LAW ENVIRONMENTAL

JOB No. 11-1564

CONTRACT No. DACW41-89-D-0124

SPECIFICATIONS
FOR
INTERIM REMOVAL ACTION DESIGNS
AT
GRIFFISS AIR FORCE BASE
ROME, NEW YORK

PREPARED FOR

U.S. ARMY CORPS OF ENGINEERS
KANSAS CITY DISTRICT

PREPARED BY

LAW ENVIRONMENTAL, INC.
GOVERNMENT SERVICES BRANCH

AUGUST 1992

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GRIFFISS AIR FORCE BASE
ROME, NEW YORK

DIVISION 1 - GENERAL REQUIREMENTS

BIDDING SCHEDULE

GRIFFISS AIR FORCE BASE
ROME, NEW YORK

BID ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNITS	UNIT COST	AMOUNT
0001	Building 101 Site, Building 110 Site, and Building 112 Site: All work complete, including mobilization and demobilization, not otherwise covered under the items listed.	1	Lump Sum	NA	$_____
0002	Building 110 Site: Pipeline Liquids Removal and Disposal	2,070	Gallons	$_____/gal	$_____
0003	Building 101 Site, Building 110 Site, and Building 112 Site: Disposal of hazardous waste and tank sludges.	475	Tons	$_____/ton	$_____
0004	Building 101 Site, Building 110 Site, and Building 112 Site: Disposal of non-hazardous contaminated soils, tank sludges and waste.	1,749	Tons	$_____/ton	$_____
0005	Building 101 Site, Building 110 Site, and Building 112 Site: Additional excavation to access the removal of non-contaminated and contaminated soils as directed by the Contracting Officer.	475	Cubic Yards	$_____/C.Y.	$_____

TOTAL BID AMOUNT $_____

SECTION 01000

GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 **SUMMARY: (Not Applicable)**

1.2 **WORK SCHEDULE:** Working hours will normally be between the hours of 0730 and 1700 excluding Saturdays, Sundays, and Federal holidays. If the contractor desires to work during periods other than above, additional government forces may be required. The Contractor must make his/her request in writing to the Contracting Officer four days in advance of his/her intention to work during other periods to allow assignment of government forces. If such force is reasonably available, the Contracting Officer may authorize the Contractor to perform work during periods other than normal duty hours/days. However, if government forces are required to perform in excess of their normal duty hour/days solely for the benefit of the contractor, the actual cost at overtime rates will be charged to the Contractor. These adjustments to the contract price may be made periodically as directed by the Contracting Officer.

PART 2 - PRODUCTS

(NOT APPLICABLE)

PART 3 - EXECUTION

(NOT APPLICABLE)

END OF SECTION

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY:

1.1.1 This Section is intended to provide a summary of the various elements of work, and describe their relationship to each other. This summary should be read in conjunction with other specifically referenced sections, and with the Contract Drawings. This section does not provide the technical detail of the referenced sections for particular work activities, but describes the work as a whole, providing an overall perspective to the separate tasks and their interrelationships. This Section shall be used in conjunction with all other sections to establish the total requirements of the work.

1.1.2 IRP Site ST-06 (Building 101 Site): The work at this site consists primarily of removing one 12,000-gallon underground storage tank that previously contained plating wastes, its associated man-way, and all associated tank contents and appurtenances. Currently, the tank lies buried in backfill and is supported on a concrete support slab below grade. It is in close proximity to the exterior foundation wall of Building 101. A shoring and bracing system must be installed to support the adjacent foundation wall of Building 101. A dewatering and ground-water transfer system is to be designed and installed by the Contractor. The concrete slab under the tank is to be removed and disposed. Soils surrounding the tank shall be excavated to the minimum extent necessary to remove the tank and support slab, sampled, segregated and stockpiled; the excavated soils and concrete tank foundation shall be sampled and analyzed to determine if they are contaminated due to leakage. The listing code at this site is F007 for cyanide from a plating bath although other hazardous constituents are also present. Contaminated soils shall be properly disposed. The tank, its contents, and the tank's foundations are to be removed and disposed. Appurtenances shall be removed within the excavation and capped at the excavation limits. The remaining native, in-situ soils are to be sampled and analyzed to confirm a clean tank closure. The excavation is to be backfilled and compacted and the excavation bracing system is to be removed. A new subbase course and concrete pavement is to cover the excavated area. All areas disturbed are to be restored.

1.1.3 IRP Site ST-36 (Building 110 Site): The work at this site consists primarily of removing four 25,000-gallon underground fuel tanks, their associated tank contents and appurtenances. In addition, a small one-story building (Building 110) must be removed in its entirety. Within this building are two 500-gallon oil-water separating tanks that must be removed. Soils surrounding all tanks shall be excavated to the minimum extent necessary to remove the tank and support slab, sampled, and segregated into petroleum contaminated and non-contaminated stockpiles. The concrete tank foundations shall be sampled and analyzed to determine if they are contaminated due to leakage. The soils shall be sampled and analyzed to determine if they may be used as backfill. A dewatering and ground-water transfer system is to be designed and installed by the Contractor. The tanks, their contents, and the tank foundations are to be removed and disposed. The remaining native, in-situ soils are to be sampled and analyzed to confirm a clean tank closure. 5700 linear feet of fuel transfer pipeline is to be cleaned and closed in-place. Ancillary structures along the pipeline to be removed include: manholes, block valves and vents, a truck fill stand, a filter pit, and a portion of the pipeline crossing a small creek, as shown on the drawings. All excavated areas are to be backfilled and compacted. The Building 110 site and truck-fill stand area are to be topsoiled and seeded.

1.1.4 **IRP Site SS-08 (Building 112 Site):** The work at this site consists primarily of removing three 500-gallon underground storage tanks that previously contained solvents, their associated tank contents and appurtenances. Currently the tanks lie beneath a concrete pavement and may be supported on a concrete slab below grade. The concrete pavement shall be removed. Soils surrounding the tanks shall be excavated to the minimum extent necessary to remove the tank and support slab, sampled, segregated, and stockpiled. The excavated soils and concrete tank foundation (if present) shall be sampled and analyzed to determine if they are contaminated. The listing code at this site is F001 for spent halogenated solvents. Contaminated soils shall be properly disposed. The tanks, their contents, and the tank foundations are to be removed and disposed. The concrete tank foundations shall be sampled and analyzed to determine if they are contaminated due to leakage. The remaining native, in-situ soils are to be sampled and analyzed to confirm a clean tank closure. The excavation is to be backfilled and compacted with suitable fill. The site is to be repaved with asphalt. All areas disturbed are to be restored.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.1 CONTRACTOR:

3.1.1 The Contractor is advised that the work will be performed on two hazardous waste sites (Building 101 Site and Building 112 Site) as identified on the National Priorities List. This listing was established pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and the National Contingency Plan. The Contractor is responsible for developing a Site Safety and Health Plan (SSHP) for his operations. SECTION: SAFETY, HEALTH AND ACCIDENT PREVENTION establishes the minimum requirements for development of the Contractor's SSHP. The Contractor shall implement this plan taking precautions necessary to protect the public and work force personnel from potential hazards. The Contractor shall utilize personnel with approved hazardous waste training (refer to SECTION: SAFETY, HEALTH AND ACCIDENT PREVENTION for training requirements).

3.1.2 The Contractor shall be responsible for excavating, containing, treating, disposing and/or handling aqueous and nonaqueous waste liquids, waste deposits, contaminated material, site soil, sediments, and other materials which may be hazardous, or non-hazardous but contaminated, as specified in this Contract. For each element of work and for the total of all work under this contract, additional work may be required if additional material must be handled. This additional work will be approved and paid for at the contract price not to exceed the 15 percent limit specified in the variation in Estimated Quantity Contract Clause (FAR 52.212-11).

3.1.3 Dewatering operating procedures and other techniques necessary to accomplish the work shall not interfere with the operation of any public or private water supply wells.

3.1.4 For any work performed in close proximity to structures, pavements, utilities or other facilities, the Contractor shall utilize every precaution to protect the property, utility lines, trees, walls and other structures from damage. Any damage that the Contractor may inflict shall be repaired or replaced in a prompt manner as directed by the Contracting Officer at no expense to the government.

3.1.5 The Contractor shall take all measures required to minimize adverse impacts from execution of the work on structures and utilities adjacent to the site and shall not interfere with their operations.

3.1.6 The Contractor shall meet all the safety and health requirements as listed in SECTION: SAFETY, HEALTH AND ACCIDENT PREVENTION of this specification.

3.2 OTHER REQUIREMENTS:

3.2.1 The Contractor shall be responsible for contacting utility companies and agencies concerning information regarding underground utilities, hookups, structures and other facilities they may own or operate which may be encountered in the execution of the work. It is the responsibility of the Contractor to notify owners and operators of underground utilities when construction, excavation, demolition or other work may affect such facilities.

3.2.2 The Contractor is responsible for using special care and/or special considerations which may be necessary for proper execution of the work, but which may not be identified in this subsection. The Contractor shall comply with the entire requirements of the Contract Documents and shall exercise special care wherever required for proper execution of the intended work of his contract.

3.2.3 The Contractor shall be responsible for obtaining all required construction permits and approvals.

END OF SECTION

SECTION 01020

SITE DESCRIPTION

PART 1 - GENERAL

1.1 SUMMARY: This section includes summary information concerning the background of the site and the remediation project. This section contains a brief description of the site in terms of site location and features, topography, and hydrogeological regime and a history of the site including both past disposal and remedial activities. The nature and extent of contamination is briefly summarized.

1.2 SITE LOCATION: Griffiss Air Force Base (GAFB) is located in the lowlands of the Mohawk River Valley in Oneida County, approximately 2 miles northeast of Rome, New York. Approximately 4,500 permanent military personnel are assigned to the base, and 3,000 civilians are employed at GAFB. The base consists of approximately 3,900 contiguous acres at an average elevation of 504 feet, NGVD (National Geodetic Vertical Datum). The base is bordered by small towns and rural areas.

1.3 SITE HISTORY: GAFB is organized with the 416th Wing as the host unit under the supervision of the Air Combat Command. Construction of GAFB, previously named Rome Air Depot, began on August 2, 1931, with the base becoming operational by February 1, 1942. On September 20, 1948, the depot was renamed in honor of Lieutenant Colonel Townsend E. Griffiss. The mission of the base has changed many times over the years. The U.S. Air Force (USAF), in performing its primary mission of national defense, has frequently engaged in operations that deal with toxic and hazardous materials which have been located in various places at GAFB.

1.4 SOIL AND HYDROGEOLOGICAL CHARACTERISTICS: Installation geology consists of relatively flat-lying, well-drained granular glacial and alluvial sediments occurring in thin to moderate thicknesses, overlying bedrock. The unconsolidated sediments form the most significant aquifers; however, ground water may occur at relatively shallow depths under unconfined conditions, locally. Soil boring logs and particle grain size distributions from the Building 101 Site are attached to the end of this section.

1.5 SURFACE WATERS: The Mohawk River borders the base to the west and south. The New York State Barge Canal lies to the south and receives surface water from the drainage basins of Six Mile and Three Mile Creeks. In and around the creeks are several state-designated wetlands. The relatively flat topography and abundant precipitation received yearly at GAFB designates this area as a ground-water recharge zone.

1.6 SITE FEATURES:

1.6.1 Building 101 Site currently serves as a metals processing facility, its previous major function being a plating shop. Located south of Building #101 is an existing 12,000-gallon fiberglass reinforced polyester underground holding tank. This UST, known as "Yellow Submarine," formerly held plating process related wastes which are considered to be a listed hazardous waste (F007). No information is available concerning tank tightness. Monitoring well no. 101 is located at this site. Analyses of ground water collected from this well are provided at the end of this section in Tables I and II. The test boring record from monitoring well 101 is appended to the end of this section.

1.6.2 Building 110 Site served as a fuel and water separation station along the fuel distribution system. The Jet Fuel Transfer Pipline consists of a steel pipe network which previously provided JP-4 to various areas of the flight line and aircraft parking aprons. The Building #110 Site includes four

25,000-gallon USTs and Tank Manhead pits located south of Building #110. Monitoring well No. 110 is located at this site. Analyses of ground water collected from this well are provided at the end of this section in Table III. The test boring record from monitoring well No. 110 is appended to the end of this section. A separate 4-inch vitrified pipeline network to be removed connects the tank's manhead pits with an oil interceptor. Two 500-gallon tanks are located in the Basement of Building #110. The portion of the Jet Fuel Transfer Pipeline to be cleaned and closed in place considered under this scope of work extends from Building #110 to a valve box in the general vicinity of Building 752, Ski Chalet, a distance of approximately 5700 linear feet.

1.6.3 Building 112 Site is the site of three USTs to be removed. Little data is available concerning these tanks. GAFB officials have previously taken measurements and estimate the three USTs to be approximately 500-gallon capacity each. Two of the tanks are currently filled with water, the middle tank is filled with sand. The water filling these tanks is contaminated with various solvents which are considered to be a listed hazardous waste (F002). It is believed that past contents in addition to solvents were probably JP-4 or AVGAS. Building #112 has previously been used as an engine test cell and research facility (Rome Labs).

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

(Not Applicable)

END OF SECTION

Table I.

Analysis: Total Dissolved Metals

	101 MW - 1	101 MW - 101
Nickel, Dissolved	<0.04	<0.04
Cadmium, Dissolved	<0.01	<0.01
Chromium, Dissolved	<0.02	<0.02
Silver, Dissolved	<0.01	<0.01
Lead, Dissolved, By GFAA, mg/L	<0.005	<0.005

Analysis: Total Metals in Liquid

	101 MW - 1	101 MW - 101
Cadmium	<0.01	<0.01
Chromium	<0.130	0.118
Lead by GFAA	0.098	0.090
Nickel	<0.04	<0.04
Silver	<0.01	<0.01

Analysis: Total Cyanide (distillation), mg/L

	101 MW - 1	101 MW - 101
Total Cyanide	0.01	<0.01

TABLE II. Volatile Organics By GCMS - Method 8240 Units: µg/L

	101MW-101	101MW-1	TB-603	Blank
Acrolein	<50	<50	<50	<50
Acrylonitrile	<50	<50	<50	<50
Benzene	<5	<5	<5	<5
Bromoform (tribromomethane)	<5	<5	<5	<5
Carbon Tetrachloride (Tetrachloromethane)	<5	<5	<5	<5
Chlorobenzene	<5	<5	<5	<5
Chlorodibromomethane (Dibromochloromethane)	<5	<5	<5	<5
Chloroethane	<10	<10	<10	<10
2 - Chloroethylvinyl Ether	<5	<5	<5	<5
Chloroform (Trichloromethane)	<5	<5	<5	<5
Dichlorobromomethane (Bromodichloromethane)	<5	<5	<5	<5
1,1 - Dichloroethane	<5	<5	<5	<5
1,2 - Dichloroethane	<5	<5	<5	<5
1,1 - Dichloroethylene (1,1 - Dichloroethene)	<5	<5	<5	<5
1,2 - Dichloropropane	<5	<5	<5	<5
1,3 - Dichloropropylene (1,3 - dichloropropene)	<5	<5	<5	<5
Ethylbenzene	<5	<5	<5	<5
Methyl bromide (bromomethane)	<10	<10	<10	<10
Methyl chloride (chloromethane)	<10	<10	<10	<10
Methylene chloride (dichloromethane)	2.1JB	<5	1.7JB	3.7J
1,1,2,2 - Tetrachloroethane	<5	<5	<5	<5
Tetrachloroethylene (Tetrachloroethene)	48	56	<5	<5
Toluene	1.3JB	1.4JB	1.4B	1.6J
1,1,1 - Trichloroethane	<5	<5	<5	<5
1,1,2 - Trichloroethane	<5	<5	<5	<5
Trichloroethylene (Trichloroethene)	31	36	<5	<5
Vinyl chloride (Chloroethylene: Chloroethene)	<10	<10	<10	<10
1,2 - Dichloroethene (Total)	3.9JB	4.1JB	<5	<5

Recovery Data	QC Limits				
1,2 - Dichloroethane - D - 4	70-121%	81	78	79	79
Toluene - D8	81-117%	105	103	103	107
4 - Bromofluorobenzene	75-121%	101	99	98	100

J = Concentration estimated
B = Blank

Table III.

Building Site 110: Ground-Water Sample Analyses

	110 MW - 1	110 MW - 101
Total Lead	0.0105 mg/L	0.0084 mg/L
Total Copper	0.031 mg/L	ND
Naphthalene	9J µg/L	7J µg/L
Phenanthrene	11 µg/L	10 µg/L
Methylene chloride	1.9J µg/L	1.8J µg/L
Acetone	5.1 µg/L	14 µg/L
Benzene	1.4J µg/L	2.6J µg/L
Toluene	2.4J µg/L	3.3J µg/L
Ethylbenzene	8.4 µg/L	9.5 µg/L
Xylenes	14 µg/L	14 µg/L

TYPE II MONITORING WELL INSTALLATION DIAGRAM

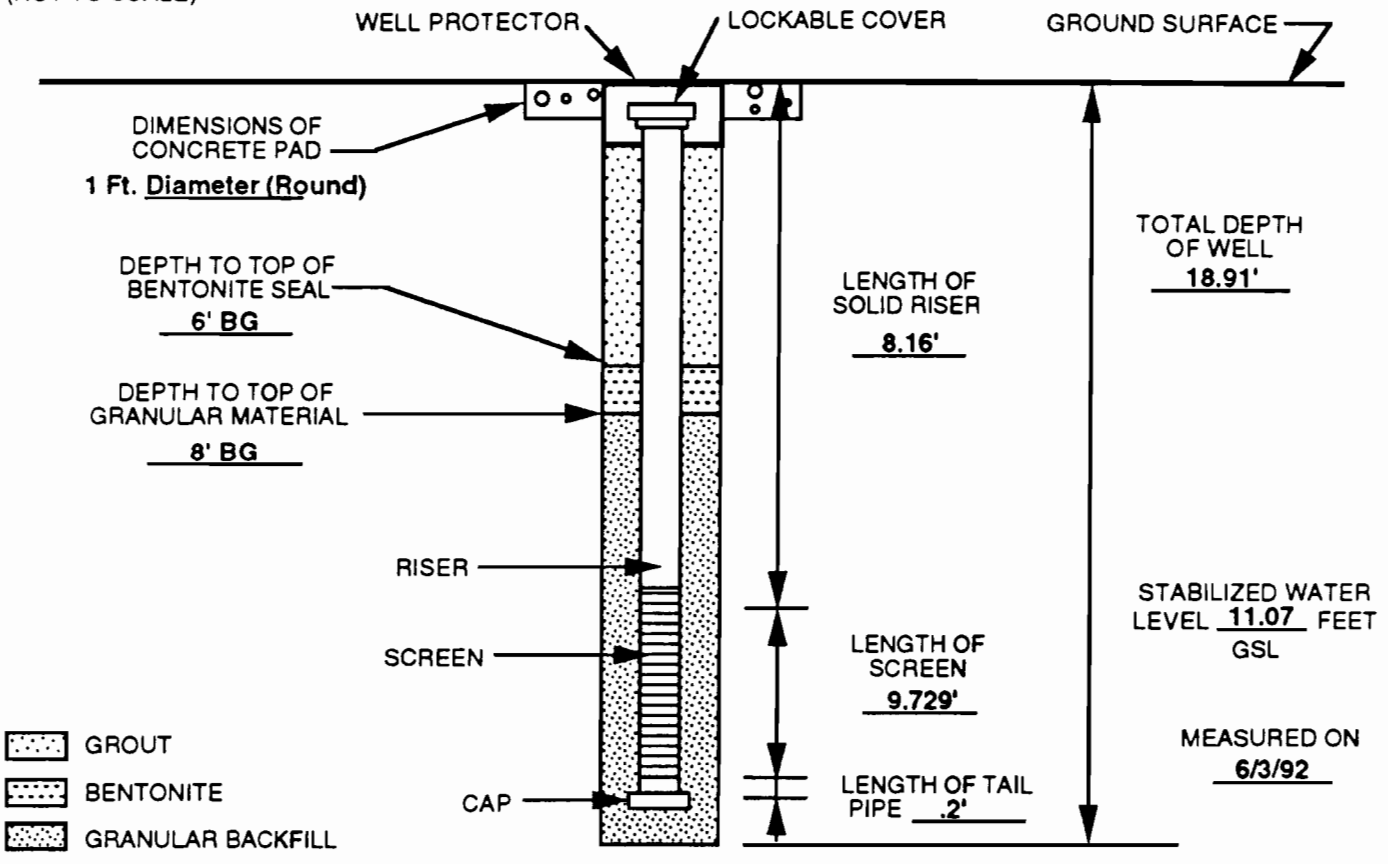
LAW ENVIRONMENTAL, INC.
GOVERNMENT SERVICES DIVISION
KENNESAW, GEORGIA

JOB NAME: GRIFFISS AFB
WELL NO.: MW-101-1 JOB NO.: 11-1564
DATE: 6-1-92 TIME: 1:40
WELL LOCATION: SOUTH OF BLDG. 101

GROUND SURFACE ELEVATION: 471.3
TOP OF SCREEN ELEVATION: 462.32
REFERENCE POINT ELEVATION: ~470.48
TYPE SAND PACK: 0 GRADATION: Uniform
SAND PACK MANUFACTURER: Morey
SCREEN MATERIAL: PVC
MANUFACTURER: Dietrick
RISER MATERIAL: PVC
MANUFACTURER: Dietrick
RISER DIAMETER: 2"
DRILLING TECHNIQUE: H.S.A
AUGER SIZE AND TYPE: 4 1/4" I.D., Acker
STRATUM (feet):

BENTONITE TYPE: 3/4" Pellets
MANUFACTURER: Entire Plug
CEMENT TYPE: Type II
MANUFACTURER: Lehigh Co.
BOREHOLE DIAMETER: 8"
SCREEN DIAMETER: 2" SLOT SIZE: 1010
LAW ENVIRONMENTAL, INC. FIELD REPRESENTATIVE: Anthony D. Murtaugh
DRILLING CONTRACTOR: Parratt Wolff
AMOUNT BENTONITE USED: 1 Bucket
AMOUNT CEMENT USED: 3 Bags
AMOUNT SAND USED: 2 Bags
STATIC WATER DEPTH (after dev.): 11.07 BMP

(NOT TO SCALE)



QA / QC

INSTALLED BY: Parratt Wolff INSTALLATION OBSERVED BY: A. Murtaugh
DISCREPANCIES:

HF

LAW ENVIRONMENTAL, INC.
GOVERNMENT SERVICES DIVISION

TEST BORING RECORD

BORING NUMBER SB-101-1
JOB NUMBER 11-1564
DATE STARTED 6/2/92
DATE COMPLETED 6/2/92
DRILLED BY PARRATT WOLFF
LOGGED BY ANTHONY D. MURTAUGH
CHECKED BY TOM RICHARDSON

REMARKS:

Boring performed using hollow-stem augers
* 3" diameter (I.D.) split spoon

ELEV. IN FEET	DEPTH IN FEET	DESCRIPTION	MONITORING WELL CONSTRUCTION	SYM-BOLS	LAB TESTS	SPT N VALUE
471.3		Loose, brown medium and fine sand, some coarse sand and fine coarse gravel, trace silt, dry SM				7
						21
						14
461.3	10.0					11*
		Loose, brown medium-coarse sand, trace silt and fine sand, few medium-large gravel, moist, wet SP-SM			GS	14
457.3	14.0					
456.3	15.0	Firm, well rounded medium-very large gravel with sand, wet GP				19
		Loose brown fine-coarse sand and gravel, wet SM				22
452.8	19.0					10*
451.8	20.0	Firm fine gravel and coarse sand, wet SP-GP				
		Firm brown medium and fine sand, trace silt, wet SP-SM			GS	14
						79
	25.0					23
445.3		BORING TERMINATED @26'				
	30.0					

1564.74

LAW ENVIRONMENTAL, INC.
GOVERNMENT SERVICES DIVISION

TEST BORING RECORD

BORING NUMBER MW-101-1
JOB NUMBER 11-1564
DATE STARTED 6/1/92
DATE COMPLETED 6/1/92
DRILLED BY PARRATT WOLFF
LOGGED BY ANTHONY D. MURTAUGH
CHECKED BY TOM RICHARDSON

REMARKS:

Boring performed using hollow-stem augers;
See Well Installation Diagram for details fo well installation.

ELEV. IN FEET	DEPTH IN FEET	DESCRIPTION	SYM-BOLS	SPT N VALUE
471.3				
		Firm brown silty fine-medium sand, well rounded gravel, dry	SM	11
				13
465.3	6.0			7
		Loose brown fine-med. sand with med-large gravel trace silt, SM, moist @ 10', wet @ 12'	SM	7
	12.5			6
				11
				5
455.3	16.0			
454.3	17.0	Firm, brown coarse sand, some med. sand and fine-med. gravel, trace silt, wet	SM	20
				16
		Firm, brown fine-med sand, some fine gravel, wet	SM-SP	17
449.3	22.0			
		BORING TERMINATED @22'		

1564.74

LAW ENVIRONMENTAL, INC.
300 CHASTAIN CNTR BLVD, SUITE 315
KENNESAW, GEORGIA 30144
404·425·7879

PARTICLE SIZE DISTRIBUTION & PHYSICAL PROPERTIES

CLIENT _____

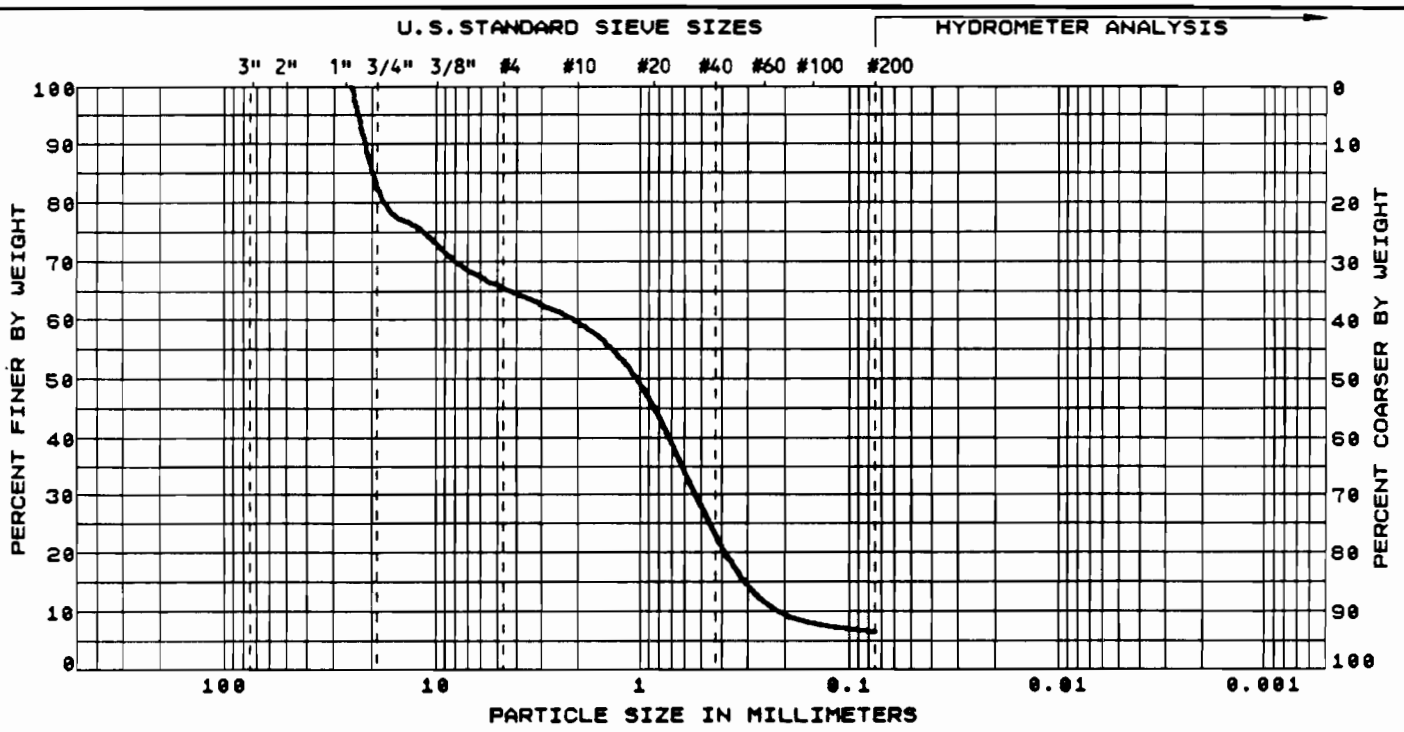
JOB NO. 11-1564 DATE June 18, 1992

LAB NO. 02408 PAGE 1

PROJECT Griffis AFB IRAD

CLIENT JOB NO./PO# _____

SAMPLE ID SB-1 S-4 Bldg 10110-12'



COBBLES	GRAVEL		SAND			SILT & CLAY
	COARSE	FINE	CO.	MEDIUM	FINE	

U.S. STANDARD SIEVE SIZE		*PERCENT PASSING		HYDROMETER
SIEVE NO.	SIEVE SIZE (MILLIMETERS)			PARTICLE DIAMETER (MILLIMETERS)
3"	75			0.050
2"	50			0.020
1-1/2"	37.5			0.005
1"	25	100.0		0.002
3/4"	19	82.7		0.001
1/2"	12.5	76.0		
3/8"	9.5	72.3	*REMARKS: TABULATED HYDROMETER VALUES ARE COMPUTER INTERPOLATED FROM A LINEAR DATA PLOT. PLOTTED VALUES MAY BE MORE ACCURATE FOR THE 0.050 mm PARTICLE DIAMETER.	
No.4	4.75	65.5		
No.10	2.00	59.6		
No.20	0.850	45.1		
No.40	0.425	22.5		
No.60	0.250	11.5		
No.100	0.150	8.0		
No.200	0.075	6.4		
			TESTED BY: JM HJ MO	

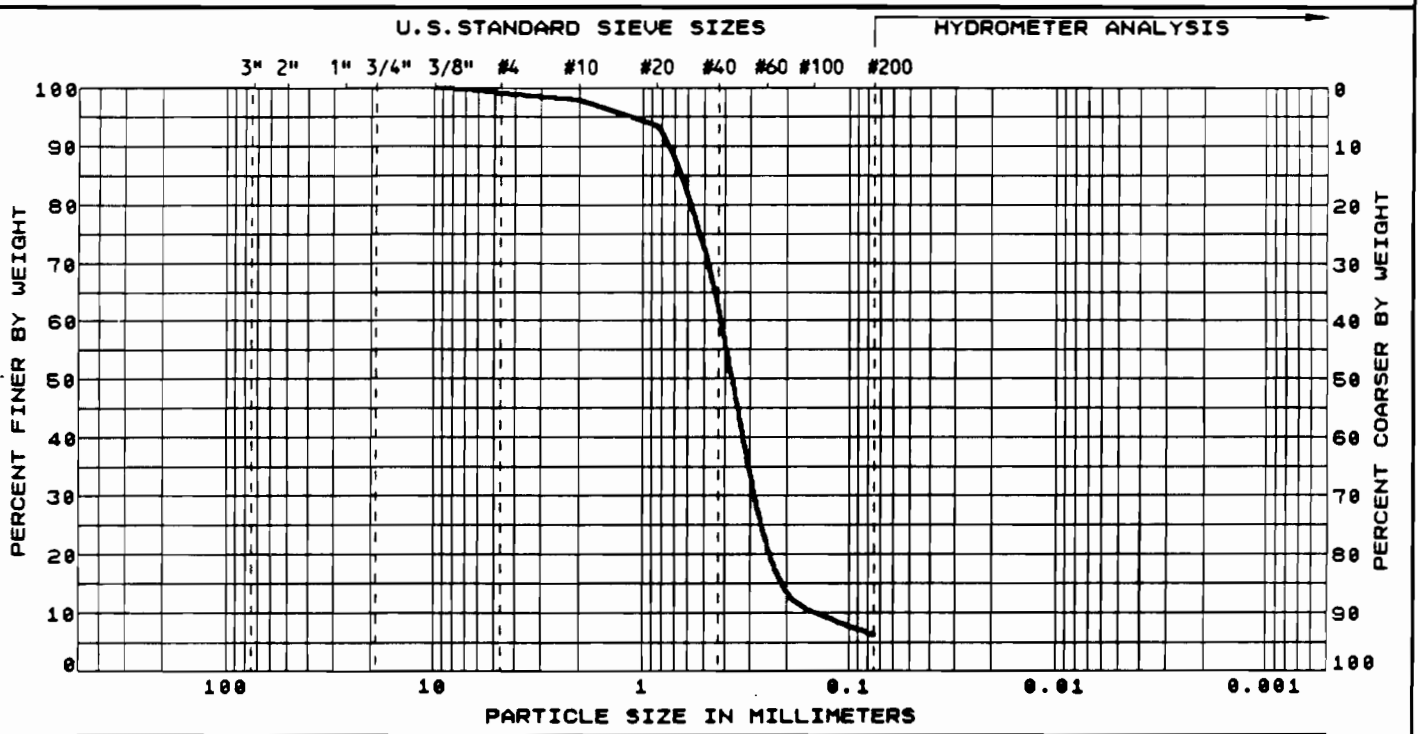
TOTAL POROSITY (%) _____
EFFECTIVE SIZE (mm) _____
COEFFICIENT OF UNIFORMITY 10.55
COEFFICIENT OF CURVATURE 0.67
LIQUID LIMIT NP
PLASTIC LIMIT NP
PLASTICITY INDEX NP
CLASSIFICATION POORLY GRADED SAND with SILT and GRAVEL (SP-SM)
WATER CONTENT (%) _____
DRY DENSITY (PCF) _____
SPECIFIC GRAVITY OF SOLIDS _____
HYDRAULIC CONDUCTIVITY (cm/sec - 20C) _____
TEST PROCEDURES: ASTM D422.

LAW ENVIRONMENTAL, INC.
M. A. O'Kelley

LAW ENVIRONMENTAL, INC.
300 CHASTAIN CNTR BLVD, SUITE 315
KENNESAW, GEORGIA 30144
404-425-7879

PARTICLE SIZE DISTRIBUTION & PHYSICAL PROPERTIES

CLIENT _____
JOB NO. 11-1564 DATE June 18, 1992
LAB NO. 02409 PAGE 2
PROJECT Griffis AFB IRAD
CLIENT JOB NO./PO# _____
SAMPLE ID SB-1 S-9 Bldg 10120-22'



COBBLES	GRAVEL		SAND			SILT & CLAY
	COARSE	FINE	CO.	MEDIUM	FINE	

U.S. STANDARD SIEVE SIZE		*PERCENT PASSING		HYDROMETER
SIEVE NO.	SIEVE SIZE (MILLIMETERS)			PARTICLE DIAMETER (MILLIMETERS)
3"	75			0.050
2"	50			0.020
1-1/2"	37.5			0.005
1"	25			0.002
3/4"	19			0.001
1/2"	12.5			
3/8"	9.5	100.0	*REMARKS: TABULATED HYDROMETER VALUES ARE COMPUTER INTERPOLATED FROM A LINEAR DATA PLOT. PLOTTED VALUES MAY BE MORE ACCURATE FOR THE 0.050 mm PARTICLE DIAMETER.	
No.4	4.75	99.1		
No.10	2.00	98.0		
No.20	0.850	93.6		
No.40	0.425	60.6		
No.60	0.250	21.2		
No.100	0.150	10.2		
No.200	0.075	6.2		
			TESTED BY: JM HJ MO	

TOTAL POROSITY (%) _____
EFFECTIVE SIZE (mm) _____
COEFFICIENT OF UNIFORMITY 2.93
COEFFICIENT OF CURVATURE 1.30
LIQUID LIMIT NP
PLASTIC LIMIT NP
PLASTICITY INDEX NP
CLASSIFICATION POORLY GRADED SAND with SILT (SP-SM)
WATER CONTENT (%) _____
DRY DENSITY (PCF) _____
SPECIFIC GRAVITY OF SOLIDS _____
HYDRAULIC CONDUCTIVITY (cm/sec - 20C) _____
TEST PROCEDURES: ASTM D422.

LAW ENVIRONMENTAL, INC.
M.A. O'Kelley

LAW ENVIRONMENTAL, INC.
GOVERNMENT SERVICES DIVISION

TEST BORING RECORD

BORING NUMBER BLDG 110 MW-01
JOB NUMBER 11-1654
DATE STARTED 7/24/92
DATE COMPLETED 7/24/92
DRILLED BY PARRATT WOLFF
LOGGED BY ANTHONY D. MURTAUGH
CHECKED BY

REMARKS:

ELEV. IN FEET	DEPTH IN FEET	DESCRIPTION		MONITORING WELL CONSTRUCTION	SYM-BOLS	LAB TESTS	SPT N VALUE
	2						
	4	Firm Brown with gray SILT: Fine sand, fine coarse gravel; trace med sand, trace CL; fill, moist	SM		ML-SM		19
	6						4
			SM				2
	8		SM-SP				5
	10	Very Loose - Loose, brown-gray; Fine-med sand with medium coarse gravel; light coarse sand, light silt; fill, wet			SM		11
	12						11
	14						1564.75

LAW ENVIRONMENTAL, INC.
GOVERNMENT SERVICES DIVISION

TEST BORING RECORD

BORING NUMBER BLDG 110 MW-01
JOB NUMBER 11-1654
DATE STARTED 7/24/92
DATE COMPLETED 7/24/92
DRILLED BY PARRATT WOLFF
LOGGED BY ANTHONY D. MURTAUGH
CHECKED BY

REMARKS:

ELEV. IN FEET	DEPTH IN FEET	DESCRIPTION	MONITORING WELL CONSTRUCTION	SYM-BOLS	LAB TESTS	SPT N VALUE
						4
	16	Loose brown med-coarse w. srt, w. round SAND; some gravel, trace SILT; wet, Native @ 16'		SW		4
	18					11
	19.5					
	20.0	Firm, tight light tan-brown SILT and fine sand, angular gravel poorly srt (sandy till?)		ML		24
	22.0	BORING TERMINATED @ 22.0'				
						1564.75

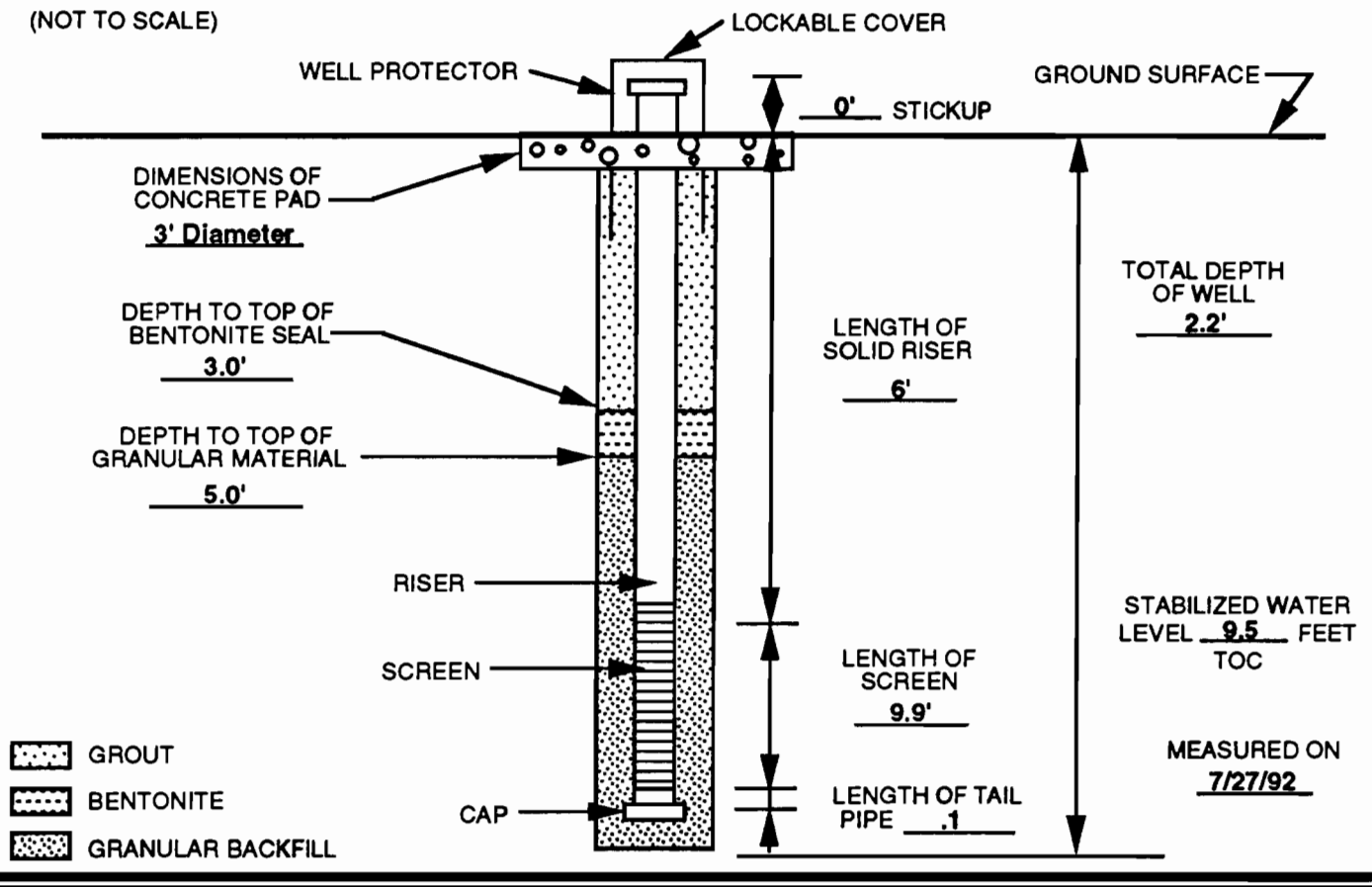
TYPE II MONITORING WELL INSTALLATION DIAGRAM

LAW ENVIRONMENTAL, INC.
GOVERNMENT SERVICES DIVISION
KENNESAW, GEORGIA

JOB NAME GAFB Interim Removal Action Design
WELL NO. Bldg. 110 MW-1 JOB NO. 11-1564
DATE 7/24/92 TIME
WELL LOCATION SW of BLDG. 110

GROUND SURFACE ELEVATION
TOP OF SCREEN ELEVATION
REFERENCE POINT ELEVATION
TYPE SAND PACK #0 GRADATION
SAND PACK MANUFACTURER Morey
SCREEN MATERIAL PVC
MANUFACTURER Dietrick
RISER MATERIAL PVC
MANUFACTURER Dietrick
RISER DIAMETER 2"
DRILLING TECHNIQUE 4 1/2 HSA
AUGER SIZE AND TYPE
STRATUM (feet)

BENTONITE TYPE Hole Plug
MANUFACTURER Envir. Seal
CEMENT TYPE Lehigh Portland Type II
MANUFACTURER
BOREHOLE DIAMETER 8"
SCREEN DIAMETER 2" SLOT SIZE .010
LAW ENVIRONMENTAL, INC. FIELD REPRESENTATIVE A. Murtaugh
DRILLING CONTRACTOR Parratt-Wolff
AMOUNT BENTONITE USED 1 Bag
AMOUNT CEMENT USED 2 Bags
AMOUNT SAND USED 3 Bags
STATIC WATER DEPTH (after dev.) 9.5'



QA / QC

INSTALLED BY: Parratt-Wolff INSTALLATION OBSERVED BY: A. Murtaugh
DISCREPANCIES:

1564.75

SECTION 01021

CONTRACTOR USE OF SITE

PART 1 - GENERAL

1.1 SCOPE: This section covers the Contractor's rights and responsibilities with respect to the use of the Project Site.

1.2 GENERAL REQUIREMENTS:

1.2.1 Written approval of the Contractor Quality Control Plan; the Chemical Data Acquisition Plan; Site Safety and Health Plan, and Plans of Operations specified herein are required in accordance with the SPECIAL CLAUSE titled: "Commencement, Prosecution, and Completion of Work," prior to allowing work at the site. Only upon approval by the Contracting Officer will the Contractor have access to the whole of the site, except for areas approved by the Contracting Officer for mobilization purposes.

1.2.2 No construction activity will be permitted until required submittals, if applicable, for that activity have been approved by the Contracting Officer as provided in the individual sections of these specifications.

1.2.3 The Contractor shall limit onsite operations to the portion of the site designated on the Drawings as "Limits of Contractor Work Area."

1.2.3.1 Other areas are not to be used by the Contractor unless authorized by the Contracting Officer in writing.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.1 EXECUTION: The Contractor shall assume full responsibility for the health and safety of all onsite personnel and the protection of all equipment and materials.

END OF SECTION

SECTION 01022

DEFINITIONS, CODES AND ABBREVIATIONS

PART 1 - GENERAL

1.1 SUMMARY:

1.1.1 This section lists and defines items, abbreviations, codes, terms, and symbols used in the Contract Documents.

1.1.2 Abbreviations may be similar but have different meanings. If clarification is required, the Contracting Officer should be consulted.

1.2 DEFINITIONS:

1.2.1 Bid drawings: Issued for Bid Drawings with all amendments.

1.2.2 Contract drawings: Issued for Construction Drawings and any revision thereafter.

1.3 CODES AND STANDARDS:

AASHO or AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association
AIA	American Institute of Architects
AIHA	American Industrial Hygiene Association
AIEE	American Institute of Electrical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron & Steel Institute
ANSI	American National Standards Institute (formerly ASA)
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
CIPRA	Cast Iron Pipe Research Association
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standard
DRMO	Government's Defense Reuse and Marketing Office
DQOs	Data Quality Objectives
EPA	United States Environmental Protection Agency
ETL	Electrical Testing Laboratories, Inc.
IEEE	Institute of Electrical and Electronics Engineers
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NEIC	National Enforcement Investigation Center
NIOSH	National Institute for Occupational Safety and Health
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NPDES	National Pollutant Discharge Elimination System
NFPA	National Fire Protection Association
NSC	National Safety Council
NYSDEC	New York State Department of Environmental Conservation
PCI	Prestressed Concrete Institute
PS	Product Standard
OSHA	United States Occupational Safety and Health Administration
SPCC	Base Spill Prevention Contingency and Countermeasures

	Plan
UL	Underwriters Laboratories, Inc.
USACE	United States Army Corps of Engineers
WPCF	Water Pollution Control Federation

1.4 TERMS:

Government EPA	U.S. Environmental Protection Agency.
Contracting Office (CO)	Any person assigned such responsibility and authority by the USACE as specified in the Contract documents.
Contract	All project work covered by the Contract documents including General Conditions, Technical Specifications (Division 1 through 16 as applicable) and all the drawings.
Contracting Officer Representative (COR)	Representative of the Contracting Officer
NTP	Notice to Proceed
State	State of New York

1.5 ABBREVIATIONS:

A.C. (AC)	alternating current
AWG	American or Brown and Sharpe Wire Gauge
NPT	American National Taper Pipe Treads
Amp, A or a.	amperes
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CIP	cast iron pipe
CISP	cast iron soil pipe
cu.	cubic
C.F.	cubic feet
C.Y.	cubic yards
°C	degrees Centigrade
°F	degrees Fahrenheit
D.C.	direct current
Dwg.	drawing
eff.	efficiency
el. or elev.	elevation
EPA	United States Environmental Protection Agency
ft.	feet
FOP	Field Operations Plan
gal.	gallons
GPD or gpd	gallons per day
GPM or gpm	gallons per minute
galv.	galvanized
ga.	gauge
HDPE	High Density Polyethylene
HP	horsepower
HASP	Health and Safety Plan
HSO	Health and Safety Officer
I.D.	inside diameter
inv.	invert
KW or kw	kilowatts
KW-hr.	kilowatt-hours
L	length

lin.	linear
L.F.	linear feet
MH	manhole
max.	maximum
m.	meters
mg	milligrams
mg/l	milligrams per liter
mm	millimeters
min.	minutes or minimum
NPL	National Priorities List
N.T.S.	not to scale
O.D.	outside diameter
ppm	parts per million
%	percent
PCE	perchloroethylene
PVC	polyvinyl chloride or polyvinyl chloride pipe
P.C. conc.	Portland cement concrete
lbs.	pounds
PPD	pounds per day
plf	pounds per linear foot
psi, psig	pounds per square inch gauge (above atmospheric pressure)
psf	pounds per square foot
POHC	principal organic hazardous constituent
PIC	product of incomplete combustion
RCRA	Resource Conservation and Recovery Act
REM	Remedial Engineering Management
SARA	Superfund Amendments and Reauthorization Act of 1986
sch.	schedule
sec.	secondary or seconds
sq.	square
S.F.	square feet
S.Y.	square yards
std.	standard
Stl. W.G.	U.S. Steel Wire, Washburn and Moer, American Steel and Wire Co., or Roebling Gauge
TCE	trichloroethylene
TDH	total dynamic head
TSD	treatment, storage, and disposal
TVO	total volatile organics
typ.	typical
USACE	United States Army Corps of Engineers
USS Gauge	United States Standard Gauge
V or v	volts
V	volume
VHO	volatile halogenated organics
VOC	volatile organic compounds
W or w	watts
w/	with
yd.	yards
125-lb standard	American Standard for Cast Iron Pipe Flanges and Flanged Fittings, Class 125

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

(Not Applicable)

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 **SUMMARY:** This section covers the methods and procedures which will be used to measure the Contractor's work and to provide payment to the Contractor for work performance. Payments will be made to the Contractor based on the quantities of work as measured in accordance with the specified methods of measurement and the prices stipulated as shown on the Bidding Schedule. This method of payment will constitute complete compensation for all work shown on the drawings and provided in the specifications or other contract documents, and for all costs of accepting the general risks, liabilities and shall include, but not be limited to, compensation for overhead, profit, materials and services, and performing all work required to accomplish and complete the work specified under each item and all other work required.

1.2 **LUMP SUM ITEMS:**

1.2.1 **General:** All lump sum items on the bidding schedule include, but are not limited to: performance and payment bonds; site preparation; site management controls; preparation, implementation and updating of all special project procedures; dust, vapor and odor control, spill control, traffic control, decontamination, and environmental protection; sampling and laboratory analyses of excavated and native in-situ soils; dewatering, treatment and disposal of water; disposal of uncontaminated wastes; project record documents; construction scheduling; site maintenance restoration and cleanup; safety equipment, clothing, monitoring and reporting; surveying; site security; site controls, inspections, and all management supervisory, and specialized personnel; and all other work complete.

1.2.2 **The quantities** of work performed under lump sum items will not be measured except for the purpose of determining reasonable interim payments.

1.2.3 **Interim payments** will be made in accordance with the estimated value of work done as determined by the Contracting Officer or as specified in this section and in accordance with CONTRACT CLAUSE titled: "Payments Under Fixed-Price Construction Contracts."

1.3 **UNIT PRICE ITEMS:**

1.3.1 **General:** All unit price items on the bidding schedule include, but are not limited to: performance and payment bonds; site preparation; site management controls; implementation and updating of all special project procedures; dust, vapor and odor control; spill control; traffic control; decontamination, and environmental protection; sampling and laboratory analyses of off-site borrow fill; project record documents; scheduling; safety equipment, clothing, monitoring and reporting; surveying; site controls; inspections; and all management supervisory, and specialized personnel.

1.3.2 **Payments** will be made for unit price items in accordance with the measurement methods set forth in this section or, where specified payment limits are unclear, as determined reasonable by the Contracting Officer, at the unit prices entered in the Bidding Schedule.

1.3.3 **Interim measurements and/or payments** may be adjusted to account for partially completed work.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.1 ALL OTHER WORK COMPLETE (BID ITEM NO. 0001):

3.1.1 Work shall include, but not be limited to, mobilization, installation and removal of temporary safety fencing; removal and reinstallation or disposal of existing chain-link fencing; removal and disposal of concrete paving; replacement of concrete paving; installation and removal of excavation shoring; Jet Fuel Transfer Pipeline cleaning and removal of above-ground appurtenances; dewatering; sampling, analysis, transportation, and disposal of collected ground water; sampling and analysis of tank contents; removal, transportation, and disposal of tank contents with the exception of tank sludges; inerting, cleaning, and removal of underground storage tanks, oil-water separating tanks, and fuel tank; removal of concrete tank foundations, and all associated piping and appurtenances; the minimum excavation necessary to remove the tanks and tank foundations; soil handling; sampling and analysis of excavated soils; confirmatory sampling and analysis of remaining in-situ soils; demolition of building 110 and site structures indicated on the drawings to be removed; backfilling and compaction of excavated soils suitable for backfill; backfill and compaction of borrow fill required to fill voids left by tanks and concrete foundations; transportation and disposal of all non-contaminated debris; topsoiling; seeding; installation of subbase and asphalt paving; demobilization and all other work complete.

3.1.2 Payment will be on a lump sum basis.

3.2 JET FUEL TRANSFER PIPELINE LIQUIDS REMOVAL TRANSPORTATION AND DISPOSAL (BID ITEM NO. 0002):

3.2.1 Work shall include, but not be limited to, removal, storage, transportation, and disposal of all Jet Fuel Transfer Pipeline liquid contents and liquid pipeline contents contained within the 4-inch vitrified pipe between the existing oil interceptor and the manheads of the tanks at Building Site 110.

3.2.2 Measurement will be made in gallons of the residues drained from Aqua-System piping.

3.2.3 Payment for the quantity determined above will be made at the unit price per gallon in the Bidding Schedule for Item 0002.

3.3 LOADING, TRANSPORTATION, AND DISPOSAL OF HAZARDOUS WASTE; REPLACEMENT WITH AND COMPACTION OF OFF-SITE BORROW MATERIAL (BID ITEM NO. 0003):

3.3.1 Work shall include, but not be limited to, disposal of hazardous soil, tank sludges, and concrete; replacement with and compaction of off-site borrow material.

3.3.2 Measurement will be made by weight (tons) of hazardous soils, sludges, and debris disposed of at an approved RCRA permitted hazardous waste TSD facility. Determination of the weight (tons) will be based on the differential between the weight of the fully loaded truck and the weight of the truck after removal of the load. Weight measurements shall be taken on scales at the approved RCRA facility. Scales shall be tested, approved, and sealed by an inspector of the State Inspection Bureau.

3.3.3 Payment for the quantity determined above will be made at the unit price per ton in the Bidding Schedule for Item 0003.

3.4 LOADING, TRANSPORTATION AND DISPOSAL OF NON-HAZARDOUS CONTAMINATED SOILS, TANK SLUDGES, AND WASTE; REPLACEMENT WITH AND COMPACTION OF OFF-SITE BORROW MATERIAL (BID ITEM NO. 0004):

3.4.1 Work shall include, but not be limited to, disposal of non-hazardous contaminated soil, tank sludges, and waste; replacement with and compaction of off-site borrow material.

3.4.2 Measurement will be made by weight (tons) of non-hazardous contaminated soils, tank sludges, and waste disposed of at an approved landfill. Determination of the weight (tons) will be based on the differential between the weight of the fully loaded truck and the weight of the truck after removal of the load. Weight measurements shall be taken on scales at the approved facility. Scales shall be tested, approved, and sealed by an inspector of the State Inspection Bureau.

3.4.3 Payment for the quantity determined above will be made at the unit price per ton in the Bidding Schedule for Item 0004.

3.5 EXCAVATION OF ADDITIONAL SOILS (INCLUDES SAMPLING AND ANALYSIS OF IN-SITU SOILS) (BID ITEM NO. 0005):

3.5.1 Work shall include, but not be limited to, excavation of additional soils in order to access the removal of non-contaminated and contaminated soils as directed by the Contracting Officer; and sampling and analysis of in-situ soils.

3.5.2 Measurement of excavation, backfilling, and compaction of additional soils shall be by surveyed cross-section for the neat line lower limit as well as for the upper limit of the fill after compaction and grading. Average-end area method shall be used to determine cubic yardage, as measured by the Contractor and as determined and approved by the Contracting Officer.

3.5.3 Payment for the quantity determined above will be made at the unit price per cubic yard in the Bidding Schedule for the Item 0005.

END OF SECTION

SECTION 01050

FIELD ENGINEERING

PART 1 - GENERAL

1.1 SUMMARY:

1.1.1 The Contractor shall provide all materials, items, operations or methods specified, listed or scheduled on the design drawings or specifications, including all materials, labor, equipment and incidentals necessary and required to conduct proper surveys required to stake and layout the work.

1.1.2 The Contracting Officer will identify site reference points and baselines as shown on the drawings.

1.1.3 The Contractor shall perform surveys for measurement and payment of completed work.

1.1.4 The Contractor shall provide a Field Change Request procedure for documentation and approval of any and all changes to the design affected by the Contractor, irrespective of cause, prior to or during construction.

1.2 QUALITY CONTROL: All survey, layout and related work shall be performed and signed by a qualified Land Surveyor registered in the State of New York.

1.3 SUBMITTALS:

1.3.1 Prior to start of any survey work, the Contractor shall submit name, address, telephone number and qualifications of the Surveyor, crew chief, superintendent and all other persons who are proposed to perform surveys or survey related duties to the Contracting Officer for approval. Upon request by the Contracting Officer, the Contractor shall submit documentation verifying accuracy of survey work.

1.3.2 The Contractor shall submit a certificate signed by the Surveyor, certifying that elevations and locations of site constructed features and depths of excavation are in conformance, or nonconformance, with Contract Documents. Any nonconformance shall be documented by a Field Change Request form (see paragraph 1.3.4 below) and subject to review and acceptance by the Contracting Officer prior to final disposition (i.e., payment, corrective actions, etc.).

1.3.3 The Contractor shall submit a detailed Field Change Request procedure and forms that he intends to use to document changes and nonconformances for the Contracting Officer's review and approval prior to start of construction.

1.3.4 Upon start of construction, the Contractor shall submit a Field Change Request form documenting any and all changes, nonconformances and deviations from the design and/or specifications for review and approval by the Contracting Officer.

1.3.5 The Contractor shall submit to the Contracting Officer for review and approval within 14 days after completion of survey a final survey report, including all original field notes and supporting calculations.

1.4 PROJECT RECORD DOCUMENTS:

1.4.1 The Contractor shall maintain on site a complete, accurate log of control of survey work as it progresses.

1.4.2 Upon completion of the work, the Contractor shall submit Record Documents to the Contracting Officer under the provisions of SECTION 01720: PROJECT RECORD DOCUMENTS.

PART 2 - PRODUCTS

2.1 GENERAL:

2.1.1 All control surveys for elevation shall be ±.01 feet and for horizontal, control angles shall be to the nearest twenty (20) seconds ±10 seconds and measured distances shall be to ±.01 feet. All measurement surveys for elevation shall be to the nearest 0.1 feet ±0.05 feet and for horizontal distances shall be to ±0.1 feet.

2.2 MATERIALS:

2.2.1 The Contractor shall provide all materials as required to properly perform the surveys, including, but not limited to, instruments, tapes, rods, measures, mounts and tripods, stakes and hubs, nails, ribbons, other reference markers, and all else as required. All material shall be of good professional quality and in first-class condition.

2.2.2 All electronic distance meters (EDM), theodolite, and other survey instruments shall be calibrated and maintained in accurate calibration throughout the execution of the work. Calibration certificates shall be submitted to the Contracting Officer prior to the use of any instrument.

PART 3 - EXECUTION

3.1 GENERAL: The Contractor shall exercise extreme care during the execution of all phases of the work to minimize any disturbance to existing property and to the landscape in the areas surrounding the work site.

3.2 INSPECTION: The Contractor shall verify with the Contracting Officer locations of site reference and survey control points prior to starting work. The Contractor shall promptly notify the Contracting Officer of any discrepancies discovered. The Contractor shall also verify layouts periodically during construction.

3.3 SURVEY REFERENCE POINTS:

3.3.1 Contractor shall protect survey control points prior to starting site work and preserve permanent reference points during construction. The Contractor shall not relocate site reference points without prior written approval from the Contracting Officer.

3.3.2 The Contractor shall promptly report to the Contracting Officer the loss, damage, or destruction of any reference point or relocation required because of changes in grades or other reasons. The Contractor shall replace dislocated survey control points based on original survey control at no additional cost to the Government. Replacement of dislocated survey control points shall be done by a licensed Land Surveyor approved by the Contracting Officer.

3.4 SURVEY REQUIREMENTS:

3.4.1 The Contractor shall reference survey and site reference points to

the provided control monuments and record locations of survey control points, with horizontal and vertical data, on Project Record Documents.

3.4.2 The Contractor shall establish lines and levels and shall locate and lay out by instrumentation and similar appropriate means, site features to be constructed including necessary stakes for cut, fill, placement, and grading operations and stakes for utility locations, slopes, and invert elevations. When necessary to remove a grade marker for construction operations, the grade lines shall be maintained parallel with the trench extending also at least three grade markers.

3.4.3 The Contractor shall, with his own forces, obtain working or construction lines or grades as needed.

3.4.4 The Contractor shall furnish all materials and accessories (i.e., grade markers, stakes, pins, spikes, etc.) required for the proper location of grade points and line.

3.4.5 All marks given shall be carefully preserved and, if destroyed or removed without the Contracting Officer's approval, they shall be reset, if necessary, at the Contractor's expense.

3.4.6 The cost to the Contractor of all work and delays occasioned by giving lines and grades, or making other necessary measurements, will be considered as having been included in the unit and lump sum prices for items of work.

3.4.7 All work not done with the methods and equipment as submitted by the Contractor and approved by the Contracting Officer shall be removed and replaced by the Contractor at his own expense unless instructed otherwise by the Contracting Officer.

3.4.8 It shall be the duty of the Contractor to keep the Contracting Officer informed of the times and places at which he intends to work in order that the Contracting Officer may have an ample opportunity to furnish and/or to check the lines and elevations with a minimum of inconvenience to the Contracting Officer or delay to the Contractor.

3.5 SURVEYS FOR MEASUREMENT AND PAYMENT:

3.5.1 The Contractor shall perform surveys, in a manner acceptable to the Contracting Officer, to determine quantities of unit cost work and percent of completed lump sum work including surveys to establish measurement reference lines and shall notify the Contracting Officer prior to starting work.

3.5.2 The Contractor's field superintendent shall sign Surveyor's field notes or shall keep duplicate field notes and shall calculate and certify quantities for payment purposes.

END OF SECTION

SECTION 01060

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY:

1.1.1 This section covers the regulatory requirements applicable to the work.

1.1.2 The Contractor shall conduct all work involved in the task of this project in accordance with the appropriate Federal, State, and local regulations and laws.

1.1.3 The Contractor shall be responsible to prepare and obtain all required permits for all work involved in this project.

1.1.4 The Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA or Superfund), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), shall be the controlling legislation in the performance of this contract.

1.1.5 The Contractor shall be totally and exclusively responsible for obtaining data, maintaining records, and preparing all reports and submissions required to satisfy the regulatory requirements. All reports and submissions documents shall be submitted to the Contracting Officer for review and approval.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.1 REGULATORY REQUIREMENTS: The latest versions and revisions of the following regulations shall be considered by the Contractor as the minimum requirements for conducting the work involved. The Contractor shall be responsible for evaluating and implementing all procedures as identified within these regulations as well as other appropriate regulations and laws to conduct and complete the intended work of the contract.

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) STANDARDS AND REGULATIONS, CODE OF FEDERAL REGULATIONS:

29 CFR 1910	Occupational Safety and Health Standards; General Industry
29 CFR 1910.120	Occupational Safety and Health Standards; Hazardous Waste and Emergency Response
29 CFR 1910.134	Occupational Safety and Health Standards; Respiratory Protection
1910.1000 thru 1910.1048	Occupational Safety and Health Standards; Air Contaminants - Permissible Exposure Limits
29 CFR 1910.1200	Occupational Safety and Health Standards; Hazard Communication

29 CFR 1910.1028	Occupational Safety and Health Standards; Air Contaminants - Benzene
29 CFR 1926	Occupational Safety and Health Standards; Construction Industry

CODE OF FEDERAL REGULATIONS

40 CFR 50	National Primary and Secondary Air Quality Standards
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264.251 (f)	RCRA, Protection from Wind
40 CFR 265	Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 266	Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 280 Subpart F	Release response and Corrective Action for UST Systems Containing Petroleum or Hazardous Substances
Subpart G	Out-of-service UST systems and closure
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 423 Subpart D	Area Runoff Subcategory

CODE OF FEDERAL REGULATIONS - TRANSPORTATION
SUBCHAPTER B - HAZARDOUS MATERIALS TRANSPORTATION AND PIPELINE SAFETY

49 CFR 106	Rulemaking Procedures
49 CFR 107	Hazardous Materials Program Procedures

CODE OF FEDERAL REGULATIONS - TRANSPORTATION
SUBCHAPTER C - HAZARDOUS MATERIALS REGULATIONS

49 CFR 171	Hazardous Materials Regulations; General Information, Regulations, and Definitions

49 CFR 172	Hazardous Materials Tables and Hazardous Materials, Communications Regulations
49 CFR 173	Shippers - General Requirements for Shipments and Packaging
49 CFR 177	Carriage by Public Highway
49 CFR 178	Shipping Container Specifications

Section 402 of the Federal Water Pollution Act - Amendments 1972

NATIONAL FIRE PROTECTION ASSOCIATION

327	Standard Procedure for Cleaning or Safeguarding Small Tanks and Containers

AMERICAN PETROLEUM INSTITUTE (API)

API Publ 2015	(Jan 1991; 4th Ed) Cleaning Petroleum Storage Tanks
API Publ 2217	(Jun 1984; 1st Ed) Guidelines for Confined Space Work in the Petroleum Industry
API Publ 2217A	(Nov 1987; 1st Ed) Guidelines for Work in Inert Confined Spaces in the Petroleum Industry
API Publ 2219	(Sep 1986; 1st Ed) Safe Operation of Vacuum Trucks in Petroleum Service
API RP 1604	(Dec 1987; 2nd Ed) Removal and Disposal of Used Underground Petroleum Storage Tanks
API Publ 1628	(Aug 1989; 2nd Ed) A Guide to the Assessment and Remediation of Underground Petroleum Storage Tanks
API RP 2003	(Mar 1991) Protection Against Ignitions Arising Out of Static, Lightening and Stray Currents

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC)

6NYCRR Part 613	(December 27, 1985) Handling and Storage of Petroleum
SPOTS 14	(May 15, 1991) Site Assessments at Bulk Storage Facilities
	(January 20, 1987; July 19, 1988) Permanent Closure of Petroleum Storage Tanks

3.2 PERMITS: The Contractor shall be responsible for preparing all required permits to execute the work in accordance with the Federal, state and local requirements. The Contractor shall be responsible for alerting the proper state and local agencies as to the nature and timing of activities which will be occurring at the job work site. The Contractor shall perform all tests and submit reports, if required, to satisfy regulatory agencies that the work is being performed in conformance with the required permits.

3.3 OFF-SITE TREATMENT/DISPOSAL: Regulations pertaining to the off-site disposal of hazardous wastes regulation shall include, but not necessarily be limited to, the following:

3.3.1 Federal Resource Conservation and Recovery Act as amended.

3.3.2 USEPA: 40 CFR 264 (48 FR 30115); 40 CFR 267 (46 FR 12429); 40 CFR 265.

3.3.3 OSHA Standards.

3.3.4 "Revised Procedures for Implementing Off-Site Response Actions," EPA OSWER Directive Number 9834.11, November 12, 1987.

3.4 TRANSPORTATION: Hazardous waste material transportation regulations shall include, but not be limited to:

3.4.1 U.S. Code of Federal Regulations, Title 49, applicable Section (Fed. Spec).

3.4.2 Federal Resource Conservation and Recovery Act as last amended.

3.4.3 Department of Transportation 49 CFR 171 through 179.

3.4.4 Department of Transportation Regulations applicable to method of transport.

3.4.5 USEPA: 40 CFR 263 (48 FR 14153).

3.4.6 OSHA Standards.

3.4.7 Posted weight limitations on roads and bridges. The Contractor shall submit complete copies of all licenses and permits for the entire route selected in the off-site transportation of waste.

