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Environmental Restoration Program

FIRE FIGHTING TRAINING AREA REMOVAL ACTION OPERABLE UNIT 5 WORK PLAN

MOUND PLANT
MIAMISBURG, OHIO

Volume I – Text and Appendices A,B,C,D

June 1994

Final
(Revision 0)

U.S. Department of Energy
Albuquerque Operations Office

EG&G Mound Applied Technologies

ENVIRONMENTAL RESTORATION PROGRAM

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LIST OF ACRONYMS

AM/RSE	Action Memorandum/Removal Site Evaluation
AST	above ground storage tank
ASTM	American Society for Testing of Materials
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
EG&G	EG&G Mound Applied Technologies, Inc.
ER	Environmental Restoration
FFA	Federal Facilities Agreement
FFTA	Fire Fighting Training Area
FSP	Field Sampling Plan
GFI	Ground Fault Interrupter
gpm	gallons per minute
HASP	Health and Safety Plan
HDPE	High Density Polyethylene
IR	Infrared Analyzer
LFI	Limited Field Investigation
NCP	National Contingency Plan
NEMA	National Electrical Manufacturer's Association
OAC	Ohio Administrative Code
OEPA	Ohio Environmental Protection Agency
O&M	Operations and Maintenance
OSC	On-Scene Coordinator
OSHA	Occupational Health and Safety Administration
OU	Operable Unit
ppb	parts per billion
PPE	Personnel Protective Equipment
PTI	Permit to Install
PTO	Permit to Operate
QAPP	Quality Assurance Project Plan
RAPCA	Regional Air Pollution Control Agency
SVOCs	Semi-Volatile Compounds
USEPA	U.S. Environmental Protection Agency
VOCs	Volatile Organic Compounds
WESTON	Roy F. Weston, Inc.

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1.0. INTRODUCTION

1.1. PURPOSE

The Fire Fighting Training Area (FFTA) Site, located near Building 34, is an area being addressed by the Environmental Restoration (ER) Program, Operable Unit 5 (OU-5) investigation at the U.S. Department of Energy (DOE) Mound Plant in Miamisburg, Ohio (Figure 1.1.). Under NCP guidelines, DOE is the lead agency as defined in Executive Order 12580 and has entered into a three-party Federal Facilities Agreement (FFA) (DOE 1993) with the U.S. Environmental Protection Agency (USEPA) and the Ohio EPA (OEPA) to follow applicable sections of CERCLA/SARA.

The purpose of this Work Plan is to describe the technical approach and methods to be implemented to perform a time-critical removal action of soil as specified in the Action Memorandum/Removal Site Evaluation (AM/RSE) for OU-5 FFTA Site dated 8 February 1994.

1.2. BACKGROUND

The FFTA Site includes two concrete containment structures (pits) used for fire fighting training purposes. In the past, fire fighting training operations were conducted using three to five gallons of diesel fuel pumped from an above ground storage tank through underground pipes and into the pits for the purpose of providing fuel for a fire. Fires were extinguished with water from a nearby hydrant. Available information indicated that the pits were operated between 1978 and 1989. A Limited Field Investigation (LFI) was conducted in 1992. The AM/RSE of February 1994 was prepared based on information presented in the LFI Report. Further site characterization information was obtained during a GeoProbe™ Investigation in March 1994 .

1.2.1. Limited Field Investigation

In order to identify the presence and types of contaminants and to provide adequate data to prepare a Remedial Investigation/Field Study (RI/FS) at Mound, the OU-3 Miscellaneous Sites LFI was conducted. The FFTA Site was one of the sites investigated as part of the LFI.

During the LFI, a series of soil borings were performed, and associated soil and water samples were collected in the vicinity of FFTA Pit #1 and Pit #2 as shown on Figure 1.2. Borings were drilled in January

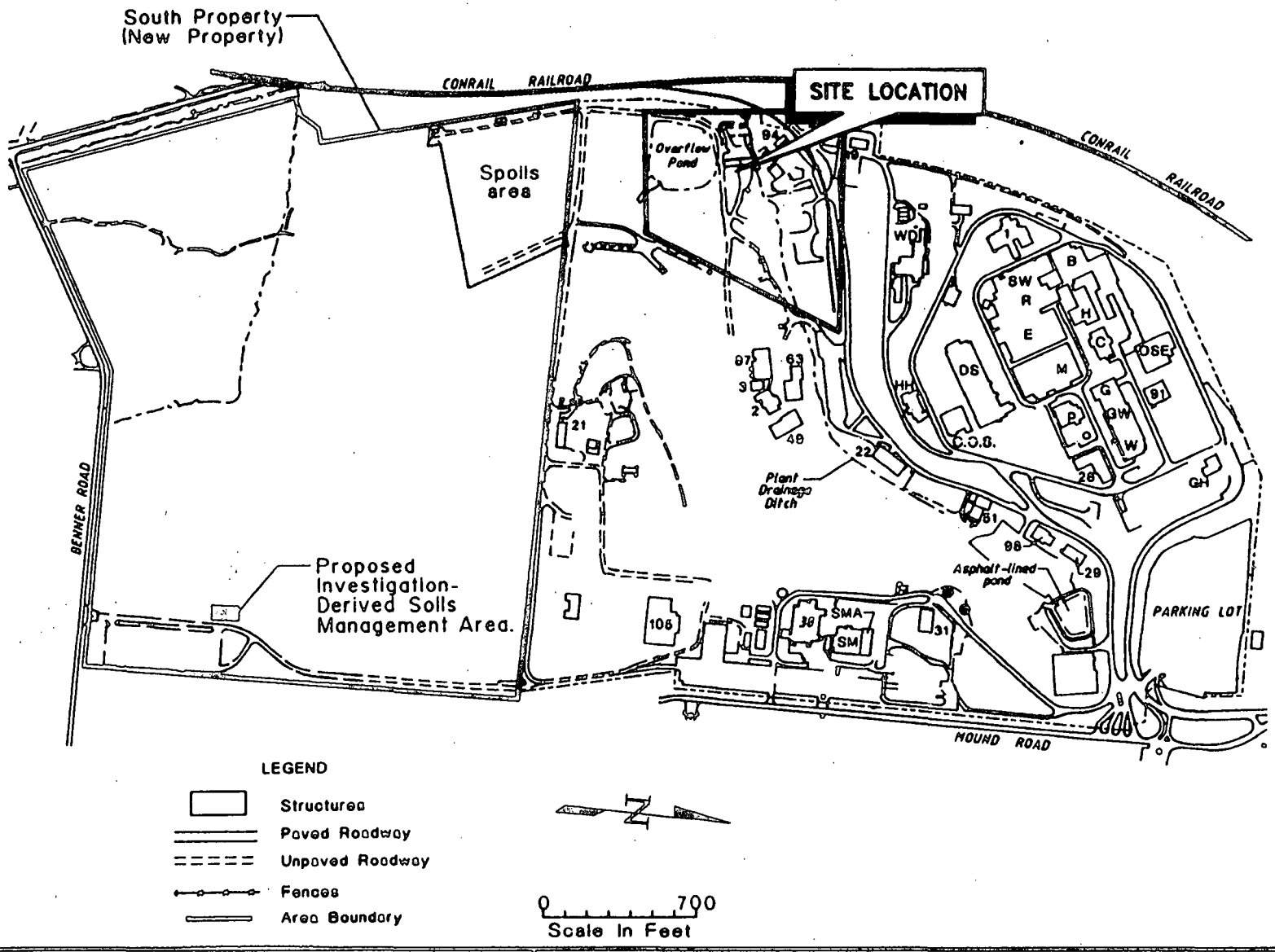

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Figure 1.1.
Fire Fighting Training Area - EG&G Mound Plant

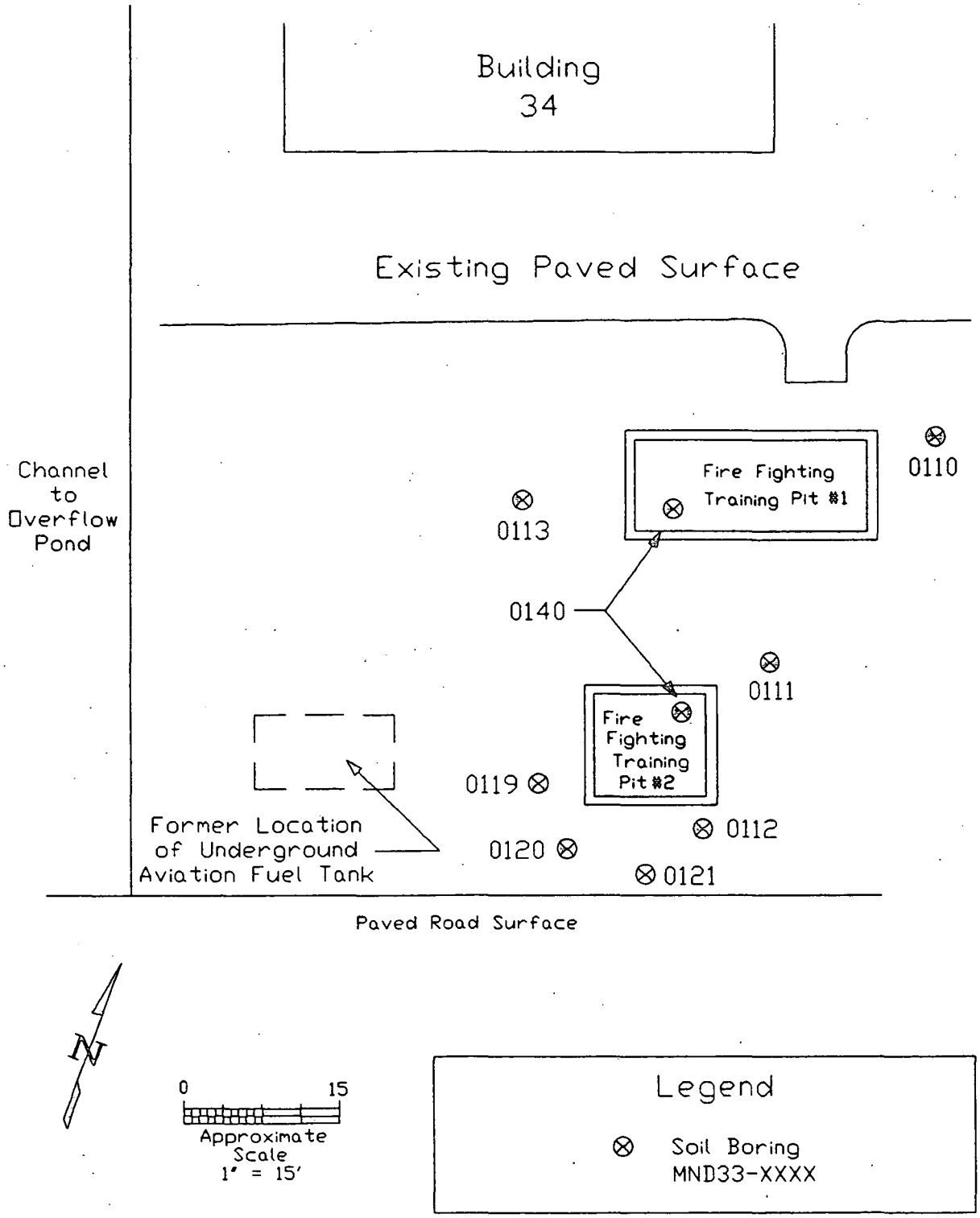

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Figure 1.2.
Limited Field Investigation Soil Boring Locations

1992 and the OU-3 LFI Report was finalized in March 1993 (DOE 1993b). The investigation results indicated that a free-phase petroleum substance was observed at what was thought to be the water table within soil boring MND33-0112 at the sample interval 8 to 10 feet below ground surface (bgs). Boring MND33-0112 was located south and adjacent to Pit #2. Laboratory analytical results indicated that low levels (5.6 to 120 parts per billion (ppb)) of benzene, toluene, ethylbenzene, and xylene (BTEX) were detected within the 8 to 10 foot soil sample interval at boring MND33-0112. The same interval had shown extractable hydrocarbon concentrations of 62 parts per million (ppm) reported as diesel fuel and 2,800 ppm reported as motor oil.

1.2.2. Action Memorandum/Removal Site Evaluation

A Removal Site Evaluation was prepared as specified in Section 300.410 of the NCP (40 CFR 300.410) and incorporated into the Action Memorandum. The Action Memorandum/Removal Site Evaluation (AM/RSE) provided an assessment of the FFTA Site as a potential source for exposure of the general population to petroleum hydrocarbons. The RSE concluded that a threat of potential exposure exists and a removal action is warranted. The AM/RSE quantified the contamination present at the FFTA Site based on the LFI and recommended that a total of approximately 333 cubic yards of soil and an unknown quantity of free product floating on the ground water surface should be removed. The proposed soil to be removed lies under and around Pit #2 and was estimated to measure 20 feet wide by 30 feet long by 15 feet deep. Limited information collected during the LFI indicated that approximately half of the soil to be removed would be saturated with water. A set of four removal alternatives were considered in the AM/RSE assessment: ex-situ biological remediation (bioremediation); in-situ bioremediation; offsite disposal; and administrative controls. Options were evaluated based on cost, implementability, and effectiveness. Ex-situ biological remediation was selected as the option which best complied with the evaluation criteria.

The following four phases of work to be performed at the FFTA Site were adapted from the AM/RSE and modified based on current information. Phase I work has already been completed. Interim waste management issues will be addressed in detail in subsequent sections of this Work Plan.

Phase I

- Conduct an investigation by obtaining soil and water samples from the surface, subgrade, and ground water to define the extent of contamination.
- Investigate the hydrologic conditions of the FFTA Site in order to determine the appropriate depth and location of the free-phase petroleum extraction pumps and dewatering points.

Phase II

- Construct temporary contaminated soil staging area.
- Remove sediment from the FFTA pits and place in temporary staging area.
- Demolish and remove the concrete pits and dispose of debris at an offsite landfill after conducting scarifying operations to remove any petroleum hydrocarbons that may have adhered to the surface of the concrete.
- Excavate contaminated soil and place in temporary staging area.

Phase III

- Construct treatment pads and erect roof structure.
- Relocate soil from temporary soil staging area to treatment pads.
- Operate and maintain treatment area until treatment criteria have been met. This includes the addition of oxygen, nitrogen, phosphorus, and microbial life, as necessary.

Phase IV

- Disposal of treated soil at Mound Spoils Area.
- Site closure.

This Work Plan provides a technical approach to completing the four phases described above.

1.2.3. GeoProbe Investigation

In order to more clearly define the extent of contamination at the FFTA Site, additional characterization information was collected during a GeoProbe™ Investigation in March 1994. This investigation consisted of 18 shallow borings at the FFTA Site. Results revealed that the ground water table was actually lower than 24 feet bgs, well below the proposed excavation depth of 15 feet. Thus, all soil to be removed will be located in the vadose zone, and lowering of the water table will not be required to facilitate excavation.

The water which was encountered was determined to be perched in pockets of granular backfill surrounded by clays with low permeability. Free product was not observed in any of the borings. Since no free product was encountered, the oil/water separator and associated facilities will not be included in the removal action. Sampling was also performed on the sediments (material contained within the two pits). Analytical results

did not indicate elevated radiation levels in the sediments, therefore, the sediment will be biologically treated with the other potentially-contaminated soil. Based on the field screening and analytical results, an area 20 feet wide by 30 feet long by 14 feet deep was determined to require excavation and subsequent treatment.

2.0. SCOPE OF WORK

2.1. INTRODUCTION

This Work Plan was developed in support of a removal action. It describes the design criteria for the construction of the treatment pads and associated facilities for the remediation of the FFTA Site. As required by the NCP to support the removal action, included as appendices to this Work Plan are Health and Safety Plans (HASP), Sampling and Analysis Plans (SAP), a Quality Assurance Project Plan (QAPP), and Construction Drawings and Specifications. This section describes Phases II and III of the removal action.

2.2. SITE PREPARATION

Site preparation activities will be conducted prior to excavation and will include a horizontal and vertical construction survey, and the installation of silt fences, hay bales, and other erosion and sedimentation control facilities. A decontamination area will be established on an existing concrete pad and all required safety equipment will be mobilized at the FFTA Site. The temporary soil staging area for excavated soil will be constructed. Building 34 electrical system will be upgraded and extended to the treatment pad area. An existing potable water source in Building 34 will be accessed and extended to the treatment pad area.

2.3. EXCAVATION

Removal activities will include removal of pit sediments within both concrete pits and relocation of pit to the temporary soil staging area. Concrete from both pits will be scarified to remove petroleum hydrocarbon contamination that might have adhered to the surface. The scarified material will be removed and staged with other potentially-contaminated soil and sediment. The concrete pits will then be dismantled and disposed of offsite as construction debris at a municipal landfill.

Underground fuel supply and drain lines associated with the FFTA pit operations will be decontaminated prior to being removed. Soil excavated in order to facilitate removal of the underground lines will be staged at the temporary soil staging area. Decontaminated piping will be segregated and disposed of offsite as construction debris at a municipal landfill.

Contaminated soil associated with FFTA Pit #2 operations will be removed to the limits of excavation as determined by the GeoProbe Investigation. Field screening and subsequent excavation will be performed

on the base and sidewalls of the excavation until total petroleum hydrocarbon (TPH) field screening results indicate that the cleanup criteria has been achieved (field screening result less than 10 ppm) as defined in the AM/RSE. When the field screening level has been reached and prior to backfill, verification samples will be collected to verify that the 40 ppm (laboratory analysis) cleanup criteria has been achieved. Backfill and compaction to grade of the pit and excavated drain lines will be accomplished with standard construction fill obtained from an offsite approved source.

2.4. STAGING

Potentially-contaminated soil, sediment, and scarification materials will be placed in the temporary staging area. Prior to relocation of staged materials to the treatment pads, samples will be collected and analyzed to determine the amount of microbial material and nutrients required for treatment.

2.5. CONSTRUCTION

Two monolithically combined treatment pads, including a roof structure and facilities for stormwater runoff and leachate collection, will be constructed on the hillside north of temporary staging area.

2.6. OPERATION AND MAINTENANCE

Operation and maintenance (O&M) of the treatment facilities area will begin with transferring soil from the temporary staging area to the treatment pads. Microbes and nutrients will be added as necessary and tilled into the soil. O&M activities will include periodic tilling of the soil to provide oxygen to the microbes. Other activities will include sampling and testing the soil to determine the progress of the remediation. Water and nutrients will be monitored during this process and added as necessary to the soil. Once verification sample results indicate that the 40 ppm TPH treatment criterion has been achieved, the soil will be relocated to the Mound Spoils Area.

2.7. ON-SCENE COORDINATION REPORT

At the completion of treatment of all excavated soil and sediment, the treatment area will be returned to the control of Mound. An On-Scene Coordinator's (OSC) Report will be drafted and submitted to the OSC for comments. This report will be written in accordance with the requirements specified in 40 CFR 300.165.

3.0. DESIGN CRITERIA

3.1. SUBSURFACE INVESTIGATION

During the OU-3 Limited Field Investigation, petroleum hydrocarbon contamination of the surface and subsurface soil and ground water was encountered in the area of Pit #2. Levels of contamination were such that EG&G Mound is undertaking this removal action consistent with NCP requirements. As part of the removal action, a subsurface GeoProbe Investigation was utilized to better define the parameters required for the Removal Action Work Plan. The specifics of the GeoProbe Investigation are described in the Field Sampling Plan (FSP) for Determination of Extent of Contamination, included as Appendix C of this Work Plan. A summary of the GeoProbe Investigation is presented below and is Phase I of the removal action.

3.1.1. Objectives

The subsurface investigation was designed to better define the extent of petroleum hydrocarbon contamination in surface and subsurface soil and ground water in the vicinity of FFTA Pit # 2. Specific objectives included the following:

- Determination of the vertical and horizontal extent of petroleum hydrocarbon contamination;
- Determination of the ground water level;
- Determination of the presence of free-floating product on the ground water table;
- Collection of surface and subsurface soil and ground water samples for on-site analytical testing, offsite confirmatory analysis, and offsite geotechnical testing; and
- Installation of piezometers for ground water level monitoring as part of the dewatering effort.
- Confirm existence of elevated levels of radionuclides in the pit sediments.

The subsurface investigation was conducted using the GeoProbe™ system. The GeoProbe system mounts on the back of a pick-up truck and hydraulically pushes a one-inch diameter core sampler to depths up to 24 feet bgs. The GeoProbe allows for more information to be collected when going to limited depths over a similar period of time and at reduced cost when compared to traditional drilling technologies.

3.1.2. Field Methodology

The subsurface investigation included the following activities:

- Establishment of a sampling grid;
- Surface and subsurface soil sample collection;
- Field screening and confirmation analytical laboratory chemical analysis of soil;
- Geotechnical testing of soils.

Sample Grid and Locations - A sampling grid was established at Pit # 2 to define the soil and ground water sampling locations. Sample grid nodes were spaced at 10-foot intervals resulting in an initial total of 28 sampling locations as shown in Figure 2.1 of the FSP, which is included as Appendix C to this Work Plan. Sampling proceeded outward from the pit area until field testing results showed nondetectable petroleum hydrocarbon contamination. Actual boring locations were modified in the field to avoid concrete structures (pits) and underground lines. A secondary sampling grid was then overlaid on the initial grid at 5-foot interval spacing only within those areas identified as being contaminated. This was done to more precisely define the vertical and horizontal extent of petroleum hydrocarbon contamination. Surface and subsurface soil samples were collected at set intervals from each GeoProbe location to a maximum depth of 24 feet. The actual method of soil collection is described in the FSP. A total of 20 points on the grid were sampled with the GeoProbe, plus the sediments in each pit.

Sample Analysis - The soil samples were field analyzed using a Horiba Occma-220 Infrared (IR) Analyzer consistent with modified USEPA Method 418.1. The results of the field analysis is shown on Table III.1. Sample Screening results were plotted to provide tentative vertical and horizontal extent of contamination. These plots are shown on Sheet G4 of the Contract Drawings included in Appendix F.

A total of twelve samples (eight soil, two sediment, and two water) were sent to an analytical laboratory for confirmatory analysis of total petroleum hydrocarbons, USEPA Method 418.1, and BTEX. The results of those analyses are shown on Tables III.2 and III.3. Table III.3 also shows sample results from previous investigations at wells in the vicinity of FFTA.

Geotechnical samples were selected from two representative hydrogeologic zones: a composite of the 4.0-6.0 ft bgs and a composite of the 8.0-10.0 ft bgs. The geotechnical samples were subjected to testing for

TABLE III.1
FFTA SAMPLE SCREENING RESULTS
(RESULTS BY COORDINATES)

COORDINATE	DEPTH (FT)	DATE	TIME	TPH
35,10	0–2'	7 MAR 94	1230	36 / 34.5
35,10	2–4'	7 MAR 94	1255	89 / 97
35,10	4–6'	7 MAR 94	1315	>150 \ >300
35,10	6–8'	7 MAR 94	1345	146
35,10	8–10'	7 MAR 94	1400	>150 \ >300 \ 600*
35,10	10–12'	7 MAR 94	1545	>150
35,10	12–14'	7 MAR 94	1605	15
35,10	14–16'	7 MAR 94	1630	6
35,10	16–18'	7 MAR 94	1645	9
35,10	18–20'	7 MAR 94	1710	7
35,0	14–16'	7 MAR 94	1700	7
35,0	12–14'	7 MAR 94	1715	7
35,0	10–12'	7 MAR 94	1730	6
35,0	8–10'	7 MAR 94	1740	8
35,0	6–8'	7 MAR 94	1750	7
35,0	12–14'	7 MAR 94	1810	8
35,0	4–6'	7 MAR 94	1820	9
35,0	0–2'	8 MAR 94	745	35
35,20	2–4'	7 MAR 94	1830	9
35,20	10–12'	8 MAR 94	800	33
35,20	8–10'	8 MAR 94	815	16
35,20	6–8'	8 MAR 94	845	16
35,20	4–6'	8 MAR 94	850	111
35,20	2–4'	8 MAR 94	900	>150
35,20	0–2'	8 MAR 94	907	39
35,30	0–2'	8 MAR 94	925	22
35,30	12–14'	8 MAR 94	1015	13
35,30	14–16'	8 MAR 94	1055	9
35,30	10–12'	8 MAR 94	1100	13
35,30	2–4'	8 MAR 94	1105	10
35,30	6–8'	8 MAR 94	1125	10
35,30	8–10'	8 MAR 94	1135	12
35,30	4–6'	8 MAR 94	1140	5
20,10	0–2'	8 MAR 94	1150	1
20,10	2–4'	8 MAR 94	1200	10
20,10	4–6'	8 MAR 94	1205	1
20,10	10–12'	8 MAR 94	1220	1
20,10	16–18'	8 MAR 94	1230	2
20,10	14–16'	8 MAR 94	1230	6
20,10	6–8'	8 MAR 94	1245	7
20,10	8–10'	8 MAR 94	1305	1
20,10	12–14'	8 MAR 94	1310	16

TABLE III.1
FFTA SAMPLE SCREENING RESULTS
(RESULTS BY COORDINATES)
Continued

COORDINATE	DEPTH (FT)	DATE	TIME	TPH
20,20	0–2'	8 MAR 94	1430	0
20,20	2–4'	8 MAR 94	1435	0
20,20	14–16'	8 MAR 94	1440	0
20,20	4–6'	8 MAR 94	1445	1
20,20	6–8'	8 MAR 94	1450	1
20,20	8–10'	8 MAR 94	1455	0
20,20	10–12'	8 MAR 94	1500	0
20,20	12–14'	8 MAR 94	1505	0
50,20	4–6'	8 MAR 94	1510	6
50,20	0–2'	8 MAR 94	1525	5
50,20	2–4'	8 MAR 94	1530	1
50,20	8–10'	8 MAR 94	1535	0
50,20	6–8'	8 MAR 94	1540	1
50,20	10–12'	8 MAR 94	1620	4
50,10	14–16'	8 MAR 94	1730	6
50,10	12–14'	8 MAR 94	1740	6
50,10	10–12'	8 MAR 94	1750	4
50,10	8–10'	8 MAR 94	1810	12
50,10	6–8'	8 MAR 94	1820	6
50,10	4–6'	8 MAR 94	1830	0
50,10	2–4'	8 MAR 94	1840	4
50,10	0–2'	8 MAR 94	1900	2
41,4	0–2'	9 MAR 94	1000	18
41,4	2–4'	9 MAR 94	1010	7
41,4	4–6'	9 MAR 94	1015	6
41,4	6–8'	9 MAR 94	1020	6
41,4	14–16'	9 MAR 94	1025	6
41,4	12–14'	9 MAR 94	1030	6
41,4	10–12'	9 MAR 94	1040	6
41,4	8–10'	9 MAR 94	1045	6
50,0	0–2'	9 MAR 94	1115	6
50,0	2–4'	9 MAR 94	1120	6
41,26	0–2'	9 MAR 94	1210	18
41,26	2–4'	9 MAR 94	1220	12
41,26	4–6'	9 MAR 94	1225	9
41,26	6–8'	9 MAR 94	1235	7
41,26	8–10'	9 MAR 94	1250	7
41,26	10–12'	9 MAR 94	1300	7
41,26	12–14'	9 MAR 94	1310	8
41,26	14–16'	9 MAR 94	1320	9
41,26	16–18'	9 MAR 94	1325	10
41,26	18–20'	9 MAR 94	1335	6

TABLE III.1
FFTA SAMPLE SCREENING RESULTS
(RESULTS BY COORDINATES)
Continued

COORDINATE	DEPTH (FT)	DATE	TIME	TPH
35,25	6–8'	9 MAR 94	1535	2
35,25	8–10'	9 MAR 94	1540	0
35,25	10–12'	9 MAR 94	1550	0
35,25	12–14'	9 MAR 94	1555	0
35,25	14–16'	9 MAR 94	1600	0
35,25	0–2'	9 MAR 94	1635	5
35,25	2–4'	9 MAR 94	1640	2
35,25	4–6'	9 MAR 94	1645	2
35,5	14–16'	9 MAR 94	1525	2
35,5	0–2'	9 MAR 94	1610	16
35,5	2–4'	9 MAR 94	1605	6
35,5	4–6'	9 MAR 94	1610	3
35,5	6–8'	9 MAR 94	1615	2
35,5	8–10'	9 MAR 94	1700	4
35,5	10–12'	9 MAR 94	1710	0
35,5	12–14'	9 MAR 94	1715	0
25,10	12–14'	9 MAR 94	1705	17
25,10	10–12'	9 MAR 94	1720	15
25,10	8–10'	9 MAR 94	1730	6
25,10	6–8'	9 MAR 94	1740	6
25,10	4–6'	9 MAR 94	1750	4
25,10	2–4'	9 MAR 94	1800	5
25,10	0–2'	9 MAR 94	1810	14
25,10	14–16'	9 MAR 94	1820	6
25,20	0–2'	10 MAR 94	1245	10
25,20	2–4'	10 MAR 94	1245	>150
25,20	4–6'	10 MAR 94	1300	8
25,20	6–8'	10 MAR 94	1305	8
25,20	8–10'	10 MAR 94	1310	3
25,20	10–12'	10 MAR 94	1315	8
25,20	12–14'	10 MAR 94	1320	4
25,20	14–16'	10 MAR 94	1321	4
25,27	0–2'	10 MAR 94	1322	19
25,27	2–4'	10 MAR 94	1325	9
25,27	4–6'	10 MAR 94	1327	2
25,27	6–8'	10 MAR 94	1330	3
25,27	8–10'	10 MAR 94	1332	3
25,27	10–12'	10 MAR 94	1334	3
25,27	12–14'	10 MAR 94	1335	2
25,27	14–16'	10 MAR 94	1337	0

TABLE III.1
FFTA SAMPLE SCREENING RESULTS
(RESULTS BY COORDINATES)
Continued

COORDINATE	DEPTH (FT)	DATE	TIME	TPH
25,15	0–2'	10 MAR 94	1339	15
25,15	2–4'	10 MAR 94	1340	106
25,15	4–6'	10 MAR 94	1342	9
25,15	6–8'	10 MAR 94	1345	5
25,15	8–10'	10 MAR 94	1450	6
25,15	10–12'	10 MAR 94	1500	7
25,15	12–14'	10 MAR 94	1500	0
25,3	0–2'	10 MAR 94	1640	15
25,3	2–4'	10 MAR 94	1740	4
25,3	4–6'	10 MAR 94	1800	0
25,3	6–8'	10 MAR 94	1810	0
25,3	8–10'	10 MAR 94	1825	0
25,3	10–12'	10 MAR 94	1840	0
25,3	12–14'	10 MAR 94	1850	0
25,3	14–16'	10 MAR 94	1900	0
41,4	0–2'	10 MAR 94	2010	11
35,10	10–12'	10 MAR 94	2025	2
20,20	2–4'	10 MAR 94	2030	1
25,20	2–4'	10 MAR 94	2035	90
35,10	6–8'	10 MAR 94	2055	90
50,20	10–12'	11 MAR 94	935	0
35,5	8–10'	11 MAR 94	1010	5
25,15	2–4'	11 MAR 94	1035	330*
Tmg Pit #1		11 MAR 94	1025	14
Tmg Pit #2		11 MAR 94	1030	61
Tmg Pit #2		11 MAR 94	1035	115
LOG_BOOK.WK3				

* – Estimated Value

TABLE III.2

EG&G MOUND FIRE FIGHTING TRAINING AREA

SUMMARY OF LABORATORY SOIL CONFIRMATION ANALYSES

SITE LOCATION	Benzene (µg/Kg)	Toluene (µg/Kg)	Ethylbenzene (µg/Kg)	Xylene (µg/Kg)	TPH mg/Kg
FFTA (41,4) 0-2'	6U	1J	6U	6U	46
FFTA (25,20) 2-4'	6U	6U	6U	6U	41
* FFTA (35,10) 10-12'	6U	6U	6U	6U	17
* FFTA (35,10) 6-8'	4J	5J	4J	20	130
* FFTA (20,20) 2-4'	6U	6U	6U	6U	7.9
* FFTA (50,20) 10-12'	6U	2J	6U	6U	24
* FFTA (35,5) 8-10'	6U	180	31	130	37
* FFTA (25,15) 2-4'	6U	3J	6U	4J	22
Training Pit #1	6U	6U	6U	6U	57
Training Pit #2	6U	6U	6U	6U	1300

* - Internal standard outside criteria.

U - Result not detected at reported limit.

J - Estimated value (below reporting limit).

TABLE III.3

EG&G MOUND FIRE FIGHTING TRAINING AREA

SUMMARY OF LABORATORY WATER CONFIRMATION ANALYSES

SITE LOCATION	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Xylene µg/L	TPH mg/L
FFTA (55,0) GW	5U	5U	5U	5U	---
FFTA (25,15) GW	5U	15	5U	5U	---

* Safe Drinking Water Standard: Toluene (MCL) = 1000 µg/L

WELLS IN VICINITY OF FFTA

(FROM PREVIOUS INVESTIGATIONS)

WELL	TCE µg/L	FCE µg/L	CCL4 µg/L
125	1.2U	0.3U	1U
151	1.2U	1U	1U
316	DRY	DRY	DRY
379	2.8	2.7	3.4
380	1.2U	0.3U	1U
MCL	5	5	5

U - Less than detection limit listed

Modified Proctor Density, falling head permeability, percent moisture, Atterberg Limits, and grain size distribution. A summary of the analytical results is provided in Table III.4. These physical tests define strength and flow characterizations of the subsurface soils to be used in the final design of the removal action.

