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CLOSURE PLAN INFORMATION AND DATA FOR THE DETREX STILL OCTOBER 1993

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FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

Closure Plan Information and Data for the Detrex Still

October 1993

U.S. DEPARTMENT OF ENERGY

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CLOSURE PLAN INFORMATION AND DATA
for the
Detrex Still

Fernald Environmental Management Project

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ACRONYMS

AEA	Atomic Energy Act
ARAR	applicable or relevant and appropriate requirement
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
CPID	Closure Plan Information and Data
CRU3	CERCLA/RCRA Unit 3
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
FEMP	Fernald Environmental Management Project
FERMCO	Fernald Environmental Restoration Management Corporation
FM	Factory Mutual
FMPC	Feed Materials Production Center
FS	Feasibility Study
HWMU	hazardous waste management unit
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
OAC	Ohio Administrative Code
OEPA	Ohio Environmental Protection Agency
OSHA	Occupational Safety and Health Administration
OU3	Operable Unit 3
PCB	polychlorinated biphenyl
PFLT	paint filter liquid test
ppm	parts per million
QA	quality assurance
QC	quality control
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design

ACRONYMS (continued)

RI	Remedial Investigation
ROD	Record of Decision
SACD	Stipulated Amendment to the Consent Decree
SAP	Sampling and Analysis Plan
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SOP	Standard Operating Procedure
TCLP	Toxicity Characteristic Leaching Procedure
TSCA	Toxic Substance Control Act
TSD	treatment, storage, or disposal
UL	Underwriters Laboratory
USEPA	U.S. Environmental Protection Agency
VOA	volatile organic analysis

CLOSURE PLAN INFORMATION AND DATA
for the
Detrex Still
U.S. Department of Energy
Fernald Environmental Management Project
Fernald, Ohio

1.0 FACILITY DESCRIPTION

1.1 GENERAL DESCRIPTION

The Fernald Environmental Management Project (FEMP) is a U.S. Department of Energy (DOE) owned facility located near Fernald, in Hamilton and Butler Counties, Ohio. A map of the FEMP is presented in Figure 1-1. The FEMP, formerly known as the Feed Materials Production Center (FMPC), was operated to produce uranium fuel elements, target cores, and other uranium compounds for use at other DOE facilities in support of the U.S. Defense program. The FEMP facility was in operation at this site from approximately 1950 until 1989.

This Closure Plan Information and Data (CPID) deals with the Detrex Still Hazardous Waste Management Unit (HWMU) located at the north end of Building 1A in Plant 1 and its ancillary equipment. The Detrex Still, which operated from September 1956 through January 13, 1981, was used to recover spent chlorinated hydrocarbon solvents potentially containing radionuclides. The spent solvents recycled in the unit (tetrachloroethylene, trichloroethylene, and 1,1,1-trichloroethane) are designated as hazardous wastes under the Resource Conservation and Recovery Act (RCRA). On January 13, 1981, the Detrex Still ceased operating; however, a small amount of solid distillation residues (approximately 2.8 ft^3) have remained in the still since shutdown.

In accordance with RCRA regulations and based upon process knowledge, the distillation residues were classified as hazardous wastes and the Detrex Still designated as a HWMU in June 1991 since hazardous waste was stored in the still tank for more than 90 days after shutdown of the recycling operation. The Detrex Still and it ancillary

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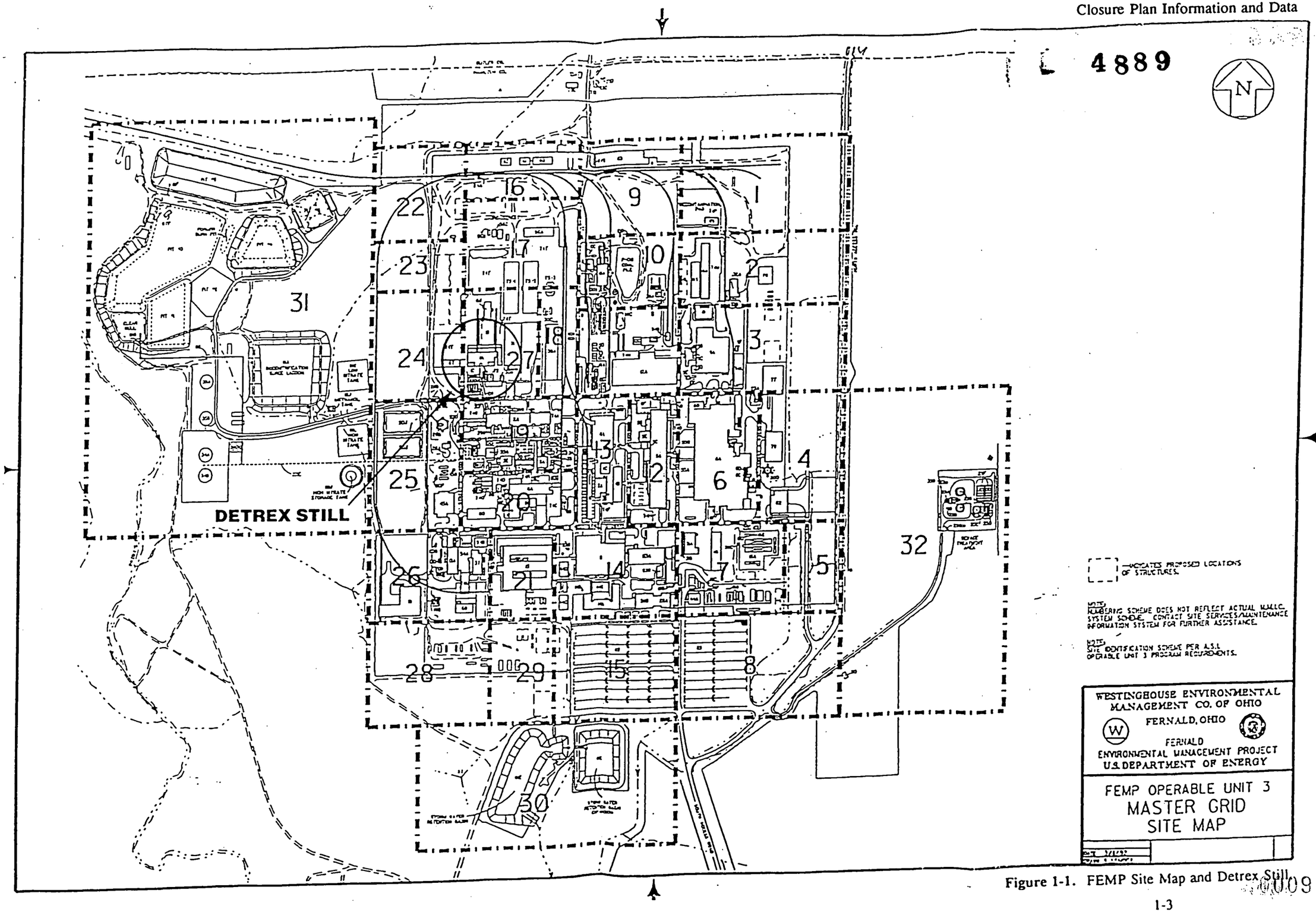

Figure 1-1. FEMP Site Map and Detrex Still

equipment is, therefore, included in the list of HWMUs in the latest RCRA Part A and Part B Permit Applications submitted to the Ohio Environmental Protection Agency (OEPA). The Detrex Still was also identified as a HWMU in the RCRA compliance schedule submitted pursuant to the 1988 Consent Decree between the State of Ohio and the DOE, as amended by the Stipulated Amendment to the Consent Decree (SACD) in January 1993. The RCRA compliance schedule requires that a CPID be submitted for all identified HWMUs.

Consistent with the terms of the July 1986 DOE/U.S. Environmental Protection Agency (USEPA) Federal Facilities Compliance Agreement, as amended by the September 1991 Consent Agreement (USEPA 1991), the FEMP has divided the scope of the Remedial Investigation/Feasibility Study (RI/FS) into 5 operable units. The Detrex Still, for which this CPID has been submitted, is included within the scope of Operable Unit 3 (OU3), Former Production Area and Suspect Facilities.

Section XI of the Amended Consent Agreement requires that response actions at the FEMP be performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements and consistent with all applicable or relevant and appropriate requirements (ARARs).

1.1.1 Purpose

This CPID for the Detrex Still is submitted in accordance with the 1993 SACD and RCRA compliance schedule and demonstrates compliance with requirements for RCRA closure. It specifies the procedures that will be followed to accomplish clean closure of the Detrex Still and constitutes only a partial closure of the FEMP facility. Applicable RCRA closure requirements, under Ohio Administrative Code (OAC) 3745-55 (40 Code of Federal Regulations [CFR] Part 264, Subpart G), require owners or operators of hazardous waste treatment, storage, or disposal (TSD) facilities to have written and approved closure plans for those units.

It is the FEMP's intent to ensure efficient integration of all RCRA closure activities with related CERCLA response actions. This CPID has been prepared to ensure that CERCLA response actions meet the RCRA requirements while adhering to the terms of the Amended Consent Agreement (USEPA 1991). The procedures described in this

CPID are consistent with the requirements for response actions under CERCLA, other ARARs, and the Amended Consent Agreement (USEPA 1991).

Copies of this CPID and any later revisions will be kept at the facility until final RCRA closure has been completed and certified according to OAC 3745-55-10 to 3745-55-15, (40 CFR §§ 264.110 to 264.115), or until CERCLA remedial actions are completed.

1.1.2 Exclusions

1.1.2.1 Mixed Radioactive and RCRA Wastes

As a result of process knowledge determinations, many FEMP wastes with a hazardous component or characteristic have been handled as mixed hazardous/radioactive low-level wastes. The radioactive portion of mixed waste is exempt from RCRA regulation. Determination of the radionuclide component of most material on site is based upon process knowledge and analyses to assay the uranium content potentially recoverable from the material. When assay values have not been established, the FEMP considers materials generated in the uranium processing areas as being contaminated with radionuclides unless proven otherwise.

Recognizing the dual nature of these wastes, the FEMP stores mixed hazardous/ radioactive wastes according to RCRA, and Atomic Energy Act (AEA) regulations, and meets U.S. Department of Transportation (DOT) container and labeling requirements, through DOE orders concerning low-level radioactive waste. These materials are stored pending the availability of acceptable treatment/disposal facilities for mixed waste pursuant to a case-by-case extension issued in conformance with 40 CFR § 268.5.

In accordance with the January 1990 Stipulation and Settlement Agreement (Case No. 88-hw-016), DOE will provide the OEPA with the results of the radiological monitoring that will be conducted during the closure of the Detrex Still. The radiological monitoring conducted during the closure will be performed according to the existing FEMP Standard Operating Procedures (SOPs) that are used on all projects at the FEMP.

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1.1.2.2 CERCLA Requirements for FEMP RCRA Closures

As discussed above, the RCRA closure described in this CPID will be undertaken in conjunction with CERCLA remediation activities at the FEMP. In 1986, the DOE initiated the ongoing RI/FS to evaluate and determine remediation requirements under CERCLA. Consistent with the scope of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and the Amended Consent Agreement (USEPA 1991), all remediation activities and any resulting changes to facility schedules must be coordinated and integrated with the RI/FS and CERCLA removal and remedial response actions. In addition, Section XIC of the Amended Consent Agreement (USEPA 1991) requires that all remediation activities (including RCRA closure activities) be consistent with the Final Record of Decision (ROD) for the operable unit containing the HWMU.

For each CERCLA response action, ARARs must be identified in accordance with 40 CFR § 300.400(g), and these ARARs must be attained, unless justifiably waived under 40 CFR § 300.430(f)(2)(C). For response actions that address units subject to RCRA closure, these ARARs include OEPA and USEPA requirements for HWMU closures. In addition, pursuant to the Amended Consent Agreement (USEPA 1991), the FEMP management will:

- Characterize chemical and radiological contamination at the FEMP and establish site cleanup objectives
- Conduct necessary short-term response actions to eliminate or minimize immediate threats to human health and the environment (i.e., removal actions)
- Implement any necessary long-term monitoring and surveillance of the facility and surrounding environment.

Based on the RI/FS, a proposed plan will be recommended for the CERCLA ROD for each operable unit. The Final ROD for each operable unit will specify the required final remediation or removal of contaminated media, equipment, and structures.

The FEMP is also developing an Interim ROD for OU3 to provide for final decontamination, removal, dismantling, and demolition of equipment and structures

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within OU3 (defined as the production area and production-associated facilities and equipment, which includes the Detrex Still). The information and data obtained from the RI/FS and completion of the Interim ROD will be used to determine the final remediation requirements under the Final ROD for OU3. Remedial Design/Remedial Action (RD/RA) plans will be prepared to implement the requirements of the RODs (interim and final) to remediate each operable unit.

A number of removal actions have been identified to provide immediate response actions necessary to stabilize or remove contamination for protection of human health and the environment. Removal Actions No. 9, 12, 17, and 26 (WEMCO 1992; WEMCO 1991; FEMP 1993; FERMCO 1993) are directly relevant to the closure of the Detrex Still.

Removal Action No. 9, "Removal of Waste Inventories," provides for the disposition of low-level radioactive wastes generated by production, maintenance, construction, and environmental restoration activities at the FEMP (WEMCO 1992). This removal action also includes procedures for packaging, shipping, and disposing of radioactively contaminated wastes. Where decontamination procedures performed during closure of the Detrex Still fail to remove sufficient radioactivity, non-hazardous materials may be classified as low-level waste. If this were to occur, such waste would be handled under Removal Action No. 9.

Removal Action No. 12, "Safe Shutdown," was created to perform the safe shutdown of all process facilities in preparation of final remediation (WEMCO 1991). Safe Shutdown entails the engineering, planning, and scheduling for isolation of process equipment, piping systems, and associated utilities; removing residual and excess materials, supplies, and combustibles to appropriate disposition and approved storage locations; and decontaminating process equipment and operating areas.

Safe Shutdown management activities include the following:

- Development of appropriate safety documentation (Risk Assessment, Risk Management Plan)

- Performance of task-specific hazard analyses (under Safe Shutdown Health and Safety Plan and Safety Assessment)

- Preparation of task-specific lesson plans
- Review of SOPs and updates
- Performance of a preliminary assessment for all process buildings and process equipment
- Evaluation of the preliminary assessment
- Preparation of work requests and Task Orders to address equipment isolation and cleanout
- Continuation of efforts to dispose of the surplus equipment and uranium contaminated materials
- Evaluation of process buildings for future use or demolition
- Initiation of the development of engineering studies and packages to guide equipment isolation/de-energization activities.

Safe Shutdown field work activities include: isolation of process equipment; removal of excess equipment and materials, supplies, and combustibles; removal of residual materials from process equipment; and decontamination. Currently under Safe Shutdown, all buildings are being inventoried for residual material and excess equipment. Necessary documentation is being processed to characterize and identify proper disposition of these materials.

Removal Action No. 17, "Improved Storage of Soil and Debris," provides specific criteria for the improved management of soil and debris contamination and identifies options for its disposition including decontamination, offsite disposal, or storage in controlled stockpiles or an improved storage facility (FEMP 1993). For this CPID, Removal Action No. 17 applies to management of debris.

Removal Action No. 26, "Asbestos Abatement," provides procedures for identifying, isolating, removing/packaging, shipping, and disposing of wastes containing asbestos (FERMCO 1993). Based on recent evaluations of the Detrex Still, it has been

determined that the Still Tank and steam lines are covered with material containing asbestos. Removal Action No. 26 includes procedures that will be observed during Detrex Still disassembly and decontamination efforts to mitigate any potential asbestos hazards.

1.1.2.3 Financial and Liability Exemptions

The FEMP is a federally owned facility. According to OAC 3745-55-40 C, the Federal Government is exempt from financial requirements of OAC 3745-55-40 through OAC 3745-55-48. A similar exclusion from 40 CFR Part 264, Subpart H (Financial Requirements) is provided in 40 CFR § 264.140(c).

1.2 TOPOGRAPHIC MAP

A topographic map is not required for the Detrex Still HWMU, as it is entirely contained within Building 1A, and no releases to the environment from the HWMU are documented or are suspected.

1.3 OTHER FEMP HWMUS

There are a total of 53 HWMUs located on the FEMP, as shown on Figure 1-2 located at the end of this section. The closure of other HWMUs will be conducted in accordance with unit-specific schedules and documentation. Closure of the Detrex Still, as described in this CPID, will constitute partial closure of the FEMP facility.

1.4 HYDROGEOLOGIC INFORMATION

Hydrogeologic information is not required for the Detrex Still HWMU, as it is entirely contained within Building 1A, and no releases to the environment from the HWMU are documented or suspected.

1.5 TANK SYSTEM DESCRIPTION

The Detrex Still was operated as a solvent reclamation unit and the equipment occupies an area approximately 2 feet 8 inches wide by 6 feet 4 inches long by 7 feet 6 inches

high. The HWMU consists of the Still Tank, ancillary equipment, and underlying floor area. The Detrex Still HWMU and its ancillary equipment are itemized below:

1) Still Tank

2) Ancillary equipment
   - Solvent condenser
   - Connected piping and valves
   - Pump
   - Equipment structure supports

3) Floor area - approximately 2 feet 8 inches by 6 feet 4 inches.

A description of the HWMU, distillation process, and contaminants is presented in the following sections. The location of the Detrex Still within Building 1A is shown in Figures 1-3 and 1-4. Plates with photographs of the Detrex Still equipment are located in Appendix 1.

1.5.1 Still Tank

The Still Tank is made of steel and measures approximately 2 feet 8 inches wide by 4 feet high by 6 feet 4 inches long. The tank is supported by a steel frame that rests on the concrete floor. The tank is covered with an asbestos coating, which is held in place by a wire mesh. The Still Tank volume is estimated to be 100 gallons and while active, it could recycle approximately 180 gallons of chlorinated solvent per day. Distillation residues remain in the tank.

As described in the Detrex Still operating procedures, contained in Appendix 2 to this CPID, dirty solvents were pumped from various containers into the Still Tank. The solvents, used in degreasing and other operations, were believed to be contaminated with other organic compounds, metals, water, and radionuclides (Section 1.5.3). The Still Tank and contents were heated by steam lines (Building 1A steam supply), thereby causing the solvents (and any water) to volatilize. The solvent and water vapors were drawn off and condensed in the attached solvent condenser unit, while the less volatile contaminants and sludge remained in the Still Tank. The accumulated sludge was periodically pumped into drums and placed into storage.