END OF SECTION

SECTION 01201

PRECONSTRUCTION AND PREWORK CONFERENCES

PART 1 - GENERAL

1.1 **PRECONSTRUCTION CONFERENCE:** Prior to issuance of the Notice to Proceed, the Contractor shall meet with the Contracting Officer, or his representative for a Preconstruction Conference. The purpose of this conference is to review submittal procedures, safety, payrolls, and labor relations, environmental protection, erosion and sediment control, work plan and schedules, schedule of values and payments, and procurement of materials. The principal features of work will also be reviewed and any questions regarding the contract and work site will be addressed. Attendance by the Contractor's superintendent, quality control personnel, safety personnel, and any major subcontractor's superintendents will be required.

1.2 **PREWORK CONFERENCE:**

1.2.1 Within 20 working days after the Notice to Proceed and prior to starting onsite construction, a Prework Conference will be held between the Contracting Officer and the Contractor or his representative. Attendance by the Contractor's superintendent, quality control personnel, safety personnel, and any major subcontractor's superintendents will be required. The Contractor shall also be required to have a representative from each of his laboratories present at the Prework Conference.

1.2.2 During this meeting, the Contractor shall submit ten (10) copies of the following:

1.2.2.1 Contractor Quality Control Plan. (CQCP)
1.2.2.2 Site Safety and Health Plan. (SSHP)
1.2.2.3 Chemical Data Acquisition Plan.
1.2.2.4 Laboratory's Quality Management Plan.
1.2.2.5 Progress Chart.
1.2.2.6 Spill Prevention and Discharge Control Plan.
1.2.2.7 Security Plan.
1.2.2.8 Dust, Vapor, and Odor Control Plan.
1.2.2.9 Environmental Protection Plan.
1.2.2.10 Demolition Plan.
1.2.2.11 Underground Storage Tank Removal Work Plan.
1.2.2.12 Pipeline Cleaning and Drying Procedures.
1.2.2.13 Plan of Operations for Soil Handling, Field Sampling, Soil Storage, and Disposal.
1.2.2.14 Plan of Operation for On-Site Handling of Hazardous Waste.
1.2.2.15 Erosion Control Plan.
1.2.2.16 Procedures for collecting, storing, transporting and disposal of waste liquids, wastewater, and ground water.
1.2.2.17 Shoring Plan.

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

1.3 **SUBMITTALS:** The Contractor shall be responsible to record the minutes of conferences and include any significant proceedings and decisions. The Contractor shall reproduce and submit to the Contracting Officer within three

days after each conference three copies of the minutes of conference and shall distribute copies to each participant in the conference and to parties affected by decisions made at the conference.

PART 2 - PRODUCTS
(Not Applicable)

PART 3 - EXECUTION
(Not Applicable)

END OF SECTION

SECTION 01300

SUBMITTAL DESCRIPTIONS

PART 1 - GENERAL

1.1 GENERAL:

1.1.1 Scope of Work: The Contractor shall provide the submittals identified in each specification section for approval by the Contracting Officer.

1.1.2 Bid Submittals:

1.1.2.1 **Letters of Commitment:** The Contractor shall submit signed letters of agreement to accept the wastes from waste haulers and TSD facilities as specified in SECTION 01307: Letters of Commitment. This submission shall be made as part of the bid.

1.1.2.2 Copy of Contractor's EIL insurance policy (minimum $5 million liability for pollution caused by Contractor actions) and Contractor's latest financial statement.

1.1.3 Shop Drawings, Product Data and Samples:

1.1.3.1 **Shop Drawings:**

1.1.3.1.1 Shop drawings, as defined in the Contract Clauses, and as specified in individual work sections include but, are not necessarily limited to, fabrication and erection/installation drawings, scheduled information, setting diagrams, actual shopwork manufacturing instruction, and coordination drawings, as applicable to the work.

1.1.3.1.2 All details on shop drawings submitted for approval shall show clearly the elevations of the various parts to the main members and lines of the structure, and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the drawings before being submitted for approval.

1.1.3.2 **Product Data:** Product data include standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specification and installation instructions, manufacturer's printed statements of compliances and applicability, catalog cuts, product photographs, production or quality control inspection and test reports and certifications, and product warranties. A list of product warranties shall be provided at the end of construction with addresses and expiration dates.

1.1.3.3 **Samples:** Samples specified in individual sections include physical examples of the items to be used in the work

1.1.3.4 Product data and samples shall also include, if requested by the Contracting Officer items of disposable clothing, safety equipment, breathing apparatus, communication devices, items of equipment to be used on the site, and any other items which are required for the safety and health of all personnel on the site.

1.1.4 Contractors Responsibilities:

1.1.4.1 The Contractor shall review shop drawings, product data, and samples prior to submission to determine and verify the following:

1.1.4.1.1 Field measurements.

1.1.4.1.2 Field construction criteria.

1.1.4.1.3 Catalog numbers and similar data.

1.1.4.1.4 Conformance with the Specifications, Protocol, and Contingency Plans.

1.1.4.2 Notify the Contracting Officer in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents.

1.1.4.3 The review and approval of shop drawings, samples or catalog data by the Contracting Officer will not relieve the Contractor from his responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the Contracting Officer will have no responsibility therefore.

1.1.4.4 No portion of the work requiring a shop drawing, working drawings, sample, or catalog data shall be started nor shall any materials be fabricated, installed or used on this site prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or onsite construction accomplished which does not conform to approved shop drawings and data shall be at the Contractor's risk. The Contracting Officer will not be liable for any expense or delay due to corrections of remedies required to accomplish conformity.

1.1.4.5 Project work, materials, fabrication, and installation shall conform with approved shop drawings, working drawings, applicable samples, and catalog data.

PART 2 - PRODUCTS
(Not Applicable)

PART 3 - EXECUTION
(Not Applicable)

END OF SECTION

SECTION 01305

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 **SUMMARY:** Not Applicable.

1.2 **REFERENCES:** Not Applicable.

1.3 **SUBMITTAL CLASSIFICATION:** Submittals are classified as follows:

1.3.1 **Government approved:** Governmental approval is required for extensions of design, critical materials, deviations, shop drawings, quality control plans, the Site Safety and Health Plan, the Chemical Data Acquisition Plan, Work Plans, the Project Schedule, and other items as designated by the Contracting Officer. Within the terms of the CONTRACT CLAUSE titled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.3.2 **Information only:** All submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the CONTRACT CLAUSE referred to above.

1.4 **APPROVED SUBMITTALS:** The approval of submittals by the Contracting Officer shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the CQC requirements of this contract, is responsible for the details and satisfactory construction of all work. After submittals have been approved by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be given consideration unless accompanied by an explanation as to why a substitution is necessary.

1.5 **DISAPPROVED SUBMITTALS:** The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected submittal in the form and number of copies as specified for the initial submittal. CAUTION: The Contractor is cautioned that for each Contractor's resubmittal required beyond the initial submittal and one resubmittal for corrections required by the Contracting Officer, the Contracting Officer will assess Administrative Deduction in the amount of $500.00 from the progress payments due the Contractor. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, notice as required under the CONTRACT CLAUSE titled "Changes" shall be given promptly to the Contracting Officer.

1.6 **WITHHOLDING OF PAYMENT:** Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.1 **GENERAL:** The Contractor shall submit all items listed on the Submittal Register (ENG Form 4288) or specified in the other sections of these specifications. The Contracting Officer may request submittals in addition to those listed when deemed necessary to adequately describe the work covered in

the respective sections. Units of weights and measures used on all submittals shall be the same used in the contract drawings. Submittals shall be made in the respective number of copies and to the respective addresses set forth below. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) representative and each respective transmittal form (ENG Form 4025) shall be stamped, signed, and dated by the CQC representative certifying that the accompanying submittal complies with the contract requirements. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; written Work Plans, Quality Control Plans, Health and Safety Plan, Chemical Data Acquisition Plans; certifications; warranties and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby.

3.2 **SUBMITTAL REGISTER (ENG Form 4288):** At the end of this section is one set of ENG Forms 4288 listing each item for which submittals are required by the specifications. Columns "c" thru "p" have been completed by the Government. The Contractor shall complete columns "a," "b," and "q" thru "y" and return six (6) completed copies to the Contracting Officer for approval within twenty (20) calendar days after Notice to Proceed for approval. The approved submittal register will become the scheduling document and will be used to control submittals throughout the life of the contract. This register and the progress schedules shall be coordinated.

3.3 **SCHEDULING:** Submittals covering items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of thirty (30) calendar days exclusive of mailing time) shall be allowed on the register for review and approval. No delays damages or time extensions will be allowed for time lost in late submittals.

3.4 **TRANSMITTAL FORM (ENG Form 4025):** The sample transmittal form (ENG Form 4025) attached to this section shall be used for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care will be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

3.5 **SUBMITTAL PROCEDURE:** Submittals shall be made as follows:

3.5.1 **Procedures:** The Contractor shall submit for approval five (5) copies of all submittals. The mailing address for these submittals shall be obtained at the preconstruction conference. Items not to be submitted in quintuplicate, such as samples and test cylinders, shall be submitted accompanied by five (5) copies of ENG Form 4025.

3.5.2 **Deviations:** For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

3.6 **CONTROL OF SUBMITTALS:** The Contractor shall carefully control his

procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

3.7 **GOVERNMENT APPROVED SUBMITTALS:** Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. Four (4) copies of the submittal will be retained by the Contracting Officer and one (1) copy of the submittal will be returned to the Contractor.

3.8 **INFORMATION ONLY SUBMITTALS:** Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. These submittals will be used for information purposes. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications and will not prevent the Contracting Office from requiring removal and replacement if nonconforming material is incorporated in the work. This does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or check testing by the Government in those instances where the technical specifications so prescribe.

END OF SECTION

SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01050	
TITLE AND LOCATION GRIFFISS AFB, FIELD ENGINEERING		CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	QUARANTEE	MFG DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFO ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		1.3.1	Qualifications of Surveyor, Crew									X			X									
			Chief, Superintendent																					
		1.3.2	Certificate of Elevations and					X						X										
			Locations																					
		1.3.3	Field Change Request Procedure									X			X									
		1.3.4	Field Change Request Form									X			X									
		1.3.5	Final Survey Report									X		X										
		2.2.2	Instrument Calibration Certificates					X						X										

SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01060
TITLE AND LOCATION GRIFFISS AFB, REGULATORY REQUIREMENTS	CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN-MENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		3.4.7	Copies of Haulers Licences & Permits									X		X										

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01201	
TITLE AND LOCATION GRIFFISS AFB, PRECONSTRUCTION AND PREWORK CONFERENCE		CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		1.3	Record of Meeting Minutes									X		X										

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01300	
TITLE AND LOCATION GRIFFISS AFB, SUBMITTAL DESCRIPTIONS		CONTRACTOR	CONTRACT NUMBER

				TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED	INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
		1.1.2.2	Contractor's Proof of Insurance and									X	X										
			Financial Statement																				

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01305	
TITLE AND LOCATION GRIFFISS AFB, SUBMITTAL PROCEDURES		CONTRACTOR	CONTRACT NUMBER

				TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	SHOP DWG	SAMPLE	OUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		3.2	Submittal Register									X			X									

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01307	
TITLE AND LOCATION GRIFFISS AFB, LETTERS OF COMMITMENT		CONTRACTOR	CONTRACT NUMBER

				TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED	INFORMATION ONLY	APPROVED MATERIAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
		1.4.1	Letters of Commitment from									X	X										
			Transporters																				
		1.4.2	Letters of Commitment from Disposal									X	X										
			Facilities																				
		1.4.2.2	List of Off-Site Disposal Facility									X	X										
			Permits to Operate Pertaining to																				
			Receipt of wastes from this contract																				
		1.4.3.3	List of Off-Site Disp. Fac. Authorizations									X	X										
			applied for but not yet issued																				
		1.4.2.4	Disposal Cell Drawings									X	X										
		1.4.2.5	Disposal Facility's last RCRA									X	X										
			inspection date																				
		1.4.2.6	List of all Disposal Facility's active									X	X										
			unresolved compliance orders																				

SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01320
TITLE AND LOCATION GRIFFISS AFB, PROJECT MANAGEMENT	CONTRACTOR	CONTRACT NUMBER

				TYPE OF SUBMITTAL									CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED	INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
		1.2.1	Bar Chart Project Schedule									X		X									
		1.2.6	Revised Project Schedule at									X	X										
			Each Progress Meeting																				
		1.3.1.5	Submit Minutes of Meetings									X	X										

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01340	
TITLE AND LOCATION GRIFFISS AFB, PHOTOGRAPHS		CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFO ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		3.1.1.1	Photos videotape and Slides Prior to Work									X		X										
		3.1.1.2	Photos videotape and Slides During Work									X		X										

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01400	
TITLE AND LOCATION GRIFFISS AFB, CONTRACTOR QUALITY CONTROL		CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
				SHOP DWG	SAMPLE	GUARANTEE	MFG DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFO ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN-MENT	CODE	DATE	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		1.4	Contractor Quality Control Plan									X			X									
		3.1.4	Daily Construction Quality									X		X										
			Control Reports																					

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01430	
TITLE AND LOCATION GRIFFISS AFB, CHEMICAL DATA QUALITY MANAGEMENT		CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST	REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED	INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN-MENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
		1.4.1.1, 1.6.1	Chemical Data Acquisition Plan									X		X									
		1.4.1.2	Laboratory Quality Management Plan									X		X									
		1.4.2.1, 1.6.2	Daily Quality Control Reports									X	X										
		1.4.2.2, 1.6.3	Quality Control Summary Report									X	X										
		1.4.2.3, 1.6.4	Chemical Data Reports									X	X										
		1.4.2.4, 1.6.5	Summary Chemical Data Report									X	X										

SUBMITTAL REGISTER	CATEGORY	SPECIFICATION SECTION
	I	01460

TITLE AND LOCATION	CONTRACTOR	CONTRACT NUMBER
GRIFFISS AFB, HEALTH, SAFETY, AND ACCIDENT PREVENTION		

				TYPE OF SUBMITTAL										CLASSI-FICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	SHOP DWG	SAMPLE	OUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFG ONLY RMATION	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN-MENT	CODE	DATE	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		1.4.1.1.1,3.1.4	Site Safety and Health Plan									X			X									
		1.4.1.1.2	Certification, Resume of									X			X									
			Qualifications, and Experience of																					
			Health and Safety Manager																					

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01460	
TITLE AND LOCATION GRIFFISS AFB, HEALTH, SAFETY AND ACCIDENT PREVENTION		CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		1.4.2.1.1	Resumes and Experience of Site									X			X									
			Safety and Health Officer																					
		1.4.2.1.2	Plans for Temporary Decon Area									X			X									
		1.4.2.2.1	Proof of Employee Respirator																					
			Fit-Testing for each Employee									X		X										
		1.4.2.2.2	Grade D Breathing Air Certification					X						X										
		1.4.2.2.3	Proof of Employee Medical Exam and																					
			Respirator Certification					X						X										
		1.4.2.2.4	Proof of 40-Hr OSHA Training					X						X										
		1.4.2.2.5	Example of Confined Space Entry									X		X										
			Permit																					
		3.1.2.2	Proof of 8-Hr OSHA Supervisor's																					
			Course for Site Safety and Health																					
			Officer					X						X										

SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01460 cont'd
TITLE AND LOCATION GRIFFISS AFB, HEALTH, SAFETY AND ACCIDENT PREVENTION	CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFO ONLY	GOVERNMENT APPROVE REMOVAL MATERIAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		1.4.2.2.6	Example of Hot Work Permit									X		X										
		3.1.2.1.4	Name Qualifications, and Experience									X			X									
			of C.I.H.																					
		3.1.2.3	Medical Consultants Letter					X						X										
		3.19.5	Certification that all equipment and					X						X										
			materials used on-site were																					
			decontaminated before removal																					
			from site																					

SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01480	
TITLE AND LOCATION GRIFFISS AFB, DUST, VAPOR, AND ODOR CONTROL		CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		1.4.1.1	Procedures for Dust, Vapor, and									X			X									
			Odor Control																					

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01490	
TITLE AND LOCATION GRIFFISS AFB, ENVIRONMENTAL PROTECTION		CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MPOS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFO ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN-MENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		1.3.2.1	Environmental Protection Plan									X			X									
		3.1	Preconstruction Survey									X		X										

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01492	
TITLE AND LOCATION GRIFFISS AFB, EROSION AND SEDIMENT CONTROL		CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL									CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MPGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED	INFO ONLY INFORMATION	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
		1.4	Erosion Control Plan									X		X									

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01495	
TITLE AND LOCATION GRIFFISS AFB, SPILL PREVENTION AND DISCHARGE CONTROL		CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFG'S DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		1.3.2.1	Spill Prevention and Discharge									X			X									
			Control Plan																					
		1.3.3.1 &	Spill Report									X		X										
		3.2.3.1																						

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01520	
TITLE AND LOCATION GRIFFISS AFB, TEMPORARY FACILITIES		CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		1.2.1	Proposed Site Layout Drawing									X			X									

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01540	
TITLE AND LOCATION GRIFFISS AFB, SECURITY		CONTRACTOR	CONTRACT NUMBER

				TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	SHOP DWG	SAMPLE	GUARANTEE	MPOS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED	INFO ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
		1.3	Security Plan									X		X									

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01700	
TITLE AND LOCATION GRIFFISS AFB, AS-BUILT DRAWINGS	CONTRACTOR	CONTRACT NUMBER	

				TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED	INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
		1.3	Preliminary As-Built Drawings									X		X									
		1.4	Final As-Built Drawings									X		X									

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01720	
TITLE AND LOCATION GRIFFISS AFB, PROJECT RECORD DOCUMENTS		CONTRACTOR	CONTRACT NUMBER

				TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED	INFORMATION ONLY	GOVERNMENT APPROVED MATERIAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
		1.2.1.6	Manufacturer's Certificates					X					X										
		1.2.1.7.1	Emergency Response Reports									X	X										
		1.2.1.7.2	Compaction Test Records									X	X										
		1.2.1.7.3	Records of All Site Work									X	X										
		1.2.1.7.4	Chain of Custody Documents									X	X										
		1.2.1.7.6	Truck Load Tickets and Shipping									X	X										
			Papers																				
		1.2.1.7.7	Laboratory Results									X	X										

SUBMITTAL REGISTER	CATEGORY	SPECIFICATION SECTION
	II	01735

TITLE AND LOCATION	CONTRACTOR	CONTRACT NUMBER
GRIFFISS AFB, PROJECT CLOSEOUT		

				TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	SHOP DWG	SAMPLE	GUARANTEE	MFOS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED	INFO ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
		1.3.1	Tank Closure Report									X		X									
		1.3.2	As-Built Drawings									X		X									
		1.3.3	Confirmatory Testing Results									X		X									
		3.3.1.2	Notice of Substantial Completion									X	X										
		3.3.2.1	Notice of Final Completion									X		X									

SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 01780
TITLE AND LOCATION GRIFFISS AFB, UTILITY SERVICE INTERRUPTIONS	CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		1.2.1	Excavation Permit (AF Form 103)									X			X									

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SUBMITTAL REGISTER	CATEGORY	SPECIFICATION SECTION
	II	02050

TITLE AND LOCATION	CONTRACTOR	CONTRACT NUMBER
GRIFFISS AFB, DEMOLITION		

				TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	SHOP DWG	SAMPLE	GUARANTEE	MPGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED	INFO ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
		1.2.1	Demolition Plan									X		X									

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 02071	
TITLE AND LOCATION GRIFFISS AFB, UNDERGROUND STORAGE TANK REMOVAL		CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL									CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED	INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
		1.4	UST Removal Work Plan									X		X									
		3.7	Tank Closure Reports									X		X									

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 02072	
TITLE AND LOCATION GRIFFISS AFB, JET FUEL TRANSFER PIPELINE CLEANING AND CLOSURE		CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL									CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
				SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED	INFO ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
		1.3.2.1	Plan of Operations for Pipeline									X		X									
		& 3.3.1	Cleaning and Drying Procedures																				

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SUBMITTAL REGISTER	CATEGORY	SPECIFICATION SECTION	
	II	02075	
TITLE AND LOCATION	CONTRACTOR	CONTRACT NUMBER	
GRIFFISS AFB, SOIL HANDLING, STORAGE, AND DISPOSAL			

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFG'S DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED	INFO ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
		1.2.1.1	Plan of Operations for Soil Handling									X		X									
		3.4	Field Sampling, Soil Storage and																				
			Disposal																				
		1.2.2.1,	Results of Soil Analyses							X			X										
		3.3.4 & 3.6.3	Letter of Acceptance									X	X										

SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 02080	
TITLE AND LOCATION GRIFFISS AFB, LIQUID REMOVAL		CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		1.5.1.1	Procedures, Materials, Equipment									X			X									
			and Methods Proposed for the																					
			Collection, Storage, Transport, and																					
			Disposal of Waste Liquids,																					
			Wastewater, and Ground Water																					

SUBMITTAL REGISTER	CATEGORY	SPECIFICATION SECTION
	II	02085

TITLE AND LOCATION	CONTRACTOR	CONTRACT NUMBER
GRIFFISS AFB, HAZARDOUS WASTE DISPOSAL		

				TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	SHOP DWG	SAMPLE	GUARANTEE	MPOS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED	INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
		1.3.2.1	Plan of Operations for On-Site									X		X									
		& 3.2.5	Handling of Hazardous Waste																				
		1.3.3.1	Hazardous Waste Manifest Originals									X	X										
		1.3.3.2	Waste Identification Results							X			X										
		& 3.2.4.2																					

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 02221	
TITLE AND LOCATION GRIFFISS AFB, EXCAVATION AND BACKFILLING		CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MPGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFO ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN-MENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		1.3.1.1	Seed & Fertilizer Certification					X						X										
		1.3.1.2 &	Field Density Test Results							X				X										
		3.15.5.2																						
		1.3.1.3 &	Proposed Topsoil Test Results							X				X										
		2.1.2.3																						
		1.3.2.1	Temporary Shoring Plan									X			X									
		& 3.7.7																						
		1.3.2.2	Dewatering Plan									X			X									

SUBMITTAL REGISTER	CATEGORY	SPECIFICATION SECTION
	II	02223

TITLE AND LOCATION	CONTRACTOR	CONTRACT NUMBER
GRIFFISS AFB, EXCAVATION BRACING AND SHORING		

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFG DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		1.2.1.1	Shoring, Working Drawings	X											X									
		1.2.1.2	Shoring Methods, Procedures,									X			X									
			Contingency Plans																					

SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 02233	
TITLE AND LOCATION GRIFFISS AFB, GRADED-CRUSHED-AGGREGATE BASE COURSE		CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		1.4.2.1	Sieve Analyses							X					X									
		1.4.2.2	Liquid Limit and Plasticity Index							X					X									
		1.4.2.3	Density Tests							X				X										
		1.4.2.4	Soundness Test							X				X										
		1.4.2.5	Wear Test							X				X										
		1.4.3	Aggregate Source									X			X									

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SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 02551	
TITLE AND LOCATION GRIFFISS AFB, BITUMINOUS PAVING FOR ROADS, STREETS, AND OPEN STORAGE AREAS		CONTRACTOR	CONTRACT NUMBER

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL									CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWG	SAMPLE	GUARANTEE	MFGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED	INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
		1.8.1.1	Aggregate Testing Results							X				X									
		1.8.1.2	Aggregate Service Record									X	X										
		2.2.1	Samples of Materials for Mix																				
			Design (Job Mix Formula)							X				X									
		1.8.2 &1.2.1.1	Bituminous Pavement Test Results							X				X									
		3.10.1.1 &	Aggregate Gradation							X			X										
		3.10.2																					
		3.10.1.1 &	Asphalt Content							X			X										
		3.10.3																					
		3.10.1.1 &	Density							X			X										
		3.10.4																					

SUBMITTAL REGISTER	CATEGORY	SPECIFICATION SECTION
	II	02592

TITLE AND LOCATION	CONTRACTOR	CONTRACT NUMBER
GRIFFISS AFB, SEALANTS FOR SEALING JOINTS IN RIGID PAVEMENTS		

NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	TYPE OF SUBMITTAL									CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		REMARKS
				SHOP DWO	SAMPLE	OUARANTEE	MPGS DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED	INFORMATION	ONLY	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERN-MENT	CODE	DATE	
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x
		1.2.1.1	Manufacturer's Material Installation									X		X									
			Recommendations																				
		1.2.1.2	Samples of Material		X									X									
		1.3	Testing Results							X			X										

SUBMITTAL REGISTER	CATEGORY II	SPECIFICATION SECTION 02611	
TITLE AND LOCATION GRIFFISS AFB, CONCRETE PAVEMENT FOR ROADS, PARKING & STORAGE AREAS		CONTRACTOR	CONTRACT NUMBER

				TYPE OF SUBMITTAL										CLASSIFICATION		CONTRACTOR SCHEDULE DATES			CONTRACTOR ACTION			GOVERNMENT ACTION		
NAS ACTIVITY CODE	ITEM NUMBER	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF ITEM SUBMITTED	SHOP DWG	SAMPLE	QUALITY CONTROL DATA	MFG'S DATA	CERTIFICATE	TEST REPORT	TECHNICAL DATA	SOFTWARE	OTHER AS NOTED		INFORMATION ONLY	GOVERNMENT APPROVAL	SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE	SUBMIT TO GOVERNMENT	CODE	DATE	REMARKS
a	b	c	d	e	f	g	h	i	j	k	l	m		n	o	p	q	r	s	t	u	v	w	x
		1.3.3.2.1, 2.1.10	Epoxy Resin							X				X										
		1.3.3.2.2, 2.1.2	Admixtures							X				X										
		1.3.3.2.3, 2.1.6	Curing Compounds							X				X										
		1.3.3.2.4, 2.1.3	Cement							X				X										
		1.3.3.2.5, 2.1.5	Reinforcement							X				X										
		1.3.3.3.1	Mix Design and Test Results							X					X									
		1.3.3.3.2	Certified Test Results for							X					X									
			Joint Sealant																					
		1.3.3.2.9, 2.1.4	Fly Ash							X				X										
		1.3.3.2.10, 3.4.2	Compressive Strength Results							X				X										

SECTION 01307

LETTERS OF COMMITMENT

PART 1- GENERAL

1.1 **SUMMARY:** This section covers the requirements for letters of commitment from the waste haulers and from the treatment, storage and disposal (TSD) facilities.

1.2 **LETTERS OF COMMITMENT** shall be obtained by the Contractor from waste haulers and from the TSD facilities agreeing to handle and dispose any wastes. In the event that a TSD facility (such as a privately owned treatment works) is prohibited from issuing a letter of commitment without a sample of the waste, a conditional type letter will be acceptable. Such a conditional letter shall specifically state what types and quantities of waste the facility will accept.

1.3 **SUBMITTALS:** All letters of commitment shall be submitted with the bid. A copy of each letter shall be maintained in the Contractor's file.

1.4 **INFORMATION:** The following information shall be submitted with the letters of commitment:

1.4.1 Waste haulers:

1.4.1.1 Name and EPA identification number.

1.4.1.2 Address.

1.4.1.3 Name of responsible contact for the hauler.

1.4.1.4 Telephone number for the contact.

1.4.1.5 List of types and sizes of all transport vehicles and equipment to be used.

1.4.1.6 A description of proposed transportation methods and procedures for hauling waste material, including type of vehicles that will be used for each type of waste.

1.4.1.7 Any and all necessary permit authorizations for each type of waste transported.

1.4.2 TSD facilities: The Contractor shall submit the following information on the Resource Conservation and Recovery Act (RCRA) approved off-site disposal facility or facilities where he is planning to take the contaminated materials removed from the site. The information in Items 1.4.2.1 through 1.4.2.6 are required by EPA for certification of the disposal facility before award of the contract. All information shall be furnished at the Contractor's expense.

1.4.2.1 General information:

1.4.2.1.1 Facility name and EPA Identification Number
1.4.2.1.2 Facility location
1.4.2.1.3 Name of responsible contact for the facility
1.4.2.1.4 Telephone number for contact
1.4.2.1.5 Signed letter of agreement to accept waste as specified in this contract
1.4.2.1.6 Unit of measure utilized at facility for costing purposes

1.4.2.2 A listing of all permits, licenses, letters of approval, and other authorizations to operate, held by the proposed facility as they pertain to receipt and management of wastes derived from this contract.

1.4.2.3 A listing of all permits, licenses, letters of approval, and other authorizations to operate applied for the proposed facility but not yet granted or issued. Provide dates of application(s) submitted. Planned submittals shall also be noted.

1.4.2.4 The Contractor shall specify and describe the unit(s) that the proposed facility will use to manage the waste and provide dates of construction and beginning of use, if applicable. Drawings may be provided. The Contractor shall identify the capacity available in the units and the capacity reserved for the subject waste.

1.4.2.5 The Contractor shall provide the date of the proposed facility's last compliance inspection under RCRA.

1.4.2.6 List of all active (unresolved) compliance orders (or agreements), enforcement notices, or notices of violation issued to the proposed facility. State the source and nature of the cause of violation, if known. If groundwater contamination is noted, provide details of the facility's groundwater monitoring program.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

END OF SECTION

SECTION 01320

PROJECT MANAGEMENT

PART 1 - GENERAL

1.1 SCOPE: This section covers project management requirements to be performed and/or followed by the Contractor.

1.2 PROJECT SCHEDULES:

1.2.1 The Contractor shall prepare for the Contracting Officer's approval, a project schedule in the form of a bar chart showing the complete sequence of work by activity. The progress chart shall conform with contract clause titled "Schedule for Construction Contracts."

1.2.1.1 A separate horizontal bar shall be provided showing each work activity and/or operation.

1.2.1.2 The horizontal time scale shall identify the first work day of each week.

1.2.1.3 Spacing between each horizontal bar shall be provided to allow for notations and future revisions.

1.2.2 The bar chart shall show the dates for the beginning and completion of each major element of work including, but not limited to, the following:

1.2.2.1 Collection and analysis of tank contents samples.

1.2.2.2 Submittals.

1.2.2.3 Preconstruction conference.

1.2.2.4 Site survey.

1.2.2.5 Mobilization.

1.2.2.6 Utility interruption periods.

1.2.2.7 Installation and removal of temporary safety fence.

1.2.2.8 Site preparation.

1.2.2.9 Concrete pavement removal.

1.2.2.10 Shoring and bracing installation and removal.

1.2.2.11 Jet Fuel Transfer System closure.

1.2.2.12 Tank removal.

1.2.2.13 Building demolition.

1.2.2.14 Soil sampling and analysis.

1.2.2.15 Contaminated soil transportation and disposal.

1.2.2.16 Backfilling.

1.2.2.17 Tank contents disposal.

1.2.2.18 Topsoiling and seeding.

1.2.2.19 Asphalt paving.

1.2.2.20 Concrete pavement patching.

1.2.2.21 Borrow site development.

1.2.2.22 Borrow site close out.

1.2.2.23 Demobilization and project closeout.

1.2.3 The Contractor shall indicate project progress of each activity to date on the bar chart. Changes in the project progress occurring since the previous submission shall be shown on the bar chart. Changes to the bar chart shall include, but not be limited to, the following:

1.2.3.1 Major change in scope.

1.2.3.2 Activities changed or modified since previous submission.

1.2.3.3 Revised progress and completion projections for each activity.

1.2.3.4 All other identifiable changes which affect project progress.

1.2.4 The Contractor shall provide, at the time of submission, a narrative report which shall include, but not be limited to:

1.2.4.1 Problem areas, anticipated delays, and the impact on the schedule.

1.2.4.2 Corrective action recommended and its possible effect.

1.2.4.3 Effect of changes on work schedules and subcontractors.

1.2.5 The Contractor's submittal requirements for the progress bar chart are described in SECTION: SUBMITTAL PROCEDURES.

1.2.6 The Contractor shall submit a revised progress bar chart to the Contracting Officer for each regular progress meeting. Progress meetings shall be held on Friday of each week after project startup and shall continue until project completion.

1.3 PROGRESS MEETINGS:

1.3.1 The Contractor shall schedule and administer progress meetings on Friday of each week after project startup and shall continue until project completion. Additional progress meetings may be required by the Contracting Officer. The following general requirements for progress meetings shall be administered by the Contractor:

1.3.1.1 Preparation of meeting agenda.

1.3.1.2 Provide meeting location and physical arrangements.

1.3.1.3 Preside at meetings.

1.3.1.4 Record minutes of meetings.

1.3.1.5 Supply and distribute copies of meeting minutes within four calendar days after each meeting to participants in the meeting, to parties affected by decisions made at the meeting, and all other parties requested by the Contracting Officer. Submit three copies of the minutes to the Contracting Officer.

1.3.2 The Contractor shall ensure that the following attendees are notified and attend the progress meetings:

1.3.2.1 Contracting Officer or Contracting Officer's representative.

1.3.2.2 Griffiss Air Force Base Environmental Office.

1.3.2.3 Contractor's Superintendent.

1.3.2.4 Contractor's Quality Control Supervisory Personnel.

1.3.2.5 Contractor's Industrial Hygienist or Industrial Hygiene Technician/Safety Specialist.

1.3.2.6 Subcontractors as appropriate to the agenda.

1.3.2.7 Suppliers as appropriate to the agenda.

1.3.2.8 Others which may be affected by the scheduled agenda.

1.3.3 Suggested agenda for progress meetings is as follows:

1.3.3.1 Review and approval of minutes of previous meeting.

1.3.3.2 Review of work progress since previous meeting.

1.3.3.3 Field observations, problems, conflicts.

1.3.3.4 Problems which impede construction schedule.

1.3.3.5 Review of off-site delivery schedules.

1.3.3.6 Corrective measures and procedures to regain projected schedule.

1.3.3.7 Revisions to construction schedule.

1.3.3.8 Progress during succeeding work period.

1.3.3.9 Coordination of schedules.

1.3.3.10 Review submittal schedules; expedite as required.

1.3.3.11 Maintenance of quality and safety standards.

1.3.3.12 Pending changes and substitutions.

1.3.3.13 Review proposed changes for effect on construction schedule and on completion date.

1.3.3.14 Other business.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

(Not Applicable)

END OF SECTION

SECTION 01340

PHOTOGRAPHS

PART 1 - GENERAL

1.1 SCOPE: This section covers project photography to be submitted by the Contractor in order to document construction.

1.2 GENERAL REQUIREMENTS:

1.2.1 General: The documentation shall provide a complete construction record of events including progression of work, potential and actual problems and solutions, and actual conditions which may vary from contract conditions.

1.2.2 Photographs shall be taken throughout the project period of such views of facilities as approved by the Contracting Officer. Each photograph shall be processed in color prints and slides. Videotape shall be in color with commentary. Photographs and video shall be legible and of clear professional quality. A scale or object of known and stated dimensions shall be included within the frame of all subjects photographed.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.1 SUBMITTALS:

3.1.1 The Contractor shall provide 8-inch by 10-inch glossy color photographs and mounted 2-inch by 2-inch color slides of the following work tasks and areas. A minimum of four (4) individual views is required for each item as shown in parentheses:

3.1.1.1 Before the work begins:

1. Video and photos of entire site (photos 4 views).

2. Video and existing access to the site (photos 4 each).

3.1.1.2 During the project work, all major work activities at least once per week and at such intervals as necessary to provide complete documentation shall be photographed and videotaped.

The following shall be considered major activities as a guide in selecting photograph locations and video events. Four (4) photographic views of each activity shall be provided:

3.1.1.2.1 Construction of temporary facilities, utilities, soil stockpile areas, and decontamination facilities.

3.1.1.2.2 Installation of temporary safety fence.

3.1.1.2.3 Jet Fuel Transfer Pipeline cleaning.

3.1.1.2.4 Jet Fuel Transfer Pipeline manhole removal.

3.1.1.2.5 Jet Fuel Transfer Pipeline block-valve and vent removal.

3.1.1.2.6 Truck fill stand removal.

3.1.1.2.7 Tank liquid removal.

3.1.1.2.8 Shoring and bracing installation and removal.

3.1.1.2.9 Underground storage tank removal.

3.1.1.2.10 Storage tank demolition (cutting)

3.1.1.2.11 Demolition of Building 110.

3.1.1.2.12 Soil sampling.

3.1.1.2.13 Loading contaminated soil for transport.

3.1.1.2.14 Backfilling and compaction.

3.1.1.2.15 Topsoiling and seeding.

3.1.1.2.16 Concrete pavement patching.

3.1.1.2.17 Asphalt paving.

3.1.2 Two (2) 8-inch by 10-inch color prints and one (1) color slide of each view photographed shall be provided.

3.1.3 The photography and video effort shall be spaced out, as appropriate, over each activity period to provide views representative of the entire project work.

3.1.4 The prints, slides, and videotape with appropriate identification and other information as directed shall be delivered to the Contracting Officer as soon as they have been processed. Identification shall include the date of the photograph and a brief description of photograph coverage. Each photograph shall be numbered in sequence. Each photograph shall be cross referenced with a map showing the photograph number and direction arrow of the shot.

END OF SECTION

SECTION 01400

CONTRACTOR QUALITY CONTROL

PART 1 - GENERAL

1.1 SCOPE: This Section covers the responsibilities of the Contractor for quality control.

1.2 WORK INCLUDED: The contractor shall prepare and maintain a Contractor Quality Control Plan. The plan shall ensure that sufficient inspections and tests are performed on a continuing basis to enable the contractor to certify, in writing, that the work conforms to the Drawings and Specifications with respect to the quality of materials, workmanship, construction, finish, and functional performance. All qualified personnel, appropriate facilities, instruments, and testing devices necessary for quality control performance shall be furnished.

1.3 APPLICABLE PUBLICATIONS: Department of the Army, U.S. Army Corps of Engineers, Engineering and Design Chemical Data Quality Management for Hazardous Waste Remedial Activities, Regulation 1110-1-263, 1990.

1.4 CONTRACTOR QUALITY CONTROL PLAN (CQCP): The CQCP shall be submitted at the Pre-Construction Conference for approval in accordance with the requirements of the Pre-Construction and Pre-Work Conferences Section. The CQCP shall present an effective program for providing quality control during construction. The CQCP shall address, as a minimum, the items: project management responsibility; staffing; chemical data quality management; and quality control system. Ten copies of the CQCP shall be provided.

1.4.1 The Contractor shall clearly define the project management organization and responsibility for ensuring compliance with quality control protocol. The CQCP shall present the qualifications and authority of quality control personnel.

1.4.2 The Contractor's supervisory staff, to the extent qualified, may be used for quality control, and shall be supplemented as necessary by additional personnel for surveillance. Special technicians, inspectors and testing facilities shall provide the capabilities required by these specifications. The Contractor's Quality Control Officer shall be on site daily.

1.4.3 As part of the CQCP a Chemical Data Acquisition Plan (CDAP) shall be submitted. The CDQMP shall be prepared and submitted in accordance with the requirements of the Chemical Data Quality Management Section.

PART 2 - PRODUCTS

(None this Section)

PART 3 - EXECUTION

3.1 QUALITY CONTROL: The Contractor shall submit as part of the CDAP his methods to be used for performing, documenting, and enforcing quality control, including subcontractor's work.

3.1.1 A quality control system shall be established to ensure conformance of all work items including those of subcontractors.

3.1.2 Inspections and tests as specified herein shall be performed as part of the quality control system. Inspections shall be performed as needed as any particular item of work progresses to ensure compliance with requirements of these specifications.

3.1.3 The Contractor shall cease work on any item pending correction of any deficiency noted by his quality control staff or the Contracting Officer.

3.1.4 A Daily Construction Quality Control Report shall be submitted to the Contracting Officer. All inspections and testing results shall be reported daily as part of the Daily Contractor Quality Control Report in accordance with the Chemical Data Quality Management Section. The daily report shall also include a summary of any significant quality control problems and corrective actions taken. All reports shall be prepared and signed by the Contractor's Quality Control Officer.

END OF SECTION

SECTION 01430

CHEMICAL DATA QUALITY MANAGEMENT

PART 1 - GENERAL

1.1 SUMMARY:

1.1.1 Data Acquisition: Due to the nature of this project, the acquisition of chemical data will be required. Therefore, the management of the quality of the chemical data is a crucial project function. This section covers the requirements for the acquisition of chemical data whose level of quality satisfies the data quality objectives (DQOs) for the project. Protocols for sampling, maintenance of sample integrity, shipping, and chemical analysis must be developed to achieve the DQOs, as well as a documentation process to demonstrate their performance. A process for the review and acceptance of the chemical data shall be prepared and implemented. The Contractor shall use this section as guidance for all activities associated with the acquisition of chemical data.

1.1.2 Laboratory Analysis: This section also describes the minimum requirements for laboratory services to be provided in support of the field sampling and analysis program. The laboratory specification requirements presented in this section apply to analyses to be performed on tank contents, ground-water soil and concrete samples.

1.2 REFERENCES: The management of the chemical data quality shall be subject to the requirements in the publications listed below. The publications listed below form a part of this section to the extent referenced. The publications are referenced in the text by basic designation only.

1.2.1 Mandatory Guidance: Exemptions from mandatory guidance documents must be approved by the Contracting Officer. The following publications shall be considered mandatory guidance documents.

1.2.1.1 U.S. Army Corps of Engineers, Environmental Regulations ER 1110-1-263 Chemical Data Quality Management for Hazardous Waste Remedial Activities (1 October 1990). Provided in Attachment.

1.2.1.2 Contractor Chemical Data Acquisition Plan, upon review and acceptance by the Contracting Officer.

1.2.1.3 U.S. Environmental Protection Agency, Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Washington, D.C., November 1986.

1.2.1.4 U.S. Environmental Protection Agency, Methods for the Determination of Organic Compounds in Drinking Water, EPA-600/4-88/039, Cincinnati, OH, December 1988.

1.2.1.5 New York State Department of Health, "Contained - In" Criteria Guidance.

1.2.2 Recommended Guidance: Documents from which guidance is obtained for chemical data quality management activities shall be obtained from the following sources. Standard methods may be proposed by reference. Non-standard methods and modifications to standard methods shall be proposed in detail for review and acceptance by the Contracting Officer.

1.2.2.1 U.S. Environmental Protection Agency, Data Quality Objectives for Remedial Response Activities - Development Process, EPA/540/G-87/003, Washington, D.C., March 1987.

1.2.2.2 U.S. Environmental Protection Agency, Data Quality Objectives for Remedial Response Activities - Example Scenario: RI/FS Activities at a Site with Contaminated Soils and Ground Water, EPA/540/G-87/004, Washington, D.C., March 1987.

1.2.2.3 New York State Department of Environmental Conservation, Spill Prevention Operations Technology Series (No. 14) Site Assessments at Bulk Storage Facilities, Albany, New York, May 1991.

1.2.2.4 Federal Register, Volume 55, No. 126, "Hazardous Waste Management System: Identification and Listing of Hazardous Waste; Toxicity Characteristic Revisions" pp. 26986-98, Friday 29 June 1990.

1.3 GENERAL REQUIREMENTS: The Contractor shall acquire chemical data to support the data acquisition requirements of the project. In order to achieve this objective, the Contractor shall plan and execute a management process that will provide the needed data. This management process will govern the following activities:

1.3.1 Data Quality Objectives: Establishing data quality objectives (DQOs) shall be the Contractor's first data quality management activity. For each material for which chemical analysis data are required, the data requirements shall be established. For this project, samples shall be collected to determine the existence and define the extent of contamination at each site, to allow waste characterization and classification for disposal or recovery, or to determine compliance with NY State Department of Conservation regulations. Available sampling and analysis protocols shall then be evaluated to determine if they can provide the required data with sufficient accuracy. The data requirements may have to be revised should the available sampling and analysis protocols be unable to provide the necessary accuracy. Likewise, sampling and analysis protocols may have to be developed or modified to achieve the data acquisition requirements. This is an iterative process that shall be completed by the Contractor before commencement of any on-site activities.

1.3.2 Sampling: The Contractor shall establish and perform sampling procedures that will provide a representative sample of each material for which chemical analysis data are required. Sampling activities shall be considered all those activities associated with the collection of samples, sample preservation during shipment, their shipment to a laboratory for chemical analysis, and the documentation of all such activities.

1.3.3 Analysis: The analytical methodology shall be as specified herein; the Contractor shall specify the format for the data reporting. The Contractor shall choose and enter into a subcontract agreement with a USACE validated laboratory that is capable of performing the specified analytical methods.

1.3.4 Data Quality Assessment: The Contractor shall be responsible for determining if the data reports are sufficiently complete and correct to the purposes of the project. The Contractor also shall evaluate the chemical data and all associated activities with respect to the DQOs and determine whether the chemical data meet the requirements of the project. The Contractor shall also be responsible for the documentation of this process.

1.4 SUBMITTALS: In accordance with SECTION: SUBMITTAL PROCEDURES, the Contractor shall submit the following documents required by this section.

1.4.1 Category I: (For Approval)

1.4.1.1 Chemical Data Acquisition Plan (CDAP)

1.4.1.2 Laboratory Submittals: The Contractor shall submit for review and approval by the USACE Missouri River Division (MRD), the laboratory(s) formal QA/QC program and procedures (Laboratory Quality Management Plan - LQMP) as partial fulfillment of the Corps' validation requirements. QA/QC programs for all on and off-site laboratories to be utilized in this program shall be submitted to the Contracting Officer (CO) for approval prior to the start of the work.

1.4.2 Category II: (For Information Only)

1.4.2.1 Daily Quality Control Reports (DQCRs)

1.4.2.2 Quality Control Summary Report (QCSR)

1.4.2.3 Chemical Data Reports

1.4.2.4 Summary Chemical Data Report

1.5 DEFINITIONS:

1.5.1 Contractor Laboratory: The laboratory performing analysis of the field samples. This may be the Contractor's own laboratory or a laboratory retained by the Contractor.

1.5.2 Quality Assurance (QA) and Quality Control (QC) Samples: Samples analyzed for the purpose of assessing the quality of the sampling effort and of the analytical data. QA and QC samples include splits or replicates of field samples, rinsate blanks, and trip blanks.

1.5.3 Quality Control (QC) Samples: Samples analyzed by the Contractor laboratory to help the Contractor and Contractor laboratory to identify and diagnose accuracy problems related to sampling and analysis. QC samples represent approximately 10 percent of the field samples.

1.5.4 Quality Assurance (QA) Samples: Samples sent to the designated USACE QA laboratory to evaluate Contractor and Contractor laboratory performance. QA samples represent approximately 10 percent of the field samples. The Contractor shall coordinate with the designated QA laboratory not less than 5 working days before sampling to assure that the QA laboratory is alerted to receive the QA samples and process them within the time limits specified.

1.5.5 Split Samples: Samples that are collected as a single sample, homogenized, divided into two or more equal parts, and placed into separate containers. The sample shall be split in the field prior to delivery to a laboratory. Split samples may be analyzed by one laboratory (QC) or two different laboratories (QA).

1.5.6 Replicate Samples: Multiple grab samples (duplicate, triplicate, etc.), collected separately, that equally represent a medium at a given time and location. This definition includes samples taken from separate locations from a larger, unmixed or uncomposited sample. Replicate samples may be analyzed by one laboratory (QC) or two different laboratories (QA).

1.5.7 Rinsate Blank: Samples consisting of reagent water collected from a final rinse of sampling equipment after the decontamination procedure has been performed. The purpose of rinsate blanks is to determine whether the sampling equipment is causing contamination of samples.

1.5.8 Trip Blank: Containers of organic-free reagent water that are kept with the field sample containers from the time they leave the laboratory until the time they are returned to the laboratory. The purpose of trip blanks is to determine whether samples are being contaminated during transit or sample collection. Trip blanks pertain only to volatile organic analyses; therefore, the containers must contain no headspace. Only one trip blank is needed for one day's sampling and shall satisfy trip blank requirements for all matrices for that day if the volatile samples are shipped in the same cooler.

1.5.9 Performance Audit (PA) Samples: Samples whose chemical composition is known to USACE and submitted to the Contractor laboratory for analysis. These samples are to be analyzed by the Contractor laboratory at no cost to the Government and the results submitted to USACE as partial fulfillment of the Corps validation procedure. At the option of USACE, no

more than six additional PA samples may be submitted to the contract laboratory at any point during project operations.

1.5.10 Grab Sample: A discrete aliquot that is representative of one specific sample site at a specific point in time.

1.5.11 Composite Sample: A non-discrete sample composed of more than one specific aliquot collected at various sampling points at the same point in time that are mixed together in appropriate proportions.

1.6 CHEMICAL DATA QUALITY MANAGEMENT DOCUMENTS: The following documents shall be produced by the Contractor for submission, review, and acceptance by the Contracting Officer:

1.6.1 Chemical Data Acquisition Plan (CDAP): Upon acceptance by the Contracting Officer, the CDAP shall become the primary reference for the performance of all data quality management activities described in PARAGRAPH: GENERAL REQUIREMENTS. Further explanation is provided in PARAGRAPH: MANDATORY GUIDANCE. The CDAP shall, at a minimum, include a Title Page, and shall cover the below named topics:

1.6.1.1 Section 1 - Table of Contents: Prepare a serial listing and page location of the CDAP elements.

1.6.1.2 Section 2 - Project Description: Describe the work site and any unusual conditions. Give the anticipated project start and completion dates. Also include past chemical data of significance as well as an overview presentation of the multimedia sampling to be carried out in the present work effort.

1.6.1.3 Section 3 - Chemical Data Quality Objectives: Describe the general requirements of the specifications and relevant background information as it relates to the acquisition of chemical analytical data. One primary DQO during the remedial cleanup contract is to meet the requirements of the specifications of the contract. Specific numeric goals for precision, bias, and completeness shall be provided. Further information on DQO development is provided in SECTION: DATA QUALITY OBJECTIVES.

1.6.1.4 Section 4 - Contractor Project Organization and Functional Area Responsibilities: The project organization for the Contractor shall be clearly defined with a discussion of quality control responsibilities. The Contractor's Quality Assurance (QA) officer shall report to a responsible senior officer of the company (i.e., QA management shall be separated from project management). A list of all individuals shall be provided and will include QC officers for the various work components and all analytical laboratory personnel. Resumes of all non-laboratory contractor personnel listing education and experience are required, including the personnel collecting samples. List the names of field personnel that will wear monitoring equipment and the name of the contract laboratory(ies) with a brief description of location, facilities and capabilities shall be included.

1.6.1.5 Section 5 - Field Activities:

1.6.1.5.1 Field Instruments and Equipment: Describe all field screening equipment to be used and the calibration procedures. Lists of the sampling equipment, the composition of the sampling devices (stainless steel, Teflon, PVC, high-carbon steel, etc.), protocols for decontamination of the sampling devices, decontamination supplies and sample containers shall be provided.

1.6.1.5.2 Sampling Locations: Sampling locations shall be described in sufficient detail to allow their choice to be evaluated and their location by sampling personnel not familiar with the site. The reasons for the sample locations will reference the specifications or otherwise describe

the process for determining the sampling points. The Contractor shall base his sampling locations on historical information, knowledge about the behavior of the contaminant(s), and/or knowledge about the effects of the physical system on the contaminant's fate.

1.6.1.5.3 Water Samples: Containers of samples for analysis for volatile organics (VOA) shall be filled allowing no headspace and with as little disturbance of the sample as possible. Hydrochloric Acid (HCl) should be added to the VOA bottles for water samples only before filling and care should be taken not to overfill the containers. If the water is alkaline enough so that a pH of less than 2 is not achieved with the premeasured acid, more preservative will be added. Testing to determine how much acid is required will be performed on a separate aliquot of sample. VOA vials will be filled first. Subsequently, the containers for other parameters will be filled approximately 7/8 full. Appropriate preservatives will be added and the effectiveness of the preservation shall be tested. Details of sampling, sample preservation, and sample handling shall be specified in the Chemical Data Acquisition Plan.

1.6.1.5.4 Split and Replicate Soil Samples: Split and replicated soil samples will have the volatile organic samples removed first with as little mixing as possible. The remaining soil shall be placed in a clean stainless steel bowl and mixed thoroughly with stainless steel implements, then divided among the sample containers to be filled and properly handled.

1.6.1.5.5 Field Documentation: The system for identifying and tracking the samples shall be described, and shall include the recording of field data to the proper samples. Indicate the method to be used to identify which contractor laboratory sample is split with which Government QA sample as well as identifying what samples which are duplicates and what samples are associated with a trip blank or other QC or QA blank. All field documentation shall be done in indelible ink. Daily Quality Control Reports shall be prepared daily, dated, signed by the site manager, and sent to the Government. Examples of the chain-of-custody sheet and label(s) will be included. Details for implementing the requirements of Appendix F of the ER 1110-1-263, dated 1 October 1990, for labeling, packing, shipping, etc. will be given.

1.6.1.5.6 Quality Control and Quality Assurance Field Samples: According to the specifications and your internal QC procedures indicate the type and number of QC and QA samples and blank samples you plan to take and where the samples will be sent. Also, the contractor shall coordinate with the designated Government QA laboratory to insure the laboratory is alerted to receive the QA samples and process them within the time limits specified by applicable EPA regulations and guidelines.

1.6.1.6 Section 6 - Sample Chain of Custody and Transportation: This section includes sample labeling, packing, transportation, and chain of custody procedures as outlined in ER 1110-1-263, Appendix F.

1.6.1.7 Section 7 - Laboratory Analytical Procedures: This section contains specific procedural details, including references to one of the following (a) EPA SW-846 method, (b) another EPA method, (c) ASTM method, (d) NIOSH method (for air analysis), (e) another accepted published method (with a description of any deviations where applicable), or (g) complete description of the procedure. A table including matrix, sample preparation method, analytical method, analytes, and laboratory reporting limits shall be prepared. The following shall also be discussed: (a) preventive maintenance, (b) instrument calibration and frequency, (c) analytical methods, (d) method specific quality control limits, (e) quality control checks, (f) corrective action, (g) data reduction, validation, and documentation and (h) the appropriateness of the methods with respect to the project DQO's shall be

addressed.

1.6.1.8 Section 8 - CDQM Deliverables: This section will include: (a) DAILY QUALITY CONTROL REPORT (DQCR) during field activities (discussed later in paragraph entitled DAILY QUALITY CONTROL REPORTS), (b) daily quality control report from contract laboratory (not required but shall be provided upon request at no additional cost to the government), (c) departure from approved plans, (d) quality control summary report (QCSR) (discussed later in paragraph entitled QUALITY CONTROL SUMMARY REPORT), and (e) data report to the QA laboratory (discussed later in paragraph entitled CHEMICAL DATA REPORT.

1.6.1.9 Section 9 - References: This section includes a list of works consulted throughout the report.

1.6.2 Daily Quality Control Reports (DQCRs): During periods in which on-site field work is performed, the Contractor's Site Manager or appropriate designee shall prepare reports of chemical data quality management activities. These shall be brief reports. One report shall be prepared and submitted for each day of field work. These reports shall be sequentially numbered and submitted on a regular basis to the Contracting Officer or appropriate designee, as determined by the Contracting Officer. These reports shall at minimum describe the following:

1.6.2.1 Date of report.

1.6.2.2 Sequence number.

1.6.2.3 Site and project identification.

1.6.2.4 Personnel on-site (Contractor, subcontractor, Government, USACE, etc.).

1.6.2.5 Description of work performed.

1.6.2.6 Sampling performed.

1.6.2.7 Problems encountered, corrective action taken, and the effectiveness of the corrective action.

1.6.2.8 Quality assurance/quality control activities initiated.

1.6.2.9 Name and signature of preparer.

This information will be reported to the Government within two working days.

1.6.3 Quality Control Summary Report (QCSR): At the conclusion of the chemical data acquisition activities, the Contractor shall prepare a summary report to compile the results of the chemical data acquisition activities, present the quality control data and the data quality evaluation results, and provide an overall assessment of the success of the chemical data quality management plan. A presentation of the chemical data itself is recommended. A compilation of the DQCRs and a summary of their contents should be integrated into this report.

1.6.4 Chemical Data Report: Laboratory chemical data shall be reported to the Contracting Officer after receipt from the laboratory. Chemical data reports shall also contain relevant QA/QC information and appropriate data qualifiers if necessary. It is recommended that the data be submitted as part of the QCSR. If a separate report is to be submitted, it is recommended that data report be submitted at the same time as the QCSR.

1.6.5 Summary Chemical Data Report: At the conclusion of the chemical data acquisition activities, the Contractor shall submit a summary compilation of all of the chemical data collected. The data shall be presented in a manner that is clearly ordered and indexed.

1.7 DATA QUALITY OBJECTIVES: The Contractor shall state in writing the purpose of the chemical data acquisition activities for each waste encountered. These data quality objectives (DQOs) shall be published in the CDAP for review and approval by the Contracting Officer. Elements of DQOs to be addressed are covered in the following paragraph. Specific guidance for each waste is also provided.

1.7.1 DQO Elements: Establishing specific goals for the quality of the chemical data provides a means for achieving the goals of the project as well as a scale for measuring the degree of success for the project. By setting qualitative and quantitative objectives, the quality assurance (QA) and quality control (QC) activities can be tuned to the requirements of the project and produce data of sufficient quality. The assessment of the level of quality achieved can also be performed better if the project objectives are clearly laid out. DQOs shall be developed in an iterative process which considers such factors as cost, time, availability of applicable methods and resources, and critically of the information requirements. The primary DQO elements to be considered are accuracy and completeness. Additional information on DQO development is provided in PARAGRAPH: RECOMMENDED GUIDANCE.

1.7.2 Waste Stream Specific DQOS:

1.7.2.1 Soil: Soil which is excavated during the remediation process may require disposal in accordance with New York State requirements for the disposal of contaminated or hazardous soils. The requirements for composite sampling of the excavated soils are described in SECTION: SOIL HANDLING, STORAGE, AND DISPOSAL. The requirements for in-situ soil sampling after completion of excavation activities are described in SECTION: UNDERGROUND STORAGE TANK REMOVAL.

1.7.2.2 Liquids: All tank and pipeline liquids, ground water, and wastewater shall be sampled in accordance with SECTION: LIQUID REMOVAL. All applicable State Regulations for Underground Storage Tank (UST) sampling and analysis of environmental media shall be followed.

1.8 SAMPLING:

1.8.1 Sampling is an important link in the chain of events leading up to the acquisition of chemical analysis data. The Contractor shall perform the sampling tasks as described in the CDAP as approved by the Contracting Officer.

1.8.2 QA/QC Procedures: The objective of the sampling activities is to collect a representative and unbiased sample in a precise manner. In order to assess the success of the sampling activities, certain QA/QC activities shall be performed by the Contractor. These activities shall be designed to achieve the DQOs as well as demonstrate that they have been achieved. At a minimum, the frequency required by the USACE in ER1110-263 (1 October 1990) shall be performed by the Contractor and his Subcontractor. The QA samples shall be sent to the USACE QA Laboratory. The QC samples shall be analyzed along with the field samples.

1.8.3 Sample Containers: The volume of sample to be collected will be dictated by the analysis specified and the sample matrix. The Contractor shall supply bottles of sufficient volume to perform the required analysis. Amber glass containers shall be used to prevent photodegradation of the

sample, except when samples are collected for metals analysis.

1.8.4 Decontamination of Sample Containers: Sample containers shall be laboratory cleaned. The cleaning procedure is dictated by the specific analysis to be performed on the sample. The person responsible for cleaning the sample container shall record the procedure used and initiate the chain of custody. Alternatively, commercially available containers may be used if the appropriate cleaning procedures are performed and sufficiently documented.

1.8.5 Chain of Custody: The decontaminated sample bottles shall be shipped to the site in such a manner as to indicate they were not tampered with during shipment. When collecting a sample, sampling personnel shall record the seal number associated with each sample shuttle or cooler and record whether the seal was intact upon arrival in the field. After sample collection, the bottles again shall be sealed into the shuttle or cooler and the seal number shall be recorded. Upon arrival at the lab, the person receiving the sample shall note the number and condition of the custody seal. When under chain of custody, sample bottles shall be secured in locked vehicles, custody sealed in shuttles, or in the presence of authorized personnel.

1.8.6 Sampling Equipment Decontamination: All field sampling equipment should be laboratory cleaned, wrapped, and dedicated to a particular sampling point. In instances where this is not feasible, approval for field cleaning must be obtained from the Contracting Officer prior to the collection of any samples and be referenced in the approved Chemical Data Acquisition Plan.

1.8.6.1 The field sampling equipment cleaning and decontamination procedures are as follows:

1.8.6.1.1 Non-phosphate detergent plus tap water wash
1.8.6.1.2 Tap water rinse
1.8.6.1.3 10% nitric acid rinse (only if sample is to be analyzed for metals) (trace metal or higher grade HNO_3 diluted with distilled/deionized H_2O)
1.8.6.1.4 Tap water rinse (only if sample is to be analyzed for metals)
1.8.6.1.5 Acetone (pesticide grade) rinse (only if sample is to be analyzed for organics)
1.8.6.1.6 Tap water rinse (only if sample is to be analyzed for organics)
1.8.6.1.7 Distilled/deionized water rinse
1.8.6.1.8 Air Dry

1.8.6.2 Wherever possible, samplers should be numbered in a manner that will not affect their integrity and wrapped in a material (e.g., aluminum foil) that has not come in contact with any contamination. Equipment should be custody sealed and information concerning decontamination methodology, date, time, and personnel should be recorded in the field log book.

1.8.6.3 The use of distilled/deionized water commonly available from commercial vendors may be acceptable for sampling equipment decontamination provided that it has been verified by laboratory analysis that the water is free of contaminants to be analyzed for. It is not recommended.

1.8.7 Trip blanks must be received in the field within one day of preparation in the lab. These blanks shall be held on site for a maximum of two calendar days. They shall be shipped back to the lab at the end of the second calendar day with the same sample bottles they accompanied to the field regardless of whether the sample bottles were used or not. The temperature of the trip blanks must be maintained at 4 degrees centigrade while on site and during shipment.

1.8.8 Rinsate Blanks: At the field location, in the most contaminated area, analyte-free water shall be passed through clean sample equipment and placed in appropriate sample containers for analysis. Rinsate blanks should be performed at a rate of one per day per matrix sampled that day. Lower frequencies must be approved by the Contracting Officer and specified in the Chemical Data Acquisition Plan. Rinsate blanks must be packaged with their associated matrix. Blank water must be received in the field within one day of preparation in the lab. Blank water shall be utilized for rinsate blank preparation within two days of receipt at the site. They must be returned to the lab at the end of the second calendar day with the same sample bottles they accompanied to the field. The temperature of the blank water must be maintained at four degrees centigrade while on site and during shipment. Rinsate blanks for all matrices must be analyzed for the same parameters as the samples collected that day.

1.8.9 Split and Replicate Samples Obtained in the Field: Collection of split and replicate provides for the evaluation of the laboratory's performance by comparing analytical results of two samples from the same location. Duplicate samples are to be included for each matrix at a minimum rate of ten percent (10%). If less than twenty samples are taken during a particular sampling episode, then one duplicate should be performed.

1.8.9.1 Aqueous Matrix: Duplicates of water samples should be obtained by alternately filling sample containers from the same sampling device for each parameter. Samples for volatile organics analysis shall be filled first from the same sampling device. When small sampling devices are used (bladder pumps), the vials for volatile organics should be alternately filled.

1.8.9.2 Non-Aqueous Matrix: Obtaining duplicate samples in a soil matrix requires homogenization of the sample aliquot prior to filling sample containers. Regardless, volatile organic samples shall always be taken from discrete locations or intervals prior to compositing or mixing the sample. Homogenization should be accomplished by filling a properly decontaminated stainless-steel tray or bowl with the sample and mixing it with a decontaminated stainless-steel or Teflon® instrument. The extent of mixing required will depend on the nature of the sample and shall be done to achieve a consistent physical appearance prior to filling sample containers. Once mixing is completed, the sample shall be divided in half and containers shall be filled by scooping sample material alternately from each half.

1.8.10 Sampling Equipment: In order to minimize interference and cross-contamination, all sampling equipment used in collecting soil, waste, and ground-water samples shall be Teflon® or stainless steel. The Contractor may use carbon steel split spoons for soil samples at depth, and for surface water samples, collection directly into the laboratory-provided sample container is permissible.

1.8.10.1 Ground water and liquids shall be collected, keeping in mind the goal of collecting a representative sample of all the horizons or phases present in the liquid. The Contractor may use a weighted bottle, dip, bomb sampler, or similar device to sample storage tank liquids. Bottle or dip samplers consist of a housing, a weight sinker, a housing plug, and a line that is used to open the housing and to lower and raise the sampler. In general, these types of samplers are lowered to the predetermined depth, then the housing plug is released, allowing the housing to fill completely. The sample is retrieved and transferred into laboratory-cleaned sample bottles for preservation and transport. A bomb sampler is very useful for sampling large storage tanks because the internal collection chamber is not exposed to product until the sampler is triggered. It is useful in collecting samples at various vertical locations. It is constructed of brass or stainless steel and is equipped with a trigger which is spring loaded. When opened, the trigger

allows liquid to enter the collection chamber. When the trigger is released, liquid is prevented from flowing into the collection chamber or out of the collection chamber.

1.8.10.2 Soils shall be sampled, keeping in mind the goal of collecting a representative sample of all horizons present in the soil. The Contractor may use a stainless-steel trowel, scoop, small coring device, decontaminated trackhoe bucket, auger, split-spoon sampler, or Shelby tube. The sampling device may be attached to the trackhoe bucket to eliminate the necessity of personnel entering the excavation. At the desired location, clear the surface of any debris (rocks or twigs). Collect a sample using one of the devices listed above. Transfer the sample directly into the sample container. For soil samples to be collected from depths, advance a hole using a bucket auger or power auger that has been properly decontaminated or use a decontaminated trackhoe bucket to bring soils to the surface where they may be sampled by the Contractor's personnel. Once at the desired depth, use a clean auger to retrieve the sample. Use a decontaminated spatula or trowel to transfer the sample directly into the sample bottle.

1.8.11 Containerized Solids Sampling: Sampling of granular material shall be accomplished through the use of a scoop or trowel, or small handheld coring device. Once the tank to be sampled is opened, insert the decontaminated sampling device into the center of the material to be sampled. Collect a core (if possible) of material from a point diagonally opposite the point of entry. Retrieve the sample and immediately transfer it into the sample bottle. If the sampling device is disposable, it may be left in the tank. Otherwise, decontaminate the device thoroughly before collecting the next sample. Each tank shall be sampled discretely. Depending on the objective of the sampling event (e.g., characterization for disposal), compositing of samples in the laboratory on a weight/weight or volume/volume basis prior to analysis may be permissible.

1.8.12 Containerized Liquids and Sludge Sampling: Prior to opening the hatch, the sampler should check the tank for a pressure gauge or release valve. The release valve should be opened slowly to bring the tank to atmospheric pressure. If the tank pressure is too great or venting releases gases or vapors, discontinue venting immediately. Measure releases to the atmosphere with portable field instrumentation and record in field logbook. If no release valve exists, slowly loosen hatch cover bolts to relieve pressure in the tank. Again, stop if pressure is too great or if a release occurs. Do not remove hatch cover bolts until tank is at atmospheric pressure. Once the tank has been stabilized, sample collection may begin. If the contents of the tank have stratified, each strata should be sampled discretely. At a minimum, a top, middle, and bottom sample should be collected. If the container has separate compartments, each should be sampled separately at varying depths, as required. The sampling of containerized liquids and sludge shall be accomplished through the use of a COLIWASA, open tube sampler, stratified sample thief, or bomb sampler. Once the tank to be sampled is opened, insert the decontaminated sampling device into the center of the liquid contents to be sampled. Collect a cross-sectional portion of the contents from a point diagonally opposite the point of entry, if possible. Retrieve the sample and immediately transfer it into the sample bottle. If the sampling device is disposable, leave it in the tank. Otherwise, decontaminate the device thoroughly before collecting the next sample. Each tank shall be sampled discretely. Depending on the objective of the sampling event (e.g., characterization for disposal), compositing of samples in the laboratory on a weight/weight or volume/volume basis prior to analysis may be permissible.