In order to determine the extent of soil requiring removal, the field analytical results were compared to the laboratory analytical results. Figure 3.1 shows a plot of the laboratory results versus the field results. Based on a comparison of the two curves, it was determined that a field reading of 10 ppm compares to the 40 ppm TPH criteria stated in the AM/RSE. Thus, a 10 ppm field analytical result will be used as the limiting concentration for soil removal.

Ground water was not encountered during the investigation. Based on the GeoProbe findings, piezometers originally anticipated to be installed to monitor the ground water are no longer necessary.

One sample was taken of the sediments from each of the pits and analyzed for radionuclides. The results of these analyses are shown on Table III.5. The activities of all the analytes were below both background and quantitation limits. Potassium-40 would be close to quantitation limit if the maximum uncertainty was added to the activity but still well below background. Strontium-90, with the addition of maximum uncertainty, would be near background but below the quantitation limit. Therefore, it was concluded that radionuclides are not a concern in the pit sediments.

3.2. PERMITS

OEPA requires the submission of two permit applications, a Permit To Install (PTI) and a Permit To Operate (PTO), for the biological remediation of petroleum-contaminated soil. Both permit applications deal with the creation/installation of a process (e.g. bioremediation in a land cell) which creates a release of an air contaminant, in this case, volatile and semi-volatile organic compounds (VOCs and SVOCs). Each permit application will be discussed in the following subsections.

3.2.1. Permit To Install

A Permit To Install (PTI), as required by Ohio Administrative Code (OAC) 3745-31-02, must be obtained for the installation of a process (e.g. bioremediation) which creates a new air contaminant source. The remedial effort to be conducted at the treatment pads may cause the release to the atmosphere of VOCs and SVOCs. This release requires the submission of a PTI unless the process is specifically exempted or granted a discretionary exemption. Under OAC 3745-31-03 (A) (1) (nn), remedial activities conducted in compliance with CERCLA Section 121 (e) are

Table III.4
Geotechnical Properties Summary

Sample ID/Fication	Modified Proctor		In-situ Moisture Content, %	Particle Sizes %			
	Maximum Dry Density, pcf	Optimum Moisture Content, %		Gravel (3"-4")	Sand (#4-#200)	Silt (#200-2μm)	Clay (<2μm)
FFTA Grid 4.0-6.0 ft bgs	143.1	6.1	8.3	15	38	34	13
FFTA Grid 8.0-10.0 bgs	144.8	6.0	8.2	21	35	32	12

Sample ID/Fication	Atterburg Limits			Recompaction Densities		Conductivity * Hydraulic cm/sec
	Liquid Limit	Plasticity Limit	Plasticity Index	Wet Unity Weight, pcf	Dry Unit Weight pcp	
FFTA Grid 4.0-6.0 ft bgs	19	13	6	142.9	132.1	7.5×10^{-8}
FFTA Grid 8.0-10.0 bgs	18	10	8	144.3	133.8	3.9×10^{-7}

* Laboratory recompacted at approximately 92% of modified dry density and 2% over optimum moisture content.

Figure 3.1

FFTA Field Data to Laboratory Data Comparison
Project: 05376-045-002
14 April 1994

Source of Data	41,4	35,10	20,20	25,20	35,10	50,20	35,5	25,15	Tmg Pit#1	Tmg Pit#2	Ave.
Field Data	11	2	1	90	90	0	5	330	14	115	65.8
Laboratory Data	45	17.3	7.9	40.8	130	24.3	37.4	22.2	56.7	1310	169.16
Difference	-34	-15.3	-6.9	49.2	-40	-24.3	-32.4	307.8	-42.7	-1195	-103.36
Relative Percent Difference	-121.43	-158.55	-155.06	75.2294	-36.364	-200	-152.83	174.787	-120.79	-167.72	NA
Absolute RPD	121.429	158.549	155.056	75.2294	36.3636	200	152.83	174.787	120.792	167.719	136.2756

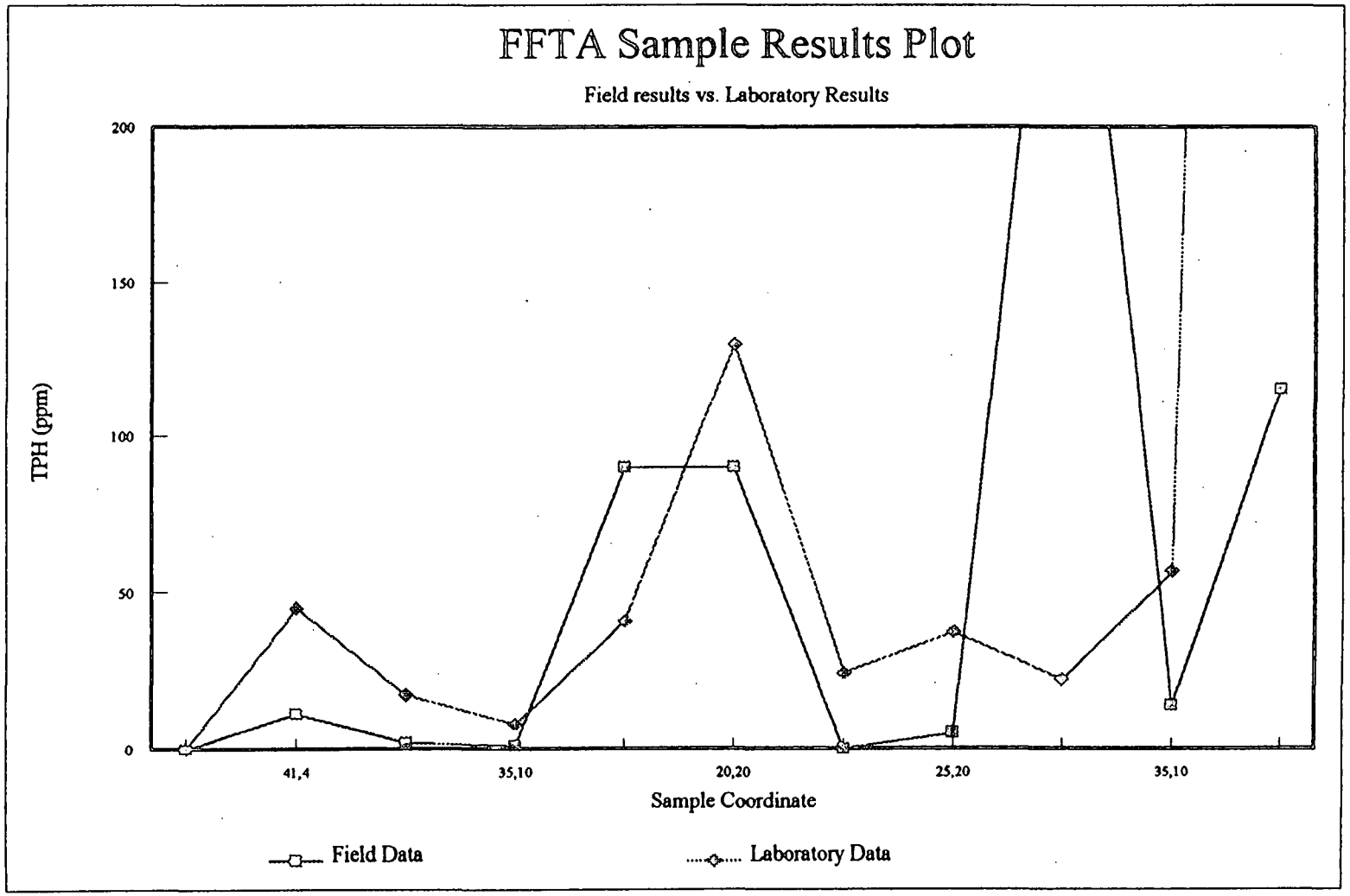


TABLE III.5
FFTA Radiological Results Evaluation

Analyte	Quantitation Limit	Training Pit #1			Training Pit #2		
		Activity	Uncertainty	Background	Activity	Uncertainty	Background
Thorium-232	1.0	0.077	0.023	1.4	0.027	0.012	1.4
Thorium-230	1.0	0.145	0.03	2.8	0.086	0.02	2.8
Thorium-228	1.0	0.057	0.024	3	0.043	0.014	3
Uranium-238	0.6	0.079	0.019	1.2	0.112	0.02	1.2
Uranium-235	0.6	0.0035	0.0051	0.11	0.0062	0.0046	0.11
Uranium-234	0.6	0.102	0.022	1.1	0.09	0.018	1.1
Plutonium-239	1.0	0.204	0.027	0.18	0.0029	0.0029	0.18
Plutonium-238	1.0	0.0027	0.0039	0.13	0.037	0.01	0.13
Americium-241	1.0	<MDA		<MDA	<MDA		<MDA
Bismuth-207	1.0	<MDA		<MDA	<MDA		<MDA
Bismuth-210M	1.0	<MDA		<MDA	<MDA		<MDA
Cobalt-60	1.0	<MDA		1	<MDA		1
Cesium-137	1.0	<MDA		0.35	<MDA		0.35
Potassium-40	10	8.9	1.6	37	5.1	2.2	37
Radium-226	0.3	<MDA		2	<MDA		2
Tritium	50	0.167	0.059	1.6	<MDA		1.6
Strontium-90	1.0	0.35	0.43	0.72	0.33	0.37	0.72

Notes:

(1) Units are pCi/g

(2) Analysis was performed by Enseco-RMAL.

(3) Reported results based on FAX received on 8 June 1994 from QuantaLex

(4) Laboratory determined units for Pb-214 and Bi-214. These results are not target nuclides.

(5) Background values are the mean plus or minus 3 times the standard deviation (based on the OU9 Background Soils Report)

(6) Quantitation limits were derived from the FFTA QAPP.

(7) MDA-Minimum Detectable Activity

granted a permanent exemption from all Federal, state, and local permits. However, under the FFA, it was agreed that Mound would comply with the substantive requirements of all permits. Therefore, a letter indicating exemption from the PTI will be prepared and submitted to OEPA and its local representative, the Regional Air Pollution Control Agency (RAPCA) and will include all the substantive required information.

3.2.2. Permit To Operate

A Permit To Operate (PTO), as required by OAC 3745-35-02, must be obtained for the operation of a process (e.g. bioremediation) which creates a new air contaminant source. As stated above, the remedial effort may cause the release VOCs and SVOCs to the atmosphere. There are no exemptions or variances identified in OAC 3745-35-03 and 3745-35-05 for CERCLA removal actions as is the case for a PTI. However, there is a rule for pollution control devices such that if the emission is under the 15 pounds per hour of VOCs rule for pollution control devices a PTO is not required. Based on calculations for the rate of emission, this process would be exempt. A summary of the calculations is shown in Table III.6. Under CERCLA Section 121 (e), remedial actions conducted under CERCLA are granted a permanent exemption from all Federal, state, and local permits. However, the FFA does require substantive compliance with all Federal, state, and local permits. In accordance with directives contained within the FAA, information required for the submission of a PTO application, including an air emission estimation in accordance with USEPA guidelines, will be submitted to OEPA and its local representative, the Regional Air Pollution Control Agency (RAPCA) indicating intentions to comply with the substantive requirements of the PTO.

3.2.3. Mound Permit

An excavation/digging permit must be obtained from the EG&G Mound Construction Safety Inspector prior to the start of any work which will disturb the surface of the earth. This includes work under any sidewalks, pavement, or concrete slab outside of a roofed structure. This also includes any type of drilling or other penetrative work. When excavation is to occur within 5 feet of an existing underground line, manual digging will be required until the line is located. Excavation/Digging permits are to be maintained at the site until the completion of work and then sent to EG&G Mound Health Physics to become part of the permanent record.

3.3. SITE PREPARATION

The preliminary field effort will consist of the following activities:

- Site construction survey

TABLE III.6

Air Emission Estimation Equation

Compound:	Benzene	Toluene	Ethylbenzene	Xylene
Temperature (degrees C):	15.6	15.6	15.6	15.6
Diffusion Coefficient (cm ^ 2/sec):	0.0881	0.0727	0.0646	0.059
Total Porosity (%):	0.19	0.19	0.19	0.19
Moisture Content (%):	0.08	0.08	0.08	0.08
Air–filled Porosity (%):	0.11	0.11	0.11	0.11
Maximum Test Result (ppb):	4	180	31	130
Concentration (lbs/cu. ft.):	1.35E–06	6.06E–05	1.04E–05	4.38E–05
Soil Depth (feet):	1.5	1.5	1.5	1.5
Vapor Flux (lbs/hr–ft ^ 2):	1.40E–09	5.19E–08	7.91E–09	3.04E–08
Surface Area (sq. ft.):	6,425	6,425	6,425	6,425
Emission Rate (lbs/hr):	9.00E–06	3.33E–04	5.08E–05	1.96E–04

EST. TOTAL EMISSION RATE : 5.89E–04 lbs/hr.

Reference Source: Office of Underground Storage Tanks. June 1989. Estimating Air Emmissions From Petroleum UST Cleanups. U.S. Environmental Protection Agency.

Assumptions:

1) Soil temperature = 60 degrees F.
2) Mositure Content = 8% (from BMI physcial testing)
3) Total Porosity --> MC = 8% + ZAV = 11%
4) Concentration (lbs/cu.ft.) --> Maximum Test Resul (ppb) *3.36E–07

- Upgrading existing electric power supply for use on the project;
- Construction of erosion and sedimentation control measures (i.e. silt fence, hay bales, and erosion control matting);
- Establishment of a decontamination area;
- Clearing and marking of underground lines and excavation areas;
- Delivery of safety equipment (i.e. barricades with flashing lights, safety fencing, and PPE disposal drums); and
- Posting of safety notices, emergency numbers, and route to hospital.

3.3.1. Decontamination Area

A decontamination area will be established before site removal activities begin. An existing concrete pad used for the storage of steel plates is located between the Building 34 addition and the Fire Fighting Training Areas (Figure 1.2.). The steel plates will be relocated. The concrete pad will be covered with 20-mil polyethylene and used for decontamination activities. Personnel decontamination, construction equipment, and general equipment procedures for the FFTA Site will be conducted in accordance with Mound Plant ER Program Standard Operating Procedures 1.6, General Equipment Decontamination, and 1.8, Personnel Decontamination Level D Protection, and the WESTON HASP.

3.3.2. Erosion and Sedimentation Control

During the site operation, including cut and fill operations, sediment barriers and temporary vegetative cover for soil stabilization will be installed until final seeding occurs. Before earthwork construction activities are to occur, a silt fence will be installed around the downgradient perimeter of the treatment area to intercept and detain small amounts of sediment from unprotected areas of the site.

In order to prevent stormwater runoff from impacting the treatment pads during construction and operation, a berm with erosion and sedimentation control matting will be installed upgradient of the treatment pad area and will extend the entire width of the treatment pad, slope toward the south, and discharge into the existing drainage swale along the south side of the road.

In addition, hay bales will be placed in the area where runoff discharge occurs, downslope of the treatment pad area. Temporary vegetative cover (i.e., seeding) will be established on exposed soils outside of the treatment pads that have the potential for causing offsite erosion damage.

3.3.3. Safety Equipment/Lighting

To ensure compliance with regulations and to ensure worker safety, various types of safety equipment will be used. During excavation of the contaminated soils, the excavation area will be delinected with safety fencing to restrict access. Because of the close proximity of the excavation to the roadway, lighted barricades with reflective surfaces will be used on a 24-hour basis while the pit excavation is taking place. Guardrail will be installed along the south and east edges of the access road adjacent to the treatment pad area. In addition, shoring or sheet piling will be provided during excavation activities to ensure that sidewall integrity and roadway stabilization is maintained. In accordance with OSHA excavation regulations, the shoring or sheet piling utilized will be certified by a registered professional engineer. Documentation will be submitted which specify the depth, soil, and conditions that the shoring or piling is designed to withstand.

All equipment on site will conform to Mound safety standards and be available for inspection by Mound Safety Personnel.

Direct air monitoring and radiation instruments will be used as specified in the WESTON HASP (Appendix B) and SAP (Appendix D).

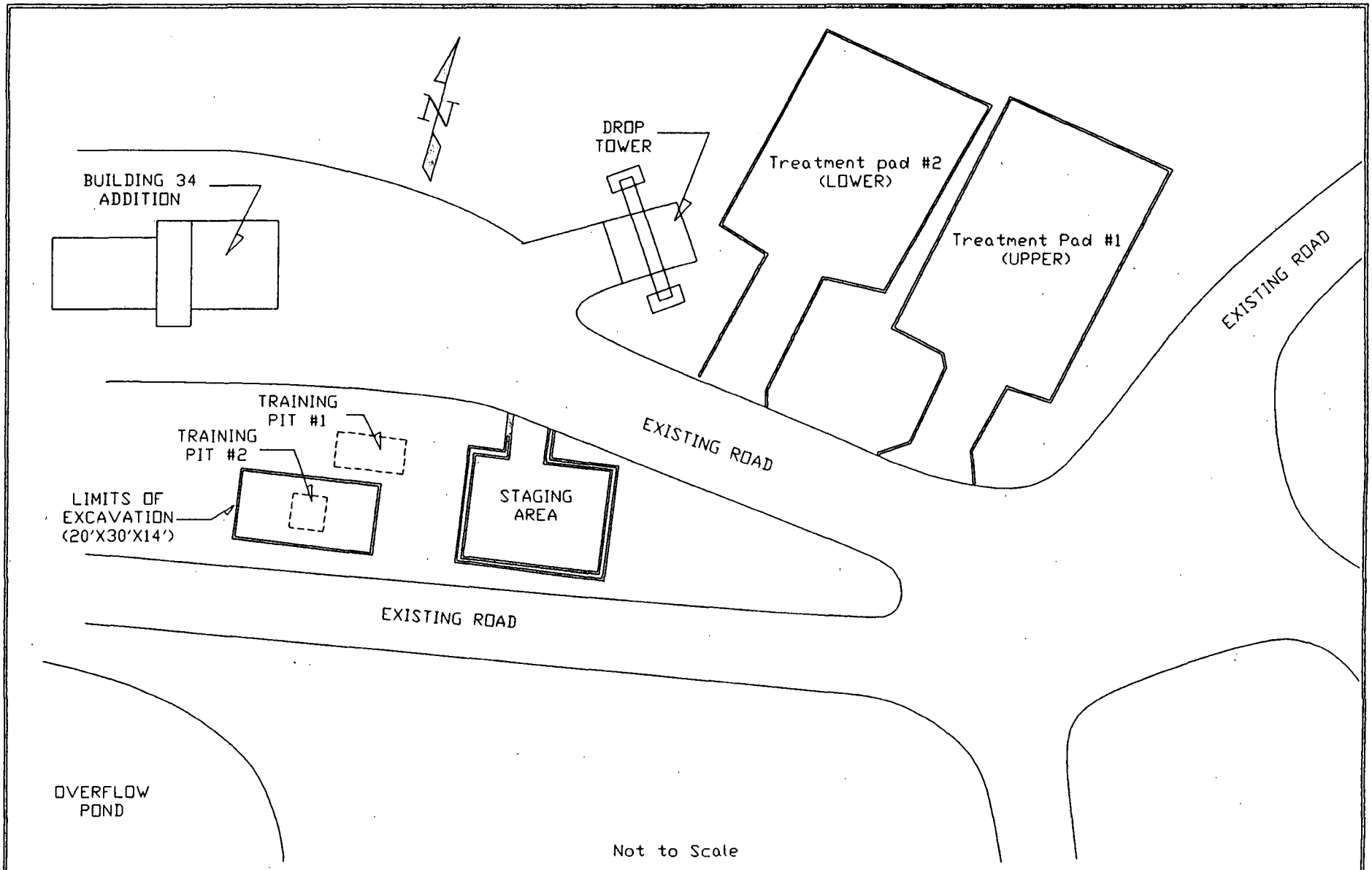
3.3.4. Storage Tank Relocation

A 275-gallon capacity above ground storage tank (AST), previously used to supply fuel to the training pits via underground piping, is currently located in the area slated for the staging area. Prior to construction of the staging area, the fuel supply lines connecting the AST to the training pits will be decontaminated, removed, and disposed of offsite as construction debris at a municipal landfill. The AST will be relocated to an appropriate location designated by the WESTON field engineer.

3.3.5. Staging Area

A temporary staging area will be constructed for staging of potentially-contaminated soil prior to placement on the treatment pads. The staging area will be located between the treatment pads and the excavation area as shown on Figure 3.2. The soil staging area will have a capacity of not less than 350 cubic yards.

Subsequent to removal of the AST and associated underground fuel supply lines, soil in the area will be reshaped to construct an earthen base and berm. The berm will be continuous around the perimeter of the area to prevent



WESTON MANAGERS DESIGNERS/CONSULTANTS

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Figure 3.2.

Site Plan

C:\SKETCH3\MOUND\FFTA\FFTASITE

any migration of surface runoff. The base and berm of the staging area will be lined with 20-mil HDPE and washed gravel for liner protection. After contaminated soil has been excavated and placed within the staging area, and until the soil is relocated to the treatment pads, the entire staging area will be covered with a UV-resistant, waterproof cover every day at the completion of work and during inclement weather. The purpose of the cover is to prevent wind dispersion of the contaminated soil and prevent precipitation from collecting inside the berm, thus minimizing the amount of water requiring collection and treatment.

During temporary staging, soil samples will be obtained and submitted for laboratory analysis. The soil samples will be analyzed for pH, Total Kjeldahl Nitrogen (TKN), and total petroleum hydrocarbons (TPH). The results of these tests will help to determine what nutrients and specific amounts of Sybron II and microbic mix are necessary to enhance and stimulate optimal bioremediation rates. Sybron II is a soil additive with microbes that specifically target the constituents of petroleum contamination.

3.3.6. Electrical Supply

The electrical supply will be provided to the treatment pads by accessing and upgrading one of the six existing surface-mounted 12 circuit electric panels located in the addition to Building 34. The existing panels are located on the east wall in the northeast corner of the Building 34 addition. A layout of the existing electrical system is provided in Appendix A to this Work Plan. The six separate electrical panels are supplied by a Hoffman 4-inch by 4-inch by 60-inch wire way. The wire way connects to three (3), number 6 (#6), 600 volt (V), direct burial electrical cables with a number 4 (#4), ground well fastened, ground wire. This wire way extends underground to an existing power pole.

The circuit panel that is to be used is the one located closest to the building entrance on the lower right hand corner of the mounting frame. This circuit panel has six 20-amp circuits that are currently not in use. These circuits were designed as spares for future increased electrical loading. An exterior receptacle loading center in a NEMA 4 enclosure is to be installed on the exterior south wall of the Building 34 addition to provide electrical supply for the FFTA removal action. There are six separate lines to be installed from the existing circuit panel located inside the Building 34 addition. Two of these circuits are to be connected to two separate, three prong, 110V, ground fault interrupter (GFI) receptacles to a newly installed NEMA 4 panel on the exterior side of the building 34 addition south wall. Two circuits are to be wired to an exterior NEMA junction located at the runoff and leachate collection sumps. The two remaining circuits are to be wired to a exterior NEMA 4 panel containing two 110V GFI receptacles located at the treatment pad roof structure. All electrical work is to be conducted in accordance with current National Electric Code standards. This upgraded electrical supply will be extended to provide a permanent electrical source at the treatment area.

3.3.7. Water Supply

The water supply will be provided to the treatment area by accessing an existing water supply in the Building 34 addition. Water service will be extended to the treatment pads for use in the automated watering system and will remain as a permanent installation. The automated watering system will be installed as part of the roof structure and will be used as part of the bioremediation process.

3.4. CONCRETE PITS DECONTAMINATION AND REMOVAL

The first step in addressing the Fire Fighting Training Area pits is the removal of the sediments within the pits. The training pits have internal dimensions of 10 foot by 10 foot (Pit # 2) and 10 foot by 20 foot (Pit # 1), both with 12 inch sidewalls. The estimated volume of sediments in Pit #2 is approximately 3.7 cubic yards and approximately 7.4 cubic yards in Pit #1. Based on the most recent laboratory analytical data, the sediments are not considered a mixed waste. Sediments will be removed and placed in the staging area.

After gross sediment removal is conducted, the concrete pads will be scarified. A minimum of 1/16 of an inch will be removed from each of the exterior surfaces of the concrete by wet grinding or other scarifying operations. The surface material will be collected and placed in the staging area. The concrete pads will then be excavated. The underside of the slabs will also be scarified in order to remove any petroleum hydrocarbon contamination that may have adhered to the concrete surface. The sidewalls of the concrete structures extend 2.5 feet bgs. A cross section of the existing pit construction is shown in Appendix A to this Work Plan.

After all scarifying operations have been completed, wipe samples for Pu-238 and Th-232 will be collected by Mound Health Physics personnel in order to release the concrete as construction debris for disposal at an offsite landfill. Scrape samples will be taken and field analyzed for TPH. If TPH levels are above the field screening limit of 10 ppm, the concrete will be rescarified. This process will continue until an acceptable level is reached.

The concrete slabs will then be demolished into pieces which are a maximum of 2 feet in any dimension. The slabs contain welded wire fabric that is formed into the concrete pit sidewalls with #4 rebar on 12 inch centers, continuously around the perimeter of the slab. Pit #2 is constructed with an estimated 3.9 cubic yards of concrete, and Pit #1 is constructed with an estimated 6.6 cubic yards of concrete.

After removal of the pits, the abandoned underground fuel supply and drain lines are to be removed. These lines are to be completely excavated after any free product contained in the lines has been removed. All lines will be

decontaminated to remove any residual product or drain washings. The residuals are to be collected and drummed. A schedule of the underground lines is shown below in Table III.7.

Table III.7
Underground Lines Schedule

Concrete Pit 1 (10'X10')	**1/2"**	**3/4"**	**2"**	**4"**
Drain Line West of Pit 1			34 LF NPT	
Valve Box/Valve			1/5 LF	
Supply Line to Pit 1 (East)		57 LF NPT Fuel		
Valve Box/Valve		5 LF		

Concrete Pit 2 (10'X20')	**1/2"**	**3/4"**	**2"**	**4"**
Drain Line West of Pit 2			53 LF NPT	
Valve Box/Valve			1/5 LF	
Supple Line to Pit 2 (East)		52 LF NPT		
Valve Box/Valve		5 LF		

AST Concrete Slab	**1/2"**	**3/4"**	**2"**	**4"**
Transite Pipe				30 LF (estimated)

Torch Stand	**1/2"**	**3/4"**	**2"**	**4"**
Supply Line	34 LF. NPT Gas			

LF - Linear feet
NPT - Normal Pipe Thread

3.5. UNDERGROUND LINES DECONTAMINATION AND REMOVAL

Underground fuel supply and drain lines associated with past FFTA operations will be decontaminated, removed, and segregated for disposal at an offsite municipal landfill. Soil excavated to facilitate removal of underground lines will be treated if field screening results indicate that the soil contains total petroleum hydrocarbons above the cleanup criterion. Prior to backfill, the base of the pipe excavation will be field screened to determine if soil contamination has occurred as a result of operation of the underground lines. If field screening results indicate contamination greater than the cleanup criterion, excavation and subsequent sampling will occur until field screening results indicate that the cleanup criterion has been achieved.

3.6. PIT SOIL REMOVAL

3.6.1. Extent of Excavation

The extent of excavation, centered around Pit #2, encompasses an area 20 feet long by 30 feet wide extending 14 feet deep. GeoProbe Investigation results indicated that a total of approximately 310 cubic yards of soil, all within the vadose zone, be removed. The contaminated soil to be removed lies directly beneath the Pit #2. The pit and associated structures will be removed prior to commencement of the vadose zone soil removal.

3.6.2. Excavation of Soil

Due to the dimensions of the excavation and the physical constraints of the area around the excavation, the excavator will have access to only three sides of the excavation. The excavator will remove the soil and place it directly onto the temporary staging area without the use of a haul truck. Water encountered during excavation will be handled as described in Section 3.8 Liquids Handling.

Dust level monitoring will meet Ohio Administrative Code (OAC) 3745-17 criteria using real-time instruments as detailed in the HASP (included in Appendix B to this Work Plan).

3.6.2.1. Soil Staging

Excavated will be placed on the temporary staging area. Operation of the staging area will be as described in Section 3.3.5 Staging Area. These samples will be taken and analyzed each for TKN, Total Phosphorus. Percent moisture will also be analyzed for each sample. Field test will be performed to measure pH. The data collected will

be used to determine the amount of nutrients to be added during treatment.

3.6.3. Construction Requirements

Three items must be addressed as part of good excavation practices: the need for shoring or sheet piling within the excavation, particularly along the roadway side; traffic control to minimize loads being transmitted to the excavation walls potentially causing wall failure; and protection of the excavation after hours to mitigate hazards associated with an open excavation.

3.6.3.1. Shoring

Federal regulations (29 CFR 1926 Subpart P) require the shoring of excavations. As the vadose zone excavation will be 14 feet deep, shoring specifications, as outlined in 29 CFR 1926.652, will be followed by the contractor.

3.6.3.2. Traffic Control

The roadway which lies to the south of the excavation will be marked and barricaded, as needed, to narrow the traffic pattern to only one lane. Traffic will be limited to the lane furthest from the excavation to avoid excess loading on the shoring walls. Signs indicating a one-lane road will be placed at least 100 feet on either side of the excavation portion of the roadway. In addition, the signs will indicate that heavy loads (e.g. truck traffic) must detour around this portion of the roadway until the excavation has been backfilled and completed. At 50 feet on either side of the excavation portion of the roadway, orange traffic cones will be used to control traffic flow to one lane. Barricades with flashing orange warning lights will also be placed for traffic control, during the night.

3.6.3.3. Excavation Protection

During those periods when excavation is not underway or if excavation activities are centered at one end of the excavation, the excavation will be safety fenced or barricaded to minimize tripping and falling hazards associated with an open excavation and as required by 29 CFR 1926 Subpart P and EG&G Mound Plant regulations. The safety fencing will be located at least 10 feet away from the edge of the excavation. The safety fencing will have warning signs attached and flashing orange warning lights will be activated at night. The safety fencing will remain in place until the excavation has been backfilled and completed.

3.7. TREATMENT PAD CONSTRUCTION

The treatment pads will be sloped for liquids collection and constructed using a two-liner clay construction, separated by a permeable leachate collection layer as shown on Figure 3.3.

3.7.1. Location and Dimensions

The treatment pads will be constructed on the hillside directly east of Building 34 and west of monitoring well MW125 as shown on Figure 3.2. The easternmost (upper) treatment pad (Treatment Pad #1) has approximate dimensions of 85 feet by 46 feet (3,910 square feet) and the westernmost (lower) treatment pad Fig 3.2. Treatment Pad Cross Section (Treatment Pad #2) has approximate dimensions of 42 feet by 65 feet (2,730 square feet). At a depth of 18 inches, approximately 217 cubic yards of capacity is available on Treatment Pad #1 and approximately 150 cubic yards of capacity is available on Treatment Pad #2, totalling approximately 367 cubic yards.

3.7.2. Grading/Cut and Fill

During construction of the treatment pads it will be necessary to conduct extensive cut and fill operations to obtain the necessary grade for the treatment pads. To construct the treatment pads, approximately 1500 to 2000 cubic yards of fill material has to be cut and moved to obtain the required grade of one percent for each treatment pad. To minimize the amount of excavation, the hillside will be terraced. However, due to the difference in elevation when terracing is used, two separate treatment pads have to be constructed. To achieve a one percent slope and obtain adequate surface area for the bioremediation piles, the hillside will need to be terraced into two levels at a difference in elevation of approximately eight (8) feet. The change in slope between the two levels is to be cut to a 2 to 1 slope to minimize the need for additional stabilization. Increasing the number of terraces to more than two would decrease the effective total treatment area of the pads and thus be undesirable. The number of terraces directly impacts the number of leachate collection systems and future O&M requirements of the site. Thus, increasing the number of terraces, would result in higher construction and O&M costs.

Results of the OU-3 LFI indicate that the hillside contains a large quantity of debris (e.g. construction debris, wood, and metal) which might prove unsuitable for the construction of the treatment pads. Existence of debris has not been substantiated, however, if encountered during construction, will be removed and disposed of either at the Mounds Spoils Area or offsite and replaced with suitable fill material.