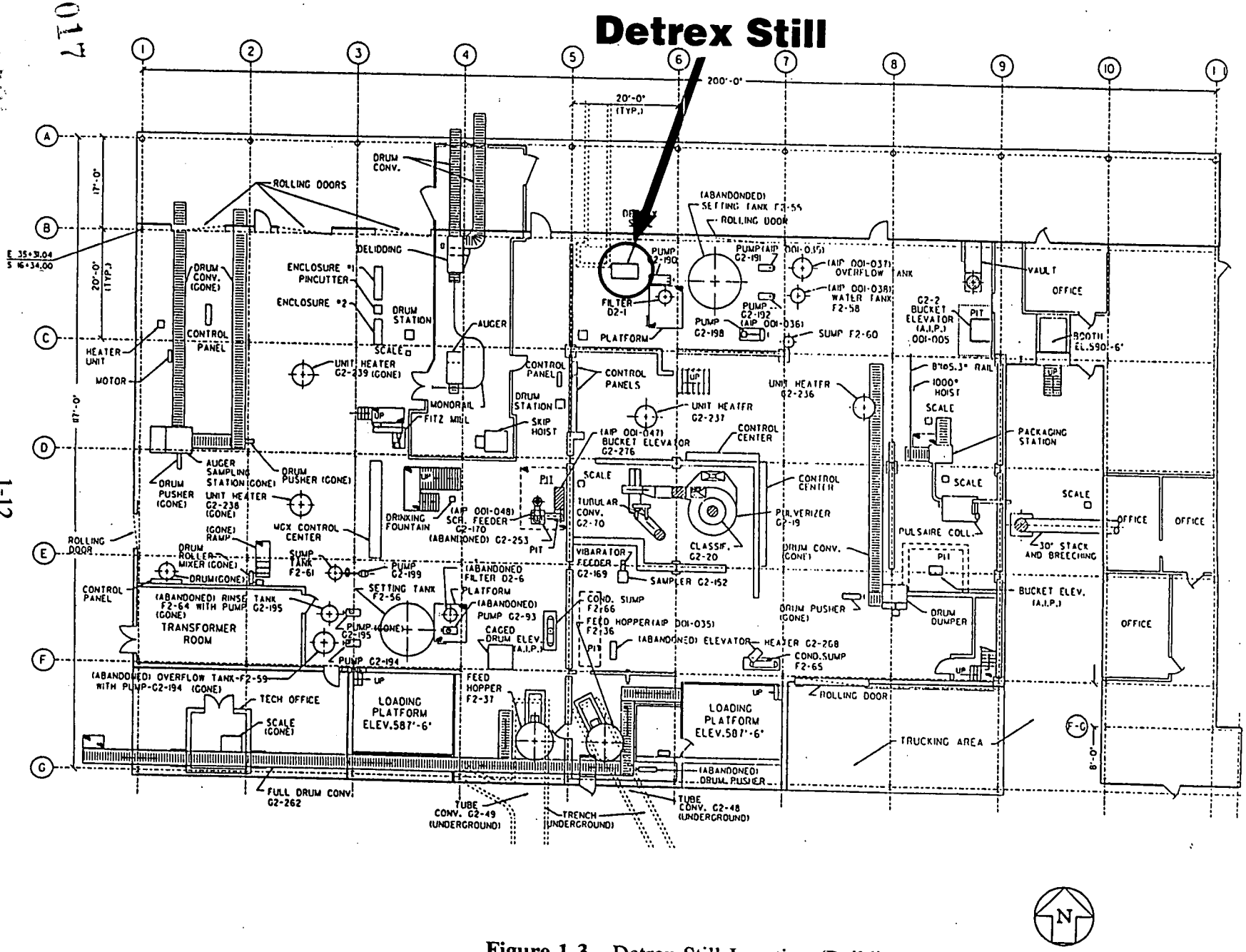

Figure 1-3. Detrex Still Location (Building 1A).

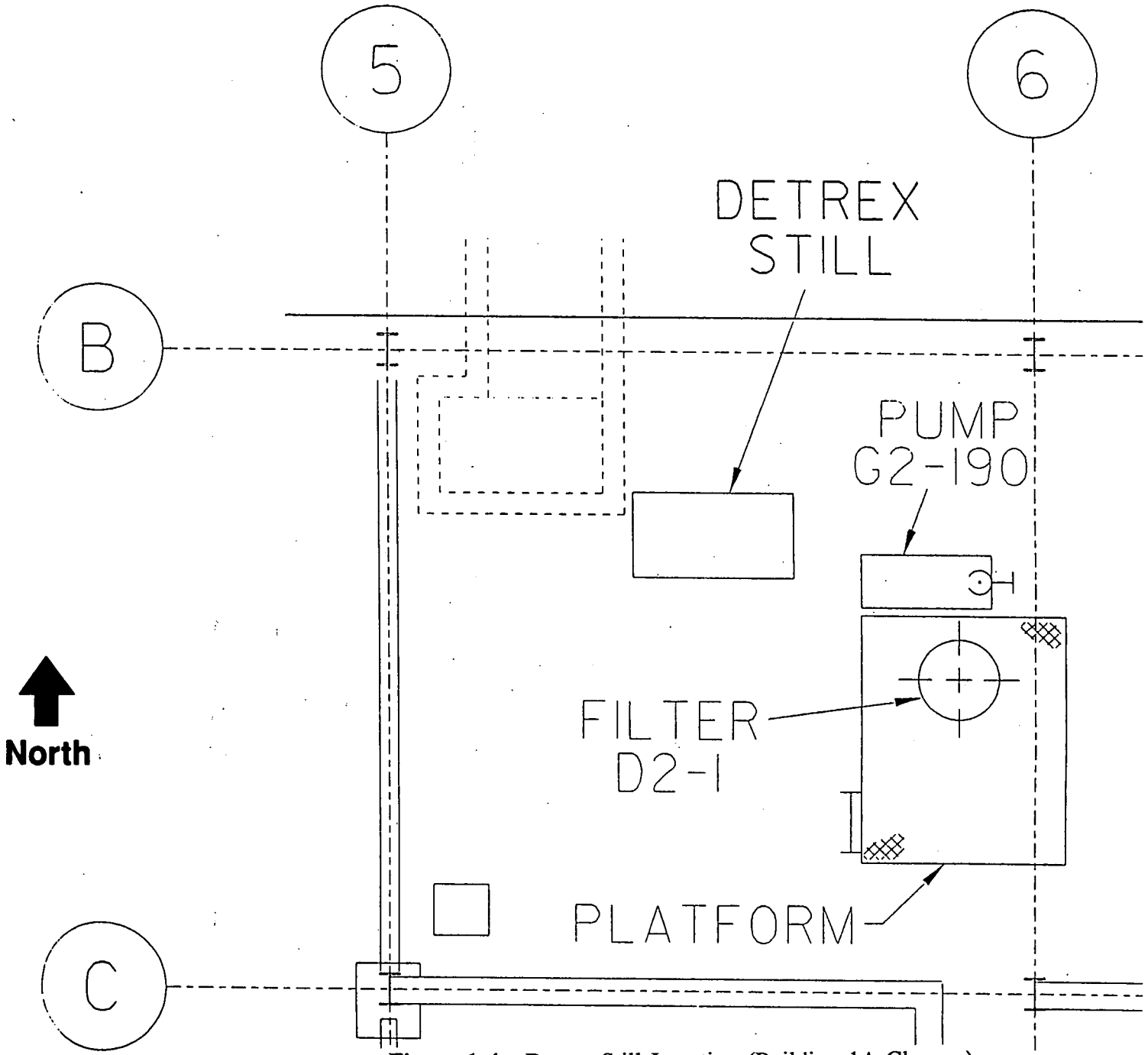

Figure 1-4. Detrex Still Location (Building 1A Closeup).

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1.5.2 Ancillary Equipment

1.5.2.1 Solvent Condenser

The solvent condenser unit is comprised of uninsulated steel, and is positioned within the steel frame above the Still Tank. The condenser measures approximately 1 foot in diameter by 6 feet long. The condenser was cooled by Building 1A cooling water, which caused the solvent and water vapors to condense. The solvent/water distillate gravity drained directly from the condenser into portable stainless steel holding tanks positioned near the still (the holding tanks are no longer present). Distillate collected in the holding tank was allowed to settle so that water had an opportunity to rise to the surface. The clean recovered solvents were then decanted (from the bottom of the holding tank) into product drums.

1.5.2.2 Piping and Valves

The Detrex Still ancillary equipment includes various connected piping and valves (steel and copper). The steam lines used for heating the Still Tank have been disconnected from the building steam supply. Sections of the steam lines appear to be wrapped with asbestos insulation. Inlet piping to the Still Tank for dirty solvents, and outlet piping from the condenser for recovered solvents, are still in place, as well as various control and shut-off valves.

1.5.2.3 Pump

The pump was used to transfer dirty solvents into the Still Tank and is located on the base of the unit. The pump has been electrically isolated, but remains connected to the still piping.

1.5.2.4 Equipment Structure Supports

The Detrex Still equipment is supported by a steel frame that rests on the concrete floor.

1.5.3 Wastes Managed

In 1984, recovered solvents and still bottoms (from the Detrex Still) were moved to the tank storage area west of the Pilot Plant and transferred into the above-ground tanks, identified as T5 and T6. In July 1989, the materials remaining in Tanks T5 and T6 were drummed and moved into RCRA storage in Building 79 and KC-2 warehouse as RCRA mixed waste materials.

Drummed waste material from Plant 1 coded as "Sludges - solvent - Trichlor, Perchlor, etc.," believed to be representative of Detrex Still residues, was sampled under FEMP Sample Plan No. 1038. The material in drum No. 1 was described in the sampling notebook as a black granular material. Logbook entries indicate that the material in drum No. 2 was in two phases, described as a "black sludge" and a "black liquid." Sampling and analysis was conducted in accordance with USEPA SW-846, *Test Methods for Evaluating Solid Wastes* (USEPA 1986). Analyses included:

- Toxicity Characteristic Leaching Procedure (TCLP) metals (solid phase),
- Total metals (liquid phase),
- TCLP volatile organic analyses (VOAs) (solid phase),
- Total VOAs (solid and liquid phases),
- Total uranium and %U-235,
- Flash point (liquid phase),
- Paint filter liquid test (PFLT).

According to sampling done under FEMP Sample Plan No. 1038. Waste from one of the sampled drums contained chromium at a concentration that exceeded the regulatory level of 5.0 parts per million (ppm); therefore, the waste was assigned the D007 characteristic hazardous waste code for chromium.

The flash point of the liquid from drum No. 2 was greater than 200°F; therefore, this waste stream is not considered ignitable under RCRA.

Tetrachloroethylene (also known as perchloroethylene) was detected in all 5 samples. Two out of three samples analyzed using the TCLP VOA revealed concentrations greater than the regulatory level for tetrachloroethylene; therefore, this waste stream was assigned the D039 hazardous waste code. One of these samples analyzed using the

TCLP VOA revealed a concentration greater than the regulatory level for trichloroethylene and was assigned the D040 hazardous waste code. The waste was also assigned the codes F001 and F002, as the trichloroethylene and tetrachloroethylene it contained were spent solvents. Acetone was found in a sample from drum No. 2. Although the waste did not exhibit the ignitability characteristic, it is designated as F003 hazardous waste.

Total uranium was detected in the solid, sludge, and liquid samples.

Historical documents and operational knowledge have indicated that the still may have reclaimed solvents laden with PCBs. Appendix 2, "Waste Characterization Data Summary," includes a letter dated February 11, 1981 that discusses reclamation of 1,1,1-trichloroethane from National Electric Coil of Louisville, Kentucky. The letter also states "Polychlorinated biphenyls are present in the still bottoms...." However, on October 20, 1993, a swipe sample and two duplicate samples were collected from the Detrex Still internal surfaces. Subsequent field analyses did not detect PCB concentrations for any of the samples above the minimum detectable concentration of 5 micrograms/100 cm^2 (Appendix 2). For this reason PCBs are not identified as a Detrex Still waste constituent.

Table 1-1 lists the Detrex Still waste constituents and their basis for selection.

1.6 OTHER ENVIRONMENTAL PERMITS

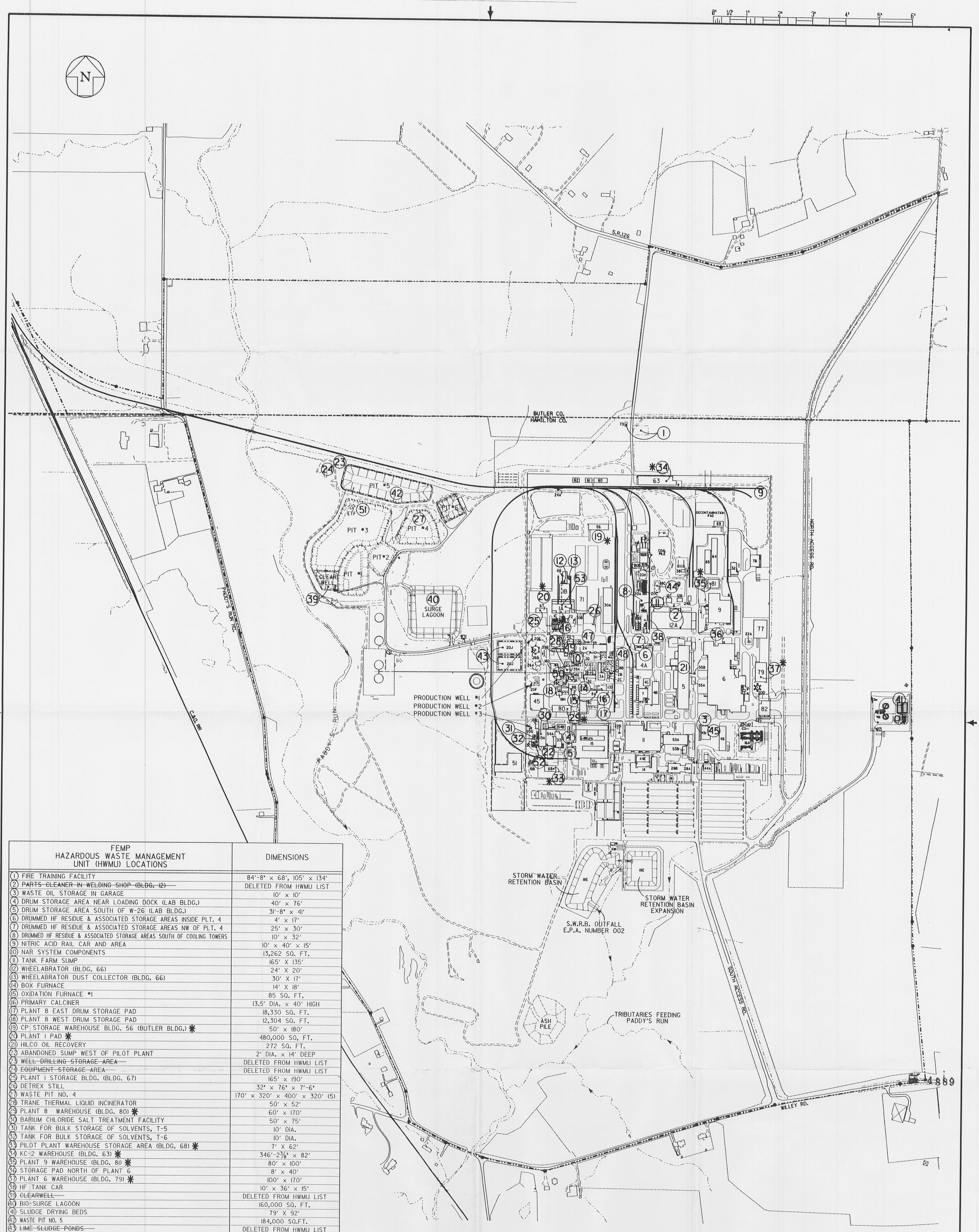
No other environmental permits, such as National Pollutant Discharge Elimination System (NPDES), or Clean Air Act (CAA), are anticipated for the closure of the Detrex Still HWMU.

1.7 ANTICIPATED WAIVERS OR EXEMPTIONS EXCEPT CLOSURE TIME

No waivers or exemptions are anticipated for the Detrex Still HWMU.

Table 1-1. Detrex Still Waste Constituents.

Hazardous Constituent	Basis
Acetone	Found in drummed waste material (Sample Plan 1038)
Chromium	Found in drummed waste material (Sample Plan 1038)
Tetrachloroethylene	Found in drummed waste material (Sample Plan 1038)
Trichloroethylene	Found in drummed waste material (Sample Plan 1038)
1,1,1-Trichloroethane	Process knowledge, operational history, historical documents



FEMP HAZARDOUS WASTE MANAGEMENT UNIT (HWMU) LOCATIONS	DIMENSIONS
(1) FIRE TRAINING FACILITY	84'-8" x 68', 105' x 134'
(2) ~~PARTS CLEANER IN WELDING SHOP (BLDG. 12)~~	DELETED FROM HWMU LIST
(3) WASTE OIL STORAGE IN GARAGE	10' x 10'
(4) DRUM STORAGE AREA NEAR LOADING DOCK (LAB BLDG.)	40' x 76'
(5) DRUM STORAGE AREA SOUTH OF W-26 (LAB BLDG.)	31'-8" x 41'
(6) DRUMMED HF RESIDUE & ASSOCIATED STORAGE AREAS INSIDE PLT. 4	4' x 17'
(7) DRUMMED HF RESIDUE & ASSOCIATED STORAGE AREAS NW OF PLT. 4	25' x 30'
(8) DRUMMED HF RESIDUE & ASSOCIATED STORAGE AREAS SOUTH OF COOLING TOWERS	10' x 32'
(9) NITRIC ACID RAIL CAR AND AREA	10' x 40' x 15'
(10) NAR SYSTEM COMPONENTS	13,262 SQ. FT.
(11) TANK FARM SUMP	165' X 135'
(12) WHEELABRATOR (BLDG. 66)	24' X 20'
(13) WHEELABRATOR DUST COLLECTOR (BLDG. 66)	30' X 17'
(14) BOX FURNACE	14' X 18'
(15) OXIDATION FURNACE #1	85 SQ. FT.
(16) PRIMARY CALCINER	13.5' DIA. x 40' HIGH
(17) PLANT 8 EAST DRUM STORAGE PAD	18,330 SQ. FT.
(18) PLANT 8 WEST DRUM STORAGE PAD	12,304 SQ. FT.
(19) CP STORAGE WAREHOUSE BLDG. 56 (BUTLER BLDG.) *	50' x 180'
(20) PLANT 1 PAD *	480,000 SQ, FT.
(21) HILCO OIL RECOVERY	272 SQ. FT.
(22) ABANDONED SUMP WEST OF PILOT PLANT	2' DIA. x 14' DEEP
(23) ~~WELL DRILLING STORAGE AREA~~	DELETED FROM HWMU LIST
(24) ~~EQUIPMENT STORAGE AREA~~	DELETED FROM HWMU LIST
(25) PLANT 1 STORAGE BLDG. (BLDG. 67)	165' x 190'
(26) DETREX STILL	32" x 76" x 7'-6"
(27) WASTE PIT NO. 4	170' x 320' x 400' x 320' (5)
(28) TRANE THERMAL LIQUID INCINERATOR	50' x 52'
(29) PLANT 8 WAREHOUSE (BLDG. 80) *	60' x 170'
(30) BARIUM CHLORIDE SALT TREATMENT FACILITY	50' x 75'
(31) TANK FOR BULK STORAGE OF SOLVENTS, T-5	10' DIA.
(32) TANK FOR BULK STORAGE OF SOLVENTS, T-6	10' DIA.
(33) PILOT PLANT WAREHOUSE STORAGE AREA (BLDG. 68) *	7' X 62'
(34) KC-2 WAREHOUSE (BLDG. 63) *	346'-2 3/8" x 82'
(35) PLANT 9 WAREHOUSE (BLDG. 81) *	80' x 100'
(36) STORAGE PAD NORTH OF PLANT 6	8' x 40'
(37) PLANT 6 WAREHOUSE (BLDG. 79) *	100' x 170'
(38) HF TANK CAR	10' x 36' x 15'
(39) ~~CLEARWELL~~	DELETED FROM HWMU LIST
(40) BIO-SURGE LAGOON	160,000 SQ. FT.
(41) SLUDGE DRYING BEDS	79' X 92'
(42) WASTE PIT NO. 5	184,000 SQ.FT.
(43) ~~LIME SLUDGE PONDS~~	DELETED FROM HWMU LIST
(44) ~~COAL PILE RUNOFF BASIN~~	DELETED FROM HWMU LIST
(45) UST #5	2'-6" DIA.
(46) URANYL NITRATE TANKS (NFS STORAGE AREA)	61'-7" x 53'-9"
(47) URANYL NITRATE TANKS (NORTH OF PLANT 2)	63'-6" x 40'-6"
(48) URANYL NITRATE TANKS (SOUTHEAST OF PLANT 2)	54'-7" x 45'-4"
(49) URANYL NITRATE TANKS (DIGESTION AREA)	127' x 20'
(50) URANYL NITRATE TANKS (RAFFINATE BLDG.)	14' x 50', 15' x 30'
(51) EXPERIMENTAL TREATMENT FACILITY (ETF)	20' x 48'
(52) NORTH & SOUTH SOLVENT TANKS (PILOT PLANT)	6'-6" DIA.
(53) SAFE GEOMETRY DIGESTION SUMP	8" DIA. x 12" DEEP