1.8.13 Chip Samples: This method of monitoring surficial contamination is intended for non-volatile species of analytes on porous surfaces. Sample points on the underground storage tank foundations shall be carefully chosen

and shall be based on obvious contamination and available surface area. To facilitate calculations once the analytical data is received, an area 25 cm x 25 cm (or 625 cm^2) should be sampled. To collect a chip sample, the following equipment is needed:

1.8.13.1 A pre-measured template to measure out area to be chipped;

1.8.13.2 Disposable surgical gloves, to be changed prior to collection of each sample;

1.8.13.3 Decontaminated chisel and hammer; and

1.8.13.4 Dedicated natural bristle brush and a dedicated decontaminated dust pan constructed of a pre-approved material which will not interfere with the contaminants of concern.

1.8.13.5 Procedure: Determine, measure, and mark off the sample location. Wearing a new pair of disposable gloves, and using a decontaminated chisel and hammer, break up the surface to be sampled. An effort should be made to avoid scattering pieces out of the sampling area boundary. The area should be chipped to less than one-quarter inch (preferably 1/8 in.). Record how deep chips were taken. Collect the chipped pieces using a dedicated, decontaminated dust pan and natural bristle brush, and transfer the sample directly into the bottle.

1.8.14 Post Sampling Activities: Once the sample is transferred into the appropriate container, the bottle should be capped, and, if necessary, the outside of the bottle should be wiped with a clean paper towel to remove excess sampling material. The bottle should not be submerged in water in an effort to clean it. A clean paper towel moistened with distilled/deionized water shall be used. The sample bottle should then be properly labeled, preserved if necessary, custody sealed, and placed in a plastic bag. Information such as sample number, location, collection time, and sample description should be recorded in the field logbook. Associated paperwork (e.g., Chain of Custody forms, Sample Analysis Request forms) should then be completed and should stay with the sample. The samples should be packaged in a manner that will allow the appropriate storage temperature to be maintained during shipment to the lab. Samples should be delivered to the lab within 24 hours so that proper temperature maintenance is assured and analytical holding times are not exceeded.

1.8.15 Documentation: The details of all activities of a sampling episode must be recorded in the field log book.

1.8.15.1 Field Log Books: Field log books must be bound and shall have numbered, water-resistant pages. All pertinent information regarding the site and sampling procedures must be documented. Notations should be made in log book fashion, noting the time and date of all entries. Information recorded in this notebook should include, but not be limited to, the following: name and exact location of site of investigation or interest; date and time of arrival and departure; affiliation of persons sampling; name of person keeping log; names of all persons on site; purpose of sampling episode; all available information on site (processes or products, waste generation, nature of spilled material); composition and concentration of substance, if known; description of sampling plan; field instrument calibration information; location of sampling points (including justification); number of samples taken, volume of samples taken; method of sample collection and any factors that may affect quality; time of sample collection; name of collector; all sample identification numbers; description of samples; weather conditions on the day of sampling and up to forty-eight hours previously; and any field observations.

1.8.15.2 Documenting Sample Points: Sampling points should be documented as to their exact location for purposes of future sampling. This

may be accomplished through the use of a monument and compass or surveying. A monument may be chosen at each site to act as a stationary reference point from which all sampling points can be measured using a compass and measuring tape. If a building or other stationary structure exists, its corner may act as this reference point. When establishing a sampling point by monument and compass, follow this procedure:

1.8.15.2.1 Standing at the monument, facing sampling point, use the compass hairlines to determine degree of direction.

1.8.15.2.2 Line of sight should run from the monument, through both hairline needles on the compass, to the sampling point.

1.8.15.2.3 When first establishing the sampling point, record the degree and direction reading from the compass in the field notebook, along with the distance measurement, from the monument to the exact sampling point.

1.8.15.2.4 In the future, field investigating teams should have no difficulty finding the exact locations from which previous samples were taken when they are provided with the monument and compass date.

1.9 GENERAL LABORATORY REQUIREMENTS: The minimum requirements for the chemical quality control officer and bench chemists shall be a baccalaureate in chemistry and one year of directly relatable experience in preparations, testing, and analyses. In addition, the GC residue analysis chemist shall have a minimum of two years additional appropriate experience and the GC/MS Chemist shall have a minimum of three years appropriate experience. Technicians shall have a minimum of one year of directly related experience and must work under the close and continuous supervision of a subject area expert.

1.9.1 Laboratory approval and validation: Before any laboratory analyses of site samples are permitted, the following requirements must be met:

1.9.1.1 The proposed laboratory shall be validated by the USACE and certified by the State of New York DEC for the analytical method being performed. No samples are to be analyzed by any laboratory not specifically designated for this project. Any change of laboratory must be approved in writing by the Contracting Officer. The Contractor shall insure, before proposing the laboratory for approval, that the lab has the instrumentation and personnel experience commensurate with the referenced analytical techniques.

1.9.1.2 Possession of a current USATHAMA Certification for metals. If laboratory does not have this certification, the laboratory shall submit to and successfully complete Corps validation; and

1.9.1.3 Successful Completion of USACE validation for all other analytes.

1.9.2 Attachment A may be consulted for USACE validation procedures.

1.10 DATA QUALITY ASSESSMENT: The Contractor shall perform an objective evaluation of the quality of the data produced to determine the degree of success of the chemical data quality management program. Each of the areas described in PARAGRAPH: DATA QUALITY OBJECTIVES shall be discussed for each sample matrix to be analyzed. All QC data acquired shall be considered during this evaluation. The results of the evaluation shall be published in the QCSR. The procedures for evaluating data quality shall be described in the Chemical Data Acquisition Plan along with a scheme for annotating data that do not meet the objectives of the project.

1.11 CHEMICAL ANALYSIS: The contractor shall be responsible for entering

into an agreement with a laboratory approved by the Contracting Officer to perform the required analyses as presented in the approved CDAP. The analyses that are required by this specification are to be used to determine if soils removed from the underground tank excavations may be reused as backfill or if the soil is considered to be a hazardous waste or a non-hazardous contaminated soil. The parameters of concern to be monitored are as follows:

BUILDING SITE	PARAMETER OF CONCERN
101	Cadmium, total
	Chromium, total
	Lead, total
	Nickel, total
	Cyanide, total
	Volatile Organics
110	Lead, total
	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)
	Polynuclear Aromatic Hydrocarbons (PAHs)
	Phthalates
112	Barium, total
	Chromium, total
	Lead, total
	Mercury, total
	Volatile Organics

Lists of compounds with their action levels are provided in Table 01430-A.. Methodologies are specified in table 01430-B.

1.11.1 Soils, Concrete, and Tank Sludge from Building Sites 101, 110, and 112 shall be analyzed directly for the constituents of concern specified above. The resulting concentrations for each detected constituent shall be compared against its corresponding "Soil Action Level" in Table 01430 - A. Soils, concrete, and tank sludge from Building Sites 101 and 112 with one or more constituents above the soil action levels shall be removed in accordance with SECTION: HAZARDOUS WASTE DISPOSAL. Soils, concrete, and tank sludge from Building Site 110 with one or more constituents above the soil action levels shall be removed in accordance with SECTION: SOIL HANDLING, STORAGE AND DISPOSAL.

1.11.2 Soils, Concrete and Tank Sludge from Building Sites 101, 110, and 112 shall also have their respective leachate analyzed directly for the constituents of concern listed above. The Toxicity Characteristic Leaching

Procedure (TCLP) (EPA Method 1311) shall be the laboratory method to generate leachate for analysis. The resulting concentrations for each detected parameter in the leachate shall be compared against its corresponding "Ground-Water Action Level" in Table 01430 - A. Soils, concrete and tank sludge from Building Sites 101 and 112 with one or more parameter above the ground-water action levels shall be removed in accordance with SECTION: HAZARDOUS WASTE DISPOSAL. Soils, concrete, and tank sludge from Building Site 110 with one or more parameters above the ground-water action levels shall be removed in accordance with SECTION: SOIL HANDLING, STORAGE AND DISPOSAL.

1.11.3 Soil at Building Site 110 maybe used as backfill if there are no visual signs of contamination and the resultant analyses on soils, concrete, or tank sludge for the Building Site 110 demonstrate all hazardous parameters detected in the soil, concrete, or tank sludge, and in the respective leachate are at or below corresponding soil action levels and ground-water action levels and all the Toxicity Characteristic compounds are below regulatory levels. The concrete and sludge shall be managed in a New York State Part 360 permitted facility. The Contractor shall note for Building Site 110, that even if all analytical results indicate values below the action and regulatory levels the soils shall still be disposed of in a New York State Part 360 permitted facility if visual contamination was apparent. If soil and ground-water action levels are met but Toxicity Characteristic (TCLP) regulatory levels are exceeded, the soils at the Building 110 Site shall be removed in accordance with HAZARDOUS WASTE DISPOSAL.

1.11.4 When the resultant analyses on soils, concrete or tank sludges for the Building 101 and 112 Sites demonstrate that all hazardous parameters detected in the soil, concrete, or tank sludge, and in the respective leachate are at or below corresponding soil action levels and ground-water action levels yet above the detection limits of the methods specified in Table 01430 - B, the soil, concrete or tank sludge shall be removed in accordance with SECTION: SOIL HANDLING, STORAGE AND DISPOSAL.

1.11.5 When the resultant analyses on soils, concrete, or tank sludges for the Building 101 and 112 sites demonstrate that all hazardous parameters detected in the soil, concrete, or tank sludge and in the respective leachate yield results below the method detection limits of the methods specified in Table 01430 - B, the soil may be used to backfill the site. The concrete and sludge shall be managed in a New York State Part 360 permitted facility.

TABLE 01430-A

MAXIMUM ALLOWABLE SOIL CONCENTRATIONS

ANALYTE [a]	SOIL ACTION LEVEL [a] (mg/kg)	GROUND-WATER ACTION LEVEL (µg/L)
Volatile Organics		
Chloromethane (Methyl Chloride)	5400	5.0
Bromomethane	80	5.0
Vinyl Chloride (Chloroethene)	0.36	2.0
Chloroethane	5400	5.0
Methylene Chloride (Dichloromethane)	930	5.0
Acetone (2-Propanone)	8000	3500
Carbon Disulfide	8000	3500
1,1-Dichloroethene (1,1-Dichloroethylene)	12	5.0
1,1-Dichloroethane	8000	5.0
trans-1,2-Dichloroethene (trans-1,2-Dichlorethylene)	2000	5.0
Chloroform (Trichloromethane)	110	7.0
1,2-Dichloroethane	7.7	5.0
2-Butanone (Methyl Ethyl Ketone)	4000	1800
1,1,1-Trichloroethane	7000	5.0
Carbon Tetrachloride	5.4	5.0
Vinyl Acetate	80000	35000
Bromodichloromethane	5.4	50
1,1,2,2-Tetrachloroethane	35	5.0
1,2-Dichloropropane	10	5.0
trans-1,3-Dichloropropene	--	5.0
Trichloroethene (Trichloroethylene)	64	5.0
Dibromochloromethane (Chlorodibromomethane)	8.3	50
1,1,2-Trichloroethane	120	5.0
Benzene	24	.70
cis-1,3-Dichloropropene	--	5.0
2-Chloroethyl Vinyl Ether	--	--
Bromoform (Tribromomethane)	89	50
2-Hexanone	--	50
4-Methyl-2-pentanone (Methyl Isobutyl Ketone)	4000	1800
Tetrachloroethene (Tetrachloroethylene)	14	5.0
Polynuclear Aromatic Hydrocarbons (PAHs)		
Napthalene	300	10
1-Methylnaphthalene	--	--
2-Methylnaphthalene	--	--
2-Chloronaphthalene	--	10
Acenaphthylene	--	--
Acenaphthene	5000	20
Fluorene	3000	50
Phenanthrene	--	50
Anthracene	20000	50
Fluroanthene	3000	50
Pyrene	2000	50
Benzo(a)anthracene (Benzanthracene)	.22	.0020
Chrysene	--	.0020
Benzo(b)fluoranthene	.22	.0020
Benzo(k)fluroanthene	.22	.0020
Benzo(a)pyrene	.061	10
Indeno(1,2,3-cd)pyrene	--	.0020
Dibenz(a,h)anthracene	.014	.00070
Benzo(g,h,i)perylene	--	--

(Continued)

TABLE 01430-A (Continued)

MAXIMUM ALLOWABLE SOIL CONCENTRATIONS

ANALYTE [a]	SOIL ACTION LEVEL [a] (mg/kg)	GROUND-WATER ACTION LEVEL (µg/L)
Phthalates		
Dimethyl phthalate	80000	50
Diethylphthalate	60000	40
Di-n-butylphthalate	8000	4.0
Butyl benzyl phthalate	20000	50
bis(2-ethylhexyl)phthalate	--	50
Di-n-octyl phthalate	20000	50
Metals		
Barium, total	4000	1000
Cadmium, total	80	5.0
Chromium, total	--	50
Lead, total	--	25
Nickel, total	2000	700
Cyanide		
Cyanide, total	2000	<100

[a] Source: New York State "Contained-In Criteria Guidance"
"--" = value not specified

END OF SECTION

TABLE 01430-B

ANALTYICAL METHODS

PARAMETER	ANALYTICAL METHOD (a) SOIL	WATER
Barium, total	3050/6010	3010/6010
Cadmium, total	3050/6010	3020/7131
Chromium, total	3050/6010	3010/6010
Lead, total	3050/6010	3020/7421
Mercury, total	7471	7470
Nickel, total	3050/6010	3010/6010
Cyanide, total	9011/9010 (b)	9010 (b)
Volatile Organics (c,d)	8240 (e)	524 (f)
Polynuclear Aromatic Hydrocarbons (PAHs) (d)	3550/8270	3510 (g)/8270
Phthalates (d)	3550/8270	3510 (g)/8270

(a) Source: EPA SW-846 (unless noted). Subsititutions permitted only if approved in writing by the Contracting Officer
(b) Method 9012 may be substituted
(c) Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) are a subset of the Volatile Organics
(d) See Table 01430-A for list of compounds to be analyzed for
(e) Method 8260 may be substituted
(f) Source: EPA-600/4-88/039
(g) Method 3520 may be substituted

END OF SECTION

SECTION 01430

ATTACHMENT A

ENGINEERING REGULATION (ER) 1110-1-263

"CHEMICAL DATA QUALITY MANAGEMENT FOR
HAZARDOUS WASTE REMEDIAL ACTIVITIES"

DEPARTMENT OF THE ARMY
U. S. Army Corps of Engineers
Washington, DC 20314-1000

CEMP-RT

ER 1110-1-263

Regulation
No. 1110-1-263

1 October 1990

Engineering and Design
CHEMICAL DATA QUALITY MANAGEMENT FOR
HAZARDOUS WASTE REMEDIAL ACTIVITIES

1. Purpose. This regulation prescribes Chemical Data Quality Management (CDQM) responsibilities and procedures for all chemical contamination investigative and remedial activities to assure that the analytical data obtained is of sufficient quality to meet intended usages within the project.

2. Applicability. This regulation applies to HQUSACE/OCE elements, major subordinate commands, districts, laboratories, and separate field operating activities.

3. References.

a. PL 98-212, Department of Defense (DOD) Appropriation Act, Fiscal Year 1984, Environmental Restoration, enacted 8 December 1983, and following legislation.

b. PL 96-510, Comprehensive Environmental Response, Compensation and Liability Act of 1980.

c. PL 99-499, Superfund Amendments and Reauthorization Act of 1986.

d. Interagency Agreement between the USACE and the U.S. Environmental Protection Agency (EPA) in executing PL 96-510, 10 February 1982, and following extensions or modifications.

e. EPA OSWER Directive 9355.3-01, Guidance for Conducting Remedial Investigations (RI) and Feasibility Studies (FS) Under CERCLA (Interim Final), October 1988.

f. EPA OSWER Directive 9355.0-4A, Superfund Remedial Design and Remedial Action Guidance, June 1986.

g. EPA OSWER Directive 9345.1-02, Expanded Site Inspection Transitional Guidance for FY 1988.

This regulation supersedes ER 1110-1-263 dated 30 December 1985

h. EPA 540/G-87/003, Data Quality Objectives for Remedial Response Activities, March 1987.

i. ER 1180-1-6.

j. ER 1110-1-261.

k. ER 415-1-11.

l. EP 1110-2-6.

4. Discussion.

a. The intent of this ER is to conduct CDQM activities in full compliance with all applicable federal and state regulatory requirements. Standard methods and procedures promulgated by the EPA and the American Society of Testing Materials (ASTM) will be followed when available and applicable. ASTM is developing a document entitled "Standard Practice for Generation of Environmental Data Related to Waste Management Activities". When finalized, the ASTM document is expected to be adopted by the EPA and the Industry as standard practice. Accordingly, this ER is intended to be in compliance with the ASTM standard.

b. The U.S. Army Toxic and Hazardous Material Agency (CETHA), now an FOA of USACE, has developed and is practicing a separate approach to CDQM activities. Insofar as the CETHA CDQM program meets the federal, state and ASTM requirements set forth above, the CETHA CDQM program may be utilized for activities CETHA independently executes.

5. General.

a. Hazardous waste programs under which USACE currently executes remedial activities include:

(1) EPA Superfund

(2) Defense Environmental Restoration Program (DERP)

(a) Installation Restoration Program (IRP) (Army, Air Force and Navy)

(b) Formerly Used Defense Sites (FUDS)

b. Chemical analysis of environmental samples is usually required during the following activities under the programs listed in the previous section.

(1) Preliminary Assessment (PA) and Site Inspection (SI)

(2) Remedial Investigation/Feasibility Study (RI/FS)

(3) Remedial Design (RD) and Pre-Design Activities

(4) Remedial Action (RA)

(5) Post Remedial Action Monitoring

c. Acquisition of chemical analytical data is an integral part of chemical contamination investigative and remedial activities. There are a multitude of purposes for which chemical analytical data are acquired; however, they generally can be divided into eight categories.

(1) Site investigation

(2) Health and safety; hazard assessment

(3) Determination of potential responsible parties

(4) Engineering decisions

(5) Construction contractor payment

(6) Post remedial action monitoring

(7) Legal support of government actions

(8) Determination of proper disposal

d. The purpose of CDQM is to insure that chemical analytical data, acquired during investigative, remedial and monitoring activities, are of sufficient quality to meet intended usages. Data quality depends not only on how carefully an analytical method is carried out, but also on the sample point selection, sampling procedures, sample integrity and analytical methods selected. Data quality objectives (DQO) will be defined in the scope of services or design specifications for contract services

and in the Chemical Data Acquisition Plan (CDAP) for in-house work for which a scope of services is not generated.

e. CDQM during chemical contamination investigative, remedial and monitoring activities includes roles for both the government (USACE) and its contractors. Planning and reporting CDQM documents/tasks required of USACE or its contractors are listed in Tables 1, 2, and 3 shown at Appendix A. An estimate of the time required to prepare and review each submittal is also included. Table 1 contains investigation activities, Table 2 design activities, and Table 3 construction activities. In most cases, investigation activities will be conducted by Architect-Engineer (AE) firms; however, the listed documents/tasks are pertinent to all activities in which both planning and execution are carried out under a single contract or by utilizing in-house government personnel. In contrast, the documents/tasks listed under design and construction activities are pertinent to all activities in which planning and execution are carried under separate contracts. Specific guidance for carrying out the tasks in Appendix A are found in Appendices B through F, and a glossary is provided in Appendix G.

6. Responsibilities.

a. The Environmental Restoration Division, Directorate of Military Programs, Headquarters (CEMP-R), is responsible for program management, technical oversight, and USACE policy and guidance development and dissemination.

b. The Investigation District or FOA is responsible for executing investigation activities for chemical contamination cleanup projects and informing the local district of their activity.

c. The Design District or FOA is responsible for executing design activities for chemical contamination projects and coordination with the local district throughout design.

d. The Construction District or FOA is responsible for executing construction chemical contamination remedial action projects within its geographical area. It is also responsible for cooperating with activities undertaken by other Investigation and Design Districts or FOA within its geographical area.

e. Divisions are responsible for monitoring and oversight of activities of their districts to assure that program policies and procedures are implemented.

f. CEMRD has primary responsibility for implementation of CDQM requirements for all aspects of HTW activities conducted in support of the Superfund, DERP, and non-mission HTW assignments. To execute this overall responsibility CEMRD is responsible for identifying shortfalls and drafting technical guidance; training; conducting selected technical reviews of documents and chemical data; coordinating review with CDQM personnel in other districts and divisions; providing technical assistance; receiving and analyzing quality assurance samples; evaluating contract laboratories; and validating USACE division laboratories to participate in the above activities. These responsibilities are discharged through the assigned tasks of the Chemical Review Branch (CEMRD-ED-GC) and the Missouri River Division Laboratory HTW Chemistry Unit (CEMRD-ED-GL), which is designated the lead USACE QA laboratory for HTW projects.

g. CEMRD has review and approval authority for all work brokered by CEMRD to other FOA until that authority is transferred to the parent division with the approval of HQUSACE.

h. The QA Laboratory is responsible for executing CDQM activities delegated to it through the procedures specified in the Appendix E, USACE Chemical Quality Assurance.

i. Additional definition of organizational responsibilities for CDQM activities is described in Tables 4, 5, and 6 shown at Appendix A.

ALBERT J. GENETTI, JR.
Colonel, Corps of Engineers
Chief of Staff

7 Appendices
App. A - Tables
App. B - Guide to USACE Chemical Quality Assurance Procedures and Notifications
App. C - Commercial Laboratory Validation Procedures

APPENDIX A

TABLES

TABLE 1

DOCUMENTS/TASKS FOR INVESTIGATIVE ACTIVITIES*

Activities	Estimated Window
Designation of a USACE Quality Assurance (QA) Laboratory	1 Week
Scope of Services	Preparation - 3 weeks Review - 3 weeks
Validation of AE's Laboratory	Begin as soon as lab is identified - allow 6-12 weeks
Chemical Data Acquisition Plan (CDAP)	Expect 1 month after scope is provided to AE - allow 3-4 weeks for review
Daily Quality Control Reports (DQCR)	Prepared daily, submitted USACE project manager daily by regular mail and to QA Lab by the USACE project manager
Submission of AE's Chemical Data to the QA Laboratory	As soon as possible
Quality Control Summary Report (QCSR)/Site Inspection Report	Expect 2-3 months after completion of field work - 3-4 weeks for review
Chemical Quality Assurance Report (CQAR)	Expect within 30 days of submission of data to the QA laboratory.

* These include SI, RI/FS, and Pre-Design investigative activities.

TABLE 2

DOCUMENTS/TASKS FOR DESIGN ACTIVITIES

Activities	Estimated Window
Scope of Services	Preparation - 3 weeks Review - 3 weeks
Design Documents, to include Design Analysis Reports and Plans and Specifications	Project manager sets deadlines for Design Analysis Reports and 30%, 60% and 90% submittals. These are reviewed by District/Division technical personnel. Copies are sent to CEMRD and program management personnel for review of each submittal.

TABLE 1

DOCUMENTS/TASKS FOR CONSTRUCTION ACTIVITIES

Activities	Estimated Window
Designation of USACE Quality Assurance (QA) Laboratory for Construction	1 Week
Contractor Laboratory Validation	Begin as soon as laboratory is identified. Allow 6-12 weeks.
Chemical Data Acquisition Plan (CDAP)	Expect 1 month after contract is awarded. Allow three weeks for review.
Daily Quality Control Reports (DQCR)	Prepared daily by contractor, submitted to contracting officer daily by regular mail and to the QA lab by the contracting officer when relevant.
Submission of Contractor's Data to the QA Laboratory	As soon as available.
Quality Control Summary Report (QCSR)/Contractor Final Report	Expect 2-3 months after completion of field work. Allow 3-4 weeks for review.
Chemical Quality Assurance Report (CQAR)	Expect within 30 days of submission of data to the QA Lab.

TABLE 4

ADDITIONAL ORGANIZATIONAL RESPONSIBILITIES FOR
INVESTIGATION CDQM DOCUMENTS/TASKS

Activity	Investigation* District	Investigation* Division	QA Laboratory	MRD	CEMP-R
Designation of a USACE QA Laboratory	I	I		E, A	O
Scope of Services (SOS)	E	R, A	R, M	O	
Disposition of SOS Comments	E	R, A	R	M	O
Contract Laboratory Validation	I, A	I	R	E, M, A	M, O
Chemical Data Acquisition Plan (CDAP)	E	R, A	R	R, M	O**
Disposition of CDAP Comments	E	R, A	R	M	O
Notice to Proceed (field work)	E	M	M	M	O
Daily Quality Control Reports (DQCR)	E	R	R	M	O
Inspection and Analyses of QA Samples.			E	R, M	O
Quality Control Summary Report (QCSR)/Site Inspection Report	E	R, A	R	M	O
Disposition of Site Inspection Report Comments	E	R, A	R	M	O
Chemical Quality Assurance Report (CQAR)	R	R	E	R, M	O

KEY: I = initiate, E = execution, R = review, A = approve, M = monitor, and O = oversight

* = These responsibilities are for district in-house work. For AE/Contractor work, the contracting officer in the district has approval authority.

** = Documents will be provided to HQUSACE (CEMP-R) for monitoring and oversight. On an exception basis, CEMP-R will audit specific projects and will require that all project documents be submitted.

The local district/division should be kept informed of the progress of any work in their geographic area, and should be furnished copies of documents if they so desire.

TABLE 5

ADDITIONAL ORGANIZATIONAL RESPONSIBILITIES FOR DESIGN CDQM DOCUMENTS/TASKS

Activity	Design[A]		Construction		QA		
	District	Division	District	Division	Laboratory	MRD	CEMP R
Designation of a USACE QA Laboratory for Design	I	I	R	R	R	M	O
Scope of Services (SOS)	E	R, A	R	R	R	R	O
Disposition of SOS Comments	E	R, A	R	R	R	R	O
AE Laboratory Validation	I, A	I			R	E, M	M, O
Chemical Data Acquisition Plan (CDAP)	E	R, A	R	R	R	R	O
Daily Quality Control Reports	E	R	R	R	R	M	O
Quality Control Summary Report/ Investigation Report	E	R, A	R	R	R	M	O[AA]
Chemical Quality Assurance Report	R	R	R	R	E	M	O[AA]
Design Analyses Reports and Design Plans and Specifications	E	R, A	R	R	R	R	O[AA]
Disposition of Design Comments	E	R, A	R	R	R	R	O
Advertise and Award Construction Contract	E			O			

KEY: I = initiate, E = execution, R = review, M = monitor, and O = oversight

[A] = These responsibilities are for district in-house work. For AE/Contractor work, the contracting officer in the district has approval authority. For design brokered by CEMRD, review and approval authority is retained by CEMRD until transferred to the Division.

[AA] = Documents will be provided to HQUSACE (CEMP-R) for monitoring and oversight. On an exception basis, CEMP-R will audit specific projects and will require that all project be submitted.

The local district/division should be kept informed of the progress of any work in their geographical area, and should be furnished copies of documents if they so desire.

TABLE 6

ADDITIONAL ORGANIZATIONAL RESPONSIBILITIES FOR
CONSTRUCTION CQM DOCUMENTS/TASKS

Activity	Design		Construction		QA		
	District	Division	District	Division	Laboratory	MRD	CEMP-R
Designation of a USACE QA Laboratory			I	I		E	O
Contract Laboratory Validation			I	I	R	E	O
Chemical Data Acquisition Plan (CDAP)	R		E, A	R	R	R	O
Disposition of CDAP Comments	R		E	R	R	M	O
Daily Quality Control Reports			E	R	R	M	O
Inspection and Analysis of QA Samples					E	M	O
Quality Control Summary Report (QCSR)/Contractor Final Report			E, A	R	R	M	O**
Disposition of Final Report Comments			E, A	R	R	M	O
Chemical Quality Assurance Report (CQAR)			R	R	E	R, M	O**

KEY: I = initiate, E = execution, R = review, A = approve, M = monitor and O - oversight
** = Documents will be provided to HQUSACE (CEMP-R) for monitoring and oversight. On an exception basis, CEMP-R will audit specific projects and will require that all project documents be submitted.

The local district/division should be kept informed of the progress of any work in their geographical area, and should be furnished copies of documents if they so desire.

APPENDIX B

GUIDE TO USACE CHEMICAL QUALITY ASSURANCE PROCEDURES AND NOTIFICATIONS

1. Purpose. Chemical quality assurance in chemical contamination investigation, design, and remedial action activities requires the interface and coordination of several USACE units. This appendix outlines the procedures involved and provides suggested formats to aid in the coordination process. The responsibility for initiation and coordination lies with the USACE project manager for investigation and design and with the contracting officer (CO) or his representative (COR) for construction.

2. Applicability. This appendix applies to all HTW investigative, design, and remedial activities executed by USACE either in-house or utilizing the services of a contractor.

3. Procedures for Chemical Quality Management.

a. Site Investigation and Pre-Design Activities.

(1) Investigation district solicits AE services.

(2) Investigation district writes Scope of Services with data quality objectives and submits it for review to division, program management personnel and CEMRD.

(3) Project Manager obtains the services of a USACE division laboratory for quality assurance using protocols established by CEMRD (memorandum or attached Request for Government Quality Assurance Services).

(4) District negotiates and awards AE contract.

(5) AE identifies subcontract laboratory and supplies Laboratory Quality Management Manual (LQMM) or required information. See Appendix C.

(6) Project Manager verifies validation status of the laboratory with CEMRD or requests validation be initiated (memorandum or attached Request for Evaluation of Commercial Laboratory).

(7) LQMM is submitted to CEMRD, performance audit samples are sent if necessary, laboratory is inspected by CEMRD, and a recommendation for approval/disapproval is sent to the USACE project manager. Personnel from the QA laboratory or investigation district will be notified of a scheduled inspection and may assist with this process. If approval is not given, AE will select another laboratory.

(8) AE submits CDAP for investigation district's approval.

(9) CEMRD-ED-GC and QA laboratory review CDAP and make approval/disapproval recommendation to investigation district.

(10) Field work begins if CDAP is approved.

(11) AE Daily Quality Control Report is filled out daily and submitted to the investigation district. Copies are sent to the QA laboratory whenever sampling or analytical activities are included.

(12) Field work completed.

(13) AE's analytical results are submitted to the QA lab as they become available, and to the executing FOA.

(14) AE's Site Inspection or Investigation Report together with the Quality Control Summary Report is submitted to the investigation district. These are revieved by the same offices that reviewed the CDAP.

(15) QA laboratory prepares the Chemical Quality Assurance Report and submits it to the investigation district.

b. Design Activities.

(1) Design district solicits AE services.

(2) Design district writes Scope of Services and submits it to design division, CEMRD, and program management personnel for review/approval.

(3) Design district negotiates and awards AE design contract.

(4) If investigative activities are included in the design contract, steps 5-15 of Section 3.a. should be followed.

(5) AE submits Design Analysis Reports which contain a section that specifically addresses chemical quality management concerns. AE also submits plans and specifications which include chemical quality management at the preliminary, intermediate, final and 100% phases. The chemical section of the plans and specifications should give the Construction Contractor instructions for writing the CDAP in addition to including all necessary site specific chemical detail. Relevant requirements in this ER and appendices should be addressed. These submittals are sent to the design division, CEMRD, and program management personnel for technical review, and comments are sent back to the design district.

(6) Design district assures that the comments are addressed and incorporated into the appropriate documents or provides an explanation if comments are not used. Revised documents and annotated comments are sent to the offices generating comments at the next submittal stage.

(7) 100% plans and specifications are approved by the design district and the district advertises and awards the construction contract.

c. Construction.

(1) The contractor submits a CDAP (which may be a section in his overall Quality Control Plan). The contract laboratory (if needed) along with the Contractor's proposed quality control officers are identified for the Construction District's approval.

(2) CEMRD at request of the CO designates the Construction Division Lab or CEMRD-ED-GL to be the government QA laboratory for construction (forms provided) and validate the contractor's laboratory.

(3) The designated QA laboratory together with CEMRD assists the Construction District in reviewing the CDAP. The contractor's proposed laboratory is validated by CEMRD according to protocols discussed in Appendices C and E.

(4) Construction district approves/disapproves the contractor's laboratory and/or CDAP.

(5) Construction cleanup begins after CDAP and contractor's laboratory are approved.

(6) Contractor's Daily Quality Control Report is submitted to the Contracting Officer's Representative (COR) daily. The COR submits copies to the QA laboratory when sampling or analyses are involved. Analytical results are submitted to the QA laboratory as soon as they are available.

(7) Construction work is completed.

(8) The contractor submits the Quality Control Summary Report to the construction district. This should include a complete data package.

(9) The QA laboratory prepares the Chemical Quality Assurance Report and submits it to the construction district.

4. The following pages contain suggested formats which may be used to initiate interaction among various Corps elements regarding chemical data quality management. These would initiate a request for government quality assurance services, laboratory validation or document review. If these services are initiated by memoranda, the information called for on these pages should be supplied. Examples of formats which might be used for Daily Quality Control Reports and Chemical Quality Assurance Reports are also included.

TO: CEMRD-ED-GC FROM: _____ DATE / /

SUBJECT: Request for Evaluation of Commercial Laboratory

Project Name: _____ Contract No.: _____

Superfund _____ FUDS _____ IRP _____ Other _____ Phase _____

Location: _____ State: _____

A-E/Contractor: _____ State: _____

USACE Project Manager: _____

Phone: _____ Address: _____

Approximate Sampling Dates: _____

Laboratory Name: _____

Address: _____

Phone: _____

POC: _____

Laboratory Quality Management Manual Request ON / /

Required analytical methods and approximate number of samples to be taken for above project.

METHOD	# OF WATER SAMPLES	# OF SOIL/SEDIMENT SAMPLES

State or other laboratory certification which will be required for this project: _____

If the laboratory is planning to subcontract any samples to another laboratory or location, all of these are to be evaluated separately. This request should be sent for verification of laboratory status regardless of expiration date on the list of validated laboratories.

(SAMPLE FORMAT)

TO:_____ FROM:_____ DATE:__/__/__

SUBJECT: Request for Government Quality Assurance Services (To be sent to the requested USACE Laboratory with a copy to CEMRD-ED-GC)

Project Name:_____ Contract No.:_____ ____

Superfund ____ FUDS ____ IRP ____ Other _____ Phase _____ ____
Location:_____ State:____ ____

A-E/Contractor:_____ State:____ ___
USACE Project
Manager:_____
Phone:_____ Address:_____

Laboratory Name:_____
Address:_____
Phone:_____
POC:_____

Approximate Sampling Dates:_____

The following QA Laboratory support is requested for the subject project: USACE Division Laboratory:_____

____ Review and comment on Draft _____

____ Analysis and Reports of Quality Assurance Samples

METHOD	NO. OF WATER SAMPLES*	NO. OF SOIL/SEDIMENT SAMPLES+

* Includes Blanks

+ Includes Background Soil Sample

CF: CEMRD-ED-GC

(SAMPLE FORMAT)

EP [illegible]
[illegible]

A-E DAILY QUALITY CONTROL REPORT

DATE _____

DAY	S	M	T	W	TH	F	S

WEATHER	Bright Sun	Clear	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 up
WIND	Still	Moderate	High	Record No.	
HUMIDITY	Dry	Moderate	Humid		

CCE PROJECT MANAGER _____

PROJECT _____

JOB NO. _____

CONTRACT NO _____

SUB-CONTRACTORS ON SITE:

EQUIPMENT ON SITE:

WORK PERFORMED (INCLUDING SAMPLING):

SHEET ____ OF ____

ER [illegible]
1 Oct 90

(Continuation Sheet)

PROJECT _____ REPORT NO. _____

JOB NO _____ DATE _____

QUALITY CONTROL ACTIVITIES (INCLUDING FIELD CALIBRATIONS)

HEALTH AND SAFETY LEVELS AND ACTIVITIES.

PROBLEMS ENCOUNTERED/CORRECTION ACTION TAKEN:

SPECIAL NOTES.

TOMORROW'S EXPECTATIONS.

BY _____ TITLE _____

(SAMPLE FORMAT)

_____ LAB NO.

DEPARTMENT OF THE ARMY
_____ DIVISION, CORPS OF ENGINEERS
DIVISION LABORATORY

_____, _____, _____
(city) (state) (zip)

Subject: Chemical Quality Assurance Report

Project: _____
Intended Use: _____
Source of Material: _____

Submitted by: _____
Date Sampled: _____, Date Received: _____
Method of Test or Specification: See attached Tables 1 - _____

References: _____

-- REMARKS --

1. CONTRACTOR DATA EVALUATION: (General comments)

   a. ACCURACY:

   b. PRECISION:

   c. LABORATORY CONTMINATION:

2. QA/QC DATA COMPARISON:

3. OTHER PROBLEMS:

4. CORRECTIVE ACTION:

Submitted by:

Director, _____ Laboratory

APPENDIX C

COMMERCIAL LABORATORY VALIDATION PROCEDURES

1. Purpose. This appendix specifies the procedure used to evaluate a commercial laboratory for hazardous and toxic chemical analysis either for AE/Contractor work or for in-house projects conducted by USACE in hazardous waste activities. The latter includes chemical analyses contracted by the quality assurance laboratory.

2. Applicability. These procedures apply to all chemical analyses conducted to support investigative and remedial actions undertaken by USACE.

3. Initiation Procedures. A project manager from a Corps District or Division contacts CEMRD-ED-GC requesting validation of a contract laboratory. A form is provided in Appendix A or a memorandum may be written. The name of the project, the contract number, analytical methods to be used, numbers of samples of each matrix, estimated dates of sampling, and any special certification requirements should be included.

4. Implementation Procedures. Ordinarily each step in this sequence is completed before the subsequent step is initiated.

a. Step 1. The laboratory must submit its qualifications. This submittal may be in the form of an off-the-shelf Quality Management Manual (LQMM) or in some other format. Blank information tables can be requested from CEMRD. The submittal includes the following information:

- General Lab Information: (1) Lab name, address, POC, phone #; lab age, number of employees; square footage, etc.
  (2) Type of analytical work routinely performed;
  (3) Organizational chart and floor plan;
  (4) Special capabilities.

- List of previous evaluation/validation programs and most recent results.

- List of EPA and USACE contracts held in the last two years.

- Copy of lab certificates for other environmental programs or states.

• Chart of employee training and experience or chronological resumes.

• Copy of QA manual and/or in-house SOP's for analyses to be conducted for the contract including all internal quality control practices.

• List of instruments to be used for the contract and date of purchase.

The laboratory is requested to furnish above information promptly for review. If it appears that the capabilities of the laboratory are adequate to meet project requirements, CEMRD will initiate Step 2.

b. Step 2. The Corps of Engineers will provide the laboratory with performance audit (PA) samples through CEMRD-ED-GC. Arrangements will be made with the laboratory for the analysis of these samples. The results will be submitted as directed within 20 working days after receipt of the PA samples. Failure to analyze these samples correctly and within the required time frame may result in termination of the validation process. Ordinarily the laboratory is not reimbursed for costs involved in the analysis of the PA samples. The details of payment must be clarified in advance. If any of the results are unacceptable, a second set of PA samples may be allowed.

(1) The performance audit samples are method and matrix specific. The results are considered passing if a particular method has no results outside three standard deviations as determined by USACE, and no more than two parameters outside two standard deviations. Often a laboratory will be contacted if problems such as dilution or calculation errors can be identified.

c. Step 3. On-site inspection. A representative of CEMRD will inspect the contract laboratory only after Steps 1 and 2 have been successfully completed. All in-house SOPs will be reviewed. Any problems encountered with the performance audit samples will be discussed with laboratory management at the time of the inspection. The inspecting team will prepare a detailed report using the format specified by CEMRD and submit this to CEMRD-ED-GC. An exit interview will be held with lab personnel in which any problems encountered are discussed. The project manager or contracting officer and/or the assigned QA laboratory will be invited to send a representative to the inspection.

5. Conclusion. CEMRD will evaluate lab performance on the preceding steps and make a validation decision. A letter and a copy of the inspection report will be sent to the USACE personnel who initiated the validation process and to the laboratory. Ordinarily the letter will specify the methods and matrices, the project(s) and the time period (usually 18 months) for which the validation is granted. If specific recommendations are made by the inspectors, the lab is required to respond to CEMRD within a given time frame. Centralized records of validations and lab performances are kept at CEMRD-ED-GC. If a laboratory obtains a second contract within the eighteen month period, previous performances will be checked. If different analytes/matrices are involved in the second contract, only those performance audit samples will be sent. If work done for the Corps by the lab has been satisfactory, no further action will be necessary. A validated laboratory may not subcontract USACE samples to a second laboratory without the knowledge and approval of the contracting officer and unless the second laboratory is validated for the parameters concerned.

6. Renewal of Validation. Towards the close of the eighteen month period CEMRD-ED-GC will notify USACE users of laboratories of the pending expiration of validation. When the next contract is awarded, the validation will be renewed. After considering use of the lab and previous performance, CEMRD-ED-GC will determine which of the steps in Part II will apply to the revalidation process.

APPENDIX D

GUIDE TO THE PREPARATION OF THE CHEMICAL DATA ACQUISITION PLAN

1. Definition and Responsibility. Chemical Data Acquisition Plan (CDAP)--a document prepared by an Architect-Engineer firm, a Contractor or USACE for all field activities, laboratory activities, and contract deliverables related to the acquisition and reporting of chemical data for HTW investigation or remedial activities. For the convenience of the sampling team, field activities may be bound separately; however for purposes of cost this should not be considered a separate document. The CDAP must be approved by the CO prior to initiation of field work. In the event corrections and comments on the draft are provided by the CO, the changes shall be incorporated by the authors in a revised plan before final approval is given. It should be noted that the purpose and content of the CDAP are essentially the same as the Quality Assurance Project Plan (QAPjP) required for Superfund investigations by the EPA. On Superfund projects QAPjP guidance may be followed as an alternative to this appendix, but ordinarily the Contract Laboratory Program (CLP) should not be used in its entirety (CLP analytical methods may be specified as well as a CLP type data validation).

2. Applicability. This guide applies to all HTW investigative, pre-design, and remedial activities undertaken by USACE. A CDAP will be prepared for each activity and submitted to the appropriate USACE personnel for review, comments, and recommendations. The identification of these reviewers for each type of project is found in Tables 4, 5, and 6 in Appendix A. Once approved, the CDAP is considered part of the contract and is enforceable as such.

3. USACE Chemical Quality Data Management. USACE requires that quality control (QC) and quality assurance (QA) samples be collected and analyzed by the contract laboratory and the USACE QA laboratory, respectively. These QC and QA samples include splits or replicates of field samples, rinsate blanks, trip blanks and background soil and groundwater samples. QC samples, which represent approximately 10% of the field samples, help the prime contractor to identify and diagnose problems related to sampling and analysis. QA samples, which represent approximately 10% of the field samples, are sent to a USACE QA laboratory by overnight delivery for government monitoring of sampling and contract laboratory performance. For additional guidance on chemical quality assurance, see Appendix E. When

the following procedures, performed by the USACE QA laboratory, demonstrate that contract requirements for chemical quality control were not met, contractor resampling and reanalysis may be required by the contracting officer.

a. Inspection of QA samples to insure that sampling procedures correspond to Chemical Data Acquisition Plan (CDAP) with regard to sample containers, preservation, labeling, and chain of custody.

b. Analyses of QA samples.

c. Evaluation of contractor deliverables specified in Chemical Data Acquisition Plan (CDAP).

d. Comparison of analytical results obtained by contract laboratory and USACE QA laboratory from split or replicate samples. The procedures for obtaining QA laboratory services are in Appendix E to ER 1110-1-263.

4. Contract Laboratory Validation. Any laboratory performing chemical analyses shall be validated by USACE Missouri River Division (MRD). Laboratories are validated for each environmental matrix and each specific analytical method to be employed. If the prime contractor selects a laboratory which has a current (within one year) validation for all analytes and matrices specific to its project, additional evaluation will not be necessary. A request for the evaluation of commercial laboratory should be sent to CEMRD to verify the status of the contract laboratory(ies). If the prime contractor selects a laboratory which does not have a current validation, the laboratory shall be validated prior to approval of the CDAP. Commercial laboratory validation procedures are in Appendix C to ER 1110-1-263. Samples may not be subcontracted to another laboratory without knowledge and approval of the contracting officer and unless the second laboratory is validated for the parameters concerned.

5. The CDAP shall address the following topics, not necessarily in the presented order within subsections.

SECTION 1.0 TABLE OF CONTENTS
SECTION 2.0 PROJECT DESCRIPTION
SECTION 3.0 CHEMICAL DATA QUALITY OBJECTIVES - GENERAL DISCUSSION
SECTION 4.0 AE CONTRACTOR PROJECT ORGANIZATION AND FUNCTIONAL AREA RESPONSIBILITIES.
SECTION 5.0 FIELD ACTIVITIES

7.2.8 Internal Quality Control Checks
7.2.9 Corrective Action
7.2.10 Data Reduction, Validation, and Documentation
7.3 Analytical Method 3, etc.

SECTION 8.0 CDQM DELIVERABLES
SECTION 9.0 REFERENCES

6. Project Description (SECTION 2.0 in Table of Contents). This section of the CDAP shall include a description of the work site and any unusual conditions. Anticipated project start and completion dates shall be estimated. This section shall also provide a summary of past and future work at the site including past chemical data of significance as well as a presentation of the multi-media sampling to be carried out in the present work effort.

7. Chemical Data Quality Objectives (SECTION 3.0 in Table of Contents). This section of the CDAP shall include a description of the general scope of work and relevant background information as it relates to the acquisition of chemical analytical data. State the objectives of the project: what questions must be answered and what decisions must be made; one specific objective may be completion of the USACE Hazardous Ranking System. Describe the level and extent of chemical data required to answer questions and support decisions during the project: the approach for sample collection, sample analysis, and QA/QC which will result in the required chemical data. The extent of analytical effort and data validation procedures to be required must be specified. Guidance for this requirement can be found in "Data Quality Objectives for Remedial Response Activities", EPA 540/G-87/003.

8. Contractor Project Organization and Functional Area Responsibilities (SECTION 4.0 in Table of Contents). The project organization for the prime contractor and any subcontractors shall be clearly defined with a discussion of quality control responsibilities. The prime contractor's Quality Assurance (QA) Officer shall report to a responsible senior officer of the company (i.e., QA management shall be separate from project management). A list of all individuals shall be provided and will include QC officers for the various components (those responsible for initiating and carrying out corrective actions and those involved in the data reporting sequence) and all analytical laboratory personnel (supervisors, chemists, and technicians). Resumes of all non-laboratory AE/Contractor personnel listing education and experience are

required, including personnel collecting samples. List the names of field personnel that will wear monitoring equipment. The name of the contract laboratory with a brief description of location, facilities and capabilities should be included.

9. Field Activities. Briefly summarize types of field activities required by the project.

10. List of Equipment, Containers, and Supplies to be taken to the Field (SECTION 5.1 in the Table of Contents). This section of the CDAP shall include all sample screening equipment to be used (brand, model, serial number) and a description of its calibration as well as sampling equipment, decontamination supplies and sample containers (specific numbers and types).

11. Sampling Locations (SECTION 5.2 in Table of Contents). This section of the CDAP shall provide the location of each sampling point on a site map. These locations shall be identified by the AE/Contractor after a visual inspection if they are not already specified in their Scope of Services or in the Specifications. In addition, at least one soil sample and one groundwater sample shall be collected in areas presenting the least potential for contamination and shall be used as background samples if this data has not been obtained in a previous phase. This section shall describe the rationale that governed the selection of sampling locations.

12. General Information and Definitions (SECTION 5.3 in Table of Contents). Some commonly used definitions are given below.

a. Contractor Laboratory. The laboratory performing analysis of the field samples. This may be an AE laboratory, a Remedial Action contractor laboratory or a laboratory subcontracted by either.

b. QA and QC Samples. Samples analyzed for the purpose of assessing the quality of the sampling effort and of the analytical data. QA and QC samples include splits or replicates of field samples, rinsate blanks, trip blanks, and background (up gradient) samples.

c. QC Samples. Quality Control samples are collected by the sampling team for use by the contractor's laboratory. The identity of these samples is held blind to the analysts and laboratory personnel until data are in deliverable form. The purpose of the sample is to provide site specific field originated checks that the data generated by the contractor's

analytical lab are of suitable quality. QC samples represent approximately 10% of the field samples.

d. QA Samples. Samples sent to a USACE QA laboratory by overnight delivery and analyzed to evaluate AE and contractor laboratory performance. QA samples represent approximately 10% of the field samples. The contractor shall coordinate with the designated QA laboratory not less than 48 hours before sampling to assure that the QA laboratory is alerted to receive the QA samples
and process them within the time limits specified by applicable EPA regulations and guidelines.

e. Split Samples. Samples that are collected as a single sample, homogenized, divided into two or more equal parts, and placed into separate containers. The sample shall be split in the field prior to delivery to a laboratory. Ordinarily split samples are analyzed by two different laboratories.

f. Replicate (duplicate, triplicate, etc.) Samples. Multiple grab samples, collected separately, that equally represent a medium at a given time and location. This is the required type of collocated sample for volatile organic analyses and most groundwater and surface water samples.

g. Rinsate Blank. Samples consisting of reagent water collected from a final rinse of sampling equipment after the decontamination procedure has been performed. The purpose of rinsate blanks is to determine whether the sampling equipment is causing cross contamination of samples.

h. Trip Blank. Containers of organic-free reagent water that are kept with the field sample containers from the time they leave the laboratory until the time they are returned to the laboratory. The purpose of trip blanks is to determine whether samples are being contaminated during transit or sample collection. Trip blanks pertain only to volatile organic analyses; therefore, the containers must contain no headspace. Only one trip blank is needed for one day's sampling and shall satisfy trip blank requirements for all matrices for that day if the volatile samples are shipped in the same cooler.

13. Sampling and Preservation Procedures (SECTION 5.4 in Table of Contents). The CDAP shall include a table, which lists sampling locations, matrix (waste, soil, water, etc.), number of field samples, number of split or replicate samples, and number of rinsate or trip blank samples. Specific sampling, preservation, etc. details shall be included. All details

shall meet the requirements of one of the following: (a) EPA SW-846 method; (b) another EPA method; (c) ASTM method; (d) NIOSH method (for air sampling); or (e) another accepted published method. Container and preservation requirements shall meet the USACE Sample Handling Protocol (Appendix F to ER 1110-1-263). Each table entry shall include the reference, if any, from which the specifications were taken. Any modifications to the standard methods must be approved by the CO with the concurrence of the QA laboratory prior to their use. All methods should be referenced to the most recent edition of their source. If a standard method is not available, the AE/Contractor or subcontractors shall propose a nonstandard method with validation data for approval by the CO.

14. Details of Sampling and Preservation Procedures. The composition and volume of sample containers shall be specified along with a description of their preparation and cleaning. Sampling equipment directly contacting the sample shall be stainless steel or Teflon. The CDAP shall describe the cleaning of equipment and precautions for prevention of sample cross contamination during collection. Any field screening methods employed to select samples for analysis shall be discussed in detail. Compositing and homogenizing procedures shall be included. Sample containers, volumes, preservatives and holding times for the common analyses in low concentration are presented in Table D-1. A more detailed table is presented in the Sample Handling Protocol (Appendix F).

a. Soil Sampling Procedure. Using stainless steel or Teflon sampling equipment enough solid is removed from a specified depth to fill the required containers. The volatile organic samples should be removed first with as little mixing as possible. The remaining soil shall be placed in a clean stainless steel bowl and mixed thoroughly with stainless steel implements (spoons, spades, etc.), then divided among the sample containers to be filled and properly preserved. QC and/or QA sample containers shall be filled from the same mixture as one of the samples.

b. Groundwater Sampling Procedure. Valid, representative samples must be obtained. Before a sample is collected from a well, the water level shall be measured and recorded. Then the well shall be pumped or bailed with clean equipment to remove a quantity of water equal to at least three times the submerged volume of the casing and filter pack. If the well does not recharge fast enough to permit removing three casing volumes, the well shall be pumped or bailed dry, and sampled as soon as sufficient recharge has occurred. The field parameters of pH,

conductivity and temperature must be stable before sampling. Containers to be analyzed for volatiles should be filled first allowing no headspace and with as little disturbance of the water as possible. If preservative is added to the bottles prior to shipment to the field, care must be taken not to overfill the containers and pH must be measured on samples where a value is specified.

c. Other Matrices. Sampling methods and equipment used shall meet the requirements of EPA or NIOSH methods.

15. Field Documentation (SECTION 5.5 in Table of Contents). The system for identifying and tracking the samples shall be described, and shall include the recording of field data in permanently bound notebooks along with the method of relating the field data to the proper samples. All field documentation shall be done in indelible ink. Daily Quality Control Reports shall be prepared daily, dated, signed by the site manager, and sent to the CO. These reports shall include (with respect to chemistry) weather information at the time of sampling, samples taken with reference given to appropriate sections of the CDAP, field instrument measurements and calibrations. Any deviations from the CDAP shall be stated. All field documentation will become part of the project files.

16. Sample Chain of Custody and Transportation (SECTION 6.0 in Table of Contents). All sample labeling, packing, transportation and chain of custody procedures shall follow the USACE Sample Handling Protocol (Appendix F to ER 1110-1-263).

17. Laboratory Analytical Procedures (SECTION 7.0 in Table of Contents). Specific laboratory procedural details shall be included. Each method shall be specified exactly and in detail by one of the following: (a) reference to an EPA SW-846 method; (b) reference to another EPA method; (c) reference to an ASTM method; (d) reference to a NIOSH method (for air analysis); (e) reference to another accepted published method; (f) reference to an accepted published method with a description of any deviations from the published procedure; or (g) complete description of the procedure, e.g., copies of laboratory instructions. EPA SW-846 methods shall be used where possible. Generally, nonstandard methods are not allowed. In special cases that require the consideration of nonstandard methods, the contract laboratory shall be prepared to provide validation data. The use of proposed nonstandard methods requires prior approval of the CO. A list of sample preparation and analytical methods most frequently used is presented in Table D-2. A table shall be included which lists for each matrix

sample preparation method number, analytical method number, analytes and laboratory quantitation limits.

18. Preventive Maintenance. The instrument, including manufacturer, model, accessories, etc., shall be specified and preventive maintenance shall be described. Preventive maintenance shall be performed by qualified personnel. Records of repairs, adjustments and calibrations shall be maintained and available for inspection by the CO on request.

19. Instrument Calibration and Frequency. Description of the procedure used for calibration and frequency of checks is required for each instrument or method. These shall be consistent with the requirements of the contract and the analytical method.

20. Analytical Methods. Include the required concentration range and data on the sensitivity (detection limits), precision, and accuracy when this information is not included in the method. Indicate how preexisting data on sensitivity, precision, and accuracy were determined, and procedures to be used to validate the method. State source and purity of analytical reference materials and laboratory chemicals necessary to perform the analyses. Nominal detection limits for common analytes are given in Tables D-3 and D-5. DQO's for specific projects will affect the value of required detection limits and goals for precision, accuracy and completeness.

21. Method Specific Data Quality Objectives. Provide objectives for precision, accuracy, detection limits, and completeness. DQO's for accuracy and precision established for each measurement parameter will be based on prior knowledge of the specific measurement system used and method validation studies employing replicate analyses, spikes, standards, calibrations, recoveries, control charts and project specific requirements. Completeness refers to the amount of valid data obtainable (by the specific method in the laboratory used with the instrument to be employed) from a measurement system compared to the expected amount of data, and is usually expressed as a percentage.

22. Quality Control Checks. Quality control checks are necessary to evaluate performance reliability for each measurement parameter. Describe procedures to assess the precision, accuracy and completeness of the measurement. The numbers and types of internal laboratory QC checks and samples proposed (e.g., blanks, duplicates, splits, spikes, surrogates, and reference standards, as applicable) shall be defined

clearly. At a minimum these must be run at the rates prescribed in the individual methods. The laboratory's established practice for including control samples among the samples analyzed and any additional controls required by the present project shall be described. Describe the feedback systems used to identify problems by means of the results obtained from control samples. Limits of data acceptability shall be included. Results from laboratory internal quality control checks shall be reported with the analytical data. Standard forms should be used, preferably CLP or SW-846 recommended format.

23. Corrective Action. Plans for corrective actions to be taken when results appear unusual, questionable, or limits of acceptability are exceeded shall be included. When limits of acceptability are exceeded, information justifying the poor recovery or precision shall be documented. Describe how reestablishment of control is demonstrated.

24. Data Reduction, Validation, and Documentation. Equations, including units, required to calculate the concentration or value of the measured parameter, shall be included. Describe the data management systems which collect raw data, store data, and document quality control data. If statistical procedures are used for data review before reporting, include descriptions. Data validation procedures and organization shall be specified. Data validation shall be conducted as determined by the Data Quality Objectives.

25. CDQM Deliverables (SECTION 8.0 in Table of Contents). The contractor shall address the frequency and content of chemical data quality control reports that shall be submitted during the project.

a. Daily Quality Control Report (DQCR) during field activities.

b. Daily Quality Control Report from the contract laboratory if this is required in the specifications or Scope of Work.

c. Departure From Approved Plans. Include problems identified, corrective actions, and verbal/written instructions from USACE personnel for sampling or re-analysis. These reports of significant problems should be sent to the CO within 48 hours of the occurrence.

d. Data Report to the QA Laboratory. The contractor's data must be submitted to the designated quality assurance laboratory (for data validation and comparison purposes) as soon as it is available. This submittal should include all sample, blank and internal quality control results such as spike and surrogate recoveries and agreement between replicate analyses. Interim data reports may be requested if the project warrants. A complete data set should also be submitted to the executing FOA for evaluation. If the submission of raw data such as chromatograms is required, it should be specified in the approved CDAP.

e. Quality Control Summary Report (QCSR)/Final Investigation Report. Ordinarily these reports are completed within thirty days of the availability of results. The QCSR addresses quality control practices employed and summarizes the DQCR. For investigative activities the QCSR may be included in the Final Investigation Report.

f. Final Investigation Report. (For investigation projects).

TABLE D-1

SAMPLE CONTAINERS, PRESERVATION AND HOLDING TIMES

Matrix	Parameter[1]	Container[2]	Preservation[3]	Maximum Holding Times[4] Extraction	Analysis
Water	Volatiles	2 x 40 mL G, Septa vial	Ice to 4°C 4 drops con HCl or $NaHSO_4$ to pH < 2	-	14 d
Water	B/N/A	2 x 1 L amber G	Ice to 4°C	7 d	40 d
Water	PCBs, Pesticides	2 x 1 L amber G	Ice to 4°C	7 d	40 d
Water	Metals[5]	1 x 1 L P	HNO_3 to pH<2	-	6 mo[5]
Water	TRPH	2 x 1 L amber G	Ice to 4°C HCl to pH<2	-	28 d
Water	Common anions[6]	1 x 1 L G	Ice to 4°C	-	28 d[6]
Water	Explosives	2 x 1 L amber G	Ice to 4°C	7 d	40 d
Water	Cyanide	1 x 1 L P	Ice to 4°C NaOH to pH > 12	-	14 d
Soils/ Sed.	Volatiles	2 x 40 mL or 2 x 125 mL G, Septa vial	Ice to 4°C	-	14 d
Soils/ Sed.	B/N/A, PCBs Pesticides	1 x 8 oz G	Ice to 4°C	14 d	40 d
Soils/ Sed.	Metals, Cyanid TRPH	1 x 8 oz G	Ice to 4°C	-	6mo[5] (TRPH: 28d)
Soils/ Sed.	Explosives	1 x 4 oz G	Ice to 4°C	14 d	40 d

TABLE D-1 (cont'd)

1. B/N/A = Base/Neutral/Acid extractable organics; TRPH = Total Recoverable Petroleum Hydrocarbons.

2. All containers must have Teflon-lined seals (Teflon-lined septa for VOA vials). G = Glass; P = High density polyethylene.

3. Sample preservation will be done in the field immediately upon sample collection. If preservative is added to the bottles prior to shipment, care must be taken not to overfill them and pH should be checked. If samples are filtered in the field, differential pressure methods and 45 micron filters will be used. (Preservative is added after filtration.) VOA samples must never be filtered.

4. When only one holding time is given, it implies total holding time from sampling until analysis.

5. Total Recoverable Metals for water samples. Holding time for Hg is 28 days; for Cr(VI) is 24 hours.

6. Cl^-, Br^-, F^-, NO_3^-, NO_2^-, PO_4^{3-}, SO_4^{2-}; 1 L for each method; orthophosphate requires filtration. Holding time for analysis is 48 hours for NO_2, NO_3, and PO_4 if not preserved with H_2SO_4 to pH < 2.

TABLE D-2
EPA METHODS FOR SAMPLE ANALYSIS

Part 1. General Information. All sample analyses of water or soils will be performed using standard EPA methods as listed below. All procedures specified must be followed exactly with no deviations unless modifications are specifically authorized by the government's QA laboratory. All method QC requirements will be followed explicitly. The running of QC duplicates and spike samples shall be in accordance with the laboratory QA/QC Plan as set forth in the LQMP, or at a minimum rate of 1 in 20 but at least 1 per batch. The detection limits stated in each method must be met by the AE laboratory. All samples must be extracted and analyzed within the specific holding times specified by each method. All analyses must be performed by the validated laboratory (in-house) and may not be subcontracted out to another laboratory. EPA-CLP methods may be substituted for analytical parameters included in the CLP Statements of Work.

Part 2. Methods for the Determination of Metals (RCRA and Priority Pollutants) by Atomic Absorption and Inductively Coupled Plasma

		Extraction and Analysis Method[2]		
Metal	Technique[1]	Soil/Sed.	Groundwater	Surface Water
Antimony (Sb)	DA	CLP[4]/7040	3005/7040	204.1
	GF	CLP[4]/7041	3020/7041	204.2
	ICP	CLP[4]/6010	3005/6010	200.7
Arsenic (As)	GF	3050/7060	Inc[3]/7060	206.2
	H	Inc[3]/7061	Inc[3]/7061	206.3
Barium (Ba)	DA	3050/7080	3005/7080	208.1
	GF	3050/7081	3020/7081	208.2
	ICP	3050/6010	3005/6010	200.7
Beryllium (Be)	DA	3050/7090	3005/7090	210.1
	GF	3050/7091	3020/7091	210.2
	ICP	3050/6010	3005/6010	200.7
Cadmium (Cd)	DA	3050/7130	3005/7130	213.1
	GF	3050/7131	3020/7131	213.2
	ICP	3050/6010	3005/6010	200.7
Calcium (Ca)	DA	3050/7140	3005/7140	215.1
	GF	-	-	-
	ICP	3050/6010	3005/6010	200.7

Table D-2 (Cont'd)

Metal	Technique[1]	Extraction and Analysis Method Soil/Sed.	Groundwater[2]	Surface Water[2]
Chromium (Cr)	DA	3050/7190	3005/7190	218.1
	GF	3050/7191	3020/7191	218.2
	ICP	3050/6010	3005/6010	200.7
Copper (Cu)	DA	3050/7210	3005/7210	220.1
	GF	3050/7211	3020/7211	220.2
	ICP	3050/6010	3005/6010	200.7
Iron (Fe)	DA	3050/7380	3005/7380	236.1
	GF	3050/7381	3020/7381	236.2
	ICP	3050/6010	3005/6010	200.7
Lead (Pb)	DA	3050/7420	3005/7420	239.1
	GF	3050/7421	3020/7421	239.2
	ICP	3050/6010	3005/6010	200.7
Manganese (Mn)	DA	3050/7460	3005/7460	243.1
	GF	3050/7461	3020/7461	243.2
	ICP	3050/6010	3005/6010	200.7
Mercury (Hg)	CV	Inc[3]/7471	Inc[3]/7470	245.1
Nickel (Ni)	DA	3050/7520	3005/7520	249.1
	GF	-	-	249.2
	ICP	3050/6010	3005/6010	200.7
Selenium (Se)	GF	3050/7740	Inc[3]/7740	270.2
	H	Inc[3]/7741	Inc[3]/7741	270.3
Silver (Ag)	DA	3050/7760	Inc[3]/7760	272.1
	GF	3050/7761	Inc[3]/7761	272.2
	ICP	3050/6010	3005/6010	200.7
Sodium (Na)	DA	3050/7770	3005/7770	273.1
	GF	-	-	273.2
	ICP	3050/6010	3005/6010	200.7
Thallium (Tl)	DA	3050/7840	3005/7840	279.1
	GF	3050/7841	3020/7841	279.2
	ICP	3050/6010	3005/6010	200.7
Zinc (Zn)	DA	3050/7950	3005/7950	289.1
	GF	3050/7951	3020/7951	289.2
	ICP	3050/6010	3005/6010	200.7

Table D-2 (Cont'd)

Part 2. Methods for the Determination of Metals (RCRA and Priority Pollutants) by Atomic Absorption and Inductively Coupled Plasma (continued)

NOTES:
1. Abbreviations: DA = Direct Aspiration; GF = Graphite Furnace; H = Hydride; CV = Cold Vapor; ICP = Inductively Coupled Plasma.

2. (a) Any water samples may be analyzed by the groundwater techniques. Groundwater samples must be analyzed by these techniques. Surface water and other water samples (drinking, silo, leachate, etc.) may be analyzed by the 200-series or the SW-846 series methods.

(b) Other extraction procedures may be appropriate instead of those listed. Methods 3010 (for flame and ICP) and 3020 (for graphite furnace) are used as extraction procedures for Total Metals and are used in TCLP methodology. Method 3040 is used to extract metals from oily wastes (greases, waxes, etc.).

(c) All 200 series methods are from EPA 600/4-79-020 (1983) "Methods for Chemical Analysis of Water and Wastes"; all other methods are from SW-846 (1986), "Test Methods for Evaluation of Solid Waste".

3. Method-specific extraction procedure is incorporated into method.

4. Follow CLP sample preparation procedures. Existing guidance in SW-846 is inadequate in this regard.

Table D-2 (Cont'd)

Part 3. Methods for the Determination of Non-Metallic Analytes

Organic Analytes	Technique[1]	Analytical Methods Soil/Sed	Groundwater[2]	Surface Water[2]
Halogenated Volatile Organics	GC	5030/8010	5030/8010[3]	601[3]
Non-Halogenated Volatile Organics	GC	5030/8015	5030/8015[3]	602[3]
Aromatic Volatile Organics	GC	5030/8020	5030/8020[3]	602[3]
Organochlorine Pesticides and PCBs	GC	3540/8080 3550/8080	3510/8080 3520/8080	608
Organophosphorus Pesticides	GC	3540/8140 3550/8140	3510/8140 3520/8140	
Chlorinated Herbicides	GC	Inc[4]/8150	Inc[4]/8150	509B[10]
Volatile Organics	GC/MS	Inc[4]/8240	Inc[4]/8240	624
Base/Neutral Semi-volatile Organics	GC/MS[5]	3540/8250 3550/8250 3540/8270 3550/8270	3510/8250 3520/8250 3510/8270 3520/8270	625
Acid Semivolatile Organics	GC/MS	3540/8250 3550/8250 3540/8270 3550/8270	3510/8250 3520/8250 3510/8270 3520/8270	625
Dioxins, etc.	GC/MS	Inc[4]/8280	Inc[4]/8280	613
Polynuclear Aromatic Hydrocarbons	HPLC	3540/8310 3550/8310	3510/8310 3520/8310	

Table D-2 (Cont'd)

Inorganic Analytes	Technique[1]	Analytical Methods: Soil/ Sediment	Ground-water[2]	Surface Water[2]
Total and Amenable Cyanide		9010 or 9012		335
Sulfide		9030	9030	376
Sulfate		9035, 9036, or 9038		375
Nitrate		9200	9200	353
Chloride		9250, 9251, or 9252		325
Common Anions[6]	IC			300.0
				429[10]
Total Organic Carbon			9060	415
Oil and Grease	IR	9071/413.2	413.2	413.2
TRPH[7]	IR	9071/418.1[7]	418.1	418.1
Ignitability		1010 or 1020		
Corrosivity[2]		9045	9040/1110	9040/1110
Reactivity		(Section 7.3.3 and 7.3.4 of SW-846)		
EP Toxicity		1310[8]	1310[8]	
TCLP		1311[8,9]	1311[8,9]	
pH		9045	9040	
Gross alpha and beta		9310	9310	
Explosives		[11]	[11]	[11]

Table D-2 (Cont'd)

Part 3 continued:
NOTES:
1. Abbreviations: GC = Gas Chromatograph; GC/MS = Gas Chromatograph/Mass Spectroscopy; IC = Ion Chromatograph; IR = Infrared Spectroscopy; HPLC = High Pressure Liquid Chromatograph.