After the cut and fill operations have been completed, final grading prior to construction of the treatment pads, will take place. The exposed subgrade will be scarified to a depth of at least 6 inches and compacted to 95 percent of standard proctor (ASTM D 698), maximum dry density. Soil samples will be taken to and analyzed for standard

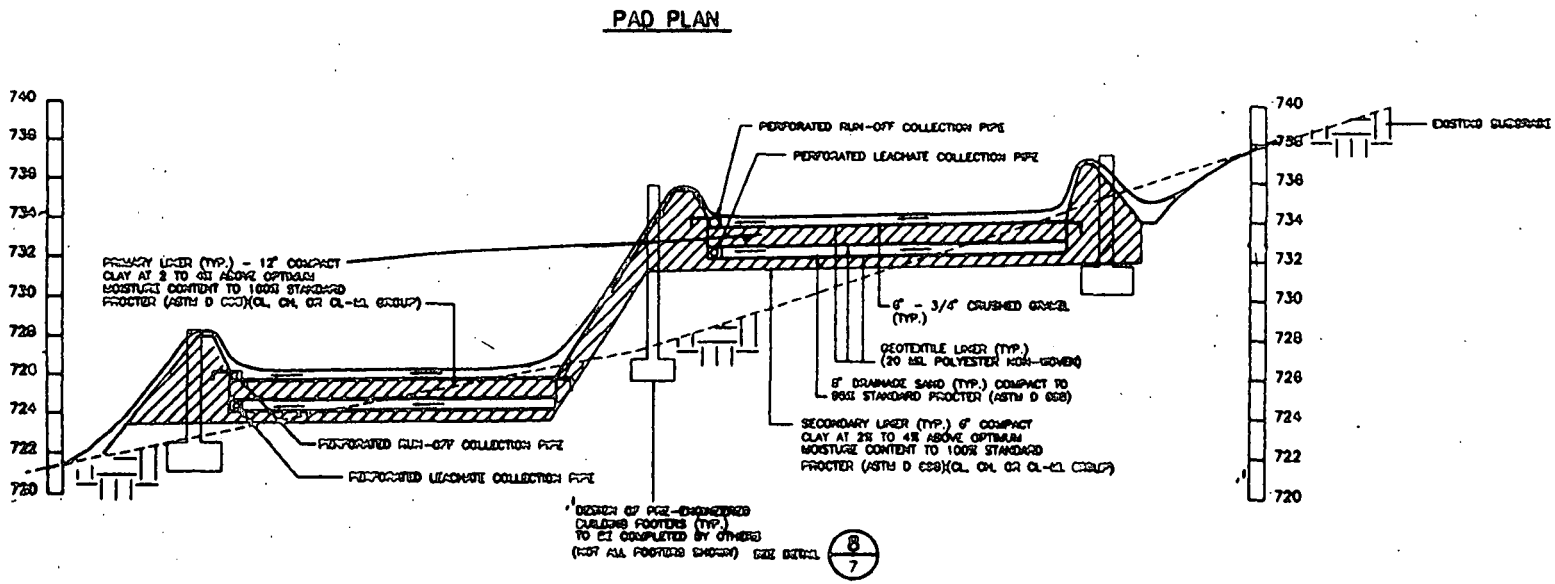

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Figure 3.3.

Treatment Pad Cross Section

proctor in. A nuclear density gauge will be used to measure compaction of the soil. Weak or compressible areas which cannot be satisfactorily compacted will be removed and replaced with properly compactable fill. All surface areas in which the treatment pads are to be constructed will be smooth, free of all foreign and organic material, sharp objects, stones or clumps greater than three inches in diameter, or debris of any kind. These surfaces will provide a firm, unyielding foundation with no sharp changes or abrupt breaks in grade. Standing water or excessive moisture will not be allowed. Samples of the existing soil will be taken and analyzed for TPH and BTBX. The analysis will serve to establish background levels prior to adding any contaminated soil.

In order to minimize accumulation of precipitation on treatment pads and to facilitate the bioremediation process, a permanent roof structure will be constructed and will cover both treatment pads. Stormwater on the roof will be diverted into piping and discharged into a nearby drainage ditch which will be upgraded to handle the additional runoff. Runon and runoff at the treatment pads will be effectively minimized by the use of diversion structures. Stormwater collection and diversion swales will be constructed upgradient of the treatment area and will discharge into an improved drainage ditch located south of the treatment area. An earthen berm constructed around the treatment pads will also reduce runon.

3.7.3. Secondary Liner

The purpose of the secondary liner is protect subsurface soil in the event of seepage penetrating the primary liner and to alert maintenance personnel of a breech in the primary liner. Liquids penetrating the primary liner will be diverted to the leachate collection piping and discharge into the designated sump.

The secondary liner will be constructed of a 6-inch thick layer of clay compacted to 100 percent standard proctor (ASTM D 698) maximum dry density, at 2% - 4% above optimum moisture content. The clay used for both the primary and secondary liner will be classified by the Unified Soil Classification System as inorganic clay with a CL, CH, or CL-ML grouping and will be obtained from an EG&G Mound-approved offsite source. A sheepsfoot vibratory roller will be used to facilitate required compaction. After compaction is verified by the use of a nuclear density gauge, three undisturbed samples will be collected from each of the primary and secondary liners and submitted to a qualified laboratory for hydraulic conductivity analysis to confirm that a permeability of 1×10^{-8} cm/sec or less has been achieved.

3.7.4. Leachate Collection System

Between the secondary and primary liner will be a leachate collection system consisting of the placement of a geotextile liner, a 2-inch diameter, Schedule 80, perforated leachate collection pipe at the downgradient edge of each treatment pad, an 8-inch thick layer of drainage sand compacted to 100 percent standard proctor, followed by

another geotextile liner to prohibit mixing of the drainage sand and primary liner during construction. The geotextile liner to be used in the construction of the leachate collection system will be 20 mil polyester, nonwoven material. The perforated pipe will lie in a northeast to southwest orientation and will span the entire length of each pad. Leachate collection piping will be sloped to drain into one of two precast concrete sumps. To prevent clogging of the drainage pipe with fine sand particles, a geotextile liner will be wrapped around the perforated piping.

3.7.5. Primary Liner

The primary liner will be constructed using a 12-inch thick layer of clay. The primary liner will be constructed, compacted, and tested as described above for the secondary liner. The purpose of the primary liner is to direct runoff from the treatment pads to the runoff collection system and protect surrounding area by preventing potentially-contaminated water from uncontrolled runoff.

3.7.6. Runoff Collection

The OEPA guidance documents require that a sump and drainage system be installed to collect any precipitation that comes in contact with the soil being treated. A runoff collection system will be installed between the primary liner and the soils being treated to allow for the collection and diversion of liquids passing through or over the treatment areas. The runoff collection system will consist of a 4-inch diameter, Schedule 80, perforated pipe installed at the downgradient edge of each treatment pad. A 6-inch thick layer of 3/4-inch crushed gravel will be placed as the uppermost layer of each treatment pad. To prevent infiltration and blockage caused by the crushed gravel layer, geotextile liner will be wrapped around the perforated piping. Runoff collection piping will be sloped and piped to drain into a dedicated second precast concrete sump.

Both concrete sumps (runoff and leachate collection) will be installed at the southeast corner of Treatment Pad #2. Because of availability and reduced cost, a standard size precast concrete manhole will be used for the purpose of a sump. Inside dimensions of each sump measure 5 feet in diameter and 9 feet deep. Allowing for 2 feet of freeboard and the installation of a sump pump, each sump will have the capacity of approximately 1000 gallons (137 cubic feet).

The sump pump will be electrically powered and will start the pumping process once the water level reaches midpoint within the sump. A high-water alarm will activate if the water level reaches the top of the freeboard. With a design capacity of 120 gallons per minute (gpm), the pump is sized for an approximate cycle time of 8 minutes before shutting off with a minimum depth of 7 inches left in the sump for minimum pump submergence. The pump will force water through a check valve and into one of two 2000-gallon storage tanks that will be located northwest of the sump. The penetration of the drainage pipes into the sump will be sealed with a leakproof connection.

3.8. LIQUIDS HANDLING

3.8.1. Saturated Soil Removal System

Prior to the GeoProbe investigation, best available information indicated that the ground water table was near the surface of the ground and would have to be drawn down in order for excavation activities to occur, and thus, creating a large amount of contact water. The GeoProbe Investigation results confirmed that the ground water table was below 24 feet bgs, well below the anticipated excavation depth of 14 feet.

It may be necessary to remove perched water suspected of being within the limits of excavation. If encountered and deemed necessary, a sump pump will be installed within the excavation. Liquids pumped from the excavation will be transferred to one of the temporary storage tanks.

3.8.2. Free Product Handling

The oil/water separator originally anticipated to be required to concentrate the free product is no longer necessary and will not be constructed.

3.8.3 Contact Water

Contact water (liquids collected as a result of excavation, decontamination activities, runon into the excavation, or any other water that has come into contact with potentially contaminated soil) will be temporarily stored in two polypropelyne 2000-gallon storage tanks to be located west of the excavation area. Based on previous water sample data and analysis, no contaminated water is expected. A summary of the data was presented Table III.3. As each tank becomes full and prior to completion of excavation activities, samples will be collected from the contact water tank(s) to verify parameters such that Mound WWTS can be used for treatment. Oil which may float on the surface of the water will be collected, drummed, and relinquished to Waste Management Group for disposition. All other water will be discharged to the Mound Waste Water Treatment Plant (WWTP).

3.9 OPERATION AND MAINTENANCE OF THE TREATMENT SYSTEM

Operation and maintenance of the treatment system, including promotion of the bioremediation process, sampling to determine progress and confirmation of remediation, and maintenance of the treatment structures, will commence as contaminated soil is transferred to the treatment pads. An outline for the O&M manual is provided in Appendix G.

3.9.1. Operation

The purpose of the treatment pads is to provide an impermeable surface upon which to place petroleum hydrocarbon contaminated soil for bioremediation. Typically, bioremediation occurs most favorably in soils which have the following general characteristics:

- sandy texture;
- high porosity;
- neutral pH;
- sufficient nitrogen and phosphorus; and
- adequate heat.

Based upon the GeoProbe Investigation, the soils to be bioremediated are principally granular backfill with adequate porosity to accommodate bioremediation.

Nutrients, in the form of nitrogen and phosphorous fertilizer, will be added to the soil to better promote bioremediation. After adding the layer of contaminated soil and spreading it on the pad, the soil will be inoculated with microbe cultures and their nutrients. An estimated total of 50 pounds microbes and 600 pounds nutrients will be added to the soil. The nutrients will be added to the soil as follows:

- An estimated 600 pounds of Sybron II nutrient will be spread evenly over entire area.
- Soil will be tilled evenly.
- An estimated 50 pounds of Sybron diesel microbe mix will be hydrated and spread evenly over the entire treatment area.
- Soil will be tilled evenly.

The soil, nutrients, and microbes will be mixed on the treatment pads. The soil will have a maximum thickness of 18 inches.

As part of the bioremediation process, the soil will be tilled biweekly for three to four months to stimulate the bio-reaction, break up the formation of soil clods, and allow oxygen to infiltrate the piles. Prior to tilling, internal soil temperatures will be measured at three randomly selected locations. The purpose of the soil temperature measurements is to measure the available heat to help determine the rate of bioremediation.

Aeration and tilling is to be accomplished utilizing a tractor-drawn rototiller capable of a 18-inch deep cut. The

contaminated soils will be tilled until a homogeneous mix can be observed. At the completion of the bioremediation cycle, soil samples will be collected to verify that the treatment criteria have been achieved. Treated soil will then be transported to the EG&G Mound Spoils Area for final disposition.

The watering device installed as part of the treatment system, will function automatically to maintain adequate moisture for the bioremediation process to occur.

A total of 8 soil samples 4 from each treatment pad will be collected during each two-week period to assess the progress of bioremediation. These samples will be analyzed for soil pH, TPH, and moisture content. After approximately two months of treatment soil samples will be analyzed for inorganic nitrogen (as NH_4-N + NO_3-N) and total phosphorus to monitor nutrient effectiveness. Based upon the results of these analyses, nutrients may be added to stimulate bioremediation. After treatment is complete, eight samples will be collected from each treatment pad and analyzed for TPH and BTEX to verify completion of the treatment process.

3.9.2 Maintenance

During bioremediation, maintenance of the treatment area is necessary to ensure the integrity of its current and future operations. Maintenance will include the following items:

- Ensuring that sediment has not built up along the perimeter berm;
- Ensuring proper drainage is occurring without any ponding of water;
- Ensuring vegetative cover has been established in those areas of cut and fill to minimize soil erosion; and
- Verifying by visual inspection that the treatment pad, in general, is in good shape.

These items will be checked and documented on a monthly basis, and also whenever a site visit is made for operational purposes.

3.9.3. Bioremediation Sampling

The initial soil sampling is to occur within 24 hours of placing the material to be treated on the treatment pads. The number of soil samples will be directly proportional to the volume of petroleum-contaminated soil. Table III.8 provides a summary of the number of samples to be collected as recommended by the State Fire Marshall Bureau of Underground Storage Tank Regulations for the bioremediation of petroleum-contaminated soil. The location of the samples to be collected will be determined by dividing the petroleum-contaminated stockpile into sections equal to the number of soil samples specified in Row 1 of Table III.8. The individual soil samples will be collected from the center of each section at a minimum depth of 12 inches below the surface of the soil.

3.9.4. Treatment Area Closure

After removal and disposition of treated soil from the treatment pads and prior to transferring maintenance of the treatment pads to EG&G Mound, gravel will be placed on the treatment pads to replace the gravel removed with the soil and retain a depth of six-inches.

TABLE III.8

SUMMARY OF BIOREMEDIATION SAMPLE COLLECTION

	Cubic yards of soil per stockpile					
	0-25	26-100	101-500	501-1000	1001-2000	>2000
(1) Minimum # of grab samples to collect and field screen. If field screening is not used minimum number of grab samples to be submitted for laboratory analysis.	2	6	8	10	13	13 plus 3 samples per additional 500 cubic yards
(2) Minimum # of grab samples to submit to the lab if field screened	1	1	2	3	4	4 plus 1 sample per additional 500 cubic yards

4.0 ANALYTICAL REQUIREMENTS

4.1. ANALYTICAL LABORATORY PROCUREMENT

The laboratory for this program will be procured in accordance with Section 10.2 of the EG&G Mound Environmental Restoration (ER) Program Operable Unit 9, Site Wide Quality Assurance Project Plan (QAPP) Revision 3. Because of the analytical complexity, requirements, and effort of this project are relatively small compared to the other ER projects, a laboratory assessment will not be performed. However, a laboratory which has previously been satisfactory assessed in support of a similar ER program project will be used for this project.

4.2 ANALYTICAL PROGRAM

The analytical methods to be performed and quality control requirements for the laboratory analysis are discussed in Sections 3 and 6 of the FFTA QAPP (Appendix E).

4.3. ANALYTICAL LABORATORY DATA REVIEW

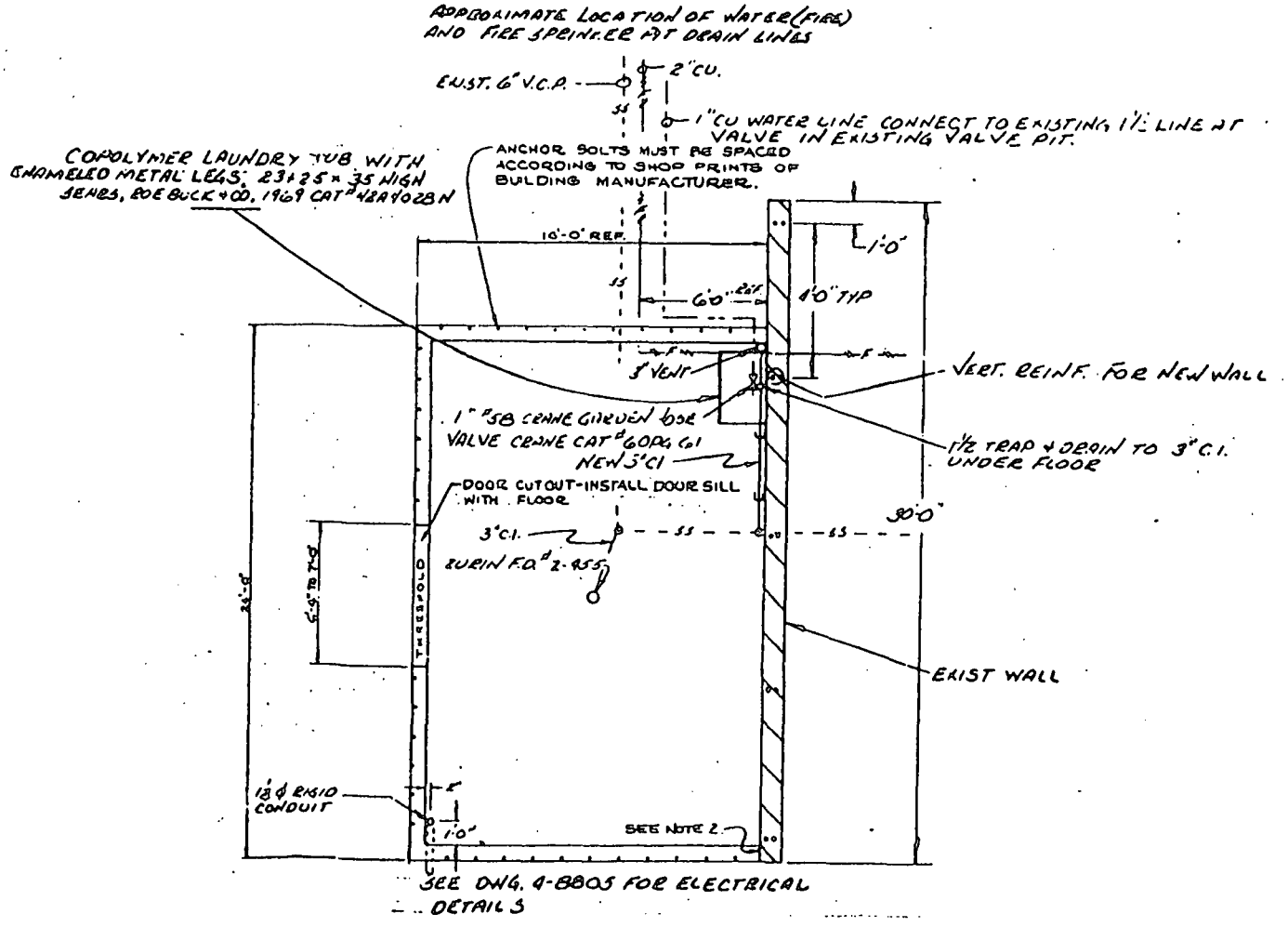
The data generated for this project will be reviewed for completeness and conformance of quality control checks to project requirements, including, surrogate recoveries, matrix spike recoveries, and duplicate relative percent differences. The data from this project is not required to be validated in accordance with Section 9 of the FFTA QAPP. If quality control checks are found to be consistently deficient, additional data review or data validation may be performed as determined necessary for the use of the data.

5.0 WORK PLAN SCHEDULE

Deliver Health & Safety Plan to Mound	Thur Feb 17
Mound Review	Thur-Thur-Feb 17-Mar 3
Deliver Final	Mon Mar 7
Deliver GeoProbe SAP to Mound	Wed Feb 23
Mound Review	Thur-Thur Feb 24-Mar 3
Deliver Final	Mon Mar 7
Preconstruction Meeting at Mound	Mon Mar 7
GeoProbe in Field	Mon-Fri Mar 7-11
Deliver 50% Draft Contract Documents to Mound	Mon Apr 4
Mound Return 50% Review Comments	Wed Apr 13
Deliver Draft Construction HASP to Mound	Thur Apr 14
Deliver 90% Draft Contract Documents to Mound	Wed Apr 27
Advertise for Construction Bids	Tues Apr 26
Advertise for Building Bids	Wed Apr 27
Contractor Prebid Meeting at Mound	Tue May 3
Receive Building Bids	Fri May 6
Mound Return Construction HASP Review Comments	Thur May 7
Receive Construction Bids	Thur May 12
Mound Return 90% Review Comments	Tue May 17
Award Building Contract	Wed May 25
Award Construction Bid	Wed May 25
Deliver Final Construction HASP	Tues May 31
Begin Construction	Tues May 31
Deliver Final Work Plan	Thur Jun 24
Complete Construction	Wed Aug 31
Operation and Maintenance	
Begin O&M Activities	Mon Sept 5
Complete O&M Activities	Thurs Dec 15
On-Scene Coordinator Report	
Deliver Draft to Mound	Thur Jan 12 1995
Mound Return Comments	Thur Fed 2
Deliver Final to Mound	Thur Feb 16

APPENDIX A

DRAWINGS OF EXISTING STRUCTURES



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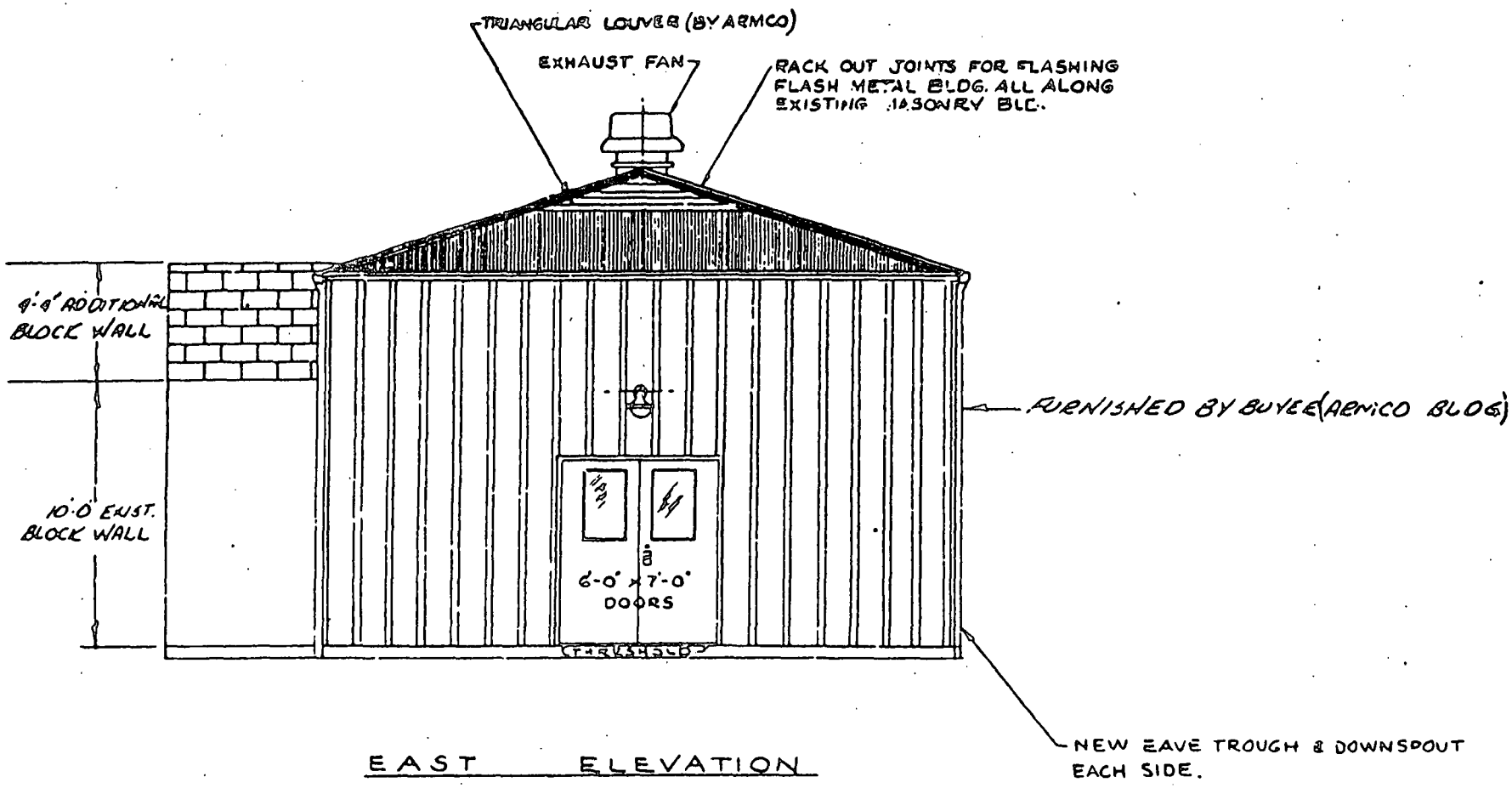

EAST ELEVATION

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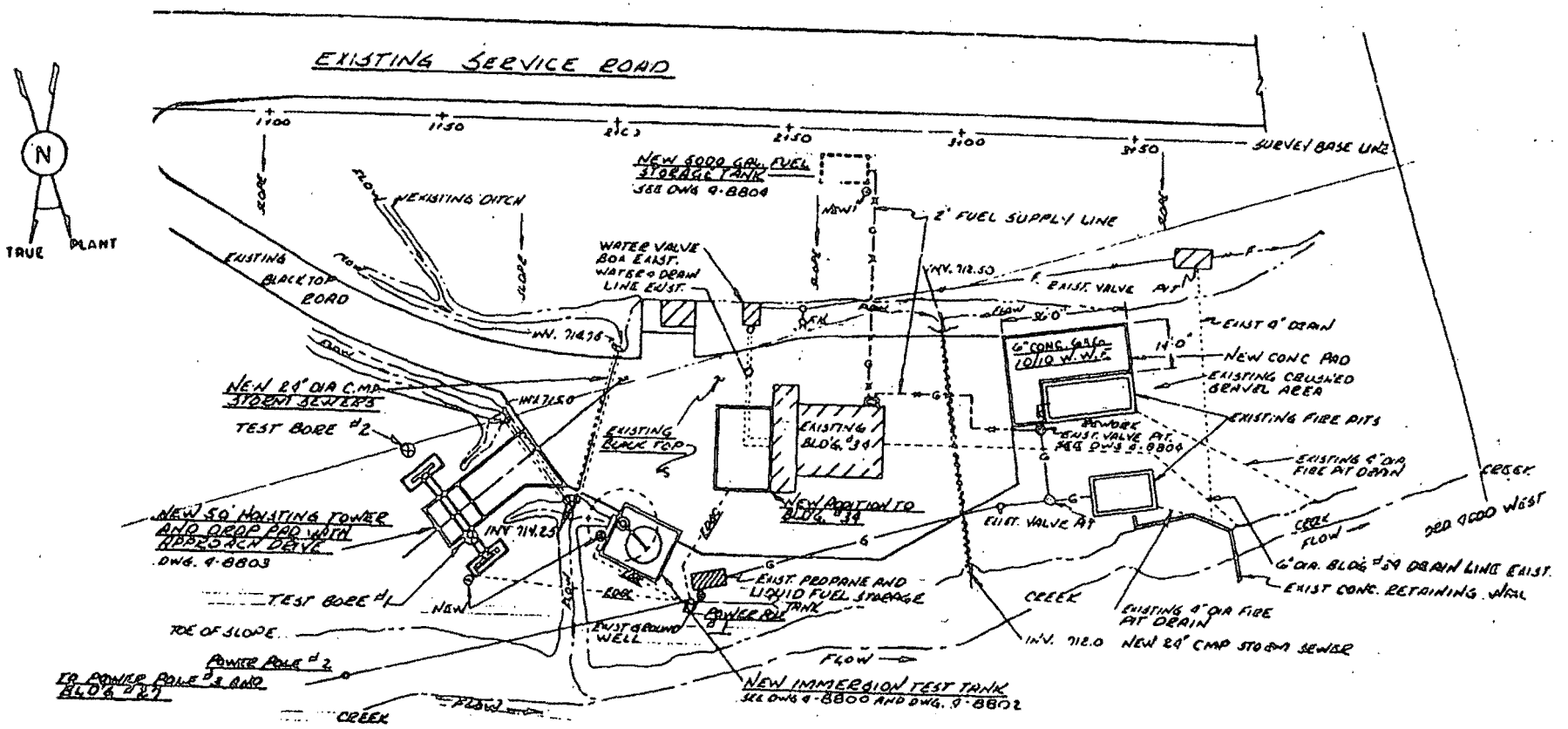

PLAN VIEW

LEGEND.

- GROUND WELL
- EXISTING GAS LINES
- NEW GAS LINES
- EXISTING FIRE LINE
- STORM SEWER
- ELECTRIC DIRECT BURIAL CABLE NEW
- TOE OF SLOPE
- CENTER LINE OF CREEK OR DITCH

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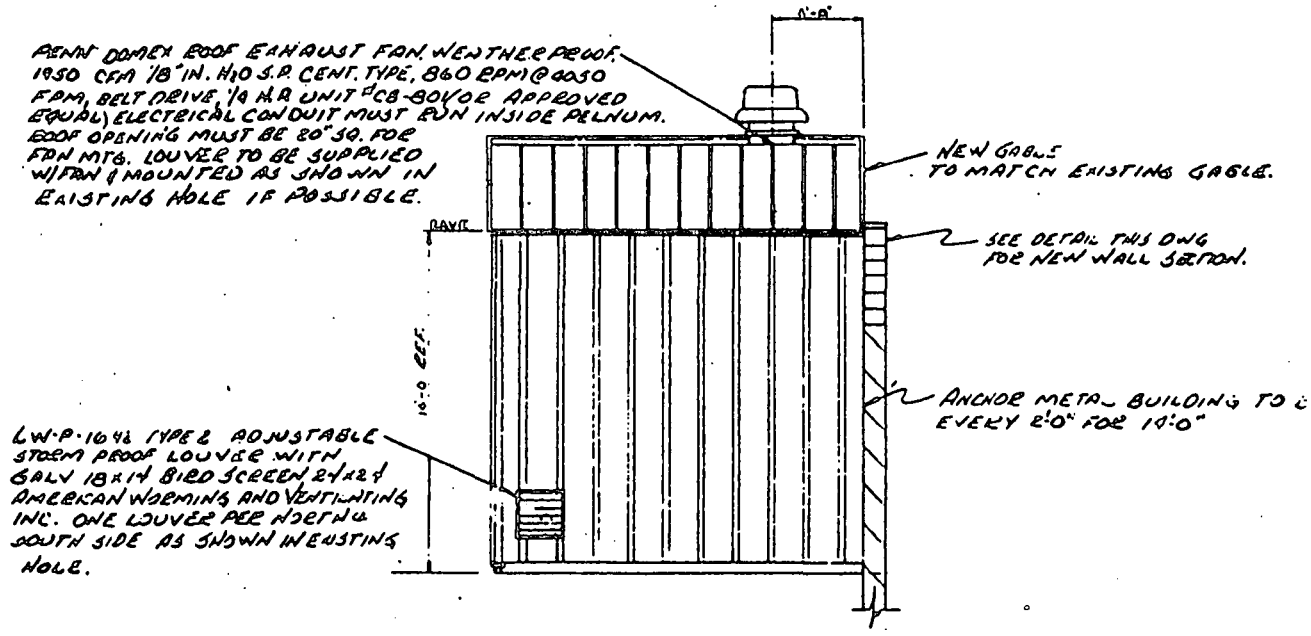

NORTH ELEVATION

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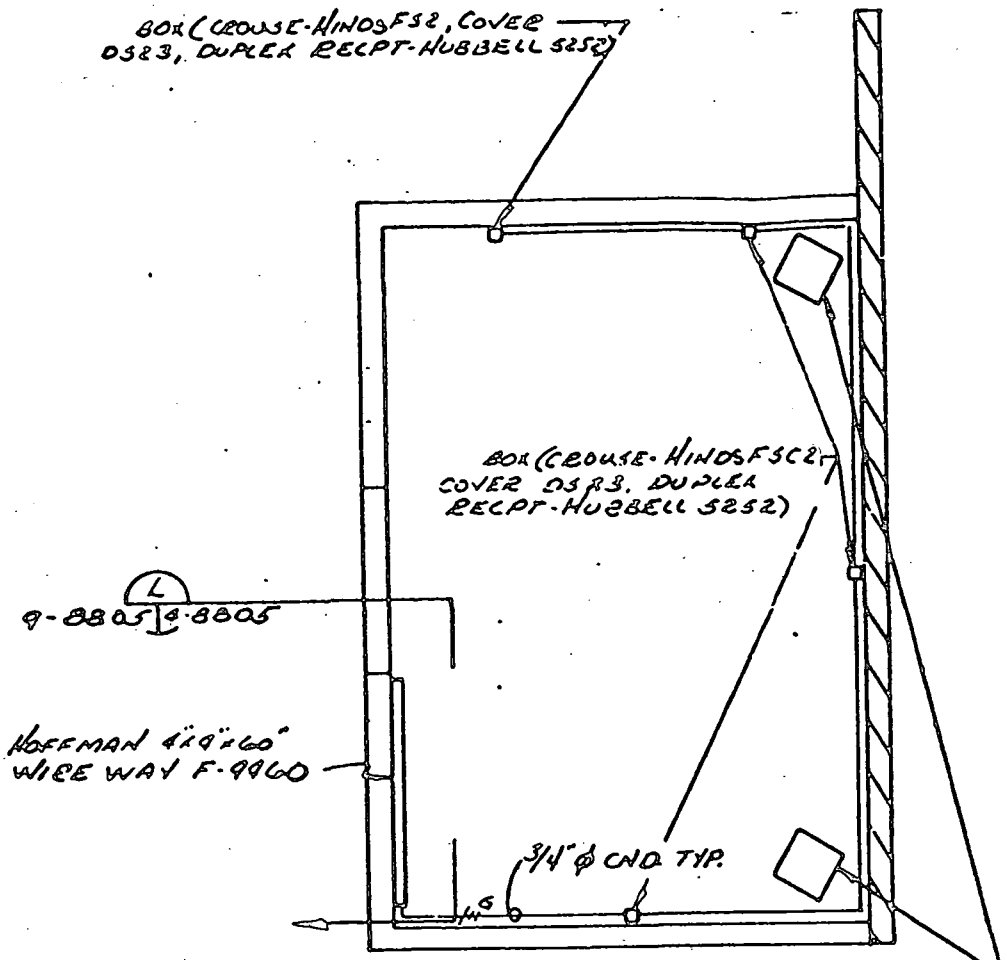

L.E.G. HORIZONTAL ELECTRIC UNIT HEATERS 7½ KW
480 V 3 ϕ 11.9 AMPS, 545 CFM @ 1550 R.P.M. 115 V
1 ϕ MOTOR, MAN. STARTER N7113, 24V CONTROL H6988
MOUNTING HEIGHT TOP 14'-0"

RECEPTICAL AND HEATER - LOCATIONS

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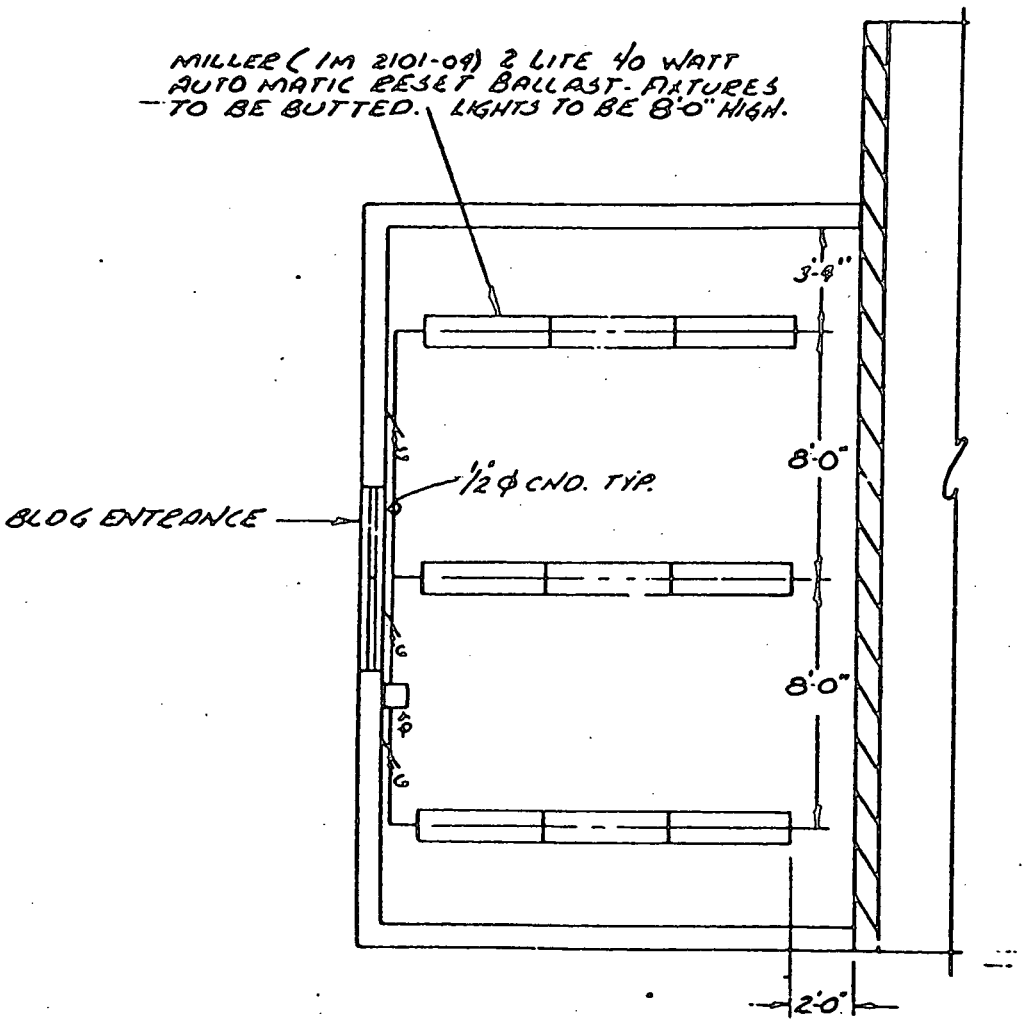

LIGHTING PLAN BLD'G ADD'N.