*-HWMU'S THE FEMP IS SEEKING TO PERMIT

NO.	REVISIONS	DATE	DWN. BY	APPD.	REF. DWG. NO.
3	REVISED PER RES #2283	10/1/93	S.J.S.	GEP	
2	ADDED HWMU NO.53	2/10/92	S.J.S.	GEP	
1	REVISED PER RES #1841	1/29/92	S.J.S.	GEP	

NOTE: FERMCO C.A.D. DRAWING NOT TO BE REVISED MANUALLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE
FRACTIONS ± 1/32
ANGLES ± 0° - 30'
DECIMALS
.X ± 0.1
.XX ± 0.03
.XXX ± 0.005
.XXXX ± 0.0010
ORIG. RELEASE DATE

APPROVALS

CIVIL & STR.		SAFETY ENG.	
ELECTRICAL		MAINTENANCE	
ENGINEER		O.A.	
INSTRUMENT		FIRE PROTECT.	
MECHANICAL		WASTE MANAGE	
		SECURITY	
		CRU	
CHECKED			
APPROVED			

FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION
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Fernald Environmental Management Project
U.S. DEPARTMENT OF ENERGY

SITE PLAN — RCRA PART A

FIGURE A-1
FACILITY LOCATION MAP
SCALE: 1" = 300'

RES #1626
DATE 5-24-91
DRAWN S.J.SMOCK

75X-5500-X-00171 — 3

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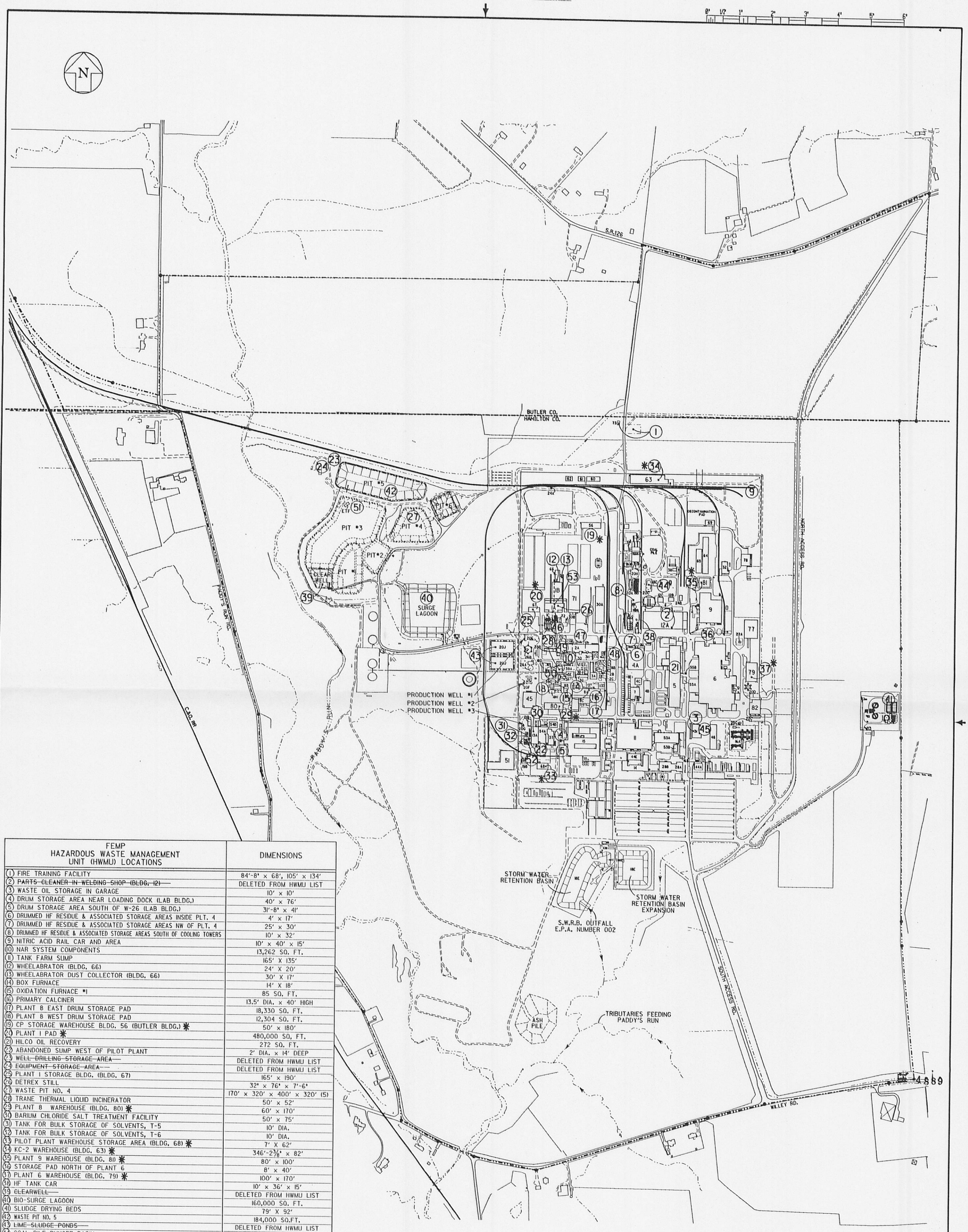
FILE NAME: 9IRCRA/75XX00171.DGN 109947_1



FEMP HAZARDOUS WASTE MANAGEMENT UNIT (HWMU) LOCATIONS	DIMENSIONS
(1) FIRE TRAINING FACILITY	84'-8" x 68', 105' x 134'
(2) ~~PARTS CLEANER IN WELDING SHOP (BLDG. 12)~~	DELETED FROM HWMU LIST
(3) WASTE OIL STORAGE IN GARAGE	10' x 10'
(4) DRUM STORAGE AREA NEAR LOADING DOCK (LAB BLDG.)	40' x 76'
(5) DRUM STORAGE AREA SOUTH OF W-26 (LAB BLDG.)	31'-8" x 41'
(6) DRUMMED HF RESIDUE & ASSOCIATED STORAGE AREAS INSIDE PLT. 4	4' x 17'
(7) DRUMMED HF RESIDUE & ASSOCIATED STORAGE AREAS NW OF PLT. 4	25' x 30'
(8) DRUMMED HF RESIDUE & ASSOCIATED STORAGE AREAS SOUTH OF COOLING TOWERS	10' x 32'
(9) NITRIC ACID RAIL CAR AND AREA	10' x 40' x 15'
(10) NAR SYSTEM COMPONENTS	13,262 SQ. FT.
(11) TANK FARM SUMP	165' X 135'
(12) WHEELABRATOR (BLDG. 66)	24' X 20'
(13) WHEELABRATOR DUST COLLECTOR (BLDG. 66)	30' X 17'
(14) BOX FURNACE	14' X 18'
(15) OXIDATION FURNACE #1	85 SQ. FT.
(16) PRIMARY CALCINER	13.5' DIA. x 40' HIGH
(17) PLANT 8 EAST DRUM STORAGE PAD	18,330 SQ. FT.
(18) PLANT 8 WEST DRUM STORAGE PAD	12,304 SQ. FT.
(19) CP STORAGE WAREHOUSE BLDG. 56 (BUTLER BLDG.) *	50' x 180'
(20) PLANT 1 PAD *	480,000 SQ. FT.
(21) HILCO OIL RECOVERY	272 SQ. FT.
(22) ABANDONED SUMP WEST OF PILOT PLANT	2' DIA. x 14' DEEP
(23) ~~WELL DRILLING STORAGE AREA~~	DELETED FROM HWMU LIST
(24) ~~EQUIPMENT STORAGE AREA~~	DELETED FROM HWMU LIST
(25) PLANT 1 STORAGE BLDG. (BLDG. 67)	165' x 190'
(26) DETREX STILL	32" x 76" x 7'-6"
(27) WASTE PIT NO. 4	170' x 320' x 400' x 320' (5)
(28) TRANE THERMAL LIQUID INCINERATOR	50' x 52'
(29) PLANT 8 WAREHOUSE (BLDG. 80) *	60' x 170'
(30) BARIUM CHLORIDE SALT TREATMENT FACILITY	50' x 75'
(31) TANK FOR BULK STORAGE OF SOLVENTS, T-5	10' DIA.
(32) TANK FOR BULK STORAGE OF SOLVENTS, T-6	10' DIA.
(33) PILOT PLANT WAREHOUSE STORAGE AREA (BLDG. 68) *	7' X 62'
(34) KC-2 WAREHOUSE (BLDG. 63) *	346'-2 3/8" x 82'
(35) PLANT 9 WAREHOUSE (BLDG. 81) *	80' x 100'
(36) STORAGE PAD NORTH OF PLANT 6	8' x 40'
(37) PLANT 6 WAREHOUSE (BLDG. 79) *	100' x 170'
(38) HF TANK CAR	10' x 36' x 15'
(39) ~~CLEARWELL~~	DELETED FROM HWMU LIST
(40) BIO-SURGE LAGOON	160,000 SQ. FT.
(41) SLUDGE DRYING BEDS	79' X 92'
(42) WASTE PIT NO. 5	184,000 SQ.FT.
(43) ~~LIME SLUDGE PONDS~~	DELETED FROM HWMU LIST
(44) ~~COAL PILE RUNOFF BASIN~~	DELETED FROM HWMU LIST
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*-HWMU'S THE FEMP IS SEEKING TO PERMIT

NO.	REVISIONS	DATE	DWN. BY	APPD.	REF. DWG. NO.
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.XX ± 0.03
.XXX ± 0.005
.XXXX ± 0.0050
ORIG. RELEASE DATE

APPROVALS

CIVIL & STR.			SAFETY ENG.		
ELECTRICAL			MAINTENANCE		
ENGINEER			Q.A.		
INSTRUMENT			FIRE PROTECT.		
MECHANICAL			WASTE MANAGE		
			SECURITY		
			CRU		
CHECKED					
APPROVED					

FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION
FERMCO
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Environmental Management Project
U.S. DEPARTMENT OF ENERGY

SITE PLAN — RCRA PART A

FIGURE A-1
FACILITY LOCATION MAP
SCALE: 1" = 300'

RES #1626
DATE 5-24-91
DRAWN S.J.SMOCK

75X-5500-X-00171 | 3

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FILE NAME:

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2.0 CLOSURE PROCEDURES

The objective of the FEMP is to close the Detrex Still in accordance with applicable RCRA clean closure regulations. The RCRA closure will be managed and implemented in conjunction with existing CERCLA removal and remedial actions. These CERCLA actions are required by the Amended Consent Agreement (USEPA 1991). The specific CERCLA actions, as summarized in Section 1.1.2.2, are:

- Removal Action No. 12, "Safe Shutdown"
- OU3 Final ROD
- Removal Action No. 9, "Removal of Waste Inventories"
- Removal Action No. 17, "Improved Storage of Soil and Debris"
- Removal Action No. 26, "Asbestos Abatement."

The Detrex Still closure actions will accomplish the clean closure performance standards prescribed by OAC 3745-55-11 (40 CFR § 264.111) by identifying, isolating, and removing any hazardous wastes present in the Detrex Still that might pose risks to human health or the environment. Therefore, the closure will accomplish the specific objectives described below.

- The clean closure will eliminate the need for post-closure maintenance associated with the Detrex Still by decontaminating and removing equipment and decontaminating the concrete floor by surface layer removal (scabbling).
- To the extent necessary to protect human health and the environment, the closure will control, minimize, or eliminate the escape of hazardous waste, hazardous waste constituents, contaminated rainfall, or waste decomposition products to the ground, to surface waters, or to the atmosphere. To accomplish this objective, material and equipment that cannot be decontaminated to satisfy the clean-up levels specified in Section 4.1 will be containerized and managed as mixed wastes as described in Section 2.2.3.

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- The closure will comply with the unit-specific closure requirements of OAC 3745-55-97 (40 CFR § 264.197) for tanks.

2.1 MAXIMUM QUANTITY OF INVENTORY TO BE REMOVED

The Detrex Still Tank and connected piping and valves are potentially contaminated on their internal and external surfaces with solvent and distillation residues. In addition, the Still Tank contains a small amount of solid distillation residues. However, there are no pumpable wastes or contaminated containment liquids in the still tank or piping and valves since the equipment was drained when the Detrex Still was shut down. Based on the horizontal dimensions of the Still Tank (2 feet 8 inches wide by 6 feet 4 inches long) and a conservatively estimated residue depth of 2 inches (visual observations). The Still Tank is estimated to contain approximately 2.8 ft^3 of distillation residues that will be removed during closure.

2.2 PROCEDURES FOR WASTE MANAGEMENT

Conducting the various actions necessary to close the Detrex Still will generate volumes of both clean and contaminated materials. Sampling, analysis, and characterization efforts described in Appendix 3 will classify these materials as clean (i.e., free of significant radioactive and hazardous contamination), hazardous, Toxic Substance Control Act (TSCA)-regulated, radioactive, or mixed wastes. Table 2-1 lists specific waste streams along with a preliminary classification, primary minimization technique, and management alternative for each. The information in Table 2-1 is preliminary, based on process knowledge, and anticipates results of decontamination efforts as discussed in Section 2.3.

Sections 2.2.1 through 2.2.3 expand on the terms used in Table 2-1 by describing measures that will be taken to manage these wastes effectively while satisfying applicable health, safety, and environmental regulations. Specifically, Section 2.2.1 describes the sequence of actions that will lead to individual waste characterizations. Section 2.2.2 discusses the FEMP programs designed to avoid the generation of additional wastes, and how they will be applied to Detrex Still closure wastes. Section 2.2.3 presents details associated with managing various types of waste, and describes alternatives currently available for management of FEMP wastes, including Detrex Still wastes.

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Table 2-1. Selected Wastes Anticipated from Detrex Still Closure.

Waste	Preliminary Classification	Minimization Technique	Management Alternatives[1/,2/]
Asbestos pipe insulation	TSCA	Segregate	Asbestos (TSCA)
Non-contact steam pipe	Clean	Size Reduce	Scrap/Landfill
Still Tank, including asbestos insulation	Mixed/TSCA	Segregate	Store/TSD
Tank distillation residues	Mixed	Segregate	Store/TSD
Decontaminated solvent condenser	Clean	Size Reduce	Scrap
Contaminated pump, valves, and piping	Mixed	Segregate	Store/TSD
Contaminated instruments	Mixed	Segregate	Store/TSD
Decontaminated structure supports	Clean	Size Reduce	Scrap
Contaminated concrete	Mixed	Segregate	Store/TSD
Decontamination wash water	Mixed	Segregate	Store/TSD
Decontamination flush water	Mixed	Segregate	Store/TSD
Personnel protective equipment	Mixed	Segregate	Store/TSD
Decontamination containment materials	Mixed	Recycle	Store/TSD
Decontaminated sampling equipment	Clean	Reuse	Scrap/Landfill

1/ All RCRA hazardous wastes are subject to Land Disposal Restriction treatment standards prior to disposal.

2/ Currently available management alternatives for Detrex Still wastes are as follows: Clean materials will be stored as scrap or shipped to a solid waste landfill. TSCA-regulated waste (asbestos), and low-level wastes will be stored on-site or shipped to the Nevada Test Site. Mixed wastes will be stored on-site pending development of treatment and/or disposal alternatives.

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2.2.1 Waste Characterization

The Sampling and Analysis Plan (SAP), included as Appendix 3, describes sampling procedures that, when implemented, will provide representative samples for each waste stream anticipated as a result of actions initiated during closure of the Detrex Still. Depending on which criteria a given waste stream satisfies, it will be characterized as clean (or decontaminated), hazardous, TSCA-regulated, radioactive, or mixed waste. Prior to characterization, these wastes will be treated as mixed wastes.

2.2.2 Waste Minimization

The primary purpose of the FEMP waste minimization program is to avoid generating any unnecessary, additional contaminated materials or wastes. The FEMP considers it essential to minimize the volume of any contaminated wastes. Specific actions designed to minimize additional wastes will include: isolating or removing noncontaminated equipment or materials; limiting additional liquids or other materials introduced during decontamination and demolition; and covering noncontaminated or decontaminated equipment or facilities to prevent spread of contamination through spills or releases.

Each individual employee at the FEMP is charged with a responsibility for minimizing wastes. The principal responsibility for implementing and enforcing measures to minimize wastes associated with closing the Detrex Still will reside with the Closure Site Supervisors and Health and Safety Officers. In addition, the Site Supervisors will be responsible for training site personnel in project-specific waste minimization practices.

2.2.2.1 Clean Materials

Miscellaneous Process Equipment - Larger pieces of clean or decontaminated equipment will be cut into smaller pieces as required, and disposed as scrap. This will encompass the equipment structure supports and solvent condenser.

2.2.2.2 Contaminated Materials

Contaminated Equipment - The Still Tank will be dismantled and placed on a prepared laydown area, where it will be sealed and placed in a storage/disposal container. The Still Tank will not be decontaminated, other than removal of distillation residues, and will be managed as mixed waste, also subject to TSCA regulations based on the presence of asbestos in the Still Tank insulation.

Miscellaneous Process Equipment and Facilities - Applying the observational approach, in cases where it is judged that decontamination activities will not be successful or will create large waste volumes in proportion to the size of the item (i.e., pump, piping, and valves), those items will bypass the normal decontamination process and be containerized and managed according to their waste characterizations. Mixed, hazardous, and low-level wastes will be segregated prior to and during shipment to onsite storage or to offsite TSD facilities.

2.2.2.3 Decontamination Wastes

Liquids - The amount of liquid waste generated by washing and flushing to decontaminate equipment will depend, primarily, on the number of wash cycles required to achieve clean surfaces. To minimize these liquid wastes, decontamination procedures will limit the number of cycles to a maximum of three. If an item is not decontaminated after three cycles, it will be containerized and managed as contaminated material. Or, if appropriate, decontamination will continue until a clean surface is reached.

Detergent solution will be recycled and reused until its cleaning power is diminished to the point that it is no longer effective. The decontamination process will generate moderate quantities of waste water. Recycling and reusing wash water will effect an overall reduction in waste volume.

Sampling Wastes - Sampling wastes will be minimized by two methods: proper sampling techniques, and sample waste screening and segregation. Sample procedures, as described in the SAP (Attachment 3), will minimize the number of samples required, as well as the potential for resampling. Residual sample materials will be returned to the originally sampled container.

Protective Clothing - Use, handling, storage, and disposal of contaminated protective clothing are routine functions at the FEMP and are addressed in existing SOPs (FMPC-0516, FMPC-2128, RM-0009I, FMPC-2151). Protective clothing will be divided into two categories: disposable and reusable. Paper coveralls and surgeon's gloves are examples of disposable protective clothing. Boots and respirators are examples of clothing that can be decontaminated and reused. Methods that will be used to reduce this volume include: identifying zones of increasing levels of protective clothing; covering and sealing contaminated equipment and facilities that could spread contamination to surrounding areas; employing dust reduction methods when excavating to reduce the level of respiratory protection; and minimizing personnel entry into contaminated areas.

2.2.3 Onsite Waste Management/Storage

Personnel will accumulate and containerize wastes as necessary during the closure action, to segregate and prevent cross contamination. They will sample these wastes according to procedures included in Appendix 3. Where appropriate, FEMP Transportation staff will transfer wastes from the vicinity of the Detrex Still directly into RCRA-permitted storage areas or 90-day storage areas, where containers will be held pending analytical results and characterization.