2. (a) All water samples may be analyzed by these techniques. Groundwater samples must be analyzed by these techniques. Surface water and other water samples (drinking, silo, leachate, etc.) may be analyzed by the 200-series or the SW-846 series methods. Soil or sediment preparation unless otherwise specified involves extration of a predetermined weight of the dried samples with a fixed anount (500 mL) of water.

(b) All 300-600 series methods are from EPA 600/4-79-020 (1983) "Methods for Chemical Analysis of Water and Wastes"; all other methods are from SW-846 (1986), "Test Methods for Evaluation of Solid Waste".

3. Direct injection may be used for high concantrations of contaminates in water. It is preferable to use Method 8240. If Method 8010, 8015, 8020, 601, or 602 is used, it is necessary to confirm results with a second GC column or a validation by GC/MS.

4. Method-specific extraction procedure is incorporated into method.

5. Either method may be used. Extract cleanup by Methods 3600 is usually also required.

6. Common anions are fluoride (F^-), chloride (Cl^-), bromide (Br^-), nitrite (NO_2^-), nitrate (NO_3^-), Orthophosphate (PO_4^{3-}), and sulfate (SO_4^{2-}).

7. Total Recoverable Petroleum Hydrocarbons. Follow extraction procedures 9071 through Step 7.11 and then dilute with Freon-113 to 100 mL.

8. Extraction procedure only. Analysis must follow.

9. Federal Register March 29, 1990. TCLP leachates are analyzed by one or more of the following methods. Scope must specify which analyses are to be performed on TCLP leachate extracts.

Table D-2 (Cont'd)

Metals: Methods 6010, 7060, 7470, and 7740
Pesticides: Method 8080
Herbicides: Method 8150
Volatile organics: Method 8240 (Zero headspace TCLP extraction required)
Semi-volatile organics: Method 8270

10. Standard Methods for the Examination of Water and Wastewater, 16th Edition, 1985.

11. USACE method developed by Cold Regions Research and Engineering Laboratory to be obtained from CEMRD.

Table D-3. Inorganic Analysis Nominal Values for Instrument Detection Limits[a].

Analyte:	User's Guide to CLP ug/L	SW-846 ICP ug/L	SW-846 AA-DA ug/L	SW-846 AA-GF ug/L
Aluminum, Al	200	45	100	-
Antimony, Sb	60	32	200	3
Arsenic, As	10	53	2[b]	1
Barium, Ba	200	2	100	-
Beryllium, Be	5	0.3	5	0.2
Cadmium, Cd	5	4	5	0.1
Calcium, Ca	5000	10	10	-
Chromium, Cr	10	7	50	1
Cobalt, Co	50	7	50	1
Copper, Cu	25	6	20	-
Iron, Fe	100	7	30	-
Lead, Pb	5	42	100	1
Magnesium, Mg	5000	30	1	-
Manganese, Mn	15	2	10	-
Mercury, Hg	0.2	-	0.2[c]	-
Nickel, Ni	40	15	40	-
Potassium, K	5000	-	10[b]	-
Selenium, Se	5	75	2	2
Silver, Ag	10	7	10	-
Sodium, Na	5000	29	2	-
Thallium, Tl	10	10	100	1
Vanadium, V	50	8	200	4
Zinc, Zn	20	2	5	-
Cyanide, CN^-	10	-	-	-

Important Note: These estimated instrument detection limits are to be used as a guide. The actual detection limits are matrix dependent and sample dependent. For ICP, each instrument must have an established analyte interference table as per Method 6010. See Method 6000 or 7000 for further guidance.

a. AA-DA = Atomic Absorption - Direct Aspiration
AA-GF = Atomic Absorption - Graphite Furnace

b. Gas hydride technique

c. Cold vapor technique

Table D-4. Volatile Organic Analysis Nominal Values for Practical Quantitation Limits

Analyte:	Ground Water ug/L	Low Soil Sediment ug/kg
Chloromethane	10	10
Bromomethane	10	10
Vinyl Chloride	10	10
Chloroethane	10	10
Methylene Chloride	5	5
Acetone	100	100
Carbon Disulfide	5	5
1, 1-Dichloroethene	5	5
1, 1-Dichloroethane	5	5
1, 2-Dichloroethene	5	5
Chloroform	5	5
1, 2-Dichloroethane	5	5
2-Butanone	100	100
1,1,1-Trichloroethane	5	5
Carbon Tetrachloride	5	5
Vinyl Acetate	50	50
Bromodichloromethane	5	5
1,2-Dichloropropane	5	5
cis-1,3-Dichloropropene	5	5
Trichloroethene	5	5
Dibromochloromethane	5	5
1,1,2-Trichloroethane	5	5
Benzene	5	5
trans-1,3-dichloropropene	5	5
Bromoform	5	5
2-Chloroethyl Vinyl Ether	10	10
4-Methyl-2-pentanone	50	50
2-Hexanone	50	50
Tetrachloroethene	5	5
Toluene	5	5
1,1,2,2-Tetrachloroethane	5	5
Chlorobenzene	5	5
Ethyl Benzene	5	5
Styrene	5	5
Xylenes (Total)	5	5

Table D-5. Semivolatile Organic Analysis Nominal Values for Practical Quantitation Limits

Analyte:	Ground Water ug/L	Low Soil Sediment ug/kg
Phenol	10	660
Bis (2-chloroethyl) ether	10	660
2-Chlorophenol	10	660
1,3-Dichlorobenzene	10	660
1,4-Dichlorobenzene	10	660
Benzyl alcohol	20	1300
1,2-Dichlorobenzene	10	660
2-Methylphenol	10	660
Bis (2-chloroisopropyl)ether	10	660
4-Methylphenol	10	660
N-Nitroso-di-n-dipropylamine	10	660
Hexachloroethane	10	660
Nitrobenzene	10	660
Isophorone	10	660
2-Nitrophenol	10	660
2,4-Dimethylphenol	10	660
Benzoic Acid	50	3300
Bis(2-chloroethoxy)methane	10	660
2,4-Dichlorophenol	10	660
1,2,4-Trichlorobenzene	10	660
Naphthalene	10	660
4-Chloroaniline	20	1300
Hexachlorobutadiene	10	660
4-Chloro-3-methylphenol	20	1300
2-Methylnaphthalene	10	660
Hexachlorocyclopentadiene	10	660
2,4,6-Trichlorophenol	10	660
2,4,5-Trichlorophenol	50	3300
2-Chloronaphthalene	10	660
2-Nitroaniline	50	3300
Dimethylphthalate	10	660
Acenaphthylene	10	660
2,6-Dinitrotoluene	10	660
3-Nitroaniline	50	3300
Acenaphthene	10	660
2,4-Dinitrophenol	50	3300
4-Nitrophenol	50	3300
Dibenzofuran	10	660
2,4-Dinitrotoluene	10	660
Diethylphthalate	10	660
4-Chlorophenyl phenyl ether	10	660
Fluorene	10	660
4-Nitroaniline	50	3300
4,6-Dinitro-2-methylphenol	50	3300

Table D-5. (Cont'd)

Analyte:	Ground Water ug/L	Low Soil Sediment ug/kg
N-Nitrosodiphenylamine	10	660
4-Bromophenyl phenyl ether	10	660
Hexachlorobenzene	10	600
Pentachlorophenol	50	3600
Phenanthrene	10	660
Anthracene	10	660
Di-n-butylphthalate	10	660
Fluoranthene	10	660
Pyrene	10	660
Butylbenzylphthalate	10	660
3,3'-Dichlorobenzidine	20	1300
Benzo(a)anthracene	10	660
Chrysene	10	660
Bis(2-ethylhexyl)phthalate	10	660
Di-n-octylphthalate	10	660
Benzo(b)fluoranthene	10	660
Benzo(k)fluoranthene	10	660
Benzo(a)pyrene	10	660
Indeno(1,2,3-cd)pyrene	10	660
Dibenzo(a,h)anthracene	10	660
Benzo(g,h,i)perylene	10	660

Table D-6. Pesticide/PCB Analysis Nominal Values for Practical Quantitation Limits

Analyte:	Ground Water ug/L	Low Soil Sediment ug/kg
Aldrin	0.04	2.7
alpha-BHC	0.03	2.0
beta-BHC	0.06	4.0
delta-BHC	0.09	6.0
gamma-BHC (Lindane)	0.04	2.7
Chlordane (technical)	0.14	9.4
4,4'-DDD	0.11	7.5
4,4'-DDE	0.04	2.7
4,4'-DDT	0.12	8.0
Dieldrin	0.02	1.3
Endosulfan I	0.14	9.4
Endosulfan II	0.04	2.7
Endosulfan sulfate	0.66	44.2
Endrin	0.06	4.0
Endrin aldehyde	0.23	15.4
Heptachlor	0.03	2.0
Heptachlor epoxide	0.83	55.6
Methoxychlor	1.76	117.9
Toxaphene	2.4	160.8
Aroclor-1016	0.5	80.0
Aroclor-1221	0.5	80.0
Aroclor-1232	0.5	80.0
Aroclor-1242	0.65	43.6
Aroclor-1248	0.5	80.0
Aroclor-1254	1.0	160.0
Aroclor-1260	1.0	160.0

APPENDIX E

USACE CHEMICAL QUALITY ASSURANCE

1. Purpose. This appendix defines the components of USACE HTW chemical quality assurance and delineates the responsibilities of those USACE elements which provide these services.

2. Applicability. The policies in this appendix apply to all HTW projects executed by USACE districts, divisions and other FOA and their contractors. Every project must be assigned a QA Laboratory. QA functions may not be contracted out directly by the FOA to commercial enterprises. Sample analysis may be performed by a commercial lab under direct contract to the USACE QA Laboratory.

3. Elements and Responsibilities of USACE Chemical Quality Assurance. CEMRD is appointed by HQUSACE to exercise the lead in Corps-wide chemical data quality management and maintain consistency in this effort for all HTW activities. The elements of chemical data quality management involved in quality assurance are document review, analysis of field quality assurance samples, generation of the Chemical Quality Assurance Report (CQAR), validation of commercial laboratories, and assignment of quality assurance responsibilities. The first three are responsibilities transferred to the assigned quality assurance laboratory for a given project. The latter two activities remain the responsibility of CEMRD.

4. Procedures. The following procedures are followed for each investigation and remedial activity involving chemical analysis.

a. The project manager/COR notifies CEMRD and the preferred QA Laboratory (CEMRD-ED-GL or the geographic USACE Division Laboratory) of the need for chemical quality assurance services. A suggested format is provided for this purpose. If a memorandum is preferred the same information should be included.

b. The proposed QA laboratory requests project specific assignment providing CEMRD with information on procedures which will be employed to discharge their responsibilities. The suggested format provided in this appendix or a memorandum which addresses the same information should be sent.

c. CEMRD confirms the assignment in writing to the project manager/COR and the Division Laboratory and monitors the chemical data quality management through oversight review of ER 1110-1-263

documents and review of the Chemical Quality Assurance Report. To facilitate this the quality assurance laboratory should send copies of their comments and of the CQAR to CEMRD as soon as these are available.

d. The quality assurance laboratory will either analyze the QA samples in-house or send them to a USACE validated commercial laboratory for analysis. Analysis in-house requires method and matrix-specific validation by CEMRD. Ongoing retention of validation requires periodic analysis of performance audit samples and laboratory site audits. Internal quality control specified in the methods--blanks, replicate analyses, spikes, surrogates, etc. must be included and reported in the analyses of the QA samples and results must be reported.

e. USACE quality assurance laboratories are required to maintain a Laboratory Quality Management Manual which is updated regularly. The manual should contain chronological resumes of all HTW chemistry personnel, a list of instruments and accessories with dates of purchase, and SOP's for the following activities:

(1) sample check-in, logging, and cooler packing procedure,

(2) in-house chain of custody,

(3) glassware cleaning,

(4) analytical procedures used in-house,

(5) data analysis and reporting,

(6) quality control procedures employed for each analytical method.

A copy of updated pages or the revised LQMM should be sent to CEMRD when these are generated.

f. The validation of commercial laboratories for nationwide USACE work is centralized at CEMRD. If a Division Quality Assurance Laboratory assists in this effort by sending an inspector to a commercial laboratory, CEMRD will be notified immediately by phone of general inspection results. A written report will be prepared by the inspector and sent to CEMRD within two weeks of the inspection date, and should not specify approval but rather make recommendations based on the inspection. The formats of the inspection checklist to be used and of the report will be provided to the inspector by CEMRD.

CEMRD will take into account all aspects of laboratory performance during evaluation and determine extent and length of validation, and make an approval recommendation to the requesting FOA.

5. Guidance on Field Quality Assurance Sample Rates. Quality Assurance Samples are duplicates and/or splits and field blanks which are sent to one of the USACE Division Laboratories to be analyzed and later compared in the CQAR with the contractor's results. Some attempt should be made to select contaminated samples for QA, as based on physical evidence such as appearance, odor, or field screening tests. Prior to determining the QA rates on a site, the following should be ascertained:

a. Number of Matrices - groundwater, surface water, soil, sediment, and waste are those most commonly encountered.

b. Whether dedicated sampling equipment will be used for each sampling event or decontamination in the field will be an issue.

c. Whether the QA splits or duplicates will be taken on the same sample as the contractor's QC or whether these will be staggered.

d. Whether the rinsates will be associated with samples which will be split for QA purposes (in most cases this would be advisable).

(1) In general samples which are taken for volatiles analyses are discrete collocated samples. Most groundwater and surface water samples also fall under this category. Soil and sediment samples which are taken for analytical methods other than volatiles should be thoroughly mixed in the field and then split for QC and/or QA purposes, with a portion going to the contractor as a regular sample.

(2) Trip blanks are relevant only when water samples are taken for volatile organics analysis. Ordinarily one trip blank is shipped in each cooler containing aqueous volatile samples. To reduce the number of trip blanks needed, it is recommended that all VOA samples be shipped in the same cooler. The trip blank is not to be opened at any time between its preparation and its analysis.

(3) The rinsates should be associated by sample number with the sample for which the equipment was decontaminated.

Rinsates taken for government quality assurance samples should be taken just prior to the QA sample. If the sample is analyzed first, and is clean, the rinsate and trip blanks need not be analyzed. If dedicated sampling equipment is used for each sampling event, rinsate blanks are not required.

(4) The Scope of Services or the CDAP for the site should contain a Data Quality Objectives section which discusses in some detail the rationale for the rates of QA which are selected for the site. The following are proposed minimum rates for the USACE QA samples.

a. DERP Site Inspection Confirmation Studies (usually a sample set of 1 to 20 samples per matrix).

(1) Soil or sediment -- 1 duplicate/split to be analyzed for all site specific analytes. Under some circumstances such as suspected heavy contamination, a rinsate may be advisable. See Section 5.d.(3) above.

(2) Groundwater -- 1 duplicate, 1 rinsate analyzed for all groundwater parameters, 1 trip blank analyzed only for volatiles.

(3) Surface water -- 1 duplicate, 1 rinsate analyzed for all surface water parameters. If volatiles are included among the parameters, ship VOA vials with groundwater VOA's to avoid the necessity of an additional trip blank.

(4) A background soil sample with no attendant blanks to be analyzed for metals, total recoverable petroleum hydrocarbons, volatiles, BNAs and PCBs/Pesticides if these are site-specific analytes for soils.

b. RI/FS or Pre-Design CDQM.

(1) Include 5-10% duplicates/splits or at least one per matrix for both QC and QA. If there is a possibility of litigation, the higher rate should probably be selected.

(2) A background soil sample should be included and analyzed for metals, volatiles, BNA's, PCB's/Pesticides, and total recoverable petroleum hydrocarbons if these are site-specific soil analytes. Additional background samples may be specified depending upon the degree of confidence needed in establishing background levels.

(3) Rinsates at the rate of one per day for water samples.

(4) Include 1 trip blank per shipping cooler containing water samples to be analyzed for volatiles.

c. Construction and other activities. Special projects such as pilot plant treatability studies, kinetic studies, leachate tests, etc. undertaken in Design/Construction stages require separate consideration. The rates of quality assurance should be decided on a case-by-case basis by the project manager or COR in concurrence with CEMRD. Ordinarily they will be somewhat less than 10%.

6. The Chemical Quality Assurance Report. The CQAR is written by the USACE Quality Assurance Laboratory and sent to the project manager within 30 days of receipt of the contractor's data and completion of the quality assurance data. This report should address the following concerns:

a. Overall performance of the laboratory--commercial or USACE--that analyzed the site primary samples,

b. Detailed evaluation of the contractor's data--laboratory blanks, replicate analyses, agreement between duplicates/splits, acceptability of spike and surrogate recoveries,

c. Comparison of the quality assurance analytical results with those of the project laboratory,

d. Any other problems or issues encountered such as packing and shipment errors, chain of custody failures, etc.

Tables should be prepared which compare the results for duplicates, splits and blanks sent to both laboratories. The quality assurance data with internal quality control results should be appended.

7. In-House Work. When a USACE Division Laboratory is functioning as the primary laboratory on a project, special arrangements for quality assurance should be made. If the samples are contracted out by the division laboratory, and only the QA samples are analyzed in-house, the final report written by the division laboratory would have to be modified to accommodate this arrangement. If the division laboratory is analyzing all of the project samples or a method subset of the samples in-house, ordinarily a second USACE Division Laboratory should be selected as the quality assurance laboratory for the project.

8. When the following procedures, performed by the designated USACE QA laboratory, demonstrate that contract requirements are not being met, resampling and/or reanalysis may be required by the COR at the expense of the contractor.

a. Inspection of QA samples to insure that sampling procedures correspond to the CDAP with regard to containers, preservation, labeling, packing, chain of custody, etc.

b. Analyses of QA samples,

c. Evaluation of contractor analytical deliverables specified in the CDAP,

d. Comparison of analytical results obtained by contract laboratory and USACE QA laboratory from split or duplicate samples.

(SAMPLE FORMAT)

TO: CEMRD-ED-GC FROM:_____ DATE: / /

SUBJECT: Request for USACE Project Specific Chemical Quality Assurance Assignment (To be filled out by the Quality Assurance Laboratory)

Project Name:_____ Contract No.:_____

Superfund ___ FUDS ___ IRP ___ Other ___ Phase _____
Location:_____ State:_____

A-E/Contractor:_____ State:_____
USACE Project Manager:_____
Phone:_____ Address:_____

Approximate Sampling Dates:_____

Document to be reviewed: _____
_____
_____
_____

Reviewer: _____

QUALITY ASSURANCE SAMPLES: _

MATRIX	METHOD	NO. OF SAMPLES	ANALYTICAL LABORATORY*	ESTIMATED COST+

* Name of USACE validated laboratory to be used or designated "in-house" analyses.
+ Include cost of review, sample checks, etc.

(SAMPLE FORMAT)

TO:_____ FROM:_____ DATE:__/__/__

SUBJECT: Request for Government Quality Assurance Services (To be sent to the requested USACE Laboratory with a copy to CEMRD-ED-GC)

Project Name:_____ Contract No.:_____

Superfund ___ FUDS ___ IRP ___ Other ___ Phase _____
Location:_____ State:_____

A-E/Contractor:_____ State:_____
USACE Project Manager:_____
Phone:_____ Address:_____

Laboratory Name:_____
Address:_____
Phone:_____
POC:_____

Approximate Sampling Dates:_____

The following QA Laboratory support is requested for the subject project: USACE Division Laboratory:_____

____ Review and comment on Draft _____

____ Analysis and Reports of Quality Assurance Samples

METHOD	NO. OF WATER SAMPLES*	NO. OF SOIL/SEDIMENT SAMPLES†

* Includes Blanks

† Includes Background Soil Sample

CF: CEMRD-ED-GC

APPENDIX F

SAMPLE HANDLING PROTOCOL FOR LOW, MEDIUM AND HIGH CONCENTRATION SAMPLES OF HAZARDOUS WASTE

1. Purpose. This protocol provides guidance on sample volumes, containers, packing, and shipping for low, medium, and high concentration environmental samples taken for chemical analysis.

2. Applicability. The guidance in this appendix applies to all samples taken by USACE for HTW chemical analysis. The requirements are consistent with those of the Environmental Protection Agency and all standard chemical methods generally used are included.

3. Low Concentration Samples. Low level samples are considered to be those collected off-site, around the perimeter of a waste site, or in areas where hazards are thought to be significantly reduced by normal environmental processes.

a. Waters.

(1) Organics.

(a) Bottle and Preservative Requirements.

- Four 1-liter amber glass bottles (Teflon-lined caps), iced to 4°C (may not be held at site over 24 hours). Remember: Leave some headspace!
- Two 40 mL glass VOA vials (with Teflon septa), iced to 4°C (may not be held at site over 24 hours). Fill completely! All air bubbles must be excluded. Add HCl (4 drops of concentrated HCl) or $NaHSO_4$ to pH < 2.
- The samples above are needed when Method 8240 is used to analyze for volatile (or purgeable) organics, when Methods 8250 or 8270 are used to analyze for Base/Neutral/Acid (B/N/A) extractable organics, and when Method 8080 is used to analyze for pesticides and PCB's. Two of the 1-L bottles are needed for 8250 or 8270 and two for 8080.

- Oil and Grease, Total Organic Carbon (TOC) or TRPH. For each analyte, two 1-liter glass bottle (Teflon-lined cap), 5 mL 1:1 HCl (to pH < 2), and 4°C. Leave headspace.

(b) Paperwork/Labels.

- (ENG Form 5021-R) Chain of Custody Record. See attached example. It is important to note that only one site may be listed per form even if the sites have the same project number. Top original goes with the samples; a copy should be saved for the sampler's files.

- Receipt for Samples. See attached example. This form complies with the requirements that the owner, operator, or agent-in-charge is legally entitled to: (1) a receipt describing the samples obtained from the site and; (2) a portion of each sample equal in weight or volume to the portion retained, if requested. The original form is retained for the Project Coordinator and a copy is given to the owner, operator, or agent-in-charge.

- Sample Labels/Tags. See attached example. You must label the sample with a date, time of collection, site name, and brief description on a label that will not float/soak off - no masking tape, please. Use only indelible ink on all labels. Numbered sample labels should be used on all samples. Some projects may also require the use of sample tags in addition to labels.

(c) Packaging and Shipping.

- Waterproof metal (or equivalent strength plastic) ice chests or coolers only.

- After filling out the pertinent information on the sample label and tag, put the sample in the bottle or vial and screw on the lid. For bottles other than VOA vials, secure the lid with strapping tape. (Tape on VOA vials may cause contamination.) Then, secure the string from the numbered approved tag around the lid.

- Mark volume level on bottle with grease pencil.

- Place about 3 inches of inert cushioning material such as vermiculite in the bottom of the cooler.
- Enclose the bottles in clear plastic bags through which sample tags and labels are visible, and seal the bag. Place bottles upright in the cooler in such a way that they do not touch and will not touch during shipment.
- Put in additional inert packing material to partially cover sample bottles (more than halfway). Place bags of ice around, among, and on top of the sample bottles. If chemical ice is used, it should be placed in a plastic bag.
- Fill cooler with cushioning material.
- Put paperwork (chain of custody record) in a waterproof plastic bag and tape it with masking tape to the inside lid of the cooler.
- Tape the drain shut.
- Secure lid by taping. Wrap the cooler completely with strapping tape at a minimum of two locations. Do not cover any labels.
- Attach completed shipping label to top of the cooler.
- Put "This Side Up" labels on all four sides and "Fragile" labels on at least two sides.
- Affix numbered and signed custody seals on front right and back left of cooler. Cover seals with wide, clear tape.

Remember that each cooler cannot exceed the weight limit set by the shipper.

(2) Inorganics.

(a) Bottle and Preservative Requirements.

- Metals. One 1-liter high density polyethylene bottle (Teflon-lined cap), adjust to pH < 2 with 1:1 HNO_3 (usually 3 mL).

- o Cyanides. One 1-liter high density polyethylene bottle (Telfon-lined cap), adjust to pH > 12 with NaOH (usually 2 mL of 10N NaOH or 4 pellets), and 4°C.

- o Sulfide. One 1-liter high density polyethylene bottle (Teflon-lined cap), 4 mL 2.0 N zinc acetate and adjust pH > 9 with NaOH, and 4°C.

- o Fluoride. One 1-liter high density polyethylene bottle (Teflon-lined cap), no preservative, and 4°C.

- o pH. No preservative. Must be measured twice immediately in field. Do not ship.

- o Ammonia, Total Kieldahl Nitrogen, Nitrate/Nitrite. For each analyte, one 1-liter high density polyethylene bottle (Telfon-lined cap), adjust to pH < 2 with H_2SO_4 (usually 4 mL 1:1 H_2SO_4), and 4°C.

(b) Paperwork/Labels.

- o Inorganic Paperwork is the same as described for organics (see Section 3.a.(1).(b). above) and includes the Chain of Custody Record, Receipt for Samples, and Labels/Sample Tags. See previous examples and explanations.

(c) Packaging and Shipment.

- o Follow packaging and shipping requirements listed for organics (see Section 3.a.(1).(c). above). "Fragile" labels are optional for coolers not containing glass bottles. In cases where ice is not required (metals), fill cooler with only packing material. Once again, remember that the cooler must not exceed the shipper's weight limit.

b. Soils/Sediments (Organics and Inorganics).

(1) Bottle and Preservative Requirements.

- o Two 8-ounce glass wide mouth jars at least 3/4 full (Teflon-lined caps), iced to 4°C - one jar for organics (non-VOA) and one jar for inorganics. For analysis of volatiles in soil, two 40 mL VOA vials or two 125 mL jars with Teflon septa are used. These shoudl be completely filled and iced to 4°C.

(2) Paperwork/Labels.

- Follow paperwork requirements listed for water samples in Section 3.a.(1).(b). above. See attached examples of forms.

(3) Packaging and Shipping.

- Follow packaging and shipping requirements in Section 3.a.(1).(c). above. Be sure that the shipping cooler does not exceed the shipper's weight limits.

4. Medium Concentration Samples. Medium level samples are most often those collected on-site, in areas of moderate dilution by normal environmental processes.

a. Water/Liquids (Organics and Inorganics).

Note: Samples are not known to contain highly toxic compounds.

(1) Bottle and Preservative Requirements.

- Four 32-ounce wide mouth glass jars (Teflon-lined caps), no preservatives, and iced to 4°C for B/N/A extractable organics and PCB/Pesticides (two jars for each method). Remember: Leave some headspace.
- Two 40 mL glass VOA vials (Teflon septa), Iced to 4°C. Fill completely. No headspace.
- Two 16-ounce wide mouth glass jars nearly full (Teflon-lined caps) one for metals and one for cyanides. (Preserved as for low level. See Section 3.a.(2).(a).)

(2) Paperwork/Labels.

- See previous examples. Follow paperwork requirements in Section 3.a.(1).(b). for low concentration samples.

(3) Packaging and Shipping

- Secure sample jar lids with strapping tape or evidence tape. At the same time secure string from USEPA numbered tag around lid.

- Mark volume level of bottle with grease pencil.
- Position jar in Ziploc bag so that tags may be read.
- Place about 1/2 inch of cushioning material in the bottom of metal can.
- Place jar in can and fill remaining volume of can with cushioning material.
- Close the can using three clips to secure lid.
- Write sample number on can lid. Indicate "This Side Up" by drawing an arrow and place "Flammable Liquid N.O.S." label on can. Personnel who ship samples must be sure to comply with DOT shipping regulations and not knowingly <u>over-classify</u> a sample prior to shipment. If the person shipping a sample <u>knows</u> that the sample is not a "Flammable Liquid" (i.e., a water phase sample or a soil sample), he should not classify it as "Flammable Liquid."
- Place about 1 inch of packing material in bottom of cooler.
- Place cans in cooler and fill remaining volume of of cooler with packing material. Add ice bags if required.
- Put paperwork in plastic bags and tape with masking tape to inside lid of cooler.
- Tape drain shut.
- After acceptance by shipper, tape cooler completely around with strapping tape at two locations. Secure lid by taping. Do not cover any labels.
- Place lab address on top of cooler.

<u>Note</u>: Write "Flammable Liquid N.O.S." on side of cooler if this is not marked on the margin of your DOT label.

- For all medium and high concentration shipments, complete shipper's hazardous material certification form.

- Put "This Side Up" labels on all four sides sides, "Flammable Liquid N.O.S." and "Danger-Peligro" on all sides.

Note: "Danger-Peligro" labels should be used only when net quantity of samples in cooler exceeds 1 quart (32 ounces) for liquids or 25 pounds for solids. In other words, for our purposes "Danger-Peligro" labels will never be used for Flammable Solids N.O.S.

- Affix number custody seals on front right and back left of cooler. Cover seals with wide, clear tape.

b. Soils/Sediments/Solids (Organics and Inorganics).

(1) Bottles and Preservatives Requirements.

- For analysis of volatiles, two 40 mL VOA vials or two 125 mL jars with Teflon septa are used. These should be completely filled and iced to 4°C.

- Two 8-ounce wide mouth glass jars, 3/4 full (Teflon-lined caps), no preservatives, one jar for organics (non-VOA) and one jar for inorganics (metals and cyanide) or

- Four 4-ounce wide mouth glass jars each 3/4 full (Teflon-lined caps), no preservative; two jars for organics (non-VOA) and two jars for inorganics.

(2) Paperwork/Labels.

- See previous examples. Follow paperwork requirements listed in Section 3.a.(1).(b). for low concentration samples.

(3) Packaging and Shipping.

- Follow packaging and shipping requirements listed in Section 3.a.(1).(c). for medium concentration water/liquids above substituting "Flammable Liquid N.O.S." with "Flammable Solid N.O.S."

5. High Concentration Samples (Hazardous: Determined Not to be D.O.T.-Defined Poison A). High concentration samples include those from drums, surface impoundments, direct discharges, and chemical spills, where there is little or no evidence of environmental dilution. High concentration (or high

hazard) samples are suspected to contain greater than 15% concentration of any individual chemical substituent.

a. Liquids (Organics and Inorganics).

(1) Bottle and Preservative Requirements.

- One 8-ounce wide mouth glass jar filled 1/2 to 3/4 full (Teflon-lined cap). No preservative.

(2) Paperwork/Labels.

(a) See previous examples. Follow paperwork requirements listed in Section 3.a.(1).(b). above.

(b) Shipper may require special forms to be completed before shipment of high hazard concentration samples.

(3) Packaging and Shipping.

- Follow packaging and shipping requirements listed in Section 3.a.(1).(c). above for medium concentration water/liquids.

b. Soils/Sediments/Solids (Organics and Inorganics).

(1) Bottle and Preservative Requirements.

- One 8-ounce wide-mouth glass jar filled 1/2 to 3/4 full (Teflon-lined cap). No preservative.

(2) Paperwork/Labels.

- See attached examples. Follow paperwork requirements in Section 3.a.(1).(b). above.

(3) Packaging and Shipping.

- Follow packaging and shipping requirements listed in Section 3.a.(1).(c). for medium concentration water/liquids, substituting "Flammable Liquid N.O.S." with "Flammable Solid N.O.S."

TABLE F-1

SAMPLE CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

Low Concentration Samples

Matrix	Parameter[1]	Container[2]	Preservation[3]	Maximum Holding Times: Extraction[4]	Analysis
Water	Volatiles	2 x 40 mL[8] G, Septa vial	Ice to 4°C 4 drops con HCl or $NaHSO_4$ to pH<2	-	14 d
Water	B/N/A	2 x 1 L[5,8] amber G	Ice to 4°C	7 d	40 d
Water	PCBs, Pesticides	2 x 1 L[5,8] amber G	Ice to 4°C	7 d	40 d
Water	Metals[6]	1 x 1 L P	HNO_3 to pH<2	-	6 mo[6]
Water	TRPH	2 x 1 L G	Ice to 4°C HCl to pH<2	-	28 d
Water	Common anions[7]	1 x 1 L[7] G	Ice to 4°C	-	28 d[7]
Water	Explosives	2 x 1 L G (amber)	Ice to 4°C	7 d	40 d
Water	Cyanide	1 x 1 L P	NaOH to pH>12 Ice to 4°C	-	14 d
Soils/ Sed.	Volatiles	2 x 40 ml G or 2 x 125 mL G, Septa vial	Ice to 4°C	-	14 d
Soils/ Sed.	B/N/A, PCBs, Pesticides	1 x 8 oz G	Ice to 4°C	14 d	40 d
Soils/ Sed.	Metals, Cyanide, TRPH	1 x 8 oz G	Ice to 4°C (Cyanide & TRPH)	-	6 mo[6] (TRPH: 28d)
Soils/ Sed.	Explosives	1 x 4 oz G	Ice to 4°C	14 d	40 d

TABLE F-2

SAMPLE CONTAINERS AND PRESERVATIVES[9]

Medium Concentration Samples

Matrix	Parameter[1]	Container[2]	Preservation[3]
Water/Liquid	Volatiles	2 x 40 mL G, Septa vial	Ice to 4°C[8]
Water/Liquid	B/N/A[5]	2 x 32 oz wide mouth jars, G	Ice to 4°C[8]
Water/Liquid	PCBs[5], Pesticides	2 x 32 oz wide mouth jars, G	Ice to 4°C[8]
Water/Liquid	Metals	1 x 16 oz wide mouth jar, G	HNO_3 to pH<2
Water/Liquid	Cyanide	1 x 16 oz wide mouth jar, G	Ice to 4°C
Water/Liquid	Explosives	2 x 1 L G (Amber)	Ice to 4°C
Soils/ Sediments	Volatiles	2 x 40 ml G or 2 x 125 mL G	Ice to 4°C
Soils/ Sediments	B/N/A, PCBs, Pesticides	1 x 8 oz wide mouth jar, G	---
Soils/ Sediments	Metals, Cyanide, TRPH	1 x 8 oz wide mouth jar, G	Ice to 4°C (Cyanide & TRPH)
Soils/ Sediments	Explosives	1 x 4 oz wide mouth jar, G	Ice to 4°C

High Concentration Samples

Matrix	Parameter[1]	Container[2]	Preservation
Liquid	All organic and inorganic analyses	1 x 8 oz wide mouth jar, G	---
Solid	All organic and inorganic analyses	1 x 8 oz wide mouth jar, G	---

1. B/N/A = Base/Neutral/Acid extractables; TRPH = Total Recoverable Petroleum Hydrocarbons

2. All containers must have Teflon-lined seals (Teflon-lined septa for VOA vials). G = Glass; P = High density polyethylene.

3. Sample preservation will be done in the field immediately upon sample collection. If water samples are filtered in the field, differential pressure methods using 45 micron filters will be used, and preservative added after filtration. VOA samples should never be filtered.

4. When only one holding time is given, it implies total holding time from sampling until analysis.

5. Three bottles are required on at least 5-10% (but at least one) sample so that laboratory can perform all method QC checks for SW-846 method.

6. Total Recoverable Metals for water samples. Holding time for Hg is 28 days in glass; for Cr(VI) is 24 hours.

7. Cl^-, Br^-, F^-, NO_3^-, NO_2^-, PO_4^{3-}, SO_4^{2-}; 1 L for each method; orthophosphate requires filtration. Holding time for extraction is 48 hours for NO_2^-, NO_3^-, and PO_4^{3-} if not preserved with H_2SO_4 to pH < 2.

8. Samples with residual chlorine present will be dechlorinated with sodium thiosulfate as specified in SW-846 (Third edition).

9. Holding times for medium concentration samples are the same as those specified for low concentration samples.

ER 1110-1-263
1 Oct 90

U.S. Army Corps of Engineers

Chain of Custody Record

(ER 1110-1-263)

Proj. No.	Project Name					Number of Containers								
Sampler: (Signature)														
Date	Time	Proc.	Grab	Comp	Site Code/Sample Number									Remarks

FOR ILLUSTRATION PURPOSES ONLY
(Local reproduction authorized - blank masters available from local FMO)

Sampler Relinquished by:	Date/Time	Received by: (Sig.)	Date/Time	Hazards Associated with Samples
Relinquished by: (Sig.)	Date/Time	Received by: (Sig.)	Date/Time	
Relinquished by: (Sig)	Date/Time	Received for Laboratory by: (Sig.)	Date/Time	Remarks at time of receipt:
Custody Seal No.		Lab case No.:		

ENG Form 5021-R, Oct 90

Proponent: CEMP-RP

SAMPLE

U.S. Army Corps of Engineers — **Chain of Custody Record** (ER 1110-1-263)

Proj. No.: 017

Project Name: Any Army Ammunition Plant

Samplers (Signature): Marcia C[illegible]

Date 90	Time	Pres.	Grab	Comp	Site Code/Sample Number	Number of Containers	Volatile Organics	B/N/A	Total Metals	TRPH	Explosives			Remarks:
9/4	0930	4°C	X		AAAP-SB01-0001	2	X							Strong hydrocarbon odor
9/4	0935	4°C	X		AAAP-SB01-0001	1		X	X		X			" " "
9/4	0937	4°C	X		AAAP-SB01-0001	1				X				" " "
9/4	1035	pH<2 HCl 4°C	X		AAAP-MW02-0001	2	X							No visual turbidity
9/4	1036	4°C	X		AAAP-MW02-0001	2		X						" " "
9/4	1040	pH<2 HNO3 4°C	X		AAAP-MW02-0001	1			X					" " "
9/4	1050	pH<2 HCl 4°C	X		AAAP-MW02-0001	2				X				" " "
9/4	1055	4°C	X		AAAP-MW02-0001	1					X			" " "

Samplers Relinquished by: Marcia C[illegible]	Date/Time 9/4 1400	Received by: (Sig.)	Date/Time	Hazards Associated with Samples: NONE
Relinquished by: (Sig.)	Date/Time	Received by: (Sig.)	Date/Time	
Relinquished by: (Sig)	Date/Time	Received for Laboratory by: (Sig.)	Date/Time	Remarks at time of receipt:
Custody Seal No. 1535		Lab case No.:		

ENG Form 5021-R, Oct 90

Proponent: CEMP-RT

SAMPLE LABELS

SITE NAME	DATE
ANALYSIS	TIME
	PRESERVATIVE

Lot # 9062023

SPECIALTY CLEANED CONTAINER

SITE NAME	DATE
Atlas Missile Site	6/1/89
ANALYSIS	TIME
Total Metals	1200
Sampler KC	PRESERVATIVE HNO3

Lot # [illegible]

SPECIALTY CLEANED CONTAINER

SAMPLE TAGS

Proj. Code | Station No. | Month Day Year | Time | Designate: Comp. / Grab | Samplers (Signature) | Station Location

Preservative: Yes ☐ or No ☐

ANALYSES

BOD Anions Solids (TSS) (TDS) (SS)	
COD, TOC, Nutrients	
Phenolics	
Mercury	
Metals	
Cyanide	
Oil and Grease	
Organics GC/MS	
Priority Pollutants	
Volatile Organics	
Pesticides	
Mutagenicity	
Bacteriology	

Remarks:

Tag No.	Lab Sample No.

Project Code: WES 310.CO1 21.SMB.0 | Station No.: MW 26 SS 11(6) | Month/Day/Year: 5-28-93 | Time: 1007 | Designate: Grab | Samplers (Signature): Jane Doe | Station Location: Monitoring Well #26 Split Spoon #11

Preservative: Yes ☐ No ☑

ANALYSES

BOD Anions Solids (TSS) (TDS) (SS)	
COD, TOC, Nutrients	
Phenolics	
Mercury	
Metals	
Cyanide	
Oil and Grease	
Organics GC/MS	X
Priority Pollutants	X
Volatile Organics	X
Pesticides	X
Mutagenicity	
Bacteriology	

Remarks: CASE 1746
TR # HE0637
Bottle Lot # 63120

Tag No.	Lab Sample No.
H0502	

APPENDIX G

GLOSSARY

1. Chemical Contamination Activities - All activities related to the cleanup of chemical contamination at a site including investigation and remedial activities. This definition includes activities defined by EPA as "removal activities" and "remedial activities".

2. Chemical Data Acquisition Plan (CDAP) - A submittal document which describes the site specific implementation of CDQM requirements. For investigation and design contracts, CDQM guidance and requirements for CDAP preparation and implementation are found in the Scope of Services. For construction contracts, these requirements are found in the contract technical specifications in language which is clearly biddable and enforceable. The CDAP shall include detailed plans for sampling, analysis, and chemical QC activities. A guide for preparation of the CDAP is found in Appendix D. A CDAP is required for both in-house and contracted work. The EPA equivalent is called a Quality Assurance Project Plan (QAPjP) and may be substituted for the CDAP.

3. Chemical Data Quality Management (CDQM) - The combination of activities establishing a government quality assurance (QA) program and specifying quality control (QC) operations for the AE, construction contractor, or USACE District. CDQM includes the maintenance of field and laboratory practices/checks which insure that Data Quality Objectives (DQO) are met.

4. Chemical Data Management Specifications - Construction Contract technical specifications prepared during design which describe all construction contractor sampling, sample handling and custody, documentation, analytical procedures, and data reporting. The specifications outline contractor QC responsibilities and the requirements of the Chemical Data Acquisition Plan for construction. Appropriate chemical concerns should be addressed at each design submittal phase.

5. Chemical Quality Assurance (QA) - The government activities required to assure desired and verifiable levels of quality in chemical data for a specific project. Chemical Quality Assurance activities are defined in Appendix E.

6. Chemical Quality Assurance Report (CQAR) - Prepared by the designated QA laboratory; approved by the investigation/design/construction division; and normally ready for distribution within 30 days of receipt of the AE/contractor analytical data. The report will include an overall evaluation of the contractor's/AE's data and quality assurance data, a comparison of the contractor's and government results, problems in accomplishing the CDAP, and lessons learned. The CQAR shall be prepared in accordance with the guidance found in Appendix E.

7. Chemical Quality Control (QC) - Specific activities for insuring that data of the required quality will be obtained for a specific project by the AE, construction contractor, or government (for in-house chemical analyses). Normally this consists of the analysis of field blanks, duplicate samples and the inclusion of laboratory internal quality control procedures as required by the methods or otherwise specified.

8. Construction District - The district assigned the responsibility to administer the construction contract.

9. Construction Division - The geographic USACE division in which the Construction District is located.

10. Contract Laboratory - The laboratory retained by a USACE AE/contractor or QA laboratory to perform chemical analyses of field samples. These laboratories are evaluated in accordance with the procedures in Appendix C, and must be validated by CEMRD prior to performing chemical analyses for HTW projects.

11. Daily Quality Control Report (DQCR) - A daily report prepared by an AE in accordance with the Scope of Services or by a construction contractor per contract specifications and submitted to the Contracting Officer (CO) during chemical contamination investigation and remedial activities. Copies are sent by the COR to the QA laboratory whenever sampling and analytical activities are involved. The DQCR shall contain at a minimum the following with respect to chemistry:

(a) Work performed. Sections in the CDAP that specify the sampling procedure and the analytical procedure shall be referenced. Weather information at the time of sampling shall be included. Information concerning all field samples, sample shipping, and field instrument measurements and calibration shall be included.

(b) Departures from the approved sampling plan. Include problems identified, corrective actions, and verbal/written instructions from USACE personnel. These shall be reported to the contracting officer (CO) in writing within two working days.

12. Data Quality Objectives (DQO) - DQOs are qualitative and quantitative statements specifying the level and extent of chemical data required to support decisions during remedial activities. They are determined based on the end uses of the data to be collected. DQOs are established prior to data collection and are not considered a separate deliverable. Rather, the DQO development process is integrated with the project planning process and the results are incorporated into Scopes of Work and Work Plans for the site. The levels and responsibility for data validations should be determined with the DQOs.

13. Design Analysis Reports - Documents prepared during design to support the Plans and Specifications. Technical Design Analysis Reports should have a section or chapter dedicated to design chemical evaluations and to the level of sampling, analysis, and CDQM required to support and document construction.

14. Design District - The USACE district assigned the responsibility for coordinating, reviewing, and completing design documents, including plans and specifications for HTW site design activities either in-house or through contracted services. Other Design District responsibilities include procuring AE services and construction contracts when work is not done in-house.

15. Design Division - The USACE Division overseeing the Design District.

16. HQUSACE (CEMP-R) - Headquarters office responsible for CDQM requirements and other supporting issues related to the proper implementation and execution of all phases of HTW program activities under USACE management.

17. Internal Quality Control - Measures which a laboratory implements to ensure data reliability. These include the analysis of blanks of various types, replicate sample or extract analysis, lab duplicates, blind standards, matrix spikes, matrix spike duplicates, surrogate compound analysis, calibrations, generation of control charts, etc. Minimal requirements are

usually specified in the analytical methods. Internal quality control needs and requirements should be determined as a part of the Data Quality Objectives. All internal quality control results should be reported with the sample results.

18. Investigation District - The USACE district assigned the responsibility for coordinating, reviewing, and completing an HTW site investigation activity either in-house or through contracted services.

19. Investigation Division - The USACE Division overseeing the Investigation District.

20. Laboratory Validation - An ongoing assessment of laboratory capabilities, including evaluation of personnel, equipment, QA/QC procedures, results from performance evaluation samples and an on-site laboratory inspection.

21. Matrix is the environmental medium which is sampled; e.g. groundwater, surface water, soil, sediment, waste, etc.

22. Quality Assurance - Measures taken by USACE to oversee the work of contractors.

23. QA Laboratory - The validated USACE Division Laboratory performing or coordinating CDQM activities for a project. These activities ordinarily include: document review, inspection and analysis of quality assurance samples, technical assistance to project managers and preparation of the Chemical Quality Assurance Reports. A given Division Laboratory may not have capability for in house performance of all these activities. The QA laboratory is assigned on a project specific basis by CEMRD. QA functions may not be contracted out directly by the FOA to commercial enterprises. QA sample analysis may be performed under contract to the USACE QA laboratory.

24. Quality Assurance and Quality Control Samples. Samples analyzed for the purpose of assessing the quality of the sampling effort and of the analytical data. QA and QC samples include splits or replicates of field samples, rinsate blanks, trip blanks, and background (up gradient) samples. The purpose of the sample is to provide site specific field originated checks that the data generated by the contractor's analytical lab are of suitable quality.

25. Quality Control - Measures taken by contractors and to verify the reliability of their own work and to oversee subcontractors.

26. Quality Control Summary Report (QCSR) - A report submitted by the AE/construction contractor at the conclusion of a chemical contamination remedial activity. For an investigation activity, the QCSR may be included in the Investigation Report. The QCSR should include the following.

(a) An outline of QC practices employed by the AE/construction contractor, including any problems and corrective actions taken;

(b) A consolidation and summary of the DQCR, as prescribed in the contract.

27. Replicate (duplicate, triplicate, etc.) Samples. Multiple grab samples, collected separately, that equally represent a medium at a given time and location. This is the required type of collocated sample for volatile organic analyses and most groundwater and surface water samples.

28. Rinsate blanks (equipment blanks) are field blanks generated by passing analyte-free reagent water through sampling equipment after it has been decontaminated between uses. Rinsates are analyzed by the same methods as the samples for which they are blanks and are a check on sampling and decontamination procedures.

29. Split is a field sample taken, homogenized, divided in the field, contained and sent to one or more laboratories for analysis.

30. Trip Blank. 40 mL vials of organic-free reagent water that are kept with the field sample containers from the time they leave the laboratory until the time they are returned to the laboratory. The purpose of trip blanks is to determine whether samples are being contaminated during transit or sample collection. Trip blanks pertain only to volatile organic analyses; therefore, the containers must contain no headspace. Only one trip blank is needed for one day's sampling and shall satisfy trip blank requirements for all matrices for that day if the volatile samples are shipped in the same cooler.

31. Scope of Services - Prepared by a District or Field Operation Activity (FOA) and provided to a contractor for the purposes of work definition and fee negotiation. The Scope of Services for an investigation activity shall have attached guidance to the AE including Guide for Preparing a Chemical Data Acquisition Plan (CDAP) (Appendix D), and the Sample Handling Protocol (Appendix F). The Scope of Services for design shall provide the AE with guidance including any appropriate Guide Specifications for Chemical Data Quality Management and the Sample Handling Protocol (Appendix F).

32. Site Inspection Report or Investigation Report - Prepared by the AE firm or the investigating district (in-house work) and includes a summary of work done, departures from the CDAP, analytical results, results from all testing, field observations, and regulatory or action level factors which impact on decisions to be made as a result of the investigation.

SECTION 01460

HEALTH, SAFETY, AND ACCIDENT PREVENTION

PART 1 - GENERAL

1.1 **GENERAL:** This section describes the minimum safety, health, and emergency response requirements for the Contractor's remediation activities at the Griffiss Air Force Base, Rome, New York underground storage tank (UST) and Jet Fuel Transfer Pipeline closure project. Due to the nature of expected contaminants associated with this site and the potential for serious accidents, a special emphasis must be placed upon health and safety considerations for all on-site personnel as well as the surrounding community. Site remediation activities may involve work exposure to potentially contaminated and hazardous materials. The Contractor is responsible for the remedial action for this project and shall implement health and safety criteria and practices sufficient to protect on-site personnel, the public, and the environment.

1.2 **REGULATORY REQUIREMENTS AND APPLICABLE PUBLICATIONS:** The following publications of the issues listed below form a part of this specification:

1.2.1 Occupational Safety and Health Administration (OSHA) Standards and Regulations, Code of Federal Regulations:

29 CFR 1910	Occupational Safety and Health Standards; General Industry
29 CFR 1910.120	Occupational Safety and Health Standards; Hazardous Waste and Emergency Response
29 CFR 1910.134	Occupational Safety and Health Standards; Respiratory Protection
1910.1000 thru 1910.1048	Occupational Safety and Health Standards; Air Contaminants - Permissible Exposure Limits
29 CFR 1910.1200	Occupational Safety and Health Standards; Hazard Communication
29 CFR 1910.1028	Occupational Safety and Health Standards; Air Contaminants - Benzene
29 CFR 1926	Occupational Safety and Health Standards; Construction Industry

1.2.2 Environmental Protection Agency (EPA) Standards and Regulations, Code of Federal Regulations:

40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Wastes
40 CFR 280 Subpart F	Release response and Corrective Action for UST Systems Containing Petroleum or Hazardous Substances
Subpart G	Out-of-service UST systems and closure
40 CFR 263	Standards Applicable to Transporters of Hazardous Wastes

1.2.3 Department of Transportation (DOT) Standards and Regulations, Code of Federal Regulations:

49 CFR 171	Hazardous Materials Regulations; General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials Tables and Hazardous Materials Communications Regulations

1.2.4 Military Standards:

EM 385-1-1 (Rev Oct 87)	Corps of Engineers Safety and Health Requirements Manual

1.2.5 Other Publications:

American Petroleum Institute (API) Recommended Practice 1604, Removal and Disposal of Used Underground Petroleum Storage Tanks

American Petroleum Institute Publication 2015, "Cleaning Petroleum Storage Tanks"

National Fire Protection Association (NFPA) 327, Standard Procedures for Cleaning or Safeguarding Small Tanks and Containers

ANSI 358.1-1981; American National Standards Institute, Emergency Eyewash and Shower Equipment

American Conference of Governmental Industrial Hygienists (ACGIH), Threshold Limit Values and Biological Exposure Indices (TLVs and BEIs) (Current Issue)

NIOSH/OSHA/USCG/EPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, DHHS (NIOSH) Pub. No. 85-115, October 1985

American National Standard Z117.1, Safety Requirement for Confined Spaces

ANSI/Commodity Gas Association (ANSI/CGA) G-7.1, Commodity Specification for Air

1.2.6 Where conflicts arise between requirements of the above listed regulatory requirements, the most restrictive of the requirements shall be followed.

1.3 HAZARDOUS MATERIALS INFORMATION:

1.3.1 Suspected Hazardous Materials: The underground storage tanks addressed by this project on Building 110 Site have been suspected as having contained petroleum and fuels, including aviation gasoline, and jet fuel. The underground storage tanks on Building 101 Site are suspected to have contained plating and solvent wastes. The underground storage tanks on Building 112 Site are suspected to have contained petroleum fuels (including aviation gasoline and jet fuel), and solvents. Tank content sample results are contained in SECTION: UNDERGROUND STORAGE TANK REMOVAL. These wastes can affect the body if inhaled (as mists or vapors), ingested, or if they come into contact with the eyes or skin. Overexposure to plating and solvent wastes has been shown to cause Central Nervous System (CNS) effects, cancer, and blistering of the skin. Overexposure to gasoline also affects the Central

Nervous System. Effects of overexposure may be evidenced by dizziness; vomiting, nausea; blurred vision; symptoms of intoxication; and irritation of the eyes, nose, and throat. Additionally, toxic metals, such as organic lead compounds, may be associated with the presence of waste fuels.

1.3.2 Unidentified Hazardous Materials: If subsequent laboratory analyses of materials contained within the tanks indicates hazardous materials or contaminants other than those identified in these specifications are present, the Contractor shall immediately halt operations on the tanks until health and safety provisions have been developed for the identified materials. Operations on the tank shall not resume until revisions have been incorporated into the Site Safety and Health Plan (SSHP) regarding these materials, and written approval has been received from the Contracting Officer to proceed.

1.4 SUBMITTALS: In accordance with SECTION: SUBMITTAL PROCEDURES, the Contractor shall submit data on the following items specified herein.

1.4.1 Category I: For Approval.

1.4.1.1 The following shall be submitted to the Contracting Officer at least 10 days prior to the pre-work conference:

1.4.1.1.1 Site Safety and Health Plan (SSHP)

1.4.1.1.2 Certification, Resume of Qualifications and Experience of Health and Safety Manager (HSM) (Include as an appendix to the SSHP)

1.4.2 Category II: The following, to be submitted prior to the commencement actual on-site activities, shall be attached to the SSHP as appendices:

1.4.2.1 For Approval:

1.4.2.1.1 Resume of Qualifications and Experience of the Site Safety and Health Officer (SSHO)

1.4.2.1.2 Decontamination Facilities: The Contractor shall submit plans for temporary decontamination facilities for approval prior to construction.

1.4.2.2 For Information:

1.4.2.2.1 Proof of Respirator Fit-Testing

1.4.2.2.2 Proof of Grade D Breathing Air Certification

1.4.2.2.3 Proof of Employee Medical Exams and Respirator Certification

1.4.2.2.4 Proof of Employee Training

1.4.2.2.5 Example of Confined Space Entry Permit

1.4.2.2.6 Example of Hot Work Permit

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 DESCRIPTION OF REQUIREMENTS:

3.1.1 Practices and Procedures: Site-specific health and safety practices, procedures, and equipment are required to protect employees involved in site activities.

3.1.2 Personnel and Qualifications:

3.1.2.1 Health and Safety Manager: The Contractor shall utilize the services of a certified Industrial Hygienist (CIH) certified by the American Board of Industrial Hygiene (ABIH) to act as the Health and Safety Manager. The Health and Safety Manager (HSM) shall develop, implement, and enforce the Site Safety and Health Plan (SSHP), to conduct initial site-specific training, and to provide continued health and safety support as needed. It is not anticipated that the Health and Safety Manager will be on-site continuously throughout the course of the project. Day-to-day industrial hygiene support shall be provided by the Site Safety and Health Officer, who shall report directly to the Health and Safety Manager and the Contractor's Project Officer. On a weekly basis, the Health and Safety Manager shall review results of air monitoring and accident reports. The Health and Safety Manager shall report problems/concerns regarding project health and safety directly to the Contractor's Project Officer and to the Contracting Officer. Qualification requirements of the CIH shall include:

3.1.2.1.1 A minimum of 3 years working experience in the chemical or hazardous waste industry.

3.1.2.1.2 Demonstrable expertise in air monitoring techniques and in the development of personal protective equipment programs for working in potentially toxic atmospheres.

3.1.2.1.3 Working knowledge of Federal and State occupational safety and health regulations.

3.1.2.1.4 The name, qualifications (education summary and documentation, ABIH certificate), and work experience summary of the CIH shall be submitted in the SSHP.

3.1.2.2 Site Safety and Health Officer (SSHO): The Contractor shall identify an individual who shall serve as the Site Safety and Health Officer (SSHO) for this project. The SSHO shall report problems/concerns regarding health and safety directly to the Health and Safety Manager and the Contractor's Project Manager. The SSHO shall have a minimum of 2 years working experience in the chemical industry and/or chemical waste disposal industry. The SSHO shall have attended within the past year, the 8-hour Supervisor's Course and the 8-hour OSHA Refresher Course required under OSHA 1910.129. The SSHO provide documentation of date of training, for each course. The SSHO shall remain on-site during all project operations and may be assigned other duties, such as project Foreman or Quality Assurance Officer. The name, qualifications (education and training summary and documentation), and work experience of the Site Safety and Health Officer shall be included as part of the SSHP.

3.1.2.3 Medical Consultant: The Contractor is required to utilize a licensed medical physician practicing occupational medicine. The physician shall have extensive experience in the occupational health area and be familiar with this site's hazards and the scope of this project. The Contractor shall submit a letter at the Pre-Work Conference which states the medical consultant is aware of this site's conditions and the proposed remediation work plan.

3.1.3 Personnel Protection: The Contractor shall provide all on-site personnel with appropriate personal safety equipment and protective clothing as provided for in Paragraph: PERSONAL PROTECTIVE EQUIPMENT, of this section, and shall ensure that all safety equipment and protective clothing is kept clean and well maintained.

3.1.4 Health, Safety, and Accident Prevention: The Contractor shall be responsible for the health, safety, and accident prevention provisions for this project. The Contractor shall develop and implement a Site Safety and Health Plan (SSHP). This plan shall incorporate the requirements of 29 CFR 1910.120(i)(2), 29 CFR 1910.120(l) (Emergency Response Plan), Paragraphs 01.A.03 thru 01.A.06 and Appendix Y of Corps of Engineers EM 385-1-1 (Accident Prevention Plan), 29 CFR 1910.134 (Respiratory Protection Plan), and incorporate the requirements of these specifications. The Health and Safety Manager shall sign and date the SSHP prior to submittal for approval. Site work shall not commence on this project until the Contracting Officer (CO) has approved the SSHP. All site operations shall proceed as outlined within the CO-approved SSHP, or CO-approved revisions. The SSHP shall address or include, at a minimum, the following items:

3.1.4.1 Names of key personnel and alternates responsible for site safety and health, and appointment of a Site Safety and Health Officer.

3.1.4.2 A safety and health risk analysis for each site task and operation.

3.1.4.3 Employee, supervisor, and visitor training.

3.1.4.4 Personal protective equipment to be used by employees for each of the site tasks and operations being conducted, including the Respiratory Protection Plan.

3.1.4.5 Medical surveillance requirements.

3.1.4.6 Site control measures.

3.1.4.7 Personnel and equipment decontamination procedures.

3.1.4.8 The site's Standard Operating Safety Procedures.

3.1.4.9 Site-specific respiratory protection.

3.1.4.10 Tank cleaning and decontamination.

3.1.4.11 Material Safety Data Sheets (MSDSs) for hazardous materials brought on-site by the Contractor, such as decontamination solvents and detergents.

3.1.4.12 Safety Meetings.

3.1.4.13 Fire Prevention and Protection.

3.1.4.14 Site Housekeeping.

3.1.4.15 Mechanical Equipment Inspection.

3.1.4.16 Sanitation.

3.1.4.17 Daily Safety Inspections.

3.1.4.18 Accident Reporting.

3.1.4.19 Construction and Excavation Safety.

3.1.4.20 Pre-emergency planning.

3.1.4.21 Personnel roles, lines of authority, training, and communication.

3.1.4.22 Emergency recognition and prevention.

3.1.4.23 Decontamination.

3.1.4.24 Emergency medical treatment and first aid.

3.1.4.25 Spill/discharge control and clean-up pertaining to the tank's contents, decontamination fluids, and contaminated soils.

3.1.4.26 Accident Reporting: In the event of an accident or incident, the Contractor shall immediately notify the Contracting Officer. Within 2 working days of any reportable accident or incident the Contractor shall complete and submit to the Contracting Officer an Accident Report on ENG Form 3394 in accordance with AR 385-40 and Supplement 1 to that regulation, and these specifications.

3.1.5 **Notifications:** At least 10 days prior to beginning work on this project, the Contractor shall provide written notification of project commencement to the Installation's Safety Office and Fire Department. This notification shall include, at a minimum, the nature of the project (e.g., "removal of 4 underground storage tanks); location of the tanks (e.g., Bldg. 110, corner of A Street and D Avenue, etc.); anticipated date of removal for each tank; and the Contractor's name, address, and telephone number. Whenever the data submitted in these notifications changes, the Safety Office and Fire Department shall be alerted to the changes. A copy of these notifications shall be provided concurrently to the Contracting Officer.

3.2 **PERSONNEL PROTECTIVE EQUIPMENT:** The Contractor shall provide all on-site personnel with appropriate personal safety equipment and protective clothing, and shall ensure that all safety equipment and protective clothing is kept clean and well maintained. At a minimum, the following items shall constitute protective clothing and equipment ensembles to be utilized during this project:

3.2.1 **Work clothing,** as dictated by the weather

3.2.2 **Safety** (steel toe/shank) shoes or boots

3.2.3 **Hardhats**

3.2.4 **Nitrile, Neoprene, or Natural Rubber Gloves** (when handling or contact may occur with contaminated soils or materials, tank's contents, or other similar incidents) Level D Modified

3.2.5 **Faceshield** (for pumping operations)

3.2.6 **Chemical Goggles** (for tank interior decontamination operations)

3.2.7 **Saranex- or Polyethylene-coated Tyvek** (or equivalent) coveralls with hood (when handling or contact may occur with contaminated soils or materials, tank's contents, tank interior decon, or other similar incidents) Level D Modified

3.2.8 **Nitrile, Neoprene, or Natural Rubber Overboots** (when handling or contact may occur with contaminated soils or materials, tank's contents, or other similar incidents) Level D Modified

3.2.9 Nitrile, Neoprene, or Natural Rubber Gloves (when handling or contact may occur with contaminated soils or materials, tank's contents, or other similar incidents) Level C Same as for Level D-Modified, except for addition of:

3.2.10 Full-facepiece, air-purifying respirator equipped with organic vapor cartridges. Level B Same as for Level D-Modified, except for addition of:

3.2.11 Full-facepiece, supplied-air respirator operated in pressure demand mode equipped with an auxiliary positive pressure self-contained breathing apparatus.

3.2.12 Level D shall be the minimum level of protection set for site operations in the Exclusion Zone and Contamination Reduction Zone. Level D-Modified shall be the minimum level of protection whenever there is a possibility of personnel contact with contaminated soils or tank residues.

3.2.13 A written respiratory protection program addressing site-specific respirator usage and training shall be developed by the Contractor and shall be submitted as part of the Site Safety and Health Plan (SSHP). Programs for respiratory protection shall conform to 29 CFR 1910.120(g)(5); 29 CFR 1910.134; and Corps of Engineers EM 385-1-1, Section 07.B, as a minimum. Employees shall be instructed in the selection, wearing, limitations, cleaning, storage, and maintenance of the type(s) of respirator(s) they will be using.

3.2.14 All on-site personnel unable to pass a respiratory fit-test shall not be assigned tasks which require the use of respiratory protection. All personnel must be able to show documentation of a successful fit-test. Qualitative or quantitative fit-testing shall be conducted at least annually on all personnel using an air purifying respirator. Fit-testing shall be performed using irritating smoke tubes or quantitative methods. If necessary, the employee shall be given a choice of facepiece sizes or styles and respirator brands in order to ensure an adequate fit. Any facial hair that may interfere with the facepiece seal shall be removed prior to fit-testing and actual respirator use. In addition, employees utilizing an air purifying respirator shall perform negative/positive pressure fit tests each time they don the respirator.

3.2.15 Each respirator shall be individually assigned and not interchanged between workers without first being cleaned and sanitized. Cartridges/canisters and filters shall be changed daily or upon breakthrough, whichever occurs first. A procedure for assuring periodic cleaning (at a minimum, daily after use), inspection, maintenance, and change-out of cartridge/canister and filters shall be provided by the Contractor and addressed in the written respiratory protection program.

3.2.16 Breathing air and supply systems shall meet at least the requirements of 29 CFR 1910.134. The compressor for supplying breathing air shall be equipped with the necessary safety and standby devices. Compressors shall be constructed and situated so as to avoid entry of contaminated air into the system and suitable in-line air purifying sorbent beds and filters installed to further assure breathing air quality. A receiver of sufficient capacity to enable the respirator wearer to escape from a contaminated atmosphere in the event of compressor failure, and alarms to indicate compressor failure and overheating shall be installed in the system. If an oil-lubricated compressor is used, it shall have both high-temperature and carbon monoxide alarms installed. Air line couplings shall be incompatible with outlets for other gas systems to prevent inadvertent servicing of air line respirators with nonrespirable gases. If breathing air is to be used on this project, the Contractor shall provide to the Contracting Officer a

certification statement that breathing air has been tested within the previous 6 months and meets Grade D specifications, as described in ANSI/CGA G-7.1.

3.2.17 If employees require prescription eyewear, they shall be given prescription inserts for the respirator. Regular eyeglasses shall not be permitted to be worn with respirators as they prevent a tight facepiece-to-face seal. Contact lenses shall not be permitted to be worn with a respirator.

3.2.18 All personal protective equipment and clothing (including work clothing and safety shoes/boots) worn in contaminated areas of this site shall be decontaminated or properly disposed of at the end of the work day. The Safety and Health Officer shall be responsible for ensuring all personal protective clothing/equipment is decontaminated before being reissued.

3.2.19 Protective Equipment, Respirators and Clothing for Use by the Government: The Contractor shall, at all times, have available for use by the Contracting Officer or official visitors, three clean sets of personal protective equipment and clothing (excluding air-purifying negative-pressure respirators and safety shoes, which will be provided by individual visitors), as required for entry in Exclusion Zone by these specifications.

3.3 MEDICAL SURVEILLANCE: Physical examinations as per 29 CFR 1910.120(f) shall be provided prior to project start-up for personnel working on-site. The examinations shall address the chemical and physical hazards to which the employees will be exposed. The medical examination results shall be evaluated by a physician practicing occupational medicine to determine that the individual is medically qualified to wear a respirator and is physically fit for the work to be performed. Additionally, the physician must certify that no physical condition or disease should be aggravated by exposure to the identified hazards and the individual is medically capable of utilizing the identified respiratory protection. The physician shall provide the above evaluations and certification statements in writing on business letterhead paper, name printed and signed, and dated. The Contractor shall provide the physician's evaluation and certification statements to the CO prior to initial entry onto the work site for all project personnel.

3.4 PERSONNEL TRAINING: Training, as per 29 CFR 1910.120(e) and 29 CFR 1910.1200, shall be provided prior to project start-up for personnel working on-site. Personnel employed to sample tank residuals or soil, perform tank purging and cleaning, and supervisors shall be trained and thoroughly familiar with the safety precautions, procedures, and equipment required for controlling the potential hazards associated with this project. The Contractor shall provide copies of current training certification statements to the Contracting Officer prior to initial entry onto the work site for all project personnel.

3.4.1 Worker Training: The training requirements for personnel who will be permitted to conduct on-site field activities shall comply with, but not necessarily be limited to, those requirements specified and approved by the Corps of Engineers in EM 385-1-1 and OSHA regulation 29 CFR 1910.120. Personnel shall have completed these training requirements within the previous 12 months prior to being permitted to enter the work areas.

3.4.1.1 Each team member shall have successfully completed at least 40 hours of formal hazardous waste activity training and a minimum of 3 days actual field experience under the direct supervision of a trained, experienced supervisor. Training providers shall meet the requirements of 29 CFR 1910.120(e). This training course shall meet the basic requirements of EPA Course 165.2. If a year has passed since any team member's 40-hour training, he shall have had 8 hours of OSHA refresher training before being allowed on site.