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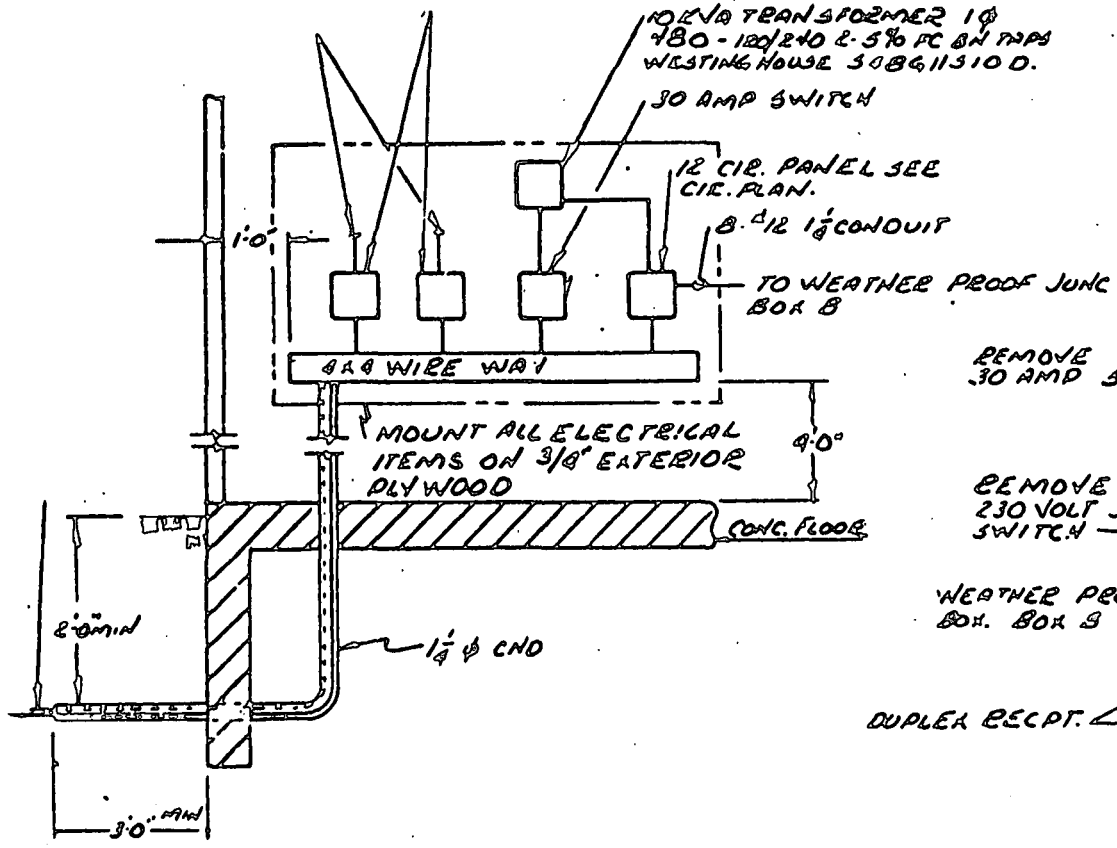
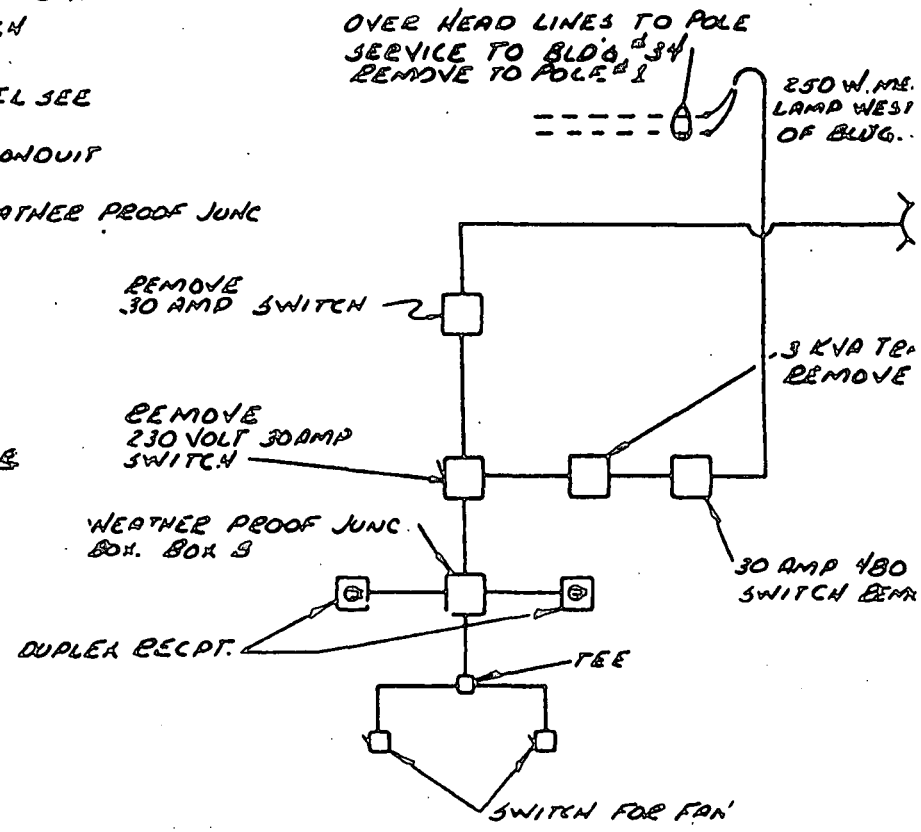


L NEW DISTRIBUTION PLAN.

SCALE NONE



EXISTING SERVICE TO BE MODIFIED

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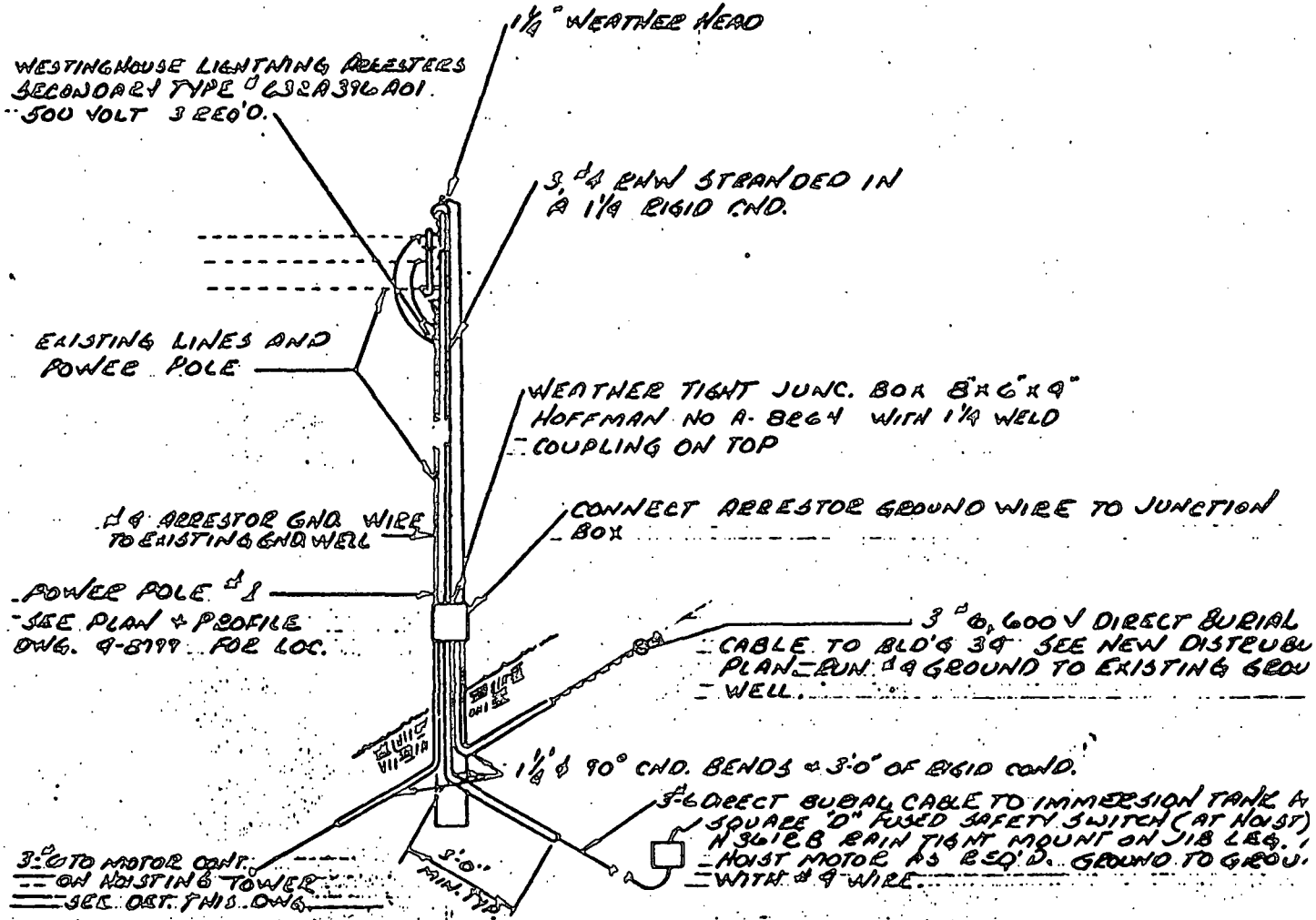

UNDER GROUND SERVICE DETAIL.
POWER POLE #1 SCALE NONE

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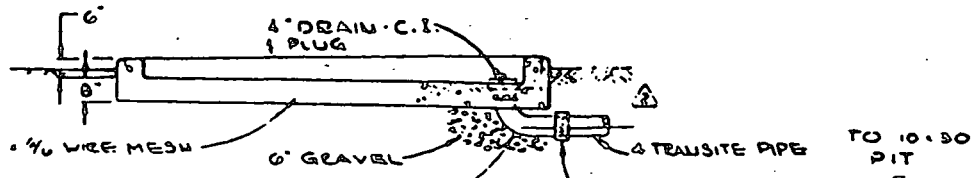

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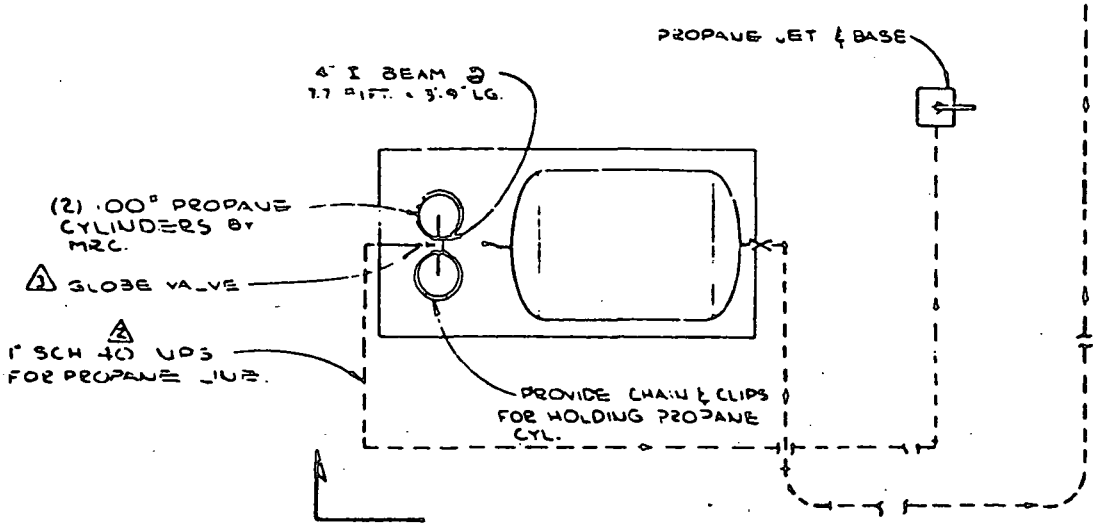
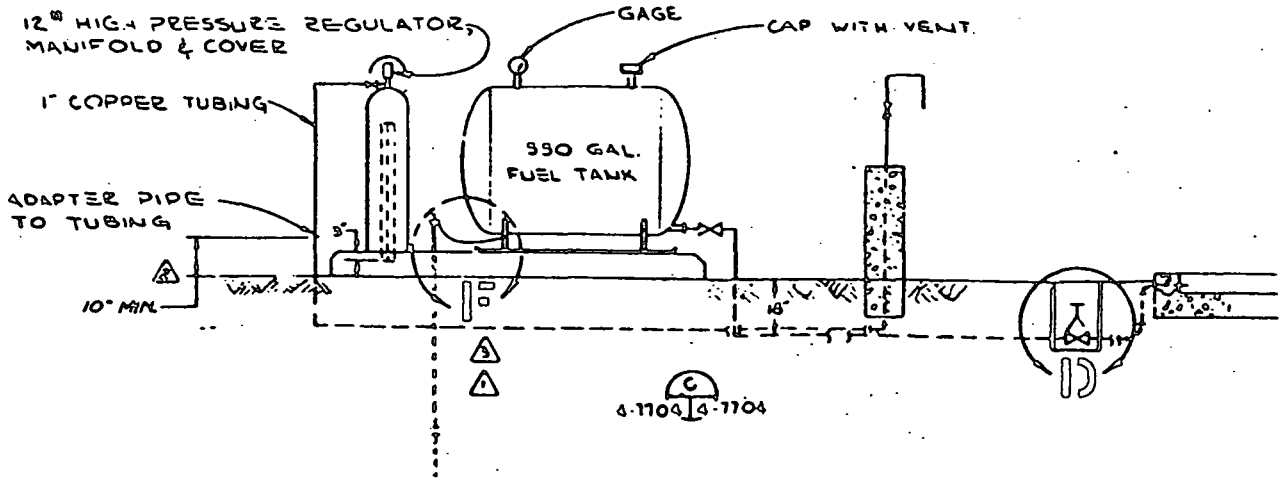
TYPICAL BOTH PITS



PLAN VIEW ~ PIPING LAYOUT



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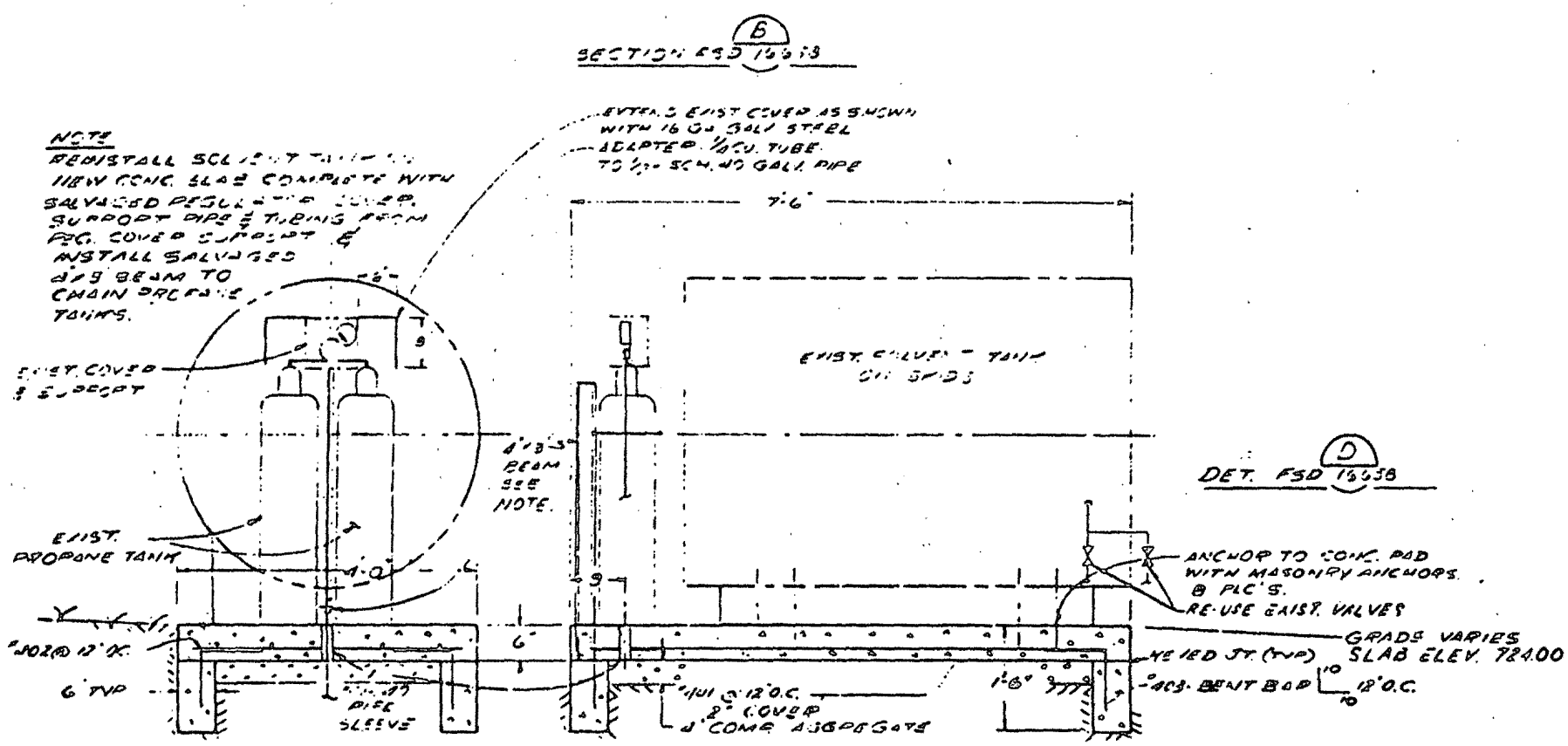

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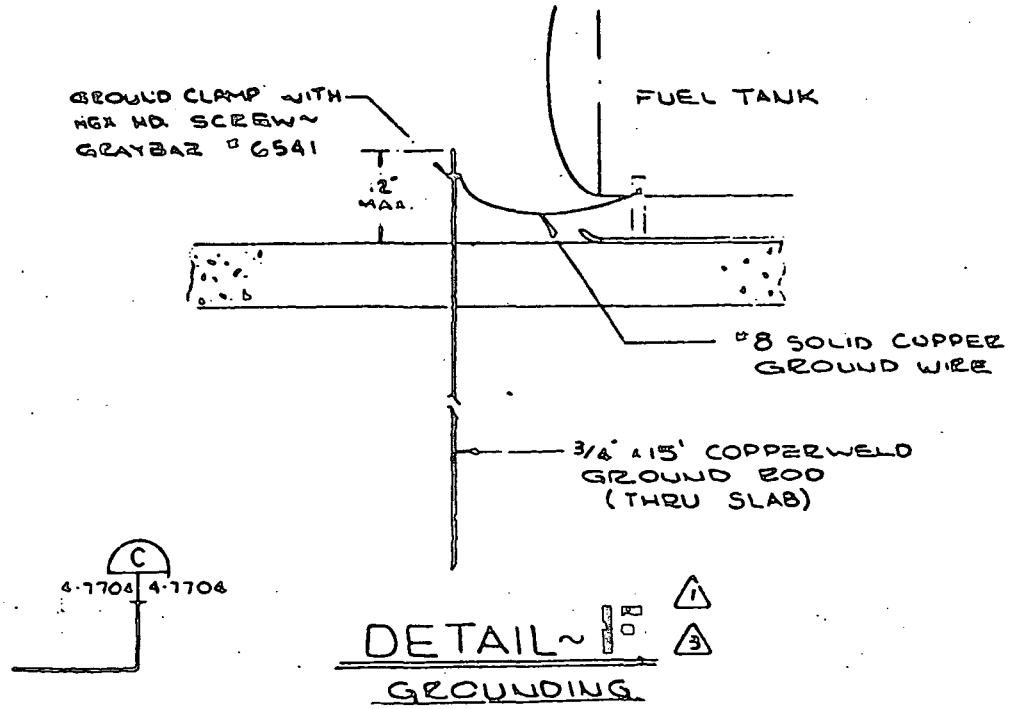
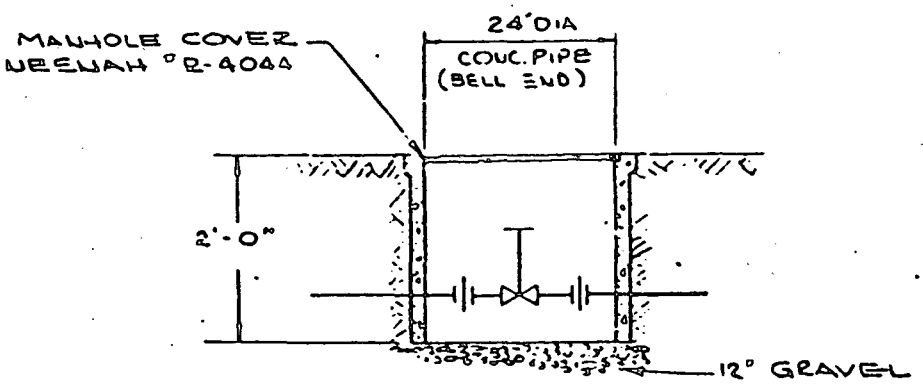


DETAIL ~ 1

GROUNDING



DETAIL ~ 1D

TYPICAL VALVE PIT INSTALLATION
FOR FUEL LINE

LEGEND

UNION

VALVE (TYPICAL
IN FUEL LINE

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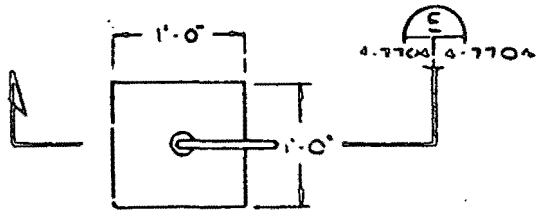
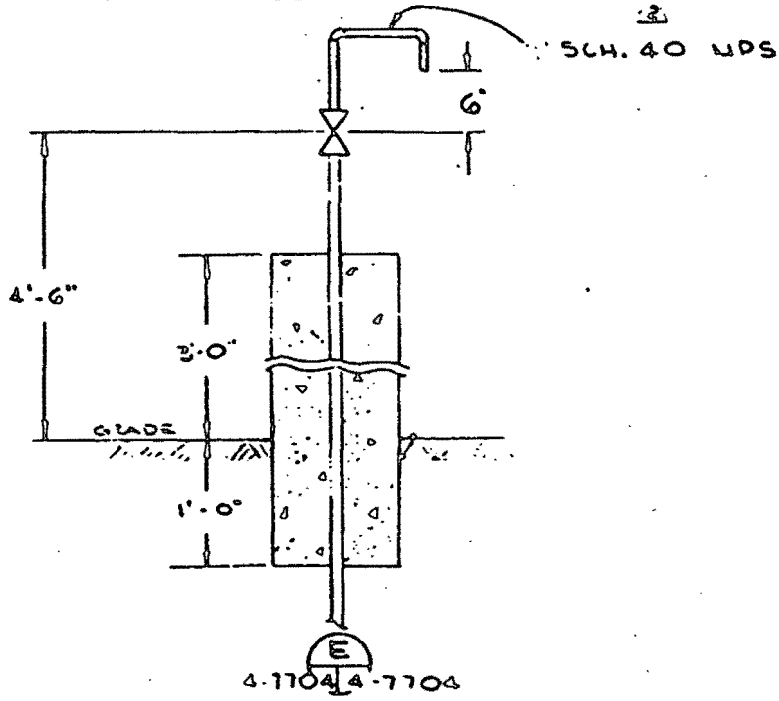


PLAN VIEW

PROPANE JET AND BASE

SCALE ~ 1" = 1'-0"



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APPENDIX B

HEALTH AND SAFETY PLANS

1. Extent of Contamination
2. Construction

SITE HEALTH AND SAFETY PLAN (HASP) FORM

Prepared by: Andy Fendorzi	**Date:** 20 January 1994 **W.O. Number:** 65376-045-002
Project Identification: **Division:** MWR **Department/Office:** Cincinnati **Site Name:** Fire Fighting Training Area (FFTA) **Client:** EG&G Mound **Work Location Address:** 1 Mound Road, Miamisburg, OH 45342 South side of Building 34	**Site History:** Government-owned (DOE) Contractor-operated R&D Production Facility supporting DOE weapons and energy programs with emphasis on explosive and nuclear technology. The use of the Fire Fighting Training Pits caused petroleum products to migrate into the subsurface soils. The presence of petroleum hydrocarbons at a concentration of 2800 mg/kg has been documented at the 8- to 10-foot interval at the FFTA.

Scope of Work: Collection of soil samples through the use of an Geoprobe rig. No more than 50 borings will be direct pushed. Surface soil sample collection. Installation of a multi-point dewatering system (maximum area - 10,000 sq. ft.). Concrete scarifing operations (maximum area 1,000 sq. ft.). Demolition of concrete pits using an air-powered breaker hammer (maximum area - 1,000 sq. ft.).

☐ Site visit only; site HASP not necessary. List personnel here and sign off below:

Hazard Assessment and Regulatory Status

Indicate types of hazards anticipated:

☑ Physio-chemical

Toxic Chemical - Levels

☐ >TLV-TWA ☐ TLV-STEL ☐ >IDLH

☑ Bio-Hazards
☑ Radiation
☑ Physical
☑ Construction type
☐ Industrial type
☑ Nuclear Industry type

Site regulatory status:

CERCLA/SARA
☑ US EPA
☑ State
☑ NPL Site

RCRA
☑ US EPA
☐ State

NRC
☐ 10 CFR 20

OSHA
☑ 1910
☑ 1926
☐ State

Other Federal Agency
☑ DOE
☐ USATHAMA
☐ Air Force

Based on the Hazard Assessment and Regulatory Status, determine the Standard HASP(s) applicable to this project. Indicate below which Standard HASP will be used and append the appropriate pages of this form along with the Standard Plan.

☐ Stack Test
☐ Air Emissions
☐ Asbestos
☐ Industrial Hygiene
☐ Life Systems
☐ Hazardous Material
☐ Construction
☐ NRC/DOE
☐ USATHAMA
☐ Air Force

Hazard Control Approval Documentation

Reviewed by:

a. P.M. Gordon Horn, P.E. — Date: 18 Feb 94
b. P.M. John Thomas, P.E. — Date:
c. DSO/RSO Kevin Soto — Date: 18 FEB 94
d. SHSC Andy Fendorzi — Date: 18 FEB 94

Approved by: Robert Schoenfelder — Robert P. Schoenfelder — Date: 3/4/94

☑ Corporate Health and Safety Director (CHSD) — TASK 1 only
☐ DSO/RSO (Only with specific delegation by CHSD)

Project start date: 7 March 1994 End date: January 1995	This site HASP must be reviewed/approved for any activities conducted after: 31-December-1995 01 SEPTEMBER 1994	Amendment date(s): 1. 2. 3. 4. 5.

N:\FFTA\HASP.F01

WESTON Representatives

Organization/Branch	Name/Title	Address	Telephone
Cincinnati	Gordon Horn, P.E. Project Manager	11840-D Kemperspringe Dr. Cincinnati, OH 45240	513-825-3440
Cincinnati	Andy Fandozzi Field Engineer	11840-D Kemperspringe Dr. Cincinnati, OH 45240	513-825-3440
Cincinnati	John Price, P.G. Project Director	11840-D Kemperspringe Dr. Cincinnati, OH 45240	513-825-3440
Vernon Hills	John Thorsen, P.E. Project Director	3 Hawthorn Parkway Vernon Hills, IL 60061	708-918-4000

Roles and Responsibilities:

Soil sampling, subcontractor oversight, excavation oversight, H & S auditing and monitoring, drilling.

WESTON Subcontractors

Organization/Branch	Name/Title	Address	Telephone
To Be Determined (TBD)			

Roles and Responsibilities: Drilling, concrete scarifying and demolition operations, installing and maintaining the multipoint dewatering system.

Site Specific Health and Safety Personnel

The Site Health and Safety Coordinator (SHSC) for activities to be conducted at this site is: Andy Fandozzi

The SHSC has total responsibility for ensuring that the provisions of this Site HASP are adequate and implemented in the field.

Changing field conditions may require decisions to be made concerning adequate protection programs. Therefore, the personnel assigned as SHSCs are experienced and meet the additional training requirements specified by OSHA in 29 CFR 1910.120

Qualifications:
B-S, SHSC Training; 40-hour OSHA hazardous waste training with current 8-hour refresher training; current first aid and CPR; extensive field experience.

Designated alternates include: Kevin Bate; B-S Certified

HEALTH AND SAFETY EVALUATION

Hazard Assessment

Background Review: ☑ Complete ☐ Partial If partial why?

Activities Covered Under This Plan:

No.	Task/Subtask	Description	Schedule
1.	Core Sampling	Drill/core bore holes via a Geoprobe rig and surface sampling.	Mar 1994 to May 1994
2.	Dewatering System	Installation, operation, and maintenance of a multipoint dewatering system (depth - 25').	March 1994 to July 1994
3.	Concrete Pad Removal	Conduct scarifying operations to remove surface contamination and demolition of the concrete pits	February 1994 to May 1994

Types of Hazards:

Numbers refer to one of the following hazard evaluation forms. Complete hazard evaluation forms for each appropriate hazard class.

Physiochemical [1]

- ☑ Flammable
- ☑ Explosive
- ☐ Corrosive
- ☐ Reactive
- ☐ O_2 Rich
- ☐ O_2 Deficient

Chemically Toxic [1]

- ☐ Inhalation
- ☑ Ingestion
- ☑ Contact
- ☐ Absorbtion
- ☑ Carcinogen
- ☐ Mutagen
- ☐ Teratogen
- ☑ OSHA 1910.1000 Substance

☑ OSHA Specific Hazard Sub. Standard
Describe:
Benzene

Radiation [3]

Ionizing:

- ☑ Internal exposure
- ☑ External exposure

Non-ionizing:

- ☑ UV
- ☐ IR
- ☐ RF
- ☐ MicroW
- ☐ Laser

Biological [2]

- ☐ Etiological Agent
- ☑ Other (Plant, insect, animal)

☑ Physical Hazards [4]

☑ Construction Activities [5]

Source/Location of Contaminants and Hazardous Substances

Directly Related to Tasks

- ☐ Air
- ☑ Other Surface (Concrete pits)
- ☑ Groundwater
- ☑ Soil
- ☐ Surface Water
- ☐ Other

Indirectly Related to Tasks - Nearby Processes) That Could Affect Team Members:

☑ Client Facility. Traffic on Mound roadways, heavy equipment and movement, Mound employees.

☐ Nearby Non-client Facility.