Recognizing the dual nature of mixed wastes, the FEMP stores mixed wastes according to RCRA and AEA regulations and meets DOT container and labeling requirements, through DOE orders concerning low-level radioactive waste. Mixed wastes generated in conjunction with closing the Detrex Still will be stored onsite pending the availability of acceptable treatment and/or disposal facilities for mixed waste.

2.2.3.1 Clean Materials

Miscellaneous Process Equipment - Clean or decontaminated equipment will be isolated from recontamination and transported to a clean, excess material laydown area to await final disposition as scrap. Clean materials that cannot be disposed as scrap will be packaged and shipped to a solid waste landfill. Clean materials are anticipated to consist of the steam piping (after removal of asbestos insulation), and (following decontamination) the structure supports, and solvent condenser.

2.2.3.2 Contaminated Materials

Mixed Wastes - Wastes containing a mixture of hazardous and radioactive constituents will be classified as mixed wastes. Currently, there are no offsite storage or treatment facilities available to accept mixed waste from the FEMP. Therefore, these wastes will be packaged, labeled, and stored onsite pending development and implementation of onsite treatment technology. Mixed wastes will consist of the pump, piping, valves, scabbled concrete, distillation residues, and any equipment items that cannot be decontaminated. The Still Tank will be managed as a mixed waste that is also TSCA regulated as a result of its asbestos insulation.

TSCA-Regulated Wastes - The pipe insulation containing asbestos is a TSCA-regulated waste. The insulation removed from the non-contact steam piping will be properly packaged, labeled, and shipped offsite to approved TSCA disposal facilities.

2.2.3.3 Liquid Decontamination Wastes

Washing associated with decontaminating Detrex Still equipment is expected to generate approximately 100 gallons of aqueous liquid wastes. These wastes will be managed as mixed wastes pending characterization. These liquid wastes will be sampled as described in Appendix 3, accumulated in drums and, if necessary, moved to storage in a FEMP RCRA storage area, or 90-day holding area, to await characterization based on analytical results. The drums will be labeled based on this characterization and will be stored onsite in an approved location.

2.2.3.4 Solid Decontamination Wastes

Secondary solid wastes generated during the course of decontamination operations include soiled protective clothing and materials used for temporary containment. The disposal of contaminated protective clothing is a routine function of FEMP addressed in the existing SOPs (FMPC-0515, FMPC-2128, RM-00091, FMPC-2152). Protective clothing is divided into two categories: disposable and reusable. Examples of disposable protective clothing are paper coveralls and surgeon's gloves. Examples of clothing that can be decontaminated and reused are cotton overalls, splash aprons, respirators and butyl nitrate gloves. For the purposes of this plan, all re-usable protective clothing used in the identified radiologically controlled area are considered

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radioactively contaminated until cleaned and surveyed for re-use. All disposable protective clothing used in the identified radiologically controlled area are considered radioactively contaminated and will be disposed of as such.

2.3 PROCEDURES FOR DECONTAMINATION/DISPOSAL

The FEMP will implement an array of specific procedures to achieve RCRA closure of the Detrex Still. As indicated in the description above, these procedures will be implemented in conjunction with existing CERCLA actions. Sections 2.3.1 and 2.3.2 describe how these CERCLA actions will be applied in closing the Detrex Still. Table 2-2 indicates major closure activities. The SAP, Appendix 3, provides detailed descriptions of the sampling and analytical techniques for characterization of Detrex Still wastes.

The ongoing Safe Shutdown program, officially termed CERCLA Removal Action No. 12, is designed to verify or take removal actions to ensure that FEMP process systems and ancillary facilities are in safe, stable conditions in terms of chemical, radiological, and physical hazards (WEMCO 1991). Orderly completion of Safe Shutdown will ensure that, while awaiting final disposition, the equipment and ancillary facilities pose no significant risk to human health and the environment.

Safe Shutdown field activities include:

- Isolation of process equipment
- Removal of excess equipment and materials
- Removal of residual materials from process equipment
- Decontamination.

During the isolation of process equipment removal activities, it will be necessary to identify, isolate, remove, and segregate wastes containing asbestos. Based on sampling of the Detrex Still equipment, the Still Tank and steam lines are covered with material containing asbestos. Removal Action No. 26, "Asbestos Abatement" procedures will be followed during the Detrex Still disassembly and decontamination efforts to mitigate any potential asbestos hazards. These procedures include identifying, isolating, removal/packaging, shipping, and disposing of wastes containing asbestos.

Table 2-2. Sequence of Actions Required for Closure of the Detrex Still.

Equipment Item	Actions
Still Tank	• Disassemble and remove • Manage contaminated materials - Remove and package Still Tank
Solvent Condenser	• Decontaminate • Dismantle and remove • Manage contaminated materials - Remove, compact, and package attached valves, and instruments • Manage decontamination wastes • Size reduce and manage clean materials
Equipment Structural Supports	• Dismantle • Decontaminate • Manage clean materials • Mange decontamination wastes
Piping	• Remove external insulation from steam piping • Dismantle and remove • Manage clean materials • Manage contaminated materials - Remove, compact, and package external insulation, connecting piping, valves, and instrumentation
Pump, valves (and any piping not suitable for decontamination - e.g., rusty)	• Manage contaminated materials - Remove, compact and package pump, valves, and any piping
Concrete Floor	• Decontaminate (scabble) • Manage decontamination wastes - Sample and package concrete rubble

The small amount (approximately 2.8 ft^3) of distillation residues remaining in the Detrex Still Tank will be removed. During operation, the solvent condenser drained liquids directly into a separate holding tank, so this unit never held liquids, thus it is not a "tank" and does not contain any residue. Piping and valves include connecting piping, solvent inlet/outlet piping, and steam lines. It is assumed the steam lines from the building did not contact solvent streams and, therefore, do not contain hazardous waste residues. The distillation residues will be removed from the tank, collected in appropriate containers, and managed as mixed waste pending characterization and disposition as described in Section 2.2. Samples of the residues will be collected according to the SAP in Appendix 3.

Following the removal of residual materials, closure personnel will decontaminate the following equipment/structures:

- Solvent condenser
- Equipment structural supports
- Concrete floor.

Decontamination will be conducted using the hazardous debris alternative treatment standards (contained in the Land Disposal Restrictions under 40 CFR 268.45-Table 1), as appropriate. These treatment standards detail specific chemical and physical methods for removal of hazardous wastes from debris (e.g., metal and concrete surfaces). The method used depends on the type of surface (e.g., porous or non-porous) and whether the surfaces can be visually inspected to ascertain a clean debris surface.

For non-porous surfaces amenable to visual inspection, the condenser and equipment structural supports, the appropriate decontamination method from 268.45-Table 1 is the Physical Extraction - High Pressure Steam and Water Sprays. For those non-porous surfaces where visual inspection would not be appropriate (internal surfaces of small diameter piping), and for those non-porous surfaces where flushing is not appropriate because of limited access to interior surfaces (pump and valves), the equipment items will be considered and managed as mixed waste.

For porous surfaces (concrete floor), the appropriate decontamination method from 268.45-Table 1 is Physical Extraction - Scarification, Grinding, and Planing which will remove at least 0.6 cm of the surface layer.

The equipment structural supports will be decontaminated using high pressure steam and water sprays until a visual inspection confirms a "clean debris surface" is obtained, in accordance with the OEPA Interim Final Closure Review Guidance (September 1, 1993) and 40 CFR § 268.45-Table 1, Footnote No. 3. Debris surfaces are considered "clean" when the surface, viewed without magnification, is free of all visible hazardous waste except that residual staining from waste consisting of light shadows, slight streaks, or minor discolorations, and waste in cracks, crevices, and pits may be present provided that such staining and waste in cracks, crevices and pits is limited to no more than 5% of each square inch of surface area.

The condenser will be decontaminated using the same high pressure steam and water spray described above for the equipment structural supports. Following decontamination and determination of a "clean debris surface" (as described above), the condenser will be dismantled and removed. The equipment items will be handled and managed as clean or contaminated materials. During disassembly, valves or instruments on the condenser will be removed, compacted, and managed as mixed waste. The condenser will then be demolished, and managed appropriately, in accordance with Section 2.2.2.1.

Spill prevention and control measures will be employed during all decontamination operations, in accordance with the FEMP SOPs. Work areas will be prepared by placing impermeable liners and/or diking to contain spills. Catch pans or basins will be placed beneath the equipment at points where there is potential for liquids to drain, once disconnected. Personnel will disconnect the equipment from existing piping, tubing, structural supports, instrumentation, ancillary equipment, and electrical connections. If appropriate, the resulting openings will be sealed. Liquids collected in catch pans and all other demolition waste created by the dismantling activities will be managed according to the procedures described in Section 2.2 for mixed wastes pending characterization and final disposition. Personnel will apply standard industry procedures selected according to the type of equipment as well as the historical use based on process knowledge.

Personnel may require access to internal surfaces of equipment to remove waste inventories and residues and to facilitate decontamination. Workers may have to cut through the walls of the Still Tank. Asbestos abatement controls specified by Removal Action No. 26, Asbestos Abatement, will be applied. Workers will seal these access

openings to prevent spread of contamination while the equipment awaits final disposition.

The Detrex Still Tank will be disassembled and removed to prevent the spread of contamination. Distillation residues (approximately 2.8 ft^3) will be sampled and removed after disassembly. However, the asbestos insulation on the outside of the Still Tank will not be removed. The equipment items will be handled and managed as contaminated material. The Still Tank then will be packaged and managed as described in Section 2.2.2.2.

The pump, valves, and piping are not amenable to decontamination, and will be considered contaminated materials. These items will be compacted, appropriately containerized and managed as described in Section 2.2.

Consistent with the Physical Extraction technologies specified in 40 CFR § 268.45-Table 1, the concrete floor within the HWMU boundaries (and any contiguous staining on the concrete floor which extends outward beyond the HWMU boundaries) will be decontaminated using a concrete impact scabbling device to remove at least 0.6 cm of the surface layer. Treatment will continue until a "clean debris surface" has been obtained, by visual inspection (see OEPA September 1993 Interim Final Closure Review Guidance page 26 and Footnote No. 3 in 40 CFR § 268.45-Table 1). The "clean debris surface" criteria are the same as those already discussed. The scabbled concrete debris will be sampled, appropriately containerized, and managed according to Section 2.2 procedures. The scabbling equipment is equipped with a high efficiency particulate (HEPA) vacuum system to collect and control airborne particulates during concrete scabbling operations.

All equipment found to be free from hazardous contamination will be managed as non-RCRA, processed through a radiological decontamination area, if necessary, and then added to the scrap inventory for recycle. Disposal will be conducted in accordance with the procedures in Section 2.2. Equipment and materials that cannot be fully decontaminated will then be containerized and managed as mixed waste according to procedures described in Section 2.2.

Decontamination will generate materials including construction debris (such as temporary diking and splash shielding), wash water, flush water, nonhazardous solvents, and wipes used to wipe down and remove visible residues and sludges from equipment and facilities. All decontamination materials will be collected and managed according to procedures described in Section 2.2. At this point in the Detrex Still closure, all hazardous materials and contaminated equipment will have been removed from the Detrex Still HWMU, and the closure field activities will be complete.

2.4 DESCRIPTION OF SECURITY SYSTEMS

The boundary of the Detrex Still has been marked and identification signs have been posted. Access to the HWMU is restricted by chains.

As with all DOE facilities, plant security at the FEMP is strict. The entire FEMP processing area, which includes Building 1A and the Detrex Still area, is surrounded by chain link fencing and monitored 24 hours a day by onsite security personnel. All employees and visitors enter through one of several guarded entrances into the facility.

3.0 CLOSURE SCHEDULE

3.1 EXPECTED YEAR OF CLOSURE

Closure of the Detrex Still HWMU will be performed in accordance with RCRA closure regulations and in conjunction with the series of CERCLA actions described in Section 2.0. Clean closure of the Detrex Still HWMU is anticipated to be complete in calendar year 1994.

3.2 FREQUENCY OF PARTIAL CLOSURE

This CPID for the Detrex Still is submitted in accordance with the 1993 SACD and RCRA compliance schedule and demonstrates compliance with requirements for RCRA closure. It is for closure of the Detrex Still HWMU and constitutes only a partial closure of the FEMP facility.

3.3 MILESTONE CHART

Following approval by OEPA, the FEMP will 1) identify specific closure action personnel, 2) prepare FEMP Site work package documentation (HASP, hazardous and radiological work permits), and 3) conduct training in accordance with the work package documentation. Following the selection of the removal organization, all closure site preparations will be completed.

A 6-month period from the time of OEPA approval has been identified for completion of this action. Activities that will occur during this 6-month period include removing, sampling, and containerizing distillation residues contained in the Still Tank; decontamination of equipment; scabbling the concrete floor; and transporting wastes to approved storage locations.

Consistent with the requirements of OAC 3745-55-15 and 40 CFR § 264.115, a 60-day time period is scheduled following completion of the closure for preparation of the final report and certification. The report shall include the analytical results from all sampling activities. Table 3-1 summarizes the Detrex Still closure schedule.

Table 3-1. Milestones for the Action Schedule.

Milestone	Activity Duration (months)	Cumulative Duration (months)[1/]
CPID Approval	Start	0
Complete Closure Actions: Remove Residues; Decontaminate Equipment; Scabble Concrete Floor; Place Wastes in Storage	6	6
Final Report	2	8

[1/] Number of months from approval of the CPID.

During the closure performance schedule, personnel will continue to inspect equipment and facilities at the Detrex Still and conduct all activities prescribed by the existing FEMP Spill Prevention, Control, and Countermeasures Plan. As documentation for the CERCLA actions is developed (e.g., work plans, evaluations of sampling and analytical data, etc.), the FEMP will provide the OEPA with copies of the documents for review and comment. In addition, standard procedures for RCRA closures require that the FEMP field supervisors contact both the independent, registered, professional engineer(s) and OEPA's facility inspector(s) at least 5 business days prior to any significant activity.

4.0 CLEANUP LEVEL DETERMINATION/CLOSURE CERTIFICATION

The following sections describe activities to be conducted, appropriate analyses to be performed, the criteria for evaluating adequacy, the schedule of inspections, and the types of documentation needed for proper RCRA closure of the Detrex Still HWMU.

4.1 RCRA CLOSURE STANDARDS

The Detrex Still Tank, pump, valves, and piping will not be decontaminated, but will be removed and stored in a hazardous waste storage area.

Decontamination of the solvent condenser, structure supports, and concrete floor, to meet RCRA closure standards will be conducted using the hazardous debris alternative treatment standards (contained in Land Disposal Restrictions under 40 CFR 268.45 and Table 1). The underlying concrete floor will be scabbled and considered decontaminated when a "clean debris surface" is reached and 0.6 cm is removed. The equipment structure supports and solvent condenser will be cleaned by high pressure steam and water spray until a "clean debris surface" is achieved. Debris surfaces are considered "clean" when the surface, viewed without magnification, is free of all visible hazardous waste except that residual staining from waste consisting of light shadows, slight streaks, or minor discolorations, and waste in cracks, crevices, and pits may be present provided that such staining and waste in cracks, crevices and pits is limited to no more than 5% of each square inch of surface area.

4.2 CERTIFICATION INSPECTIONS

Certification inspections will be conducted by a qualified, independent registered professional engineer licensed in Ohio or his/her designated representatives to ensure that the actions performed to achieve closure are conducted consistent with the discussions in this CPID. Representatives of DOE and Fernald Environmental Restoration Management Corporation (FERMCO) will also conduct inspections during the performance of response actions. The major emphasis of the closure inspection will be:

- To ensure that the equipment from the Detrex Still HWMU including the solvent condenser, structure supports, and underlying concrete floor are properly cleaned and decontaminated

- To ensure that all wastes resulting from this closure action are properly stored, labeled and characterized.

4.3 CERTIFICATION DOCUMENTS

Actions taken in accordance with the approved CPID for HWMUs must be certified by both the owner or operator and a qualified, independent registered professional engineer licensed in Ohio. The FEMP has agreed to provide this certification. The certification provided by the FEMP will include the following:

- Certification Statement (see Section 4.4)

- Approved plan or reference to this plan

- Description of volume of waste removed

- All correspondence regarding closure activity after OEPA approval

- Details of sampling and analysis methods (including copies of shipping records, and chain of custody forms used for sample handling and tracking)

- Copies of laboratory analyses reports

- Narrative describing all activities during closure (this narrative may be presented in the form of a daily log of activities or field notes recorded by the owner or operator)

- Signatures of the qualified, independent registered professional engineer and the owner or operator.

4.4 STATEMENT OF CERTIFICATION

The FEMP will submit a Certification of RCRA Closure within 60 days after the Detrex Still closure is complete. Completion of closure for the Detrex Still will be certified after the completion of the actions described in this CPID. The Certification will comply with the provisions of OAC 3745-55-15 and 40 CFR § 264.115. The Certification will state the following:

"Based on information made available to me, I....., (Title)....., do hereby certify that to the best of my knowledge, the Detrex Still System Components have been closed in accordance with the closure plan information and data for the Detrex Still as approved by the Ohio EPA on....(date)."

4.5 POST-CLOSURE PLAN

Because this plan contemplates clean closure of the Detrex Still HWMU as defined in this CPID, no specific post-closure care for this unit is anticipated.

4.6 NOTICE IN DEED

A notation in the property deed is required under OAC 3745-55-19(b)(1) (40 C.F.R. § 264.119) for areas that require post-closure care. Because the Detrex Still HWMU will not require unit-specific, post-closure care, these notice requirements will not be necessary.

5.0 SAMPLING PLAN AND ANALYTICAL PROCEDURES

Closing the Detrex Still will involve sampling the following types of materials:

- Residual waste in the Still Tank
- Scabbled concrete floor debris
- Decontamination wash water and flush water.

It should be noted that during and following operation, the condenser drained liquids directly into a collection tank, so this unit did not hold liquid waste and is not considered a "tank." Therefore, this unit is not likely to contain any residuals, thus sampling is not necessary.

All sampling and analyses will be conducted as described in the SAP, Appendix 3. All sampling and analyses for radioactive contamination and/or constituents will be conducted in accordance with existing FEMP SOPs as described in CERCLA Removal Action No. 12, "Safe Shutdown" (WEMCO 1991) and the Sitewide CERCLA Quality Assurance Project Plan (SCQ). As they are generated and collected, materials will be containerized and kept within the project exclusion zones until sampled. After sampling, the containerized materials will be assumed hazardous wastes and transported to appropriate FEMP RCRA and/or TSCA storage areas or transferred to a 90-day holding area to await analytical results, characterization, and final disposition.

5.1 NATURE, RATE, AND EXTENT OF CONTAMINATION

The waste constituents for the Detrex Still HWMU are based on process knowledge and on sampling performed on waste materials believed to be representative of Detrex Still residues, under Sample Plan 1038, May 1993. The constituents identified are acetone, chromium, tetrachloroethylene, trichloroethylene, and 1,1,1-trichloroethane. All hazardous and other wastes will be removed from the Detrex Still HWMU and placed into approved storage, and decontamination to meet RCRA closure standards will be conducted using the hazardous debris alternative standards in 40 CFR 268.45 (consistent with OEPA September 1991 Interim Final Closure Plan Review Guidance). Debris surfaces are considered "clean" when the surface, viewed without magnification, is free of all visible hazardous waste except that residual staining from waste consisting of light

shadows, slight streaks, or minor discolorations, and waste in cracks, crevices, and pits may be present provided that such staining and waste in cracks, crevices and pits is limited to no more than 5% of each square inch of surface area. Therefore, sampling and analysis to define the nature, rate, and extent of contamination is not necessary. Analytical procedures will be performed in accordance with methods specified in SW-846 (USEPA 1986).