3.4.1.2 **On-site supervisors** shall have completed the above as well as an additional 8 hours of additional, specialized training covering at least the following topics: The employer's health and safety program, personal protective equipment program, spill containment program, and health hazard monitoring procedure and techniques.

3.4.1.3 **Prior to commencement** of on-site field activities, a health and safety training briefing shall be taught by the Site Safety and Health Officer to discuss the implementation of the SSHP. All personnel who will be performing on-site field activities shall attend. The Contracting Officer shall be notified of the training class at least 24 hours in advance. Emphasis shall be placed on the main topics contained in the SSHP. Hazards of concern shall be made clear and the protective methods employed by the SSHP to prevent exposure shall be thoroughly discussed. Personnel who are not able to attend shall be given a similar pre-work orientation individually or in groups by the Site Safety and Health Officer. A sheet shall be signed by all those who have been given the health and safety orientation, and shall be maintained by the Site Safety and Health Officer. This record shall be kept on-site as part of the project file. The following outline provides minimum orientation context:

3.4.1.3.1 Health and safety organization, including discussion concerning distribution of functions and responsibilities.

3.4.1.3.2 Organization and components of the SSHP.

3.4.1.3.3 Site-specific hazard identification: physical, chemical, psychological.

3.4.1.3.4 Basic toxicology and toxicity information.

3.4.1.3.5 Site work zones.

3.4.1.3.6 Levels of protection.

3.4.1.3.7 Protective clothing.

3.4.1.3.8 Respiratory protection.

3.4.1.3.9 Air quality monitoring.

3.4.1.3.10 Personnel exposure guidelines (e.g., PEL, TLV, IDLH, odor thresholds, etc.).

3.4.1.3.11 Decontamination procedures.

3.4.1.3.12 Basic first-aid review and on-site/off-site first-aid resources.

3.4.1.3.13 Emergency procedures and contingency planning.

3.4.1.3.14 Site entry and exit procedures.

3.4.1.3.15 Sampling procedures.

3.4.1.3.16 How to deal with third parties (e.g., visitors, press, agency visitors, etc.).

3.4.2 **On-Site Safety Meetings:** A daily health and safety training/tailgate discussion meeting shall be held. The Site Safety and Health Officer shall be responsible for scheduling and conducting this safety meeting. All on-site personnel assigned to work during the day shall be

required to attend. Hands-on refresher training on personal protective equipment, decontamination procedures, work practices, changes in work-tasks, schedule changes, results of previous day's air monitoring, review of safety discrepancies noted during previous day, etc. shall be discussed. Should an operation change affecting the on-site field work be made, a meeting prior to implementation of the change shall be convened to explain to all concerned the required changes. This shall include such operational changes as personnel changes in the on-site administration of the field effort.

3.4.3 Visitor Training: Should an occasion arise when an official visitor seeks entry into an Exclusion Zone or Contamination Reduction Zone, the visitor shall present documentation that he/she has received health and safety training and medical surveillance examination/certification equivalent to that required for on-site work. In addition, a short orientation covering relevant information outlined above shall be given by the Site Safety and Health Officer. The visitor shall also provide evidence of respirator fit testing and that an appropriate respirator is available in the event one is required in the Exclusion Zone.

3.5 FIRST AID AND EMERGENCY RESPONSE EQUIPMENT AND PROCEDURES: The Contractor shall provide for appropriate emergency first aid equipment (including ANSI-approved eye wash stations and an industrial-type (16-unit) first aid kit approved by the Contractors physician suitable for treatment of exposure to site physical and chemical hazards. Additionally, a 20-pound ABC-rated fire extinguisher shall be maintained on-site as well as absorbent material of sufficient quantity to collect any spill which might occur during this project. A listing of emergency phone numbers and points of contact for fire, hospital, police, ambulance, and other necessary contacts shall be posted at the Contractor's site. A route map detailing the directions to the nearest medical facility shall also be posted as well as being included in the SSHP.

3.6 HEAT AND COLD STRESS: The Contractor shall provide all project personnel with the necessary training and monitoring designed to prevent personnel injury due to heat or cold stress, as dictated by weather conditions and as outlined below. This monitoring shall commence when the ambient environmental temperature exceeds 70 degrees Fahrenheit (°F)(for heat stress) or falls below 40°F (for cold stress). In addition, all field personnel shall be provided rest breaks. The break areas shall be situated so that personnel may remove the chemical-protective clothing, rest in a protected area, and drink cool or warm fluids (as the weather dictates).

3.6.1 Heat Stress Monitoring: The Contractor shall institute the following practices and controls whenever the ambient environmental temperatures exceed 70°F:

3.6.1.1 Work/Rest Schedules: To guard against heat injury, the Contractor shall monitor environmental conditions and establish work/rest/schedules based upon either the current ACGIH TLV and BEI Booklet or NIOSH Publication 85-115. It shall be the responsibility of the CIH to establish within the SSHP the environmental monitoring to be conducted as well as appropriate work/rest schedules based upon that monitoring.

3.6.1.2 Physiological Monitoring: In addition to the establishment of work/rest schedules, addressed above, the Contractor shall monitor the workers physiological status, described as follows:

3.6.1.2.1 Pulse Rate: Determine the normal resting pulse rate. Monitor the pulse rate as soon as possible at the beginning of each rest period. If the pulse rate is greater than 40 beats per minute above the normal resting rate, shorten the next work period by one-third (1/3) without shortening the duration of the rest period. If the pulse rate at the

beginning of the next rest period is, again, greater than 40 beats per minute above the normal resting rate, shorten the following work cycle, again, by 1/3. Repeat.

3.6.1.2.2 Body Temperature: Determine the body temperature at the end of the work cycle and before drinking any fluids. If the individual's temperature is above 99.6°F, shorten the next work cycle by 1/3 without shortening the duration of the rest cycle. Repeat. Do NOT permit a worker to wear protective clothing when his or her body temperature exceeds 100.6°F! Also, if the individual's body temperature has fallen to or below 95°F, further exposure to cold shall be immediately terminated.

3.6.2 Cold Stress Monitoring: The Contractor shall institute the following practices and controls whenever the ambient environmental temperatures fall below 40°F:

3.6.2.1 To guard against cold injury the Contractor shall provide appropriate clothing, warm shelter for the rest periods, and shall monitor workers' conditions in accordance with the current ACGIH TLV and BEI Booklet.

3.6.2.2 The work rate should not be so high as to cause heavy sweating that will result in wet clothing. If heavy work must be done, rest periods must be taken periodically and workers must be offered the opportunity for changing into dry clothing.

3.6.2.3 The work shall be arranged in such a way that sitting still or standing still for prolonged periods is minimized.

3.6.2.4 At air temperatures of 36°F or less it is imperative that workers whose clothing becomes wet be immediately provided a change of clothing and be treated for hypothermia.

3.6.2.5 Workers handling evaporative liquid (gasoline, alcohol, or cleaning fluids) at air temperatures below 40°F shall take special precautions to avoid soaking of clothing or gloves with the liquids because of the added danger of cold injury due to evaporative cooling.

3.6.2.6 Employees shall be excluded from work in cold at 30°F or below if they are suffering from diseases or taking medication which interferes with normal body temperature regulation or which reduces tolerance to work in cold environments.

3.7 ILLUMINATION: Work areas shall be illuminated to a minimum of 10 foot-candles during the hours from sunrise to sunset. This requirement should not pose any burden on the Contractor as all site operations are to be conducted only during the hours between sunrise and sunset, as determined locally. If work area illumination levels fall below 10 foot-candles, the Contractor must provide supplementary lighting. Supplementary lighting shall meet the requirements of Paragraph: ELECTRICAL SAFETY of this section.

3.8 ELECTRICAL SAFETY: All electrical installations for this project shall conform to the National Electrical Code, the National Electrical Safety Code, and Section 15 of EM 385-1-1. Where possible, motorized vehicles within the Exclusion Zone shall be grounded. Electrical equipment to be used on this project shall conform to Section 16 of EM 385-1-1. All air monitoring equipment used in and around USTs and associated piping shall be rated as intrinsically safe.

3.9 SITE CONTROL AND WORK ZONES: Personnel not directly involved with this project shall not be permitted to enter the work zones, called the Exclusion Zone and Contamination Reduction Zone. For purposes of this contract, the Exclusion Zone shall involve an area 25 feet from the location

of the storage tank and excavations. At the perimeter of the Exclusion Zone, the Contractor shall establish a Contamination Reduction Zone. Within the Contamination Reduction Zone, equipment and personnel shall be cleaned as stated in Paragraph: PERSONNEL AND EQUIPMENT DECONTAMINATION of this section. The Contractor's site office, parking area, and other support facilities shall be located outside the Exclusion Zone and Contamination Reduction Zone, in the Support Zone. The initial minimum level of personal protective equipment shall be in accordance with these specifications. The boundaries of the Exclusion and Contamination Reduction Zones shall be clearly demarcated and posted by the Contractor. A site map shall be included within the SSHP outlining the extent of work zones and the support facilities. The Contractor shall maintain a register of all personnel visiting, entering, or working on the site.

3.10 AIR MONITORING:

3.10.1 Environmental Air Monitoring: All confined spaces, such as excavations greater than 5 feet in depth, shall be monitored for oxygen and toxics (e.g., gasoline and benzene) levels prior to allowing workers to enter such spaces, and continuously during the time the workers are present in these spaces. The Contractor shall test all areas (top, middle, bottom) of the confined space in the event stratification has occurred. Action levels, presented in Paragraph: ACTION LEVELS, shall be complied with. Resolution of the hazardous situation may require forced ventilation of the spaces. Whenever air monitoring within the Exclusion Zone indicates that Level C PPE (as required by Paragraph: ACTION LEVELS) is required, routine air monitoring at the boundary of the Exclusion Zone shall be required. The Contractor shall expand the Exclusion Zone as necessary to ensure airborne concentrations do not exceed Level D Action Levels.

3.10.2 Personnel Air Monitoring: When personnel are working on or near tanks or within trenches/excavations, the Contractor shall implement routine personnel air surveillance monitoring for the constituents referenced in paragraph: ACTION LEVELS, which include oxygen level and lower explosive level (LEL). Air monitoring shall be required whenever personnel enter a confined space (e.g., trench, excavation, or similar environments), continuously during tank vapor-freeing, or whenever site conditions indicate that hazardous air contaminants or conditions may be present. Air monitoring shall be performed in the breathing zone(s) of personnel effected to ensure they are not exposed above OSHA Permissible Exposure Limits (PELs) or ACGIH Threshold Limit Values (TLVs), whichever is more stringent. PELs/TLVs include, dependant upon specific compounds, Short Term Exposure Limits (STELs), Ceiling Limits, and Skin Designation-restrictions.

3.10.3 Work Area Air Monitoring: Air monitoring shall include testing the air with an aerosol monitor and extrapolating exposure levels from analytical data. When quality control personnel indicate that the work area may contain toxic levels of dust or aerosols, the Contractor shall restrict some or all work practices until additional dust control procedures have been instituted to prevent contaminant migration.

3.10.4 Data Recording: Results of air monitoring shall be recorded daily by the Site Safety and Health Officer. Data to be logged shall include: location monitored, activities ongoing during monitoring, date and time(s) monitoring occurred, personnel exposed during monitoring, background concentrations recorded, location of background concentration determination, weather conditions (wind direction, precipitation, temperature, etc.), identification of equipment used for air monitoring, results of air monitoring.

3.10.5 Equipment Requirements: Any gasoline, benzene, tetrachloroethylene, trichloroethylene, and oxygen monitoring equipment,

provided it complies with Paragraph: ELECTRICAL SAFETY of this section, may be selected to comply with this paragraph's requirements. The monitoring equipment shall be calibrated, checked, and maintained daily as per manufacturer's directions.

3.11 ACTION LEVELS: Based upon the results of air monitoring for gasoline, benzene, tetrachloroethylene and trichloroethlyene vapors and combustible gas/oxygen monitoring the following action levels are established. The levels identified are (1) those which are maintained for 10 seconds or, for rapidly fluctuating levels, (2) the average reading observed over 10 seconds.

3.11.1 Air Monitoring for BTEX and Gasoline at Building 110 Site:

(1) 0 - 0.5 ppm -- Level D/Level D-Modified, begin monitoring for Benzene with colorimetric tube
(2) 0.5 - 50 ppm and 0 ppm on colorimetric tube -- Level D
(3) 50 - 500 ppm or 0.5 - 25 ppm on colorimetric tube -- Level C
(4) Greater than 500 ppm or greater than 25 ppm on colorimetric tube -- Shut down operation and ventilate area or employ Level B if area cannot be ventilated.

3.11.2 Air Monitoring for Benzene, tetrachloroethylene, and trichloroethylene at Building 101 Site:

(1) 0 - 0.5 ppm -- Level D/Level D-Modified, begin monitoring for Benzene with colorimetric tube
(2) 0.5 - 25 ppm and 0 ppm on colorimetric tube -- Level D
(3) 25 - 1000 ppm or 0.5 - 25 ppm on colorimetric tube -- Level C
(4) Greater than 1250 ppm or greater than 25 ppm on colorimetric tube -- Shut down operation and ventilate area or employ Level B if area cannot be ventilated.

3.11.3 Air Monitoring for Benzene, gasoline, and trichloroethylene at Building 112 Site:

(1) 0 - 0.5 ppm -- Level D/Level D-Modified, begin monitoring for Benzene with colorimetric tube
(2) 0.5 - 25 ppm and 0 ppm on colorimetric tube -- Level D
(3) 25 - 1000 ppm or 0.5 - 25 ppm on colorimetric tube -- Level C
(4) Greater than 1250 ppm or greater than 25 ppm on colorimetric tube -- Shut down operation and ventilate area or employ Level B if area cannot be ventilated.

3.11.4 Oxygen Monitoring:
(1) 19.5% - 22% Oxygen -- Normal operations, continue monitoring.
(2) Less than 19.5% Oxygen -- Level B; Shut down operations and ventilate area.
(3) Greater than 22% Oxygen -- Shut down operations and ventilate area.

3.11.5 Lower Explosive Limit (LEL) Monitoring:
(1) Less than or Equal to 8% LEL -- Normal operations, continue monitoring.
(2) Greater than 8% LEL -- Shut down operations and introduce additional inert gas.

3.12 EXCAVATION SAFETY: All excavating work shall be conducted in accordance with SECTION: EXCAVATION AND BACKFILLING.

3.13 CONFINED SPACE ENTRY: Absolutely no personnel shall be permitted to enter the storage tank as a part of this project at any time.

3.14 EATING, DRINKING, SMOKING: No eating, drinking, smoking, chewing of tobacco or gum or other hand-to-mouth activities shall be permitted in any of the work areas during the course of this project.

3.15 IGNITION SOURCES: No ignition sources (e.g., cigarette lighters, matches, or other flame producing items) not required for the completion of this project shall be permitted in the Exclusion or Contamination Reduction Zones. Before any work is done that might release vapors, Work Zones shall be barricaded and posted, and burning or other work which might be source of ignition shall be stopped. All sources of ignition shall be eliminated from the area where flammable vapors may be present or may travel. Work Zones shall be kept free of all sources of ignition from the time any residues have been removed, and the tanks' interiors have been decontaminated to the time tank safing starts until the tank is gas-free. Signs shall be posted warning that vehicles and other sources of ignition shall be kept out of the area. No work shall be done if the direction of the wind carries vapors into areas outside the Work Zones where they might produce a hazardous condition, nor when an electrical storm is threatening the site of work. Sparks caused by friction or electrostatic effects may also be a source of ignition in flammable atmospheres, especially at low humidity. Proper grounding of metal objects and/or electrical equipment, together with the use of sparkless tools and localized adjustment of humidity, may reduce this hazard.

3.16 HOT WORK: Absolutely NO hot work shall be permitted on or within the tanks unless combustible gas/oxygen monitoring indicates atmospheres within and immediately surrounding the tanks are noncombustible, as outlined in Paragraph: Action Levels. This prohibition includes welding, grinding, sawing, or other similar operations which could be expected to potentially generate combustion-producing temperatures or sparks, or which could evolve potentially hazardous fumes or vapors. If hot work is to be conducted, the Contractor shall obtain a permit from the Installation's Safety Office prior to conducting such work and shall designate an individual at each hot work site as a fire watch. This person's sole responsibility shall be to monitor the hot work and have immediate access to the fire extinguisher located at each hot work site. The Contractor shall obtain a new permit at the start of each work shift during which hot work will be conducted.

3.17 BREAK AREA AND SUPPORT ACTIVITIES: All eating, drinking, smoking, and break facilities, as well as the Contractor's equipment storage, parking, and office shall be located in the Support Zones. The Contractor shall provide appropriate decontamination. Appropriate on-site personnel decontamination facilities, supplies, and procedures shall be detailed in the SSHP.

3.18 SANITATION: Sanitary facilities, including potable water, toilets, and washing facilities, shall be provided by the Contractor within the support zone in adherence with Section 03 of EM 385-1-1. The Contractor shall ensure that all on-site personnel have ready access to soap and clean water for washing before exiting contaminated areas and to toilet facilities. Additionally, potable water shall be maintained for drinking purposes. These facilities shall be maintained adjacent to the Work Zone, not within it.

3.19 PERSONNEL AND EQUIPMENT DECONTAMINATION: Personnel and equipment which have come into contact with contaminated materials shall not exit the Work Zones without first being decontaminated. Contaminated materials include soils which show visible evidence of being discolored or contaminated,

decontamination fluids, and equipment which has come into contact with such soils or decontamination fluids.

3.19.1 Personnel Decontamination: A detergent shall be used as the decontamination solution at Building 110 Site, a solution containing 5% sodium carbonate shall be used as the decontamination solution at Building 101 Site, and a solution containing 5% trisodium phosphate shall be used as the decontamination solution at Building 112 Site. Following washing, items shall be rinsed with clean water. When temperatures fall to or below 32°F an additive shall be mixed into the decontaminating solutions to prevent the solutions from freezing. Personnel who inadvertently become contaminated shall immediately wash all contaminated areas.

3.19.1.1 Equipment which is to be reused shall be taken through the wash/rinse cycle three (3) times. Any equipment/clothing which cannot be so washed shall be discarded with the disposable clothing.

3.19.1.2 After use, wash and rinse solutions shall be properly containerized and disposed of as contaminated fluids.

3.19.2 Equipment Decontamination: Equipment used on each site which comes into contact with contaminated soils or materials shall be decontaminated prior to its leaving the site on a cleaning pad designed to contain all wash waters. The cleaning pad shall consist of a minimum 20-mil HDPE liner appropriately sized to contain the heavy equipment utilized on site. The liner shall be placed between, and attached to, railroad ties along two sides of the pad. The front and rear sides of the pad (to be used for entry and exit of equipment) shall be raised underneath the liner using earthen berms. The pad will be sloped to one side where a 3/4-inch submersible pump will transfer collected wash waters to a temporary holding tank for either drummed loadout with other hazardous wastes, or transfer (if non-hazardous) to the Rome Waste Water treatment facility. The pad shall be enclosed by a polyethylene curtain to capture fugitive mist. The Contractor shall thoroughly steam clean each piece of equipment using a diluted solution of phosphate-free, analytical quality detergent at Building 110 Site, a 5% sodium carbonate solution at Building 101 Site and a 5% trisodium phosphate solution at Building 112 Site. These solutions may be applied with a steam cleaner applied by personnel wearing Level C and a rainsuit. Equipment will be considered decontaminated when all visible residue and soil is removed.

3.19.3 Equipment utilized along the various points of the Jet Fuel Transfer System pipeline, at manhole locations for example, shall be cleaned of all dirt, debris, and residue at each individual worksite along the pipeline on a minimum 6-mil polyethylene sheet appropriately sized to contain the equipment. Decontamination at only these pipeline work areas shall consist of physical removal of visible dirt by shovels and wiping off of residues that may drip during movement of the equipment to the next site along the pipeline. No equipment shall leave the base without decontamination as specified in Paragraph: EQUIPMENT DECONTAMINATION.

3.19.4 Disposal: The Contractor shall detail within the SSHP practices and procedures to be utilized to properly dispose of project-generated wastes which are or may have become contaminated by the wastes being remediated under this project. Such wastes would include, but not be limited to, disposable clothing, decontamination solvents, and decontamination wash waters.

3.19.5 Upon completion of this project, the Health and Safety Manager shall certify that all equipment and materials used on-site were properly decontaminated prior to being removed from the site.

3.20 HEALTH AND SAFETY WORK PRACTICES AND PROCEDURES: Task-specific safety and health practices and procedures shall be followed during this

project in conformance with OSHA, Corps of Engineers, and the following:

3.20.1 Tank Contents Sampling: Personnel accomplishing this activity shall initially wear, minimally, Level C PPE.

3.20.2 Transfer of Materials Out of Storage Tank: Personnel engaged in material transfer activities, or within 25 feet, shall initially wear, minimally, Level C PPE. Tank residues shall be collected in drums, tanks, or tank trucks labeled according to Department of Transportation (DOT) standard 49 CFR Part 171 and Part 172 and disposed of in accordance with SECTION: LIQUID REMOVAL.

3.20.3 TANK DEMOLITION: The tanks excavated as part of this project shall be demolshed as specified in SECTION: UNDERGROUND STORAGE TANK REMOVAL before being removed from the site. The Contractor shall submit in the SSHP plans and procedures, including materials and supplies, for safely and effectively demolishing the tanks.

3.21 EMERGENCY RESPONSE REQUIREMENTS: The Contractor shall develop and implement an Emergency Response and Contingency Plan in accordance with OSHA standard 29 CFR 1910.120(l).

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

3.21.2 Emergency contact names and telephone numbers shall be posted at all project phones and in site-support vehicles. Additionally, this listing shall be included within the SSHP.

3.21.3 All site-support vehicles shall be equipped with route maps providing directions to the medical treatment facility. Additionally, a copy of the route map shall be included within the SSHP. All drivers of the support vehicles shall become familiar with the emergency route and the travel time required at the beginning of project operations.

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

3.21.4.1 Name, organization, telephone number, and location of the Contractor.

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

3.21.4.3 Date and time of the accident/incident.

3.21.4.4 Location of the accident/incident, i.e., site location, facility name.

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

3.21.4.6 Cause of the accident/incident, if known.

3.21.4.7 Casualties (fatalities, disabling injuries).

3.21.4.8 Details of any existing chemical hazard or contamination.

3.21.4.9 Estimated property damage, if applicable.

3.21.4.10 Nature of damage, effect on contract schedule.

3.21.4.11 Action taken by Contractor to ensure safety and security.

3.21.4.12 Other damage or injuries sustained, public or private.

3.22 SPILL AND DISCHARGE CONTROL: The Contractor shall develop (as part of the SSHP), implement, maintain, supervise, and be responsible for a comprehensive Spill and Discharge Control Plan in accordance with SECTION: SPILL PREVENTION AND DISCHARGE CONTROL.

3.22.1 Spills and Discharges: If a spill or discharge occurs, the actions outlined in SECTION: SPILL PREVENTION AND DISCHARGE CONTROL, shall be taken by the Contractor at a minimum.

3.22.2 Notification of Spills and Discharges: If the spill or discharge is reportable, and/or human health or the environment are threatened, the Contractor shall notify the National Response Center, the State, and the Contracting Officer as soon as possible.

3.22.3 Decontamination Procedures: Decontamination procedures may be required after clean-up to eliminate traces of the substance spilled or reduce it to an acceptable level, as determined by the Contracting Officer. Complete clean-up may require removal of contaminated soils. Personnel and equipment decontamination shall occur as specified Paragraph: EQUIPMENT AND PERSONNEL DECONTAMINATION of this section. All contaminated material solvents, cloth, soil, and wood, that cannot be decontaminated must be properly containerized, labeled, and properly disposed of as soon as possible.

3.23 LOGS, REPORTS AND RECORDKEEPING: The following logs, reports, or records shall be maintained by the Contractor and shall be submitted to the Contracting Officer or his representative within 30 days following completion of this project, furnished as a Final Report. This does not relieve the Contractor of recordkeeping requirements contained in OSHA standards 29 CFR 1910.20 and 29 CFR 1910.120.

3.23.1 Daily Safety Inspection Logs

3.23.2 Employee/Visitor Register

3.23.3 Air Monitoring Data Reports

3.23.4 Decontamination Statements

3.23.5 Accident/Incident Reports

3.23.6 Waste Disposal Certification

3.24 UNFORESEEN HAZARDS: Should any unforeseen or site-specific safety-related factor, hazard, or condition become evident during the performance of work at this site, it shall be the Contractor's responsibility to bring such to the attention of the CO both verbally and in writing as quickly as possible, for resolution. In the interim, the Contractor shall take prudent action to establish and maintain safe working conditions and to safeguard employees, the public, and the environment.

3.25 TERMINATION: Any disregard for the provisions of these specifications shall be deemed just and sufficient cause for termination of the Contractor or any Subcontractor without compromise or prejudice to the rights of the Contractor.

3.26 PAYMENT: No separate payment will be made for the requirements of this section.

** END OF SECTION **

SECTION 01480

DUST, VAPOR, AND ODOR CONTROL

PART 1 - GENERAL

1.1 **SCOPE:** This section covers the requirements for dust, vapor, and odor control during the contract period.

1.2 **GENERAL REQUIREMENTS:** The Contractor shall conduct operations and maintain the project site so as to minimize the creation and dispersion of dust, vapor, and odor as specified below. Wind indicators shall be installed and air monitoring shall be performed as per SSHP.

1.3 **APPLICABLE PUBLICATIONS:** The following publications form a part of this specification. Where conflicts arise between regulatory requirements, the most restrictive requirements will be followed.

29 CFR 1910.1000	Air Contaminants
40 CFR 50	National Primary and Secondary Air Quality Standards
40 CFR 264.251 (f)	RCRA, Protection from Wind
New York Ambient Air Quality Standards Part 257	New York State Air Quality Standards

1.4 **SUBMITTALS:** In accordance with SECTION: SUBMITTAL PROCEDURES, the Contractor shall submit for approval, data as specified herein on the following:

1.4.1 Category II: (For Approval)

1.4.1.1 **Procedures** for Dust, Vapor and Odor Control: As part of the Contractor's Work Plan specified in SECTION: UNDERGROUND STORAGE TANK REMOVAL, the Dust, Vapor, and Odor Control Plan shall describe procedures to minimize the creation and dispersion of dust, vapor, and odor. The Plan shall address each major construction activity including, but not limited to:

1.4.1.1.1 Building demolition
1.4.1.1.2 Concrete pavement cutting and removal
1.4.1.1.3 Jet Fuel Transfer Pipeline cleaning and appurtenance removal
1.4.1.1.4 Tank excavation
1.4.1.1.5 Tank cleaning
1.4.1.1.6 Tank removal
1.4.1.1.7 Soils handling
1.4.1.1.8 Backfilling

1.5 **DUST CONTROL:** The Contractor shall maintain all excavations, embankments, stockpiles, access roads, plant sites, waste areas, borrow areas, and all other work areas free from excess dust to such reasonable degree as to avoid causing a hazard or nuisance to the Using Service or to others. Approved temporary methods consisting of sprinkling, chemical treatment, or similar methods will be permitted to control dust. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs.

1.5.1 Exposure Levels: Contractor shall insure compliance with all applicable standards and regulations concerning exposure levels to aerosol and

dust that may be present during the site activities. The Contractor at a minimum shall adhere to the Permissible Exposure Limit as defined in 29 CFR 1910.1000 Tables Z-1, Z-2, and Z-3, and Threshold Limit Values as adopted by the American Conference of Governmental Industrial Hygienists. The Contractor shall control migration of contaminants from the Exclusion Zone and keep the contaminants below toxic levels outside the Exclusion Zone at all times during the remedial activities.

1.5.2 Work Area Air Monitoring: The quality control personnel shall monitor the surrounding work area for toxic levels of dusts or aerosols in accordance with SECTION: HEALTH, SAFETY, AND ACCIDENT PREVENTION.

1.5.3 Intrusive Activities: Prior to excavating, all dirt surfaces within the limits of work shall be sprayed with a dust suppressant, or as otherwise directed by the Contracting Officer.

1.5.4 Water Application: Water application shall not be performed without written approval of the Contracting Officer. Surface runoff shall not be allowed. Seepage into the subgrade shall not be allowed.

1.5.4.1 Material: Provide clean water, free from salt, oil, and other deleterious materials.

1.5.4.2 Equipment: Apply water with equipment as necessary consisting of a tank, spray bar, and pump.

1.5.4.3 Methodology: Spray above grade; arrange nozzle spacing and spray pattern to provide complete even coverage of ground with water.

1.5.5 Calcium Chloride Application: The Contractor shall prevent calcium chloride from entering and contaminating surface waters on or surrounding the project site. Damage to property and surface or ground waters, including public or private water supplies, caused by the use of calcium chloride shall be repaired by the Contractor at no cost to the Government.

1.5.5.1 Material: The Contractor shall provide calcium chloride that conforms to ASTM D98, latest edition.

1.5.5.2 Application: The Contractor shall apply completely and evenly by hand or spreader.

1.6 VAPOR AND ODOR CONTROL: The Contractor shall provide the suitable materials, such as vapor suppressing foam, and adequate labor to control vapors and odor originating from the site to approved levels in accordance with SECTION: HEALTH, SAFETY, AND ACCIDENT PREVENTION.

The Contractor shall:

1.6.1 Limit exposure area.

1.6.2 Cover exposure area nightly with suitable cover material.

1.6.3 Use other odor suppressants if necessary to reduce off-site odors to acceptable levels.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

(Not Applicable)

END OF SECTION

SECTION 01490

ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.1 **SCOPE OF WORK:** This section covers the furnishing of all labor, material, and equipment and performing all work required for the protection of the environment during construction operations except for those measures set forth in other sections of these specifications.

1.2 **GENERAL:** For the purpose of this specification, environmental protection is defined as the retention of the environment in its natural state to the greatest extent possible during project construction and the enhancement of the natural appearance in its final condition. Environmental protection requires consideration of air, water, and land resources and involves noise control, solid waste-management, and management of other pollutants. In order to prevent, and to provide for abatement and control of any environmental pollution arising from the construction activities in performance of this contract, the Contractor and his subcontractors shall comply with all applicable Federal, state, and local laws and regulations. In particular, the Contractor shall perform all work in such manner as to minimize the polluting of air, water, or land, and shall, within reasonable limits, control noise and the disposal of solid waste materials, as well as other pollutants.

1.3 **SUBMITTALS:** In accordance with SECTION: SUBMITTAL PROCEDURES, the Contractor shall submit data for the following items required by this section.

1.3.1 Category I: None

1.3.2 Category II: For Approval

1.3.2.1 Prior to commencement of the work, the Contractor shall submit to the Contracting Officer for approval an Environmental Protection Plan for implementing this section on environmental protection. This shall be followed by a meeting with representatives of the Contracting Officer to develop mutual understandings relative to compliance with this provision and administration of the environmental protection program. Approval of the Contractor's Plan for environmental protection will not relieve the Contractor of his responsibility for adequate and continuing control of pollutants.

1.4 **SUBCONTRACTORS:** Compliance with the provisions of this section by subcontractors will be the responsibility of the Contractor.

1.5 **NOTIFICATION:** The Contracting Officer will notify the Contractor in writing of any noncompliance with the aforementioned Federal, state, or local laws or regulations. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. The Contractor shall, after receipt of such notice, immediately inform the Contracting Officer of proposed corrective action and take such action as may be approved. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made subject of a claim for extension of time or for excess costs or damages by the Contractor.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.1 PRECONSTRUCTION SURVEY: Prior to start of any on-site construction activities, the Contractor and the Contracting Officer shall make a joint condition survey after which the Contractor shall prepare a brief report indicating on a layout plan the condition of sidewalks, fences, streets, structures greater than 3 feet from the building(s), signage, trees, shrubs and grassed areas immediately adjacent to the site of the work and adjacent to his assigned storage area and access route(s) as applicable. Any trees to be removed will be indicated as such on this survey. This report will be signed by both the Contracting Officer and Contractor upon mutual agreement as to its accuracy and completeness.

3.2 PROTECTION OF LAND RESOURCES:

3.2.1 General: The land resources within the project boundaries and outside the limits of permanent work performed under this contract shall be preserved in their present condition or be restored to a condition after completion of construction that will appear to be natural and not detract from the appearance of the project. The Contractor shall confine his construction activities to areas defined by the plans and specifications. Storage and related areas and access routes required temporarily by the Contractor in the performance of the work will be assigned by the Contracting Officer. The Contractor's attention is called upon to minimize activities in front of Building Number 123 and Building Number 135 when accessing the Contractor's staging area. No other areas on Government premises shall be used by the Contractor without written consent of the Contracting Officer.

3.2.2 Protection of Trees and Shrubs: Except for trees or shrubs indicated on the Preconstruction Survey to be removed, the Contractor shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without the authority of the Contracting Officer. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorages unless specifically authorized. Where such special emergency use is permitted, it shall be performed in such a manner as to avoid damage to the trees. The Contractor shall in any event be responsible for any damage resulting form such use. Where the possibility exists that trees may be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment or operations, the Contractor shall adequately protect such trees by placing boards, planks, or poles around them.

3.2.2.1 Restoration of Damaged Trees: Any tree scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the Contractor's expense. All scars made on trees not designated by the Contracting Officer to be removed by demolition operations shall be coated as soon as possible with an approved tree wound dressing. Trees that are to remain, either within or outside established removal limits, that are damaged by the Contractor so as to be beyond saving in the opinion of the Contracting Officer, shall be immediately removed, if so directed, and replaced with a nursery-grown tree of the same species and size.

3.2.2.2 Protection and Restoration of Exposed Root Structures: Any root structures exposed during excavation activities shall be protected from drying at all times. The exposed roots will be covered as quickly as possible with moist backfill, tamped and watered with a fine mist spray.

3.2.3 Location of Storage Facilities: Contractor's storage and other construction buildings, which are required in the performance of the work, shall be located within the limits of the Contractor's work area as shown on the drawings or within the Contractor's staging area as shown on the drawings.

3.2.4 Post Construction Cleanup: The Contractor shall remove all signs of temporary construction facilities, excess materials, or any other vestiges of construction as directed by the Contracting Officer. The area will be restored to conditions which will permit the growth of vegetation thereon.

3.3 PROTECTION OF WATER RESOURCES: The Contractor shall not pollute any streams, rivers, or waterways through direct discharge or by rainfall runoff. The Contractor shall control the disposal of fuels, oils, bitumens, calcium chloride, acids or harmful materials, both on and off the Government premises and shall comply with applicable Federal, State, County and Municipal laws concerning pollution of rivers and streams while performing work under this contract. Special measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, herbicides, and insecticides from entering public waters. Water used in dust control, concrete cutting, and other waste waters shall not be allowed to reenter a stream if an increase in the turbidity of the stream could result therefrom.

3.4 WASTE DISPOSAL: Disposal of any debris resulting from the contract work and any wastes, effluents, trash, garbage, oil, grease, chemicals, etc., in or adjacent to the work area will not be permitted. If any waste material is dumped in unauthorized areas, the Contractor shall remove the material and restore the area to its original condition. If necessary, contaminated soil shall be excavated, disposed of as directed by the Contracting Officer, replaced with suitable fill material, compacted and finished with topsoil, and planted as required to reestablish vegetation, all at the Contractor's expense. The Contractor must arrange for off-site disposal of these materials.

END OF SECTION

SECTION 01492

EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SUMMARY:

1.1.1 This section provides the technical requirements for the design of erosion and sediment control and systems to limit discharge of turbid or contaminated water into streams and waterways from construction operations in accordance with state and local ordinances.

1.1.2 The Contractor shall design, furnish, install and maintain all erosion control measures as specified in this section.

1.2 RELATED SECTIONS: Related work and/or equipment that is specified in other sections of the contract documents includes but is not limited to the following:

SECTION: DUST, VAPOR, AND ODOR CONTROL
SECTION: LIQUID REMOVAL
SECTION: ENVIRONMENTAL PROTECTION
SECTION: SPILL PREVENTION AND DISCHARGE CONTROL

1.3 REFERENCES: Materials and services furnished shall be in accordance with state or local laws and ordinances and the regulations listed below.

EPA - Environmental Protection Agency

EPA-430/9-73-007 - Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity

Federal Regulations

Section 402 of the Federal Water Pollution Control Act - Amendments 1972

40 CFR 423, Subpart D - Area Runoff Subcategory

1.4 SUBMITTALS: At the Prework Conference the Contractor shall submit to the Contracting Officer, as part of the Environmental Protection Plan specified in SECTION: ENVIRONMENTAL PROTECTION, his proposals for implementing this section on erosion and sediment control.

PART 2 - PRODUCTS

2.1 MATERIALS: Waterproof HDPE coverings used for covering stockpiles shall be a minimum of 10 mils thick.

PART 3 - EXECUTION

3.1 GENERAL: The Contractor shall conduct his operations in conformance with his Soil Erosion and Sediment Control Plan. Surface drainage from cuts and fills within the limits of work shall be held in suitable polyethylene-lined sedimentation ditches and shall be graded to control erosion within acceptable limits. All surface drainage from within the limits of the excavation shall be collected, treated, and disposed of in accordance with SECTION: LIQUID REMOVAL. Temporary erosion and sediment control measures shall be provided and maintained until the permanent work is completed and operative. The area of bare soil exposed at any given time by construction shall be restricted to a minimum. Fills shall be constructed by selective placement of materials to eliminate silts or clays on the surface which may erode and contaminate adjacent areas. The

Contractor shall comply with all applicable laws concerning soil erosion and sediment control.

3.2 INSTALLATION:

3.2.1 The Contractor shall design, furnish, install and maintain all erosion control measures during the course of construction. He shall make every effort to minimize erosion from clearing and grubbing, excavation, and backfill operations.

3.2.2 The Contractor shall provide, install and maintain waterproof coverings for the contaminated soil and backfill soil stockpiles to prevent infiltration. He shall construct and maintain ditches or diversions around each pile to collect runoff and convey it to a sediment ditch. The water collected in the sediment ditch shall be treated in accordance with SECTION: LIQUID REMOVAL.

3.2.3 Erosion and sediment control measures shall be phased-out upon completion of the construction work and the stabilization of the drainage areas. Any standing water shall be removed from the ditch prior to regrading.

* * END OF SECTION * *

SECTION 01495

SPILL PREVENTION AND DISCHARGE CONTROL

PART 1 - GENERAL

1.1 SUMMARY: This section covers the Contractor's responsibilities with respect to spill prevention and discharge control.

1.2 REFERENCES: The publications listed below form a part of this specification as referenced and are not limited to the following standards or codes.

1.2.1 United States Environmental Protection Agency:

EPA/625/6-B5/006	Remedial Action at Waste Disposal sites

1.2.2 Code of Federal Regulations (CFR):

CFR 40 PART 300	National Oil and Hazardous Substances Pollution Contingency Plan
CFR 40	Protection of Environment

1.2.3 American Society for Testing and Materials (ASTM):

ASTM E 119	(1983) Fire Test of Building Construction and Materials

1.2.4 Underwriters Laboratories (UL):

UL-05	Fire Resistance Directory

1.3 SUBMITTALS: In accordance with SECTION: SUBMITTAL PROCEDURES, the Contractor shall submit the following items required by this section.

1.3.1 Category I: None

1.3.2 Category II: For Approval

1.3.2.1 Spill Prevention and Discharge Control Plan

1.3.3 Category II: (For Information Only)

1.3.3.1 Spill Report

1.4 GENERAL REQUIREMENTS:

1.4.1 Work Included: The Contractor shall be responsible for developing, implementing, maintaining, and supervising a comprehensive Spill Prevention and Discharge Control Plan. The plan shall be submitted to the Contracting Officer for approval thirty (30) days prior to commencement of field work, and shall be a component of the Site Safety and Health Plan, see SECTION: SAFETY HEALTH AND ACCIDENT PREVENTION. This plan shall provide contingency measures to prevent and control the maximum spillage of any specific item within the scope of work. This includes potential spills and discharges from construction operations, tank closures, pipeline draining and cleaning, and trucks transporting potentially hazardous materials on site.

The plan shall ensure that sufficient inspections and tests are performed on a continuing basis to enable the Contractor to certify, in writing, that the Spill Prevention and Discharge Control Plan provides methods, means, and facilities required to prevent contamination of soil, water, atmosphere, uncontaminated structures, equipment, or material by the maximum discharge of wastes from spills due to Contractor's operations. All qualified personnel, appropriate facilities, instruments, equipment and testing devices necessary for quality spill prevention and control shall be furnished. The plan shall be a carefully thought-out plan, prepared in accordance with good engineering practices. Also it shall have the necessary resources for implementing emergency response procedures, methods and equipment operations.

1.4.2 **Perform Emergency Response:** The Contractor shall provide equipment and personnel to perform emergency response measures required to contain any spills and to remove spilled materials and soils or liquids that become contaminated due to spillage. This collected spill material shall be properly disposed of at the Contractor's expense. Spills shall be cleaned up to the satisfaction of the Contracting Officer and all damages to Government property caused by any spilled materials shall be repaired by the Contractor at no additional cost to the Government.

1.4.3 **Decontamination:** The Contractor shall provide equipment and personnel to perform decontamination measures that may be required to remove spillage from previously uncontaminated structures, equipment, or material. Decontamination residues must be properly disposed of at the Contractor's expense.

1.4.4 **Special measures** shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, waste washings, harmful materials, concrete materials and surface drainage from entering any ground water sources, utilities, or drainage structures.

1.4.5 **Communications:** The Contractor shall provide internal communications or alarm systems capable of providing immediate emergency instructions to facility personnel.

1.4.5.1 The Contractor shall provide a device, such as a mobile telephone (immediately available at the scene of operations) or a hand-held two-way radio, capable of summoning emergency assistance from local or State police departments, fire departments, or emergency response teams.

1.4.5.2 A Project Telephone Directory shall be incorporated into the plan.

1.4.6 **Written Agreements:** The Contractor shall provide the following written agreements.

1.4.6.1 Where more than one local or State police department, fire department, or emergency response team, emergency response contractor or equipment supplier might respond to an emergency; agreements shall be provided designating one primary emergency authority to a specific police department, fire department, state emergency response team, emergency response contractor, or equipment supplier. Additional agreements with other emergency agencies to provide support to the primary emergency authority shall be provided by the Contractor, if necessary.

1.4.6.2 Where the state or local authorities decline to enter into such arrangements, the Contractor shall document the refusal in the operating records.

1.4.7 **Financial Responsibility:** The Contractor shall provide proof of financial responsibility. The Contractor must be able to pay to correct damages that releases from the Contractor may cause. State or Federal Government agencies do not have to meet these financial responsibility

requirements, but the agencies will take action to correct damages caused by releases from the Contractor.

1.4.8 The Contractor shall schedule and conduct a Health and Safety Training Briefing in accordance with SECTION: HEALTH, SAFETY, AND ACCIDENT PREVENTION. Such briefings shall highlight and describe known spill events or failures, malfunctioning components, and recently developed spill prevention precautionary measures.

1.4.9 Testing:

1.4.9.1 All facility communication or alarm systems, spill control equipment, and decontamination equipment must be tested and maintained by the Contractor as necessary to assure proper operation in time of emergency.

1.4.10 Arrangements: The Contractor shall make all arrangements with local and state authorities for the following:

1.4.10.1 Arrangements to familiarize police, fire, and state personnel with the layout of the facility, properties of the hazardous waste handled at the project, and associated hazards.

1.4.10.2 Arrangements to familiarize local hospitals with the properties of hazardous waste and the types of injuries or illnesses which could result from fires, explosions, or releases at the site.

PART 2 - PRODUCTS

2.1 Products shall meet the more rigorous applicable Federal, state, county and municipal laws and regulations concerning spill prevention and control products.

PART 3 - EXECUTION

3.1 EQUIPMENT REQUIRED: The Contractor shall provide for any unexpected spills or discharges with the following minimum equipment to be kept on site at all times during site activities:

3.1.1 Sand, clean fill, or other noncombustible absorbent.

3.1.2 Front-end loader (to be available for emergency response - not necessarily on-site).

3.1.3 Drums (55 gallon U.S. DOT 17-E or 17-H).

3.1.4 Shovels.

3.1.5 Solvent for decontamination of tools and equipment.

3.1.6 Oil-sorbent pads.

3.1.7 Sump pumps, hoses, and collection systems.

3.2 SPILL PREVENTION AND DISCHARGE CONTROL PLAN:

3.2.1 Spills: The Contractor shall report all spills and leaks, regardless of their quantity. If a spill occurs, the following actions shall be taken by the Contractor:

3.2.1.1 Notify the COR, the Base Environmental Office, and the Base Civil Engineering Office immediately.

3.2.1.2 Take immediate measures to control and contain the spill within the site boundaries. This shall include the following actions:

3.2.1.2.1 Isolate and contain hazardous spill areas.

3.2.1.2.2 Deny entry to unauthorized personnel.

3.2.1.2.3 Do not allow anyone to touch spilled material.

3.2.1.2.4 Stay upwind; keep out of low areas.

3.2.1.2.5 Keep combustibles away from the spilled material.

3.2.1.2.6 Use water spray to reduce vapors and dust, as needed.

3.2.1.2.7 Remove or retrieve any discharged liquids or sludges, if possible. Absorb discharged materials with sand, clean fill, or other noncombustible absorbent material. Place the absorbent/spill mixture into containers and dispose of as per EPA and DOT requirements.

3.2.1.2.8 For solid spills, immediately remove and place contaminated materials into HDPE-lined staging piles and cover; identify the pile as contaminated; test the material for treatability; dispose of off-site at an approved off-site disposal facility.

3.2.1.2.9 Take samples for analysis to determine that cleanup is adequate.

3.2.1.2.10 Other actions, as needed.

3.2.2 Spill Control: General spill control actions the Contractor shall implement are described below.

3.2.2.1 Solid Spills: The Contractor shall recover any noticeable amount of soils spilled on the Base during transport to the treatment site, as directed by the Contracting Officer.

3.2.2.2 Liquid Spills: The Contractor shall absorb all liquid spills with sand, clean fill, or noncombustible absorbent material. The absorbent/spill mixture shall be placed in a container, labeled, and disposed of as soon as possible.

3.2.3 Notification of Spills and Discharges: If the spill or discharge occurs on or off the installation and is reportable, and/or human health or the environment are threatened, the Contractor will immediately notify the installation environmental coordinator, the Contracting Officer, the State, and the National Response Center, and implement the Base Spill Prevention Contingency and Countermeasures Plan (SPCC). The Base SPCC Plan will be furnished to the Contractor at the Pre-Construction Conference.

3.2.3.1 Spill Report: A written spill report follow up shall be prepared and submitted by the Contractor to the Contracting Officer no later than 7 calendar days after the occurrence of any spill. The report shall include a minimum, the following:

3.2.3.1.1 Description of the material spilled (including identity, quantity, and manifest number).

3.2.3.1.2 Whether amount spilled is EPA/State reportable, and, if so, whether it was reported.

3.2.3.1.3 Exact time and location of spill, including description of the area involved.

3.2.3.1.4 Containment procedures initiated.

3.2.3.1.5 Summary of any communications Contractor has with press or Government officials other than COR.

3.2.3.1.6 Description of clean up procedures employed or to be employed at the site including disposal location of spill residue.

3.2.3.1.7 Laboratory reports, testing results, or verification tests which are required to validate the removal of contamination from the spill area.

3.2.4 Decontamination Procedures: Decontamination procedures may be required after cleanup to eliminate traces of the substance spilled or reduce it to an acceptable level as determined by the Contracting Officer. Complete cleanup may require removal of contaminated soils. Personnel decontamination shall include showers and cleansing, or disposal of clothing and equipment. All contaminated materials including cloth and soil that cannot be decontaminated must be properly containerized, labeled, and disposed of as soon as possible.

END OF SECTION

SECTION 01520

TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 **SCOPE:** This section includes requirements for furnishing, operating, and maintaining temporary facilities and utilities, and removal on completion of the project:

1.1.1 Facilities:

1.1.1.1 Contracting Officer's office.

1.1.1.2 Contractor's office.

1.1.1.3 Contractor's equipment storage area.

1.1.1.4 Soil Stockpile Area

1.1.1.5 Equipment and Decontamination Pad

1.1.1.6 Contractor's parking area and site access haul route.

1.1.2 Utilities:

1.1.2.1 Electricity and lighting.

1.1.2.2 Telephone service.

1.1.2.3 Water supply.

1.1.2.4 Sanitary facilities.

1.2 **SUBMITTALS:** The following information shall be submitted to and approved by the Contracting Officer prior to delivery to and erection at the site:

1.2.1 A Proposed Site Layout showing to scale the Contractor's office, the Contracting Officer's office, the equipment storage area, the soil stockpile area, the equipment decontamination pad, the contractor's parking area and the proposed site access and egress haul route; the location of the contractor's temporary electric power and water supply source; and the location of the contractor's sanitary facilities. The proposed haul route to and from the Contractor's staging area shall minimize traffic directly in front of buildings 123 and 125.

1.3 **REQUIREMENTS OF REGULATORY AGENCIES:**

1.3.1 Electricity and lighting shall be in accordance with Federal, state and local regulations as well as local utility company requirements. All work shall be in accordance with the National Electric Code.

1.3.2 Sanitary facilities, and disposal of sanitary wastes, shall be in accordance with state and local regulations. The Contractor shall dispose of sanitary waste off site at his own expense.

1.4 **LOCATION AND SOURCE:** All facilities specified shall be located on site. The Contractor shall meter and purchase utilities at the site by entering into a utility service contract with the installation.

1.5 **MATERIALS:** All materials shall be suitable for their intended use and shall conform to applicable codes and standards. Manufacturers requirements shall be strictly adhered to. Used materials may be utilized provided that they are sound and capable of performing the intended function.

1.6 **ELECTRICITY AND LIGHTING:**

1.6.1 All temporary electric service for the project site shall be provided where required. It shall be the responsibility of the Contractor to coordinate electric service installation. The Contractor is responsible for determining actual power requirements and arranging with the local utilities for installation with associated wiring and electrical equipment, as necessary to perform site work activities. The Contractor is responsible for assuring that the system is sufficient and adequate for all temporary power needs.

1.6.2 Service shall be brought to the project site by buried conduit or from conventional above ground poles. All work shall be by personnel familiar with code requirements and qualified for the work to be performed. The Contractor shall install circuit and branch wiring with area distribution boxes located so that power and lighting are available throughout the construction site by the use of construction-type power cords.

1.6.3 Service shall be brought to immediate work areas of the site, as required, by construction-type power cords. Distribution boxes and circuit wiring shall be provided, if required, to meet the required power needs. All circuits throughout the construction site shall be protected either by a ground fault interrupter or an approved grounding system in accordance with paragraph 15.C.09 of EM 385-1-1 of USACE regulations.

1.6.4 Lighting shall be provided for all work areas for night work and where natural light is inadequate to perform the work safely. Work areas shall be lighted to not less than the minimum illumination intensities listed in OSHA Standard 29 CFR 1910.120.

1.6.5 Project completion: The Contractor shall be responsible for disconnecting and removing the temporary electrical and lighting systems at the completion of the work.

1.7 **TELEPHONE SERVICE:**

1.7.1 The Contractor shall make all arrangements and pay all costs for providing telephone services for his requirements.

1.7.2 Removal: Contractor shall be responsible for arranging for removal of his telephone service at the completion of the site work.

1.8 **WATER SYSTEM:**

1.8.1 The Contractor shall provide adequate water required for dust control and other site activities. Project site water service shall be connected to existing installation water service as directed by the Contracting Officer. The Contractor is responsible for determining actual water requirements necessary to perform site work activities and for installation of all water service for the project site. The Contractor shall meter and purchase water at the operating site by entering into a utility service contract with the installation. Non-potable water outlets shall be clearly identified that the water is not to be used for drinking or cooking purposes.

1.8.2 An adequate supply of potable water shall be provided on site.

1.8.3 Site water may be stored in holding tanks and distribution piping or by tank trucks or any combination thereof.

1.9 SANITARY WASTE SYSTEM:

1.9.1 Waste from sanitary facilities shall be collected in holding tanks for subsequent transfer to an off-site septage disposal facility. Holding tanks may be stationary tanks or tank trucks of suitable size.

1.9.2 Temporary toilet facilities shall be the chemical type or flush toilets, hot and cold water may be installed at Contractor's option and cost.

1.9.3 The Contracting Officer's trailer shall have toilet facilities as specified in paragraph: CONTRACTING OFFICER'S OFFICE.

1.10 TRAFFIC CONTROL: The Contractor shall control vehicular traffic on the site and ensure safe and efficient operations. The Contractor shall provide and maintain flagmen as required by local authorities with jurisdiction on roads used by the Contractor.

1.10.1 All roads shall be left open to traffic. All vehicles utilizing base roads shall be adequately decontaminated prior to use of the road to prevent any spillage or loss of contaminated materials.

1.11 FACILITY REQUIREMENTS:

1.11.1 Prior to installation of offices and temporary storage sheds, the Contractor shall consult with the Contracting Officer in regard to location, access, and related facilities. All trailers other than storage sheds shall be provided with the following minimum requirements:

1.11.1.1 Lighting: electric, non-glare type producing a minimum illumination level of 50 foot-candles measured at desk height.

1.11.1.2 Heating and cooling capable of maintaining ambient temperature within the structure of 70 degrees Fahrenheit (plus or minus 3 degrees).

1.11.1.3 Potable water.

1.11.1.4 Fire extinguisher; non-toxic dry chemical type, UL-approved for Class A, B and C fires (minimum rating of 2A, 10B, 10C).

1.11.1.5 Temporary offices and trailers shall be provided with proper safety features including exits, stairways with handrails, safety doors and any other precaution called out by National Fire Protection Standards, state and local standards, and any other applicable standards.

1.11.1.6 Fire and smoke detectors meeting applicable standards.

1.11.2 Separate male and female sanitary facilities shall be provided at the work site.

1.11.3 Janitorial services shall be supplied on a daily basis.

1.11.4 Facilities shall be structurally sound and weathertight, with floors raised above ground and open to allow free circulation of air.

1.11.5 At the Contractor's option, portable or mobile buildings may be used as on-site project facilities.

1.11.6 Living quarters shall not be established at the site.

1.12 **CONTRACTING OFFICER'S OFFICES:** The Contractor shall supply and maintain one lockable field office for use by the Contracting Officer. The office shall consist of a trailer measuring approximately 40 ft. long by 10 ft. wide. Trailer shall be placed on concrete blocks and leveled, with adequate wooden steps and handrails provided at each exterior door. The trailer and its associated equipment shall be new or recently renovated to a like new condition subject to the Contracting Officer's approval. The interior shall consist of wood-grain paneling. The following shall be provided by the Contractor:

1.12.1 One partitioned office with doors. The office shall contain at least one operable window and shall be supplied with the following equipment:

1.12.1.1 Office desk (60 inches by 30 inches laminated top) with lockable drawers, cloth swivel chair with arms, and table (60 inches by 30 inches laminated top).

1.12.1.2 Telephone - a separate telephone line.

1.12.1.3 Fire-resistant, four-drawer, lockable filing cabinet, legal size.

1.12.1.4 Two waste baskets.

1.12.1.5 Seven straight backed chairs.

1.12.1.6 Bulletin board, 4 feet by 6 feet.

1.12.1.7 Vertical filing plan rack for two sets of 30-inch by 42-inch plans each.

1.12.1.8 One typewriter, IBM Selectric or equivalent.

1.12.1.9 One current local telephone directory.

1.12.1.10 One office table with laminated top 3 feet by 8 feet.

1.12.1.11 One desktop, heavy-duty, electric, dry-process photocopying machine, Xerox 1012 RE or equivalent, and an adequate supply of copy paper. The supply of copy paper shall be replenished by the Contractor as required by the Contracting Officer.

1.12.1.12 Three-tier bookcase, 3 feet wide by 3 feet high by twelve inches deep.

1.12.1.13 Toilet facilities: Office shall contain a separately enclosed room, properly ventilated and complying with applicable sanitary codes, including hot and cold running water and a flush type toilet connected to the Base sanitary waste system.

1.12.1.14 The Contractor shall purchase one 386 25MHz computer with: math chip; minimum 102MB hard drive; minimum 8 megabyte RAM; a 3½-inch high-density disk drive; a 5¼-inch high-density disk drive; and a Super VGA monitor, all of which shall become the property of the Contracting Officer including the following items:

1.12.1.14.1 Mouse.

1.12.1.14.2 HP LaserJet III printer or equal.

1.12.1.14.3 Fax modem: fax send, fax receive, 2400 baud with Comtel package or equal.

1.12.1.14.4 Optical Character Recognition (OCR) hand scanner.

1.12.1.14.5 All connection cables necessary.

1.12.1.14.6 Surge protector with six electrical outlets.

1.12.1.14.7 CD-ROM reader.

1.12.1.14.8 Modem.

1.12.1.15 Bottled water cooler and bottled water supply.

PART 2 - PRODUCTS
(NOT APPLICABLE)

PART 3 - EXECUTION
(NOT APPLICABLE)

* * END OF SECTION * *

SECTION 01530

PROJECT IDENTIFICATION AND SIGNS

PART 1 - GENERAL

1.1 **SCOPE:** This section covers the requirements for project identification and safety performance signs at the project site.

1.2 **APPLICABLE PUBLICATION:** The following publication forms a part of this specification to the extent referenced. The publication is referred to in the text by basic designation only.

Corps of Engineers Publication

EP 310-1-6a and 6b Sign Standards Manual with Appendices

PART 2 - PRODUCTS

2.1 **PRODUCTS AND MATERIALS:** All project identification and safety performance signs shall be fabricated with the materials indicated herein. Layout of signs including coloring, lettering, letter and word spacing and insignias shall be as shown on the attached sheets. All letter and word spacing shall be in accordance with Appendix D of EP 310-1-6. Materials shall be suitable for use in an unprotected exterior environment typical to the project area.

PART 3 - EXECUTION

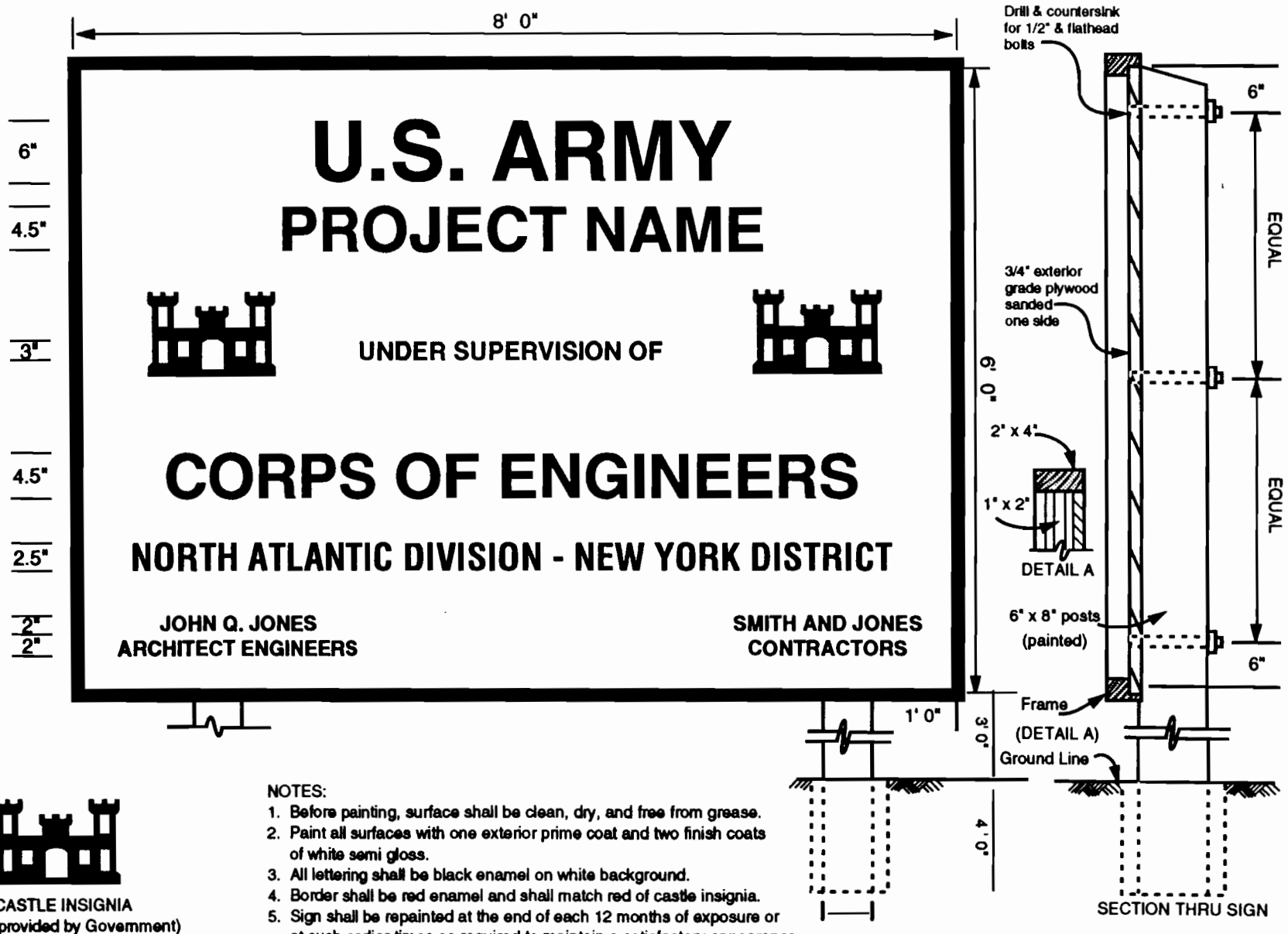
3.1 **GENERAL:** The signs shall be installed within 10 days after the date of Notice to Proceed and shall be maintained in good condition throughout the contract period. Dollar amounts to be included on the sign will be provided by the Contracting Officer after contract award.

3.2 **PROJECT SIGN FOR AIR FORCE PROJECTS:** The Contractor shall furnish and erect a project sign at the location directed by the Contracting Officer. Details of construction shall be as shown on the drawings attached at the end of this section. The sign shall be constructed of 1/2-inch thick, grade A-C, exterior type plywood. The sign shall receive one coat primer paint followed by two coats blue color paint in accordance with Federal Standard 595a, Color Number 15090 gloss exterior type enamel. Dollar amounts to be included on the sign will be provided by the Contracting Officer after contract award. Upon completion of work under this contract, the project sign shall be removed from the jobsite and shall remain the property of the Contractor.

3.3 **PROJECT SAFETY SIGN:** The Contractor shall furnish and erect a project safety sign at the Contractor's field office. The safety sign shall be located in a conspicuous place easily within view of all employees and visitors as approved by the Contracting Officer. Details of construction shall be as shown on the drawings attached at the end of this section. The sign shall be constructed of 3/4-inch thick, grade A-C, exterior type plywood. The sign shall receive two coats of an approved white, semigloss, exterior type enamel. Lettering shall be as shown on the drawings and shall be semigloss, exterior type enamel of the colors noted on the drawings. The Contractor shall furnish and apply a red decal of the Corps of Engineers' Castle or may use a stencil in lieu of a decal provided the dimensions are the same. The decal, if used, shall receive a thin coat of clear spar varnish after application. If a stencil is used, the castle shall be painted with an approved red, semigloss, exterior type enamel. The Contractor shall furnish a sufficient number of sign numbers to cover the length of the contract period and to keep both numbered spaces up to date. The Contractor shall keep the safety sign current by posting the numbers daily in both slots (lines 5 and 6

of sign). Numbers shall be red and the size indicated on the drawing and shall be of a weatherproof material. Upon completion of work under this contract, the project safety sign shall be removed from the Government-controlled land and remain the property of the contractor.

* * END OF SECTION * *



CASTLE INSIGNIA
(Decal provided by Government)

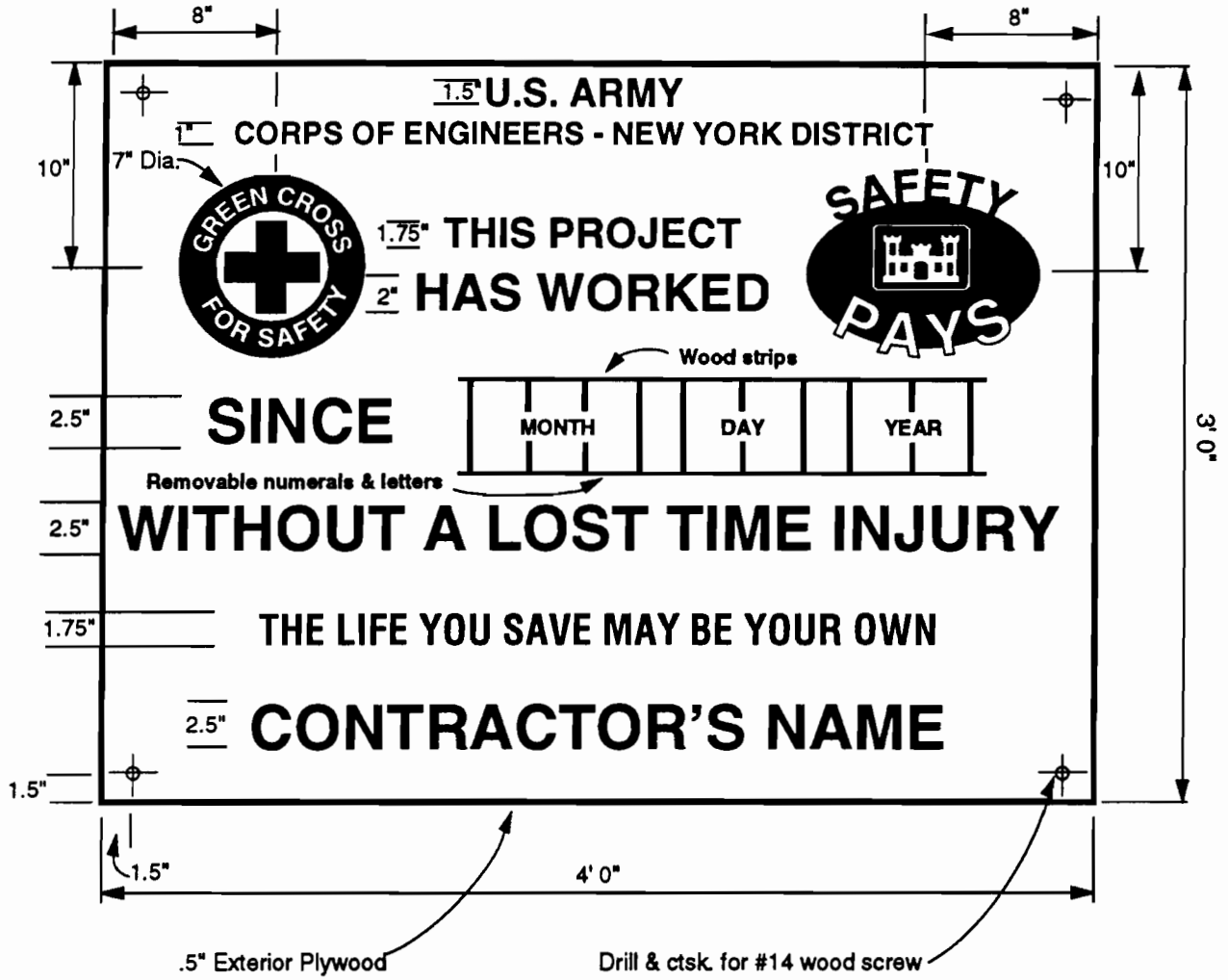
NOTES:

1. Before painting, surface shall be clean, dry, and free from grease.
2. Paint all surfaces with one exterior prime coat and two finish coats of white semi gloss.
3. All lettering shall be black enamel on white background.
4. Border shall be red enamel and shall match red of castle insignia.
5. Sign shall be repainted at the end of each 12 months of exposure or at such earlier times as required to maintain a satisfactory appearance.