☑ Client Briefing Arranged. A client pre-construction meeting will be held with Mound Plant personnel and WESTON field team members prior to the commencement of field activities.

HEALTH AND SAFETY EVALUATION – 1 CHEMICAL HAZARDS

☑ N/A Identify and attach Material Safety Data Sheets for all reagent type chemicals, solutions, or other identified materials that in normal use in performing tasks related to this project could produce hazardous substances.

☐ N/A Chemical Contaminants of Concern. If present, provide the following data.

Hazardous Substance/Task	Physical Properties	Normal Physical State	State At Site/Proj. Temp.	Characteristics	Exposure Limits	Route(s) of Exposure/ Symptoms	Monitoring Instruments/ Ionization Potential + % Response
Diesel Fuel/ All Tasks	☐ Explosive ☑ Flammable ☐ Corrosive ☐ Reactive ☐ Water Reactive ☐ Oxidizer	☐ Solid ☑ Liquid ☐ Gas	☐ Solid ☑ Liquid ☐ Gas	pH: 7 FP: 100°F LEL: UEL: Auto. Ig.: 494°F BP:	☐ CA ☐ PEL _____ ☐ TLV _____ ☐ IDLH _____ ☐ Only toxicological data available ☑ Other: ORL-RAT LDSG: 9g/Kg NIOSH REL: TWA 100mg/m³	☑ Inhalation ☑ Ingestion ☑ Skin Absorption ☑ Contact ☐ Direct Penetration ☐ Other:	☐ PID ☐ 11.7 eV ☐ 10.2 eV ☑ OVM ☐ CGI ☑ OVA
CAS No: 77650-28-3	☐ Radioactive ☐ Other	Incompatible With: Oxidizers		MP: Sp. Gr.: <1 Vap. D.: Vap. P.: H_2O Sol.: Other:		Symptoms: Irritated eyes, mucus membranes; head, derm; narco, coma.	IP: <10.2eV % Response: OVA - 100% HNu - 100%
Synonyms: Fuel oil							

HEALTH AND SAFETY EVALUATION — 1 CHEMICAL HAZARDS

☑ N/A Identify and attach Material Safety Data Sheets for all reagent type chemicals, solutions, or other identified materials that in normal use in performing tasks related to this project could produce hazardous substances.

☐ N/A Chemical Contaminants of Concern. If present, provide the following data.

Hazardous Substances/Tasks	Physical Properties	Normal Physical State	State At Site/Proj. Temp.	Characteristics	Exposure Limits	Route(s) of Exposure/ Symptoms	Monitoring Instruments/ Ionization Potential + % Response
Ethyl benzene/ All Tasks	☐ Explosive ☑ Flammable ☐ Corrosive ☐ Reactive ☐ Water Reactive ☐ Oxidizer ☐ Radioactive ☐ Other	☐ Solid ☑ Liquid ☐ Gas	☐ Solid ☐ Liquid ☐ Gas	pH: FP: 55°F LEL: 1.0% UEL: 6.7% Auto. Ig.: BP: 277°F	☐ CA ☐ PEL _____ ☑ TLV 435 mg/m³, 100 ppm ☑ IDLH 2000 ppm ☐ Only toxicological data available ☑ Other: STEL 543 mg/m³, 125 ppm	☑ Inhalation ☑ Ingestion ☐ Skin Absorption ☑ Contact ☐ Direct Penetration ☐ Other:	☐ PID ☐ 11.7 eV ☐ 10.2 eV ☑ OVM ☐ CGI ☑ OVA
CAS No: 100-41-4		Incompatible With: Strong oxidizers.		MP: Sp. Gr.: 0.87			
Synonyms: Ethylbenzol, Phenylethane				Vap. D.: Vap. P.: 10 mm H_2O Sol.: 0.01% Other:		Symptoms: Irritated eyes, mucous membrane; head, derm; narco, coma.	IP: 8.76 eV % Response: OVA = 100% OVM = 59%

HEALTH AND SAFETY EVALUATION — 1 CHEMICAL HAZARDS

☑ N/A Identify and attach Material Safety Data Sheets for all reagent type chemicals, solutions, or other identified materials that in normal use in performing tasks related to this project could produce hazardous substances.

☐ N/A Chemical Contaminants of Concern. If present, provide the following data.

Hazardous Substance/Tasks	Physical Properties	Normal Physical State	State At Site/Proj. Temp.	Characteristics	Exposure Limits	Route(s) of Exposure/ Symptoms	Monitoring Instruments/ Ionization Potential + % Response
Benzene/ All Tasks	☐ Explosive ☑ Flammable ☐ Corrosive ☐ Reactive ☐ Water Reactive ☐ Oxidizer ☐ Radioactive ☑ Other:	☐ Solid ☑ Liquid ☐ Gas	☐ Solid ☑ Liquid ☐ Gas	pH: FP: 12° LEL: 1.3% UEL: 7.9% Auto. Ig.: BP: 176°	☑ CA (Carcinogen) ☑ PEL 1 ppm/8H PK5ppm/15m ☑ TLV 32 mg/m³, 10 ppm ☑ IDLH 3000 ppm ☐ Only toxicological data available ☑ Other: REL Ci 1ppm/60m	☑ Inhalation ☑ Ingestion ☑ Skin Adsorption ☑ Contact ☐ Direct Penetration ☐ Other:	☑ PID ☑ 11.7 eV ☑ 10.2 eV ☑ OVM ☐ CGI ☑ OVA
CAS No: 71-43-2		Incompatible With: Strong oxidizers, many fluorides & perchlorates, nitric acid.		MP: Sp. Gr.: 0.88 Vap. D.: Vap. P.: 75 mm H_2O Sol.: 0.07% Other:		Symptoms: Irritated eyes, nose, respiratory system; giddy; head, nausea, staggered gait; ftg. anor, loss; derm; bone marrow depression; (carcinogen).	IP: 9.24 eV % Response: PID(11.7) = 122% PID(10.2) = 100% OVA = 150% OVM = 143% PID = 100%
Synonyms: Benzol, Phenyl hydride.							

HEALTH AND SAFETY EVALUATION — 1 CHEMICAL HAZARDS

☑ N/A Identify and attach Material Safety Data Sheets for all reagent type chemicals, solutions, or other identified materials that in normal use in performing tasks related to this project could produce hazardous substances.

☐ N/A Chemical Contaminants of Concern. If present, provide the following data.

Hazardous Substances/Tasks	Physical Properties	Normal Physical State	State At Site/Proj. Temp.	Characteristics	Exposure Limits	Route(s) of Exposure/ Symptoms	Monitoring Instruments/ Ionization Potential + % Response
Toluene/ All Tasks	☐ Explosive ☑ Flammable ☐ Corrosive ☐ Reactive ☐ Water Reactive ☐ Oxidizer	☐ Solid ☑ Liquid ☐ Gas	☐ Solid ☑ Liquid ☐ Gas	pH: N/A FP: 40°F LEL: 1.27% UEL: 7% Auto. Ig.: 896°F BP: 232°F	☐ CA ☑ PEL 200 ppm ☑ TLV 100 ppm ☑ IDLH 2,000 ppm ☐ Only toxicological data available ☐ Other:	☑ Inhalation ☑ Ingestion ☑ Skin Absorption ☐ Contact ☐ Direct Penetration ☐ Other:	☐ PID ☐ 11.7 eV ☐ 10.2 eV ☐ OVM ☐ CGI ☑ OVA
CAS No: 108-88-3	☐ Radioactive ☐ Other	Incompatible With: Strong oxiders		MP: -95°C Sp. Gr.: N/A Vap. D.: 3.14 Vap. P.: 36.7 H_2O Sol.: Other:		Symptoms: Impairment of coordination and reaction time - headache, nausea, eye irritation, loss of appetite, lassitude	IP: 8.82 eV % Response: 110
Synonyms: Methylbenzene, methylbenzol, phenylmethane, toluol							

HEALTH AND SAFETY EVALUATION — 1 CHEMICAL HAZARDS

☑ N/A Identify and attach Material Safety Data Sheets for all reagent type chemicals, solutions, or other identified materials that in normal use in performing tasks related to this project could produce hazardous substances.

☐ N/A Chemical Contaminants of Concern. If present, provide the following data.

Hazardous Substances/Tasks	Physical Properties	Normal Physical State	State At Site/Proj. Temp.	Characteristics	Exposure Limits	Route(s) of Exposure/ Symptoms	Monitoring Instruments/ Ionization Potential + % Response
Xylenes (o,p, or m isomers)/ All Tasks	☐ Explosive ☑ Flammable ☐ Corrosive ☐ Reactive ☐ Water Reactive ☐ Oxidizer	☐ Solid ☑ Liquid ☐ Gas	☐ Solid ☑ Liquid ☐ Gas	pH: FP: 63/81/84°F LEL: 1.1/1.1/1.0% UEL: 7.0/7.0/7.0% Auto. Ig.: BP: 292/281/269°F	☐ CA ☐ PEL _____ ☑ TLV 434 mg/m³ ☑ IDLH 1000 ppm ☐ Only toxicological data available ☑ Other: STEL 651 mg/m³	☑ Inhalation ☑ Ingestion ☑ Skin Absorption ☑ Contact ☐ Direct Penetration ☐ Other:	☑ PID ☐ 11.7 eV ☑ 10.2 eV ☐ OVM ☐ CGI ☑ OVA
CAS No: 1330-20-7	☐ Radioactive ☐ Other	Incompatible With: Strong oxidizers		MP: Sp. Gr.:0.88/0.86/0.86 Vap. D.: Vap. P.: 7/9/9 mm H_2O Sol.: insoluble Other:			
Synonyms: o: o-Xylol, 1,2-dimethylbenzene p: p-Xylol, 1,4-dimethylbenzene m: m-Xylol, 1,3-dimethylbenzene						Symptoms: Dizziness, excitement, drowsiness, incoherence, staggering gait; irritated eyes, nose, throat; corneal vacuolization; anor, nausea, vomiting, abdominal pain; derm	IP: 8.56/8.44/8.56 eV % Response: All isomers >100%

HEALTH AND SAFETY EVALUATION — 1 RADIOLOGICAL HAZARDS

Task: All Tasks

IONIZING						
			DAC (μCi/mL)			
Radionuclide	Major Radiations	Radioactive Half-Life (Years)	D	W	Y	Monitoring Instrument
Plutonium 238	Alpha, Gamma	86.4	$3x10^{-10}$	$3x10^{-12}$	$7x10^{-12}$	Alpha Scint.
Plutonium 239/240	Alpha, Gamma	$2.9x10^{7}$	-	$2x10^{-12}$	$6x10^{-12}$	Alpha Scint.
Plutonium 242	Alpha, Gamma	$3.76x10^{0}$	-	$2x10^{-12}$	$6x10^{-12}$	Alpha Scint.
Thorium 230	Alpha, Gamma	$8x10^{4}$	-	$3x10^{-12}$	$7x10^{-12}$	Alpha Scint.
Thorium 232	Alpha, Gamma	$1.14x10^{10}$	-	$5x10^{-13}$	$1x10^{-12}$	Alpha Scint.
Thorium 234	Beta	24.10 days	-	$9x10^{-0}$	$6x10^{-0}$	GM Pancake
Uranium 234	Alpha, Gamma	$2.47x10^{5}$	$5x10^{-10}$	$3x10^{-10}$	$2x10^{-11}$	Alpha Scint.
Uranium 235	Alpha, Gamma	$7.1x10^{8}$	$6x10^{-10}$	$3x10^{-10}$	$2x10^{-11}$	Alpha Scint.
Uranium 238	Alpha, Gamma	$4.51x10^{9}$	$6x10^{-10}$	$3x10^{-10}$	$2x10^{-11}$	Alpha Scint.
Strontium 90	Beta	27.7	$8x10^{-0}$	-	$8x10^{-0}$	Pancake GM
Radium 226	Alpha, Gamma	1602	-	$3x10^{-10}$	-	Alpha Scint.
Cesium 137	Beta, Gamma	30	$7x10^{-0}$	-	-	GM Pancake
Bi 207	Positron (weak)	33.4	$7x10^{-7}$	$2x10^{-7}$	-	Not Available
Bi 210	Alpha, Gamma	$3x10^{0}$	$1x10^{-7}$	$1x10^{-0}$	-	Alpha Scint.
Tritium	Beta (weak)	12.3	$2x10^{-3}$	$2x10^{-3}$	$2x10^{-3}$	Not Available
Pu 241	Beta (weak)	14.4	-	$1x10^{-10}$	$3x10^{-10}$	GM Pancake
Co 60	Gamma	5.27	-	$7x10^{-0}$	$1x10^{-0}$	GM Pancake
Am 241	Alpha, Gamma	432.2	-	$2x10^{-12}$	-	Alpha Scint.
Np 237	Alpha, Gamma	$2.14x10^{6}$	-	$2x10^{-12}$	-	
NON-IONIZING						
Ultraviolet	Sun					

HEALTH AND SAFETY EVALUATION - 2 BIOLOGICAL HAZARDS OF CONCERN

☑ Poisonous Plants

Location/Task No(s).: All Tasks
Route of Source: ☐ Known ☑ Suspect
Exposure: ☐ Inhalation ☐ Ingestion ☑ Contact ☐ Direct Penetration
Team Member(s) Allergic: ☐ Yes ☐ No - TBD
Immunization required: ☐ Yes ☐ No - TBD

☑ Insects

Location/Task No(s).: All Tasks
Route of Source: ☐ Known ☑ Suspect
Exposure: ☐ Inhalation ☐ Ingestion ☐ Contact ☑ Direct Penetration
Team Member(s) Allergic: ☐ Yes ☐ No - TBD
Immunization required: ☐ Yes ☐ No - TBD

☑ Snakes, Reptiles

Location/Task No(s).: All Tasks
Route of Source: ☐ Known ☑ Suspect
Exposure: ☐ Inhalation ☐ Ingestion ☐ Contact ☑ Direct Penetration
Team Member(s) Allergic: ☐ Yes ☐ No - TBD
Immunization required: ☐ Yes ☐ No - TBD

☑ Animals

Location/Task No(s).: All Tasks
Route of Source: ☐ Known ☑ Suspect
Exposure: ☐ Inhalation ☐ Ingestion ☐ Contact ☑ Direct Penetration
Team Member(s) Allergic: ☐ Yes ☐ No - TBD
Immunization required: ☐ Yes ☐ No - TBD

☐ Sewage

Location/Task No(s).:
Route of Source: ☐ Known ☐ Suspect
Exposure: ☐ Inhalation ☐ Ingestion ☐ Contact, ☐ Direct Penetration
Team Member(s) Allergic: ☐ Yes ☐ No
Immunization required: ☐ Yes ☐ No

☐ Etiologic Agents (List)

Location/Task No(s).:
Route of Source: ☐ Known ☐ Suspect
Exposure: ☐ Inhalation ☐ Ingestion ☐ Contact ☐ Direct Penetration
Team Member(s) Allergic: ☐ Yes ☐ No
Immunization required: ☐ Yes ☐ No

HEALTH AND SAFETY EVALUATION - 3 RADIATION HAZARDS OF CONCERN

Ionizing (See Table Pg. 9 of 38)					
Radionuclide	Location/Source	Type Emitter	Task No(s).	Exposure Limits	Protection Protocol Reference
Non-Ionizing					
Ultraviolet	Sun		1,2,3,4,5		

HEALTH AND SAFETY EVALUATION - 4 PHYSICAL HAZARDS OF CONCERN

	Hazard	Task No.(s)	Protection OP(s)
☑	Noise	1,2,3	90db - FLD 01
☐	Heat - ambient air		
	☐ Hot Process - Steam		
	☐ Hot Process - LT3		
	☐ Hot Process - Incineration		
☑	Cold	1,2,3	COLD STRESS FLD 02, 06, 07
☑	Rain	1,2,3	RAIN GEAR FLD 02, 06, 07
☑	Snow	1,2,3	COLD STRESS, INCLEMENT WEATHER, FLD 02, 06, 07
☑	Electrical Storms	1,2,3	INCLEMENT WEATHER FLD 02
☐	Confined Space Entry		
☐	"Hot Work"		
☑	Heavy Manual Lifting/Moving	1,2,3	FLD 10 REQUEST ASSISTANCE
☐	Rough Terrain		
☐	Housekeeping		
☐	Structural Integrity		
☐	Neighborhood		
☐	Remote Area		
☐	Compressed Gases		
☐	Diving		
☐	Using Boats		
☐	Working Over Water		
☑	Traffic		FLD 20
☐	Explosives		
☑	Heavy Equipment Operation	1,2,3	FLD 22A, 22B - DSG
☑	Lifting Equipment Operation	1,2,3	FLD 23
	☐ Cranes		
	☐ Manlifts		
☐	Working at Elevation		
☐	Using Ladders		
☐	Using Scaffolding		
☑	Excavating/Trenching	3	FLD 28
☐	Materials Handling		
☐	Hazardous Materials Use/Storage		
	☐ Flammable liquid/gases		
	☐ Oxidizers		
	☐ Corrosives		
☐	Fire Prevention/Response Plan Required		
☑	Fire Extinguishers Required	1,2,3	FLD 22A, 22B
☑	Demolition	3	FLD 33
☑	Utilities	1,2,3	FLD 34
	☑ Underground		FLD 34
	☑ Overhead		FLD 34
☑	Electrical - General	1,2,3	FLD 35A
	☑ High Voltage	1,2,3	FLD 35B
☐	Welding/Cutting/Burning		
☑	Hand Tools	1,2,3	FLD 38
☐	Power Hand Tools	1,2,3	FLD 38
☑	High Pressure Water	1,2,3	FLD 37
☑	Other: Breaker Hammer	3	
☑	Other: Drill Rig Operation	1	22B DSG (DRILLING SAFETY GUIDE)
☐	Other:		

KEY PERSONNEL/IDENTIFICATION OF HEALTH AND SAFETY PERSONNEL

Key Personnel

The following personnel and organizations are key to the activities at this site.

EPA Representatives

Organization/Branch	Name/Title	Address	Telephone
OEPA/Southwest District Office	Jeff Smith	40 South Main Street Dayton, Ohio 45402	(513)285-6357
USEPA/Region V	Diane Spencer	USEPA HS Room - 6J 77 W. Jackson Chicago, Illinois 60604	(312)353-6287

Roles and Responsibilities: Diane Spencer: Representative USEPA Policy
Jeff Smith: Representative OEPA Policy

Other EPA Contractors and Subcontractors

Organization/Branch	Name/Title	Address	Telephone

Roles and Responsibilities:

Other Regulatory Agency Representatives

Organization/Branch	Name/Title	Address	Telephone

Roles and Responsibilities:

TASK-BY-TASK RISK ASSESSMENT
(Complete One Sheet for Each Task)

TASK DESCRIPTION

Drilling, geophysical logging of boreholes (1)

EQUIPMENT REQUIRED/USED
(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

Heavy Equipment: Auger drill rig.
Hand tools. Instruments: CGI/O_2 meter, PID meter, FID meter, miniram, alpha scintillometer, pancake G-M probe, micro-R meter.

POTENTIAL HAZARDS/RISKS

CHEMICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? Chemical hazards occur when drilling disturbs or penetrates a contaminated pocket of soil. The rig will stir some dust and generate heat that will volatilize organics in the soil. These factors combine to greatly enhance the possibility of exposure to field personnel. However the low concentrations of contaminants expected in the work areas minimize the potential for generation of measurable levels of contaminants.

While drilling is in progress, a CGI/O_2 meter will be placed near the well borehole to continuously monitor the percent LEL of combustible gasses and the percent oxygen. PID and FID meters will be used to monitor vapors in the breathing zone, downhole, and in the headspace of samples. A Miniram meter will be used to monitor airborne particulates contaminants.

It is anticipated that Level D protection will be used for the remedial investigation activities. Action Levels for the various instruments will be as follows:

- If PID/FID are > 1.0 unit above background in breathing zone, Drager Tubes will be used to measure concentrations of benzene. If benzene is present in concentrations of < 1.0 ppm, Level C protection must be implemented or stop work and re-evaluate situation. If benzene is present in concentrations of > 1.0 ppm, Level B protection must be implemented.

- If Miniram readings exceed 2.5 mg/m^3 Level C protection must be used to avoid the inhalation of chemically and/or radioactively contaminated particulates. Stop work and re-evaluate situation.

PHYSICAL

☑ Hazard Present Risk Level: ☐ H ☑ M ☐ L

What Justifies Risk Level? In drilling there is a great possibility for physical injuries that may range from bruised and cut fingers to death. A drill rig allows for entanglement and pinch points in many parts of the rig. These injuries are generally minor, but may amputate fingers. Other severe injuries may occur from failure of wire rope under extreme stress. If the rope breaks under high tension, it will act as a whip and can injure workers in the area. Work on slopes will present an additional hazard. In order to drill these borings in a safe manner, a Simco Track Rig will be used. This rig has the ability to drill a vertical boring while sitting at an angle on a slope without danger of rig movement. Personnel must follow safe working OPs as indicated on Page 14 of 34.

BIOLOGICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? There is a small risk of exposure to poisonous plants through external contact. Snakes and reptiles are also suspect in the area. Other small animals may present a hazard. Care should be taken to notice the signs of rabies.

<u>Winter work</u> - Minimal contact with dormant plant and animal life.

<u>Summer work</u> - Recognize and avoid contact with poisonous plant and all animals.

RADIOLOGICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? Previous borings from OU-3, Limited Field Investigation, in the source area indicate low levels of radiological components which fall well below action levels. Regardless, initial work will require adherence to previously-established action levels for drilling until more data is obtained from Task 1 - Geoprobe Sampling.

TASK-BY-TASK RISK ASSESSMENT
(Complete One Sheet for Each Task)

LEVELS OF PROTECTION/JUSTIFICATION

GENERAL DISCUSSION OF ACTION LEVELS

If it becomes necessary to utilize Level B protection, work will be stopped, and the appropriate equipment and personnel will be obtained to continue working in Level B.

ER Program SOPs will be followed. The levels of protection described above for use during field activities have been modified from EPA protocol and are based on the following total organic concentration levels for a 1-minute sustained reading in the breathing zone, as measured with a PID.

Protection Level	Concentration Range
Level D[a]	Background - 1.0 unit above background
Level C[b]	1.0 - 25 units above background
Level B[c]	25 - 50 units above background
Exit site, re-evaluate conditions with the SHSC	≥ 50 units above background

[a] If vinyl chloride and/or benzene are not present.
[b] If benzene and/or vinyl chloride are present in any concentration above background and below 1.0 ppm.
[c] If vinyl chloride and/or benzene are present at concentrations greater than 1.0 ppm.

JUSTIFICATION FOR USING A MINIRAM TO ENSURE PROTECTION AGAINST AIRBORNE RADIONUCLIDES

The portable radiation detectors to be used for monitoring soils and surface contamination are generally capable of detecting concentrations of 50 pCi/g or less. Using 50 pCi/g as a potential maximum concentration for radionuclides in soil at Mound, the following calculation indicates that the action level of 2.5 mg/m³ on the Miniram will be adequate to protect against airborne radioactive material.

$$A.R.\ \mu Ci/ml = S.R.\ pCi/g \times A.L.\ mg/m^3 \times C.F.$$

where:

- A.R. = the airborne radionuclide concentration if contaminated soils is suspended in the air.
- S.R. = the concentration of the radionuclide in the soil, assumed to be 50 pCi/G for this example.
- A.L. = the action level set for the Miniram, which is 2.5 mg/m³.
- C.F. = correction factors as necessary to reconcile the units for A.R., S.R., and A.L.

The Calculation is as follows:

A.R. = (50 pCi/g)(E-3 g/mg)(E-6 μCi/pCi)(2.5 mg/m³)(E-6 m³/ml)
= 1.25 E-13 μCi/ml

The most restrictive Derived Air Concentration for the site, from page 9 of this plan, is 1 E-12 μCi/ml. This gives a Safety Factor of approximately 10, making the Miniram an adequate detection device to protect against expected airborne radionuclides.

SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED

1.1 General Instructions for Field Personnel (Rev. 2)
1.6 General Equipment Decontamination (Rev. 2)
1.7 Sampling for Removable Alpha Contamination (Rev. 1)
1.8 Personnel Decontamination - Level D Protection (Rev. 1)
1.9 Personnel Decontamination - Level C Protection (Rev. 1)
1.10 Personnel Decontamination - Level B Protection (Rev. 1)
1.12 Air Particulate Sampling with a Real-Time Aerosol Monitor (Rev. 0)
6.1 Health and Safety Monitoring of Combustible Gas Levels (Rev. 1)
6.2 Health and Safety Monitoring of Organic Vapors with a Photoionization Detector (Rev. 1)
6.3. H & S Monitoring of Organic Vapors with a Flame Ionization Detector (Rev. 0)
6.4 Total Alpha Surface Contamination Measurements (Rev. 1)
6.7 Near Surface and Soil Sample Screening for Low-Energy Gamma Radiation Using the FIDLER (Rev. 0)
6.11 Beta-Gamma Radiation Measurements (Rev. 1)
6.15 Measurement of Gamma Ray Fields Using a Sodium Iodide (NaI) Detector (Rev. 0)

TASK-BY-TASK RISK ASSESSMENT
(Complete One Sheet for Each Task)

TASK DESCRIPTION

Installation of multi-point dewatering system (2)

EQUIPMENT REQUIRED/USED
(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

Heavy Equipment: Backhoe or ditchwitch; dump trucks.
Hand tools. Instruments: CGI/O_2 meter, PID meter, FID meter, miniram, alpha scintillometer, pancake G-M probe, micro-R meter.

POTENTIAL HAZARDS/RISKS

CHEMICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? Chemical hazards occur when excavation disturbs or penetrates a contaminated pocket of soil. The heavy equipment will stir some dust and generate heat that will volatilize organics in the soil. These factors combine to greatly enhance the possibility of exposure to field personnel. However the low concentrations of contaminants expected in the work areas minimize the potential for generation of measurable levels of contaminants.

While excavation is in progress, a CGI/O_2 meter will be placed near the excavation area to continuously monitor the percent LEL of combustible gasses and the percent oxygen. PID and FID meters will be used to monitor vapors in the breathing zone, downhole, and in the headspace of samples. A Miniram meter will be used to monitor airborne particulates contaminants.

It is anticipated that Level D protection will be used for the remedial investigation activities. Action Levels for the various instruments will be as follows:

- If PID/FID are >1.0 unit above background in breathing zone, Drager Tubes will be used to measure concentrations of benzene. If benzene is present in concentrations of <1.0 ppm, Level C protection must be implemented or stop work and re-evaluate situation. If benzene is present in concentrations of >1.0 ppm, Level B protection must be implemented.
- If Miniram readings exceed 2.5 mg/m^3 Level C protection must be used to avoid the inhalation of chemically and/or radioactively contaminated particulates. Stop work and re-evaluate situation.

PHYSICAL

☑ Hazard Present Risk Level: ☐ H ☑ M ☐ L

What Justifies Risk Level? Heavy equipment traffic will be a main concern due to small work area. All heavy equipment will be moved using spotters unless back-up alarms are installed on each vehicle. Proper barriers will be installed to prevent pedestrian and vehicle traffic into excavation area. Personnel must follow safe working OPs as indicated on page 14 of 39.

BIOLOGICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? There is a small risk of exposure to poisonous plants through external contact. Snakes and reptiles are also suspect in the area. Other small animals may present a hazard. Care should be taken to notice the signs of rabies.

<u>Winter work</u> - Minimal contact with dormant plant and animal life.

<u>Summer work</u> - Recognize and avoid contact with poisonous plant and all animals.

RADIOLOGICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? Previous borings from OU-3, Limited Field Investigation, in the source area indicate low levels of radiological components which fall well below action levels. Regardless, initial work will require adherence to previously-established action levels for drilling until more data is obtained from Task 1 - Geoprobe Sampling.

TASK-BY-TASK RISK ASSESSMENT
(Complete One Sheet for Each Task)

LEVELS OF PROTECTION/JUSTIFICATION

GENERAL DISCUSSION OF ACTION LEVELS

If it becomes necessary to utilize Level B protection, work will be stopped, and the appropriate equipment and personnel will be obtained to continue working in Level B.

ER Program SOPs will be followed. The levels of protection described above for use during field activities have been modified from EPA protocol and are based on the following total organic concentration levels for a 1-minute sustained reading in the breathing zone, as measured with a PID.

Protection Level	Concentration Range
Level D[a]	Background - 1.0 unit above background
Level C[b]	1.0 - 25 units above background
Level B[c]	25 - 50 units above background
Exit site, re-evaluate conditions with the SHSC	≥50 units above background

[a] If vinyl chloride and/or benzene are not present.
[b] If benzene and/or vinyl chloride are present in any concentration above background and below 1.0 ppm.
[c] If vinyl chloride and/or benzene are present at concentrations greater than 1.0 ppm.

JUSTIFICATION FOR USING A MINIRAM TO ENSURE PROTECTION AGAINST AIRBORNE RADIONUCLIDES

The portable radiation detectors to be used for monitoring soils and surface contamination are generally capable of detecting concentrations of 50 pCi/g or less. Using 50 pCi/g as a potential maximum concentration for radionuclides in soil at Mound, the following calculation indicates that the action level of 2.5 mg/m^3 on the Miniram will be adequate to protect against airborne radioactive material.

$$A.R.\ \mu Ci/ml = S.R.\ pCi/g \times A.L.\ mg/m^3 \times C.F.$$

where:

A.R. =	the airborne radionuclide concentration if contaminated soils is suspended in the air.
S.R. =	the concentration of the radionuclide in the soil, assumed to be 50 pCi/G for this example.
A.L. =	the action level set for the Miniram, which is 2.5 mg/m^3.
C.F. =	correction factors as necessary to reconcile the units for A.R., S.R., and A.L.

The Calculation is as follows:

A.R. = (50 pCi/g)(E-3 g/mg)(E-6 μCi/pCi)(2.5 mg/m^3)(E-6 m^3/ml)
= 1.25 E-13 μCi/ml

The most restrictive Derived Air Concentration for the site, from page 9 of this plan, is 1 E-12 μCi/ml. This gives a Safety Factor of approximately 10, making the Miniram an adequate detection device to protect against expected airborne radionuclides.

SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED

1.1 General Instructions for Field Personnel (Rev. 2)
1.6 General Equipment Decontamination (Rev. 2)
1.7 Sampling for Removable Alpha Contamination (Rev. 1)
1.8 Personnel Decontamination - Level D Protection (Rev. 1)
1.9 Personnel Decontamination - Level C Protection (Rev. 1)
1.10 Personnel Decontamination - Level B Protection (Rev. 1)
1.12 Air Particulate Sampling with a Real-Time Aerosol Monitor (Rev. 0)
G.1 Health and Safety Monitoring of Combustible Gas Levels (Rev. 1)
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G.3. H & S Monitoring of Organic Vapors with a Flame Ionization Detector (Rev. 0)
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G.7 Near Surface and Soil Sample Screening for Low-Energy Gamma Radiation Using the FIDLER (Rev. 0)
G.11 Beta-Gamma Radiation Measurements (Rev. 1)
G.15 Measurement of Gamma Ray Fields Using a Sodium Iodide (NaI) Detector (Rev. 0)

TASK-BY-TASK RISK ASSESSMENT
(Complete One Sheet for Each Task)

TASK DESCRIPTION

Concrete Pad Removal (3)

EQUIPMENT REQUIRED/USED
(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

Heavy Equipment: Backhoe; dump trucks
Hand tools. Instruments: CGI/O_2 meter, PID meter, FID meter, miniram, alpha scintillometer, pancake G-M probe, micro-R meter.

POTENTIAL HAZARDS/RISKS

CHEMICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? Chemical hazards occur when excavation disturbs or penetrates a contaminated pocket of soil. The heavy equipment will stir some dust and generate heat that will volatilize organics in the soil. These factors combine to greatly enhance the possibility of exposure to field personnel. However the low concentrations of contaminants expected in the work areas minimize the potential for generation of measurable levels of contaminants.

While excavation is in progress, a CGI/O_2 meter will be placed near the excavation area to continuously monitor the percent LEL of combustible gasses and the percent oxygen. PID and FID meters will be used to monitor vapors in the breathing zone, downhole, and in the headspace of samples. A Miniram meter will be used to monitor airborne particulates contaminants.

It is anticipated that Level D protection will be used for the remedial investigation activities. Action Levels for the various instruments will be as follows:

- If PID/FID are >1.0 unit above background in breathing zone, Drager Tubes will be used to measure concentrations of benzene. If benzene is present in concentrations of <1.0 ppm, Level C protection must be implemented or stop work and re-evaluate situation. If benzene is present in concentrations of >1.0 ppm, Level B protection must be implemented.
- If Miniram readings exceed 2.5 mg/m^3 Level C protection must be used to avoid the inhalation of chemically and/or radioactively contaminated particulates. Stop work and re-evaluate situation.

PHYSICAL

☑ Hazard Present Risk Level: ☐ H ☑ M ☐ L

What Justifies Risk Level? Heavy equipment traffic will be a main concern due to small work area. All heavy equipment will be moved using spotters unless back-up alarms are installed on each vehicle. Proper barriers will be installed to prevent pedestrian and vehicle traffic into excavation area. Personnel must follow safe working OPs as indicated on page 14 of 39.

BIOLOGICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? There is a small risk of exposure to poisonous plants through external contact. Snakes and reptiles are also suspect in the area. Other small animals may present a hazard. Care should be taken to notice the signs of rabies.

<u>Winter work</u> - Minimal contact with dormant plant and animal life.

<u>Summer work</u> - Recognize and avoid contact with poisonous plant and all animals.

RADIOLOGICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? Previous borings from OU-3, Limited Field Investigation, in the source area indicate low levels of radiological components which fall well below action levels. Regardless, initial work will require adherence to previously-established action levels for drilling until more data is obtained from Task 1 - Geoprobe Sampling.

Demolition of the short concrete berms may result in greater dust levels than with normal excavation work. All personnel will maintain safe distance from the actual demolition area due to the possibility of flying debris.

TASK-BY-TASK RISK ASSESSMENT
(Complete One Sheet for Each Task)

LEVELS OF PROTECTION/JUSTIFICATION

GENERAL DISCUSSION OF ACTION LEVELS

If it becomes necessary to utilize Level B protection, work will be stopped, and the appropriate equipment and personnel will be obtained to continue working in Level B.

ER Program SOPs will be followed. The levels of protection described above for use during field activities have been modified from EPA protocol and are based on the following total organic concentration levels for a 1-minute sustained reading in the breathing zone, as measured with a PID.

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Level B[c]	25 - 50 units above background
Exit site, re-evaluate conditions with the SHSC	≥50 units above background

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$$\text{A.R. } \mu\text{Ci/ml} = \text{S.R. pCi/g} \times \text{A.L. mg/m}^3 \times \text{C.F.}$$

where:

A.R. =	the airborne radionuclide concentration if contaminated soils is suspended in the air.
S.R. =	the concentration of the radionuclide in the soil, assumed to be 50 pCi/G for this example.
A.L. =	the action level set for the Miniram, which is 2.5 mg/m^3.
C.F. =	correction factors as necessary to reconcile the units for A.R., S.R., and A.L.

The Calculation is as follows:

A.R. = (50 pCi/g)(E-3 g/mg)(E-6 μCi/pCi)(2.5 mg/m^3)(E-6 m^3/ml)
= 1.25 E-13 μCi/ml

The most restrictive Derived Air Concentration for the site, from page 9 of this plan, is 1 E-12 μCi/ml. This gives a Safety Factor of approximately 10, making the Miniram an adequate detection device to protect against expected airborne radionuclides.

SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED

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6.11 Beta-Gamma Radiation Measurements (Rev. 1)
6.15 Measurement of Gamma Ray Fields Using a Sodium Iodide (NaI) Detector (Rev. 0)

PERSONNEL PROTECTION PLAN

Engineering Controls
Describe Engineering Controls used as part of Personnel Protection Plan:

Task(s)	All Tasks
Dust Suppression Techniques	

Administrative Controls
Describe Administrative controls used as part of Personnel Protection Plan:

Task(s)	All Tasks
Monitor for cold or heat	

Personnel Protective Equipment
Action Levels for Changing Levels of Protection. Define Action Levels for up or down grade for each task

Task(s) All Tasks

CHEMICAL: CGI - (Assume work begins in Level D)
- 19.5-25% Oxygen: Continue investigation with caution, as oxygen levels > 21% require extreme caution.
- < 19.5% Oxygen: Monitor wearing SCBA (Level B)
- > 25% Oxygen: Fire hazard potential. Stop work and consult a fire safety specialist.

PID/FID - (Assume work begins in Level D) - > 1.0 unit above background in breathing zine, Drager Tubes will be used to measure concentrations of vinyl chloride and benzene. If either is present in concentrations of < 1.0 ppm, Level C protection will be implemented. If either is present in concentrations of > 1.0 ppm, Level B protection will be implemented.

Miniram - (Assume work begins in Level D) - > 2.5 mg/m^3 upgrade to Level C protection.

RADIATION: If RAD Instrument Action Levels are reached: Stop work and initiate decon procedure, ensure use of disposable PPE. Continue investigation with caution. Consult a health physicist.

Instrument	Units	Action Level
Alpha Scint.	CPM	Determine typical background readings in an uncontaminated area. Contamination is potentially present when readings exceed 3 times typical background value.
Pancake G-M	CPM	Determine typical background readings in an uncontaminated area. Contamination is potentially present when readings exceed 3 times typical background value.
FIDLER	CPM	Determine typical background readings in an uncontaminated area. Contamination is potentially present when readings exceed 3 times typical background value.
Micro-R Meter	micro-R/hr	Readings in excess of 3 times background indicate potential contamination. If readings exceed 500 micro-R/hr, stop work and consult a health physicist.

Description of Levels of Protection — Level D

Task(s): 1,2		Task(s): 3	
☑ Head	Hard Hat	☑ Head	Hard Hat
☑ Eye and Face	Safety Glasses	☑ Eye and Face	Safety Glasses
☑ Hearing	Ear Plugs if needed	☑ Hearing	Ear plugs if needed
☐ Arms and Legs		☐ Arms and Legs	
☑ Whole Body	Tyvek or coveralls-Saranex when wet	☑ Whole Body	Tyvek or coveralls-Saranex when wet
☐ Apron		☐ Apron	
☑ Hand - Gloves	Latex gloves; cloth work gloves if needed	☑ Hand - Gloves	Latex gloves; cloth work gloves if needed
☐ Gloves		☐ Gloves	
☐ Gloves		☐ Gloves	
☑ Foot - Boots	Steel-toed boots	☑ Foot - Boots	Steel-toed boots
☑ Boots	Disposable boot covers if needed	☑ Boots	Disposable boot covers if needed
☐ Boots		☐ Boots	

Description of Levels of Protection — Levels B and C

Task(s): All Tasks - Level C		Task(s): All Tasks - Level B	
☑ Head	Hard Hat	☑ Head	Hard Hat
☐ Eye and Face		☐ Eye and Face	
☑ Hearing	Ear Plugs if needed	☑ Hearing	Ear Plugs if needed
☐ Arms and Legs Only		☐ Arms and Legs Only	
☑ Whole Body	Tyvek or Saranex	☑ Whole Body	Tyvek or Saranex
☐ Apron		☐ Apron	
☑ Hand - Gloves	Nitrile outer	☑ Hand - Gloves	Nitrile outer
☑ Gloves	Inner latex or nitrile	☑ Gloves	Inner latex or nitrile
☐ Gloves		☐ Gloves	
☑ Foot - Boots	Steel-toed boots	☑ Foot - Boots	Steel-toed boots
☑ Boots	Disposable boot covers	☑ Boots	Disposable boot covers
☐ Boots		☐ Boots	
☑ APR - Neg. Pres.		☐ APR - Neg. Pres.	
☐ Half Face		☐ Half Face	
☐ Cart./Canister		☐ Cart./Canister	
☑ Full Face		☐ Full Face	
☑ Cart./Canister	GMCH	☐ Cart./Canister	
☐ PAPR		☐ PAPR	
☐ Cart./Canister		☐ Cart./Canister	
☐ Type C		☐ Type C	
☐ SAR - Airline		☐ SAR - Airline	
☐ SCBA		☐ SCBA	
☐ Comb. Airline/SCBA		☑ Comb. Airline/SCBA	
☐ Cascade System		☐ Cascade System	
☐ Compressor		☐ Compressor	
☐ Fall Protection		☐ Fall Protection	
☐ Flotation		☐ Flotation	
☐ Other		☐ Other	

SITE OR PROJECT HAZARD MONITORING PROGRAM

Direct Reading Air Monitoring Instruments

Instrument Selection and Initial Check Record

Reporting Format: ☑ Field Notebook ☐ Field Data Sheets ☐ Air Monitoring Log ☐ Trip Report ☐ Other

Instrument	Task No.(s)	Number Required	Number Received	Checked Upon Receipt	Comment	Initials
☐ CGI				☐		
☐ O_2				☐		
☑ CGI/O_2	1,2,3			☐		
☐ CGI/O_2/tox-PPM, H_2S,H_2S/CO				☐		
☑ RAD-GM	1,2,3			☐		
☑ NaI				☐		
☑ ZnS				☐		
☑ Other: Pancake G-M				☐		
☑ PID				☐		
☑ HNU 10.2	1,2,3			☐		
☐ HNU 11.7				☐		
☐ HNU 9.5				☐		
☐ Photovac, TMA, Other				☐		
☑ FID				☐		
☑ FOX-128	1,2,3			☐		
☐ FOX 128GC				☐		
☐ Heath, AID, Other				☐		
☑ RAM, Mini-RAM, Other	1,2,3			☐		
☐ Monitox-HCN				☐		
☐ H_2S				☐		
☐ COCL				☐		
☐ SO_2				☐		
☐ Other				☐		
☐ Bio-Aerosol Monitor				☐		
☐ Detector Tubes				☐		
☑ Pump - MSA, Dräeger, Sensidyne	1,2,3			☐		
☑ Tubes/type: Benzene/0.5				☐		
☐ Tubes/type:				☐		

SITE AIR MONITORING PROGRAM

Direct Reading Air Monitoring Instruments

Air Monitoring Instrument PID/FID/CGI/O_2/FIDDLER/MICRO-R/GEIGER-MULLER

Air Monitoring Frequency:

	Tasks
☑ Periodically: During drilling/augering	1,3
☑ Periodically: When samples are taken	1,3
☑ Continuously: During excavation	3
☐ Other:	

Monitoring Locations

☐ Upwind/downwind of site activities	
☐ Near residents, etc.	
☑ Key site activity locations:	
☐ Decon area	
☑ Staging area	3
☑ Excavation area	3
☐ Field lab area	
☐ Storage tanks	
☐ Lagoons	
☐ Drums	
☐ Fixed stations	
☐ Other:	

Air Monitoring Instrument Miniram

Air Monitoring Frequency:

☐ Periodically:	
☐ Periodically:	
☑ Continuously: During excavation and drilling activities.	1,3
☐ Other:	

Monitoring Locations

☐ Upwind/downwind of site activities	
☐ Near residents, etc.	
☑ Key site activity locations:	
☐ Decon area	
☐ Staging area	
☑ Excavation area	3
☐ Field lab area	
☐ Storage tanks	
☐ Lagoons	
☐ Drums	
☐ Fixed stations	
☐ Other:	

SITE OR PROJECT HAZARD MONITORING PROGRAM

Direct Reading Air Monitoring Instruments

Direct Reading Air Monitoring Instruments Calibration Record

Instrument, Mfg., Model, Equip. ID No.	Date	Time	Calib. Material	Calib. Method Mfg.'s	Other	Initial Setting and Reading	Final Setting and Reading	Calibrator's Initials

SITE AIR MONITORING PROGRAM

Action Levels

These Action Levels, if not defined by regulation, are some percent (usually 50%) of the applicable PEL/REL/TLV. That number must also be adjusted to account for instrument response factors.

	Tasks	Action Level	Action
☑ Explosive atmosphere	1,2,3	<10% LEL	Continue investigation
		10%-25% LEL	Continue on-site monitoring with extreme caution as higher levels are encountered.
		>25% LEL	Explosion hazard. Withdraw from area immediately.
☑ Oxygen	1,2,3	<19.5%	Monitor. Note: Combustible gas readings may not be valid in atmosphere in 19.5% oxygen.
		19.5%-25%	Continue investigation with caution, as oxygen levels >21% require extreme caution. Other than normal level may be due to presence of other substances.
		>25%	Fire hazard potential. Stop work and consult a fire safety specialist.
☑ Radiation	1,2,3	3x Background	For alpha scintillometer, pancake G-M detector, FIDLER: Determine typical background readings in an uncontaminated area. Contamination is potentially present when readings exceed 3 times typical background value. Stop work. Preform decontamination, if necessary. Consult with a health physicist. For Micro-R meter: Readings in excess of 3 times the background indicate potential contamination. If readings exceed 500 Micro-R/hr, stop work and consult a health physicist.
☑ Organic gases and vapors	1,2,3	>1.0 units above background	If PID/FID are > 1.0 unit above background in breathing zone, Drager Tubes will be used to measure concentrations benzene. If benzene is present in concentrations of <1.0 ppm, Level C protection must be implemented or stop work and re-evaluate situation. If benzene is present in concentrations of >1.0 ppm, Level B protection must be implemented.
☐ Inorganic gases and vapors			

SITE AIR MONITORING PROGRAM

Ambient Air Sampling

Check situations which will require or action levels which will apply to deciding to institute or increase scope of planned air sampling.

☑ No air sampling is required on this site.

☐ An air sampling plan is incorporated in this HASP.

Meteorological Conditions

☐ Dry weather for ____ days

☐ Ambient temperature above ____ °F

☐ Wind increasing potential of more contaminant dispersion in or migration out of controlled area.

Activities which will require instituting or increasing scope of air sampling:

☐ Major spills

☐ New site activity resulting in potential presence of new chemical hazards.

☐ Site activity increases airborne contaminants possibilities.

☐ Air sampling documentation required for:

- ☐ Downgrading from stipulated level of protection
- ☐ Documenting no migration of contaminants offsite through air

Applicable Action Levels for Instituting Air Sampling:

☐ Visible vapor/gas clouds or vapor levels, or

☐ Visible dust or particulate levels measured with Direct Reading Instrument, two-three times background or above action level, sustained over 10-15 minute period.

The following requirements apply to air sampling:

Sampling Matrix/Air Interface - Monitor matrix/air interface and breathing zone periodically with DRI. If vapor levels > 2-3 times background, monitor continuously. Follow No. 4.

Container Opening - Monitor opening and breathing zone periodically with DRI. If vapor levels > 2-3 times background, monitor opening and breathing zone continuously. Follow No. 4.

Excavation/Drilling/Intrusive Work - Monitor at ground level and breathing zone periodically with DRI. If vapor levels > 2-3 times background, monitor opening and breathing zone continuously. Follow No. 4.

Breathing Zone - Ensure level of protection specified in HASP is being used. Consult HASP or Corporate Health and Safety relative to instituting personnel, area, or perimeter sampling.

☐ Other

SITE AIR MONITORING PROGRAM

Air Sampling

Hi-Volume Pumps - Gilian, SKC, MSA

Sampling Media - Filter

Task(s)	Location	Duration	Frequency	Type	Analysis Method

Portable Gas Chromatograph Task(s): Type:

Portable GC Analytical Plan:

Passive Dosimeters

	Task(s)	Type	Location	Frequency	Duration
☐ Organic Vapor					
☐ Mercury Vapor					
☐ Paper Color Change					
☑ TLD	All Tasks				Continuous
☑ Radiation Dosimeters (Mound)	All Tasks				Continuous
☐ Film Badge					
☐ Liquid Media					

Wipe Sampling

Wipe Sampling Plan: Per Mound radiation SOP's

SITE AIR MONITORING PROGRAM

Work Location Instrument Readings

Location:

% LEL	% O_2	PID (units)	FID (units)	Aerosol Monitor (mg/m³)	GM: Shield Probe/ Thin Window		NaI (uR/hr)	ZnS (cpm)
					mR/hr	cpm		
Monitox (ppm)				Detector Tube(s)				
Sound Levels (dBA)		Illumination	pH	Other	Other	Other	Other	Other

Location:

% LEL	% O_2	PID (units)	FID (units)	Aerosol Monitor (mg/m³)	GM: Shield Probe/ Thin Window		NaI (uR/hr)	ZnS (cpm)
					mR/hr	cpm		
Monitox (ppm)				Detector Tube(s)				
Sound Levels (dBA)		Illumination	pH	Other	Other	Other	Other	Other

DECONTAMINATION PLAN

Personnel Decontamination

Section III C. lists the tasks and specific levels of protection required for each. Consistent with the levels of protection required, step-by-step procedures for personnel decontamination for each Level of Protection are attached.

Levels of Protection Required for Decontamination Personnel - Level D (All Tasks)

The levels of protection required for personnel assisting with decontamination will be:

☐ Level B
☐ Level C
☑ Level D

Modifications include: Hands and Face will be washed and surveyed before leaving site. If upgrades of level of protection are needed, this plan will be revised.

Disposition of Decontamination Wastes

Provide a description of waste disposition including identification of storage area, hauler, and final disposal site, if applicable:

Follow SOP 1.15 - Guide to Waste Management.

Place disposable PPE and decontamination fluids in separate plastic-lined drums. Mound will store and dispose of these wastes.

Equipment Decontamination

A procedure for decontamination steps required for non-sampling equipment and heavy machinery follows: The Geoprobe rig and all other Geoprobe sampling equipment and excavation equipment will be decontaminated through the use of a high pressure cleaner.

Sampling Equipment Decontamination

Sampling equipment will be decontaminated in accordance with the following procedure: Equipment will be rinsed in an alconox and water mixture while being scrubbed with brushes. It will then be sprayed with hexane then methanol followed by a rinse with deionized water. MSDS for Alconox, Hexane and Methanol are attached to HASP.

CONTINGENCIES

Emergency Contacts and Phone Numbers

Agency	Contact	Phone Number
Local Medical Emergency Facility	Sycamore Hospital	513-296-7026
WESTON Medical Emergency Contact	EMR	800-229-3674
WESTON Health and Safety	Kevin Bate	513-825-3440
Fire Department	Fire Chief - Dave Heitz	911 or 513-865-3125
Police Department	Security - Duty Officer	911 or 513-865-3400
Onsite Coordinator	Denny Gault	513-865-3913
Site Telephone	WESTON Trailer	513-859-7121
Nearest Telephone	To Be Determined	TBD

Local Medical Emergency Facility(s)

Name of Hospital: Sycamore Hospital		
Address: 2150 Leiter, Miamisburg, Ohio		Phone No.: 513-865-8797
Name of Contact:		Phone No.:
Type of Service: ☐ Physical trauma only ☐ Chemical exposure only ☑ Physical trauma and chemical exposure ☑ Available 24 hours	Route to Hospital: (Figure 1) Exit Mound facility at construction gate on Benner Rd., travel east to Gebhart Church Rd., and turn left. Take Gebhart Church Rd. to Leiter Rd. and turn right. Hospital on right 0.5 mile.	Travel time from site: 5-6 minutes Distance to hospital: <5 miles Name/No. of 24-hr Ambulance Service: Mound Plant Fire Department Medical Response, ext. 911

Secondary or Specialty Service Provider

Name of Hospital: Mound Plant Fire Department Medical Response		
Address:		Phone No.: Ext. 911
Name of Contact: Ray Hensley		Phone No.:
Type of Service: ☐ Physical trauma only ☐ Chemical exposure only ☑ Physical trauma and chemical exposure ☑ Available 24 hours	Route to Hospital (attach map):	Travel time from site: Distance to hospital: Name/No. of 24-hr Ambulance Service:

Response Plans

Medical - General Administer First Aid; Transport to Hospital, if necessary. Mound Plant emergency response for on-site emergencies only. If off-site, contact 911 or transport to Hospital.			Special First Aid Procedures Hydrofluoride on site ☐ Yes ☑ No Cyanides on site ☐ Yes ☑ No	Plan for Response to Fire/Explosion A small fire emergency will be handled by evacuating the work area and immediately using fire extinguisher. Only if a fire appears to be small and easily extinguishable will field personnel attempt to put out the fire with available fire extinguisher. The fire department will be notified of any larger fires through available alarms or by telephone.		
First aid kit:	Type OSHA approved First Responder	Location: Field vehicle, Office trailer				
Eyewash required ☑ Yes ☐ No	Location: Office trailer, Field First Aid kit	Location:				
Safety shower ☐ Yes ☑ No	Location	Location		Fire Extinguisher	Type Dry Chem 20 BC	Location Field vehicle/ Office Trailer
Plan for Response to Spill/Release Not Anticipated			Plan for Response to Security Problems Call Security - Duty officer at 513-865-3400			
Spill Response Gear	Description	Location				

CONTINGENCIES		
Emergency Contacts and Phone Numbers		
Agency	Contact	Phone Number
Fire Department	Fire Cheif - Dave Heitz	911 or 513-865-3125
Police Department	Security - Duty Officer	911 or 513-865-3400
Health Department		
Poison Control Center		1-800-962-1253
EPA State Office		
Spill Contractor		
Onsite Coordinator	Denny Gault	513-865-3913
Site Telephone		
Nearest Telephone (site-specific)		
Roy F. Weston, Inc.	Cincinnati - Kevin Bate	513-825-3440
Corporate H&S Director	George Crawford	215-430-7406
H&S Manager - Local Office	Kevin Bate	513-825-3440
H&S Manager - Corporate	Bob Shoenfelder	505-884-5050
24-Hour (WESTON) National Medical	EMR	800-229-3674
National Response Center		800-424-8802
CHEMTREC		800-424-9300
Center for Disease Control	Day: Environmental Health	(404) 329-3311
	Night: Environmental Health	(404) 329-2888
	Day: Superfund	(404) 452-4100
National Pesticide Information Service		(800) 845-7633
Bureau of Explosives, Association of American Railroads		(800) 835-9500
Bureau of Alcohol, Tobacco, and Firearms (Explosives - EOD)		(800) 424-9555
EPA - TSCA Hotline	Week day	(800) 424-9065
	Week day	(202) 554-1404
EPA - Occupational Health and Safety	Week day	(202) 382-3648
NIOSH - Health Hazard Evaluation	Week day	(513) 684-4382
OSHA - Technical Data Center	Week day	(202) 523-9700
OSHA - Health Response Team	Week day	(801) 524-5896

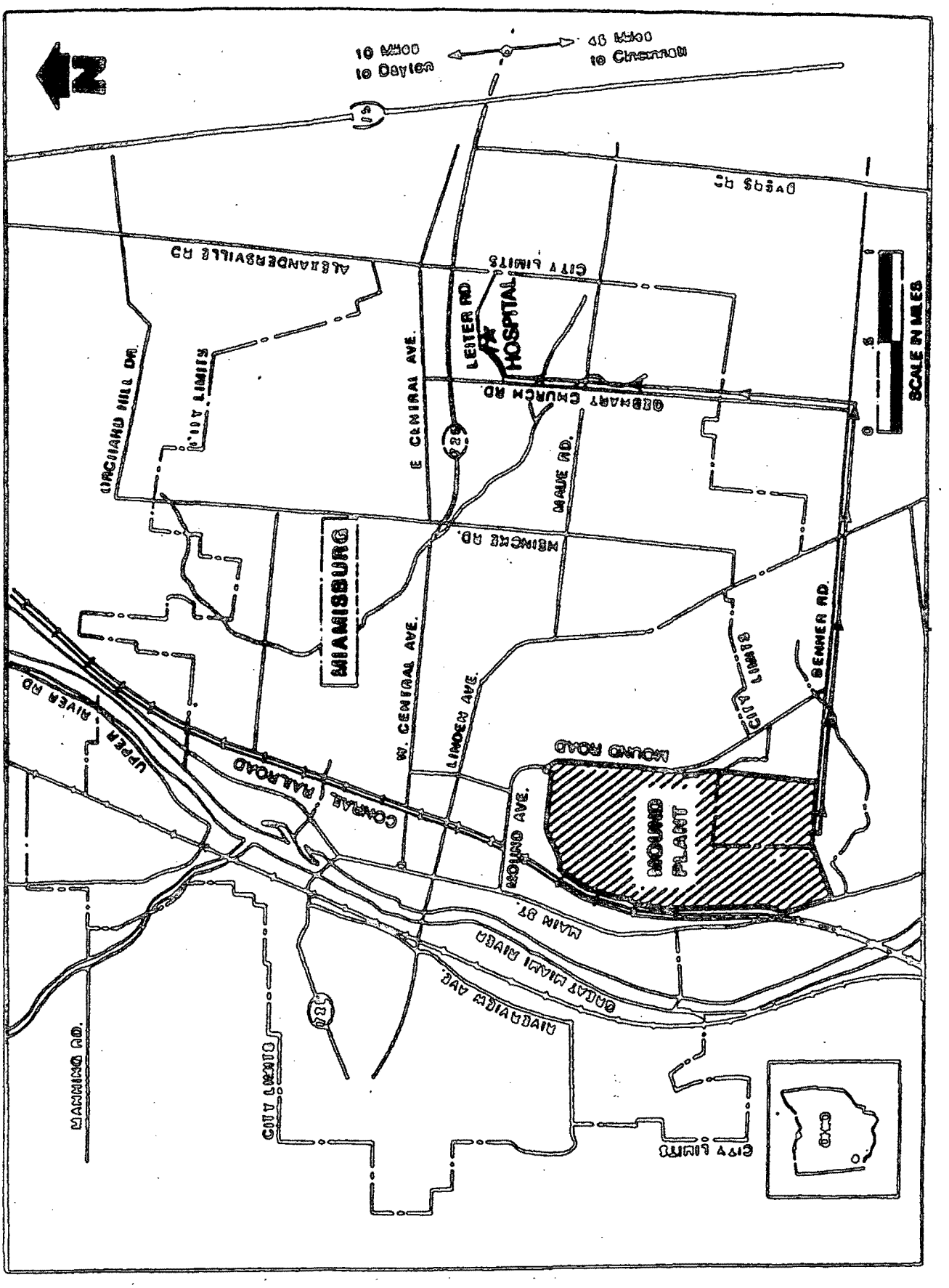

Figure 1. Route to Hospital

SITE PERSONNEL AND CERTIFICATION STATUS

WESTON

Name: Andy Fandozzi Title: Field Engineer Task(s): All Tasks Certification Level or Description: B-S ☑ Medical Current ☑ Training Current ☑ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	Name: Andy Sperry Title: Geologist Task(s): All Tasks Certification Level or Description: D-S ☑ Medical Current ☑ Training Current ☑ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)
Name: Kevin Bate Title: Regional Safety Officer Task(s): All Tasks Certification Level or Description: B-S ☑ Medical Current ☑ Training Current ☑ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	Name: Tim Dunlevy Title: Technician Task(s): All Tasks Certification Level or Description: B-T ☑ Medical Current ☑ Training Current ☑ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)
Name: Craig Dodd Title: Senior Technician Task(s): All Tasks Certification Level or Description: D-S ☑ Medical Current ☑ Training Current ☑ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)
Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)
Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)
Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)

MEDICAL CURRENT - Training: All personnel, including visitors, entering the exclusion or contamination reduction zones must have certifications of completion of training in accordance with OSHA 29 CFR 1910 29, CFR 1926/1910 or 20 CFR 1910.120.

FIT TEST CURRENT - Respirator Fit Testing: All persons, including visitors, entering any area requiring the use or potential use of any negative pressure respirator must have had as a minimum, a qualitative fit test, administered in accordance with OSHA 20 CFR 1910.134 or ANSI within the last 12 months. If site conditions require the use of a full face negative pressure, air purifying respirator for protection from Asbestos or Lead, employees must have had a quantitative fit test, administered according to OSHA 20 CFR 1910.1002 or 1025 within the last 6 months.

TRAINING CURRENT - Medical Monitoring Requirements: All personnel, including visitors, entering the exclusion or contamination reduction zones must be certified as medically fit to work, and to wear a respirator, if appropriate, in accordance with 29 CFR 1910, 20 CFR 1926/1910 or 29 CFR 1910.120.

The Site Health and Safety Coordinator is responsible for verifying all certifications and fit tests.

SITE PERSONNEL AND CERTIFICATION STATUS

Subcontractor's Health and Safety Program Evaluation

Name of Subcontractor:

Address:

Activities to Be Conducted by Subcontractor:

Evaluation Criteria

Medical program meets OSHA/WESTON criteria ☐ Acceptable ☐ Unacceptable Comments:	Personal protective equipment available ☐ Acceptable ☐ Unacceptable Comments:	Onsite monitoring equipment available, calibrated and operated properly ☐ Acceptable ☐ Unacceptable Comments:
Safe working procedures clearly specified ☐ Acceptable ☐ Unacceptable Comments:	Training meets OSHA/WESTON criteria ☐ Acceptable ☐ Unacceptable Comments:	Emergency procedures ☐ Acceptable ☐ Unacceptable Comments:
Decontamination procedures ☐ Acceptable ☐ Unacceptable Comments:	General health and safety program evaluation ☐ Acceptable ☐ Unacceptable Comments:	Additional comments:

Evaluation Conducted by: **Date:**

Subcontractor

Name: **Title:** **Task(s):** **Certification Level or Description:** ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	**Name:** **Title:** **Task(s):** **Certification Level or Description:** ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)
Name: **Title:** **Task(s):** **Certification Level or Description:** ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	**Name:** **Title:** **Task(s):** **Certification Level or Description:** ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)
Name: **Title:** **Task(s):** **Certification Level or Description:** ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	**Name:** **Title:** **Task(s):** **Certification Level or Description:** ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)

HEALTH AND SAFETY PLAN APPROVAL/SIGNOFF FORMAT

Site Name: EG&G Mound WO# 05376-045-002

Address: 1 Mound Road, Miamisburg, Ohio 45342

I have read, understood, and agreed with the information set forth in this Health and Safety Plan (and attachments) and discussed in the Personnel Health and Safety briefing.

Name	Signature	Date

TRAINING AND BRIEFING TOPICS		
The following items will be covered at the site specific training meeting, daily or periodically.		
☑ Site characterization and analysis, Sec. 3.0, 29 CFR 1910.120 l	☐ Daily	☑ Periodically
☑ Physical hazards, Table 3.2	☑ Daily	☐ Periodically
☑ Chemical hazards, Table 3.1	☑ Daily	☐ Periodically
☑ Animal bites, stings, and poisonous plants	☐ Daily	☑ Periodically
☐ Etiologic (infectious) agents	☐ Daily	☐ Periodically
☑ Site control, Sec. 8.0; 29 CFR 1910.120 d	☐ Daily	☑ Periodically
☑ Engineering controls and work practices, Sec. 8.5; 25 CFR 1910.120 g	☑ Daily	☐ Periodically
☑ Heavy machinery	☑ Daily	☐ Periodically
☐ Forklift	☐ Daily	☐ Periodically
☑ Backhoe	☑ Daily	☐ Periodically
☑ Equipment	☑ Daily	☐ Periodically
☑ Tools	☐ Daily	☑ Periodically
☐ Ladder 29 CFR 1910.27 d	☐ Daily	☐ Periodically
☑ Overhead and underground utilities	☑ Daily	☐ Periodically
☐ Scaffolds	☐ Daily	☐ Periodically
☐ Structural integrity	☐ Daily	☐ Periodically
☐ Unguarded openings - wall, floor, ceilings	☐ Daily	☐ Periodically
☐ Pressurized air cylinders	☐ Daily	☐ Periodically
☑ Personnel protective equipment, Sec. 5.0; 25 CFR 1910.120 g; 29 CFR 1910.134	☑ Daily	☐ Periodically
☑ Respiratory protection, Sec. 5.8; 29 CFR 1910.120 g; Z88.2-1980	☑ Daily	☐ Periodically
☐ Level A	☐ Daily	☐ Periodically
☑ Level B	☐ Daily	☑ Periodically
☑ Level C	☐ Daily	☑ Periodically
☑ Level D	☐ Daily	☑ Periodically
☑ Monitoring, Sec. 7.0; 29 CFR 1910.120 h	☑ Daily	☐ Periodically
☑ Decontamination, Sec. 9.0; 29 CFR 1910.120 k	☑ Daily	☐ Periodically
☑ Emergency response, Sec. 10.0; 29 CFR 1910.120 l	☐ Daily	☑ Periodically
☑ Elements of an emergency response, Sec. 100; 29 CFR 1910.120 l	☐ Daily	☑ Periodically
☑ Procedures for handling site emergency incidents, Sec. 10.0; 29 CFR 1910.120 l	☐ Daily	☑ Periodically
☐ Offsite emergency response, 29 CFR 1910.120 l	☐ Daily	☐ Periodically
☐ Handling drums and containers, 29 CFR 1910.120 j	☐ Daily	☐ Periodically
☐ Opening drums and containers	☐ Daily	☐ Periodically
☑ Electrical material handling equipment	☐ Daily	☑ Periodically
☑ Radioactive waste	☑ Daily	☐ Periodically
☐ Shock sensitive waste	☐ Daily	☐ Periodically
☐ Laboratory waste packs	☐ Daily	☐ Periodically
☐ Sampling drums and containers	☐ Daily	☐ Periodically
☑ Shipping and transport, 49 CFR 172.101	☐ Daily	☑ Periodically
☐ Tank and vault procedures	☐ Daily	☐ Periodically
☑ Illumination, 29 CFR 1910.120 m	☐ Daily	☑ Periodically
☑ Sanitation, 29 CFR 1910.120 n	☐ Daily	☑ Periodically

LEVEL D DECONTAMINATION

Check indicated functions or add steps as necessary:

Function	Description of Process, Solution, and Container
☐ Segregated equipment drop	
☐ Boot cover and glove wash	
☐ Boot cover and glove rinse	
☐ Tape removal - outer glove and boot	
☑ Boot cover removal	Remove, place in bag, place bag in drum.
☑ Outer glove removal	Remove, place in bag, place bag in drum.
HOTLINE	
☐ Suit/safety boot wash	
☐ Suit/boot/glove rinse	
☐ Safety boot removal	
☑ Suit removal (Tyvek)	Remove, place in bag, place bag in drum.
☐ Inner glove wash	
☐ Inner glove rinse	
☐ Inner glove removal	
☐ Inner clothing removal	
CRC/SAFE ZONE BOUNDARY	
☑ Field wash	Soap and water/water rinse (before leaving Mound)
☐ Redress	

Disposal Plan, End of Day: According to SOP 1.15

Disposal Plan, End of Week: According to SOP 1.15

Disposal Plan, End of Project: According to SOP 1.15

LEVEL C DECONTAMINATION

Check indicated functions or add steps as necessary:

Function	Description of Process, Solution, and Container
☑ Segregated equipment drop	Place equipment on plastic
☑ Boot cover and glove wash	Soap and water rinse
☑ Boot cover and glove rinse	Water rinse
☑ Tape removal - outer glove and boot	Remove and place in bag then drum
☑ Boot cover removal	Remove and place in bag then drum
☑ Outer glove removal	Remove and place in bag then drum
HOTLINE	
☑ Suit/safety boot wash	Soap and Water (Tubs)
☑ Suit/boot/glove rinse	Water rinse
☐ Safety boot removal	
☑ Suit removal	Remove and place in bag then drum
☑ Inner glove wash	Soap and Water (Bucket)
☑ Inner glove rinse	Water rinse (Bucket)
☑ Face piece removal	Remove and place in bag then drum
☑ Inner glove removal	Remove and place in bag then drum
☐ Inner clothing removal	
CRC/SAFE ZONE BOUNDARY	
☑ Field wash	Soap and water/water rinse
☐ Redress	

Disposal Plan, End of Day: According to SOP 1.15

Disposal Plan, End of Week: According to SOP 1.15

Disposal Plan, End of Project: According to SOP 1.15

LEVEL B DECONTAMINATION

Check indicated functions or add steps as necessary:

Function	Description of Process, Solution, and Container
☑ Segregated equipment drop	Place equipment on plastic
☑ Boot cover and glove wash	Soap and water rinse
☑ Boot cover and glove rinse	Water rinse
☑ Tape removal - outer glove and boot	Remove and place in bag, then drum
☑ Boot cover removal	Remove and place in bag, then drum
☑ Outer glove removal	Remove and place in bag, then drum
HOTLINE	
☑ Suit/safety boot wash	Soap and water (tubs)
☑ Suit/SCBA/boot/glove rinse	Water rinse (tubs)
☐ Safety boot removal	
☑ Remove SCBA backpack w/o disconnecting	
☑ Splash suit removal	Remove and place in bag, then drum
☑ Inner glove wash	Soap and water (bucket)
☑ Inner glove rinse	Water rinse (bucket)
☑ SCBA disconnect and face piece removal	
☑ Inner glove removal	Remove and place in bag then drum
☐ Inner clothing removal	
CRC/SAFE ZONE BOUNDARY	
☑ Field wash	Soap and water/water rinse
☐ Redress	

Disposal Plan, End of Day: According to SOP 1.15

Disposal Plan, End of Week: According to SOP 1.15

Disposal Plan, End of Project: According to SOP 1.15

APPENDIX A

DOE ER PROGRAM
STANDARD OPERATING PROCEDURES LISTING*

SOP No.	TITLE
1.1	General Instructions for Field Personnel (Rev. 2)
1.6	General Equipment Decontamination (Rev. 2)
1.7	Sampling for Removable Alpha Contamination (Rev. 1)
1.8	Personnel Decontamination - Level D Protection (Rev. 1)
1.9	Personnel Decontamination - Level C Protection (Rev. 1)
1.10	Personnel Decontamination - Level B Protection (Rev. 1)
1.12	Air Particulate Sampling with a Real-Time Aerosol Monitor (Rev. 0)
6.1	Health and Safety Monitoring of Combustible Gas Levels (Rev. 1)
6.2	Health and Safety Monitoring of Organic Vapors with a Photoionization Detector (Rev. 1)
6.3.	H & S Monitoring of Organic Vapors with a Flame Ionization Detector (Rev. 0)
6.4	Total Alpha Surface Contamination Measurements (Rev. 1)
6.7	Near Surface and Soil Sample Screening for Low-Energy Gamma Radiation Using the FIDLER (Rev. 0)
6.11	Beta-Gamma Radiation Measurements (Rev. 1)
6.15	Measurement of Gamma Ray Fields Using a Sodium Iodide (NaI) Detector (Rev. 0)

* From OU-9 Quality Assurance Project Plan (QAPP) and OU-9 Site-Wide Safety Plan.