5.2 EQUIPMENT, CALIBRATION, AND EXPERIENCE OF OPERATORS

The following equipment will be used to collect liquid samples:

- 500 ml amber glass widemouth bottle with teflon-lined closure
- Thermal coolers and freezer packs
- Sample labels
- Waterproof marking pen
- Field sampling logbook and field data forms
- Acid resistant gloves
- Polyethylene or other approved impervious sheeting
- Dedicated, clean rinseate sample collection drums
- Coliwasa sampler
- Peristaltic sampling pump(s)
- Tygon tubing.

The following equipment will be used to collect residue and concrete samples:

- Sample labels
- Waterproof marking pen
- Field sampling logbook and field data forms
- Acid resistant gloves
- Polyethylene or other approved impervious sheeting
- Long-handled scrapper (stainless steel, glass)
- Spatula (stainless steel, glass)
- Sample bottles for solid samples
- Stainless steel catch basin
- Stainless steel bucket
- Stainless steel dust pan.

The list can be modified as appropriate by a trained, qualified sampling supervisor or manager. Any change to the sampling equipment will be noted in the field sampling logbook or in the field sampling plan. All sampling activities will be performed by personnel trained in accordance with the SCQ.

5.3 PROCEDURES FOR GROUNDWATER MONITORING ANALYSIS

Groundwater monitoring analysis will not be required for the Detrex Still HWMU, as it is entirely contained within Building 1A, and no releases to the environment from the HWMU are documented or are suspected.

5.4 NUMBER, LOCATION, AND FREQUENCY OF SAMPLES

The number, location, and frequency of samples are detailed in the SAP contained in Appendix 3. In the event that additional samples are required, they will be determined by a trained, qualified site sampling supervisor or manager.

6.0 AIR AND WASTEWATER MANAGEMENT PLANS

6.1 CONTROL OF AIRBORNE PARTICULATES

The Detrex Still is fully enclosed within Building 1A. As such, closure operations will not generate releases of airborne particulates to the environment. However, the closure operations will use FEMP SOPs designed to minimize the generation of airborne particulates. The concrete scabbling equipment is equipped with a HEPA vacuum to collect and control airborne particulates during the concrete scabbling operations.

6.2 CONTROL OF RUNOFF TO SURFACE WATER

The Detrex Still is fully enclosed within Building 1A. As such, closure operations will not generate any runoff to surface water.

6.3 CONTROL OF RINSEATE RUNOFF

Spill prevention and control measures will be employed during all closure operations, in accordance with FEMP SOPs and the Spill Prevention Control and Countermeasure Plan. As detailed in Section 2.0 of this CPID, work areas will be prepared by spreading impermeable liners, and/or using diking to contain spills. Catch pans and basins will be used, as appropriate, for control and containment of decontamination solutions.

6.4 CONTROL OF HAZARDOUS CONSTITUENTS

Detrex Still equipment and materials that are not fully decontaminated during Safe Shutdown will be containerized and managed as hazardous, TSCA-regulated, radioactive, or mixed wastes, as discussed in Section 2.0.

6.5 WASTEWATER TREATMENT

Liquid decontamination wastes will be collected, labeled, and stored in designated RCRA storage areas or 90-day storage areas, until analyses determine levels of contamination. No decontamination wastes are anticipated to be processed through the FEMP Waste Water Treatment System. Decontamination wastes will be managed in accordance with Section 2.2.3.3.

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7.0 PERSONNEL SAFETY AND FIRE PREVENTION

Detrex Still closure operations will be conducted in accordance with an approved Health and Safety Plan (Appendix 4). Before initiating field operations, a health and safety briefing will be provided for all closure personnel. This briefing will address Health Safety Plan issues such as personal protective equipment (PPE), fire prevention, and any other pertinent information.

In order to minimize the potential for fires and their impact, proper fire prevention and protection procedures are necessary. The following list includes some fire prevention rules that will be implemented during the closure action:

- No smoking is allowed in the FEMP process area which houses Building 1A and the Detrex Still.

- All sources of ignition are prohibited within a 50-foot radius of substances or operations which constitute a fire hazard. These operations or areas shall be posted with signs indicating: NO SMOKING OR OPEN FLAMES.

- All tanks, containers, and pumping equipment, whether portable or stationary, will be Underwriters Laboratory (UL) or Factory Mutual (FM) approved if they are being used for the storage or transfer of flammable and/or combustible liquids. These storage containers will also meet all applicable Occupational Safety and Health Administration (OSHA) regulations.

- Equipment requiring flammable liquid fuel will be shut down during refueling, servicing, or maintenance. This requirement can be waived for diesel-powered machinery serviced by a closed system provided that there are attachments to prevent spillage.

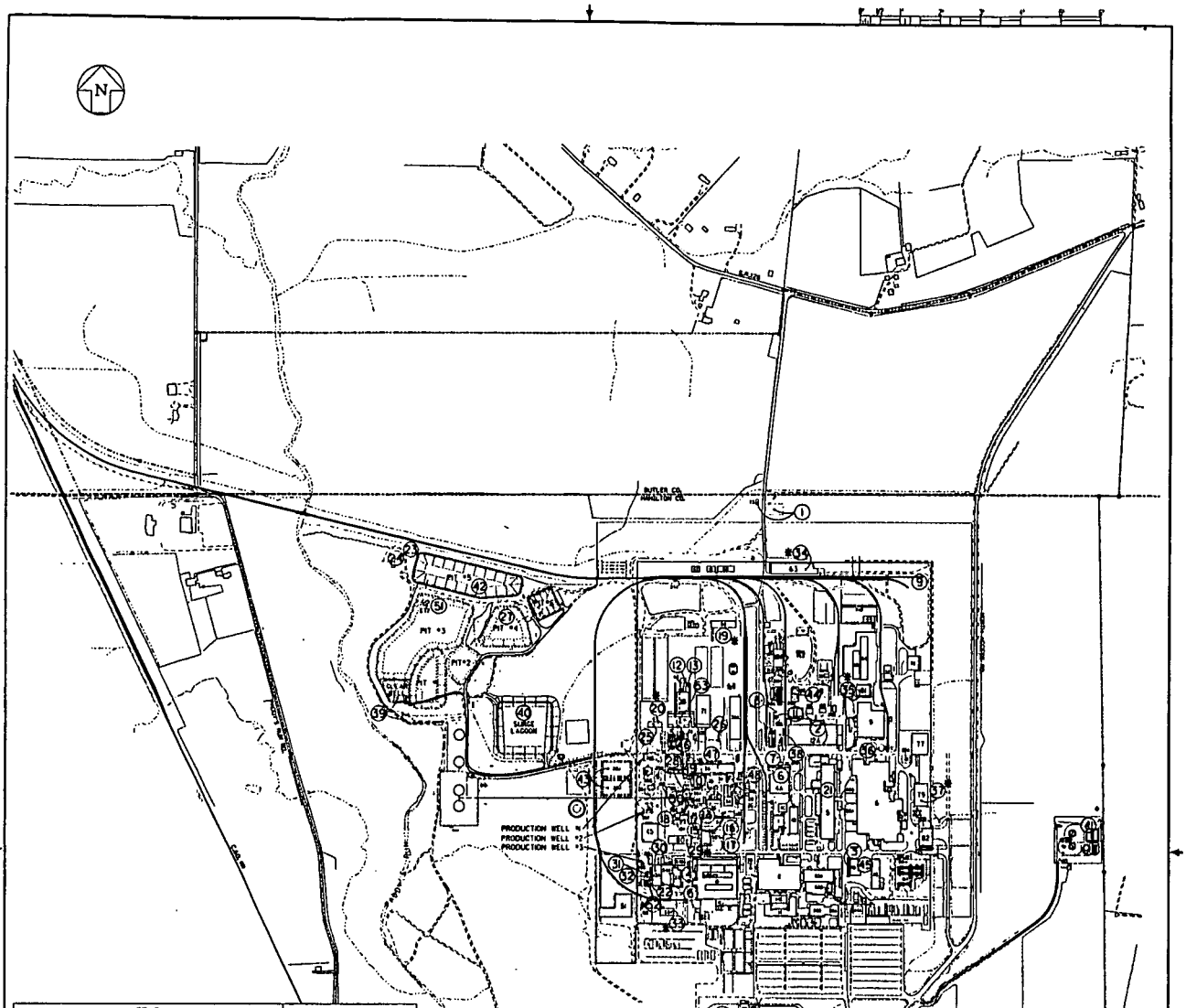
Additional fire prevention rules will be implemented if deemed necessary by the health and safety manager.

7.1 GUIDELINES FOR PREPARATION OF HEALTH AND SAFETY PLANS

A Task/Project specific Health and Safety Plan, pursuant to requirements in the current FEMP Comprehensive Environmental Safety and Health Plan and Safe Shutdown Health and Safety Plan, will be required before RCRA closure activities are initiated. The specific procedures, including personnel and equipment decontamination procedures, will be based on the required health and safety hazard analysis that will characterize hazards and conditions applicable at the time. Appendix 4 includes a copy of the guidelines for the preparation of the Task/Project Specific Health and Safety Plan.

APPENDIX 1

DETREX STILL PHOTOGRAPHS



FEMP HAZARDOUS WASTE MANAGEMENT UNIT (HWMU) LOCATIONS	DIMENSIONS
(1) FIRE TRAINING FACILITY	84'-8" x 68'; 105' x 134'
(2) ~~PARTS CLEANER BY WELDING SHOP (BLDG. 8)~~	DELETED FROM HWMU LIST
(3) WASTE OIL STORAGE IN GARAGE	10' x 10'
(4) DRUM STORAGE AREA NEAR LOADING DOCK (LAB BLDG.)	40' x 76'
(5) DRUM STORAGE AREA SOUTH OF R-26 (LAB BLDG.)	32'-8" x 40'
(6) DRUMMED HF RESIDUE & ASSOCIATED STORAGE AREAS INSIDE PLT. 4	41' x 17'
(7) DRUMMED HF RESIDUE & ASSOCIATED STORAGE AREAS NW OF PLT. 4	25' x 50'
(8) DRUMMED HF RESIDUE & ASSOCIATED STORAGE AREAS SOUTH OF COOLING TOWERS	10' x 32'
(9) NITRIC ACID RAIL CAR AND AREA	10' x 40' x 15'
(10) NAR SYSTEM COMPONENTS	(3,262 SQ. FT.
(11) TANK FARM SUMP	65' x 135'
(12) WHEELABRATOR (BLDG. 66)	24' x 20'
(13) WHEELABRATOR DUST COLLECTOR (BLDG. 66)	30' x 17'
(14) BOX FURNACE	14' x 18'
(15) OXIDATION FURNACE #1	85 SQ. FT.
(16) PRIMARY CALCINER	15.5' DIA. x 41' HIGH
(17) PLANT 8 (TANK DRUM) STORAGE PAD	18,350 SQ. FT.
(18) PLANT 8 (BASE DRUM) STORAGE PAD	12,304 SQ. FT.
(19) CP STORAGE WAREHOUSE (BLDG. 56 (BUTLER BLDG.) ✱	50' x 160'
(20) PLANT 1 PAD ✱	480,000 SQ. FT.
(21) NCO OIL RECEIVER	272 SQ. FT.
(22) ABANDONED SUMP WEST OF PILOT PLANT	2' DIA. x 14' DEEP
(23) ~~WELL DRILLING STORAGE AREA~~	DELETED FROM HWMU LIST
(24) ~~EQUIPMENT STORAGE AREA~~	DELETED FROM HWMU LIST
(25) PLANT 1 STORAGE (BLDG. 67)	65' x 140'
(26) FERRO STAL	32' x 76' x 7'-6"
(27) ASSE PIT NO. 4	170' x 320' x 400' x 320' 15'
(28) TANK THERMAL LIQUID INCINERATOR	50' x 5.5'
(29) PLANT 8 WAREHOUSE (BLDG. 80) ✱	60' x 170'
(30) BARIUM CHLORIDE SALT TREATMENT FACILITY	50' x 75'
(31) TANK FOR BLM STORAGE OF SOLVENTS, T-5	10' DIA.
(32) TANK FOR BLM STORAGE OF SOLVENTS, T-6	10' DIA.
(33) PILOT PLANT WAREHOUSE STORAGE AREA (BLDG. 68) ✱	7' x 62'
(34) PC-2 WAREHOUSE (BLDG. 63) ✱	346'-2½" x 82'
(35) PLANT 9 WAREHOUSE (BLDG. 84) ✱	80' x 100'
(36) STORAGE PAD NORTH OF PLANT 4	8' x 40'
(37) PLANT 4 WAREHOUSE (BLDG. 79) ✱	100' x 170'
(38) 18" TANK CAR	10' x 36' x 15'
(39) ~~CLEARWELL~~	DELETED FROM HWMU LIST
(40) BIO SURGE LAGOON	160,000 SQ. FT.
(41) SLUDGE DRYING BEDS	19' x 92'
(42) WASTE PIT NO. 5	184,000 SQ.FT.
(43) ~~LIME SLUDGE PONDS~~	DELETED FROM HWMU LIST
(44) ~~SOAL PILE RUNOFF BASIN~~	DELETED FROM HWMU LIST
(45) PIT #5	3'-6" DIA.
(46) URANYL NITRATE TANKS (UF6 STORAGE AREA)	62'-7" x 53'-9"
(47) URANYL NITRATE TANKS (NORTH OF PLANT 2)	63'-6" x 40'-6"
(48) URANYL NITRATE TANKS (SOUTHEAST OF PLANT 2)	54'-7" x 45'-4"
(49) URANYL NITRATE TANKS (DIGESTION AREA)	12'-7" x 20'
(50) URANYL NITRATE TANKS (WAREHOUSE BLDG.)	14' x 50', 15' x 30'
(51) EXPERIMENTAL TREATMENT FACILITY (ETF)	20' x 40'
(52) NORTH & SOUTH SOLVENT TANKS (PILOT PLANT)	6'-6" DIA.
(53) SAFE GEOMETRY DIGESTION SUMP	8' DIA. x 12' DEEP

✱ HWMFS THE FEMP IS SEEKING TO PERMIT

NO.	REVISIONS	DATE	DWN. BY	APPD.	REF. DWG. NO.
3	REVISED PER RES #2283	8/91	S.A.S.	GEP	
2	ADDED HWMU NO.53	1/89	S.A.S.	GEP	
1	REVISED PER RES #484	10/88	S.A.S.	GEP	

NOTE: FERMCO C.A.D. DRAWING NOT TO BE REVISED MANUALLY

CHECKED / APPROVED

FERNALD ENVIRONMENTAL RESTORATION MANAGEMENT CORPORATION
FERMCO
Fernald Environmental Management Project
U.S. DEPARTMENT OF ENERGY

SITE PLAN — RCRA PART A

FIGURE A-1
FACILITY LOCATION MAP
SCALE: 1" = 300'

75X-5500-X-00171 | 3

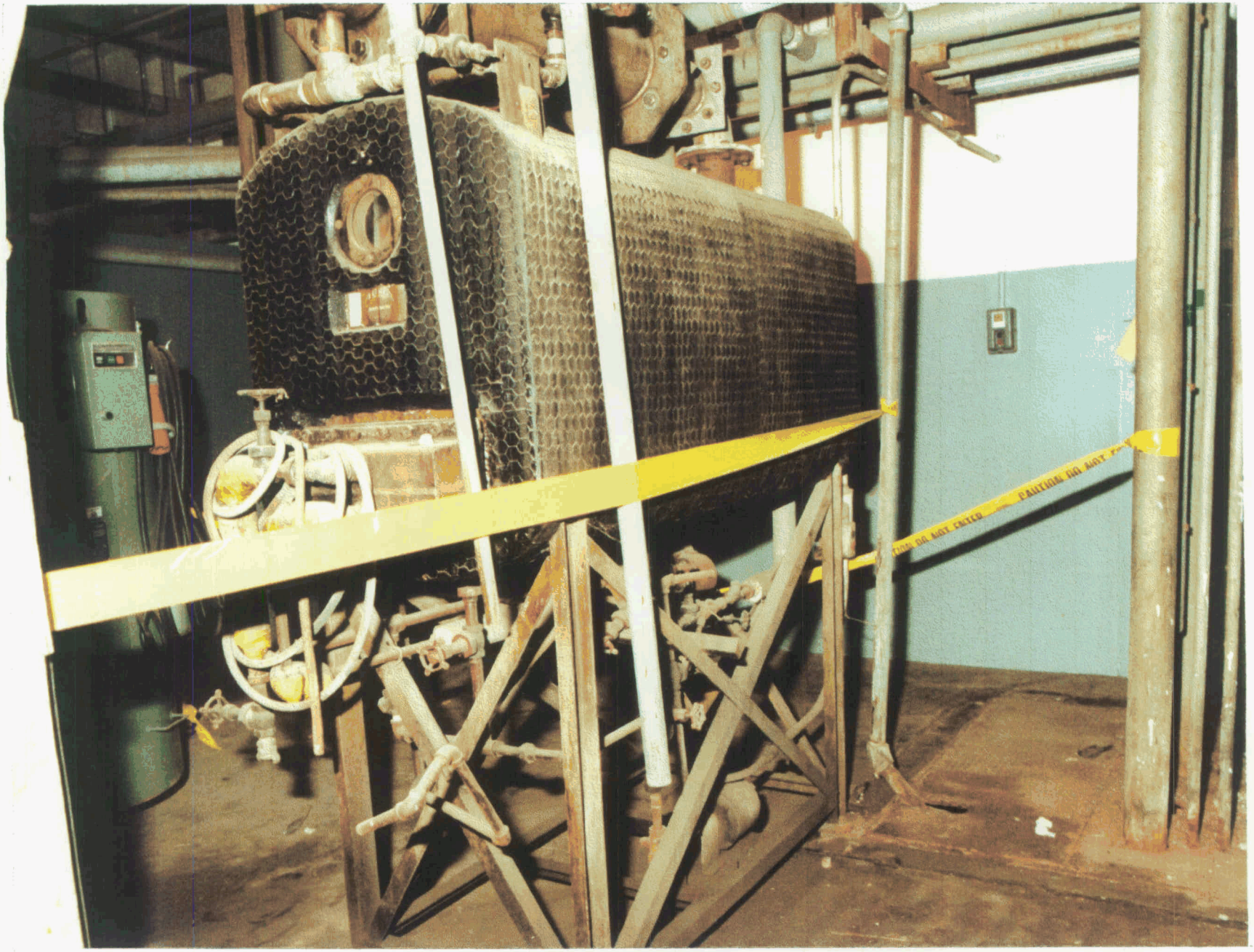


Plate 1. Detrex Still

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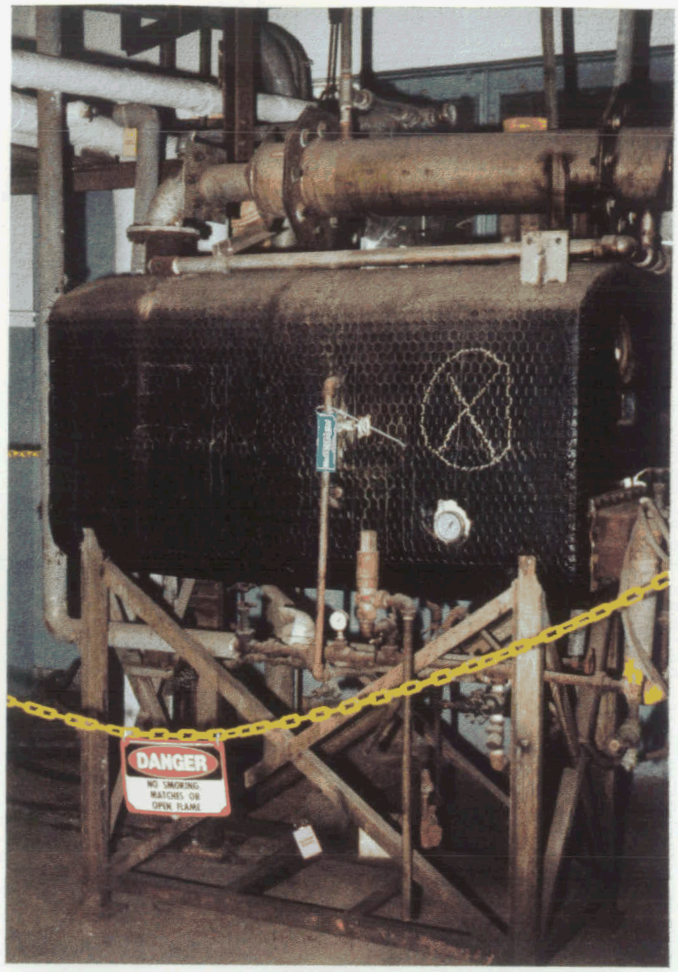

Plate 2. Still Tank.