12" 6" 0 1'

Graphic Scale

1564.74



NOTES:

1. Board to be sanded and painted with one prime coat and two coats white enamel.
2. All lettering to be black enamel except as noted.
3. Provide removable numerals and letters painted on 1/8" tempered pressed wood as required.
4. Decals for cross and castle will be Gov't furnished.
5. Typical example of date: Nov. 23. 69.

SAFETY SIGN
NEW YORK DISTRICT
FORT DRUM, N.Y.
NOV. 1969

1564.74

SECTION 01540

SECURITY

PART 1 - GENERAL

1.1 **SUMMARY:**

1.1.1 The general security of matters within the periphery of the installation shall be under the scrutiny of the security staff. The security personnel shall monitor all movements within the site limits, and they shall have access to any area or property of the work for routine investigation. All personnel and property within the site limits are under the jurisdiction of the local security staff, and the Contractor shall investigate the requirements of the security system prior to starting any work under this contract.

1.1.2 The Contractor shall be responsible for maintaining site security within the limits of this contract as identified in the contract drawings, 24 hours a day, 7 days a week including holidays throughout the duration of the contract.

1.1.3 The Contractor shall provide control of all persons, equipment and vehicles entering and leaving the site.

1.2 **RELATED SECTIONS:**

SECTION 01460: HEALTH, SAFETY, AND ACCIDENT PREVENTION
SECTION 01529: TEMPORARY FACILITIES

1.3 **SUBMITTALS:** The Contractor shall prepare and submit at the Prework Conference a Security Plan to the Contracting Officer for his review and approval.

1.4 **APPLICABLE PUBLICATIONS:** U.S. Army Corps of Engineers, Safety and Health Requirement Manual (EM 385-1-1, Revised Oct. 1987).

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.1 **WARNING SIGNS:** The exclusion zone and contamination reduction zone, identified as active hazardous work areas, shall be posted with signs at 40 foot intervals declaring "WARNING, HAZARDOUS WORK AREA, DO NOT ENTER UNLESS AUTHORIZED." The design of signs shall conform with the Section 10.6.02 of the U.S. Army Corps Engineers' Safety and Health Requirements Manual-EM385-1-1, revised October, 1984.

3.2 **VISITORS:** The Contractor shall be responsible for insuring that all personnel have complied with the requirements, including training and medical monitoring, of the Site Health and Safety Plan in accordance with SECTION: HEALTH, SAFETY, AND ACCIDENT PREVENTION.

3.3 **LOG:** The Contractor shall be responsible for maintaining a log of all security incidents. This log will be furnished to the Contracting Officer upon request.

3.4 **PERSONNEL IDENTIFICATION:**

3.4.1 Security identification cards specific to the site, shall be provided by the Contractor for all on-site personnel and visitors entering the site, showing:

1. Name of individual
2. Occupation
3. Name of employer

3.4.2 The Contractor shall be responsible for and guarantee that such identification shall be worn by each individual and visible at all times while the individual is on site.

3.4.3 The Contractor shall exclude improperly identified personnel from the site.

3.5 **ENTRANCE CONTROL:** Control of all persons, equipment, and vehicles entering and leaving the site will be provided by the Contractor.

3.5.1 The Contractor shall require each person to display proper identification.

3.5.2 The Contractor shall maintain a list of persons authorized for site entry and submit a copy of the list to the Contracting Officer on request.

3.5.3 The Contractor shall require all personnel and visitors having access to the site to sign in and sign out, and shall keep a record of all site access. A log of all visitors shall be maintained.

3.5.4 Site visitors shall not be permitted to enter active hazardous work areas (Exclusion Zone and Contamination Reduction Zone), unless authorized by the Contracting Officer and complying with the visitor training requirements in SECTION: SAFETY, HEALTH AND ACCIDENT PREVENTION.

3.5.4.1 Visitors shall be required to sign a form relieving the U.S. Government, its officers, employees, and agents of the liability or consequences related to potential hazards associated with site entry.

3.5.5 Vehicular access to the site shall be restricted to authorized vehicles only. Use of site-designated parking areas shall be restricted to vehicles of Government, Contractor, Subcontractor, and Base personnel assigned to the site and actually on duty.

3.5.6 Personal vehicles shall not be authorized to enter the exclusion zone or contamination reduction zone.

3.5.7 The Contractor shall only use the roads and access routes approved by the Contracting Officer on the Contractor's proposed site layout required by SECTION: TEMPORARY FACILITIES.

3.6 Upon completion of each workday, on weekends or during non-working periods, the Contractor shall be responsible for turning off operations such as electricity, heating, air conditioning, machinery, etc. The Contractor shall also securely lock trailers and other facilities and equipment at the completion of each workday. The Government will not be responsible for any loss of Contractor's materials or any other belongings, etc.

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SECTION 01560

TEMPORARY FIRE PROTECTION

PART 1 - GENERAL

1.1 **SCOPE:** This section covers Contractor's responsibilities for prevention and control of fire at the project site during the contract period.

1.2 **FIRE FIGHTING EQUIPMENT:** As a minimum, two 20 pound ABC-Rated fire extinguishers shall be maintained at each entrance to the Exclusion Zone from the Contamination Reduction Zone. This area shall be clearly marked as a fire station.

1.3 **OUTSIDE ASSISTANCE:** The Contractor shall prearrange for the services of the local fire department and coordinate roles of the local fire department and Contractor personnel.

1.4 **A listing of emergency phone numbers** and points of contact for fire, hospital, police, ambulance, and other necessary contacts shall be posted at the site in accordance with SECTION: SAFETY, HEALTH, AND ACCIDENT PREVENTION.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

(Not Applicable)

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SECTION 01700

AS-BUILT DRAWINGS

PART 1 - GENERAL

1.1 **SCOPE:** This section covers as-built drawings technical requirements and provides information on preliminary and final as-built drawing submittals.

1.2 **AS-BUILT DRAWINGS:**

1.2.1 General: As part of the contract drawings furnished under the SPECIAL CLAUSE titled "Contract Drawings, Maps, and Specifications," the Contractor will be furnished a full size set of sepias and a full size set of black line prints for use in preparation of as-built drawings. The as-built drawings shall be a record of the interim removal action as recorded and completed by the Contractor. They shall include all the information shown on the contract set of drawings and a record of all deviations, modifications, or changes from those drawings, however minor, which were encountered in the work, all in-situ soil sampling locations, all remaining pipelines, all locations of pipeline caps and any other utility termination points, all additional work not appearing on the contract drawings, all changes which are made after final inspection of the contract work and the location and size of all uncharted existing utilities encountered. In event the Contractor accomplishes additional work which changes the as-built conditions of the facility after submission of the as-built drawings, the Contractor shall furnish revised and/or additional drawings as required to depict as-built conditions. The requirements for these additional drawings will be the same as for the as-built drawings included in the original submission. The Contractor shall submit these as-built drawings on full-size mylar sheets.

1.2.2 Submittals of preliminary and final as-built drawings shall be as outlined:

1.2.2.1 Contracts having a single item of work and the chronologically last item of work on contracts having multiple items of work. At the time of final inspection on the last item of work, the Contractor shall deliver the approved as-built drawing sepias and black lines to the Contracting Officer's representative.

1.3 **PRELIMINARY AS-BUILT DRAWINGS:** The Contractor shall mark up both the sepias and the black line prints to show as-built conditions. These two sets, hereafter called preliminary as-built drawings, or singly, sepias or black lines, shall be kept current and available on the job site at all times, except as noted below. The Contractor's Quality ControlPersonnel shall be assigned responsibility for the maintenance and currency of preliminary as-built drawings. This assignment and any reassignment of duties concerning the maintenance of the as-built drawings shall be promptly reported to the Contracting Officer's representative for his approval. All changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction, including uncharted utilities, shall be accurately and neatly recorded as they occur by means of details and notes. All changes and/or required additions to the preliminary as-built drawings shall be clearly identified in a color contrasting to black and which is compatible with reproduction of the preliminary as-built sepias. During periods when the sepias are being copied and are therefore not available at the job site, the Contractor shall continue posting all required data to the black lines. The Contractor shall minimize the time that the sepias are away from the job site and he shall update them with all as-built data immediately upon their return. The sepias and black lines will be jointly inspected for accuracy and completeness by the Contracting Officer's representative and the assigned representative of the Contractor's Quality

Control Organization prior to submission of each monthly pay estimate. (See paragraph: Withholding for Preliminary As-Builts.) The as-built drawings shall show the following information, but not be limited thereto.

1.3.1 The location and description of any utility lines or other installation of any kind or description known to or found to exist within the construction area. The location of exterior utilities includes actual measured horizontal distances from utilities to permanent facilities/features. These measurements shall be within an accuracy range of 6 inches and shall be shown at sufficient points to permit easy location of utilities for future maintenance purposes. Measurements shall be shown for all change of direction points and all surface or underground components such as valves, manholes, drop inlets, cleanouts, meters, etc. The general depth range of each underground utility line shall be shown (i.e., 3 feet to 4 feet depth). The description of exterior utilities includes the actual quantity, size, and material of utility lines.

1.3.1.1 The former location and dimensions of the tanks, and the actual limits of excavation.

1.3.1.2 Correct grade or alignment of roads, structures or utilities if any changes were made from contract plans.

1.3.1.3 Correct elevations if changes were made in site grading.

1.3.1.4 Additional information obtained from the interim removal action completed by the Contractor including but not limited to in-situ soil sampling locations, concrete pavement and asphalt pavement installation plans and placing details, dimensions of former tank foundations, etc.

1.3.1.5 The topography and grades of all drainage installed or affected as a part of the project construction.

1.3.1.6 For utilities and pipelines to be left in place, utility and pipeline termination points shall be surveyed in and indicated on the as-built drawing set.

1.3.2 As part of the pre-final inspection for each item of work, the preliminary as-built drawings will be reviewed. The drawings must comply with this specification prior to scheduling the final inspection, and/or prior to substantial completion of the item of work.

1.3.3 Preliminary as-built drawing final submittal: Prior to scheduling the final acceptance inspection of the last item of work, the preliminary as-built drawings shall be completed and delivered to the Contracting Officer's representative for his review and approval. If upon review, the drawings are found to contain errors and/or omissions, they will be returned to the Contractor for corrections. Failure of the Contractor to make timely delivery of the preliminary as-built drawings on any items of work will be cause for the Government to delay substantial completion, and to assess liquidated damages in accordance with the terms and conditions of the contract.

1.3.4 Withholding for preliminary as-built drawings: Failure by the Contractor to maintain current and satisfactory preliminary as-built drawings in accordance with these requirements will result in withholding from progress payments an amount determined by the Contracting Officer's Authorized Representative as the value of the subject as-built drawings, and will indicate this unearned amount on monthly payment estimates until the Contractor has fulfilled the contract requirements.

1.4 FINAL AS-BUILT DRAWINGS: Upon approval of the preliminary as-built drawings, the Contracting Officer will furnish the Contractor the approved black lines and the original set of contract drawings or tracings. The Contractor will then modify these original drawings or tracings as may be necessary to correctly show all the features of the project as it has been completed by bringing the contract set into agreement with the preliminary as-built drawings, adding such additional drawings as may be necessary. The original drawings or tracings are part of the permanent records of this project and the Contractor shall be responsible for the protection and safety thereof until returned to the Contracting Officer. Any drawings or tracings damaged or lost by the Contractor shall be satisfactorily replaced by the Contractor at his expense. If additional drawings are required, they shall be prepared on blank sheets furnished by the Government.

1.4.1 Drafting: Only personnel proficient in the preparation of engineering drawings shall be employed to modify the original contract drawings or prepare additional new drawings. All additions and corrections to the contract drawings shall be neat, clean, and legible and shall match the adjacent existing linework and/or lettering being annotated in type, density, size, and style.

1.4.1.1 When final revisions have been completed, each drawing shall be lettered or stamped with the words "DRAWING OF WORK AS BUILT" in letters at least 3/16-inch high placed below the title block between the border and the trim line. The date of completion and the words "REVISED AS-BUILT" shall be placed in the revision block above the latest existing revision notation.

1.4.1.2 Title blocks: The title block to be used for any new as-built drawings shall be similar to that used on the original drawings.

1.4.2 Copies of the final as-built drawings: Black line prints shall be full size, 28 inch x 40 inch image on 30 inch x 42 inch sheet. All black line prints shall exhibit good readable print with clear, sharp, dark lines, and shall not be smeared, faded, double imaged, or have torn or ragged edges.

1.4.3 Submittal requirements: The Contractor shall submit to the Contracting Officer the final as-built drawings, one set of full size black line prints, the approved preliminary black lines, and all required reproduced items. All paper prints, reproducible drawings, and microfilms will become the property of the Government upon final approval. Failure to submit as-built drawings as required herein shall be cause for withholding payment due the Contractor for final as-built drawings under this contract and for assessment of the specified liquidated damages. Approval and acceptance of final as-built drawings shall be accomplished before final payment is made to the Contractor.

1.4.4 Payment for final as-built drawings: Payment for the performance of the work outlined above will be made after its acceptance by the Contracting Officer.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

(Not Applicable)

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SECTION 01710

WARRANTY OF CONSTRUCTION

PART 1 - GENERAL

1.1 **GENERAL:** In addition to any other warranties set out elsewhere in this contract, the Contractor warrants that work performed under this contract conforms to the contract requirements and is free of any defect of equipment, material or design furnished, or workmanship performed by the Contractor or any of his subcontractors or suppliers at any tier. Such warranty shall continue for a period of one year from the date of final acceptance of the work, but with respect to any part of the work which the Government takes possession of prior to final acceptance, such warranty shall continue for a period of one year from the date the Government takes possession. Under this warranty, the Contractor shall remedy at his own expense any such failure to conform or any such defect. In addition, the Contractor shall remedy at his own expense any damage to Government-owned or controlled real or personal property, when that damage is the result of the Contractor's failure to conform to contract requirements or any such defect of equipment, material, workmanship, or design. The Contractor shall also restore any work damaged in fulfilling the terms of this clause. The Contractor's warranty with respect to work repaired or replaced hereunder will run for one year from the date of such repair or replacement.

1.2 **NOTICE OF FAILURE:** The Government will notify the Contractor in writing within a reasonable time after the discovery of any failure, defect, or damage.

1.3 **CONTRACTOR'S LIABILITY:** Should the Contractor fail to remedy any failure, defect, or damage described in paragraph GENERAL above, within a reasonable time after receipt of notice thereof, the Government will have the right to replace, repair, or otherwise remedy such failure, defect, or damage at the Contractor's expense.

1.4 **OTHER WARRANTIES:** In addition to the other rights and remedies provided by this clause, all subcontractors', manufacturers', and suppliers' warranties expressed or implied, respecting any work and materials shall, at the direction of the Government, be enforced by the Contractor for the benefit of the Government. In such case if the Contractor's warranty under paragraph GENERAL above has expired, any suit directed by the Government to enforce a subcontractors', manufacturers', or suppliers' warranty will be at the expense of the Government. The Contractor shall obtain any warranties which the subcontractors, manufacturers, or suppliers would give in normal commercial practice.

1.5 **ENDORSEMENT OF OTHER WARRANTIES:** If directed by the Contracting Officer, the Contractor shall require any such warranties to be executed in writing to the Government.

1.6 **CONTRACTOR'S LIABILITY EXCLUSIONS:** Notwithstanding any other provision of this clause, unless such a defect is caused by the negligence of the Contractor or his subcontractors or suppliers at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage which results from any such defect in Government-furnished material or design.

1.7 **GOVERNMENT'S ADDITIONAL RIGHTS:** The warranty specified herein shall not limit the Government's rights under CONTRACT CLAUSE titled "Inspection of Contract" of this contract with respect to latent defects, gross mistake, or fraud.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

(Not Applicable)

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SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 **SUMMARY:** This section covers the requirements for maintenance and submittal of record documents.

1.2 **MAINTENANCE OF DOCUMENTS:**

1.2.1 The Contractor shall maintain at the site for the Contracting Officer one record copy of:

1.2.1.1 Construction schedule and progress record.

1.2.1.2 The Technical Specification.

1.2.1.3 Addendum and Modifications.

1.2.1.4 Change Orders and other modifications to the contract.

1.2.1.5 Contracting Officer's Field Orders.

1.2.1.6 Manufacturer's certificates.

1.2.1.7 Daily work activity summary reports, including:

1.2.1.7.1 Reports on any emergency response actions.

1.2.1.7.2 Compaction test records.

1.2.1.7.3 Records of all site work.

1.2.1.7.4 Chain-of-custody documents.

1.2.1.7.5 Reports on all spill incidents.

1.2.1.7.6 Truck load tickets and shipping papers.

1.2.1.7.7 Laboratory results.

1.2.1.7.8 Other items as may be required by the Contracting Officer.

1.2.1.8 Contractor Quality Control Plan

1.2.1.9 Site Safety and Health Plan

1.2.1.10 Chemical Data Acquisition Plan

1.2.1.11 Laboratory's Quality Management Plan

1.2.1.12 Spill Prevention and Discharge Control Plan

1.2.1.13 Dust, Vapor, and Odor Control Plan

1.2.1.14 Environmental Protection Plan

1.2.1.15 Underground Storage Tank Removal Work Plan

1.2.1.16 Pipeline Cleaning and Drying Procedures

1.2.1.17 Plan of Operations for Soil Handling, Field Sampling, Soil Storage, and Disposal

1.2.1.18 Plan of Operation for On-site Handling of Hazardous Waste

1.2.2 Record Documents shall be stored in the Contractor's Field Office. The Contractor shall provide files, racks, and secure storage for Record Documents.

1.2.3 Record Documents are to be maintained in a clean, dry and legible condition.

1.2.4 The Contractor shall keep Record Documents available for inspection by Contracting Officer.

1.3 RECORDING:

1.3.1 The Contractor shall record information on a set of blue line drawings, provided by the Contracting Officer. A list of these drawings is included in the SPECIAL CLAUSES of this specification.

1.3.2 Information is to be recorded concurrently with construction progress. No work shall be concealed or covered in a manner that would prevent inspection until required information is recorded and approved by the Contracting Officer.

1.3.3 Contract Drawings and Shop Drawings shall be legibly marked and each item of actual construction recorded including:

1.3.3.1 Measured depths of elements of construction in relation to survey datum.

1.3.3.2 Measured horizontal and vertical locations of underground utilities, underground storage tanks and appurtenances, referenced to permanent surface improvements.

1.3.3.3 Field changes of dimension and detail.

1.3.3.4 Changes made by Modifications.

1.3.3.5 Details not on original Contract Drawings.

1.3.3.6 References to related shop drawings and modifications.

1.3.4 Specifications shall be legibly marked and each item of actual construction recorded including:

1.3.4.1 Changes made by Addenda and Modifications.

1.3.5 Additionally the Contractor shall maintain manufacturer's certifications, inspection certifications, and field test records required by individual Specification Sections.

1.4 SUBMITTALS:

1.4.1 Record Documents shall be delivered at Final Acceptance under provisions of SECTION 01735: PROJECT CLOSEOUT.

1.4.2 Transmit with cover letter in triplicate, listing:

1.4.2.1 Date.

1.4.2.2 Project title and number.

1.4.2.3 Contractor's name, address, and telephone number.

1.4.2.4 Number and title of each Record Document.

1.4.2.5 Signature of Contractor or authorized representative.

1.4.3 Documents must be submitted to and accepted by Contracting Officer at completion of work as a condition of final payment.

1.4.4 All submittals shall become the property of the installation once delivered.

PART 2 - PRODUCTS
(Not Applicable)

PART 3 - EXECUTION
(Not Applicable)

* * * * * *

SECTION 01735

PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 **SUMMARY:** This section covers the requirements for final cleaning, inspection and other procedures necessary for contract closeout.

1.2 **SCOPE:** The work shall consist of the complete decontamination of all equipment, cleaning the project site, inspection, and administrative provisions for substantial completion and for final acceptance. The Contractor shall be responsible for proving that all excess contaminated soils, liquids, and debris above the allowable standards have been removed from the site and have been properly disposed.

1.3 **SUBMITTALS:** The Contractor shall submit, in the manner and within the time limit set forth in the contract documents, a Project Closeout Report for approval. This report shall include as a minimum the following items:

1.3.1 A tank closure report that addresses all items required in 40 CFR 264.112 as specified in SECTION: UNDERGROUND STORAGE TANK REMOVAL.

1.3.2 As built drawings in accordance with SECTION: AS-BUILT DRAWINGS.

1.3.3 Confirmatory testing results showing locations and concentrations found in the sides and bottom of the limits of excavation.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.1 **DECONTAMINATION:**

3.1.1 The final decontamination shall include the following:

3.1.1.1 Decontamination and removal of all of the Contractor's equipment and materials;

3.1.1.2 Collection and disposal of all Contractor generated contaminated material and equipment on the site for which decontamination is inappropriate;

3.1.1.3 A wash down of the equipment decontamination pad and sump specified in SECTION: SAFETY, HEALTH, AND ACCIDENT PREVENTION, including collection of sediments and washwaters for disposal off site at approved disposal facility. Refer to SECTION: SOIL HANDLING STORAGE AND DISPOSAL for off-site disposal requirements for soils and sediments. Refer to SECTION: LIQUID REMOVAL for off-site disposal requirements for the Contractor's decontamination washwaters.

3.1.2 Equipment decontamination: Decontamination shall take place on the equipment decontamination pad and shall consist of degreasing (if required) followed by high pressure water and/or steam cleaning. Special attention shall be paid to removal of material on and within the undercarriage, trucks and sprockets of crawler equipment, and undercarriage, tires and axles of trucks and rubber tire mounted equipment.

3.1.3 Tools decontamination: Tools and items for which decontamination is difficult or impossible to verify shall remain on site, until completion of the work, for subsequent packing and disposal by the Contractor at an approved disposal facility. (Example of such items are wire, rope, lumber, personnel protective equipment and apparel.)

3.1.4 Temporary facilities: Decontamination of temporary facilities located within the Support Zone shall be limited to exterior cleaning prior to removal from site.

3.1.5 Final approval:

3.1.5.1 Prior to removal from site, all decontaminated equipment and material shall be inspected and approved by the Contractor's Health and Safety Officer and the Contracting Officer.

3.1.5.2 Certification of decontamination shall be attested to by the Contractor's Health and Safety Officer and the Contracting Officer.

3.1.5.3 A copy of each decontamination certificate will be provided to the Contractor's Health and Safety Officer. The original certificate will be maintained at the Contracting Officer's office.

3.2 CLEANING THE PROJECT SITE:

3.2.1 The cleaning work shall include the following:

3.2.1.1 Removal of all waste such as excess construction material, wood, bituminous concrete, debris and any other foreign material;

3.2.1.2 Disconnection of all temporary utilities to the site;

3.2.1.3 Removal of temporary site facilities and utilities;

3.2.1.4 Removal of treatment systems (on-site aqueous treatment system);

3.2.1.5 Removal of all Contractor constructed access roads and parking areas;

3.2.1.6 The site shall be cleared, graded, topsoiled, and seeded in accordance with SECTION: EXCAVATION AND BACKFILLING.

3.3 ADMINISTRATIVE PROVISION:

3.3.1 Substantial completion:

3.3.1.1 Prior to substantial completion, the Contracting Officer shall present to the Contractor a punch list of work items to be completed in accordance with the Contract Documents.

3.3.1.2 When Contractor considers the work on the punch list to be substantially complete, he shall submit written notice with a list of items to be completed or corrected, and the estimated dates of the completion or correction.

3.3.1.3 Should inspection by the Contracting Officer find the work is not substantially complete, the Contracting Officer will promptly notify the Contractor in writing, listing observed deficiencies. The Contractor shall remedy the deficiencies and send a new written notice of substantial completion. This procedure shall continue until such time when the Contracting Officer is satisfied with such repairs and corrections.

3.3.1.4 When the Contracting Officer finds the work to be substantially complete, he will prepare a Certificate of Substantial Completion with a list of deficiencies which require timely correction and/or nonconstruction deficiencies in accordance with provisions of General Conditions.

3.3.2 Final acceptance:

3.3.2.1 When the Contractor considers the work to be complete, he shall submit to the Contracting Officer written certification that:

3.3.2.1.1 Contract Documents have been reviewed.

3.3.2.1.2 Work has been inspected for compliance with Contract Documents.

3.3.2.1.3 Work has been completed in accordance with Contract Documents, and deficiencies listed with Certificate of Substantial Completion have been corrected.

3.3.2.1.4 Work is complete and ready for final inspection.

3.3.2.2 Should the Contracting Officer's inspection find work incomplete, he will promptly notify the Contractor in writing listing observed deficiencies. The Contractor shall remedy the deficiencies and send a second certificate of final completion. This procedure shall continue until such time when the Contracting Officer is satisfied with such repairs and corrections.

3.3.2.3 When the Contracting Officer finds work is complete, he will consider closeout submittals, and a Final Acceptance Certificate will be issued to the Contractor.

3.3.2.4 When the Contractor receives the Final Acceptance Certificate, he shall submit his final invoice for final payment.

END OF SECTION

SECTION 01780

UTILITY CLEARANCE AND NOTIFICATIONS

PART 1 - GENERAL

1.1 UTILITY SERVICE INTERRUPTIONS:

1.1.1 Advance Notice: The Contractor shall submit written notification not less than 5 working days in advance of each interruption of each utility and communication service to or within existing buildings and facilities being used by others. No single outage will exceed 4 hours unless approved in writing. The time and duration of all outages will be coordinated with the Using Agency by the Contracting Officer.

1.1.2 Overtime Work By Base Operating and Maintenance (O&M) Personnel: The normal working hours for Government O&M personnel whose services may be required for utility outages or similar services are from 7:30 a.m. to 4:00 p.m. Overtime work by Government O&M personnel due to Contractor delays in scheduled outages, interruptions of known utility services, or other negligent acts, shall be the responsibility of the Contractor. The Contractor shall pay the Government for such additional overtime costs at the existing overtime wage rates established for the Government personnel involved.

1.1.3 Electrical Service and Communications Facilities: The Contractor will not disturb buried and overhead electrical and/or communications facilities and wiring. Where such facilities require relocation (the underground electrical line over the 25,000-gallon gasoline tanks at the Building 110 Site), the Contractor shall notify the Contracting Officer at least seven calendar days in advance of relocation. The proposed new location of any existing service shall be approved by the Contracting Officer. The Contractor shall allow COR personnel and base personnel to be present during digging and relocation operations. If electrical and/or communication facilities are damaged by the Contractor, the Contractor shall restore them within 24 hours at no cost to the Government.

1.1.4 Existing Facilities: The existing dimensions and locations shown on the applicable drawings are for approximation purposes only. Failure to verify the dimensions and locations will be at the Contractor's risk and shall not relieve the Contractor from accomplishing the work required by the contract at the price awarded by the government.

1.2 DIGGING, PERMIT AND ROAD CLOSINGS:

1.2.1 Excavation Permits: The Contractor shall obtain an excavation permit prior to any excavation, boring or other intrusive action. The excavation permit (AF Form 103) shall be created and processed in accordance with CES Reg 85-43. Two weeks prior to performance, the Contractor shall submit his/her request in writing. At the minimum, the following information will be provided:

1.2.1.1 Contract number and name.

1.2.1.2 Point of contact for questions or concerns.

1.2.1.3 Planned start date and daily planned work schedule.

1.2.1.4 General site location drawing.

1.2.1.5 A scaled or dimensioned drawing indicating the specific location of excavation and or intrusion.

1.2.1.6 **Estimated Depth of Excavation:** The Contractor will also, in the field, mark by stakes, flagging or other acceptable method, the exact location of the excavation or intrusion. The Government will review the existing utility drawing and annotate the submitted maps and/or field mark the location of existing utilities. The Contractor will not perform the work until he has returned an executed AF Form 103. Should any one of the Governmental coordination points indicate an additional underground utility or structure over and above those shown on the contract drawing either by sketch on the Contractor's drawing by field pointing or by flagging, the Contractor shall be responsible for protection of each of the items indicated. Should damage occur to any of the items indicated by the Contractor, contract drawings or coordinating agencies, the Contractor shall be responsible for prompt repair of the damage and return of the item to its original workable condition.

1.2.2 **Additional Excavation:** If the Contractor is required to excavate outside of area specified in AF Form 103, he shall submit a revised form provding new updated information as specified herein at least three days prior to commencement of additional excavation.

1.2.3 **Road Closings:** The Contractor shall allow 14 calendar days from date of written application to receive permission to close roads. Work on or near roadways shall be flagged with warning tape and flashing safety barricades.

PART 2 - PRODUCTS

NOT APPLICABLE

PART 3 - EXECUTION

3.1 PROTECTION OR REMOVAL OF UTILITY LINES:

3.1.1 **Existing Utility Lines:** Existing utility lines that are shown on the drawings or the locations of which are made known to the Contractor prior to excavation and that are to be retained shall be protected from damage during excavation and backfilling, and if damaged, shall be repaired by the Contractor at his expense. In the event that the Contractor damages any existing utility lines that are not shown on the drawings or the locations of which are not known to the Contractor, report thereof shall be made immediately to the Contracting Officer, the Base Environmental Office, and the Base Civil Engineering Office. If the Contracting Officer determines that repairs shall be made by the Contractor, such repairs will be made in accordance with the clause entitled "Changes" of the CONTRACT CLAUSES and adjustment in payment will be made.

3.1.2 **Utility Clearance:** Contractor shall be responsible for notifying Contracting Officer of all potential conflicts with known utilities as shown on the drawings or otherwise made known to the Contractor.

** END OF SECTION **

SECTION 02050

DEMOLITION

PART 1 GENERAL

1.1 **GENERAL REQUIREMENTS:** The work includes demolition and removal of all construction indicated or specified including removal of resulting rubbish and debris. Rubbish and debris shall be removed from Government property daily by the Contractor, unless otherwise directed, to avoid accumulation at the demolition site. Materials that cannot be removed daily shall be stored in the Contractor's temporary staging area as shown on the drawings. In the interest of conservation salvage shall be pursued to the maximum extent possible; items salvaged by the Contractor and all other materials removed shall be disposed of as specified in paragraph: DISPOSITION OF MATERIAL. Conduct demolition operations and removal of debris within the limits of work and ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without written permission from Government as specified in SECTION: UTILITY CLEARANCE AND NOTIFICATION. Provide alternate routes around closed or obstructed traffic ways if closure is approved.

1.2 **SUBMITTALS:** In accordance with SECTION 01305: SUBMITTAL PROCEDURES, the Contractor shall submit for approval, data as specified herein on the following:

1.2.1 Category II: (For Approval)

1.2.1.1 Procedures for accomplishment of demolition work to remove Building #110, truck fill stand, chain link fencing, concrete manholes, block valves and vents, flushing pit, concrete foundations, concrete paving as necessary at Building Site 101, all as indicated on the drawings, including procedures for:

1.2.1.1.1 Safe conduct of the work including verification that building 110 is vacant prior to demolition.

1.2.1.1.2 Concrete sawcutting procedures to be utilized at site 101.

1.2.1.1.3 Protection of property which is to remain undisturbed.

1.2.1.1.4 Coordination with other work in progress.

1.2.1.1.5 Detailed description of the methods and equipment to be used for each operation including the name and location of the landfill where demolition materials will be disposed.

1.2.1.1.6 Sequence of operations including a schedule for the shut-off, disconnection and capping of utility services as required.

1.2.1.1.7 Methods to be used to cap the Jet Fuel Transfer Pipeline which shall be in accordance with SECTION: JET FUEL TRANSFER PIPELINE CLEANING AND REMOVAL.

1.3 **DUST CONTROL:** The amount of dust resulting from demolition shall be controlled in accordance with SECTION: DUST, VAPOR, AND ODOR CONTROL to prevent the spread of dust to occupied portions of the construction site and to avoid creation of a nuisance in the surrounding area.

1.4 PROTECTION:

1.4.1 Protection of Existing Property: Before beginning any concrete sawcutting or demolition work, the Contractor shall carefully survey the existing work and examine the drawings and specifications to determine the extent of the work. The Contractor shall take all necessary precautions to ensure against damage to existing work to remain in place, to be reused, or to remain the property of the Government, and any damage to such work shall be repaired or replaced as approved by the Contracting Officer at no additional cost to the Government. The Contractor shall carefully coordinate the work of this section with all other work and shall construct and maintain shoring, bracing and supports, as shown on the drawings and specified in SECTIONS: EXCAVATION AND BACKFILLING AND EXCAVATION BRACING AND SHORING. The Contractor shall ensure that structural elements are not overloaded and be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under any part of this contract. Erect temporary safety fencing in accordance with SECTION: EXCAVATION AND BACKFILLING around excavations prior to commencement of intrusive activities and leave fencing in place until completion of backfilling and grading work. Clean adjacent structures as directed by the Contracting Officer of dust, dirt, and debris caused by demolition operations. Return adjacent areas to conditions existing prior to the start of work unless otherwise directed by the Contract Documents. Any tree designated to remain that is damaged during the work under this contract shall be replaced in kind or as approved by the Contracting Officer.

1.4.2 Environmental Protection: All work and Contractor operations shall comply with the requirements of SECTION: ENVIRONMENTAL PROTECTION.

1.5 BURNING: The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.6 USE OF EXPLOSIVES: Use of explosives will not be permitted.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.1 EXISTING STRUCTURES: Existing structures, fencing, Jet Fuel Transfer System piping and appurtenances, truck fill stand, flushing pit, manholes, block valves and vents indicated shall be removed to the limits as shown on the drawings. Where demolition requires removal of concrete pavement or walks, removal shall be to the nearest joint.

3.2 UTILITIES: Protection, disconnection and removal of utilities by the Contractor shall be as specified in SECTION: UTILITY CLEARANCE AND NOTIFICATIONS. All utilities serving building 110 to be demolished (power, water, telephone and sewer) shall be disconnected prior to the start of demolition. Water and sewer lines shall be capped as required. The Contractor shall install flush to the ground, a 4-inch by 4-inch by 3 foot long concrete monument at all water and sewer cap locations. Power and telephone lines shall be terminated as required. Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations. When utility lines are encountered that are not indicated on the drawings, the contracting officer shall be notified immediately. Do not interrupt existing utilities serving occupied or used facilities. Provide temporary services during interruptions to existing utilities. Contractor shall coordinate shut-off of utilities serving the

structure with the contracting officer. Government shall verify proper disconnection and capping of utilities before commencement of demolition operations by Contractor.

3.3 **BACKFILLING:** Completely fill below-grade areas and voids resulting from demolition of structures in accordance with SECTION 02201: EXCAVATION AND BACKFILLING.

3.4 **DISPOSITION OF MATERIAL:** Title to all materials and equipment not considered to be a hazardous waste to be demolished is vested in the Contractor upon receipt of notice to proceed. The Government will not be responsible for the condition, loss or damage to such property after notice to proceed. All material not considered to be a hazardous waste shall be removed and transported from Government Property as soon as it is removed. Material the Contractor can salvage shall not be sold on the base.

3.4.1 **Unsalvageable Materials:** Non-hazardous concrete, masonry, and other noncombustible materials shall be disposed of off-base in a landfill fully permitted and licensed to accept construction debris and credit for the value thereof, if any, shall have been reflected in the Contractor's bid prices. Combustible materials shall be disposed of off-base.

3.5 **CLEAN-UP:** Debris and rubbish shall be removed daily by the Contractor. Debris shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

END OF SECTION

SECTION 02071

UNDERGROUND STORAGE TANK REMOVAL

PART 1 - GENERAL

1.1 **REFERENCES:** The publications listed below form a part of this section to the extent referenced. The publications are referenced in the text by basic designation only.

AMERICAN PETROLEUM INSTITUTE (API)

API Publ 2015	(Jan 1991; 4th Ed) Cleaning Petroleum Storage Tanks
API Publ 2217	(Jun 1984; 1st Ed) Guidelines for Confined Space Work in the Petroleum Industry
API Publ 2217A	(Nov 1987; 1st Ed) Guidelines for Work in Inert Confined Spaces in the Petroleum Industry
API Publ 2219	(Sep 1986; 1st Ed) Safe Operation of Vacuum Trucks in Petroleum Service
API RP 1604	(Dec 1987; 2nd Ed) Removal and Disposal of Used Underground Petroleum Storage Tanks
API Publ 1628	(Aug 1989; 2nd Ed) A Guide to the Assessment and Remediation of Underground Petroleum Releases
API RP 2003	(Mar 1991) Protection Against Ignitions Arising out of Static, Lightening and Stray Currents

CODE OF FEDERAL REGULATIONS (CFR)

CFR 40 Part 280	Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (UST)

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA SW-846	(Nov 1986, 3rd Ed) Test Methods for Evaluating Solid Waste Physical/Chemical Methods (2 Vol.)

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC)

6NYCRR Part 613	(December 27, 1985) Handling and Storage of Petroleum
SPOTS No. 14	(May 15, 1991) Spill Prevention Operations Technology Series No. 14 - Site Assessments of Bulk Storage Facilities
NYDEC	(January 20, 1987; modified July 19, 1988) Permanent Closure of Petroleum Storage Tanks

NATIONAL FIRE PROTECTION ASSOCIATION

327	Standard Procedure for Cleaning or Safeguarding Small Tanks and Containers
NFPA No. 30	(July 5, 1989) Flammable and Combustible Liquids Code, No. 30

1.2 **MEASUREMENT AND PAYMENT:** Measurement and Payment shall be accomplished in accordance with the requirements specified in SECTION: MEASUREMENT AND PAYMENT.

1.3 **SUBMITTALS:** In accordance with SECTION: SUBMITTAL PROCEDURES, the Contractor shall submit the following items required by this section.

1.3.1 **CATEGORY I:** None

1.3.2 **CATEGORY II:** **(For Approval)** Work Plan

1.4 **WORK PLAN:** The Contractor shall develop, implement, maintain, and supervise as part of the work, a comprehensive plan for tank sampling, analysis, tank and ancillary equipment removal, temporary storage, disposal and related operations. The Work Plan shall be based on the guidance provided in this specification. The Work Plan shall be submitted to the Contracting Officer's representative for approval at least 10 days prior to the pre-work conference. No work at the site, with the exception of site inspections and mobilization, shall be performed until the Work Plan is approved. The Contractor shall allow 30 calendar days in the schedule for the Government's review and approval. No adjustment for time or money will be made for resubmittals required as a result of noncompliance. At a minimum, the Work Plan shall include:

1.4.1 Exploratory excavations.

1.4.2 Tank deactivation operations, including methods of draining, disconnecting, and removing ancillary equipment.

1.4.3 Scheduling and operational sequencing.

1.4.4 Methods to be employed for the removal of tank liquids, solids, residues, vapors, and contaminated water; tank cleaning; tank inerting; temporary storage of solids and liquids; and methods proposed for control of surface water.

1.4.5 Discussion of the tank cutting procedures, if applicable.

1.4.6 Soil sampling locations and rational for locations.

1.4.7 Explanation of how the analytical results will be used.

1.4.8 Identification of applicable regulatory requirements and permits.

1.4.9 The location(s) for disposal or salvage of ancillary equipment, and tanks.

1.4.10 Name, address, and phone number of acting Contractor's Representative.

1.4.11 Borrow source location(s).

1.4.12 A statement, signed by a responsible company official of the Contractor, that the Contractor shall have a minimum of 2 years of tank removal experience.

1.5 **REGULATORY REQUIREMENTS:**

1.5.1 **Statutes and Regulations:** Tank closure shall be carried out in accordance with the requirements identified in CFR 40 Part 280 as well as the applicable local and State of New York regulations. Hazardous material shall be removed and disposed in accordance with SECTION: HAZARDOUS WASTE DISPOSAL.

1.5.2 Notification: The Contractor shall notify the Installation's Environmental Coordinator and the Contracting Officer 30 calendar days prior to tank removal. The Contracting Officer or the Base Environmental Office will contact the Implementing Agency (IA) New York State Department of Conservation (NYSDEC) in accordance with the applicable reporting requirements. The Contractor shall provide NYSDEC with his schedule for underground storage tank removal. Notification to the Contracting Officer by the Contractor shall include a schedule of all anticipated utility interruptions that will be required to complete the work, in accordance with SECTION: UTILITY CLEARANCE AND NOTIFICATION.

1.5.3 Permits and Licenses: The Contractor shall obtain any local, state, or federal permits or licenses required to do the work included in this contract prior to commencing operations at no additional cost to the Government.

1.6 PROJECT/SITE CONDITIONS: The work consists of underground storage tank removal activities at three separate sites.

1.6.1 Building 110 Site: The work consists of removal, decontamination and disposal of four, 25,000-gallon underground fuel storage tanks and associated piping and ancillary equipment; two 500-gallon oil-water separating tanks located in the basement of Building 110 and one 125-gallon underground fuel tank at the truck fill stand and all associated piping and ancillary equipment, as shown on the drawings and described in SECTION: SUMMARY OF WORK.

1.6.2 Building 101 Site: The work consists of removal, decontamination and disposal of one, 12,000-gallon underground storage tank and associated piping and ancillary equipment, as shown on the drawings and described in SECTION: SUMMARY OF WORK.

1.6.3 Building 112 Site: The work consists of removal, decontamination and disposal of three, 500-gallon underground storage tanks with associated piping and ancillary equipment, as shown on the drawings and described in SECTION: SUMMARY OF WORK.

1.7 DEFINITIONS:

1.7.1 Ancillary Equipment: Ancillary equipment includes, but is not limited to: dispensing equipment, piping, valves, vent tubes, and underground service piping.

1.7.2 Residue: Solid or semi-solid material, sludge, liquid or vapor remaining in the tank(s) following removal of water and the liquid phase the tank was designed to store.

1.7.3 Phase: A distinctly separate stratified liquid or solid layer(s) of material contained within the tank.

1.7.4 Free Product: A measurable volume of liquid with a homogeneous chemical composition identical or nearly identical to a chemical stored in or transported to the tank.

PART 2 - PRODUCTS

2.1 BACKFILL MATERIAL: Backfill material shall be in accordance with SECTION: EXCAVATION AND BACKFILLING.

PART 3 - EXECUTION

3.1 GENERAL: The Contractor shall furnish all labor, materials, and equipment required for tank and ancillary equipment draining and dismantling; temporary storage of solids and liquids; tank removal; transportation of the tank, associated piping, liquids, and residues; and off-site disposal of all debris and hazardous materials.

3.1.1 Safety Guidelines: The Contractor shall perform all operations in a prudent, safe and professional manner. The Contractor shall ensure that its employees and subcontractors perform in a safe manner. Contractor personnel working in the general vicinity of the tank shall be trained in accordance with SECTION: SAFETY, HEALTH AND ACCIDENT PREVENTION and be thoroughly familiar with the safety precautions, procedures, and equipment required for controlling the potential hazards associated with this work.

3.2 PREPARATION FOR TANK REMOVAL: The Contractor shall be responsible for performing the investigations necessary to verify the tank location, dimensions, construction materials, contents, and ancillary equipment requiring removal for the tanks shown on the drawings. Investigations performed shall be accomplished at no additional cost to the Government.

3.2.1 Tank Contents Verification Sampling, Analyses and Identification: Prior to removing any of the tank contents, the contents shall be identified to determine the proper disposal of wastes. Tank residues (sludges) and liquids shall be sampled and analyzed by the Contractor to the extent required by the approved off-site permitted treatment, storage or disposal (TSD) facility receiving the material shall be the responsibility of the Contractor. Meeting all regulatory requirements, including manifesting shall be the responsibility of the Contractor. The tank contents determination and accompanying test results for each phase present in the tank shall be submitted to the Contracting Officer before moving the waste off-site. Tank contents analyses have been performed on all three sites by the Government, and are presented in Table A. The Contractor shall be responsible for any additional analytical requirements required by the disposal facility. Disposal of tank contents shall be accomplished in accordance with SECTION: LIQUID REMOVAL, SECTION: CHEMICAL DATA QUALITY MANAGEMENT, and SECTION: HAZARDOUS WASTE DISPOSAL, as required.

3.3 TANK REMOVAL: Remove all residue, liquids, piping, and ancillary equipment from the tanks and inert, vent, and label the tanks in accordance with API RP 1604 and as specified herein.

3.3.1 Utility Location: Contractor shall determine all utility locations prior to any excavation in accordance with SECTION: UTILITY CLEARANCE AND NOTIFICATIONS.

3.3.2 Exploratory Excavations: Exploratory trenches shall be excavated as necessary to determine the tank location, limits and the location of ancillary equipment.

3.3.3 Piping and Ancillary Equipment Product Removal: Drain product within piping back into the tank, remove residual liquids trapped in the product lines, and disconnect the piping from the tank.

3.3.4 Removal and Disposal of Tank Contents:

3.3.4.1 Tank Contents may be removed by various approved methods depending on the construction of the tank, the number and size of shell openings, and the characteristics of the tank contents. Residue, liquids and contaminated water, shall be segregated to the greatest extent possible by the Contractor prior to being transported to the TSD facility. Tank liquids, residues, and sludges shall be removed and disposed of by the Contractor in

accordance with SECTION: LIQUID REMOVAL and SECTION: SOIL HANDLING STORAGE AND DISPOSAL. No Government facilities shall be used for treatment, storage or disposal of the wastes. The Contractor shall provide the equipment and labor necessary for accomplishment of the work including cleaning up spills in accordance with SECTION: SPILL PREVENTION AND DISCHARGE CONTROL. Level D-modified PPE as specified in SECTION: SAFETY, HEALTH AND ACCIDENT PREVENTION shall be the minimum PPE utilized by personnel who may come into contact with tanks' contents or materials/soils which may be contaminated with the tanks' contents. Upgrades to higher levels of PPE will be at no additional cost to the government.

3.3.4.2 Contaminated Water Analyses and Disposal: Analyses of contaminated water within the tanks to be taken to an off-site treatment facility shall conform to the requirements of SECTION: LIQUID REMOVAL.

3.3.5 Tank and Ancillary Equipment Excavation: Excavation around the perimeter of the tank shall be performed in accordance with SECTION: EXCAVATION AND BACKFILLING. Initially, level D PPE as described in SECTION: HEALTH, SAFETY, AND ACCIDENT PREVENTION shall be required for all personnel involved in tank excavation or within 50 feet of such operations. Air monitoring for organic vapors as described in SECTION: HEALTH SAFETY AND ACCIDENT PREVENTION shall be conducted during excavating and removal.

3.3.5.1 Excavated Soil shall be handled in accordance with SECTION: SOIL HANDLING, STORAGE AND DISPOSAL and Paragraph: In-Situ Soil Sampling, and analyzed in accordance with SECTION: CHEMICAL DATA QUALITY MANAGEMENT.

3.3.6 Tank Preparation: After the tanks have been exposed, fittings and lines leading to the tanks shall be disconnected using non-sparking tools and drained of their contents. Remove and cap all tank ancillary equipment connections, and piping in the excavation zone, except those connections necessary to vapor free (inert) the tank. The Contractor shall take special precautions to ensure no spillage of the pipe contents occurs. Line caps shall be in accordance with SECTION: JET FUEL TRANSFER PIPELINE CLEANING AND REMOVAL. The Contractor shall install flush to the ground a 4-inch by 4-inch by 3-foot long concrete monument at all capped pipe ends that remain. Any materials drained shall be transferred into DOT-approved drums for storage and/or transportation. Only nonsparking or non-heat producing tools shall be used to cut through tank fittings. Electrical equipment (e.g., pumps, portable hand tools, etc.) used for tank preparation shall be explosion-proof. Precautions shall be taken to ensure that the contents of the lines do not spill during cutting or disconnecting of the tanks' fittings. Following cutting or disconnecting of the fittings, openings leading to the tanks shall be plugged.

3.3.7 INERTING: Following the removal of the tanks' contents, the tanks shall be inerted in accordance with API RP 1604 by introducing carbon dioxide (CO_2) or nitrogen (N_2) with the exception that CO_2 fire extinguishers or filling with water shall not be used. Before inerting, the Contractor shall plug all openings in the tanks except the vent tube and the opening to be used for introducing the inert gas. All vapors from the tank shall be vented at a minimum height of 12 feet above grade or 3 feet above any roof line within 75 feet of the tank. Skin contact with dry ice shall be prevented by wearing heavy cloth gloves. If a compressed gas (e.g., CO_2 or N_2) is introduced into the tank, it shall be only supplied at low flows which will not result in a pressure inside the tank of greater than 5 psig to prevent the buildup of static electricity. The nozzle of the hose shall be grounded when introducing CO_2 or N_2. The oxygen content and LEL of the tank atmosphere shall be continuously monitored at various levels in the tank and kept below 8 percent.

3.3.8 Tank Removal: After being deemed safe, the tank shall be removed from the excavation, placed on a 30-mil minimum thickness HDPE sheet, and the

exterior cleaned to remove excess material and inspected for signs of corrosion, structural damage, or leakage. Typically when a tank explodes it is most likely to do so at the ends. Therefore, personnel shall be directed to remain away from the ends of the tank and tanks shall be positioned, whenever possible, to orientate the ends away from occupied or traveled areas. All materials coming into contact with the tank, or in the vicinity of the excavation such as shovels, slings and tools shall be of the non-sparking type. After removal from the excavation, the tank shall be placed on a level surface adjacent to the tank excavation and secured with wood blocks to prevent movement.

3.3.8.1 Tank Cleaning Exterior: Soil shall be removed from the tank exterior to ensure markings will adhere to the tank surface, and simplify later tank cutting. Soil shall be removed using non-sparking tools and handled in accordance with SECTION: SOIL HANDLING, STORAGE, AND DISPOSAL.

3.3.8.2 Temporary Storage: After the tank exterior is cleaned and prior to being cut into manageable sections suitable for disposal, the tank shall be labeled as directed in API RP 1604, and placed on blocks if the tank is to be temporarily stored on a flat area adjacent to the excavation.

3.3.8.2.1 Tank Labeling: The tank shell shall be labeled and ALL holes in the tank, except for one vent hole 1/8-inch in diameter, shall be plugged unless the tank is demolished within 48 hours of removal from the excavation. The labels shall be similar to the following in legible letters at least 2 inches high and in a color contrasting to adjacent tank colors:

TANK HAS CONTAINED FUELS, SOLVENTS, PLATING WASTES, etc.
TANK NOT INERTED
NOT SUITABLE FOR STORAGE OF FOOD OR LIQUIDS
INTENDED FOR HUMAN OR ANIMAL CONSUMPTION
DATE OF REMOVAL: (Month/Day/Year)

Any UL Labels from removed tanks must be given to the Contracting Officer with serial number and tank size.

3.3.8.3 Interior: At a minimum, level D-modified PPE shall be utilized by personnel conducting decontamination procedures. The interior of the tank shall be decontaminated prior to being removed from the work site. No volatile organic solvents shall be permitted for use in decontamination procedures. The tank interior shall be cleaned using a high pressure (greater than 500 psi) low volume (less than 2 gpm) water spray or steam cleaned as per API RP 1604 until all loose scale and residue is removed, and contamination in the form of a sheen is no longer visible in the effluent stream. All contaminated water resulting from cleaning operations shall be handled at no additional cost to the government in accordance with SECTION: LIQUID REMOVAL. Cleaning shall be accomplished in a manner that eliminates the need for personnel to enter the tank, using specially designed tank cleaning equipment which allows the tank to be cleaned without personnel entering the tank. Upon completion of the project the Contractor shall certify in writing to the Contracting Officer that the tanks were properly decontaminated prior to removal from the site.

3.3.9 Concrete Slab Removal: Concrete slabs at Buildings 101 and 112 Sites shall be handled as a potential hazardous waste in accordance with SECTION: SOIL HANDLING, STORAGE AND DISPOSAL. Each concrete slab from Buildings 101 and 112 Sites shall be sampled to determine if it is a hazardous waste in accordance with SECTION: CHEMICAL DATA QUALITY MANAGEMENT. Concrete samples which exceed the standards presented in that section shall be handled in accordance with SECTION: HAZARDOUS WASTE DISPOSAL. Otherwise, the concrete shall be handled in accordance with SECTION: DEMOLITION.

3.3.10 Open Excavations: Open excavations while awaiting verification test results from the soil beneath the tank shall be secured in strict adherence to EM 385-1-1 and 29 CFR 1926.650 thru 1926.653 requirements including, but not limited to, requirements for shoring or continuously sloping excavations as specified in SECTION: EXCAVATION AND BACKFILLING and SECTION: EXCAVATION BRACING AND SHORING. Verification analyses shall ensure that the analytical results are available within 5 calendar days. The Contractor shall make every effort to minimize the time period the excavation remains open. The excavation shall not be left open for a period exceeding 14 calendar days subsequent to final excavating work, but in any case shall not be backfilled without approval from the Contracting Officer.

3.3.11 Backfilling: The tank area and any other excavations shall be backfilled, in accordance with SECTION: EXCAVATING, AND BACKFILLING, only after the in-situ soil test results indicate a clean condition or as directed by the Contracting Officer. The excavation shall be dewatered if necessary in accordance with SECTION: EXCAVATION AND BACKFILLING. Stockpiled material subjected to chemical confirmation testing shall be used as backfill if it is found to conform to the requirements of clean fill as described in SECTION: SOIL HANDLING, STROAGE, AND DISPOSAL. The Contractor shall begin backfilling the excavation within a maximum of 48 hours after the bottom of the tank excavation and the four sides of the tank excavation are determined by the Contracting Officer to require no further excavation.

3.4 SOIL EXAMINATION, TESTING, AND ANALYSIS:

3.4.1 Soil Examination: Observe closely the soils being excavated. Signs of contamination include stained soil; chemical or petroleum odors; or signs of a sheen on any water surface. All field observations shall be recorded. Note particularly the depth of stained soil and its location within the excavation. A "bucket test" or "jar test" is one form of visual observation which can be very useful to indicate petroleum contamination. This test is done simply by mixing a small quantity of soil in a bucket or jar of clean water and allowing the mixture to settle. A sheen appearing on the water surface is evidence of contamination. However, the absence of a sheen does not indicate that the material is clean. Further investigation is necessary to determine that a site is free of contamination. Another field method the Contractor may use to test for the presence of volatile organic contamination is dynamic headspace analysis. Place the soil sample in a decontaminated glass container by filling one-half to two-thirds of the container volume. Quickly cover and seal the top of the container with one or more sheets of aluminum foil and secure with a screw-on lid. Shake the sample for 15 seconds, remove the screw-on cap, and puncture the foil seal with the tip of the instrument probe and insert it to a point about one-half of the headspace depth for a PID instrument reading. After the tank has been removed, the soils native at the bottom and around the perimeter of the excavation shall be observed for signs of contamination. The native soils at the tank bottom and around the perimeter of the excavation shall be screened for the presence of volatile and semi-volatile hydrocarbon contamination using a real time vapor monitoring instrument. Contaminated soil shall be excavated at the direction of the Contracting Officer in accordance with SECTION: EXCAVATION AND BACKFILLING.

3.4.2 Building 101 and 112 Sites In-Situ Soil Sampling: After soil known to be contaminated has been removed or after soil excavation at Building 101 Site is complete, and there is no evidence of contaminated soil, then two samples shall be taken from each sidewall of the excavation and six samples shall be taken from the bottom of the excavation. For Building 112 Site, one sample shall be taken from each sidewall of the excavation and two samples shall be taken from the bottom of the excavation. At both sites, at least one sample shall be collected from each end of the tank and at least one sample shall be collected from beneath the fill pipe or manway. If there is evidence

of contaminated soil indicated by field measurement readings, then samples shall be taken from those locations that have the highest instrument readings. On Building 101 Site, three additional samples shall be taken from 2 to 3 feet below the bottom of the excavation. On Building 112 Site, one additional sample shall be taken from 2 to 3 feet below the bottom of the excavation. Collect a soil sample at every pipe joint if the joint locations are known, otherwise collect a sample at every 20 feet of the piping run extending from the excavation. Sample preservation and analytical procedures shall conform to SECTION: CHEMICAL DATA QUALITY MANAGEMENT.

3.4.3 Building 110 Site In-Situ Soil Sampling: After soil known to be contaminated has been removed or after soil excavation at the direction of the Contracting Officer is complete, and there is no evidence of contaminated soil, then at least two samples shall be taken from each sidewall of the excavation, and eight samples shall be taken from the bottom of the excavation. Three additional samples shall be taken from two to three feet below the bottom of the excavation. At the small UST at the truck fill stand site, collect one soil sample from each sidewall, one soil sample from the bottom of the excavation, and one soil sample from two to three feet below the bottom of the tank. Collect a soil sample at every pipe joint if the joint locations are known, otherwise collect a sample at every 20 feet of the piping runs extending from the excavations. Sample preservation and analytical procedures shall conform to SECTION: CHEMICAL DATA QUALITY MANAGEMENT.

3.4.4 In-Situ Soil Sampling at Jet Fuel Transfer Pipeline Manholes, Block Valves, and Filter Pit: One sample shall be taken from the bottom of the excavation at manholes, block valves and the filter pit. Concrete manholes shall not be sampled unless visually stained, and shall be disposed of in accordance with SECTION: DEMOLITION. Analysis shall be in accordance with SECTION: CHEMICAL DATA QUALITY MANAGEMENT.

3.4.5 Stockpiled Material Sampling: Contractor shall collect samples from soils and concrete which have been segregated as potentially uncontaminated, and contaminated as specified in SECTION: SOIL HANDLING, STORAGE, AND DISPOSAL. Copies of all tests results shall be provided to the Contracting Officer.

3.5 DISPOSAL REQUIREMENTS:

3.5.1 General: Disposal of hazardous wastes shall be in accordance with SECTION: HAZARDOUS WASTE DISPOSAL. Disposal of soils shall be in accordance with SECTION: SOIL HANDLING, STORAGE, AND DISPOSAL. Liquids removed from the tank shall be handled in accordance with SECTION: LIQUID REMOVAL. The tanks removed shall be disposed of as required by the State of New York to document delivery and acceptance at the disposal facility.

3.5.2 Tank and Ancillary Equipment Disposal: After the tank, piping, and ancillary equipment have been removed from the excavation and the tank cleaned, the tank shall be cut into sections to the extent necessary to prevent any further use for liquid storage. The tanks and piping from Building Sites 101, 110, and 112 once cleaned do not have to be handled as hazardous wastes and shall be disposed of in a State approved off-site disposal facility. Piping shall be disconnected from the tank and removed in its entirety unless otherwise indicated on the drawings.

3.5.3 Salvage Rights: The Contractor shall retain the rights to salvage value of tanks and appurtenances, so long as the requirements of CFR 40 Part 266, or the applicable State requirements are met.

3.6 SPILLS:

3.6.1 Spill Responsibility: Immediate containment actions and cleanup, in accordance with SECTION: SPILL PREVENTION AND DISCHARGE CONTROL, shall be taken as necessary to minimize effect of any spill or leak.

3.7 **TANK CLOSURE REPORTS:** For each UST site opened, a Tank Closure Report shall be prepared in a standard three ring binder and submitted with a copy to the Installation Environmental Coordinator within 14 calendar days of completing work at each site. Tank Closure Reports shall include the following information as a minimum:

3.7.1 A cover letter signed by a responsible company official certifying that all services have been performed in accordance with the terms and conditions of this specification.

3.7.2 A narrative report describing what was encountered at each site, including:

3.7.2.1 Condition of the UST.

3.7.2.2 The location and a description of any visible evidence of leaks or stained soils.

3.7.2.3 Results of vapor monitoring readings.

3.7.2.4 Methods used for removing, transporting, treating, storing and disposing of all wastes including quantities of materials treated or removed including hazardous soils, hazardous liquids, petroleum-contaminated soils, and petroleum-contaminated liquids.

3.7.2.5 Reasons for selecting sample locations.

3.7.2.6 Sample locations.

3.7.2.7 Reasons for backfilling site.

3.7.2.8 Whether or not ground water was encountered and at what depth.

3.7.3 Description of all analyses performed for disposal, and identification of all sampling and analysis facilities.

3.7.4 Copies of all waste analyses or waste profile sheets.

3.7.5 Identification of the disposal sites used and copies of all certifications of final disposal signed by the responsible disposal facility official.

3.7.6 Identification of transporters who accepted all wastes encountered and signed copies of manifests or shipping orders.

3.7.7 Copies of all analysis performed for verification that underlying soil is not contaminated, with copies of chain-of-custody for each sample. All analyses shall give the identification number of the sample used. Sample locations and corresponding sample identification numbers shall be provided by the Contractor on the as-built drawings as specified in SECTION: AS-BUILT DRAWINGS.

3.7.8 Scaled as-built drawings showing former tank locations, limits of excavation, limits of contamination, underground utilities within 50 feet, sample locations, and sample identification numbers.

3.7.9 Progress Photographs. The Contractor shall take Progress Photographs in accordance with SECTION: PHOTOGRAPHS.

3.7.10 The actual project schedule.

****END OF SECTION****

TABLE 02071-A
TANK CONTENTS AS OF JANUARY 29, 1992
BUILDING 101 SITE

AQUEOUS PHASE (Sample No. 101 UST 1)

Cadmium	0.131	mg/L
Chromium	0.836	mg/L
Nickel	0.065	mg/L
Lead	2.46	mg/L
Cyanide	0.094	mg/L
Methylene Chloride	180JB	µg/L
Tetrachloroethylene	7,300	µg/L
1,2-Trans Dichloroethylene	240J	µg/L
Trichloroethylene	1,800	µg/L

SLUDGE PHASE (Sample No. 101 UST 1)

Cadmium	140	mg/Kg
Chromium	670	mg/Kg
Nickel	71.6	mg/Kg
Lead	1,060	mg/Kg
Cyanide	6.64	mg/Kg
1,1-Dichloroethylene	600	µg/Kg
Ethylbenzene	190	µg/Kg
Methylene Chloride	190	µg/Kg
Tetrachloroethylene	6,000,000	µg/Kg
Toluene	820	µg/Kg
1,2-Trans-Dichloroethylene	79,000	µg/Kg
Trichloroethylene	960,000	µg/Kg

DUPLICATE RESULTS (Sludge, Sample No. 101 UST 101)

Cadmium	26.2	mg/Kg
Chromium	167	mg/Kg
Nickel	19.97	mg/Kg
Lead	218	mg/Kg
Cyanide	2.35	mg/Kg
Benzene	1,900J	µg/Kg
Methylene Chloride	6,600JB	µg/Kg
Tetrachloroethylene	6,000,000	µg/Kg
Toluene	6,200J	µg/Kg
1,2-Trans-Dichloroethylene	210,000	µg/Kg
Trichloroethylene	1,700,000	µg/Kg

J = Concentration Estimated
B = Also found in associated method blank

TABLE 02071-A
TANK CONTENTS AS OF JANUARY 29, 1992
BUILDING 110 SITE

TANK 1 (Sample No. 110 UST 1)

(Tank 1 contains a 1.90' layer of free product.)

Benzene	5,700	µg/L
Toluene	170	µg/L
Ethylbenzene	660	µg/L
Xylenes	13,000	µg/L
Iron	14.8	mg/L
Lead	0.156	mg/L
Oil and grease	2,930	mg/L
Diesel	>90%	
Gasoline	619	ppm

TANK 2 (Sample No. 110 UST 2)

(Tank 2 contains a 1.90' layer of free product.)

Benzene	15,000	µg/L
Toluene	12,000	µg/L
Ethylbenzene	790	µg/L
Xylenes	15,000	
Iron	393	mg/L
Lead	0.0375	mg/L
Oil and grease	3,010	mg/L
Diesel	>90%	
Gasoline	214.6	ppm

TANK 3 (Sample No. 110 UST 3)

(Tank 3 contains a 1.80' layer of free product.)

Benzene	210	µg/L
Toluene	2.5	µg/L
Ethylbenzene	170	µg/L
Xylenes	3,900	µg/L
Iron	521	mg/L
Lead	0.0384	mg/L
Oil and grease	31.5	mg/L
Diesel	19,000	µg/L
Gasoline	9.6	ppm

TANK 4 (Sample No. 110 UST 4)

(Tank 4 contains a 1.50' layer of free product.)

Benzene	3,000	µg/L
Toluene	2,800	µg/L
Ethylbenzene	720	µg/L
Xylenes	9,400	µg/L
Iron	21.6	mg/L
Lead	0.0235	mg/L
Oil and grease	314	mg/L
Diesel	36,800	µg/L
Gasoline	49	ppm

TABLE 02071-A
TANK CONTENTS
BUILDING 112 SITE

TANK 1 (Aqueous Sample No. 112 UST 1) as of January 29, 1992

Methylene Chloride	200JB	µg/L
Toluene	125J	µg/L
2,4-Dimethylphenol	6J	µg/L
4,6-Dinitro-o-cresol	1J	µg/L
4-Nitrophenol	9J	µg/L
Anthracene	2J	µg/L
bis (2-Ethylhexyl) phthalate	2JB	µg/L
Butylbenzyl Phthalate	2JB	µg/L
Fluorene	15	µg/L
Naphthalene	1J	µg/L
Phenanthrene	8J	µg/L
Pyrene	1J	µg/L
Lead	0.030	mg/L
Barium	0.0168	mg/L
Oil and grease	16	mg/L

TANK 2 (Aqueous Sample No. 112 UST 2) as of January 30, 1992

Benzene	36	µg/L
Methyl Chloride	17J	µg/L
Methylene Chloride	110,000	µg/L
Tetrachloroethylene	180	µg/L
Toluene	47	µg/L
1,2-Trans-Dichloroethylene	440	µg/L
Trichloroethylene	51,000	µg/L
Isophorone	31J	µg/L
Barium	1.01	mg/L
Chromium	0.034	mg/L
Lead	0.262	mg/L
Mercury	0.0076	mg/L
Oil and grease	97.2	mg/L

DUPLICATE RESULTS (Aqueous Sample No. 112 UST 201)

Benzene	35	µg/L
Ethylbenzene	14J	µg/L
Methyl Chloride	15J	µg/L
Methylene Chloride	96,000	µg/L
Tetrachloroethylene	480	µg/L
Toluene	37	µg/L
1,2-Trans-Dichloroethylene	320	µg/L
Trichloroethylene	53,000	µg/L
Naphthalene	28J	µg/L
Barium	1.18	mg/L
Lead	0.555	mg/L
Mercury	0.0112	mg/L
Oil and grease	62.9	mg/L

J = Concentration estimated
B = Also found in associated method blank

SECTION 02072

JET FUEL TRANSFER PIPELINE CLEANING AND CLOSURE

PART 1 - GENERAL

1.1 **SUMMARY:**

1.1.1 **Applicability:** Jet fuel transfer pipeline sections to remain, as shown on the drawings, shall be cleaned in accordance with the guidance presented herein. Pipeline sections and associated appurtenances removed shall be handled and disposed of by the Contractor in accordance with this section.

1.1.2 **Cleaning Objectives:** Liquid fuel product, residues and deposits remaining in lines and appurtenances shall be removed to the extent possible prior to capping product delivery pipe lines. Removal of product and residues shall be performed in a manner which ensures the safe removal of these substances without creating sources of ignition in the presence of a flammable or combustible atmosphere within the pipeline or immediate work area. Flammable or combustible vapors in the pipeline shall be removed during the cleaning operation.

1.1.2.1 **Water:** Use of water or any liquids to flush or pig lines is not allowed.

1.1.3 **Removal Objectives:**

1.1.3.1 **Liquid Wastes:** Liquids collected during cleaning operations shall be handled in accordance with SECTION: LIQUID REMOVAL. Liquids and fuel residues shall be removed to the extent that it can be assumed without a reasonable doubt, that the pipeline interior is cleaned and dried throughout the length of the sections to be left in place.

1.1.3.2 **Pipeline Removal and Disposal:** Pipeline sections and appurtenances shall be removed as shown on the drawings.

1.1.4 **Title:** All materials removed by the Contractor in accordance with the execution of this section shall become the property of the Contractor upon removal.

1.1.5 **Salvage Rights:** The Contractor shall retain the rights to salvage values of materials removed. Additional labor, equipment, and transportation incurred by the Contractor to obtain salvage values (profits) shall be at no additional cost to the Government.