APPENDIX B

WESTON FIELD OPERATING PROCEDURES LISTING

FLD. No.	TITLE
01	Noise Protection
02	Inclement Weather
06	Cold Stress
07	Wet Feet
09	Hot Work
10	Manual Lifting and Handling of Heavy Objects
22A	Heavy Equipment Operation - General
22B	Heavy Equipment Operation - Drill Rigs
22B/DSG	Drilling Safety Guide
23	Lifting Equipment Operation
28	Excavation/Trenching
32	Fire Extinguishers Required and Requirements
33	Demolition
34	Utilities - General
35A	Electrical Safety
35B	Electrical Safety - High Voltage
37	High Pressure Water
38	Hand and Power Hand Tools

SITE HEALTH AND SAFETY PLAN (HASP) FORM

Prepared by: Andy Fandozzi

Date: 13 April 1994
W.O. Number: 05376-045-002

Project Identification:

Division: MWR
Department/Office: Cincinnati/000713
Site Name: Fire Fighting Training Area (FFTA)
Client: EG&G Mound
Work Location Address: 1 Mound Road, Miamisburg, OH 45342 South side of Building 34

Site History: Government-owned (DOE) Contractor-operated R&D Production Facility supporting DOE weapons and energy programs with emphasis on explosive and nuclear technology. The use of the Fire Fighting Training Pits caused petroleum products to migrate into the subsurface soils. The presence of petroleum hydrocarbons at a concentration of 2800 mg/kg has been documented at the 8- to 10-foot interval at the FFTA.

Scope of Work: Excavation of approximately 325 (maximum) cubic yards of petroleum-contaminated soil (dimensions 20'L x 30'W x 14'D). Construction of a double lined clay treatment pad involving extensive earthwork operations. Erection of a 100'L x 115'W x 20'H pre-engineered steel structure. Installation of water and electric utility lines. Underground line removal. Concrete scarifing operations (maximum area 1,000 sq. ft.). Demolition of concrete pits using an air-powered breaker hammer (maximum area - 1,000 sq. ft.). Soil sample collection.

☐ Site visit only; site HASP not necessary. List personnel here and sign off below:

Hazard Assessment and Regulatory Status:

Indicate types of hazards anticipated:

☑ Physio-chemical

Toxic Chemical - Levels

☐ >TLV-TWA ☐ TLV-STEL ☐ >IDLH

☑ Bio-Hazards
☑ Radiation
☑ Physical
☑ Construction type
☐ Industrial type
☑ Nuclear Industry type

Site regulatory status:

CERCLA/SARA
☑ US EPA
☑ State
☑ NPL Site

RCRA
☑ US EPA
☐ State

NRC
☐ 10 CFR 20

OSHA
☑ 1910
☑ 1926
☐ State

Other Federal Agency
☑ DOE
☐ USATHAMA
☐ Air Force

Based on the Hazard Assessment and Regulatory Status, determine the Standard HASP(s) applicable to this project. Indicate below which Standard HASP will be used and append the appropriate pages of this form along with the Standard Plan.

☐ Stack Test
☐ Air Emissions
☐ Asbestos
☐ Industrial Hygiene
☐ Life Systems
☑ Hazardous Material
☐ Construction
☐ NRC/DOE
☐ USATHAMA
☐ Air Force

Review and Approval Documentation:

Reviewed by:

a. P.M. Gordon Horn, P.E. Barry J. Fray for Gordon Horn — Date: 23 May 1994
b. P.D. John Thorsen, P.E. — Date:
c. DSO/RSO Kevin Bate Kevin Bate — Date: 23 May 1994
d. SHSC Andy Fandozzi Andy Fandozzi — Date: 23 MAY 1994

Approved by: Robert Schoenfelder Robert P. Schoenfelder — Date: 5/24/94

☑ Corporate Health and Safety Director (CHSD)
☐ DSO/RSO (Only with specific delegation by CHSD)

Project start date: 23 May 1994
End date: July 1995

This site HASP must be reissued/reapproved for any activities conducted after: 31 October 1994

Amendment date(s):
1.
2.
3.
4.
5.

WESTON Representatives

Organization/Branch	Name/Title	Address	Telephone
Cincinnati	Gordon Horn, P.E. Project Manager	11840-D Kemperspringe Dr. Cincinnati, OH 45240	513-825-3440
Cincinnati	Andy Fandozzi Field Engineer	11840-D Kemperspringe Dr. Cincinnati, OH 45240	513-825-3440
Cincinnati	John Price, P.G. Project Director	11840-D Kemperspringe Dr. Cincinnati, OH 45240	513-825-3440
Vernon Hills	John Thorsen, P.E. Project Director	3 Hawthorn Parkway Vernon Hills, IL 60061	708-918-4000

Roles and Responsibilities:

Soil sampling, subcontractor oversight, excavation oversight, H & S auditing and monitoring.

WESTON Subcontractors

Organization/Branch	Name/Title	Address	Telephone
To Be Determined (TBD)			

Roles and Responsibilities: Concrete scarifying and demolition operations, earthwork and excavation operations, bioremediation treatment pad construction, pre-engineered steel building construction, water and electric utility line installation. Underground fuel and drain line removal.

Site Specific Health and Safety Personnel

The Site Health and Safety Coordinator (SHSC) for activities to be conducted at this site is: Andy Fandozzi

The SHSC has total responsibility for ensuring that the provisions of this Site HASP are adequate and implemented in the field.

Changing field conditions may require decisions to be made concerning adequate protection programs. Therefore, the personnel assigned as SHSCs are experienced and meet the additional training requirements specified by OSHA in 29 CFR 1910.120

Qualifications:
B-S, SHSC Training; 40-hour OSHA hazardous waste training with current 8-hour refresher training; current first aid and CPR; extensive field experience.

Designated alternates include: Kevin Bate; B-S Certified

HEALTH AND SAFETY EVALUATION

Hazard Assessment

Background Review: ☑ Complete ☐ Partial If partial why?

Activities Covered Under This Plan:

No.	Task/Subtask	Description	Schedule
1.	Concrete Pad Removal	Conducting scarifying operations to remove surface contaminates and demolition of the pits.	May 1994 to July 1994
2.	Petroleum Contaminated Soil Excavation	Excavation of approximately 310 cubic yards (30'L x 20'W x 14'D) of petroleum-contaminated soil. Excavation will require shoring designed by a P.E. and a depth/loading schedule adequate for specific site conditions. backfill will be offsite fill material to original grade.	May 1994 to August 1994
3.	Treatment Pad Construction	Conduct earthwork operations on a 10% grade to level subgrade for treatment pads (approximate area 125' x 110' - 13,750 ft² / approximate volume - 1625 yds). Construct Treatment pad consisting of compacted clay geofabric and granular backfill.	May 1994 to September 1994
4.	Utility Line Installation and Removal	Install electrical system upgrade consisting of six new 30 ampere branch circuits in Building 34 and to the Treatment Pad roof structure. Installation of 1" water service at the Treatment Pad roof structure. Removal of the pits fuel supply and drain Lines.	May 1994 to August 1994
5.	Pre-engineered Building Erection	Erection of a pre-engineered steel building (approximate dimensions 115'L x 100'W x 20'H). The construction involves pouring of concrete footers and steel erection.	June 1994 to October 1994

Types of Hazards:

Numbers refer to one of the following hazard evaluation forms. Complete hazard evaluation forms for each appropriate hazard class.

Physiochemical [1]

- ☑ Flammable
- ☑ Explosive
- ☐ Corrosive
- ☐ Reactive
- ☐ O_2 Rich
- ☐ O_2 Deficient

Chemically Toxic [1]

- ☑ Inhalation
- ☑ Ingestion
- ☑ Contact
- ☐ Absorption
- ☐ Carcinogen
- ☐ Mutagen
- ☐ Teratogen
- ☐ OSHA 1910.1000 Substance

☐ OSHA Specific Hazard Sub. Standard
Describe:

Radiation [3]

Ionizing:

- ☑ Internal exposure
- ☑ External exposure

Non-ionizing:

- ☑ UV
- ☐ IR
- ☐ RF
- ☐ MicroW
- ☐ Laser

Biological [2]

- ☐ Etiological Agent
- ☑ Other (Plant, insect, animal)

☑ Physical Hazards [4]

☑ Construction Activities [5]

Source/Location of Contaminants and Hazardous Substances

Directly Related to Tasks

- ☐ Air
- ☑ Other Surface (Concrete pits)
- ☑ Groundwater
- ☑ Soil
- ☐ Surface Water
- ☐ Other

Indirectly Related to Tasks - Nearby Process(es) That Could Affect Team Members:

☑ Client Facility. Traffic on Mound roadways, heavy equipment and movement, Mound employees.

☐ Nearby Non-client Facility.

☑ Client Briefing Arranged. A client pre-construction meeting will be held with Mound Plant personnel, removal contractor, and WESTON field team members prior to the commencement of field activities.

HEALTH AND SAFETY EVALUATION – 1 CHEMICAL HAZARDS

☑ N/A Identify and attach Material Safety Data Sheets for all reagent type chemicals, solutions, or other identified materials that in normal use in performing tasks related to this project could produce hazardous substances.

☐ N/A Chemical Contaminants of Concern. If present, provide the following data.

Hazardous Substance/Tasks	Physical Properties	Normal Physical State	State At Site/Proj. Temp.	Characteristics	Exposure Limits	Route(s) of Exposure/ Symptoms	Monitoring Instruments/ Ionization Potential + % Response
Diesel Fuel/ All Tasks	☑ Explosive ☑ Flammable ☐ Corrosive ☐ Reactive ☐ Water Reactive ☐ Oxidizer	☐ Solid ☑ Liquid ☐ Gas	☐ Solid ☑ Liquid ☐ Gas	pH: 7 FP: 100°F LEL: 0.7% (Kerosene) UEL: 5.0% (Kerosene) Auto. Ig.: 494°F BP:	☐ CA ☐ PEL _____ ☐ TLV _____ ☐ IDLH _____ ☐ Only toxicological data available ☑ Other: ORL-RAT LDSG: 9g/Kg NIOSH REL: TWA 100mg/m³	☑ Inhalation ☑ Ingestion ☑ Skin Adsorption ☑ Contact ☐ Direct Penetration ☐ Other:	☑ PID ☐ 11.7 eV ☑ 10.2 eV ☑ OVM ☐ CGI ☐ OVA
CAS No: 77650-28-3	☐ Radioactive ☐ Other	Incompatible With: Oxidizers		MP: Sp. Gr.: <1			
Synonyms: Fuel oil				Vap. D.: Vap. P.: H_2O Sol.: Other:		Symptoms: Irritated eyes, mucus membranes; head, derm; narco, coma.	IP: <10.2eV % Response: OVM - 100% HNu - 100%

HEALTH AND SAFETY EVALUATION — 1 RADIOLOGICAL HAZARDS

Task: All Tasks

IONIZING						
			DAC (μCi/mL)			
Radionuclide	Major Radiations	Radioactive Half-Life (Years)	D	W	Y	Monitoring Instrument
Plutonium 238	Alpha, Gamma	86.4	$3x10^{-10}$	$3x10^{-12}$	$7x10^{-12}$	Alpha Scint.
Plutonium 239/240	Alpha, Gamma	$2.9x10^{7}$	-	$2x10^{-12}$	$6x10^{-12}$	Alpha Scint.
Plutonium 242	Alpha, Gamma	$3.76x10^{6}$	-	$2x10^{-12}$	$6x10^{-12}$	Alpha Scint.
Thorium 230	Alpha, Gamma	$8x10^{4}$	-	$3x10^{-12}$	$7x10^{-12}$	Alpha Scint.
Thorium 232	Alpha, Gamma	$1.14x10^{10}$	-	$5x10^{-13}$	$1x10^{-12}$	Alpha Scint.
Thorium 234	Beta	24.10 days	-	$9x10^{-9}$	$6x10^{-9}$	GM Pancake
Uranium 234	Alpha, Gamma	$2.47x10^{5}$	$5x10^{-10}$	$3x10^{-10}$	$2x10^{-11}$	Alpha Scint.
Uranium 235	Alpha, Gamma	$7.1x10^{8}$	$6x10^{-10}$	$3x10^{-10}$	$2x10^{-11}$	Alpha Scint.
Uranium 238	Alpha, Gamma	$4.51x10^{9}$	$6x10^{-10}$	$3x10^{-10}$	$2x10^{-11}$	Alpha Scint.
Strontium 90	Beta	27.7	$8x10^{-9}$	-	$8x10^{-9}$	Pancake GM
Radium 226	Alpha, Gamma	1602	-	$3x10^{-10}$	-	Alpha Scint.
Cesium 137	Beta, Gamma	30	$7x10^{-8}$	-	-	GM Pancake
Bi 207	Positron (weak)	33.4	$7x10^{-7}$	$2x10^{-7}$	-	Not Available
Bi 210	Alpha, Gamma	$3x10^{6}$	$1x10^{-7}$	$1x10^{-9}$	-	Alpha Scint.
Tritium	Beta (weak)	12.3	$2x10^{-6}$	$2x10^{-6}$	$2x10^{-5}$	Not Available
Pu 241	Beta (weak)	14.4	-	$1x10^{-10}$	$3x10^{-10}$	GM Pancake
Co 60	Gamma	5.27	-	$7x10^{-9}$	$1x10^{-8}$	GM Pancake
Am 241	Alpha, Gamma	432.2	-	$2x10^{-12}$	-	Alpha Scint.
Np 237	Alpha, Gamma	$2.14x10^{6}$	-	$2x10^{-12}$	-	
NON-IONIZING						
Ultraviolet	Sun					

HEALTH AND SAFETY EVALUATION - 2 BIOLOGICAL HAZARDS OF CONCERN

☑ **Poisonous Plants**

Location/Task No(s).: All Tasks
Route of Source: ☐ Known ☑ Suspect
Exposure: ☐ Inhalation ☐ Ingestion ☑ Contact ☐ Direct Penetration
Team Member(s) Allergic: ☐ Yes ☐ No - TBD
Immunization required: ☐ Yes ☐ No - TBD

☑ **Insects**

Location/Task No(s).: All Tasks
Route of Source: ☐ Known ☑ Suspect
Exposure: ☐ Inhalation ☐ Ingestion ☐ Contact ☑ Direct Penetration
Team Member(s) Allergic: ☐ Yes ☐ No - TBD
Immunization required: ☐ Yes ☐ No - TBD

☑ **Snakes, Reptiles**

Location/Task No(s).: All Tasks
Route of Source: ☐ Known ☑ Suspect
Exposure: ☐ Inhalation ☐ Ingestion ☐ Contact ☑ Direct Penetration
Team Member(s) Allergic: ☐ Yes ☐ No - TBD
Immunization required: ☐ Yes ☐ No - TBD

☑ **Animals**

Location/Task No(s).: All Tasks
Route of Source: ☐ Known ☑ Suspect
Exposure: ☐ Inhalation ☐ Ingestion ☐ Contact ☑ Direct Penetration
Team Member(s) Allergic: ☐ Yes ☐ No - TBD
Immunization required: ☐ Yes ☐ No - TBD

☐ **Sewage**

Location/Task No(s).:
Route of Source: ☐ Known ☐ Suspect
Exposure: ☐ Inhalation ☐ Ingestion ☐ Contact ☐ Direct Penetration
Team Member(s) Allergic: ☐ Yes ☐ No
Immunization required: ☐ Yes ☐ No

☐ **Etiologic Agents (List)**

Location/Task No(s).:
Route of Source: ☐ Known ☐ Suspect
Exposure: ☐ Inhalation ☐ Ingestion ☐ Contact ☐ Direct Penetration
Team Member(s) Allergic: ☐ Yes ☐ No
Immunization required: ☐ Yes ☐ No

HEALTH AND SAFETY EVALUATION - 3 RADIATION HAZARDS OF CONCERN

Ionizing (See Table Pg. 5 of 33)					
Radionuclide	Location/Source	Type Emitter	Task No(s).	Exposure Limits	Protection Protocol Reference
Non-Ionizing					
Ultraviolet	Sun		All Tasks		

HEALTH AND SAFETY EVALUATION - 4 PHYSICAL HAZARDS OF CONCERN

	Hazard	Task No.(s)	Protection OP(s)
☑	Noise	1,2,3,4,5	90db - FLD 01
☑	Heat - ambient air	1,2,3,4,5	FLD 05
	☐ Hot Process - Steam		
	☐ Hot Process - LT3		
	☐ Hot Process - Incineration		
☑	Cold	1,2,3,4,5	COLD STRESS FLD 02, 06, 07
☑	Rain	1,2,3,4,5	RAIN GEAR FLD 02, 06, 07
☑	Snow	1,2,3,4,5	COLD STRESS, INCLEMENT WEATHER, FLD 02, 06, 07
☑	Electrical Storms	1,2,3,4,5	INCLEMENT WEATHER FLD 02
☐	Confined Space Entry		
☑	"Hot Work"	1,5	FLD 09
☑	Heavy Manual Lifting/Moving	1,2,3,4,5	FLD 10 REQUEST ASSISTANCE
☑	Rough Terrain	3	FLD 11
☑	Housekeeping	1,2,3,4,5	FLD 12
☑	Structural Integrity	2,4,5	FLD 13
☐	Neighborhood		
☐	Remote Area		
☑	Compressed Gases	1,4,5	FLD 16
☐	Diving		
☐	Using Boats		
☐	Working Over Water		
☑	Traffic	1,2,3,4,5	FLD 20
☐	Explosives		
☑	Heavy Equipment Operation	1,2,3,4,5	FLD 22A
☑	Lifting Equipment Operation	1,2,3,4,5	FLD 23
	☑ Cranes	2,5	FLD 23
	☐ Manlifts		
☑	Working at Elevation	5	FLD 25
☑	Using Ladders	2,5	FLD 26
☑	Using Scaffolding	5	FLD 27
☑	Excavating/Trenching	1,2,3,4,5	FLD 28
☐	Materials Handling		
☐	Hazardous Materials Use/Storage		
	☐ Flammable liquid/gases		
	☐ Oxidizers		
	☐ Corrosives		
☐	Fire Prevention/Response Plan Required		
☑	Fire Extinguishers Required	1,2,3,4,5	FLD 32
☑	Demolition	1,4	FLD 33
☑	Utilities	1,2,3,4,5	FLD 34
	☑ Underground	1,2,3,4,5	FLD 34
	☑ Overhead	1,2,3,4,5	FLD 34
☑	Electrical - General	1,2,3,4,5	FLD 35A
	☑ High Voltage	1,2,3,4	FLD 35B
☑	Welding/Cutting/Burning	1,5	FLD 36
☑	Hand Tools	1,2,3,4,5	FLD 38
☑	Power Hand Tools	1,2,3,4,5	FLD 38
☑	High Pressure Water	1,2,3,4,5	FLD 37
☑	Other: Breaker Hammer	1	
☐	Other: Drill Rig Operation		
☑	Other: Mound Electrical Safety Manual	4	MD-10395 (Mound - Rev. 5-24-93)
☑	Other: Mound Safety and Hygiene Manual	1,2,3,4,5	MD-10286 (Mound - Rev. 3-3-94)

KEY PERSONNEL/IDENTIFICATION OF HEALTH AND SAFETY PERSONNEL

Key Personnel

The following personnel and organizations are key to the activities at this site.

EPA Representatives

Organization/Branch	Name/Title	Address	Telephone
OEPA/Southwest District Office	Jeff Smith	40 South Main Street Dayton, Ohio 45402	(513)285-6357
USEPA/Region V	Diane Spencer	USEPA HS Room - 6J 77 W. Jackson Chicago, Illinois 60604	(312)353-6287

Roles and Responsibilities: Diane Spencer: Representative USEPA Policy
Jeff Smith: Representative OEPA Policy

Other EPA Contractors and Subcontractors

Organization/Branch	Name/Title	Address	Telephone

Roles and Responsibilities:

Other Regulatory Agency Representatives

Organization/Branch	Name/Title	Address	Telephone

Roles and Responsibilities:

TASK-BY-TASK RISK ASSESSMENT
(Complete One Sheet for Each Task)

TASK DESCRIPTION

Concrete Pit Removal (1)

EQUIPMENT REQUIRED/USED
(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

Heavy Equipment: Backhoe, dump trucks, breaker hammer.
Instruments: CGI/O_2 meter, FID meter, PID meter, miniram, alpha scintillometer, pancake G-M probe, micro-R meter.

POTENTIAL HAZARDS/RISKS

CHEMICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? Chemical hazards occur when demolition and excavation disturbs or penetrates a contaminated area. Soils may be contaminated with diesel fuel, though the site has not been in use for many years. The heavy equipment, breaker hammer and scarifier will generate dust and heat that will volatilize organics in the concrete pit and in the soil. These factors combine to greatly enhance the possibility of exposure to field personnel. However, the low concentrations and low volatility of contaminants expected in the work areas minimize the potential for generation of measurable levels of contaminants.

While removal, scarifying and demolition are in progress, a PID, FID, and CGI/O_2 meter will be utilized near the work area to monitor vapors in the breathing zone.

It is anticipated that modified Level D will be used for removal actions within the hot zone.

- If PID/FID are >5.0 units above background in breathing zone, Level C protection must be implemented. Stop work and re-evaluate the situation. Contact the SHSC or RSO.
- If Miniram readings exceed 2.5 mg/m^3 Level C protection must be used to avoid the inhalation of chemically and/or radioactively contaminated particulates. Stop work and re-evaluate situation.

PHYSICAL

☑ Hazard Present Risk Level: ☐ H ☑ M ☐ L

What Justifies Risk Level? Heavy equipment traffic will be a main concern due to a limited work area. The use of a scarifier and a breaker hammer to demolish and resurface the concrete pits also present physical hazards of concern. Proper barriers will be installed to prevent pedestrian and vehicle traffic into the excavation area. All heavy equipment shall have back-up (reverse) alarms installed. Underground and overhead utilities and buried lines will be cleared by EG&G Mound construction inspectors. Personnel must follow safe working OPs as indicated on page 7 of 33.

BIOLOGICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? There is a small risk of exposure to poisonous plants through external contact. Snakes and reptiles are also suspect in the area. Other small animals may present a hazard. Care should be taken to notice the signs of rabies.

Winter work - Minimal contact with dormant plant and animal life.

Summer work - Recognize and avoid contact with poisonous plants and all animals.

RADIOLOGICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? Previous borings from OU-3 Limited Field Investigation and the recent GeoProbe field investigation in the source area indicate low levels of radiological components which fall well below action levels. Regardless, initial work will require adherence to previously-established action levels. A Miniram aerosol monitor will be used to monitor airborne particulates.

Scarifying and demolition of the concrete pits may result in greater dust levels than with normal excavation work. Dust suppression techniques shall be used during scarifying and demo operations. All personnel will maintain safe distance from the actual demolition due to the possibility of airborne projectiles.

TASK-BY-TASK RISK ASSESSMENT
(Complete One Sheet for Each Task)

TASK DESCRIPTION

Petroleum-Contaminated Soil Excavation (2)

EQUIPMENT REQUIRED/USED
(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

Heavy Equipment: Excavator, dump trucks and shoring. Hand tools.
Instruments: CGI/O_2 meter, PID meter, FID meter, miniram, alpha scintillometer, pancake G-M probe, micro-R meter.

POTENTIAL HAZARDS/RISKS

CHEMICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? Chemical hazards occur when excavation disturbs or penetrates a contaminated pocket of soil. The excavator will stir some dust and generate heat that will volatilize organics known to be present in the soil. These factors combine to greatly enhance the possibility of exposure to field personnel. However the concentrations of volatile contaminants expected in the work areas shall be continuously monitored.

While excavation is in progress, a CGI/O_2 meter will be placed at the excavation area to continuously monitor the percent LEL of combustible gasses and the percent oxygen. PID and FID meters will be used to monitor vapors in the breathing zone.

It is anticipated that modified Level D protection will be used for the excavation activities. Action Levels for the various instruments will be as follows:

- If PID/FID are >5.0 units above background in breathing zone, Level C protection must be implemented. Stop work and re-evaluate situation. Contact the SHSC or RSO.
- If Miniram readings exceed 2.5 mg/m^3 Level C protection must be used to avoid the inhalation of chemically and/or radioactively contaminated particulates. Stop work and re-evaluate situation.

PHYSICAL

☑ Hazard Present Risk Level: ☐ H ☑ M ☐ L

What Justifies Risk Level? Excavation will require shoring due to the 14 foot depth of excavation. Due to the limited area, sloping or benching is not feasible. The shoring shall be designed by a registered P.E. and include depth/loading specifications adequate for this specific situation. Heavy equipment traffic will also be a concern due to the limited work area. All heavy equipment will be equipped with back-up (reverse) alarms. Proper barriers will be installed to prevent inadvertent worker, pedestrian and vehicle traffic into excavation area. Underground and overhead utilities and buried lines will be cleared by EG&G Mound construction inspectors. Personnel must follow safe working OPs as indicated on page 7 of 33.

BIOLOGICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? There is a small risk of exposure to poisonous plants through external contact. Snakes and reptiles are also suspect in the area. Other small animals may present a hazard. Care should be taken to notice the signs of rabies.

Winter work - Minimal contact with dormant plant and animal life.

Summer work - Recognize and avoid contact with poisonous plants and all animals.

RADIOLOGICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? Previous borings from OU-3 Limited Field Investigation in the earthwork area, indicate low levels of radiological components which fall well below action levels. Regardless, initial work will require adherence to previously established action levels. A Miniram aerosol meter will be used to monitor airborne particulates.

Airborne particulate loadings shall be continuously monitored during excavation operations. Airborne particulate suppression techniques shall be used during excavation operations.

TASK-BY-TASK RISK ASSESSMENT
(Complete One Sheet for Each Task)

TASK DESCRIPTION

Treatment Pad Construction (3)

EQUIPMENT REQUIRED/USED
(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

Heavy Equipment: Excavator, backhoe, bulldozer, dump trucks, sheepfoot vibratory conpactor
Instruments: PID meter, FID meter, miniram, alpha scintillometer, pancake G-M probe, micro-R meter.

POTENTIAL HAZARDS/RISKS

CHEMICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? Chemical hazards occur when excavation disturbs or penetrates a contaminated pocket of soil. The heavy equipment will stir some dust and generate heat that will volatilize organics in the soil. These factors combine to greatly enhance the possibility of exposure to field personnel. However the OU-3 Limited Field Investigation revealed low concentrations of contaminants, which minimizes the potential for generation of measurable levels of contaminants.

PID, FID, and CGI/O_2 meters will be utilized at the location of the earthwork operations to monitor vapors in the breathing zone.

- If PID/FID are >5.0 unit above background in breathing zone, Level C protection must be implemented. Stop work and re-evaluate situation. Contact the SHSC or RSO.
- If Miniram readings exceed 2.5 mg/m^3 Level C protection must be used to avoid the inhalation of chemically and/or radioactively contaminated particulates. Stop work and re-evaluate situation.

PHYSICAL

☑ Hazard Present Risk Level: ☐ H ☑ M ☐ L

What Justifies Risk Level? The earthwork operations are to occur on a hillside with an approximate grade of 10%. Heavy equipment traffic and maneuverability will be a main concern. All heavy equipment shall have back-up (reverse) alarms. Proper barriers will be installed to prevent inadvertent worker, pedestrian and vehicular traffic into earthwork area. Underground and overhead utilities and buried lines will be cleared by EG&G Mound construction inspectors. Personnel must follow safe working OPs as indicated on page 7 of 33.

BIOLOGICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? There is a small risk of exposure to poisonous plants through external contact. Snakes and reptiles are also suspect in the area. Other small animals may present a hazard. Care should be taken to notice the signs of rabies.

Winter work - Minimal contact with dormant plant and animal life.

Summer work - Recognize and avoid contact with poisonous plant and all animals.

RADIOLOGICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? Previous borings from OU-3 Limited Field Investigation in the earthwork area, indicate low levels of radiological components which fall well below action levels. Regardless, initial work will require adherence to previously-established action levels. A Miniram aerosol meter will be used to monitor airborne particulates.

Earthwork operations may result in greater dust levels than with normal excavation work. Dust suppression techniques shall be employed as necessary.

TASK-BY-TASK RISK ASSESSMENT
(Complete One Sheet for Each Task)

TASK DESCRIPTION

Utility Line Installation (4)

EQUIPMENT REQUIRED/USED
(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

Heavy Equipment: Backhoe, hand tools.
Instruments: CGI/O_2 meter, PID meter, FID meter, miniram, alpha scintillometer, pancake G-M probe, micro-R meter.

POTENTIAL HAZARDS/RISKS

CHEMICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? Chemical hazards occur when excavation disturbs or penetrates a contaminated pocket of soil. The heavy equipment will stir some dust and generate heat that will volatilize organics in the soil. These factors combine to greatly enhance the possibility of exposure to field personnel. However the OU-3 Limited Field Investigation revealed low concentrations of contaminants which minimized the potential for generation of measurable levels of contaminants.

While excavation is in progress, a CGI/O_2 meter will be placed at the excavation area to continuously monitor the percent LEL of combustible gasses and the percent oxygen. PID and FID meters will be used to continuously monitor vapors in the breathing zone and downhole.

- If PID/FID are >5.0 units above background in breathing zone, Level C protection must be implemented. Stop work and re-evaluate situation. Contact the SHSC or RSO.
- If Miniram readings exceed 2.5 mg/m^3 Level C protection must be used to avoid the inhalation of chemically and/or radioactively contaminated particulates. Stop work and re-evaluate situation.

PHYSICAL

☑ Hazard Present Risk Level: ☐ H ☑ M ☐ L

What Justifies Risk Level? Obstacles, existing underground and overhead utilities and buried lines, and heavy equipment traffic will be a main concern due to small work area. All heavy equipment shall have back-up (reverse) alarms. Proper barriers will be installed to prevent inadvertent worker, pedestrian and vehicular traffic into excavation line. All utilities shall be located and marked before excavation is to occur. Underground and overhead utilities and buried lines will be cleared by EG&G Mound construction inspectors. Personnel must follow safe working OPs as indicated on page 7 of 33.

BIOLOGICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? There is a small risk of exposure to poisonous plants through external contact. Snakes and reptiles are also suspect in the area. Other small animals may present a hazard. Care should be taken to notice the signs of rabies.