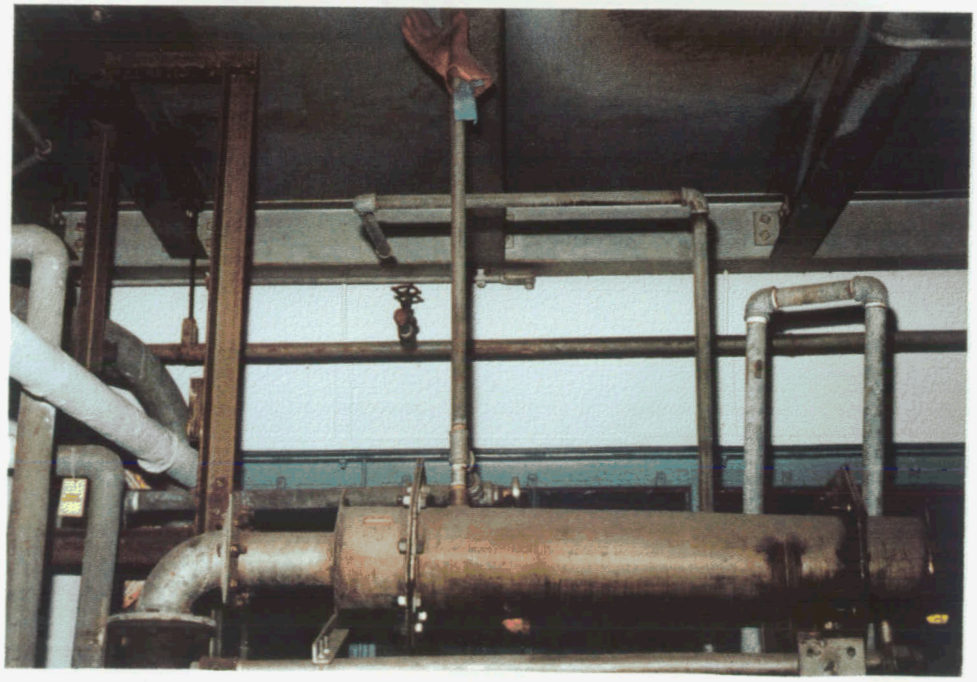

Plate 3. Condensate Tank.

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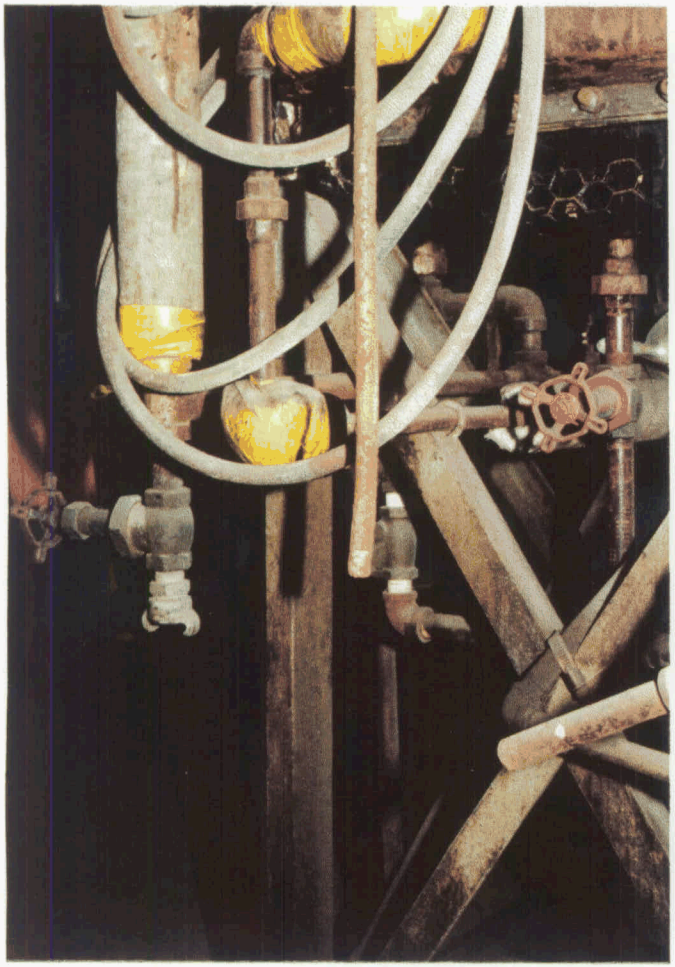

Plate 4. Piping and Valves.

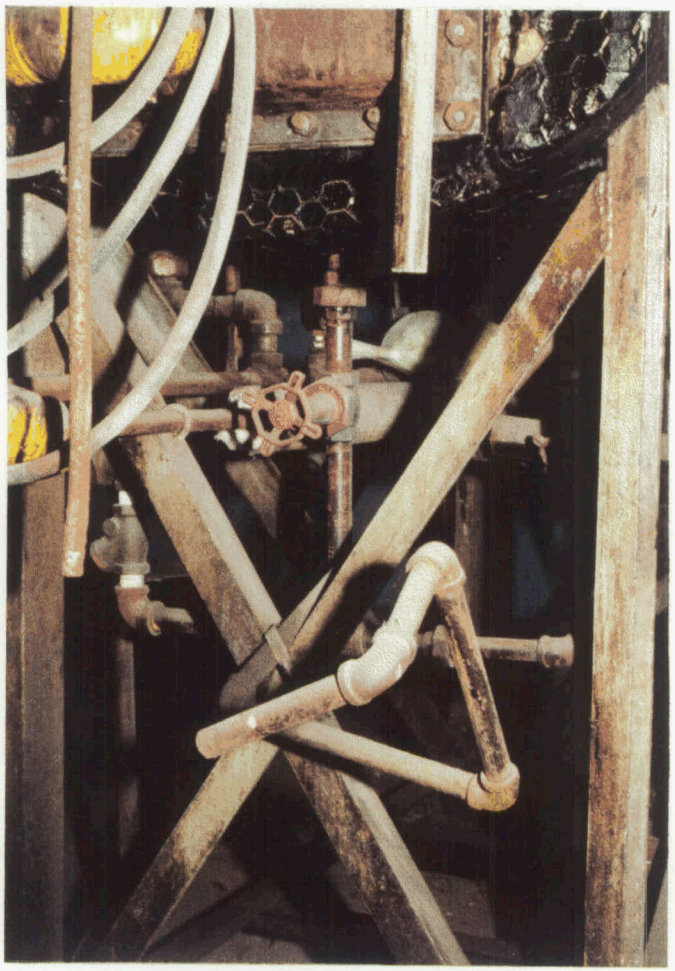

Plate 5. Piping and Valves.

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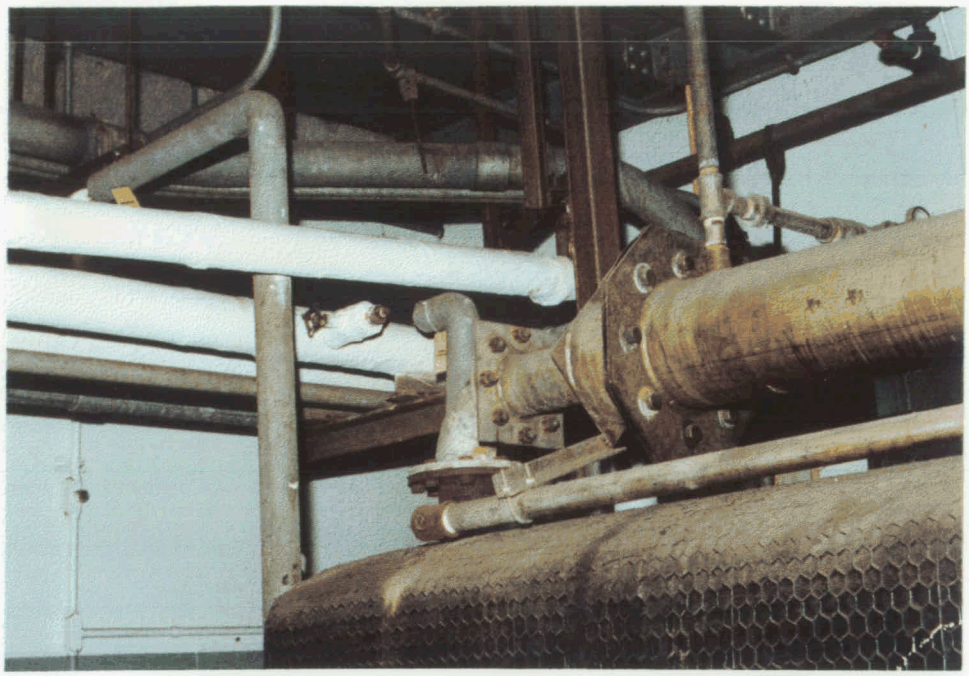

Plate 6. Steam Lines and Condensate Tank.

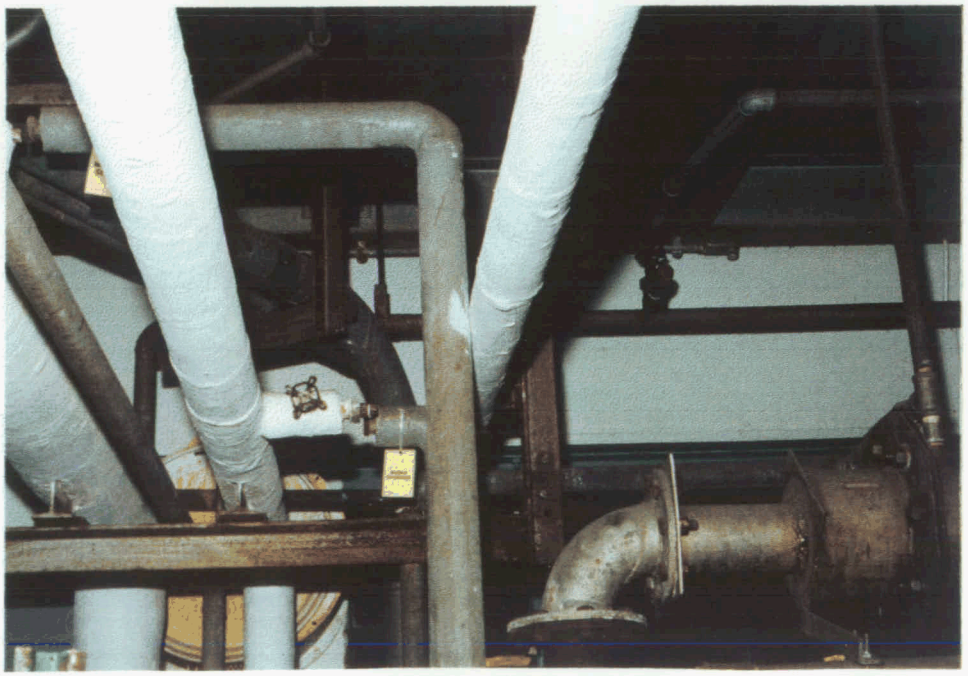

Plate 7. Steam Lines and Condensate Tank.

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Plate 8. Pump.

Plate 9. Pump.

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APPENDIX 2

WASTE CHARACTERIZATION DATA SUMMARY

PCB LETTER

-4889

February 11, 1981

POSSIBLE DISPOSAL OF PCBs BY MEANS OF INCINERATION

W. C. Hill

R. C. Heatherton

40 CFR 761, U.S. EPA, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions"

At the present time we are engaged in the distillation of 1,1,1-trichloroethane which is received from National Electric Coil in Louisville, Kentucky. This operation is performed at the Dotrex Still in Plant 1. Presently, we are generating about one 55-gallon drum of still bottoms from every eight to ten drums of 1,1,1-trichloroethane. Polychlorinated biphenyls are present in the still bottoms at concentrations which may require destruction in an EPA-approved incinerator. Federal regulations covering incineration of PCBs are found in 40 CFR 761.40.

Specific requirements for an incinerator must be met before an EPA approval will be granted.

Enclosed with this letter is a list of these requirements. Please review this list and determine if an FMPC kiln or furnace meets or can be adapted to meet these requirements.

For additional information concerning this, please contact R. B. Weidner, IH&R Department, extension 723.

Thank you.

Original Signed by
R. C. HEATHERTON
Dir. of Health & Safety

R. C. Heatherton

RBW/vvs

cc: W. J. Adams
R. W. Hoback
R. B. Weidner

SOP 1-C-906

4889

TITLE:	INDEX NO.:
SOP - RECOVERY OF CHLORINATED HYDROCARBON SOLVENTS IN DETREX STILL	1-C-906

DIVISION & PLANT:	SUPERSEDES:	PREPARED BY:	DATE ISSUED:
Prod. - 1	None	A. J. Mangold	3-24-81

CANCELLED REFERENCE ONLY

CANCELLED

REFERENCE ONLY
8/28/89

DESCRIPTION OF EQUIPMENT AND PROCESS

Dirty perchloroethylene, trichloroethylene, 1,1,1 trichloroethane, or other chlorinated hydrocarbons are received in drums and pumped into the Detrex still where they are heated, vaporized, and condensed in a water-cooled header. The condensate is piped to stainless steel hold tanks. From the hold tanks the reclaimed solvent is drawn off in drums, and water is decanted and sent to the Plant Sump. When all solvent has been recovered, the still bottoms are pumped from the still into residue drums and put in storage pending further disposition. The following lot numbers will be used in this operation:

S000-YAQ-0013-XXXX	Solvent (each receipt to be a new lot)
S000-YAQ-0043-XXXX	Sludge (each month's production to be a lot)
S000-YAQ-0015-XXXX	Still bottoms (each month's production to be a lot)

INDUSTRIAL SAFETY REQUIREMENTS

1. Cover goggles will be worn when operator is in close proximity to lines and pumps during a transfer of liquids, when operator is sampling, when removing drum bungs, or any time when liquid materials may be splashed in the eyes. At all other times, including while deheading drums, safety glasses are required.

2. Rubber or plastic gloves will be worn when hands are exposed to liquid solvents. Leather-palm or cotton gloves will be sufficient when handling dry or water-filled drums.

3. Drums containing pyrophoric sludges will be vented and stored in areas accessible to emergency fire equipment.

4. Air supplied respirators or respirators equipped with filter cartridges that will absorb organic vapors will be used when handling solvents and/or sludges that give off excess solvent vapor.

5. Whenever spills or leaks are suspected or found or the odor of solvent is strong, an appropriate respirator will be worn. All filled drums containing solvent or still bottoms should be kept closed. An air purifying respirator with organic cartridge will be worn when excess fumes are in the area or when draining still bottom. An air supplied respirator will be worn for any unusual condition, such as cleanup of large spills which have increased the solvent vapor concentration excessively.

6. Spills or leaks of solvent in process or storage areas will be cleaned up immediately.

7. All personnel will evacuate the still area if large amounts of solvent vapor are released from the still or if solvent liquid is spilled over a large area. No re-entry to the still area will be made until appropriate cleanup procedures and respiratory protection have been specified by the supervisor and the Industrial Hygiene & Radiation Department.

ENVIRONMENTAL CONSIDERATIONS

It is the intention of NLO, Inc., to achieve and maintain those levels of air and water quality which will protect health and promote welfare and safety. The responsibility for limiting the release of pollutants to tolerable quantities rests with all personnel, both management and operators.

INSPECTIONS

Areas where containers of dirty and clean solvents and still bottoms are stored must be inspected at least weekly for evidences of leaks and deterioration. If a container is in poor condition, the material must be transferred to a safe container or managed in some satisfactory manner.

The still and its associated equipment must be inspected at least daily when in operation for leaks, spills, and fugitive emissions.

An entry will be made on a record sheet or log page for each inspection. Such entries will include the date, time of inspection, name of inspector, notation of observations made, date and nature of repairs or remedial action. These records will be kept for three years from the date of inspection.

PROCEDURE

1. Loading Dirty Solvent into the Still

1.01 Start area exhaust fan.

1.02 Be certain strainer is on the suction end of the unloading pump hose.

1.03 Insert the hose in the drum, being careful not to put the strainer in the sludge on the bottom of the drum.

1.04 Start the pump.

1.05 Fill the still to a point between the limits shown on the sight glass.

1.06 When the dirty solvent has been pumped from the drum, remove any sludge and drum it separately. If a bung-type drum has been emptied, it must be cut open with a drum deheader to facilitate removing the sludge and cleaning the drum. Use a long-handled tool to scrape settled sludge from the drum bottom.

2. Operating the Still

2.01 Open valves in the cooling water lines to admit sufficient water to condense the solvent vapors.

2.02 Place a clean, empty drum, premarked with tare weight, name of solvent, and drum number under the hold tank's product discharge pipe (lower outlet).

NOTE: Unmarked clean buckets must be available to receive aqueous phase, which is decanted and dumped to the Plant 1 Sump.

2.03 Open the two valves in the condensate return line from the header.

2.04 Open the two valves in the steam line to the still coils.

NOTE: When distilling perchloroethylene, open the valve in the steam line that goes to the bottom of the still and add live steam to the interior of the still to steam distill this material with its higher boiling point.

2.05 Control the temperature of the solvent to the appropriate level as given below by reading the thermometer on the still and adjusting the amount of steam admitted to it. Monitor the temperature at least every 15 minutes, and make corrections immediately to maintain temperature within range.

DISTILLING TEMPERATURE LIMITS

Trichloroethane	180°F Maximum*	(Boiling Point is 166°F)
Trichloroethylene	205°F Maximum*	(Boiling Point is 189°F)
Perchloroethylene	250°F Maximum*	(Boiling Point is 250°F)

*These target temperatures may be exceeded by about 25°F when stripping the last solvent from the still sludge.

2.06 Add contaminated solvent to still on an "as needed" basis.

2.07 Frequently observe the sight glass to see if foaming is occurring and if it is, decrease the steam flow.

2.08 Frequently check the level in the hold tank which is receiving distillate, and when necessary to prevent overflowing, redirect the distillate to the other hold tank.

2.09 Allow the distillate in the "full" hold tank to settle so that water in the organic phase has time to rise to the upper level.

2.10 Begin to drain the distillate to the product drum.

NOTE: The water phase may be drawn off each time product is drained down to the side decant line or as otherwise convenient. To remove the aqueous phase, stop removal of distillate when the organic-water separation line descends to the lower side of the decant line, and discharge the aqueous to a bucket under the decant line by opening the decant line pipe. When the aqueous flow discontinues, close the decant valve, and reopen the distillate drain valve. Follow the instructions of supervision concerning whether to completely empty a hold tank.

In all cases avoid draining aqueous to the product drum.