1.2 **REFERENCES:** The publications listed below form a part of this specification to the extent referenced and shall be used by the Contractor as they apply to complete this section of the specifications. Where the publications are referred to in the text it shall be by basic designation only.

AMERICAN PETROLEUM INSTITUTE

API RP 2003	Protection Against Ignitions Arising Out of Static, Lightning and Stray Currents.
API Publication 2219	Safe Operating Guidelines for Vacuum Trucks in Petroleum Service.

AMERICAN WATER WORKS ASSOCIATION (AWWA) STANDARD

C110-82	Ductile-Iron and Gray-Iron, Fittings, 3-inch Through 48-inch for Water and other Liquids.
C153	Ductile Iron Compact Fittings 3 inch through 16 for Water and other Liquids
C111-85	Rubber-Gasket Joints for Ductile Iron and Gray-Iron Pressure Pipe and Fittings.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) PUBLICATIONS

D 2000	(1986) Rubber Products in Automotive Applications.

1.3 SUBMITTALS: In accordance with SECTION: SUBMITTAL PROCEDURES, the Contractor shall submit the following items required by this section.

1.3.1 Category I: (For Approval)

1.3.2 Category II: None

1.3.2.1 Plan of Operations: Pipeline Cleaning and Drying Procedures.

PART 2 - PRODUCTS

2.1 MATERIALS:

2.1.1 Cleaning shall be accomplished using a pneumatically propelled polyurethane internal pipeline cleaner (pig). These pigs consist of flexible foam cylinders with spirals of urethane rubber attached to the surface. When pressure is applied behind the pig, it is propelled forward causing the rubber spirals to scrape the pipeline's interior thereby cleaning the pipeline and forcing all pipeline contents out of the line. Drying shall be accomplished using a pneumatically propelled polyurethane pipeline drying pig. Drying pigs generally consist of flexible foam cylinders of lower density than cleaning pigs with various types and configurations of outside coverings to act as an interior pipeline squeegee and absorbent. Propellant shall be pressurized nitrogen gas or other inert gas which will not create the potential for an explosion or fire during the cleaning operation. Liquid propellants shall not be used. Cleaning pigs shall have a density of approximately 5 lbs. per cubic foot. Drying pigs shall have a density of approximately 2 lbs. per cubic foot.

2.1.2 Line Caps: Subsequent to draining and cleaning as specified herein, pipeline ends shall be capped using a Mechanical Joint SSB-Ductile Iron Class 350 cap, and SBR Rubber Transition gasket meeting the requirements of ASTM D 2000 - 3 BA 715. Fittings shall be in accordance with ANSI/AWWA C153/A 21.53 and ANSI/AWWA C110/A 21.11. Each blind flange will be tapped and fitted with a manual ball valve which shall be used to purge any remaining hydrocarbon vapors and introduce a nitrogen blanket into the abandoned pipeline.

2.1.3 Concrete monuments shall be 4 inches by 4 inches by 3 feet long.

PART 3 - EXECUTION

3.1 SITE SAFETY: The Contractor shall perform all operations in a prudent, safe, and professional manner. The Contractor shall ensure that its employees and subcontractors perform in a safe manner, and shall manage the work in accordance with SECTION: HEALTH, SAFETY AND ACCIDENT PREVENTION.

3.2 EMERGENCY OPERATIONS:

3.2.1 Spills: Spill and discharge controls shall be in accordance with SECTION: SPILL PREVENTION AND DISCHARGE CONTROL.

3.3 PIPELINE CLEANING AND DRYING: Pipelines abandoned in place shall be subject to cleaning and drying as described herein.

3.3.1 Plan of Operations: Contractor shall submit a Plan of Operations describing pipeline cleaning and drying procedures to be used at least 15 days prior to work start up. Plan shall describe, as a minimum:

3.3.1.1 Liquid product removal, and collection procedures.

3.3.1.2 Pipe cleaning operation, use and type of pigs, pig insertion method, inert gas use, pipeline ventilation method, pig recovery method.

3.3.1.3 Prevention of sources of ignition.

3.3.1.4 Pipe drying method.

3.3.1.5 Spill prevention planning and spill controls, in accordance with SECTION: SPILL PREVENTION AND DISCHARGE CONTROL.

3.3.2 Method:

3.3.2.1 Cleaning: All liquid fuel product and product deposits and residues shall be cleaned from the pipeline. Contractor shall perform a minimum of three runs of the pigging operation until the pipeline section is cleaned as determined by the units emerging visibly clean. The Contractor shall employ a soft density pig (2 lbs./cu.ft.) through the pipeline on the initial run and subsequently employ medium density pigs (5 lbs./cu.ft.) for the second and third cleaning runs.

3.3.2.1.1 Removed Liquids: Liquids removed during the cleaning operation shall not be allowed to spill onto the ground, and shall be collected and disposed of by the Contractor in accordance with SECTION: LIQUID REMOVAL.

3.3.2.2 Drying: Contractor shall employ pneumatically propelled polyurethane pipeline drying pigs, soft density (2 lbs./cu.ft.), which are designed to remove moisture from inside surfaces of the pipeline and appurtenances. A minimum of five runs shall be used to accomplish drying. Drying operations shall be continued until the pipeline section has been dried as determined by the units emerging dry to the touch.

3.3.3 Vapor Purging: Upon completion of the pipeline drying operation to the satisfaction of the Contracting Officer, Contractor shall monitor the inert gas mixture exiting the pipeline for the presence of volatiles. A real-time vapor monitoring instrument shall be used in accordance with SECTION: HEALTH, SAFETY AND ACCIDENT PREVENTION. Pipeline ventilation shall be continued until the measured exiting atmosphere is less than 10 percent of the Lower Explosive Limit. The Contractor shall introduce a blanket of nitrogen into the pipeline at time of pipeline capping.

3.4 REMOVAL:

3.4.1 Pipeline Cleaning Materials Disposal: Contractor shall dispose of all materials used during the cleaning and drying operations off of Government property in accordance with SECTION: LIQUID REMOVAL.

3.4.2 Piping and Ancillary Equipment Removal:

3.4.2.1 **Removal:** Pipeline sections and ancillary equipment shall be removed as shown on the drawings. Excavations associated with these removals shall be in accordance with SECTION: UNDERGROUND STORAGE TANK REMOVAL. If contaminated soils are encountered, they shall be removed at the direction of the Contracting Officer. One soil sample shall be obtained from the invert of each excavation and analyzed in accordance with SECTION: CHEMICAL DATA QUALITY MANAGEMENT.

3.4.2.2 **Storage:** Removed pipeline sections and ancillary equipment may be temporarily stored within the limits of the Contractor's work area as shown on the drawings or within the limits of the Contractor's staging area shown on the drawings, for not more than 5 calendar days.

3.4.2.3 **Disposal:** Removed pipeline sections and ancillary equipment shall be disposed of at an off-base salvage yard or disposal facility.

3.4.3 **Capping:** Pipelines and ancillary equipment to be abandoned in place shall be capped by the Contractor prior to backfilling. Caps shall be installed using the same material as the line, and shall be installed at an existing pipe joint whenever possible.

3.4.3.1 **Preparation:** Pipelines shall be cleaned of all dirt, gasket compounds and loose materials to allow the cap or plug to properly seal the line. Standard plugs shall be used.

3.4.3.2 **Line Capping:** Subsequent to draining and cleaning, pipeline ends shall be capped using the materials specified. Contractor shall notify the Contracting Officer at least 48 hours prior to backfilling to allow the Contracting Officer to inspect the plug prior to backfilling.

3.4.3.3 **Monuments:** The Contractor shall install flush to the ground a concrete monument at all capped pipe ends that remain.

3.5 **BACKFILLING:** Upon removal of pipeline and appurtenances, trench shall be backfilled in accordance with SECTION: EXCAVATING AND BACKFILLING.

** END OF SECTION **

SECTION 02075

SOIL HANDLING, STORAGE AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY: The requirements of this section are applicable to the handling, treatment and disposal of excavated soils, concrete, and sludges contaminated, or potentially contaminated, with: petroleum products on Building 110 Site including excavated soils at ancillary structures along the Jet Fuel Transfer pipeline; spent solvents and/or petroleum products on Building 112 Site; and, plating wastes and/or spent solvents on Building 101 Site.

1.1.1 Contaminated, Non-Hazardous Waste Soils: These soils include: soils from the Building 110 site which either appear contaminated using field observations or exceed the action levels described in SECTION: CHEMICAL DATA QUALITY MANAGEMENT; and soils from the Building 101 or 112 Sites which exceed the detection limits but are below the action levels described in SECTION: CHEMICAL DATA QUALITY MANAGEMENT.

1.1.2 Hazardous Waste Soil: Soils sampled as specified herein, and analyzed in accordance with SECTION: CHEMICAL DATA QUALITY MANAGEMENT and which exceed the ground-water action levels or soil action levels in Table 01430-A in SECTION: CHEMICAL DATA QUALITY MANAGEMENT.

1.2 **SUBMITTALS:** In accordance with SECTION: SUBMITTAL DESCRIPTIONS, the Contractor shall submit the following items required by this section.

1.2.1 Category II: For Approval.

1.2.1.1 Plan of Operations: Soil handling, field sampling, soil storage and disposal.

1.2.2 Category II: For Information Only.

1.2.2.1 Results of soil analyses.

1.2.2.2 Letter of Acceptance.

1.3 PERMITS AND LICENSES: The Contractor shall obtain any local, state, or federal permits or licenses required to do the work included in this contract prior to commencing operations at no additional costs to the Government.

PART 2 - PRODUCTS

2.1 30-MIL HDPE: All excavated non-hazardous material shall be placed on 30-mil. minimum thickness HDPE sheets.

2.2 CLEAN FILL: Clean fill shall meet the analytical requirements specified in SECTION: CHEMICAL DATA QUALITY MANAGEMENT and the requirements for satisfactory materials as specified in SECTION: EXCAVATION AND BACKFILLING.

PART 3 - EXECUTION

3.1 EXCAVATED SOIL HANDLING - BUILDING 110 SITE:

3.1.1 Field Sampling and Segregation: Contractor shall excavate soils, concrete, and remove sludges in a manner that limits the amount of potentially contaminated soil that could be mixed with uncontaminated soil to the maximum

extent possible. During soil excavation, Contractor shall visually inspect each discrete volume of soil removed immediately upon removal from the ground. The soil shall be visually inspected for staining and also screened for the presence of volatile hydrocarbons. A photoionization detector shall be used to detect the presence of contamination not visually apparent. A headspace field test as described in SECTION: UNDERGROUND STORAGE TANK REMOVAL shall be performed on every tenth bucket of excavated material. A positive instrument reading shall indicate the presence of contamination. A negative instrument reading shall be interpreted as "potentially uncontaminated." Excavated soils shall be separated into contaminated and potentially uncontaminated volumes, and soil verification sampling, as specified herein, shall be performed by the Contractor prior to backfilling, as specified in SECTION: EXCAVATION AND BACKFILLING.

3.1.2 Initial Storage On Site: All excavated soils shall be considered as contaminated and handled as such until stockpiled verification sampling is performed by the Contractor. Potentially uncontaminated soils shall be initially handled as a contaminated soil and stored on 30 mil minimum thickness HDPE sheets until laboratory verification results indicate that the soil can be used as backfill, as defined in SECTION: CHEMICAL DATA QUALITY MANAGEMENT. Soils shall be covered with 10-mil minimum thickness HDPE sheets and graded to prevent the generation of contaminated surface runoff during wet weather.

3.2 EXCAVATED SOIL HANDLING - BUILDING 101 AND BUILDING 112 SITES: All concrete and soils excavated and sludges removed at these sites shall be placed in covered containers in a manner to limit the mixing contaminated and uncontaminated soils. All soils must remain in containers until verification sampling results indicate final disposal requirements, as described in Paragraph: DISPOSAL. During soil excavation, Contractor shall visually inspect each discrete volume of soil removed immediately upon removal from the ground. The soil shall be visually inspected for staining and also screened for the presence of volatile hydrocarbons. A photoionization detector shall be used to detect the presence of contamination not visually apparent. A headspace field test as described in SECTION: UNDERGROUND STORAGE TANK REMOVAL shall be performed on every tenth bucket of excavated material. A positive instrument reading shall indicate the presence of contamination. A negative instrument reading shall be interpreted as "potentially uncontaminated." Excavated soils shall be separated into contaminated and potentially uncontaminated volumes. Soil verification sampling shall be performed by the Contractor prior to backfilling, as specified in SECTION: EXCAVATION AND BACKFILLING.

3.3 SOIL VERIFICATION SAMPLING AND ANALYSIS:

3.3.1 Sampling Frequency: Contractor shall collect composite samples from soils excavated from each site as indicated herein. Samples shall be collected separately from contaminated and potentially uncontaminated soil volumes. One composite sample shall be collected from each 50 cubic yards of excavated soil, or fraction thereof. Soil sample composites shall be collected from homogeneous soils based on appearance, staining, moisture content, and grain size distribution.

3.3.2 Analytical Requirements: Each soil sample shall be analyzed for the site-specific parameters listed in SECTION: CHEMICAL DATA QUALITY MANAGEMENT.

3.3.3 Contractor may take additional composite samples for analysis at his expense with the approval of the Contracting Officer.

3.3.4 Analyses shall be accomplished in accordance with SECTION: CHEMICAL DATA QUALITY MANAGEMENT. Results of all soil analyses shall be reported by the Contractor.

3.4 PLAN OF OPERATIONS: The Contractor shall develop, implement, maintain, and supervise a soil handling, field sampling, storage, and disposal

plan for soil excavation, contamination determination, on-site use, and off-site disposal of soils. The Plan shall be submitted no later than 30 days prior to soil excavation operations, and include as a minimum a description of the following:

3.4.1 Soil removal and sample screening techniques to be used;

3.4.2 Temporary soil stockpile liners, containers and covers and method of soil volume segregation.

3.4.3 Sample collection technique employed to collect representative composite samples for analysis.

3.4.4 Sample preservation and analysis procedures to be employed in accordance with SECTION: CHEMICAL DATA QUALITY MANAGEMENT;

3.4.5 Soil storage methods to prevent generation of surface runoff, leachate and silt migration;

3.4.6 A list of transporters and disposal facilities to be used for off-site disposal, including facility name, address, phone number and name of site manager.

3.5 BACKFILL: All excavated soils to be used by the Contractor as backfill shall be sampled and analyzed prior to being used. Backfill placement shall be as specified in SECTION: EXCAVATION AND BACKFILLING.

3.5.1 Site-specific sampling and analysis shall be performed on off-site borrow in accordance with SECTION: CHEMICAL DATA QUALITY MANAGEMENT. One composite soil sample from each borrow area shall be collected and analyzed by the Contractor for those parameters listed by site in Table A of SECTION: CHEMICAL DATA QUALITY MANAGEMENT and the results submitted to the Contracting Officer for information prior to any borrow being transported onto Government property.

3.5.2 Contaminated borrow shall not be transported onto Government property.

3.5.3 Mixing contaminated soils with excavated soils suitable for backfill or potentially uncontaminated soils with excavated soils suitable for backfill as defined herein shall not be allowed.

3.5.4 On-site excavated soils may be used as backfill provided that the chemical analysis requirements specified in SECTION: CHEMICAL DATA QUALITY MANAGEMENT - PARAGRAPH CHEMICAL ANALYSIS are satisfied. Excavated soils from one site shall not be used as backfill at another site.

3.6 DISPOSAL: Contaminated soils shall be disposed of by the Contractor off of Government property as specified herein and in accordance with all local, state, and federal regulations.

3.6.1 Hazardous waste soils shall be disposed of in accordance with SECTION: HAZARDOUS WASTE DISPOSAL.

3.6.2 Contaminated but not hazardous soils shall be disposed in a New York State Part 360 permitted facility.

3.6.3 Acceptance: Contractor shall provide a photocopy of the treatment or disposal agreement or letter of acceptance from the facility to receive the petroleum-contaminated soil to the Contracting Officer no later than 7 calendar days before waste is sent to the facility.

3.6.4 Testing and Analysis: Testing and analysis of contaminated soil required by the waste treatment, storage, or disposal facility as a condition

of acceptance of waste materials shall be performed by the Contractor at no additional cost to the Government.

3.6.5 Soils Not Contaminated: Uncontaminated soils not required or not satisfactory as defined in SECTION: EXCAVATION AND BACKFILL for use as backfill shall be disposed of off of Government property by the Contractor, at no additional cost to the Government.

** END OF SECTION **

SECTION 02080

LIQUID REMOVAL

PART 1 - GENERAL

1.1 **SUMMARY:** The Contractor shall manage free liquids in accordance with the State of New York Solid Waste Management Regulations, and the guidance given herein. Free liquids include liquids recovered from underground storage tanks and pipelines, ground water recovered during dewatering operations, and water generated during decontamination operations.

1.2 **DEFINITIONS:**

1.2.1 **Waste Liquids:** Liquids recovered from underground storage tanks or underground pipelines.

1.2.2 **Ground Water:** Water recovered during dewatering operations.

1.2.3 **Wastewater:** Water generated during decontamination or other site operations.

1.2.4 **Reclaimable Liquids:** Liquids determined by the Contractor to be in a reusable condition.

1.3 **HAZARDOUS WASTE:** Free liquids determined to be hazardous waste shall be handled in accordance with SECTION: HAZARDOUS WASTE DISPOSAL.

1.4 **TITLE:** All non-hazardous liquids removed by the Contractor shall become the property of the Contractor upon removal. The Contractor shall retain the rights to salvage values of all liquid wastes and free fuel if encountered, so long as the applicable state requirements are met.

1.5 **SUBMITTALS:** In accordance with SECTION: SUBMITTAL PROCEDURES, the Contractor shall submit the following items required by this section.

1.5.1 **Category II: For Approval**

1.5.1.1 The Contractor shall submit, as part of the Environmental Protection Plan specified in SECTION: ENVIRONMENTAL PROTECTION, procedures, materials, equipment, and methods proposed for the collection, storage, transport, and disposal of waste liquids, wastewater and collected ground water.

1.5.1.2 Identification of the Contractor's laboratory performing chemical analysis as specified in SECTION: CHEMICAL DATA QUALITY MANAGEMENT.

1.5.1.3 The Contractor shall submit a water treatment plan describing his proposed methods and equipment for the sampling, analysis and transfer of ground water at Building Sites 101 and 110 and the treatment of Building Site 110's tank contents to be discharged into the Base sanitary system. The plan shall also describe the handling of free fuel, if encountered, and ground-water sampling strategy.

PART 2 - PRODUCTS

NOT APPLICABLE

PART 3 - EXECUTION

3.1 PERMITS AND LICENSES: The Contractor shall obtain any local, state, or federal permits or licenses required to do the work included in this contract prior to commencing operations at no additional cost to the Government.

3.2 EMERGENCY OPERATIONS:

3.2.1 Spills: Spill and discharge controls shall be in accordance with SECTION: SPILL PREVENTION AND DISCHARGE CONTROL.

3.3 SITE SAFETY: The Contractor shall perform all operations in a prudent, safe, and professional manner. The Contractor shall ensure that his employees and subcontractors perform in a safe manner, and shall manage site operations in accordance with SECTION: HEALTH SAFETY AND ACCIDENT PREVENTION.

3.4 TRANSPORT OF LIQUIDS: Packaging, labelling, placarding, and transport of liquids shall be in compliance with all federal and New York State shipping and handling requirements.

3.5 DISPOSITION:

3.5.1 Sampling and Analysis: The Contractor shall be responsible for all sampling and analysis of free liquids as required by the accepting facility as a condition of acceptance. Analysis to characterize the liquid shall be performed by a laboratory approved by the Contracting Officer.

3.5.2 Waste Characterization Records: The Contractor shall maintain a current record of all waste determinations, in accordance with SECTION: CHEMICAL DATA QUALITY MANAGEMENT.

3.5.2.1 Reclaimed Liquids: Free fuels removed from the underground storage tanks by the Contractor shall be collected, stored, and transported by the Contractor to a petroleum reclaiming or recycling facility. The reclaiming facility shall specifically accept such liquids for reprocessing in compliance with the regulations of New York State and the U.S. EPA. If free fuel is encountered during dewatering operations as specified in SECTION: EXCAVATION AND BACKFILLING, a modification to the contract will be negotiated with the government allowing the Contractor to modify his dewatering system.

3.5.3 Waste Liquids:

3.5.3.1 Building 101 and 112 Sites: Waste liquids from the Building 101 and Building 112 sites shall be disposed off-site in accordance with SECTION: HAZARDOUS WASTE DISPOSAL.

3.5.3.2 Building 110 Site: Waste liquid can be discharged to the ROME POTW after pre-treatment by the Contractor. The pre-treatment shall be sufficient to reduce concentrations to less than the maximum allowable discharge concentrations shown in Table 02080-A. Analytical testing shall be in accordance with SECTION: CHEMICAL DATA QUALITY MANAGEMENT. One sample shall be collected per 10,000 gallons of waste liquid discharged to the POTW. Pre-treated waste liquids shall be held in tanks until testing confirms achievement of discharge standards.

3.5.4 Ground Water and Wastewater:

3.5.4.1 Ground water and wastewater from Building Sites 101, 110 and 112 may be discharged through the Base sewer system to the ROME POTW without pre-treatment if analytical results show contaminant concentrations less than the maximum allowable discharge concentrations shown in Table 02080-A. For

the purposes of this bid the Contractor shall assume no pre-treatment of ground waters from these sites shall be required. If pretreatment of ground water from these sites is required, a modification to the contract will be negotiated with the government allowing the Contractor to design a treatment system capable of meeting the POTW's discharge and capacity requirement. The Contractor shall be responsible for meeting all requirements of the ROME POTW including but not limited to sampling and analytical requirements, discharge times, and capacity limits. As of August 3, 1992 the daily capacity the POTW can accept is approximately 85,000 gallons per day discharged between the hours of 12:00 a.m. and 5:00 a.m. This capacity may have been revised since early August. The point of contact at the ROME POTW is Mr. Dick Gifford at 315-339-7775. The Contractor shall make every effort to coordinate discharges with the POTW and is advised that allowable discharge capacity may be decreased due to rainy weather conditions. Analytical testing shall be in accordance with SECTION: CHEMICAL DATA QUALITY MANAGEMENT. One representative sample shall be collected per day of the ground water and wastewater expected to be discharged to the POTW.

3.5.4.2 Wastewater shall be collected within the decontamination facilities and from other sources producing wastewater. The Contractor shall not spray or drain wastewater onto any ground surface.

3.5.4.3 The Contractor shall adhere to all requirements specified by the ROME POTW. If the ROME POTW withdraws the use of its facilities, the Contractor shall submit a claim to the government for the cost of additional treatment or off-site disposal.

3.5.5 Flow Metering: The Contractor shall monitor discharge of all waste liquids, ground water, and wastewater to the ROME POTW with a calibrated flow meter. Calibration shall be performed by a qualified service organization. The Contractor shall notify the ROME POTW once metering equipment is in place and shall not begin discharging until the installed metering equipment has been inspected and approved by POTW personnel.

3.5.6 Deliveries Record: Contractor shall maintain a current written record of all deliveries. Records shall include the date, quantity and characterization of liquid, name, address and phone number of receiving facility and transporter. Deliveries record shall be available at all times for Contracting Officer's inspection, upon request. Upon contract close-out, the records shall become the property of the Government.

TABLE 02080 - A

MAXIMUM ALLOWABLE DISCHARGE CONCENTRATIONS IN WATER TO ROME POTW

Benzene	0.13 mg/L
Ethyl Benzene	1.59 mg/L
Toluene	1.35 mg/L
Xylenes	1.35 mg/L
BETX	2.87 mg/L
Lead	0.70 mg/L
Oil and Grease	100.0 mg/L
Cadmium	0.1 mg/L
Chromium	2.0 mg/L
Cyanide	2.0 mg/L
Lead	0.7 mg/L
Mercury	0.2 mg/L
Nickel	1.5 mg/L

** END OF SECTION **

SECTION 02085

HAZARDOUS WASTE DISPOSAL

PART 1 - GENERAL

1.1 **SUMMARY:** The Contractor shall manage hazardous waste activity in accordance with and USEPA hazardous waste management regulations, specifically RCRA, and conditions specified herein. The Contractor shall provide all services necessary for the disposal of hazardous wastes.

1.2 **REFERENCES:** The publications listed below form a part of this specification and shall be used by the Contractor as they apply to complete the section of the specifications to the extent referenced. Where the publications are referred to in the text it will be by basic designation only.

CODE OF FEDERAL REGULATIONS - PROTECTION OF THE ENVIRONMENT
SUBCHAPTER I - SOLID WASTES

40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 265	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 266	Standards For the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities

CODE OF FEDERAL REGULATIONS - TRANSPORTATION
SUBCHAPTER B - HAZARDOUS MATERIALS TRANSPORTATION AND PIPELINE SAFETY

49 CFR 106	Rulemaking Procedures
49 CFR 107	Hazardous Materials Program Procedures

CODE OF FEDERAL REGULATIONS - TRANSPORTATION
SUBCHAPTER C - HAZARDOUS MATERIALS REGULATIONS

49 CFR 171	General Information, Regulations, and Definitions.
49 CFR 172	Hazardous Materials Tables and Hazardous Materials Communications Regulations
49 CFR 173	Shippers - General Requirements for Shipments and Packaging
49 CFR 177	Carriage by Public Highway
49 CFR 178	Shipping Container Specifications

1.3 SUBMITTALS: In accordance with SECTION: SUBMITTAL PROCEDURES, the Contractor shall submit the following items required by this section.

1.3.1 Category I: None

1.3.2 Category II: For Approval

1.3.2.1 Plan of Operations for On-Site Handling of Hazardous Waste.

1.3.3 Category II: For Information.

1.3.3.1 Hazardous Waste Manifests, Original Copy.

1.3.3.2 Waste Identification Results.

PART 2 - PRODUCTS

NOT APPLICABLE

PART 3 - EXECUTION

3.1 PERMITS AND LICENSES: The Contractor shall obtain any local, state, or federal permits or licenses required to do the work included in this contract prior to commencing operations at no additional cost to the Government.

3.2 STORAGE, TREATMENT AND DISPOSAL OPERATIONS:

3.2.1 Manifest: Contractor shall obtain and prepare all manifests in accordance with New York State Waste Management Regulations and U.S. EPA requirements.

3.2.1.1 Generator portion of manifest must be signed by the Base Commander or his designated representative. Contractor shall deliver prepared manifest documents to Contracting Officer for signature.

3.2.1.2 Transport of Wastes: Two copies of each manifest document signed by the Transporter shall be submitted by the Contractor to the Contracting Officer at the time each waste shipment leaves the site. No waste shipment shall leave the site prior to the delivery of manifest copies.

3.2.1.3 Completed Manifest: Complete original copies of all manifests which document all hazardous waste activities up to ultimate storage, treatment or disposal of hazardous wastes by the Contractor shall be submitted to the Contracting Officer. Manifests shall be submitted to Contracting Officer no later than 7 calendar days after the date of receipt of hazardous wastes at the treatment or disposal facility.

3.2.2 Storage of Wastes: Hazardous wastes shall not be accumulated or stored on Base facilities by the Contractor more than 90 calendar days.

3.2.2.1 Security of storage areas shall be in accordance with SECTION: SECURITY. Warning signs and identification of hazardous areas shall be in compliance with SECTION: SAFETY HEALTH AND ACCIDENT PREVENTION.

3.2.3 Transportation of Hazardous Waste:

3.2.3.1 Acceptance of Hazardous Waste by Transporters: Written letters of commitment between the Contractor and all potential transporters authorized by valid U.S. EPA or New York State identification number to deliver hazardous wastes shall be submitted with the bid, as specified in SECTION: LETTERS OF

COMMITMENT. Any changes in waste transporters shall be submitted in writing by the Contractor no later than 7 calendar days prior to the initiation of shipment.

3.2.3.2 Movement of hazardous waste by transporter shall be Monday through Friday, during normal daytime business hours only.

3.2.4 Treatment and Disposal: Contractor's responsibility includes sources of approved treatment and disposal facilities for hazardous wastes, in accordance with the regulations of New York State and U.S. EPA.

3.2.4.1 Acceptance of Hazardous Wastes for Treatment: Contractor shall obtain and submit with the bid, letters of commitment as specified in SECTION: LETTERS OF COMMITMENT for all potential treatment or disposal at facilities accepting the hazardous wastes anticipated. Any changes in the storage or treatment facility to be used must be submitted as specified in SECTION: LETTERS OF COMMITMENT by the Contractor at least 7 calendar days prior to shipment of hazardous waste to the facility.

3.2.4.2 Sampling, Analysis and Waste Identification: Contractor shall perform the sampling, analysis and waste identification required by the treatment, storage and disposal facility prior to the acceptance of any hazardous waste at no additional cost to the government. Waste identification shall be performed in accordance with SECTION: CHEMICAL DATA QUALITY MANAGEMENT and as required by the storage, treatment and disposal facility. All waste characterization results shall be submitted to the Contracting Officer or his designated representative no less than 48 hours before hazardous wastes are removed from the base.

3.2.5 Plan of Operations: Contractor shall prepare and submit a Plan of Operations for on-site handling of hazardous waste at least 14 days prior to the commencement of work. Plan shall include:

3.2.5.1 Type of storage containers and containment methods to be used for liquid and solid wastes, and methods employed to fill, empty, and maintain containers.

3.2.5.2 Procedures used for loading wastes for transport.

3.2.5.3 List of transporters employed by the Contractor.

3.2.5.4 List of storage, treatment, and disposal facilities to be used.

3.3 EMERGENCY OPERATIONS:

3.3.1 Spills: Spill and discharge controls shall be in accordance with SECTION: SPILL PREVENTION AND DISCHARGE CONTROL.

3.4 SITE SAFETY: The Contractor shall perform all operations in a prudent, safe, and professional manner. The Contractor shall ensure that its employees and subcontractors perform in a safe manner, and shall manage hazardous waste activity in accordance with SECTION: HEALTH SAFETY AND ACCIDENT PREVENTION.

** END OF SECTION **

SECTION 02221

EXCAVATION AND BACKFILLING

PART 1 - GENERAL

1.1 **REFERENCES:** The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1556	(1982) Density of Soil in Place by the Sand-Cone Method
ASTM D 1557	(1978) Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop
ASTM D 2167	(1984) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2216	(1980) Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures
ASTM D 2487	(1985) Classification of Soils For Engineering Purposes
ASTM D 2922	(1981) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 2937	(1983) Density of Soil in Place by the Drive-Cylinder Method
ASTM D 3017	(1988) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(1984) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.2 **DEFINITIONS:**

1.2.1 Degree of Compaction: Degree of compaction required is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557, Method B, C, or D, abbreviated hereinafter as percent laboratory maximum density.

1.2.2 Non-Expansive Soil is defined as any suitable material having a plasticity index less than 12 percent when tested in accordance with ASTM D 4318. The maximum particle size in any dimension shall be 2 inches.

1.2.3 Acceptable Topsoil is specified in Paragraph: Materials.

1.3 **SUBMITTALS:** In accordance with SECTION: SUBMITTAL PROCEDURES, the Contractor shall submit the following:

1.3.1 Category II: (For Information Only)

1.3.1.1 Certificate of compliance certifying that fertilizer and seed mixtures meet the specifications of Paragraphs: Fertilizer and Seed.

1.3.1.2 Field Density Test Results

1.3.1.3 Analytical Results of Proposed Topsoil Materials

1.3.2 **Category II:** (For Approval)

1.3.2.1 Temporary Shoring Plan

1.3.2.2 Dewatering Plan which summarizes all relevant aspects of the Contractor's proposed dewatering operations. The plan shall be submitted for approval at least 14 days prior to installation of dewatering wells or other dewatering begins.

PART 2 - PRODUCTS

2.1 MATERIALS:

2.1.1 Satisfactory Backfill Materials include materials classified in ASTM D 2487 as GW, GP, SW, SP, GC, SC, GM, and SM, and shall be free of trash, debris, roots or other organic matter, or stones larger than 3 inches in any dimension and must meet the analytical requirements specified in SECTION: CHEMICAL DATA QUALITY MANAGEMENT.

2.1.2 Topsoil materials shall consist of loose, friable soil in conformance with NYS DOT "Standard Specification" Sect 713-01. Topsoil shall be a well-graded soil of good uniform quality. It shall be a natural, friable soil representative of productive soils in the vicinity. Topsoil shall be free of subsoil, foreign matter, stumps, brush, objects larger than one inch in any dimension, toxic substances, weeds, and any material or substances that may be harmful to plant growth and shall have a pH value of not less than 5.0 nor more than 7.5.

2.1.2.1 Topsoil material that is obtained from any topsoil stockpiles established on site shall be fertile, friable, natural surface soil conditioned by the addition of peat moss at the ratio of 1 part peat and 2 parts topsoil thoroughly mixed.

2.1.2.2 If sufficient topsoil is not available on the site to meet the depth as specified herein, the Contractor shall furnish additional topsoil. Contractor shall submit a certificate of compliance certifying that topsoil meets the specified requirements.

2.1.2.3 Prior to topsoil delivery, Contractor must notify the Contracting Officer of the source(s) from which topsoil is to be furnished. Obtain topsoil from well-drained areas. Additional topsoil shall meet the general requirements as stated above and comply with the requirements specified. Topsoil not meeting the pH range specified shall be amended by the addition of pH adjusters. Range testing for pH shall be performed independently and results submitted to the Contracting Officer for approval by Government personnel.

2.1.3 Unsatisfactory Materials: Unsatisfactory materials include materials classified in ASTM D 2487 as Pt, OH, OL, ML, CL, CH, and MH, and any other materials not defined as satisfactory.

2.1.4 Cohesionless and Cohesive Materials: Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic.

2.1.5 **Expansive Soils:** Expansive soils are defined as soils that have a plasticity index equal to or greater than 12 percent when tested in accordance with ASTM D 4318.

2.2 **SAFETY FENCING** shall be strong, durable and resistant to corrosion from fuels, petroleum, and salt spray. The fencing shall be new, 6-feet high, non-conductive, and made from copolymers making it safe, lightweight and easy to install. It shall have a minimum tensile strength of 1500 pounds per foot.

2.2.1 Vertical posts shall be pressure treated and measure 4 inches by 4 inches by 8 feet.

PART 3 - EXECUTION

3.1 **CLEARING AND GRUBBING:** The areas 5 feet outside of each building to be removed and structure line shall be cleared and grubbed of trees, stumps, roots, brush and other vegetation, debris, existing foundations, pavements, utility lines, structures, fences, and other items that would interfere with work operations. Stumps, logs, roots, and other organic matter shall be completely removed and the resulting depressions shall be filled with satisfactory material, placed and compacted in accordance with paragraph FILLING AND BACKFILLING. Materials removed shall be disposed of outside the limits of Government-controlled property at the Contractor's expense.

3.2 **TOPSOIL:** Topsoil shall be stripped to a depth of 4 inches below existing grade within the designated excavations and grading lines and deposited in storage piles for later use. Excess topsoil shall be disposed as specified for excess excavated material in Paragraph: DISPOSAL OF EXCAVATED MATERIALS.

3.3 **SAFETY FENCING INSTALLATION:** Prior to any excavation activity, safety fencing shall be installed in locations as shown on the drawings. At areas of entrance and egress from the work area, the fence shall be overlapped a minimum of eight feet. Vertical posts shall be installed on a maximum of 8-foot centers and buried two feet into the ground. The fence fabric shall be securely fastened to the posts with galvanized steel staples.

3.3.1 At the conclusion of all site activities, the fencing and posts shall be removed and disposed of by the Contractor. All post holes shall be backfilled, topsoiled and seeded as specified herein.

3.4 **EXCAVATION:** All excavated materials shall be handled in accordance with SECTION: SOIL HANDLING, STORAGE, AND DISPOSAL. The excavations shall be kept to the minimum dimensions and elevations necessary to remove each building, structure, and tank system, except as specified hereinafter, and shall include trenching for utility, tank piping and foundation removal. The Contractor shall proceed with extreme caution in areas of underground utilities. The Contractor shall expose them by hand excavation or other methods acceptable to the Contracting Officer. Utilities entering a building shall be removed to a point 3 feet beyond the building line of each building and structure. Excavation includes trenching for outside flushing pits, manholes, block valves and vents, underground fuel tanks and piping, and all work incidental thereto.

3.4.1 **Overexcavation:** Excavations below depths necessary to remove the tanks and tank foundations will not be permitted except to remove unsatisfactory or contaminated material. Unsatisfactory material not shown, but which is encountered adjacent to or underlying the limits of excavation necessary for removal of the tank or structure shall be immediately reported to the Contracting Officer and the Contractor's Quality Control Officer. Unsatisfactory material removed as directed by the government shall be

replaced with satisfactory material. In cases where overexcavation is ordered to remove unsatisfactory material, an equitable adjustment in contract price will be made in accordance with the clause entitled "Changes" of the CONTRACT CLAUSES to cover the additional cost of performing the overexcavation, disposing of the unsuitable material and backfilling the overexcavation. Material removed below the depths necessary for removal of the tank or structure without specific direction by the government shall be replaced, at no additional cost to the Government, to the indicated excavation grade with satisfactory materials placed and compacted as specified in Paragraph: FILLING AND COMPACTION. Backfilling of any overexcavated area shall commence as directed by the Contracting Officer or as soon as possible after confirmatory sampling results are received from the laboratory indicating no further contamination exists within the excavation and shall be diligently carried out until completed. Backfill materials shall be placed and compacted as specified in Paragraph: FILLING AND COMPACTION.

3.5 **DRAINAGE AND DEWATERING:** The excavations at each building site which extend down to or below ground-water level shall be kept dry during tank removal and backfilling by wellpoints or other approved means, located outside the perimeter of the excavation area. The water level at each site shall be maintained at a minimum of one foot below the excavation level at these times. Site grading at all sites shall be performed in such manner that the area immediately surrounding the site will be continually and effectively drained by gravity or by temporary pumps. Water shall not be permitted to accumulate in the excavations or adjacent to structure foundations. The excavations required for building foundation removal and manhole removal shall be drained by methods which will prevent wetting of the excavation bottom, undercutting of footings, or other conditions detrimental to proper work procedures. All excavations shall be kept dry during digging, subgrade preparation, and continually thereafter until backfill operations are completed to the extent that all excavations are backfilled and no damage from hydrostatic pressure, flotation, or other causes will result. All ground water shall be disposed of in accordance with SECTION: LIQUID REMOVAL.

3.6 **If Free Fuel is Encountered during dewatering,** the Contractor shall notify the Contracting Officer and the Base Environmental Office and discontinue dewatering operations resulting in direct discharge to the ROME POTW. In cases where storage, treatment and/or disposal of free fuel is required, an equitable adjustment in contract price will be made in accordance with the clause entitled "Changes" of the CONTRACT CLAUSES to cover the additional cost of performing the storage, treatment and/or disposal of free fuel.

3.7 **EXCAVATION SAFETY, BRACING AND SHORING:** All excavating work at all sites shall be conducted in strict conformance with, at a minimum, EM 385-1-1 and 29 CFR 1926.650 through 29 CFR 1926.653, including requirements for shoring or continuously sloping excavations which employees will be required to enter. If these excavations are sloped rather than shored, continuously sloping to a 1-1/2 to 1 (34°) angle of repose shall be completed, unless the Contractor tests and characterizes the soils. If the Contractor tests and categorizes the soils, an angle of repose, as indicated below, may be utilized.

APPROXIMATE ANGLE OF REPOSE
for Sloping of Sides of Excavations

Type of Soil	Angle of Repose
Stable Rock	Vertical (90°)
Type A	3/4:1 (53°)
Type B	1:1 (45°)
Type C	1-1/2:1 (34°)

3.7.1 **Type A** means cohesive soils with an unconfined compressive strength of 1.5 ton per square foot (tsf). Examples of cohesive oils are: clay, silty clay, sandy clay, clay loam, and in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are considered **Type A**. However, NO soils is Type A if the soil is fissured; or the soil is subject to vibration from heavy traffic, pile driving, or similar effects; or the soil has been previously disturbed; or the soil is part of a sloped, layered system where the layers dip into the excavation on a flop of four horizontal to one vertical (4:1) or greater; or the material is subject to other factors that would require to be classified as a less stable material.

3.7.2 **Type B** means cohesive soils with an unconfined compressive strength greater than 0.5 tsf but less than 1.5 tsf; or granular cohesionless soils including angular gravel (similar to crushed rock), silt, silt loam, sandy loam and in some cases, silty clay loam and sandy clay loam; or previously disturbed soils except those which would otherwise be classed as Type C soils; or soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or dry rock that is not stable; or material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4:1), but only if the material would otherwise be classified as Type B.

3.7.3 **Type C** means cohesive soils with an unconfined compressive strength of 0.5 tsf or less; or granular soils including gravel, sand, and loamy sand; or submerged soil or soil from which water is freely seeping; or submerged rock that is not stable; or material in a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4:1).

3.7.4 **Overhead Utilities:** Clearances to adjacent overhead transmission and distribution electrical lines shall be sufficient for the movement of vehicles and operation of construction equipment. The requirements stated in EM 385-1-1, 29 CFR 1926, and the National Electric Safety Code shall be followed by the Contractor.

3.7.5 **Open Excavations:** If the excavation must remain open during periods when the worksite is unoccupied (i.e., overnight, over a weekend, and other similar off periods) lighted barricades shall be placed around the excavation in such a manner to alert personnel to the danger and prevent them from falling into the trench.

3.7.6 **Excavated or stockpiled materials** or tank and equipment shall not be placed closer than 2 feet from the edge of the excavation and at a distance to prevent excessive loading on the face of the excavation.

3.7.7 **Temporary Shoring:** The Contractor is responsible for the design and installation of temporary shoring required at all sites except Building 101. The temporary shoring may be required for excavation safety or maintenance of adjacent pavements, utilities, and structures. The shoring system shall be designed by a Professional Engineer registered in New York state. The Contractor shall submit a temporary shoring plan which shall detail design calculations and proposed installation procedures.

3.7.8 **Where personnel are required to enter excavations** over 4 feet in depth, sufficient stairs, ladders, or ramps shall be provided to require no more than 25 feet of lateral travel. When access to excavations in excess of 20 feet in depth is required, ramps, stairs, or mechanical personnel hoists shall be provided.

3.8 **BLASTING:** Blasting will not be permitted.

3.9 EXCAVATION FOR REMOVAL OF UTILITIES: Trenches for removal of underground utilities systems and underground storage tank pipe lines, manholes, block valves and vents shall be excavated, shored and braced in strict accordance with EM 385-1-1 and 29 CFR 1926.650 through 29 CFR 1926.653. The bottoms of trenches shall be tamped if necessary to provide a firm subgrade. Unauthorized overdepth excavations shall be backfilled with satisfactory material placed in conformance with paragraph FILLING AND COMPACTION at the Contractor's expense.

3.10 BORROW: Where satisfactory materials are not available in sufficient quantity from required excavations, approved materials shall be obtained from off government property.

3.11 DISPOSAL OF EXCAVATED MATERIALS: Satisfactory excavated material required for fill or backfill shall be placed in the proper section of the permanent work required under this section or shall be separately stockpiled if it cannot be readily placed. Satisfactory material in excess of that required for the permanent work and all unsatisfactory material shall be disposed of outside the limits of Government-controlled land and at the Contractor's responsibility. Stockpiles and wasted materials shall be placed, graded, and shaped for proper drainage and neat appearance giving due consideration to drainage from adjacent properties.

3.12 FINAL SUBGRADE OF SURFACES TO SUPPORT PAVING: Care shall be taken not to disturb the bottom of the excavations. All subgrades beneath sidewalks, and paved areas which have a density less than that specified in Paragraph: COMPACTION, shall be scarified to a depth of 6 inches and compacted to that specified density.

3.13 SUBGRADE PREPARATION: Unsatisfactory material in surfaces to receive fill or in excavated areas shall be removed and replaced with satisfactory materials in accordance with Paragraph: Preparation of Ground Surfaces.

3.14 BACKFILLING shall not begin until directed to do so by the Contracting Officer when confirmatory sampling results are received from the laboratory and work below finish grade has been approved, underground utilities capped or terminated have been inspected, tested, and approved, and the excavation cleaned of trash and debris. Backfill shall be brought to indicated finish grade. Backfill shall not be placed in wet or frozen areas. Backfill material and its compaction shall be the same as fill material specified under Paragraph: FILLING AND COMPACTION. Heavy equipment for spreading and compacting backfill shall not be operated closer to foundation or retaining walls than a distance equal to the height of backfill above the top of footing; the area remaining shall be compacted in layers not more than 4 inches in compacted thickness by power-driven hand tampers suitable for the material being compacted. Backfill shall be placed carefully around pipes to avoid damage to coatings.

3.15 FILLING AND COMPACTION: Satisfactory material shall be used in fills and backfills and for replacing unsatisfactory material as defined hereinbefore. Sampling and testing shall be performed as hereinafter specified.

3.15.1 Moisture Density Determinations: Tests for determination of maximum density and optimum moisture shall be performed by the Contractor in accordance with the requirements of ASTM D 1557, except that a mechanical tamper may be used provided the results are correlated with those obtained with the referenced hand tamper. Samples shall be representative of the materials to be placed. An optimum moisture density curve shall be obtained for each principal type of material or combination of materials encountered or utilized. Results of these tests shall be the basis of control for

compaction. The above testing shall include Atterburg limits, grain size determinations, and specific gravity. A copy of these tests shall be furnished to the Contracting Officer with the construction quality control daily report.

3.15.2 Preparation of Ground Surfaces: Unsatisfactory material in surfaces to receive fill or in excavated areas shall be removed and replaced with suitable materials. The surface shall be scarified to a depth of 6 inches before the fill is started. Sloped surfaces steeper than 1 vertical to 4 horizontal shall be plowed, stepped, benched, or broken up in such manner that the fill material will bond with the existing material. When subgrades are of less than the specified density, the ground surface shall be broken up, to a minimum depth of 6 inches, pulverized, and compacted to the specified density in Paragraph: Compaction.

3.15.3 Placing: The approved suitable materials shall be placed in successive horizontal uniformly spread layers of loose material not more than 8 inches thick except in areas not accessible or permitted for the use of self-propelled rollers or vibrators the loose layer shall be not more than 6 inches thick. Fill shall not be placed until subgrade is checked and approved. Fills shall not be placed on muddy or frozen sub-base. Backfill shall be placed carefully around pipes to remain to avoid damage to coatings.

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

	Percent laboratory maximum density	
	Cohesive material	Cohesionless material
Fill, embankment, backfill, and subgrade under proposed structures, building slabs, sidewalks, paved areas, around footings, and in utility trenches.	90	95
Grassed areas	85	90

3.15.5 Tests for and Control of Density:

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

3.15.5.2 Density Control: The Contractor shall adequately control his compaction operations by tests made in accordance with ASTM Standard D 1556, ASTM D 2167, ASTM D 2937 or ASTM D 2922 to insure placement of materials within the limits of densities specified above. When ASTM D 2922 is used, the calibration curves shall be checked and adjusted if necessary by the procedure described in ASTM D 2922, paragraph ADJUSTING CALIBRATION CURVE. ASTM D 2922 results in a wet unit weight of soil and when using this method ASTM D 3017

shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall also be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at intervals as directed by the Contracting Officer. ASTM D 2937 shall be used only for soft, fine-grained, cohesive soils. The following number of tests, if performed at the appropriate time, shall be the minimum acceptable for each type operation. A minimum of two density tests are required for each 3,000 sq. ft. or less of area filled or backfilled in each lift. The locations of the tests shall be as directed by the Contracting Officer. The Contractor shall make as many additional tests as he requires to obtain the specified density at all points. Copies of all test results shall be furnished to the Contracting Officer with the Construction Quality Control Daily Report. Tests may be made by the Government for verification of compliance; however, the Contractor shall not depend on such tests for his control of operations. Deficiencies in construction shall be corrected by the Contractor at no additional cost to the Government.

3.15.6 Reconditioning of Subgrades: Approved compacted subgrades that are disturbed by Contractor's subsequent operations or adverse weather shall be scarified and compacted as specified hereinbefore to the required density and moisture limits prior to further construction thereon. Recompaction over underground utilities and heating lines shall be by hand tamping.

3.16 GRADING: Unless otherwise shown, the areas outside of each building and structure line required to be graded shall be constructed true-to-grade, shaped to drain, and shall be maintained free of trash and debris until final inspection has been completed and the work has been accepted.

3.17 TOPSOIL PLACING: Areas outside the building lines from which topsoil has been removed except paved or otherwise surfaced areas which are disturbed by the work shall be topsoiled. Prior to placing topsoil, vegetation on the areas to be topsoiled shall be removed from the area and the ground surface cleared of all other materials that would hinder proper grading, tillage, or subsequent maintenance operations. Previously constructed grades shall be repaired if necessary so that the area to be topsoiled shall conform to the section indicated on the drawings upon completion of the topsoil placement. The subgrade shall be pulverized to a depth of 2 inches by disking or plowing for the bonding of topsoil with the subsoil. Topsoil shall then be uniformly spread, raked, and rolled to the thickness, elevations, slopes shown, and left free of surface irregularities. Topsoil shall be compacted by one pass of a cultipacker, roller, or other approved equipment weighing 100 to 160 pounds per linear foot of roller.

3.17.1 Fertilizer: Superphosphate 20% fertilizer shall be raked into the soil at a rate of 30 lbs. per 1,000 sq. ft. 5-10-5 fertilizer shall be applied uniformly at a rate of 15 lbs. per 1,000 sq. ft. and scratched into upper inch of soil. Topsoil shall not be placed when the subgrade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to seeding, planting, or proper grading. Finished surfaces of the placed topsoil shall conform to within 0.10 foot above or below the elevations and cross-section shown.

3.18 SEEDING: Grass seed, formula 34% Perennial Rye Grass, 33% Creeping Red Fescue, 33% Kentucky Blue Grass, shall be spread uniformly at a rate of 4 lbs. per 1,000 sq. ft. and covered by stirring the ground not deeper than 1/4 inch. Place a hay mulch uniformly in a continuous blanket on all seeded areas. All seeded areas are to be watered immediately following placement of hay mulch. Keep watered for two weeks and protect seeded areas from traffic. Final Contract acceptance will not be given until after grass is fully established and growing.

3.19 PROTECTION: Settlement or washing that occurs in graded, topsoiled, or backfilled areas prior to acceptance of the work shall be repaired and grades reestablished to the required elevations and slopes.

END OF SECTION

SECTION 02223

EXCAVATION BRACING AND SHORING

PART 1 - GENERAL

1.1 SCOPE OF WORK: This section specifies bracing and shoring support for the open cut excavation at the Building 101 Site. The system of support is to consist of soldier piles and lagging secured in place by means of waler beams as shown on the drawings. Piles may be driven, vibrated, or pre-drilled and grouted in place. All piles shall be extracted after completion of excavation and backfilling.

1.2 SUBMITTALS: In accordance with SECTION: SUBMITTAL PROCEDURES, the Contractor shall submit the following items required by this section.

1.2.1 Category II: For approval

1.2.1.1 Working drawings shall show member sizes, connection details, and method of installation.

1.2.1.2 As part of the Contractor's proposed Underground Storage Tank Removal Work Plan specified in SECTION: UNDERGROUND STORAGE TANK REMOVAL the Contractor shall submit his proposed methods for:

1.2.1.2.1 Resolving difficulties arising from misalignment of soldier piles exposed during excavation and criteria for implementation of those procedures.

1.2.1.2.2 Controlling and monitoring vibrations caused by driving or vibrating of soldier piles to prevent damage to structures and utility facilities.

1.2.1.2.3 Lean mix concrete materials and placing methods to be used at the soldier piles.

1.2.1.2.4 Provide contingency plan or alternative procedures to be implemented if unfavorable performance is evidenced.

1.2.1.2.5 Pile extraction methods and procedures.

1.2.1.2.6 Provide monitoring plan for daily checking horizontal and vertical movement of the support system and surrounding structures.

1.3 DEFINITIONS

1.3.1 Lean Concrete: Portland cement and mineral or soil aggregate proportioned so that concrete retains its shape during excavation operations.

1.4 JOB CONDITIONS

1.4.1 The Contractor shall provide for contingencies by surveying and monitoring daily the performance of all components of the support system for both vertical and horizontal movement.

1.4.2 The Contractor shall survey and monitor Building 101 daily for settlement.

1.4.3 The Contractor shall have available on site the necessary equipment to implement his contingency plan.

1.4.4 The Contractor shall not splice elements of the support system unless approval is received by the Contracting Officer.

PART 2 - PRODUCTS

2.1 MATERIALS:

2.1.1 Timber Lagging: Structural grade, minimum allowable flexural stress of 1,500 psi. Minimum thickness three inches actual depth - not dressed.

2.1.2 Structural Steel: ASTM A36 minimum.

PART 3 - EXECUTION

3.1 Soldier piles may be set within pre-drilled holes and grouted in place by tremie methods either by gravity flow or by pumping in place with lean mix concrete. If the Contractor elects to drill and set piles with lean grout the piles shall be provided with a bond breaker to allow for their removal after backfilling.

3.1.1 When pre-drilling, the Contractor shall take appropriate measures to stabilize the excavated hole to prevent the loss of ground. The pre-drilled holes shall be adequate to accommodate the pile section shown.

3.1.2 After seating soldier piles in pre-drilled holes, encase piles with lean concrete, completely encasing pile.

3.2 Soldier piles may also be installed in place by vibrating or driving so that the piles are in solid contact with native soils. Water jetting shall not be allowed.

3.3 Piles shall be installed vertically within a tolerance of one foot per each 100 feet for the full depth of each pile. Horizontal tolerance shall be within plus or minus 3" of indicated plan locations.

3.4 The Contractor shall use timber lagging secured in place for shoring the excavation. As excavation proceeds, lean concrete if used, shall be chipped from inside the pile flanges to allow for the placement of wood lagging. Obtain tight bearing between soldier piles and lagging, and between struts and walers. Over-digging of soil shall be avoided when freeing pile flanges to allow for the placement of wood lagging. Wood lagging shall be in full contact with soil.

3.5 The Contractor shall follow the following installation and excavation sequence:

3.5.1 Install soldier beams.

3.5.2 EXCAVATE to a depth of two feet below upper waler location shown installing wood lagging as excavation proceeds.

3.5.3 Install upper two side walers at location shown to soldier beams.

3.5.4 Jack to jacking load shown. Jacking shall be applied symmetrically to walers without introducing eccentricity.

3.5.5 Install short walers, and make welded connections with jacking force held.

3.5.6 Remove jacks and proceed with excavation installing wood lagging to two feet below lower waler elevation.

3.5.7 Proceed with installation of the lower row of walers following the same sequence used for the first row.

3.5.8 Complete excavation and removal of tank and other materials as shown and indicated.

3.5.9 Remove lagging, and walers as backfilling and compaction proceeds. Removal shall not exceed three feet above the highest point of backfilling and compaction.

3.5.10 Remove soldier beams and restore site per drawings.

3.6 PRIMARY SUPPORTS:

3.6.1 The Contractor shall not permit the height of unlagged face to exceed 15 inches if water flows from face of excavation or if soil of face moves toward excavation area.

3.6.2 If unstable material is encountered during excavation, take immediate measures to contain it in place and prevent ground displacement.

3.6.3 The Contractor shall maintain sufficient quantity of material on hand for shoring, bracing and other operations for protection of work and for use in case of accident or emergency.

3.6.4 Equipment wheel load shall not be allowed within three feet of the open excavation.

3.6.5 Excavation to two feet below upper waler location shown, installation of wood lagging, and installation of upper row of walers shall be accomplished in one continuous operation. On completion of installation of the upper row of walers, excavation to two feet below lower waler location shown, installation of wood lagging, and installation of lower row of walers shall also be accomplished in one continuous operation.

3.7 PRELOADING WALER BEAMS TO THE FORCES NOTED ON THE DRAWINGS:

3.7.1 Use procedures that produce uniform loading of bracing members without appreciable eccentricities or overstressing and distortion of members of the wall system.

3.7.2 Make provisions for permanently fixing the load in each member using steel shims or wedges welded into place.

3.7.3 Accomplish preloading by jacking support in place against soldier piles or wales as shown.

3.7.4 Wooden wedges shall not be used to preload bracing member.

3.8 REMOVAL OF SUPPORTING SYSTEM:

3.8.1 When removing support of excavation system, wholly or in part, do not disturb or damage adjacent buildings, structures, construction or utility facilities. Fill voids immediately with approved compacted backfill as specified in SECTION: EXCAVATION AND BACKFILLING.

3.8.2 Wood lagging shall be removed in a sequence which minimizes deflection as the excavation is backfilled. Walers shall be removed as backfilling and compaction proceeds. Soldier piles shall be removed after backfill and compaction operations are complete. Remove material of supporting system from site immediately.

3.8.3 The site shall be restored to match the existing natural ground and be well drained to prevent the accumulation of surface water in accordance with SECTION: EXCAVATION AND BACKFILLING.

3.8.4 If damage to existing structures occurs due to construction activities, it shall be repaired or replaced as directed by the Contracting Officer at no additional charge to the government.

END OF SECTION

SECTION 02233

GRADED-CRUSHED-AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 **REFERENCES:** The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 29	(1990) Unit Weight and Voids in Aggregate
ASTM C 88	(1983; R 1990) Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C 117	(1987) Materials Finer Than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 131	(1989) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(1984a) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 75	(1987) Sampling Aggregates
ASTM D 1556	(1982) Density of Soil in Place by the Sand-Cone Method
ASTM D 1557	(1978) Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54 kg) Rammer and 18-in. (457 mm) Drop
ASTM D 2167	(1984) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2487	(1985) Classification of Soils for Engineering Purposes
ASTM D 2922	(1981) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 4318	(1984) Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM E 11	(1987) Wire-Cloth Sieves for Testing Purposes
ASTM E 548	(1984) Preparation of Criteria for Use in the Evaluation of Testing Laboratories and Inspection Bodies

1.2 **DEGREE OF COMPACTION:** Degree of compaction is a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557, Method D. This will be abbreviated herein as percent of laboratory maximum density.

1.3 EQUIPMENT:

1.3.1 Approval: All plant, equipment, and tools used in the performance of the work will be subject to approval before the work is started and shall be maintained in satisfactory working condition at all times. The equipment shall be adequate and shall have the capability of producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

1.3.2 Weather Limitation: Base courses shall be placed when the atmospheric temperature is above 35 degrees F. Areas of completed base course that are damaged by freezing, rainfall, or other weather conditions shall be corrected to meet specified requirement.

1.4 SAMPLING AND TESTING: Sampling and testing shall be the responsibility of the Contractor. Sampling and testing shall be performed by an approved commercial testing laboratory, or by the Contractor subject to approval.

1.4.1 Sampling: Sampling for material gradation, liquid limit, and plastic limit tests shall be taken in conformance with ASTM D 75. When deemed necessary, the sampling will be observed by the Contracting Officer.

1.4.2 Tests: The following tests shall be performed in conformance with the applicable standards listed.

1.4.2.1 Sieve Analyses: Sieve analyses shall be made in conformance with ASTM C 117 and ASTM C 136. Sieves shall conform to ASTM E 11.

1.4.2.2 Liquid Limit and Plasticity Index: Liquid limit and plasticity index shall be determined in accordance with ASTM D 4318.

1.4.2.3 Density Tests: Density shall be measured in the field in accordance with ASTM D 1556, ASTM D 2167 or ASTM D 2922. A minimum of 3 field density tests shall be made.

1.4.2.4 Soundness Test: Soundness tests shall be made in conformance with ASTM C 88.

1.4.2.5 Wear Test: Wear tests shall be made in conformance with ASTM C 131.

1.4.3 Approval of Material: The source of the material to be used for producing aggregates shall be selected 45 days prior to the time the material will be required in the work. Tentative approval of the source will be based on an inspection by the Contracting Officer. Tentative approval of material will be based on tests of samples for the specific job. Final approval of both the source and the material will be based on tests for gradation, liquid limit, and plasticity index performed on samples taken from the completed and compacted subbase course.

PART 2 - PRODUCTS

2.1 AGGREGATES: Aggregates shall consist of clean, sound, durable particles of crushed stone, crushed slag, or crushed gravel, and screenings. The Contractor shall obtain materials that meet the specification and can be used to meet the grade and smoothness requirements specified herein, after all compaction operations have been completed. Slag shall be an air-cooled, blast-furnace product having a dry weight of not less than 65 pcf as determined by ASTM C 29. The aggregates shall be free of silt and clay as defined by ASTM D 2487, vegetable matter, and other objectionable materials or

coatings. The portion retained on the No. 4 sieve shall be known as coarse aggregate; that portion passing the No. 4 sieve shall be known as fine aggregate.

2.1.1 Coarse Aggregates: Coarse aggregates shall be angular particles of uniform density. The coarse aggregate shall have a loss not greater than 15 percent weighted averaged at five cycles when tested for soundness in magnesium sulfate in accordance with ASTM C 88. The coarse aggregate shall have a percentage of wear not to exceed 40 percent after 500 revolutions as determined by ASTM C 131. The percentage of flat and/or elongated particles shall not exceed 20 in the fraction retained on the 1/2-inch sieve and in the fraction passing the 1/2-inch sieve. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. When the coarse aggregate is supplied from more than one source, aggregate from each source shall meet the requirements set forth herein. Crushed gravel shall be manufactured from gravel particles 90 percent of which by weight are retained on the maximum-size sieve listed in TABLE I. In the portion retained on each sieve specified, the crushed gravel shall contain at least 90 percent by weight of crushed pieces having two or more freshly fractured faces with the area of each face being at least equal to 75 percent of the smallest midsectional area of the place. When two fractures are contiguous, the angle between planes of the fractures must be at least 30 degrees in order to count as two fractured faces.

2.1.2 Fine Aggregate: Fine aggregate shall be angular particles produced by crushing stone, slag, or gravel that meets the requirements for wear and soundness specified for coarse aggregate.

2.1.3 Gradation Requirements: Gradation requirements specified herein shall apply to the completed base course. The aggregates shall have a maximum size of 1½ inches and be graded continuously well within the limits specified in TABLE I. Sieves shall conform to ASTM E 11.

TABLE I. GRADATION OF AGGREGATES

Percentage by Weight Passing Square-Mesh Sieve

Sieve Designation	
2-inch	--
1-1/2 inch	100
1-inch	60-100
1/2-inch	30-65
No. 4	20-50
No. 10	15-40
No. 40	5-25
No. 200	0-10

NOTE 1: Particles having diameters less than 0.02 mm shall not be in excess of 3 percent by weight of the total sample tested.

NOTE 2: The values are based on aggregates of uniform specific gravity, and the percentages passing the various sieves may require appropriate correction by the Contractor when aggregates of varying specific gravities are used.

2.1.4 Liquid Limit and Plasticity Index: Liquid limit and plasticity index requirements stated herein shall apply to any aggregate component that is blended to meet the required gradation and also to the aggregate in the completed base course. The portion of the aggregate passing the No. 40 sieve shall be either nonplastic or have a liquid limit not greater than 25 and a plasticity index not greater than 5.

PART 3 - EXECUTION

3.1 OPERATION OF AGGREGATE SOURCES: Clearing, stripping, and excavating shall be the responsibility of the Contractor. The aggregate sources shall be operated in such a manner as to produce the quantity and quality of base course materials meeting these specification requirements in the specified time limits. Upon completion of the work, the aggregate sources on Government reservations shall be conditioned to drain readily and be left in a satisfactory condition. Aggregate sources on private lands shall be conditioned in agreement with local laws or authorities.

3.2 STOCKPILING MATERIAL: Prior to stockpiling of material, storage sites shall be cleared and leveled by the Contractor. All materials, including approved material available from excavation and grading, shall be stockpiled in the manner and at the locations designated. Aggregates shall be stockpiled on the cleared and leveled areas designated by the Contracting Officer so as to prevent segregation. Materials obtained from different sources shall be stockpiled separately.

3.3 PREPARATION OF UNDERLYING COURSE: Prior to constructing the crushed-aggregate base course, the underlying course shall be cleaned of all foreign substances. At the time of construction of the base course, the underlying course shall contain no frozen material. The underlying course shall conform to SECTION: EXCAVATION AND BACKFILL. Ruts or soft, yielding spots in the underlying courses, areas having inadequate compaction, and deviations of the surface from the requirements set forth herein shall be corrected by loosening and removing soft or unsatisfactory material and by adding approved material, reshaping to line and grade, and recompacting to specified density requirements. For cohesionless underlying courses containing sands or gravels as defined in ASTM D 2487 the surface shall be stabilized prior to placement of the graded-crushed-aggregate base course. Stabilization shall be accomplished by mixing graded-crushed-aggregate base material into the underlying course and compacting by approved methods. The stabilized material shall be considered as part of the underlying course and shall meet all requirements of the underlying course. The finished underlying course shall not be disturbed by traffic or other operations and shall be maintained by the Contractor in a satisfactory condition until the base course is placed.

3.4 GRADE CONTROL: During construction, the lines and grades including crown and cross slope indicated for the base course shall be maintained by means of line and grade stakes placed by the Contractor.

3.5 MIXING OF MATERIALS: The coarse and fine aggregates shall be mixed in a stationary plant, or in a traveling plant or bucket loader on an approved paved working area. The Contractor shall make such adjustments in mixing procedures or in equipment as may be directed to obtain true grades, to minimize segregation or degradation, to obtain the required water content, and to insure a satisfactory base course meeting all requirements of this specification.

3.6 PLACING: The mixed material shall be placed on the prepared subgrade or subbase in layers of uniform thickness with an approved spreader. When a compacted layer 6 inches or less in thickness is required, the material shall be placed in a single layer. When a compacted layer in excess of 6 inches is

required, the material shall be placed in layers of equal thickness. No layer shall exceed 6 inches or be less than 3 inches when compacted. The layers shall be so placed that when compacted they will be true to the grades or levels required with the least possible surface disturbance. Where the base course is placed in more than one layer, the previously constructed layers shall be cleaned of loose and foreign matter by sweeping with power sweepers, power brooms, or hand brooms, as directed. Such adjustments in placing procedures or equipment shall be made as may be directed to obtain true grades, to minimize segregation and degradation, to adjust the water content, and to insure an acceptable base course.

3.7 COMPACTION:

3.7.1 Requirements: Each layer of base course shall be compacted as specified to produce an average field-measured density, through the full depth, of at least 100 percent of laboratory maximum density obtained in the laboratory. In all places not accessible to the rollers, the base course material shall be compacted with mechanical tampers.

3.7.2 Finishing: The surface of top layer of base course shall be finished after final compaction, and proof rolled, where required, by cutting any overbuild to grade and rolling with a steel-wheeled roller. In no case will thin layers of material be added to the top layer of base course to meet grade. If the elevation of top layer of base course is 1/2 inch or more below the grade, the top layer of base shall be scarified to a depth of at least 3 inches, new material shall be added, and the layer shall be blended and recompacted to bring to grade. Adjustments in rolling and finishing procedures shall be made as may be directed to obtain grades, to minimize segregation and degradation of base course material, to adjust the water content, and to insure an acceptable base course. Material found unacceptable shall be removed and replaced, as directed, with acceptable material.

3.8 EDGES OF BASE COURSE: Acceptable material shall be placed along the edges of the base course in such quantity as will compact to the thickness of the course being constructed. When the course is being constructed in two or more layers, at least a 1-foot width of the shoulder shall be rolled and compacted simultaneously with the rolling and compacting of each layer of the base course, as directed.

3.9 SMOOTHNESS TEST: The surface of the top layer shall not deviate more than 3/8 inch when tested with a 10-foot straightedge applied parallel with and at right angles to the centerline of the area to be paved. Deviations exceeding 3/8 inch shall be corrected as directed.

3.10 THICKNESS CONTROL: The completed thickness of the base course shall be within 1/2 inch of the thickness indicated. The thickness of the base course shall be measured at intervals providing at least one measurement for at least each 500 square yards of base course. The depth measurement shall be made by test holes at least 3 inches in diameter. Where the measured thickness of the base course is more than 1/2 inch deficient, such areas shall be corrected by excavating to the required depth and replacing with new material. Where the measured thickness of the base course is 1/2 inch more than indicated, it will be considered as conforming with the requirements plus 1/2 inch, provided the surface of the base course is within 1/2 inch of established grade. The average job thickness shall be the average of the job measurements as specified above but within 1/4 inch of the thickness indicated.