2.11 Repeat Items 2.08 - 2.10 as necessary to continue operations.

2.12 When instructed, check specific gravity of each filled drum by means of a hydrometer and mark the specific gravity on the drum.

2.13 When instructed, submit a one-pint sample of distilled solvent from each drum to the Technical Laboratory for identification of trichloroethane, trichloroethylene, or perchloroethylene by spectrometer DK-2 method. Also, request laboratory to check each sample for its inhibitor level by the aluminum scratch method. Take other samples and request analyses as may be required.

NOTE: Trichloroethane (safety solvent) may contain 30% trichloroethylene and be used as a cold wash solvent. Trichloroethylene may not contain any trichloroethane because it will hydrolize when subjected to heat.

2.14 When distillation stops, shut off the steam and pump out sludge into correctly identified drums.

2.15 When directed, take a dip sample from each drum of sludge, composite as instructed, and request chemical analysis as specified by supervision.

2.16 Keep records of feed receipts, consumption (by manifest numbers when available), production, product shipments, and of inventories and locations of feed, sludge, and product on hands.

Records of still bottoms produced, the amount on hands, and the storage location will be kept.

All records will be retained by the Production Division for a minimum of three years from the date of their initiation.

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The above Standard Operating Procedure has been approved by the Production Department Superintendent, General Superintendent, Health & Safety Division, and the Production Technology and Quality Control Department.

AUTHORIZED BY:

W Adams 3/17/81

Assistant Manager Date

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SOP 1CE-204

NLO - FMPC MANUFACTURING STANDARDS

TITLE: SOP - OPERATION OF DETREX STILL FOR ENRICHED (0.96% U-235 MAX) SOLVENT RECOVERY - 500 SERIES			SPECIFICATION NO.: 1CE-204
DIVISION & PLANT	SUPERSEDES:	AUTHOR(S) OR REVISOR(S):	DATE ISSUED:
Prod. - 1	T-1CE-200.12, 10-25-63	J. M. Weber	3-10-64

CANCELLED REFERENCE ONLY

PURPOSE:

To reclaim degreasing solvents (code 556) for reuse and to alleviate the problem of storing contaminated solvents.

SPECIFICATIONS:

1. The dirty solvent will consist principally of chlorinated hydrocarbons, such as 1,1,1,-Trichlorethane (Safety Solvent), Trichlorethylene or Perchlorethylene, and must otherwise be suitable for distillation.

2. 1,1,1,-Trichlorethane (Safety Solvent) boils at 166°F. Do not exceed 180°F when distilling this solvent.

3. Trichlorethylene boils at 189°F. Do not exceed 205°F when distilling this solvent.

4. Perchlorethylene boils at 250°F. It will be necessary to steam distill this solvent by opening the steam valve under the still, thus allowing the steam to mix directly with the solvent.

SPECIAL PRECAUTIONS:

1. Nuclear Safety:

   1.1 Handle solvent (556), H_2O (543), and sludge (538) in unlimited quantities in 30-gallon or larger drums.

   1.2 An isolation distance of two feet is required for materials stored in a nuclearly safe configuration - i.e., by safe (limited) mass or safe (limited thickness) slab storage. Maintain one-foot isolation distance between such nuclearly safe configurations and barriers and/or walls.

   1.3 NLO-H&S-1171 form is not required for interplant shipments of any of the materials specified herein since they may be handled in unlimited quantities.

2. Industrial Safety:

2.1 The sludges remaining in the feed drums may be highly pyrophoric. Vent all lidded drums and do not store in close array.

2.2 The chlorinated hydrocarbon vapors are toxic. Use respirator equipped with M-118 cartridges and leather-palm gloves in all drum handling, material transfers, and all other operations where containers of solvent or sludge can not be covered. The respirator should also be used if solvent odor is strong due to spills or leaks.

3. Materials Identification:

3.1 All areas in the plant which are used for the storage of enriched feed, product, or residues are to be surrounded by a waist-high galvanized chain barrier on which signs are hung indicating the presence of 0.96% U-235 max enriched uranium.

3.2 Color code drums all red for 500 series materials.

3.2.1 Prior to filling, premark the drums with material type number, tare weight, and per cent U-235 enrichment, stencilled with aluminum paint.

3.2.2 All filled drums are to bear complete identification including lot number; drum number; gross, tare, and net weights; and per cent enrichment.

3.3 The Detrex Still must bear a 3" to 4" square red and silver color target for the 500 series material, and a sign indicating the presence of 0.96% U-235 max enriched urnaium.

4. Nuclear Materials Control:

4.1 If the previous processing campaign was on normal material, the equipment must be cleaned out prior to processing enriched material, and all normal feed, product and residues removed from the area. Advise Nuclear Safety, Nuclear Materials Control, and Production Records following cleanup, so that inspection by assigned personnel may be scheduled. Furnish at least two hours advance notice of such inspection. If any of the assigned inspection personnel are not available at the time specified, that office must either assign an alternate or notify the plant that

APPENDIX 3

SAMPLING AND ANALYSIS PLAN

FOR CHARACTERIZATION OF DETREX STILL WASTES

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SAMPLING AND ANALYSIS PLAN for Characterization of Detrex Still Wastes

Fernald Environmental Management Project

October 1993

U.S. DEPARTMENT OF ENERGY

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TABLES

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ACRONYMS

ARAR	applicable or relevant and appropriate requirement
ASL	analytical support level
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
CPID	Closure Plan Information and Data
DOE	U.S. Department of Energy
DQO	data quality objective
FEMP	Fernald Environmental Management Project
FID	flame-ionization detector
FMPC	Feed Materials Production Center
FS	Feasibility Study
HWMU	hazardous waste management unit
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
NPDES	National Pollutant Discharge Elimination System
OAC	Ohio Administrative Code
OU3	Operable Unit 3
PID	photo-ionization detector
PPE	personal protective equipment
PSP	project specific plan
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
SACD	Stipulated Amendment to the Consent Decree
SAP	Sampling and Analysis Plan
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SWSAR/CR	Sitewide Sample Analysis Request/Custody Record
TCLP	Toxicity Characteristic Leaching Procedure
TSD	treatment, storage, or disposal
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

1.0 INTRODUCTION

The Fernald Environmental Management Project (FEMP) is a U.S. Department of Energy (DOE) owned facility located near Fernald, in Hamilton and Butler Counties, Ohio. The FEMP was previously known as the Feed Materials Production Center (FMPC) and was operated to produce various uranium products used in support of the U.S. Defense program. The facility operated at this site from approximately 1950 until 1989. In 1986, the DOE initiated the ongoing Remedial Investigation/Feasibility Study (RI/FS) to evaluate and determine remediation requirements pursuant to the Comprehensive Environmental, Response, Compensation, and Liability Act (CERCLA).

The Detrex Still is located at the FEMP, in Building 1A (part of Plant 1) and performed distillation operations from September, 1956 until January 13, 1981. The unit recovered chlorinated hydrocarbon solvents, including tetrachloroethylene, trichloroethylene, and 1,1,1-trichloroethane.

On January 13, 1981, the Detrex Still was shut down and partially disassembled, however, it was not cleaned or emptied after it was shut down in 1981. The unit contains distillation residues that have remained in the Still Tank since its shutdown. Because the Detrex Still has been storing listed hazardous waste since 1981, it is classified as a hazardous waste management unit (HWMU).

This Sampling and Analysis Plan (SAP) was prepared to support the Closure Plan Information and Data (CPID) for the Detrex Still HWMU. The purpose of this SAP is to describe the sample collection and handling procedures, identify analyses to be conducted, and specify the quality assurance/quality control (QA/QC) procedures to characterize wastes resulting from the Detrex Still HWMU closure. Sampling and analysis will follow the procedures discussed in this SAP and will be conducted consistent with the FEMP Sitewide CERCLA Quality Assurance Project Plan (SCQ).

In accordance with Resource Conservation and Recovery Act (RCRA) Interim Status Closure requirements, Ohio Administrative Code (OAC) 3745-55 (40 Code of Federal Regulations [CFR] Part 264 Subpart G) requires owners/operators of hazardous waste treatment, storage, or disposal (TSD) facilities to have written and approved closure plans for those units. The physical closure of the Detrex Still will be undertaken in

conjunction with CERCLA removal and remedial actions at the FEMP, and in accordance with the July 1986 U.S. Environmental Protection Agency (USEPA)/DOE Federal Facilities Compliance Agreement, as amended by the Consent Agreement in September 1991. The closure of the Detrex Still is also subject to the State of Ohio and DOE Stipulated Amendment to the Consent Decree (SACD).

The remainder of this introductory section discusses the objectives and overall approach to sampling the Detrex Still HWMU. Section 2.0 provides details on sample collection, accepted practices, standard equipment, and analysis methods that will be used to support the sampling effort. Section 3.0 presents procedures for field operations, including documenting procedures, and sample management. Section 4.0 discusses QA/QC governing the sampling effort, including procedures for field and laboratory operations and sample chain-of-custody. Sampling and monitoring conducted for worker safety and health will be conducted in accordance with the requirements of the FEMP Comprehensive Environmental Safety and Health Plan. Section 5.0 presents health and safety requirements specific to sampling the Detrex Still HWMU.

1.1 SAMPLING APPROACH

Sampling and analysis to be conducted for this CPID is required to support the following data needs:

1. Determine the characteristics and regulatory status of closure wastes and evaluate the proper disposal, treatment, or storage option.

2. Determine the appropriate level of health and safety requirements for protection of site workers during sampling and analysis and waste disposal, treatment, or storage.

1.2 SAMPLING OBJECTIVES

All sampling and analysis activities must be conducted and documented in a manner ensuring that sufficient data of known quality are collected to support the end use of the data. As discussed above, there are different end uses for the data collected under this SAP. The data quality objectives (DQOs) specified for each data collection activity are

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qualitative and quantitative statements specifying the quality of the data required to support decisions during remedial response activities.

The FEMP SCQ defines analytical support levels (ASLs) A, B, C, D, or E as major components of DQOs. The ASLs are described in Section 6.0 and are referenced in Section 2.0.

1.3 SAMPLE ANALYSES

Table 1-1 presents the analytes for the Detrex Still HWMU. As discussed in Section 1.5, the COCs are acetone, chromium, tetrachloroethylene, 1,1-dichloroethylene, trichloroethylene, and 1,1,1-trichloroethane. These contaminants were determined through prior sampling and process knowledge, to potentially be present in the Detrex Still and were the basis for determining that the still and ancillary equipment comprise a HWMU. Table 1-1 also lists the additional analytes that will be investigated during the Detrex Still closure for waste characterization purposes.

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Table 1-1. Detrex Still Analytes for Waste Characterization. Page 1 of 2

Waste Number[1/]	Analyte	TCLP Regulatory Levels (mg/l)[2/]
F003[2/]	Acetone	--
D004	Arsenic	5.0
D005	Barium	100.0
D018	Benzene	0.5
D006	Cadmium	1.0
D019	Carbon tetrachloride	0.5
D021	Chlorobenzene	100.0
D022	Chloroform[3/]	6.0
D007	Chromium	5.0
D023	o-Cresol	200.0
D024	m-Cresol	200.0
D025	p-Cresol	200.0
D026	Cresol (total)	200.0
D016	2,4-D	10.0
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D030	2,4-Dinitrotoluene	0.13
D032	Hexachlorobenzene	0.13
D033	Hexachlorobutadiene	0.5
D034	Hexachloroethane	3.0
D008	Lead	5.0
D009	Mercury	0.2
D035	Methyl ethyl ketone	200.0
D036	Nitrobenzene	2.0
D037	Pentachlorophenol	100.0
D038	Pyridine	5.0
D010	Selenium	1.0
D011	Silver	5.0
D039/F001[4/]	Tetrachloroethylene	0.7
D040/F002[4/]	Trichloroethylene	0.5
D041	2,4,5-Trichlorophenol	400.0
D042	2,4,6-Trichlorophenol	2.0
D043	Vinyl chloride	0.2
F002/F001[4/]	1,1,1-Trichloroethane	--

Table 1-1. Detrex Still Analytes for Waste Characterization. Page 2 of 2

Waste Number[1/]	Analyte	TCLP Regulatory Levels (mg/l)[2/]
--	Thorium (total)	--
--	Uranium (total)	--
--	Polychlorinated biphenyls	--

1/ Waste number that would be applied if the analyte concentration exceeds the TCLP regulatory level.
2/ Maximum concentrations of contaminants for the TCLP (40 CFR § 261.24).
3/ Chloroform is regulated as the sum of all trihalomethanes.
4/ Waste number that would be applied if the analyte is detected at any concentration.

2.0 SAMPLE COLLECTION

The following sections discuss the procedures to be followed in collecting waste samples from the Detrex Still HWMU.

2.1 EQUIPMENT SAMPLING

Residue from the Still Tank will be collected for waste characterization purposes following disassembly and removal of the tank. The sample will be collected by scraping with a stainless steel spatula into a stainless steel catch basin for transfer to sample bottles. The sample will be analyzed for all analytes listed in Table 1-1 to ASL B.

The equipment structure supports, and the condenser that have all surfaces visually accessible, will be decontaminated by physical extraction to reach a "clean debris surface" as described in Section 2.2. This equipment will not require sampling and analysis.

2.2 DECONTAMINATION SOLUTION SAMPLING

Sampling methods to be implemented for the collection of decontamination solution samples are those outlined in the USEPA SW-846, Third Edition (USEPA 1986). All equipment used to collect the samples, including agitators and catch pans, will be decontaminated prior to the beginning of each sampling effort. All equipment will be properly decontaminated after the sampling effort to reduce the chance of contamination through contact with the equipment outside the HWMU boundary. (See Section 2.5 for further discussion of decontamination of sampling equipment.)

The following procedures outline collecting the decontamination solution characterization samples:

1. Assemble sampling equipment as specified in Section 2.3.

2. Collect samples of the decontamination solution and QA/QC duplicates from the drum using a Coliwasa sampler or an appropriate sampling pump and tubing.

3. Analyze samples for the presence of the waste constituents or hazardous waste characteristics listed in Table 1-1. The DQO for the samples will be ASL B.

Because organics tend to accumulate in the upper layers of a solution, a 40 ml sample shall be collected for volatile organic compound (VOC) analysis before the solution is agitated to eliminate possible volitization of any contaminates. A 1.5 l sample, to be analyzed for COCs, shall be collected after the solution has been agitated to ensure any solid materials are suspended at the time of sampling.

2.3 CONCRETE SAMPLING

In addition to the ancillary equipment associated with the Still Tank, the Detrex Still HWMU includes the (concrete) floor beneath the unit. Currently, it is unclear if any of the concrete is contaminated with hazardous materials. The concrete floor will be scabbled to reach a "clean debris surface" at a minimum depth of 0.6 cm, or deeper until the surface, "when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except that residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations, and soil or waste in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area." (40 CFR §268.45-Table 1). Upon reaching a clean debris surface for the concrete, hand-held radiation detectors (such as a Geiger-Muller probe) will be used to verify absence of radiological contamination. There will be no concrete cores or rinseate samples taken, however, the scabbling debris will be sampled for waste characterization purposes and analyzed for the full list of analytes (ASL B).

2.4 SAMPLING EQUIPMENT

The following equipment will be used to collect decontamination solution samples:

- 500 ml amber glass widemouth bottle with teflon-lined closure
- Thermal coolers and freezer packs

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- Sample labels
- Waterproof marking pen
- Field sampling logbook and field data forms
- Acid resistant gloves
- Polyethylene or other approved impervious sheeting
- Dedicated, clean rinseate sample collection drums
- Coliwasa sampler
- Peristaltic sampling pump(s)
- Tygon tubing.

The following equipment will be used to collect residue and concrete samples:

- Sample labels
- Waterproof marking pen
- Field sampling logbook and field data forms
- Acid resistant gloves
- Polyethylene or other approved impervious sheeting
- Long-handled scrapper (stainless steel, glass)
- Spatula (stainless steel, glass)
- Sample bottles for solid samples
- Stainless steel catch basin
- Stainless steel bucket
- Stainless steel dust pan.

This list may be modified as appropriate by a trained, qualified sampling supervisor or manager. Any change to this list will be noted in the field sampling logbook or in the field sampling plan.

2.5 SAMPLE HANDLING AND MANAGEMENT OF SAMPLE CONTAINERS

Once a sample has been placed inside a sample container it will be managed as follows:

1) For all samples: Tightly close the lid, seal the lid with custody tape, and attach appropriate label that has been filled out using indelible ink.

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2) Record the sample label and container information in the field sampling logbook and on a Sitewide Sample Analysis Request/Custody Record (SWSAR/CR) form.

3) Immediately place sample containers into a sample cooler that will maintain samples at approximately 4°C.

4) Record all transfers of sample custody on the SWSAR/CR form.

5) To maintain chain-of-custody, ensure that access to all samples is controlled. This requires the sample collector or designated sample custodian to:

- Have constant direct physical control
- Use a locked limited access area under his/her control
- Affix signed container custody seals on samples or sample coolers.

When the planned sampling activity has been completed, secure the lid of the sample cooler and transfer the samples with the appropriate SWSAR/CR form to the FEMP Sample Processing Laboratory. The FEMP Sample Processing Laboratory will be responsible for ensuring custody records are maintained during shipment to the laboratory selected to conduct the analyses.

2.6 EQUIPMENT DECONTAMINATION

Before beginning any decontamination procedures, all personnel shall inspect their clothing to ensure that clean clothing or clean disposable outer coveralls are used. All personal protective equipment (PPE) will be free of contamination prior to beginning the decontamination process and when handling any clean equipment. Equipment decontamination procedures are discussed in the following sections.

All sampling equipment that will be used must be clean or decontaminated prior to use. All reusable sampling equipment that has been used to collect a sample must be decontaminated before it is used to collect additional samples. After decontamination, all equipment must be tagged and bagged as "clean."

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2.6.1 Sampling Equipment Decontamination Supplies

Supplies used in decontamination may vary based on the media being sampled and the type of contamination encountered. The following basic list of supplies may be modified, as necessary, by a trained, qualified supervisor or manager:

- Laboratory grade non-phosphate detergent solution
- Long-handled scrapers (stainless steel, glass)
- Long-handled, soft bristled brushes
- Portable low-pressure water sprayer
- Potable water
- Deionized water (organic free)
- Reagent grade ethanol rinse
- Dilute (0.02 normal) hydrochloric or sulfuric acid rinse
- Polyethylene or other approved impervious sheeting
- Heavy duty plastic bags
- Absorbent materials, socks, and pads
- Wash/rinse tubs, buckets, or other approved containers.

2.6.2 Sampling Equipment Decontamination Procedures

All reusable sampling equipment will be decontaminated after each use. If decontamination is not practical, the sampling equipment will be managed in a manner consistent with FEMP hazardous waste management practices pending RCRA waste determinations. The following procedures will be used to decontaminate sampling equipment:

1) Establish a decontamination area in a location that is protected from potential contamination. Use a double thickness of 6-mil polyethylene or other suitable sheeting to line the decontamination area, including containment dikes or berms for run on/run off control.

2) Provide appropriate containers for containment, handling, and collection of wastes. Non-liquid wastes shall be collected in a heavy duty plastic bag, 55-gallon drum, or other suitable container. Liquid wastes will be collected in buckets and/or placed into 55-gallon drums or other suitable liquid storage

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containers. Solid wastes will be stored at the FEMP in an approved RCRA storage area pending RCRA waste characterizations and determinations.

3) Establish sample equipment decontamination line including the following:

Stage 1) Rinse with potable water, wash with non-phosphate laboratory grade detergent, and rinse with potable water rinse. As necessary, use brushes and scrapers to remove visible contamination and stains. If needed, steam cleaning or high pressure potable water may be used as an alternate decontamination method.

Stage 2) A dilute (0.02 normal) hydrochloric or sulfuric acid solution rinse followed by a potable water rinse. Residual acids in used rinse solutions will be neutralized.

Stage 3) A solvent rinse (using an approved solvent, such as ethanol) followed by a final triple rinse with deionized water.

4) At least once per day, for each media being sampled and each decontamination line, collect a QC rinse sample of the final rinse. The sample will be collected using the procedures in Section 4.1 of this SAP.

5) After the sampling equipment has been properly decontaminated, place it on a clean sheet of plastic or other suitable material to air dry. While air drying, loosely cover the equipment with another clean piece of sheeting to minimize the potential for contamination.

6) Upon completion of decontamination of sampling equipment, the buckets and other containers used for temporary storage of the decontamination wash and rinse wastes will be washed with clean detergent solution and rinsed twice with deionized water.

2.7 WASTES GENERATED DURING SAMPLING AND DECONTAMINATION

Wastes and materials generated during sampling and analyses will be managed in a manner consistent with approved Management of Investigation-Derived Wastes practices and approved FEMP hazardous waste management practices. Solid wastes (e.g., personnel protective equipment, plastic sheeting, etc.) will be characterized and placed as appropriate into containers, and stored in a RCRA storage area pending characterization following the FEMP Waste Analysis and Determination Plans. Based on the waste characterizations, wastes will be managed according to all applicable hazardous and solid waste rules and regulations.

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3.0 FIELD DOCUMENTATION AND SAMPLE HANDLING

Sample handling and documentation procedures shall conform to approved FEMP procedures applicable at the time closure activities are conducted. The information in the following sections presents the procedures to follow during and after the samples have been collected.

3.1 FIELD SAMPLING LOGBOOK

A field sampling logbook will be kept and updated to document information pertinent to the RCRA closure sampling activities. At a minimum, the entries in the logbook will include the following:

- Name of supervisor(s) responsible for HWMU management
- Name of FEMP closure project manager
- Maps, drawings, or photographs of the sampling site
- Purpose of sampling (e.g., verification of decontamination)
- Description and location of sampling points
- Description of sampling methods and field sampling activities (e.g., containers, types of samples, etc.)
- Task review meetings
- Documentation of any deviations from this SAP
- Weather conditions at the time samples are collected
- Number, type, and volume of samples taken
- Date and time of collection
- Field sample identification number(s)
- Names of sampling personnel
- Date and time of transfer to sample receiving/shipping area
- Field observations (e.g., spills or other activities nearby)
- Data from field measurements (e.g., pH, specific conductance)
- Signatures of persons responsible for maintaining the logbook.

The logbook will record information sufficient to reconstruct the sampling event without reliance on the collector's memory. The logbook shall be stored and maintained according to FEMP document control procedures.

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3.2 ONSITE HANDLING/PROCESSING PROCEDURES

Sample coolers, along with the signed and completed SWSAR/CR form, will be taken to the FEMP Sample Processing Laboratory. Each person who relinquishes or takes possession of the samples or sample coolers shall sign the Custody Record and record the date and time of transfer.

The FEMP will characterize radiation levels associated with the samples to determine disposition of the samples.

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4.0 QUALITY ASSURANCE AND QUALITY CONTROL

QA/QC procedures are required to identify, evaluate, and control conditions and activities that can affect the quality and validity of the analytical data obtained from sampling and analyses. Validation of data requires accurate records to document procedures and conditions during the sampling and analysis. At a minimum, these records will include the following:

- Updated field sampling logbook
- Properly completed sample labels
- Field and laboratory QA/QC samples
- Completed SWSAR/CR forms.

Quality assurance procedures will include the following:

- Only clean sample containers will be used.
- Clean PPE will be used whenever contact is made with the sampling equipment.
- Sampling containers and collection equipment shall be handled, stored, and maintained in a manner that prevents cross-contamination.
- Any field conditions, events, or activities that may affect analytical results will be documented in the field sampling logbook (see Section 3.1 of this SAP).

Sampling activities will be conducted consistent with applicable FEMP QA/QC procedures as defined in the current revision of the SCQ. Sections 4.1, 4.2, and 4.3 discuss field QA/QC, laboratory QA/QC, and SWSAR/CR forms. respectively.

4.1 FIELD QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

To minimize the potential for cross-contamination between samples and locations, only clean or decontaminated sampling equipment will be used. An equipment rinseate sample will be collected on a daily basis during operations and analyzed for the constituents listed in Table 1-1, to provide QA/QC information concerning the effectiveness of the decontamination process and to identify possible cross contamination

of samples. As a normal practice, it is presumed that the decontamination procedures are adequate for reuse of decontaminated equipment, as needed, even though QA/QC analyses is not complete. The following procedures will be used to collect sampling equipment decontamination rinse samples:

Pour deionized water over and through the cleaned surfaces of the decontaminated sampling equipment.

Collect the deionized water rinseate using an appropriate sample container.

Follow sample container management procedures in Section 2.4 of the SAP.

Blanks will be collected and analyzed as part of normal QC procedures. At a minimum, the following samples will be collected for each sampling event:

- One (1) container blank consisting of a sample of clean deionized water prepared and retained in a non-contaminated area

- One (1) field blank consisting of a grab sample of the deionized rinse water supply (used for sampling equipment rinse), taken into the field and exposed to the airborne contamination that may impact sample data.

To evaluate the impact of field sampling activities on analytical precision (i.e., repeatability of results), field duplicate samples will be collected. At least one (1) duplicate sample of will be collected for every twenty (20) samples collected for a like medium.

4.2 LABORATORY QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

The analytical laboratory shall use the approved SW-846 Methods as specified in the SCQ for the constituents of concern. The laboratory will document the performance and results of laboratory QC samples and analyses. Laboratory samples for QC may include:

- Sample preparation blanks to detect residual contamination of analytical equipment that may affect analytical results
- Duplicate samples prepared in the laboratory to evaluate the precision (i.e., the ability to reproduce analytical results) achieved by the methods used
- Laboratory control and calibration verification samples (to verify calibration of the equipment)
- Matrix-spike samples to evaluate analytical recovery rates.

All pertinent information concerning problems and conditions that may affect the validity of the analytical data must be clearly identified. In addition to laboratory QC and analytical data, information to be provided by the laboratory includes:

- Name of person receiving the sample
- Date and time of sample receipt
- Laboratory sample number (if different from field identification)
- Date and time of sample analysis
- Signature of the laboratory supervisor.

Conditions outside the control of the laboratory that could affect sample quality and validity of analytical results shall also be documented by the laboratory. These conditions include items such as:

- Discrepancies between sample shipping records, sample analytical requests, custody records and the sample shipments as received by the laboratory
- Sample containers and packaging problems, such as broken containers, loose lids, and broken custody seals.

To prevent any laboratory bias, field duplicate samples submitted shall not be identifiable as duplicates in any of the information provided to identify samples or any special conditions/qualifying statements to support the request for analysis. Field duplicate samples will be noted in the field sampling logbook for use in FEMP QA/QC review of analytical reports.

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4.3 SAMPLE ANALYSIS REQUEST/CHAIN-OF-CUSTODY PROCEDURES

Each sample container shall be labeled with the sample number and identification that is consistent with the SWSAR/CR form. Prior to relinquishing possession of a sample, the person that collected the sample shall complete and sign a SWSAR/CR. Each person that accepts custody will also sign and date the custody record. A complete record of custody transfers shall be maintained on the SWSAR/CR form.

All samples taken to the FEMP Sample Processing Laboratory must be accompanied by the completed SWSAR/CR form. An Offsite Sample Analysis Request/Custody Transfer Record will be prepared and accompany samples to be sent offsite for laboratory analyses.

The laboratory conducting the analyses will be responsible for maintaining sample custody logs until samples are returned to the FEMP or disposed after obtaining FEMP approval. The Custody Records will document sample possession from the time of collection through analysis by the laboratory. Records of any custody seals used on sample containers shall be maintained. The laboratory will document the condition of any custody seals on containers that they receive. Laboratories conducting analyses are required to provide the FEMP a copy of all completed laboratory custody records.

The completed sample Analysis Request/Custody Record, Offsite Analysis Request/Custody Transfer Record, and laboratory custody forms will be signed and returned with the analytical report for the samples identified on the form(s). These documents will be filed in the FEMP RCRA HWMU Closure files.

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5.0 HEALTH AND SAFETY

Prior to conducting any field activities at the FEMP, a health and safety assessment must be conducted to characterize existing hazards and conditions. Based on the findings of the health and safety assessment, the Project/Task Specific Health and Safety Plan will specify required health and safety procedures, including PPE, entry and exit requirements, and personnel/PPE decontamination procedures.

As part of the safety assessment, a radiation survey will be conducted for the area to determine radiation protection requirements. Additional screening, including on-site laboratory analyses for radionuclides, may be required to further categorize radiation levels and hazards before the samples can be shipped to an offsite laboratory. Radiation survey procedures and requirements for shipping samples to offsite laboratories for analysis will be in accordance with approved FEMP procedures.

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6.0 ANALYTICAL SUPPORT LEVELS

The intended use of acquired data is to assess the nature of the site and the degree and extent of potential problems resulting from past activities, to evaluate the potential hazard to human health and the environment, to evaluate remedial actions, to choose and implement preferred remedial actions, and to monitor the migration of contaminants and the effectiveness of remedial actions.

DQOs are qualitative and quantitative statements specifying the quality of data required to support decision making. Because they are based on end use of the data to be collected, different uses require different levels of data quality. There are five FEMP-defined analytical levels that will be assigned depending on intended use of the data and the QA/QC methods required to achieve the desired level of quality. These levels are analogous to the 1987 USEPA-defined DQO levels 1 through 5 (USEPA 1987). However, because radionuclides comprise a large proportion of the analyses supporting FEMP programs and projects and because these radionuclide analyses have been used and verified by DOE and DOE contractors for many years, it is appropriate to address these measurements as standard. Therefore, to maintain consistency in definition of DQO levels and to avoid confusion between USEPA and DOE/USEPA programs, DQO levels at FEMP will be referred to as ASLs A through E.

6.1 ASL A (QUALITATIVE FIELD ANALYSIS)

Provides the most rapid (real or short time) results. ASL A is often used for health and safety monitoring at the site, preliminary comparison to applicable or relevant and appropriate requirements (ARARs), initial site characterization to locate areas for subsequent and more accurate analyses, field screening of samples to select those for fixed laboratory analysis, and engineering screening of alternatives (bench-scale tests). These types of data include those generated on site through the use of photo- or flame-ionization detectors (PID or FID), pH, conductivity, alpha and beta-gamma friskers, or radiological wipe samples. ASL A is analogous to USEPA DQO Level 1.

Example: Field screening for alpha, beta, and gamma radiation conducted with portable field equipment provides real time qualitative analysis for the presence or absence of radioactive isotopes.

Example: Field screening for chemical gases in the well bore of groundwater monitoring wells using PIDs provides real time qualitative analysis for presence of volatile compounds (e.g., benzene, toluene).

6.2 ASL B (SEMI-QUANTITATIVE/QUANTITATIVE AND QUALITATIVE ANALYSES)

Provides more QC checks than ASL A and results may be qualitative, semi-quantitative, or quantitative. ASL B can be assigned when rapid turnaround results are needed. FEMP-specified analytical protocols shall be used. There are two sublevels available for specifying QA/QC, data reporting, and data validation requirements.

Sublevel 1 specifies QA/QC, data reporting, and data validation requirements for FEMP-specified analytical protocols, which are similar to those used for ASLs C and D, but with different QA/QC sample type and frequency, QC criteria for acceptance ranges, and requirements for data packages.

Sublevel 2 specifies user-defined and special requirements. The data user shall specify QA/QC, data reporting, and data validation requirements based on intended data use and regulatory requirements. Specific requirements shall be defined in project specific plans (PSPs).

Methods may range from more sophisticated screening techniques to fully defined methods similar to ASL C or D for radiological and non-radiological parameters, but with reduced QA/QC frequency and data reporting requirements for more rapid turnaround times. Also included in ASL B are standard methods (e.g., USEPA 500-series drinking water methods with QA/QC requirements different than those specified for ASLs C and D) and conventional parameter analysis in support of regulatory requirements such as National Pollutant Discharge Elimination System (NPDES) permit monitoring.

Example: Measurement of gross alpha and beta radioactivity in water in compliance with the Safe Drinking Water Act to provide information on drinking water quality.

Example: Determination of volatile halogenated organic compounds (e.g., chloroform) in water by purge and trap gas chromatography without second column confirmation, with a limited suite of field and laboratory QC samples, and a minimal data package.

6.3 ASL C (QUANTITATIVE WITH FULLY DEFINED QA/QC)

Provides data generated with full QA/QC checks of types and frequencies specified for ASL D according to FEMP-specified analytical protocols for radiological and non-radiological parameters. The analytical methods are identical to ASL D for QA/QC sample analysis and method performance criteria. However, the data package does not typically contain raw instrument output but does include summaries of QA/QC sample results. ASL C may be used when analyses require a rigid, well-defined protocol, but where other information is available, so that a complete raw data package validation effort is not required. Laboratories shall be required to retain, in the project file, raw instrument data required to upgrade ASL C reports to ASL D.

Example: Analysis of total uranium by the fluorimetric method with a full set of QA/QC samples as specified for ASL D. A summary data package is provided including QA/QC sample performance without raw instrument output. A limited level of data validation is required because only the summary forms need review.

Example: Determination of VOCs in soil by purge and trap gas chromatography/mass spectrometry with a full complement of QA/QC samples as specified for ASL D. A summary data package is provided including QA/QC sample performance without raw instrument output. A limited level of data validation is required because only the summary forms need review.

6.4 ASL D (CONFIRMATIONAL WITH COMPLETE QA/QC AND REPORTING)

Provides data generated with a full complement of QA/QC checks of specified types and frequencies according to FEMP-specified analytical protocols for radiological and non-radiological parameters. The data package includes raw instrument output for validation of ASL D data. It may be used to confirm data gathered at ASLs B and C and when full validation of raw data is required.

Example: Analysis of total uranium by the fluorimetric method, with a full set of QA/QC samples per analytical batch with analytical results and the full raw data package reported from the laboratory.

Example: Determination of volatile organic compounds in soil or water by purge and trap gas chromatography/mass spectrometry with a full complement of field and laboratory QA/QC samples. A complete raw data package is provided and validated for the analyses.

6.5 ASL E (NON-STANDARD)

Analyses by non-standard protocols that often require method development or validation (e.g., when exacting detection limits or analysis of an unusual chemical compound are required). ASL E methods may be significantly different from those specified for ASLs B, C, or D data. New methods may be developed for ASL E data to allow for parameters or matrices that cannot be analyzed using existing standard methods. This could be caused by interferences, analyses performed outside of accepted requirements for existing methods, or new methods developed to meet site requirements or project-specific requirements that cannot be met by existing analytical methods.

Example: Analysis or evaluation of a geotextile material for suitability to use as a component of a remedial action at the site. Existing evaluation methods may not be adequate to evaluate site-specific needs so development of a new method is required.

Example: Determination of organic compounds (e.g., benzo(a)anthracene) in drinking water at sub-part per billion levels by special method on-column injection gas chromatography/mass spectrometry with selective ion monitoring detection and a full suite of field and laboratory QA/QC samples as required for ASLs C and D data. A complete raw data package may be required for validation.

APPENDIX 4

GUIDELINES FOR PREPARATION OF HEALTH AND SAFETY PLANS

NOTE:

This plan and associated permits shall be reviewed with each worker and be posted at the work site at all times. Review of all of the listed sections is required prior to work start.

CRU3 S&H PLAN GUIDELINE

1.0 CRU3 Description and History
- 1.1 FEMP Site History
- 1.2 Characterization
- 1.3 Define Scope or Goal of the Work
  - 1.3.1 Short Term
  - 1.3.2 Long Term
- 1.4 Goal of this Project

2.0 Work Area (for this project) and Management
- 2.1 Define Work Area within FEMP
- 2.2 Define Management Chain of Command
  - 2.2.1 Program Manager
  - 2.2.2 Project Manager
  - 2.2.3 S&H Officer

3.0 General Safety Requirements
- 3.1 Permits and Postings
- 3.2 Safety Equipment List
- 3.3 Heat Stress
- 3.4 Cold Stress
- 3.5 Material Safety Data Sheets (MSDS) Locations
- 3.6 Illumination
- 3.7 Sanitation at Temporary Worksites
- 3.8 Standard Operating Procedure and Other Requirements

4.0 Site Control

- 4.1 FEMP Requirements
- 4.2 Work Site Requirements for Entry
- 4.3 How Work Site will be defined (Safety Fence - CHAWLWK Fence)
- 4.4 Exclusion Zones

5.0 Training and Education
- 5.1 Required Training for Entry to Site
- 5.2 Required Training to Perform Work in the Defined Work Zones
- 5.3 Operation Training of Construction Type Equipment
- 5.4 Required Safety Meetings
- 5.5 Safety Meetings and Daily Work Plans
- 5.6 Records of Training

6.0 Medical Monitoring and Surveillance
- 6.1 Required Medical Monitoring
- 6.2 Required Medical Records

7.0 Personal Protection Equipment Requirements/Engineering Controls

8.0 Required Monitoring and Action Limits
- 8.1 Air Monitoring
  - 8.1.1 Ambient Air Monitoring
  - 8.1.2 Employee Breathing Zone
  - 8.1.3 Perimeter Air Monitoring
- 8.2 Rad Monitoring

9.0 Handling Drums & Containers
- 9.1 Inspection
- 9.2 Storage
- 9.3 Transportation
- 9.4 Monitoring

10.0 Decontamination
- 10.1 Site Decontamination Requirement

11.0 Hazard (Risk) Assessment and Accident Prevention
- 11.1 Industrial Hygiene Issues (Identify the Physical, Chemical, and Health Hazards)
  - 11.1.1 Explosive Chemical Contaminants
  - 11.1.2 Heavy Metals
  - 11.1.3 Organic

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11.2 Radiological Safety Issues (Identify the Physical, Chemical, and Health Hazards)
11.3 Industrial Safety Issues (Identify the Physical, Chemical, and Health Hazards)
11.4 Fire Protection Issues (Identify the Physical, Chemical, and Health Hazards)
11.5 Nuclear Safety Issues (Identify the Physical, Chemical, and Health Hazards)
11.6 Natural Occurrence Issues (Weather) (Identify the Physical, Chemical, and Health Hazards)
11.7 (Identify and State Action to Correct Each Noted Hazard)

12.0 Emergency/Contingency Plans
- 12.1 Reporting
  - 12.1.1 Numbers
    - 12.1.1.1 Emergency Phone Number
    - 12.1.1.2 Emergency Radio Number
  - 12.1.2 Site Notification Procedure
  - 12.1.3 What/How to Report
- 12.2 Evacuation Routes/Accountability
  - 12.2.1 Rally Point Accountability
  - 12.2.2 Plant Wide Accountability
  - 12.2.3 In Place Accountability
- 12.3 Available Emergency Equipment
  - 12.3.1 Site Equipment
  - 12.3.2 Plant Equipment
  - 12.3.3 Offsite Equipment
- 12.4 Emergency Response
  - 12.4.1 Medical Emergencies
  - 12.4.2 Fire Emergencies
  - 12.4.3 Explosion Emergency
  - 12.4.4 Chemical Emergency
    - 12.4.4.1 Splashes
    - 12.4.4.2 Employee Contamination
  - 12.4.5 Radiological Emergencies
    - 12.4.5.1 Releases
    - 12.4.5.2 Employee Contamination

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12.4.6 Weather Limitations/Adverse Condition
12.4.7 Accident Investigation

13.0 Changes/Amendments to Safety and Health Plan

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