3.11 MAINTENANCE: The base course shall be maintained in a condition that will meet all specification requirements until accepted.

****END OF SECTION****

SECTION 02551

BITUMINOUS PAVING FOR ROADS, STREETS AND OPEN STORAGE AREAS

PART 1 - GENERAL

1.1 **REFERENCES:** The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 29	(1990) Unit Weight and Voids in Aggregate
ASTM C 88	(1990) Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C 117	(1990) Materials Finer than 75-um (No 200) Sieve in Mineral Aggregates by Washing
ASTM C 127	(1988) Specific Gravity and Absorption of Coarse Aggregate
ASTM C 128	(1988) Specific Gravity and Absorption of Fine Aggregate
ASTM C 131	(1989) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	(1984) Sieve Analysis of Fine and Coarse Aggregates
ASTM C 183	(1988) Sampling and the Amount of Testing of Hydraulic Cement
ASTM D 5	(1986) Penetration of Bituminous Materials
ASTM D 75	(1987) Sampling Aggregates
ASTM D 140	(1988) Sampling Bituminous Materials
ASTM D 242	(1985; R 1990) Mineral Filler for Bituminous Paving Mixtures
ASTM D 422	(1963; R 1990) Particle-Size Analysis of Soils
ASTM D 946	(1982) Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D 1250	(1980; R 1990) Petroleum Measurement Tables
ASTM D 1856	(1979; R 1984) Recovery of Asphalt from Solution by Abson Method
ASTM D 2041	(1990) Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures

ASTM D 2172	(1988) Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
ASTM D 2216	(1990) Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures
ASTM D 3381	(1983) Viscosity-Graded Asphalt Cement for Use in Pavement Construction
ASTM D 3515	(1989) Hot-Mixed, Hot-Laid Bituminous Paving Mixtures

CORPS OF ENGINEERS (COE)

COE CRD-C 119	(1953; Rev 1963) Flat and Elongated Particles in Coarse Aggregate

MILITARY STANDARDS (MIL-STD)

MIL-STD 620	(Rev A; Notice 1) Test Methods for Bituminous Paving Materials

1.2 SUBMITTALS: In accordance with SECTION: SUBMITTAL PROCEDURES, the Contractor shall submit for approval, data as specified herein on the following:

1.2.1 Category II: For Approval

1.2.1.1 Two copies of Bituminous Pavement test results to be submitted 45 days before commencing work.

1.3 PLANT, EQUIPMENT, MACHINES, AND TOOLS:

1.3.1 General: The bituminous plant shall be of such capacity to produce the quantities of bituminous mixtures required. Hauling equipment, paving machines, rollers, miscellaneous equipment, and tools shall be provided in sufficient numbers and capacity and in proper working condition to place the bituminous paving mixtures at a rate equal to the plant output.

1.3.2 Mixing Plants: The mixing plant shall be an automatic or semiautomatic controlled commercially manufactured unit designed and operated to consistently produce a mixture within the job-mix formula (JMF). The plant shall have a minimum capacity of 100 tons per hour. Drum mixers shall be prequalified at the production rate to be used during actual mix production. The prequalification tests will include extraction and recovery of the asphalt cement in accordance with ASTM D 2172 and ASTM D 1856. The penetration of the recovered asphalt binder shall not be less than 60 percent of the original penetration, as measured in accordance with ASTM D 5.

1.3.3 Straightedge: The Contractor shall furnish and maintain at the site, in good condition, one 12-foot straightedge for each bituminous paver. Straightedge shall be made available for Government use. Straightedges shall be constructed of aluminum or other lightweight metal and shall have blades of box or box-girder cross section with flat bottom reinforced to insure rigidity and accuracy. Straightedges shall have handles to facilitate movement on pavement.

1.4 WEATHER LIMITATIONS: Unless otherwise directed, bituminous courses shall not be constructed when temperature of the surface of the existing pavement or base course is below 40 degrees F.

1.5 PROTECTION OF PAVEMENT: After final rolling, no vehicular traffic of any kind shall be permitted on the pavement until the pavement has cooled to 140 degrees F.

1.6 GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS: Finished surface of bituminous courses, when tested as specified below and in paragraph ACCEPTABILITY OF WORK, shall conform to gradeline and elevations shown and to surface-smoothness requirements specified.

1.6.1 Plan Grade: The grade of the completed surface shall not deviate more than 0.05 foot from the plan grade.

1.6.2 Surface Smoothness: When a 12-foot straightedge is laid on the surface parallel or transverse with the centerline of the paved area to pavement edge, the surface shall vary not more than 1/4 inch from the straightedge.

1.7 GRADE CONTROL: Lines and grades shall be established and maintained by means of line and grade stakes placed at site of work in accordance with the SPECIAL CLAUSES. Elevations of bench marks used by the Contractor for controlling pavement operations at the site of work will be determined, established, and maintained by the Government. Finished pavement elevations shall be established and controlled at the site of work by the Contractor in accordance with bench mark elevations furnished by the Contracting Officer.

1.8 SAMPLING AND TESTING:

1.8.1 Aggregates:

1.8.1.1 General: Reports of tests performed on samples of aggregates shall be furnished by the Contractor for approval of aggregate sources and stockpiles prior to the start of production and at times during production of the bituminous mixtures. Times and points of sampling will be designated by the Contracting Officer. Samples will be the basis of approval of specific sources or stockpiles of aggregates for aggregate requirements. Unless otherwise directed, ASTM D 75 shall be used in sampling coarse and fine aggregate, and ASTM C 183 shall be used in sampling mineral filler.

1.8.1.2 Sources: Sources of aggregates shall be selected well in advance of the time the materials are required in the work. If a previously developed source is selected, evidence shall be submitted 45 days before starting production, indicating that the central-plant hot-mix bituminous pavements constructed with the aggregates have had a satisfactory service record of at least five years under similar climatic and traffic conditions. The Contracting Officer will make such tests and other investigations as necessary to determine whether aggregates meeting requirements specified herein can be produced from proposed sources. If a sample of material from a new source fails to meet specification requirements, the material represented by the sample shall be replaced, and the cost of testing the replaced sample will be at the expense of the Contractor. Approval of the source of aggregate does not relieve the Contractor of responsibility for delivery at the jobsite of aggregates that meet the requirements specified herein.

1.8.2 Bituminous Materials: Samples of bituminous materials shall be obtained by the Contractor; sampling shall be in accordance with ASTM D 140. Tests necessary to determine conformance with requirements specified herein will be performed by the Contractor. Sources where bituminous materials are obtained shall be selected in advance of the time when materials will be required in the work. In addition to initial qualification testing of bituminous materials, samples shall be taken before and during construction when shipments of bituminous materials are received or when necessary to

assure some condition of handling or storage has not been detrimental to the bituminous material. The samples will be taken by the Contractor and tested by an approved laboratory at the Contractor's expense. Test results shall be submitted to the Contracting Officer.

1.8.3 Bituminous Mixtures: Sampling and testing of bituminous mixtures will be accomplished by the Contractor and a laboratory approved by the Contracting Officer at the Contractor's expense.

1.9 DELIVERY, STORAGE, AND HANDLING OF MATERIALS:

1.9.1 Mineral Aggregates: Mineral aggregates shall be delivered to the site of the bituminous mixing plant and stockpiled in such manner as to preclude fracturing of aggregate particles, segregation, contamination, or intermingling of different materials in the stockpiles or cold-feed hoppers. Mineral filler shall be delivered, stored, and introduced into the mixing plant in a manner to preclude exposure to moisture or other detrimental conditions.

1.9.2 Bituminous Materials: Bituminous materials shall be maintained at appropriate temperature during storage but shall not be heated by application of direct flame to walls of storage tanks or transfer lines. Storage tanks, transfer lines, and weigh buckets shall be thoroughly cleaned before a different type or grade of bitumen is introduced into the system. The asphalt cement shall be heated sufficiently to allow satisfactory pumping of the material; however, the storage temperature shall be maintained below 300 degrees F.

1.10 ACCESS TO PLANT AND EQUIPMENT: The Contracting Officer shall have access at all times to all parts of the paving plant for checking adequacy of the equipment in use; inspecting operation of the plant; verifying weights, proportions, and character of materials; and checking temperatures maintained in preparation of the mixtures.

PART 2 - PRODUCTS

2.1 BITUMINOUS HOT MIX: Shall consist of coarse aggregate, fine aggregate, mineral filler, bituminous material, and approved additives, if required, of the qualities and in the proportions specified and shall conform to the requirements contained in paragraphs PROPORTIONING OF MIXTURE and ACCEPTABILITY OF WORK.

2.1.1 Aggregates: Aggregates shall consist of crushed stone, crushed gravel, crushed slag, screening, sand, and mineral filler, as required. The portion of materials retained on the No. 4 sieve shall be known as coarse aggregate, the portion passing the No. 4 sieve and retained on the No. 200 sieve as fine aggregate, and the portion passing the No. 200 sieve as mineral filler. Aggregate gradation shall conform to gradation(s) specified in TABLE I. TABLE I is based on aggregates of uniform specific gravity; the percentage passing various sieves may be changed by the Contracting Officer when aggregates of varying specific gravities are used. Adjustments of percentage passing various sieves may be changed by the Contracting Officer when aggregates vary by more than 0.2 in specific gravity.

TABLE I. AGGREGATE GRADATION

Sieve Size	Wearing Course, Percent Passing	Intermediate Course, Percent Passing
1½ inch	-	-
1 inch	-	100
¾ inch	-	83±9

Sieve Size	Wearing Course, Percent Passing	Intermediate Course, Percent Passing
½ inch	100	73±9
⅜ inch	86±9	64±9
No. 4	66±9	48±9
No. 8	53±9	37±9
No. 16	41±9	28±9
No. 30	31±9	21±9
No. 50	21±8	16±7
No. 100	13±6	11±5
No. 200	5±2.5	5±2

2.1.1.1 Coarse Aggregate: Coarse aggregate shall consist of clean, sound, durable particles meeting the following requirements.

2.1.1.1.1 Percentage of loss shall not exceed 40 after 500 revolutions, as determined in accordance with ASTM C 131.

2.1.1.1.2 Percentage of loss shall not exceed 15 after five cycles performed in accordance with ASTM C 88, using magnesium sulfate.

2.1.1.1.3 The dry weight of crushed slag shall not be less than 75 pcf, as determined in accordance with ASTM C 29.

2.1.1.1.4 Crushed gravel retained on the No. 4 sieve and each coarser sieve shall contain at least 75 percent by weight of crushed pieces having one or more fractured faces with the area of each face equal to at least 75 percent of the smallest midsectional area of piece. When two fractures are contiguous, the angle between planes of fractures shall be at least 30 degrees to count as two fractured faces.

2.1.1.1.5 Particle shape of crushed aggregates shall be essentially cubical. The quantity of flat and elongated particles in any sieve size shall not exceed 20 percent by weight, when determined in accordance with COE CRD-C 119.

2.1.1.2 Fine Aggregate: Fine aggregate shall consist of clean, sound, durable particles including natural sand or crushed stone, slag, or gravel that meets requirements for wear and soundness specified for coarse aggregate. Fine aggregate produced by crushing gravel shall have at least 90 percent by weight of crushed particles having two or more fractured faces in the portion retained on the No. 30 sieve. This requirement shall apply to the material before blending with natural sand when blending is necessary. Quantity of natural sand to be added to the wearing- and intermediate-course mixtures shall not exceed 25 percent by weight of coarse and fine aggregate and material passing the No. 200 sieve. Natural sand shall be clean and free from clay and organic matter. Percentage of loss shall not exceed 15 after five cycles of the soundness test performed in accordance with ASTM C 88, using magnesium sulfate.

2.1.2 Bituminous Material: Asphalt cement shall conform to ASTM D 3381, Grade AC-20.

2.1.3 Additives: The use of additives such as antistripping and antifoaming agents is subject to approval.

2.2 PROPORTIONING OF MIXTURE:

2.2.1 Job Mix Formula: The JMF for the bituminous mixture will be furnished the Contractor by the Contracting Officer or by the testing laboratory retained by the Contractor with the approval of the Contracting Officer. The Contractor shall furnish samples of materials for mix design. Blending of the aggregates will be accomplished by the testing laboratory. No payment will be made for mixtures produced prior to the approval of the JMF. The formula will indicate the percentage of each stockpile and mineral filler, the percentage of each size aggregate, the percentage of bitumen, and the temperature of the completed mixture when discharged from the mixer. Tolerances are given in TABLE II for asphalt content, temperature, and aggregate grading for tests conducted on the mix as discharged from the mixing plant; however, the final evaluation of aggregate gradation and asphalt content will be based on paragraph ACCEPTABILITY OF WORK. Bituminous mix that deviates more than 25 degrees F from the JMF shall be rejected. The JMF may be adjusted during construction to improve paving mixtures, as directed, without adjustments to the contract price.

TABLE II. JOB-MIX TOLERANCES

Material	Tolerance, Plus or Minus
Aggregate passing No. 4 sieve or larger	5 percent
Aggregate passing Nos. 8, 16, 30, and 50 sieves	4 percent
Aggregate passing Nos. 100 and 200 sieves	2 percent
Bitumen	0.25 percent
Temperature of mixing	25 degrees F

2.2.2 Test Properties of Bituminous Mixtures: Finished mixture shall meet requirements described below when tested in accordance with MIL-STD 620, Method 100. All samples will be compacted with 50 blows of specified hammer on each side of sample. When bituminous mixture fails to meet the requirements specified below, the paving operation shall be stopped until the cause of noncompliance is determined and corrected.

2.2.2.1 Stability, Flow, and Voids: Requirements for stability, flow, and voids are shown in TABLES III and IV for nonabsorptive and absorptive aggregates, respectively.

TABLE III. NONABSORPTIVE-AGGREGATE MIXTURE

	Wearing Course	Intermediate Course
Stability minimum, pounds	500	500
Flow maximum, 1/100-inch units	20	20
Voids total mix, percent (1)	3-5	4-6
Voids filled with bitumen, percent (2)	75-85	65-75

(1) The Contracting Officer may permit deviations from limits specified when gyratory method of design is used to develop the JMF.

(2) The Contracting Officer may permit deviation from limits specified for voids filled with bitumen in the intermediate course in order to stay within limits for percent voids total mix.

TABLE IV. ABSORPTIVE-AGGREGATE MIXTURE

	Wearing Course	Intermediate Course
Stability minimum, pounds	500	500
Flow maximum, 1/100-inch units	20	20
Voids total mix, percent (1)	2-4	3-5
Voids filled with bitumen, percent (2)	80-90	70-80

(1) The Contracting Officer may permit deviations from limits specified when gyratory method of design is used to develop the JMF.

(2) The Contracting Officer may permit deviation from limits specified for voids filled with bitumen in the intermediate course in order to stay within limits for percent voids total mix.

a. When the water-absorption value of the entire blend of aggregate does not exceed 2.5 percent as determined in accordance with ASTM C 127 and ASTM C 128, the aggregate is designated as nonabsorptive. The theoretical specific gravity computed from the apparent specific gravity or ASTM D 2041 will be used in computing voids total mix and voids filled with bitumen, and the mixture shall meet requirements in TABLE III.

b. When the water-absorption value of the entire blend of aggregate exceeds 2.5 percent as determined in accordance with ASTM C 127 and ASTM C 128, the aggregate is designated as absorptive. The theoretical specific gravity computed from the bulk-impregnated specific gravity method contained in MIL-STD 620, Method 105, or ASTM D 2041 shall be used in computing percentages of voids total mix and voids filled with bitumen; the mixture shall meet requirements in TABLE IV.

2.2.2.2 Stability: The index of retained stability must be greater than 75 percent as determined by MIL-STD 620, Method 104. When the index of retained stability is less than 75, the aggregate stripping tendencies may be countered by the use of hydrated lime or by treating the bitumen with an approved antistripping agent. The hydrated lime is considered as mineral filler and should be considered in the gradation requirements. The amount of hydrated lime or antistripping agent added to bitumen shall be sufficient, as approved, to produce an index of retained stability of not less than 75 percent. No additional payment will be made to the Contractor for addition of antistripping agent required.

PART 3 - EXECUTION

3.1 BASE COURSE CONDITIONING: The surface of the graded-crushed aggregate base course will be inspected for adequate compaction and surface tolerances specified in SECTION: GRADED CRUSHED AGGREGATE BASE COURSE. Unsatisfactory areas shall be corrected.

3.2 PREPARATION OF BITUMINOUS MIXTURES: Rates of feed of aggregates shall be regulated so that the moisture content and temperature of aggregates will be within specified tolerances. Aggregates, mineral filler, and bitumen shall be conveyed into the mixer in proportionate quantities required to meet the JMF. Mixing time shall be as required to obtain a uniform coating of the aggregate with the bituminous material. Temperature of bitumen at time of mixing shall not exceed 300 degrees F. Temperature of aggregate and mineral filler in the mixer shall not exceed 325 degrees F when bitumen is added. Overheated and carbonized mixtures or mixtures that foam shall not be used.

3.3 WATER CONTENT OF AGGREGATES: Drying operations shall reduce the water content of mixture to less than 0.75 percent. The water content test will be conducted in accordance with ASTM D 2216; the weight of the sample shall be at

least 500 grams. If the water content is determined on hot bin samples, the water content will be a weighted average based on composition of blend.

3.4 STORAGE OF BITUMINOUS PAVING MIXTURE: Storage shall conform to the applicable requirements of ASTM D 3515; however, in no case shall the mixture be stored for more than 4 hours.

3.5 TRANSPORTATION OF BITUMINOUS MIXTURE: Transportation from paving plant to site shall be in trucks having tight, clean, smooth beds lightly coated with an approved releasing agent to prevent adhesion of the mixture to the truck bodies. Excessive releasing agent shall be drained prior to loading. Each load shall be covered with canvas or other approved material of ample size to protect mixture from weather and to prevent loss of heat. Loads that have crusts of cold, unworkable material or that have become wet will be rejected. Hauling over freshly placed material will not be permitted.

3.6 SURFACE PREPARATION OF UNDERLYING COURSE: Prior to placing of the intermediate or wearing course, the underlying course shall be cleaned of all foreign or objectionable matter with power brooms and hand brooms.

3.7 PLACING: Bituminous courses shall be constructed only when the base course or existing pavement has no free water on the surface. Bituminous mixtures shall not be placed without ample time to complete spreading and rolling during daylight hours, unless approved satisfactory artificial lighting is provided. The pavement shall consist of a two-inch thick intermediate course and a two-inch thick wearing course.

3.7.1 Offsetting Joints: The wearing course shall be placed so that longitudinal joints of the wearing course will be offset from joints in the intermediate course by at least 1 foot. Transverse joints in the wearing course shall be offset by at least 2 feet from transverse joints in the intermediate course.

3.7.2 General Requirements for Use of Mechanical Spreader: Range of temperatures of mixtures, when dumped into the mechanical spreader, shall be as determined by the Contracting Officer. Mixtures having temperatures less than 225 degrees F when dumped into the mechanical spreader shall not be used. The mechanical spreader shall be adjusted and the speed regulated so that the surface of the course being laid will be smooth and continuous without tears and pulls, and of such depth that, when compacted, the surface will conform to the cross section indicated. Placing with respect to center line areas with crowned sections or high side of areas with one-way slope shall be as directed. Each lot of material placed shall conform to requirements specified in paragraph ACCEPTABILITY OF WORK. Placing of the mixture shall be as nearly continuous as possible, and speed of placing shall be adjusted, as directed, to permit proper rolling. When segregation occurs in the mixture during placing, the spreading operation shall be suspended until the cause is determined and corrected.

3.7.3 Placing Strips Succeeding Initial Strips: In placing each succeeding strip after initial strip has been spread and compacted as specified below, the screed of the mechanical spreader shall overlap the previously placed strip 2 to 3 inches and be sufficiently high so that compaction produces a smooth dense joint. Mixture placed on the edge of a previously placed strip by the mechanical spreader shall be pushed back to the edge of the strip by use of a lute. Excess mixture shall be removed and wasted.

3.7.4 Handspreading in Lieu of Machine Spreading: In areas where the use of machine spreading is impractical, the mixture shall be spread by hand. Spreading shall be in a manner to prevent segregation. The mixture shall be spread uniformly with hot rakes in a loose layer of thickness that, when compacted, will conform to required grade, density, and thickness.

3.8 COMPACTION OF MIXTURE: Rolling shall begin as soon after placing as the mixture will bear a roller without undue displacement. Delays in rolling freshly spread mixture will not be permitted. After initial rolling, preliminary tests of crown, grade, and smoothness shall be made by the Contractor. Deficiencies shall be corrected so that the finished course will conform to requirements for grade and smoothness specified herein. Crown, grade, and smoothness will be checked in each lot of completed pavement by the Contracting Officer for compliance and will be evaluated as specified in paragraph ACCEPTABILITY OF WORK. After the Contractor is assured of meeting crown, grade, and smoothness requirements, rolling shall be continued until a mat density of 97.0 to 100.0 percent and a joint density of 95.0 to 100.0 percent of density of laboratory-compacted specimens of the same mixture is obtained. The density will be determined and evaluated as specified in paragraph ACCEPTABILITY OF WORK. Places inaccessible to rollers shall be thoroughly compacted with hot hand tampers.

3.8.1 Testing of Mixture: At the start of the plant operation, a quantity of mixture shall be prepared that is sufficient to construct a test section at least 50 feet long, two spreader widths wide and of thickness to be used in the project. Mixture shall be placed, spread, and rolled with equipment to be used in the project and in accordance with the requirements specified above. This test section shall be tested and evaluated as a lot and shall conform to all specified requirements. If test results are satisfactory, the test section shall remain in place as part of the completed pavement. If tests indicate that the pavement does not conform to specification requirements, necessary adjustments to plant operations and rolling procedures shall be made immediately, and test section will be evaluated as specified in paragraph ACCEPTABILITY OF WORK. Additional test sections, as directed, shall be constructed and sampled for conformance to specification requirements. In no case shall the Contractor start full production of an intermediate or wearing course mixture without approval.

3.9 JOINTS:

3.9.1 General: Joints between old and new pavements, between successive work days, or joints that have become cold (less than 175 degrees F) shall be made to insure continuous bond between the old and new sections of the course. All joints shall have the same texture and smoothness as other sections of the course. Contact surfaces of previously constructed pavements coated by dust, sand, or other objectionable material shall be cleaned by brushing or shall be cut back as directed. Material shall be applied far enough in advance of placement of a fresh mixture to insure adequate curing. Care shall be taken to prevent damage or contamination of the sprayed surface.

3.9.2 Transverse Joints: The roller shall pass over the unprotected end of a strip of freshly placed material only when placing is discontinued or delivery of the mixture is interrupted to the extent that the material in place may become cold. In all cases, prior to continuing placement, the edge of previously placed pavement shall be cut back to expose an even vertical surface for full thickness of the course. In continuing placement of a strip, the mechanical spreader shall be positioned on the transverse joint so that sufficient hot mixture will be spread to obtain a joint after rolling that conforms to the required density and smoothness specified herein.

3.10 ACCEPTABILITY OF WORK:

3.10.1 General: A lot shall be that quantity of construction that will be evaluated for compliance with specification requirements. A lot shall be equal to 24 hours of production. Tests required to determine acceptability of nonconforming material will be preformed by the laboratory at the expense of the Contractor.

3.10.1.1 Lot Evaluation: In order to evaluate aggregate gradation, asphalt content, and density, each lot shall be divided into four equal sublots. For density determination, one random sample shall be taken from the mat, and one random sample shall be taken from the joint of each sublot. A coring machine will be used for taking mat and joint samples from the completed pavement. Core samples will be taken with the coring machine centered over the joint. After air drying to a constant weight, random samples obtained from the mat shall be used for density determination in accordance with MIL-STD 620, Method 101. Samples for determining asphalt content and aggregate gradation shall be taken from loaded trucks within each sublot. Asphalt content shall be determined in accordance with ASTM D 2172, Method A or B. Aggregate gradation shall be determined for the mix by testing the recovered aggregate in accordance with ASTM C 136 and ASTM C 117.

3.10.1.2 Lot Failure: When a lot of material fails to meet the specification requirements, that lot shall be removed and replaced or accepted at a reduced price. The lowest percent payment for any pavement characteristic (i.e., gradation, asphalt content, density, grade, and smoothness) defined below shall be the percent payment for that lot. The percent payment is based on the pavement characteristics and the contract unit price.

3.10.1.3 Optional Sampling and Testing: The Contracting Officer reserves the right to sample and test any area which appears to deviate from the specification requirements. Testing in these areas will be in addition to the lot testing, and the requirements for these areas will be the same as those for a lot.

3.10.2 Aggregate Gradation: The mean absolute deviation of the four sublot aggregate gradations from the JMF for each sieve size will be evaluated and compared with TABLE V. The percent payment based on aggregate gradation shall be the lowest value determined for any sieve size in TABLE V. All tests for aggregate gradation will be completed and reported within 24 hours after completion of construction of each lot. The computation of mean absolute deviation for one sieve size is illustrated below:

Example: Assume the following JMF and sublot test results for aggregate gradation

	Percent by Weight Passing Sieves				
Sieve Size	JMF	Test No. 1	Test No. 2	Test No. 3	Test No. 4
3/4 inch	100	100	100	100	100
1/2 inch	88	87	88	90	88
3/8 inch	75	72	77	78	74
No. 4	64	60	65	67	62
No. 8	53	50	56	57	52
No. 16	42	39	44	45	41
No. 30	32	30	34	35	32
No. 50	20	17	20	22	21
No. 100	10	8	10	10	11
No. 200	6	4	7	8	6

Mean Absolute Deviation (for No. 200 seive) = ((Absolute value of 4-6) + (Absolute value of 7-6) + (Absolute value of 8-6) + (Absolute value of 6-6))/4 = (2 + 1 + 2 + 0)/4 = 1.25

The mean absolute deviation for other sieve sizes can be determined in a similar way for this example to be:

Sieve Size	3/4 inch	1/2 inch	3/8 inch	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100
Mean Absolute Deviation	0	0.75	2.25	2.50	2.75	2.25	1.75	1.50	0.75

The least percent payment based on any sieve size listed in TABLE V would be 98 percent for the No. 200 sieve. Therefore for this example the percent payment based on aggregate gradation is 98 percent.

TABLE V. PERCENT PAYMENT BASED ON MEAN ABSOLUTE DEVIATION OF AGGREGATE GRADATIONS FROM JMF

Sieve Size	Percent Payment Based On Mean Absolute Deviation from JMF						
	0.0-1.0	1.1-2.0	2.1-3.0	3.1-4.0	4.1-5.0	5.1-6.0	Above 6.0
3/4 inch	100	100	100	100	98	95	90
1/2 inch	100	100	100	100	98	95	90
3/8 inch	100	100	100	100	98	95	90
No. 4	100	100	100	100	98	95	90
No. 8	100	100	100	98	95	90	reject
No. 16	100	100	100	98	95	90	reject
No. 30	100	100	100	98	95	90	reject
No. 50	100	100	100	98	95	90	reject
No. 100	100	98	95	90	90	reject	reject
No. 200	100	98	90	reject	reject	reject	reject

3.10.3 Asphalt Content: The mean absolute deviation of the four asphalt contents from the JMF will be evaluated and compared with TABLE VI. The percent payment based on asphalt content shall be the value determined in TABLE VI. Asphalt content tests shall be completed and reported within 24 hours after construction of the lot.

TABLE VI. PERCENT PAYMENT BASED ON ASPHALT CONTENT

Mean Absolute Deviation of Extracted Asphalt Content from JMF	Percent Payment
less than 0.25	100
0.25-0.30	98
0.31-0.35	95
0.36-0.40	90
above 0.40	reject

3.10.4 Density: The average mat and joint densities will be expressed as a percentage of the laboratory density. The laboratory density for each lot will be determined in accordance with MIL-STD 620, Method 100 from four sets of laboratory samples. One sample will be obtained from each of the four sublots and will be divided into three specimens to produce one set of laboratory samples. Laboratory samples will be prepared from asphalt mixture which has not been reheated. Samples will be compacted at 250 degrees F within 2 hours of the time the mixture was prepared at the asphalt plant. Laboratory samples will be prepared in accordance with MIL-STD 620, Method 100.

3.10.4.1 Field Density: The field density will be determined and compared with TABLE VII. The percent payment based on density shall be the lowest value determined from TABLE VII. The percent payment based on mat density will be for all of the material placed in the lot. The percent payment based on joint density will be for the amount of material represented by an area equal to the lot joint length by 10 feet wide not to exceed the lot size.

TABLE VII. PERCENT PAYMENT BASED ON DENSITY

Average Mat Density (4 Cores)	Percent Payment	Average Joint Density (4 Cores)
97.0-100.0	100.0	95.0-100.0
96.9	100.0	94.9
96.8-100.1	99.9	94.8
96.7	99.8	94.7
96.6-100.2	99.6	94.6
96.5	99.4	94.5
96.4-100.3	99.1	94.4
96.3	98.7	94.3
96.2-100.4	98.3	94.2
96.1	97.8	94.1
96.0-100.5	97.3	94.0
95.9	96.3	93.9
95.8-100.6	94.1	93.8
95.7	92.2	93.7
95.6-100.7	90.3	93.6
95.5	87.9	93.5
95.4-100.8	85.7	93.4
95.3	83.3	93.3
95.2-100.9	80.6	93.2
95.1	78.0	93.1
95.0-101.0	75.0	93.0
below 95.0, above 101.0	reject	below 93.0

3.10.4.2 Lot Density: All density results on a lot will be completed and reported within 24 hours after construction of that lot. When the Contracting Officer considers it necessary to take additional samples for density measurements, samples will be taken in groups of four (one for each sublot). The percent payment will be determined for each additional group of four samples and averaged with the percent payment for the original group to determine the final percent payment. The Contractor shall fill all sample holes with hot mix and compact.

3.10.5 Grade: Grade-conformance tests will be conducted by the Contractor's Quality Control Officer and verified by the Contracting Officer. The finished surface of the pavement will be tested for conformance with plan-grade requirements. Within 5 working days after completion of placement of a particular lot, the Contractor will inform the Contracting Officer in writing of results of grade-conformance tests. The finished grade of each pavement area shall be determined by running lines of levels at intervals of 25 feet or less longitudinally and transversely to determine the elevation of the completed pavement. When more than 5 percent of all measurements made within a lot are outside the tolerances specified in paragraph GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS, the payment for that lot will not exceed 95 percent of the bid price. In areas where the grade exceeds the plan-grade tolerances given in paragraph GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS by more than 50 percent, the Contractor shall remove the deficient area and

replace with fresh paving mixture at no additional cost to the Government. Sufficient material shall be removed to allow at least 1 inch of asphalt concrete to be placed. Skin patching for correcting low areas or planing for correcting high areas shall not be permitted.

3.10.6 **Surface Smoothness:** After completion of final rolling of a lot, the compacted surface will be tested by the Contractor's Quality Control Officer with a 12-foot straightedge. Measurements will be made perpendicular to and across all mats at distances along the mat not to exceed 25 feet. Location and deviation from straightedge of all measurements will be recorded. When more than 5 percent of all measurements along the mat within a lot exceed the specified tolerance, the unit price for that lot shall not exceed 95 percent of the bid price. Any joint or mat area surface deviation which exceeds the tolerance given in paragraph GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS by more than 50 percent shall be corrected to meet the specification requirements. The Contractor shall remove the deficient area and replace with fresh paving mixture at no additional cost to the Government. Sufficient material shall be removed to allow at least 1 inch of asphalt concrete to be placed. Skin patching for correcting low areas or planing for correcting high areas shall not be permitted.

****END OF SECTION****

SECTION 02592

FIELD MOLDED SEALANTS FOR SEALING JOINTS IN RIGID PAVEMENTS

PART 1 GENERAL

1.1 **REFERENCES:** The publications listed below form a part of this specification to the extent referenced. The publications are referred to in this text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 509	(199) Elastomeric Cellular Preformed Gasket and Sealing Material
ASTM D 789	(1986) Determination of Relative Viscosity, Melting Point, and Moisture Content of Polyamide (PA)

CORPS OF ENGINEERS (COE)

COE CRD-C 525	(1989) Test Method for Evaluation of Hot-Applied Joint Sealants for Bubbling Due to Heating
COE CRD-C 572	(1988) Joint Sealants, Cold-Applied, Non-Jet-Fuel-Resistant, for Rigid and Flexible Pavements

FEDERAL SPECIFICATIONS (FS)

FS SS-S-200	(Rev E; Am 1) Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold-Applied, for Portland Cement Concrete Pavement
FS SS-S-1401	(Rev C; Notice 1) Sealants, Joint, Non-Jet-Fuel-Resistant, Hot-Applied, for Portland Cement and Asphalt Concrete Pavements
FS SS-S-1614	(Rev A; Notice 1) Sealants, Joint, Jet-Fuel-Resistant, Hot-Applied, for Portland Cement and Tar Concrete Pavements

1.2 **SUBMITTALS:** In accordance with SECTION: SUBMITTAL PROCEDURES, the Contractor shall submit for approval, data as specified herein on the following:

1.2.1 **Category II:** (For Approval)

1.2.1.1 Where installation procedures, or any part thereof, are required to be in accordance with the manufacturer's recommendations, printed copies of these recommendations, shall be submitted to the Contracting Officer 45 days prior to use on the project. Installation of the material will not be allowed until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

1.2.1.2 Samples of the materials (sealant, primer if required, and backup material), in sufficient quantity for testing and approval shall be submitted to the Contracting Officer 45 days prior to the beginning of work. No material will be allowed to be used until it has been approved.

1.3 **TEST REQUIREMENTS:** The joint sealant and backup or separating material shall be tested for conformance with the referenced applicable

material specification. Testing of the materials shall be performed in an approved independent laboratory and certified copies of the test reports shall be submitted and approved 45 days prior to the use of the materials at the job site. Samples will be retained by the Government for possible future testing should the materials appear defective during or after application. Conformance with the requirements of the laboratory tests specified will not constitute final acceptance of the materials. Final acceptance will be based on the performance of the in-place materials.

1.4 **EQUIPMENT:** Machines, tools, and equipment used in the performance of the work required by this section shall be approved before the work is started and shall be maintained in satisfactory condition at all times.

1.4.1 Joint Cleaning Equipment

1.4.1.1 Tractor-Mounted Routing Tool: The routing tool used for removing old sealant from the joints shall be of such shape and dimensions and so mounted on the tractor that it will not damage the sides of the joints. The tool shall be designed so that it can be adjusted to remove the old material to varying depths as required. The use of V-shaped tools or rotary impact routing devices will not be permitted. Hand-operated spindle routing devices may be used to clean and enlarge random cracks.

1.4.1.2 Concrete Saw: A self-propelled power saw with water-cooled diamond or abrasive saw blades will be provided for cutting joints to the depths and widths specified or for refacing joints or cleaning sawed joints where sandblasting does not provide a clean joint.

1.4.1.3 Sandblasting Equipment: Sandblasting equipment shall include an air compressor, hose, and long-wearing venturi-type nozzle of proper size, shape and opening. The maximum nozzle opening should not exceed 1/4 inch. The air compressor shall be portable and shall be capable of furnishing not less than 150 cubic feet per minute and maintaining a line pressure of not less than 90 psi at the nozzle while in use. Compressor capability under job conditions must be demonstrated before approval. The compressor shall be equipped with traps that will maintain the compressed air free of oil and water. The nozzle shall have an adjustable guide that will hold the nozzle aligned with the joint approximately 1 inch above the pavement surface. The height, angle of inclination and the size of the nozzle shall be adjusted as necessary to secure satisfactory results.

1.4.1.4 Hand Tools: Hand tools may be used, when approved, for removing defective sealant from a crack and repairing or cleaning the crack faces.

1.4.2 Sealing Equipment:

1.4.2.1 Single-Component Sealing Equipment: The equipment for installing COE CRD-C 527 single component joint sealants shall consist of an extrusion pump, air compressor, following plate, hoses, and nozzle for transferring the sealant from the storage container into the joint opening. The dimension of the nozzle shall be such that the tip of the nozzle will extend into the joint to allow sealing from the bottom of the joint to the top. The initially approved equipment shall be maintained in good working condition, serviced in accordance with the supplier's instructions, and shall not be altered in any way without obtaining prior approval. Small hand-held air-powered equipment (i.e., caulking guns) may be used for small applications.

1.5 **DELIVERY AND STORAGE:** Materials delivered to the job site shall be inspected for defects, unloaded, and stored with a minimum of handling to

avoid damage. Storage facilities shall be provided by the Contractor at the job site for maintaining materials at the temperatures and conditions recommended by the manufacturer.

1.6 **ENVIRONMENTAL CONDITIONS:** The ambient air temperature and the pavement temperature within the joint wall shall be a minimum of 50 degrees F and rising at the time of application of the materials. Sealant shall not be applied if moisture is observed in the joint.

PART 2 PRODUCTS

2.1 **SEALANTS:** Sealing material for sealing cracks in the various paved areas indicated on the drawings shall be as follows for all areas: COE CRD-C 527

2.2 **PRIMERS:** Primers, when their use is recommended by the manufacturer of the sealant, shall be as recommended by the manufacturer of the sealant.

2.3 **BACKUP MATERIALS:** The backup material shall be a compressible, nonshrinking, nonstaining, nonabsorbing material and shall be nonreactive with the joint sealant. The material shall have a melting point at least 5 degrees F greater than the pouring temperature of the sealant being used when tested in accordance with ASTM D 789. The material shall have a water absorption of not more than 5 percent of the sample weight when tested in accordance with ASTM C 509. The backup material shall be 25 plus or minus 5 percent larger in diameter than the nominal width of the crack.

2.4 **BOND BREAKING TAPES:** The bond breaking tape or separating material shall be a flexible, nonshrinkable, nonabsorbing, nonstaining, and nonreacting adhesive-backed tape. The material shall have a melting point at least 5 degrees F greater than the pouring temperature of the sealant being used when tested in accordance with ASTM D 789. The bond breaker tape shall be approximately 1/8-inch wider than the nominal width of the joint and shall not bond to the joint sealant.

PART 3 EXECUTION

3.1 **PREPARATION OF JOINTS:** Immediately before the installation of the sealant, the joints shall be thoroughly cleaned to remove all laitance, curing compound, filler, protrusions of hardened concrete, and old sealant from the sides and upper edges of the joint space to be sealed.

3.1.1 Refacing of Joints: Facing of joints shall be accomplished using a concrete saw as specified in paragraph EQUIPMENT to remove all residual old sealant and a minimum of concrete from the joint face to provide exposure of newly cleaned concrete, and, if required, to enlarge the joint opening to the width and depth shown on the drawings. The blade shall be stiffened with a sufficient number of suitable dummy (used) blades or washers. Immediately following the sawing operation, the joint opening shall be thoroughly cleaned using a water jet to remove all saw cuttings and debris.

3.1.2 Refacing of Random Cracks: Sawing of the cracks shall be accomplished using a power-driven concrete saw as specified in paragraph EQUIPMENT. The saw blade shall be 6 inches or less in diameter to enable the saw to follow the trace of the crack. The blade shall be stiffened as necessary with suitable dummy (or used) blades or washers. Immediately following the sawing operation, the crack opening shall be thoroughly cleaned using a water jet to remove all saw cuttings and debris.

3.1.3 Back-Up Material: When the joint opening is of a greater depth than indicated for the sealant depth, the lower portion of the joint opening shall be plugged or sealed off using a back-up material to prevent the

entrance of the sealant below the specified depth. Care shall be taken to ensure that the backup material is placed at the specified depth and is not stretched or twisted during installation.

3.1.4 **Bond Breaking Tape:** Where inserts or filler materials contain bitumen, or the depth of the joint opening does not allow for the use of a backup material, a bond breaker separating tape will be inserted to prevent incompatibility with the filler materials and three-sided adhesion of the sealant. The tape shall be securely bonded to the bottom of the joint opening so it will not float up into the new sealant.

3.1.5 Rate of Progress of Joint Preparation: The stages of joint preparation which include sandblasting, air pressure cleaning and placing of the back-up material shall be limited to only that lineal footage that can be sealed during the same day.

3.2 PREPARATION OF SEALANT:

3.2.1 **Cold-Applied Sealants:** The COE CRD-C 527 sealant and containers shall be inspected prior to use. Any materials that contain water, hard caking of any separated constituents, nonreversible jell, or materials that are otherwise unsatisfactory shall be rejected. Settlement of constituents in a soft mass that can be readily and uniformly remixed in the field with simple tools will not be cause for rejection.

3.3 INSTALLATION OF SEALANT:

3.3.1 Time of Application: Joints shall be sealed immediately following final cleaning of the joint walls and following the placement of the separating or backup material. Open joints that cannot be sealed under the conditions specified, or when rain interrupts sealing operations shall be recleaned and allowed to dry prior to installing the sealant.

3.3.2 Sealing Joints: Immediately preceding, but not more than 50 feet ahead of the joint sealing operations, a final cleaning with compressed air shall be performed. The joints shall be filled from the bottom up to 1/8 inch plus or minus 1/16 inch below the pavement surface. Excess or spilled sealant shall be removed from the pavement by approved methods and shall be discarded. The sealant shall be installed in such a manner as to prevent the formation of voids and entrapped air. In no case shall gravity methods or pouring pots be used to install the sealant material. Traffic shall not be permitted over newly sealed pavement until authorized by the Contracting Officer. When a primer is recommended by the manufacturer, it shall be applied evenly to the joint faces in accordance with the manufacturer's instructions. Joints shall be checked frequently to ensure that the newly installed sealant is cured to a tack-free condition within the time specified.

3.4 INSPECTION:

3.4.1 Joint Cleaning: Joints shall be inspected during the cleaning process to correct improper equipment and cleaning techniques that damage the concrete pavement in any manner. Cleaned joints shall be approved prior to installation of the separating or back-up material and joint sealant.

3.4.2 Joint Sealant Application Equipment: The application equipment shall be inspected to ensure conformance to temperature requirements, proper proportioning and mixing (if two-component sealant) and proper installation. Evidences of bubbling, improper installation, failure to cure or set shall be cause to suspend operations until causes of the deficiencies are determined and corrected.

3.4.3 Joint Sealant: The joint sealant shall be inspected for proper rate of cure and set, bonding to the joint walls, cohesive separation within the sealant, reversion to liquid, entrapped air and voids. Sealants

exhibiting any of these deficiencies at any time prior to the final acceptance of the project shall be removed from the joint, wasted, and replaced as specified herein at no additional cost to the Government.

3.5 **CLEAN-UP:** Upon completion of the project, all unused materials shall be removed from the site and the pavement shall be left in a clean condition.

END OF SECTION

SECTION 02611

CONCRETE PAVEMENT FOR ROADS PARKING AND STORAGE AREAS

PART 1 - GENERAL

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

1.1.1 Federal Specifications (Fed. Spec.):

SS-S-1401C & Notice 1	Sealant, Joint, Non-Jet-Fuel-Resistant, Hot-Applied, for Portland Cement and Asphalt Concrete Pavements

1.1.2 Department of the Army, Corps of Engineers, Handbook for Concrete and Cement:

CRD-C 55-85	Concrete Uniformity
CRD-C 95-89	Concrete Plant Standards
CRD-C 100-75	Sampling Concrete Aggregate and Aggregate Sources, and Selection of Material for Testing
CRD-C 104-80	Calculation of the Fineness Modulus of Aggregate
CRD-C 112-69	Surface Moisture in Aggregate by Water Displacement
CRD-C 115-73	Soundness of Aggregates by Freezing and Thawing of Concrete Speciments
CRD-C 119-53 (Rev Jun 1963)	Flat and Elongated Particles in Coarse Aggregate
CRD-C 143-62	Meters for Automatic Indication of Moisture in Fine Aggregate
CRD-C 300-88	Membrane-Forming Compounds for Curing Concrete
CRD-C 400-63	Water for Use in Mixing or Curing Concrete
CRD-C 572-74	Polyvinylchloride Waterstop

1.1.3 American Society for Testing and Materials (ASTM) with Corresponding CRD Standard Indicated Where Available:

A 36-87	Structural Steel
A 184-86 (CRD-C 562)	Fabricated Deformed Steel Bar Mats for Concrete Reinforcement
A 185-85 (CRD-C 510)	Steel Welded Wire Fabric, Plain, for Concrete Reinforcement
A 497-86	Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement
A 499-81	Steel Bars and Shapes, Carbon Rolled from "T" Rails

A 615-87 (CRD-C 501)	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
A 616-87 (CRD-C 502)	Rail-Steel Deformed and Plain Bars for Concrete Reinforcement
A 617-87 (CRD-C 519)	Axle-Steel Deformed and Plain Bars for Concrete Reinforcement
A 675-85	Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical Properties
C 31-88	Making and Curing Concrete Test Specimens in the Field
C 33-86	Concrete Aggregates
C 39-86	Compressive Strength of Cylindrical Concrete Specimens
C 94-86b	Ready-Mixed Concrete
C 150-86	Portland Cement
C 172-82	Sampling Freshly Mixed Concrete
C 227-87	Potential Alkali Reactivity of Cement-Aggregate nations (Mortar-Bar Method)
C 260-86	Air Entraining Admixtures for Concrete
C 309-81	Liquid Membrane-Forming Compounds For Curing Concrete
C 311-87	Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland Cement Concrete
C 494-86	Chemical Admixtures for Concrete
C 618-87	Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
C 666-84	Resistance of Concrete to Rapid Freezing and Thawing
C 881-87	Epoxy-Resin-Base Bonding Systems for Concrete
D 1751-83	Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
D 1752-84	Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
D 2828-71	Nonbituminous Inserts for Contraction Joints (R 1981) in Portland Cement Concrete Airfield Pavements, Sawable Type

1.2 GENERAL: Concrete and the equipment, workmanship, materials and Contractor Quality Control therefore shall conform to the applicable requirements of ASTM C 94, except as otherwise specified herein. A concrete mix approved by New York State DOT is acceptable for this work, if it meets requirements as follows. Concrete shall be composed of cement, fine aggregate, coarse aggregate, water, and an air entraining mixture. At the Contractor's option, fly ash may be used as a partial replacement of portland cement, subject to the requirements specified hereinafter. All fly ash mixtures shall contain fly ash in the proportion of 20 percent of the total cementitious material, by absolute volume (based on the specific gravity of the portland cement and the fly ash). However, final mix proportions shall be stated by weight and the cementitious materials shall be batched by weight. Concrete shall have an average compressive strength of 4000 psi at 28 days. The air content of the concrete by volume shall be maintained by the Contractor at 6.0 percent plus or minus 1.0 percent. Concrete shall not have a slump exceeding 2 inches for fixed form and 1-1/2 inches for slip form paving. The slump of transit-mixed concrete shall not be increased because of the inadequacy of mixing, discharge, or placing equipment.

1.3 SAMPLING, TESTING AND SUBMITTALS:

1.3.1 General: Sampling, testing, and certification of concrete and concrete materials, including design of concrete mixes, shall conform to the requirements therefore specified in ASTM C 94 and shall be submitted to the Contracting Officer for approval. During actual concrete operations, no substitutions shall be made in the materials or proportions which were used in the mix design without additional testing as required unless specifically approved or directed by the Contracting Officer. Quality control sampling and testing including concrete mix design shall be performed by the Contractor in accordance with paragraph: CONTRACTOR QUALITY CONTROL in SECTION: SPECIAL CLAUSES and as specified herein. The Government may perform verification tests as considered necessary.

1.3.2 Certification for Additional Pavement Materials: Prior to the use of materials not listed in ASTM C 94, but listed in this section, the Contractor shall submit Certificate of Compliance or Certified Test Results for each lot as directed by the Contracting Officer.

1.3.3 Submittals: In accordance with SECTION: SPECIAL CLAUSES, the Contractor shall submit data as specified herein on the following:

1.3.3.1 Category I: None.

1.3.3.2 Category II: (For Information Only)

1.3.3.2.1 Epoxy Resin
1.3.3.2.2 Admixtures
1.3.3.2.3 Curing Compounds
1.3.3.2.4 Cement
1.3.3.2.5 Reinforcement
1.3.3.2.6 Fly Ash
1.3.3.2.7 Compressive Strength Results

1.3.3.3 Category II: (For Approval)

1.3.3.3.1 Mix Design Plus Test Results
1.3.3.3.2 Certified Test Results for Joint Sealant

PART 2 - PRODUCTS

2.1 MATERIALS:

2.1.1 Aggregate: Aggregate shall conform to ASTM C 33, except Procedure A of ASTM C 666 shall be used for fine aggregate requiring freezing and thawing tests. Aggregate shall have a maximum nominal size of 1-1/2 inches.

2.1.2 Admixtures:

2.1.2.1 Air-entraining admixture shall conform to ASTM C 260.

2.1.2.2 Accelerating admixture shall conform to ASTM C 494, Type C, and shall be used only when cold weather protection is required and only when approved in writing.

2.1.2.3 Water-reducing or retarding admixtures shall conform to ASTM C 494, Type A, B, or D.

2.1.3 Cement: Cement shall be portland cement. Portland cement shall conform to ASTM C 150, type I or II. The cement shall meet the requirements for low alkali and for false set contained therein. If the Contractor can satisfactorily demonstrate that the proposed composition of cement and aggregate to be used in the concrete mix is nonreactive when tested in accordance with ASTM C 227, the low alkali requirement may be waived. Certified test results and supporting test data for determining nonreactivity must be submitted for approval and no substitutions shall be permitted in the aggregate and cement used in the work without additional testing.

2.1.4 Fly Ash: Fly ash shall conform to the requirements of ASTM C 618, class F or C, including the Supplementary Optional Chemical Requirement for available alkalies and the Supplementary Optional Physical Requirements for uniformity and reactivity with cement alkalies. Maximum loss on ignition shall not be over 4 percent. Samples shall be obtained, prepared, and tested in accordance with ASTM C 311. Only one class of fly ash from a single source may be used.

2.1.5 Reinforcement:

2.1.5.1 Bar mats shall conform to ASTM A 184. The bar members shall be billet steel.

2.1.5.2 Welded steel wire fabric shall conform to ASTM A 185.

2.1.5.3 Welded deformed steel wire fabric shall conform to ASTM A 497.

2.1.6 Curing Materials: Curing materials shall be an approved white pigmented membrane-forming curing compound conforming to the requirements specified in ASTM C 309, Type 2, Class A or B.

PART 3 - EXECUTION

3.1 GRADE CONTROL: Using bench-mark elevations furnished by the Contracting Officer, the lines and grades shown for the pavement shall be established and maintained by means of line and grade stakes placed at the jobsite by the Contractor in accordance with the SPECIAL CLAUSES. The intent is to match existing paving and maintain existing positive drainage. The

pavements shall be constructed to the thicknesses and elevations indicated insofar as possible.

3.2 GRANULAR FILTER COURSE, BASE, AND FORMS:

3.2.1 Underlying Material:

3.2.1.1 General: The surface of the base course shall be tested as to elevation and density in advance of setting forms or of concrete placement using slip-form techniques. The prepared surface of the base course material shall be kept free of foreign matter, waste concrete and/or cement, and debris at all times and shall be thoroughly wetted down sufficiently in advance to insure a firm, moist condition when the concrete is placed. In cold weather the underlying material shall be prepared and so protected that it will be entirely free from frost when the concrete is placed. The use of chemicals to eliminate frost in the underlying material will not be permitted. When the surface of the underlying material is used as a reference for controlling grade and elevation of the slip-form paver, the surface shall meet the plan grade and smoothness requirements of the pavement as set forth in GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS AND TESTS.

3.2.2 Forms for Fixed-Form Paving: Forms shall be steel or wood, and shall be subject to approval. Forms shall be one-piece and equal in depth to the edge thickness of the slab as shown on the drawings. Under no conditions shall forms other than the depth of the pavement be used and adjusted by filling or excavating under the forms to an elevation other than the bottom of the pavement slab. The top surface of a form shall not vary more than 1/8 inch in 10 feet from a true line and the face shall not vary more than 1/4 inch in 10 feet from a true plane. Where keyway forms are required, they shall be rigidly attached to the main form so no displacement can take place. Metal keyway forms shall be tack-welded to steel forms. Keyway forms shall be so aligned that there is no variation over 1/4 inch, either vertically or horizontally, when tested with a 12-foot template after forms are set, including tests across form joints.

3.2.2.1 Steel Forms shall be furnished in sections not less than 10 feet in length, except that on curves the sections shall be flexible or curved to the proper radius. Each form section shall be provided with form braces, pin sockets, and rigid joint locking devices.

3.2.2.2 Wood Forms shall be made of not less than 2 inch nominal thickness, well-seasoned, surfaced plank or plywood, straight, and free from warp or bend. Wood forms shall have the strength and rigidity to resist the impact and vibrations of concrete placing, spreading and finishing without springing, weaving or settling.

3.2.2.3 Form Setting: The forms shall be set on firm material cut true to grade so that each form section when placed will be firmly in contact with the underlying layer for its entire length and base width. Setting forms on blocks or on built-up spots of subgrade and then attempting to fill and compact under forms after they are in place will not be permitted under any condition. The form sections shall be staked into position and tightly locked together. When tested by a 12-foot straightedge, the top of the form shall conform to the requirements specified for the finished surface of the concrete, and the longitudinal axis of the upstanding leg shall not vary more than 1/4 inch from the straightedge. The forms shall be cleaned and oiled each time before concrete is placed. No concrete shall be placed until setting of forms has been approved.

3.3 PLACING, SPREADING AND VIBRATION:

3.3.1 General: Concrete shall be placed between stationary forms. Concrete shall be deposited between the forms within 45 minutes from the time all ingredients are charged into the mixing drum. Concrete shall be deposited as close as possible to its final position in the pavement cross section. Concrete placement shall be continuous and at a uniform rate. Concrete shall be spread and vibrated immediately after placement.

3.3.2 Spreading: Spreading shall be by hand method. Hand spreading shall be done with shovels; rakes shall not be used. Where the concrete is delivered to the form in truck mixers, suitable chutes may be used, provided windrows cover essentially the entire area within the form. In no case shall dumping of concrete in piles be permitted.

3.3.3 Vibration: Concrete 8 inches or less in thickness shall be consolidated with mechanical vibrating equipment or properly designed and operating vibratory screeds immediately after spreading. Concrete in odd shaped slabs, or lanes 50 feet or less in length shall be vibrated with a hand-manipulated vibrator. Vibrators shall not be used to transport or spread the concrete in the forms. Vibrators shall not be operated in the concrete at one location for more than 20 seconds. Additional vibrators shall be maintained at the site at all times.

3.3.4 Placing Reinforcing Steel: The reinforcement steel shall be positioned on suitable chairs securely fastened to the subgrade prior to concrete placement or may be installed by the strike-off method wherein the concrete is deposited on the underlying material, consolidated and struck to an elevation of upper one third of slab depth. When using the strike-off method, the reinforcement shall be laid upon the prestruck surface, and the remaining concrete shall then be placed and finished in the required manner. Any portions of the bottom layer of concrete that have been placed more than 30 minutes without being covered with the top layer shall be removed and replaced with newly mixed concrete without additional cost to the Government. Regardless of placement procedure, reinforcing steel shall be free from coatings which could impair bond between the steel and concrete and laps in the reinforcement shall be as indicated.

3.3.5 Placing During Cold Weather: Concrete placement shall be discontinued when the air temperature reaches 40 degrees F. and is falling and shall not be resumed until the air temperature reaches 35 degrees F. and is rising. No concrete shall be placed on base course containing frost or frozen material. Provision shall be made to protect the concrete from freezing during the specified curing period. Concrete damaged by freezing shall be removed and replaced by the Contractor at no cost to the Government.

3.3.6 Placing During Warm Weather: During warm weather, concrete shall be produced at the lowest temperature practicable under the existing conditions. In no case shall the temperature of the concrete when placed exceed 90 degrees F. The mixing water and/or aggregates shall be cooled, if necessary, to maintain a satisfactory placing temperature. Concrete shall be placed continuously and rapidly at a rate of not less than 100 feet of paving lane per hour. The finished surfaces of newly placed pavement shall be kept damp by applying a waterfog or mist with approved spraying equipment until the pavement is covered by the curing medium.

3.4 FIELD TEST SPECIMENS:

3.4.1 General: Except as modified hereinafter, tests to determine the slump, air content, and strength of the concrete shall be performed by the Contractor in accordance with the requirements of ASTM C 94. Tests for slump and air content shall be made each time cylinders are fabricated and at such other times as directed by the Contracting Officer.

3.4.2 Specimens for Strength Tests: Compressive test cylinders shall be taken not less than once a day nor less than once for each 250 cubic yards of concrete or fraction thereof. The samples of strength tests shall be taken in accordance with ASTM C 172. Cylinders for acceptance tests shall be molded and cured in accordance with ASTM C 31. Cylinders shall be tested in accordance with ASTM C 39 by an approved testing laboratory at no cost to the Government. Sufficient specimens shall be molded each time to provide two compressive-strength tests at each test age. Test ages shall be 7, 14, and 28 days.

3.5 FINISHING: Finishing operations shall be started immediately after placing, spreading and vibration of the concrete. Finishing shall be by the hand method. Finishing equipment and tools shall be maintained clean and in an approved condition.

3.5.1 Hand Finishing:

3.5.1.1 Equipment: A strike and tamping template and a longitudinal float shall be provided for hand finishing. The template shall be at least 1 foot longer than the pavement width, shall be equipped with handles, and shall have a striking edge at least 4 inches wide. The longitudinal float shall be not less than 10 feet long, and the face used to finish the pavement surface shall be at least 6 inches wide. The bottom edges of the base of the float shall be rounded on a radius not exceeding 3/8 inch.

3.5.1.2 Finishing and Floating: As soon as placed and vibrated, the concrete shall be struck off and screeded to the crown and cross section and to such elevation above grade that, when consolidated and finished, the surface of the pavement will be at the required elevation. The entire surface shall be tamped, and the tamping operation continued until the required compaction and reduction of internal and surface voids are accomplished. Immediately following the final tamping of the surface, the pavement shall be floated longitudinally from bridges resting on the side forms and spanning but not touching the concrete. If necessary, additional concrete shall be placed and screeded, and the float operated until a satisfactory surface has been produced. The floating operation shall be advanced not more than half the length of the float, and the floating continued over the new and previously floated surfaces.

3.5.2 Surface Correction and Testing: After all other finishing is completed but while the concrete is still plastic, minor irregularities and score marks in the pavement surface shall be eliminated by means of straightedges. Straightedges shall be 12 feet in length rigidly constructed to prevent deflection in any direction during use, and shall be operated from the sides of the pavement and from bridges. After straightedge finishing appears complete, the entire surface shall then be tested for trueness with a 12-foot straightedge held in successive positions parallel and at right angles to the centerline of the pavement, and the whole area covered as necessary to detect variations. The straightedge shall be advanced along the pavement in successive stages of not more than one-half the length of the straightedge. The straightedge testing and finishing shall continue until the entire surface of the concrete is free from observable departure from the straightedge and conforms to the surface requirements specified under subparagraph: SURFACE TESTS AND CORRECTIONS below.

3.5.3 Texturing: Before the surface sheen has disappeared and before the concrete becomes nonplastic, the surface of the pavement shall be given a burlap drag finish.

3.5.3.1 Burlap-Drag Finish: Surface texture shall be applied by dragging the surface of the pavement, in the direction of the concrete placement, with an approved multiple-ply burlap drag at least three feet in width

and equal in length to the width of slab. The leading transverse edge of the drag shall be securely fastened to a lightweight pole or traveling bridge, and at least one foot of the burlap shall be in contact with the pavement during dragging operation. The drag shall be operated with the burlap moist and the burlap shall be cleaned and changed as required. The dragging shall be done so as to produce a uniform finished surface having a fine sandy texture without disfiguring marks.

3.5.4 Edging: After texturing has been completed, the edge of slabs along the forms, along the edges of slip-formed lanes, and at the joints, where indicated or directed, shall be carefully finished with an edging tool to form a smooth rounded surface of the required radius. Tool marks shall be eliminated, and the edges shall be smooth and true to line.

3.6 FORM REMOVAL: Forms shall remain in place at least 12 hours after the concrete has been placed or for a longer period, if directed by the Contracting Officer. Forms shall be removed without injuring the concrete. Any concrete found defective after form removal shall be repaired promptly, using approved procedures.

3.7 CURING:

3.7.1 General: Concrete shall be protected against loss of moisture and rapid temperature changes for at least 7 days commencing immediately after finishing is complete. Unhardened concrete shall be protected from rain and flowing water. All equipment needed for adequate curing and protection of the concrete shall be on hand and ready to use before actual concrete placement begins. If the curing materials and procedures used do not provide proper curing and protection against concrete cracking caused by temperature changes during the curing period, the damaged pavement shall be removed and replaced and another method of curing shall be employed as directed.

3.7.2 Membrane Curing: A uniform coating of white pigmented membrane curing compound shall be applied to the entire exposed surface of the concrete as soon after finishing as free water has disappeared from the finished surface. Formed surfaces shall be coated immediately after the forms are removed and in no case longer than 1 hour after removal of forms. The concrete shall not be allowed to dry before the application of the membrane. The curing compound shall be applied to the finished surfaces by means of an approved automatic spraying machine as soon as the free water has disappeared. The curing compound in the drum used for the spraying operation shall be thoroughly and continuously agitated mechanically throughout the full depth of the drum during the application. Air agitation may be used only to supplement mechanical agitation. The curing compound shall be applied with an overlapping coverage that will give a two-coat application at a coverage of not more than 400 square feet per gallon for each coat. The application of curing compound by hand-operated pressure sprayers will be permitted only on odd widths or shapes of slabs where specifically approved, and on concrete surfaces exposed by the removal of forms. When application is made by hand-operated sprayers, the second coat shall be applied in a direction approximately at right angles to the direction of the first coat. The compound shall form a uniform, continuous, cohesive film that will not check, crack, or peel, and that will be free from pinholes and other discontinuities. Curing compound that has pinholes, abrasions, or other discontinuities, that was subjected to heavy rainfall within 3 hours of application, or was damaged by subsequent construction operations shall be resprayed by the method and at the coverage specified above. Necessary precautions shall be taken to insure that the concrete is properly cured at sawed joints, but that no curing compound enters the joints. The top of the joint opening and the joint groove at exposed edges shall be tightly sealed by approved procedures using a temporary sealer or filler before the concrete in the region of the joint is resprayed with curing compound. The method used for sealing the joint groove

shall prevent loss of moisture from the joint during the entire specified curing period. Approved standby facilities for curing concrete pavement shall be provided at an accessible location at the jobsite for use in the event of mechanical failure of the spraying equipment or other conditions that might prevent correct application of the membrane curing compound at the proper time. Concrete surfaces to which membrane curing compounds have been applied shall be adequately protected during the entire curing period from pedestrian and vehicular traffic, except as required for joint-sawing operations and surface tests, and from any other possible damage to the continuity of the membrane.

3.8 GRADE AND SURFACE-SMOOTHNESS REQUIREMENTS AND TESTS:

3.8.1 General: Pavements shall be smooth and true to grade and cross section. When tested with a 10-foot straightedge on lines 5 feet apart parallel with and at right angles to the centerline of the pavement, the surface shall not vary more than 1/8 inch from the testing edge of the straightedge for road and street pavements and not more than 1/4 inch for all other pavements.

3.8.2 Surface Tests and Corrections: Not later than 24 hours after concrete has been placed, the surface of the pavement shall be tested by the Contractor in the presence of a representative of the Contracting Officer using an approved straightedge or other approved device that will reveal all surface irregularities varying from the testing edge exceeding tolerances specified above for concrete pavements. High spots indicated by the testing edge in excess of applicable tolerances shall be marked plainly by the Contractor. High areas shall be reduced by approved methods or the pavement shall be removed and replaced by the Contractor at no cost to the Government.

3.9 TOLERANCES IN PAVEMENT THICKNESS: Pavements shall be of the thicknesses indicated on the plans. Deficiencies in the thickness shall be treated as described below.

3.9.1 Thickness Determination: The thickness of the pavement shall be determined by the Government on the basis of measurements made on 4 inch diameter cores which shall be drilled by the Contractor, within 7 days after placement of the concrete. Cores shall be drilled at the points directed by the Contracting Officer and there shall be at least one core taken from each separate pavement areas of 4000 sq. yd. or less. The Contractor shall fill the core holes with concrete similar to the surrounding concrete. For pavements deficient in thickness, when any core shows a deficiency in thickness greater than 1/2 inch, the pavement area represented by the core shall be removed and replaced by the Contractor at no cost to the Government.

3.10 JOINTS:

3.10.1 General: Joints shall be perpendicular to the finished grade of the pavement. Transverse expansion and contraction joints shall be straight and continuous from edge to edge of the pavement. Concrete shall be divided into segments of fifteen foot square or less with joints spaced to have no segment five feet or less between joints. Divide individual concrete pours into as nearly equal blocks as possible.

3.10.2 Contraction Joints: Transverse and longitudinal contraction joints shall be of the weakened-plane or dummy type. Longitudinal contraction joints shall be constructed by sawing a groove in the hardened concrete with a power-driven saw in conformance with subparagraph: Sawed Joints below, unless otherwise approved.

3.10.2.1 Sawed Joints: Sawed joints shall be constructed by sawing a groove in the concrete with a 1/8 inch blade to full depth as indicated,

without chipping, spalling, or tearing the concrete adjacent to the joint. After expiration of the curing period, the upper portion of the groove shall be widened by sawing to the width and depth indicated. The time of sawing shall vary depending on existing and anticipated weather conditions, and shall be such as to prevent uncontrolled cracking of the pavement. The joints shall be sawed at the required spacing consecutively in the sequence of the concrete placement. The saw cut shall not vary more than 1/2 inch from the true joint alinement. Joints shall not be sawed if a crack has occurred near the joint location and sawing shall be discontinued when a crack develops ahead of the saw cut. Immediately after joint is sawed, the saw cut and adjacent concrete surface shall be thoroughly flushed with water until all waste from sawing is removed from the joint. The top of the joint opening shall then be temporarily sealed as specified in subparagraph: MEMBRANE CURING. An ample supply of saw blades and at least one standby sawing unit in good working order shall be available at the jobsite at all times during concrete paving operations.

3.10.2.2 Filler (Insert) Type Joints: Insert type contraction joints may not be used if slip form paving method is chosen by the Contractor. Insert type contraction joints shall be constructed by installation of a preformed insert in the plastic concrete to form a weakened plane to induce cracking. The insert materials shall conform to the requirements specified hereinbefore in SECTION 02592 FIELD MOLDED SEALANTS FOR SEALING JOINTS IN RIGID PAVEMENTS.

3.10.3 Sealing Joints: Joints shall be sealed immediately following curing of the concrete, or as soon as weather conditions permit, as directed. Sawing of the reservoir or space for sealant, or removal of nonsawable filler, in filler-type joints shall be accomplished immediately before sealing of the joints. Sawing shall be performed by a multi-blade concrete saw. Sawing to the width specified and to the depth indicated shall be performed in one pass. The cutting unit shall be readily adjustable for width by the addition and removal of spacers or by other suitable means. The machine shall be equipped with a mechanical guide which will keep the cutting unit aligned so as to cut equal widths from each side of the joint groove.

3.11 PAVEMENT PROTECTION: The Contractor shall protect the pavement against all damage prior to final acceptance of the work by the Government. Traffic shall be excluded from the pavement until the concrete is at least 14 days old, or for a longer period if so directed. Paving mixers and batch-hauling equipment will be permitted on the pavement after the pavement has been cured for 7 days and has attained a flexural strength of 500 psi and the joints have been sealed or otherwise protected. Also, paving equipment may be permitted to ride upon the edges of previously constructed slabs when the concrete is at least 72 hours old and has attained a minimum flexural strength of 400 pounds per square inch, and adequate means are furnished to prevent damage to the slab edge.

* * END OF SECTION * *