Winter work - Minimal contact with dormant plant and animal life.

Summer work - Recognize and avoid contact with poisonous plants and all animals.

RADIOLOGICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? Previous borings from OU-3 Limited Field Investigation in the source area indicate low levels of radiological components which fall well below action levels. Regardless, initial work will require adherence to previously-established action levels. A Miniram meter will be used to monitor airborne particulates.

As with all excavation work, dust levels in the work zone are expected at elevated levels. Airborne particulates are to be monitored and dust suppression techniques shall be employed as necessary.

TASK-BY-TASK RISK ASSESSMENT
(Complete One Sheet for Each Task)

TASK DESCRIPTION

Pre-engineered Building Erection (5)

EQUIPMENT REQUIRED/USED
(Be specific, e.g., hand tools, heavy equipment, instruments, PPE)

Heavy Equipment: Backhoe, rubber tire crane, cable, tie lines.
Instruments: None.

POTENTIAL HAZARDS/RISKS

CHEMICAL

☐ Hazard Present Risk Level: ☐ H ☐ M ☐ L

What Justifies Risk Level? None present for this activity.

PHYSICAL

☑ Hazard Present Risk Level: ☐ H ☑ M ☐ L

What Justifies Risk Level? Steel structure erection involves significant overhead hazards. Any piece of equipment used for lifting materials or personnel shall be used and maintained in strict accordance with manufacturer's directions and applicable OSHA regulations. Load limits will be visibly posted on all lifting devices. Only operators with demonstrated competence shall be permitted to operate lifting devices. Machinery and equipment involved in lifting or supporting loads must be inspected prior to use each day. Inspections must be performed by a competent person and must be documented. Underground and overhead utilities and buried lines will be cleared by EG&G Mound construction inspectors. Personnel must follow safe working OPs as indicated on page 7 of 33.

BIOLOGICAL

☑ Hazard Present Risk Level: ☐ H ☐ M ☑ L

What Justifies Risk Level? There is a small risk of exposure to poisonous plants through external contact. Snakes and reptiles are also suspect in the area. Other small animals may present a hazard. Care should be taken to notice the signs of rabies.

Winter work - Minimal contact with dormant plant and animal life.

Summer work - Recognize and avoid contact with poisonous plant and all animals.

RADIOLOGICAL

☐ Hazard Present Risk Level: ☐ H ☐ M ☐ L

What Justifies Risk Level? None present for this activity.

LEVELS OF PROTECTION/JUSTIFICATION

GENERAL DISCUSSION OF ACTION LEVELS

If it becomes necessary to utilize Level C protection, work will be stopped, and the appropriate equipment and personnel will be obtained to continue working in Level C.

ER Program SOPs will be followed. The levels of protection described above for use during field activities have been modified from EPA protocol and are based on the following total organic concentration levels for a 1-minute sustained reading in the breathing zone, as measured with a PID.

Protection Level	Concentration Range
Level D	Background - 5.0 unit above background
Level C	5.0 - 25 units above background
Exit site, re-evaluate conditions with the SHSC and RSO.	≥25 units above background

JUSTIFICATION FOR USING A MINIRAM TO ENSURE PROTECTION AGAINST AIRBORNE RADIONUCLIDES

The portable radiation detectors to be used for monitoring soils and surface contamination are generally capable of detecting concentrations of 50 pCi/g or less. Using 50 pCi/g as a potential maximum concentration for radionuclides in soil at Mound, the following calculation indicates that the action level of 2.5 mg/m^3 on the Miniram will be adequate to protect against airborne radioactive material.

$$\text{A.R. } \mu\text{Ci/ml} = \text{S.R. pCi/g} \times \text{A.L. mg/m}^3 \times \text{C.F.}$$

where:

A.R. =	the airborne radionuclide concentration if contaminated soils is suspended in the air.
S.R. =	the concentration of the radionuclide in the soil, assumed to be 50 pCi/G for this example.
A.L. =	the action level set for the Miniram, which is 2.5 mg/m^3.
C.F. =	correction factors as necessary to reconcile the units for A.R., S.R., and A.L.

The Calculation is as follows:

A.R. = (50 pCi/g)(E-3 g/mg)(E-6 μCi/pCi)(2.5 mg/m^3)(E-6 m^3/ml)
= 1.25 E-13 μCi/ml

The most restrictive Derived Air Concentration for the site, from page 9 of this plan, is 1 E-12 μCi/ml. This gives a Safety Factor of approximately 10, making the Miniram an adequate detection device to protect against expected airborne radionuclides.

Due to absence of radiological contaminants at this site (based on previous projects) EG&G has indicated that no radiological hazards are anticipated. WESTON will rely on the normal health physics coverage provided by EG&G Mound (scan of all soils, equipment wipes, and personal screening) and will not require WESTON-issued radiological H & S equipment unless elevated levels are encountered.

SAFETY PROCEDURES REQUIRED AND/OR FIELD OPS UTILIZED

1.1 General Instructions for Field Personnel (Rev. 2)
1.6 General Equipment Decontamination (Rev. 2)
1.7 Sampling for Removable Alpha Contamination (Rev. 1)
1.8 Personnel Decontamination - Level D Protection (Rev. 1)
1.9 Personnel Decontamination - Level C Protection (Rev. 1)
1.10 Personnel Decontamination - Level B Protection (Rev. 1)
1.12 Air Particulate Sampling with a Real-Time Aerosol Monitor (Rev. 0)
6.1 Health and Safety Monitoring of Combustible Gas Levels (Rev. 1)
6.2 Health and Safety Monitoring of Organic Vapors with a Photoionization Detector (Rev. 1)
6.3. H & S Monitoring of Organic Vapors with a Flame Ionization Detector (Rev. 0)
6.4 Total Alpha Surface Contamination Measurements (Rev. 1)
6.7 Near Surface and Soil Sample Screening for Low-Energy Gamma Radiation Using the FIDLER (Rev. 0)
6.11 Beta-Gamma Radiation Measurements (Rev. 1)
6.15 Measurement of Gamma Ray Fields Using a Sodium Iodide (NaI) Detector (Rev. 0)

PERSONNEL PROTECTION PLAN

Engineering Controls
Describe Engineering Controls used as part of Personnel Protection Plan:

Task(s) All Tasks

Dust Suppression Techniques

Administrative Controls
Describe Administrative controls used as part of Personnel Protection Plan:

Task(s) All Tasks
Monitor for cold or heat

Personnel Protective Equipment
Action Levels for Changing Levels of Protection. Define Action Levels for up or down grade for each task:

Task(s) All Tasks

CHEMICAL: CGI - (Assume work begins in Level D)
- 19.5-25% Oxygen: Continue investigation with caution, as oxygen levels > 21% require extreme caution.
- < 19.5% Oxygen: Monitor wearing SCBA (Level B)
- > 25% Oxygen: Fire hazard potential. Stop work and consult a fire safety specialist.

PID/FID - (Assume work begins in Level D) - >5.0 units above background in breathing zone, stop work and consult SHSC. Work requires Level C protection in concentrations >5.0 units.

Miniram - (Assume work begins in Level D) - > 2.5 mg/m^3 upgrade to Level C protection is necessary. Stop work and consult SHSC.

RADIATION: If RAD Instrument Action Levels are reached: Stop work and initiate decon procedure, ensure use of disposable PPE. Consult a WESTON health physicist.

Instrument	Units	Action Level
Alpha Scint.	CPM	Determine typical background readings in an uncontaminated area. Contamination is potentially present when readings exceed 3 times typical background value.
FIDLER	CPM	Determine typical background readings in an uncontaminated area. Contamination is potentially present when readings exceed 3 times typical background value.

Description of Levels of Protection - Level D

Task(s): 1,2,3,4		Task(s): 5	
☑ Head	Hard Hat	☑ Head	Hard Hat
☑ Eye and Face	Safety Glasses	☑ Eye and Face	Safety Glasses
☑ Hearing	Ear Plugs if needed	☑ Hearing	Ear Plugs if needed
☐ Arms and Legs		☐ Arms and Legs	
☑ Whole Body	Tyvek or coveralls/ Saranex when wet	☐ Whole Body	
☐ Apron		☐ Apron	
☑ Hand - Gloves	Latex Gloves; cloth work gloves if needed	☑ Hand - Gloves	Cloth work gloves if needed
☐ Gloves		☐ Gloves	
☐ Gloves		☐ Gloves	
☑ Foot - Boots	Steel-toed boots	☑ Foot - Boots	Steel-toed boots
☑ Boots	Disposable boot covers	☑ Boots	Disposable boot covers if needed
☐ Boots		☐ Boots	

Description of Levels of Protection — Level C

Task(s): All Tasks - Level C		Task(s):
☑ Head	Hard Hat	☐ Head
☐ Eye and Face		☐ Eye and Face
☑ Hearing	Ear Plugs if needed	☐ Hearing
☐ Arms and Legs Only		☐ Arms and Legs Only
☑ Whole Body	Tyvek or Saranex	☐ Whole Body
☐ Apron		☐ Apron
☑ Hand - Gloves	Nitrile outer	☐ Hand - Gloves
☑ Gloves	Inner latex or nitrile	☐ Gloves
☐ Gloves		☐ Gloves
☑ Foot - Boots	Steel-toed boots	☐ Foot - Boots
☑ Boots	Disposable boot covers	☐ Boots
☐ Boots		☐ Boots
☑ APR - Neg. Pres.		☐ APR - Neg. Pres.
☐ Half Face		☐ Half Face
☐ Cart./Canister		☐ Cart./Canister
☑ Full Face		☐ Full Face
☑ Cart./Canister	GMCH	☐ Cart./Canister
☐ PAPR		☐ PAPR
☐ Cart./Canister		☐ Cart./Canister
☐ Type C		☐ Type C
☐ SAR - Airline		☐ SAR - Airline
☐ SCBA		☐ SCBA
☐ Comb. Airline/SCBA		☐ Comb. Airline/SCBA
☐ Cascade System		☐ Cascade System
☐ Compressor		☐ Compressor
☐ Fall Protection		☐ Fall Protection
☐ Flotation		☐ Flotation
☐ Other		☐ Other

SITE OR PROJECT HAZARD MONITORING PROGRAM

Direct Reading Air Monitoring Instruments

Instrument Selection and Initial Check Record

Reporting Format: ☑ Field Notebook ☑ Field Data Sheets ☐ Air Monitoring Log ☐ Trip Report ☐ Other

Instrument	Task No.(s)	Number Required	Number Received	Checked Upon Receipt	Comment	Initials
☐ CGI				☐		
☐ O_2				☐		
☑ CGI/O_2	2,3,4			☐		
☐ CGI/O_2/tox-PPM, H_2S,H_2S/CO				☐		
☑ RAD-GM*	1,2,3,4,5			☐		
☐ NaI				☐		
☑ ZnS	1,2,3,4,5			☐		
☑ Other: FIDLER*	1,2,3,4,5			☐		
☑ PID				☐		
☐ HNU 10.2				☐		
☐ HNU 11.7				☐		
☐ HNU 9.5				☐		
☑ Photovac, TMA, Other	1,2,3,4			☐		
☑ FID				☐		
☑ FOX-128	1,2,3,4			☐		
☐ FOX 128GC				☐		
☐ Heath, AID, Other				☐		
☑ RAM, Mini-RAM, Other	1,2,3,4			☐		
☐ Monitox-HCN				☐		
☐ H_2S				☐		
☐ COCL				☐		
☐ SO_2				☐		
☐ Other				☐		
☐ Bio-Aerosol Monitor				☐		
☐ Detector Tubes				☐		
☐ Pump - MSA, Dräeger, Sensidyne				☐		
☐ Tubes/type: Benzene/0.5				☐		
☐ Tubes/type:				☐		

* To be provided and operated by EG&G Mound health physics personnel.

SITE AIR MONITORING PROGRAM

Direct Reading Air Monitoring Instruments

Air Monitoring Instrument PID/FID/CGI/O_2

Air Monitoring Frequency:

	Tasks
☐ Periodically:	
☑ Periodically: When samples are taken	1,2,3,4
☑ Continuously: During excavation	1,2,3,4
☐ Other:	

Monitoring Locations

☐ Upwind/downwind of site activities	
☐ Near residents, etc.	
☑ Key site activity locations:	
☐ Decon area	
☑ Staging area	1,2,3,4
☑ Excavation area	1,2,3,4
☐ Field lab area	
☐ Storage tanks	
☐ Lagoons	
☐ Drums	
☐ Fixed stations	
☐ Other:	

Air Monitoring Instrument Miniram

Air Monitoring Frequency:

☐ Periodically:	
☐ Periodically:	
☑ Continuously: During excavation, earthwork and utility line installation.	1,2,3,4
☐ Other:	

Monitoring Locations

☐ Upwind/downwind of site activities	
☐ Near residents, etc.	
☑ Key site activity locations:	
☐ Decon area	
☐ Staging area	
☑ Excavation area	1,2,3,4
☐ Field lab area	
☐ Storage tanks	
☐ Lagoons	
☐ Drums	
☐ Fixed stations	
☐ Other:	

SITE OR PROJECT HAZARD MONITORING PROGRAM

Direct Reading Air Monitoring Instruments

Direct Reading Air Monitoring Instruments Calibration Record

Instrument, Mfg., Model, Equip. ID No.	Date	Time	Calib. Material	Calib. Method Mfg.'s	Other	Initial Setting and Reading	Final Setting and Reading	Calibrator's Initials

SITE AIR MONITORING PROGRAM

Action Levels

These Action Levels, if not defined by regulation, are some percent (usually 50%) of the applicable PEL/REL/TLV. That number must also be adjusted to account for instrument response factors.

	Tasks	Action Level	Action
☑ Explosive atmosphere	2,3,4	<10% LEL	Continue investigation
		10%-25% LEL	Continue on-site monitoring with extreme caution as higher levels are encountered.
		>25% LEL	Explosion hazard. Withdraw from area immediately.
☑ Oxygen	2	<19.5%	Monitor. Note: Combustible gas readings may not be valid in atmosphere in 19.5% oxygen.
		19.5%-25%	Continue investigation with caution, as oxygen levels >21% require extreme caution. Other than normal level may be due to presence of other substances.
		>25%	Fire hazard potential. Stop work and consult a fire safety specialist.
☑ Radiation	1,2,3,4,5	3x Background	For alpha scintillometer, pancake G-M detector, FIDLER: Determine typical background readings in an uncontaminated area. Contamination is potentially present when readings exceed 3 times typical background value. Stop work. Perform decontamination, if necessary. Consult with a health physicist. For Micro-R meter: Readings in excess of 3 times the background indicate potential contamination. If readings exceed 3 times background, stop work and consult a WESTON health physicist.
☑ Organic gases and vapors	1,2,3,4	>5.0 units above background	If PID/FID are >5.0 unit above background in breathing zone, Level C protection must be implemented or stop work and re-evaluate situation.
☐ Inorganic gases and vapors	Not anticipated to be present		

SITE AIR MONITORING PROGRAM

Ambient Air Sampling

Check situations which will require or action levels which will apply to deciding to institute or increase scope of planned air sampling.

☑ No air sampling is required on this site.

☐ An air sampling plan is incorporated in this HASP.

Meteorological Conditions

☐ Dry weather for ____ days

☐ Ambient temperature above ____ °F

☐ Wind increasing potential of more contaminant dispersion in or migration out of controlled area.

Activities which will require instituting or increasing scope of air sampling:

☐ Major spills

☐ New site activity resulting in potential presence of new chemical hazards.

☐ Site activity increases airborne contaminants possibilities.

☐ Air sampling documentation required for:

- ☐ Downgrading from stipulated level of protection
- ☐ Documenting no migration of contaminants offsite through air

Applicable Action Levels for Instituting Air Sampling:

☐ Visible vapor/gas clouds or vapor levels, or

☐ Visible dust or particulate levels measured with Direct Reading Instrument, two-three times background or above action level, sustained over 10-15 minute period.

The following requirements apply to air sampling:

Sampling Matrix/Air Interface - Monitor matrix/air interface and breathing zone periodically with DRI. If vapor levels > 2-3 times background, monitor continuously. Follow No. 4.

Container Opening - Monitor opening and breathing zone periodically with DRI. If vapor levels > 2-3 times background, monitor opening and breathing zone continuously. Follow No. 4.

Excavation/Drilling/Intrusive Work - Monitor at ground level and breathing zone periodically with DRI. If vapor levels > 2-3 times background, monitor opening and breathing zone continuously. Follow No. 4.

Breathing Zone - Ensure level of protection specified in HASP is being used. Consult HASP or Corporate Health and Safety relative to instituting personnel, area, or perimeter sampling.

☐ Other

SITE AIR MONITORING PROGRAM

Air Sampling

Hi-Volume Pumps - Gilian, SKC, MSA

Sampling Media - Filter

Task(s)	Location	Duration	Frequency	Type	Analysis Method

Portable Gas Chromatograph Task(s): Type:

Portable GC Analytical Plan:

Passive Dosimeters

	Task(s)	Type	Location	Frequency	Duration
☐ Organic Vapor					
☐ Mercury Vapor					
☐ Paper Color Change					
☑ TLD	All Tasks				Continuous
☑ Radiation Dosimeters (Mound)	All Tasks				Continuous
☐ Film Badge					
☐ Liquid Media					

Wipe Sampling

Wipe Sampling Plan: Per Mound radiation SOP's

SITE AIR MONITORING PROGRAM

Work Location Instrument Readings

Location:

% LEL	% O_2	PID (units)	FID (units)	Aerosol Monitor (mg/m³)	GM: Shield Probe/ Thin Window		NaI (uR/hr)	ZnS (cpm)
					mR/hr	cpm		
Monitox (ppm)				Detector Tube(s)				
Sound Levels (dBA)		Illumination	pH	Other	Other	Other	Other	Other

Location:

% LEL	% O_2	PID (units)	FID (units)	Aerosol Monitor (mg/m³)	GM: Shield Probe/ Thin Window		NaI (uR/hr)	ZnS (cpm)
					mR/hr	cpm		
Monitox (ppm)				Detector Tube(s)				
Sound Levels (dBA)		Illumination	pH	Other	Other	Other	Other	Other

DECONTAMINATION PLAN

Personnel Decontamination

Section III C. lists the tasks and specific levels of protection required for each. Consistent with the levels of protection required, step-by-step procedures for personnel decontamination for each Level of Protection are attached.

Levels of Protection Required for Decontamination Personnel - Level D (All Tasks)

The levels of protection required for personnel assisting with decontamination will be:

☐ Level B
☐ Level C
☑ Level D

Modifications include: Hands and Face will be washed and surveyed before leaving site. Nose wipes shall be taken and screened by Mound Health Physics. If upgrades of level of protection are needed, this plan will be revised.

Disposition of Decontamination Wastes

Provide a description of waste disposition including identification of storage area, hauler, and final disposal site, if applicable:

Follow SOP 1.15 - Guide to Waste Management.

Place disposable PPE and decontamination fluids in separate plastic-lined drums. Mound will store and dispose of these wastes.

Equipment Decontamination

A procedure for decontamination steps required for non-sampling equipment and heavy machinery follows: The excavation equipment will be decontaminated through the use of a high pressure cleaner. Mound Health Physics will then take wipe samples to verify that radiological contamination does not exist.

Sampling Equipment Decontamination

Sampling equipment will be decontaminated in accordance with the following procedure: Equipment will be rinsed in an alconox and water mixture while being scrubbed with brushes. It will then be sprayed with hexane then methanol followed by a rinse with deionized water. MSDS for Alconox, Hexane and Methanol are attached to HASP.

CONTINGENCIES

Emergency Contacts and Phone Numbers

Agency	Contact	Phone Number
Local Medical Emergency Facility	Sycamore Hospital	513-298-7026
WESTON Medical Emergency Contact	EMR	800-229-3674
WESTON Health and Safety	Kevin Bate	513-825-3440
Fire Department	Fire Chief - Dave Heitz	911 or 513-865-3125
Police Department	Security - Duty Officer	911 or 513-865-3400
Onsite Coordinator	Keith Mc Mahan	513-865-3462
Site Telephone	WESTON Trailer	513-868-9545
Nearest Telephone	Building 34	513-865-3471

Local Medical Emergency Facility(s)

Name of Hospital: Sycamore Hospital		
Address: 2150 Leiter, Miamisburg, Ohio		Phone No.: 513-865-8797
Name of Contact:		Phone No.:
Type of Service: ☐ Physical trauma only ☐ Chemical exposure only ☑ Physical trauma and chemical exposure ☑ Available 24 hours	Route to Hospital: (Figure 1) Exit Mound facility at construction gate on Benner Rd., travel east to Gebhart Church Rd., and turn left. Take Gebhart Church Rd. to Leiter Rd. and turn right. Hospital on right 0.5 mile.	Travel time from site: 5-6 minutes Distance to hospital: <5 miles Name/No. of 24-hr Ambulance Service: Mound Plant Fire Department Medical Response, ext. 911

Secondary or Specialty Service Provider

Name of Hospital: Mound Plant Fire Department Medical Response		
Address:		Phone No.: Ext. 911
Name of Contact: Ray Hensley		Phone No.:
Type of Service: ☐ Physical trauma only ☐ Chemical exposure only ☑ Physical trauma and chemical exposure ☑ Available 24 hours	Route to Hospital (attach map):	Travel time from site: Distance to hospital: Name/No. of 24-hr Ambulance Service:

Response Plans

Medical - General Administer First Aid; Transport to Hospital, if necessary. Mound Plant emergency response for on-site emergencies only. If off-site, contact 911 or transport to Hospital.

First aid kit:	Type OSHA approved First Responder	Location: Building 34
Eyewash required ☑ Yes ☐ No	15 Minute OSHA approved eye wash station	Location: Building 34
Safety shower ☐ Yes ☑ No	Location	Location

Special First Aid Procedures

Hydrofluoride on site ☐ Yes ☑ No

Cyanides on site ☐ Yes ☑ No

Plan for Response to Fire/Explosion
A small fire emergency will be handled by evacuating the work area and immediately using fire extinguisher. Only if a fire appears to be small and easily extinguishable will field personnel attempt to put out the fire with available fire extinguisher. The fire department will be notified of any larger fires through available alarms or by telephone.

Fire Extinguisher	Type Dry Chem 20 BC	Location Building 34

Plan for Response to Spill/Release Not Anticipated

Spill Response Gear	Description	Location

Plan for Response to Security Problems
Call Security - Duty officer at 513-865-3400

CONTINGENCIES		
Emergency Contacts and Phone Numbers		
Agency	Contact	Phone Number
Fire Department	Fire Chief - Dave Heitz	911 or 513-865-3125
Police Department	Security - Duty Officer	911 or 513-865-3400
Health Department		
Poison Control Center		1-800-962-1253
EPA State Office		
Spill Contractor		
Onsite Coordinator	Keith Mc Mahan	513-865-3462
Site Telephone		
Nearest Telephone (site-specific)		
Roy F. Weston, Inc.	Cincinnati - Kevin Bate	513-825-3440
Corporate H&S Director	George Crawford	215-430-7406
H&S Manager - Local Office	Kevin Bate	513-825-3440
H&S Manager - Corporate	Bob Shoenfelder	505-884-5050
24-Hour (WESTON) National Medical	EMR	800-229-3674
National Response Center		800-424-8802
CHEMTREC		800-424-9300
Center for Disease Control	Day: Environmental Health	(404) 329-3311
	Night: Environmental Health	(404) 329-2888
	Day: Superfund	(404) 452-4100
National Pesticide Information Service		(800) 845-7633
Bureau of Explosives, Association of American Railroads		(800) 835-9500
Bureau of Alcohol, Tobacco, and Firearms (Explosives - EOD)		(800) 424-9555
EPA - TSCA Hotline	Week day	(800) 424-9065
	Week day	(202) 554-1404
EPA - Occupational Health and Safety	Week day	(202) 382-3648
NIOSH - Health Hazard Evaluation	Week day	(513) 684-4382
OSHA - Technical Data Center	Week day	(202) 523-9700
OSHA - Health Response Team	Week day	(801) 524-5896

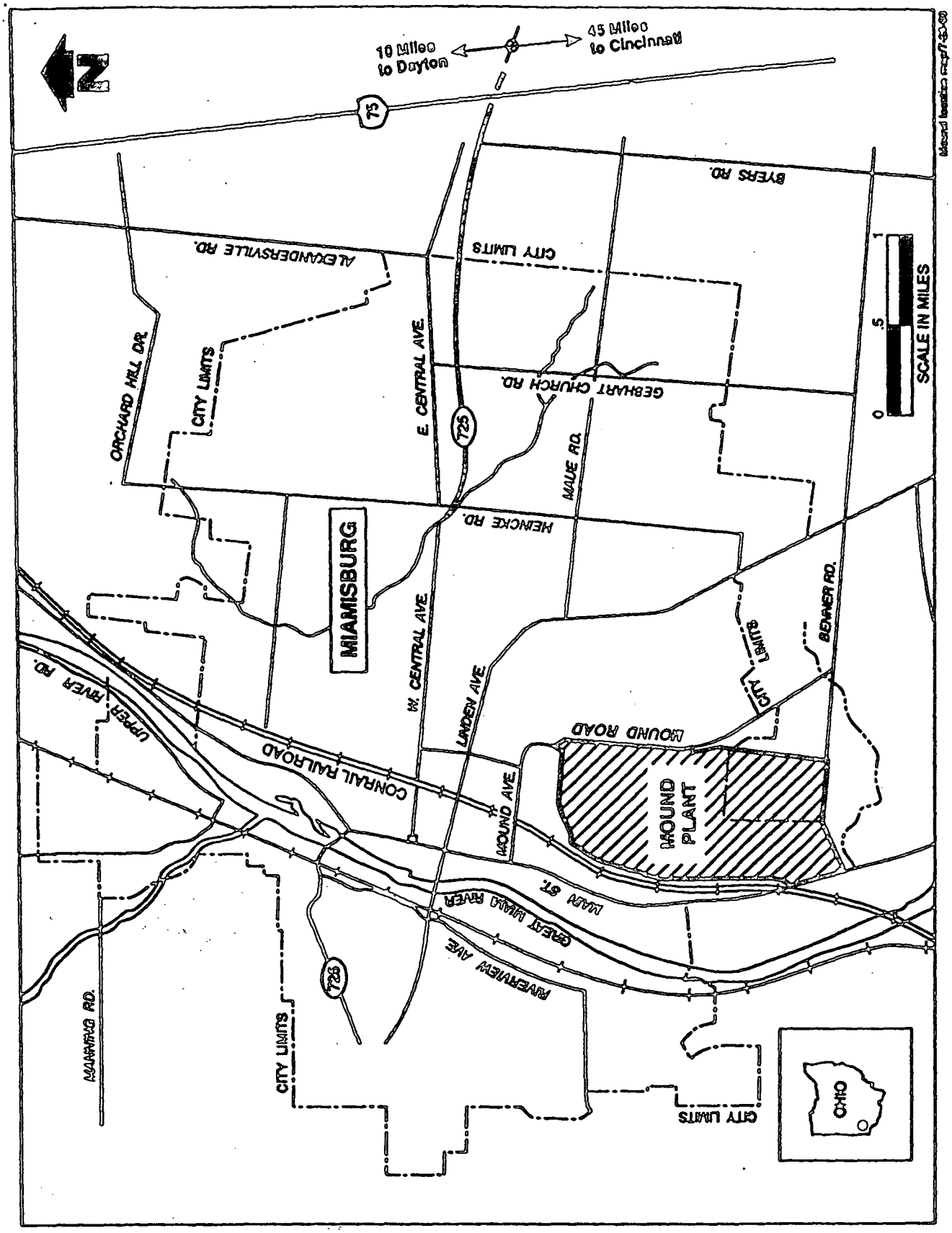

Figure 1.1. Location of Mound Plant, Miamisburg, Ohio.

Figure 1. Route to Hospital

SITE PERSONNEL AND CERTIFICATION STATUS

WESTON

Name: Andy Fandozzi Title: Field Engineer Task(s): All Tasks Certification Level or Description: B-S ☑ Medical Current ☑ Training Current ☑ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	Name: Andy Sperry Title: Geologist Task(s): All Tasks Certification Level or Description: D-S ☑ Medical Current ☑ Training Current ☑ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)
Name: Kevin Bate Title: Regional Safety Officer Task(s): All Tasks Certification Level or Description: B-S ☑ Medical Current ☑ Training Current ☑ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	Name: Tim Dunlevy Title: Technician Task(s): All Tasks Certification Level or Description: B-T ☑ Medical Current ☑ Training Current ☑ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)
Name: Windle McDonald Title: Senior Technician Task(s): All Tasks Certification Level or Description: B-T ☑ Medical Current ☑ Training Current ☑ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)
Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)
Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)
Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	Name: Title: Task(s): Certification Level or Description: ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)

MEDICAL CURRENT - Training: All personnel, including visitors, entering the exclusion or contamination reduction zones must have certifications of completion of training in accordance with OSHA 29 CFR 1910 29, CFR 1926/1910 or 20 CFR 1910.120.

FIT TEST CURRENT - Respirator Fit Testing: All persons, including visitors, entering any area requiring the use or potential use of any negative pressure respirator must have had as a minimum, a qualitative fit test, administered in accordance with OSHA 20 CFR 1910.134 or ANSI within the last 12 months. If site conditions require the use of a full face negative pressure, air purifying respirator for protection from Asbestos or Lead, employees must have had a quantitative fit test, administered according to OSHA 20 CFR 1910.1002 or 1025 within the last 6 months.

TRAINING CURRENT - Medical Monitoring Requirements: All personnel, including visitors, entering the exclusion or contamination reduction zones must be certified as medically fit to work, and to wear a respirator, if appropriate, in accordance with 29 CFR 1910, 20 CFR 1926/1910 or 29 CFR 1910.120.

The Site Health and Safety Coordinator is responsible for verifying all certifications and fit tests.

SITE PERSONNEL AND CERTIFICATION STATUS

Subcontractor's Health and Safety Program Evaluation

Name of Subcontractor: ETG Environmental, Inc.

Address: 4900 Olympic Blvd., Erlanger, KY 41018

Activities to Be Conducted by Subcontractor: Excavation, construction per sow

Evaluation Criteria

Medical program meets OSHA/WESTON criteria ☑ Acceptable ☐ Unacceptable Comments:	Personal protective equipment available ☑ Acceptable ☐ Unacceptable Comments:	Onsite monitoring equipment available, calibrated and operated properly N/A ☐ Acceptable ☐ Unacceptable Comments: WESTON to provide
Safe working procedures clearly specified ☑ Acceptable ☐ Unacceptable Comments:	Training meets OSHA/WESTON criteria ☑ Acceptable ☐ Unacceptable Comments:	Emergency procedures ☑ Acceptable ☐ Unacceptable Comments:
Decontamination procedures ☑ Acceptable ☐ Unacceptable Comments:	General health and safety program evaluation ☑ Acceptable ☐ Unacceptable Comments:	Additional comments:

Evaluation Conducted by: **Date:** 5/23/94

Subcontractor

Name: TBD **Title:** **Task(s):** **Certification Level or Description:** ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	**Name:** **Title:** **Task(s):** **Certification Level or Description:** ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)
Name: **Title:** **Task(s):** **Certification Level or Description:** ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	**Name:** **Title:** **Task(s):** **Certification Level or Description:** ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)
Name: **Title:** **Task(s):** **Certification Level or Description:** ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)	**Name:** **Title:** **Task(s):** **Certification Level or Description:** ☐ Medical Current ☐ Training Current ☐ Fit Test Current (Qual.) ☐ Fit Test Current (Quant.)

HEALTH AND SAFETY PLAN APPROVAL/SIGNOFF FORMAT

Site Name: EG&G Mound WO# 05376-045-002

Address: 1 Mound Road, Miamisburg, Ohio 45342

I have read, understood, and agreed with the information set forth in this Health and Safety Plan (and attachments) and discussed in the Personnel Health and Safety briefing.

Name	Signature	Date

TRAINING AND BRIEFING TOPICS

The following items will be covered at the site specific training meeting, daily or periodically.

☑ Site characterization and analysis, Sec. 3.0, 29 CFR 1910.120 i	☐ Daily	☑ Periodically
☑ Physical hazards, Table 3.2	☑ Daily	☐ Periodically
☑ Chemical hazards, Table 3.1	☑ Daily	☐ Periodically
☑ Animal bites, stings, and poisonous plants	☐ Daily	☑ Periodically
☐ Etiologic (infectious) agents	☐ Daily	☐ Periodically
☑ Site control, Sec. 8.0; 29 CFR 1910.120 d	☐ Daily	☑ Periodically
☑ Engineering controls and work practices, Sec. 8.5; 25 CFR 1910.120 g	☑ Daily	☐ Periodically
☑ Heavy machinery	☑ Daily	☐ Periodically
☐ Forklift	☐ Daily	☐ Periodically
☑ Backhoe	☑ Daily	☐ Periodically
☑ Equipment	☑ Daily	☐ Periodically
☑ Tools	☐ Daily	☑ Periodically
☑ Ladder 29 CFR 1910.27 d	☐ Daily	☑ Periodically
☑ Overhead and underground utilities	☑ Daily	☐ Periodically
☐ Scaffolds	☐ Daily	☐ Periodically
☑ Structural integrity	☐ Daily	☑ Periodically
☐ Unguarded openings - wall, floor, ceilings	☐ Daily	☐ Periodically
☑ Pressurized air cylinders	☐ Daily	☑ Periodically
☑ Personnel protective equipment, Sec. 5.0; 25 CFR 1910.120 g; 29 CFR 1910.134	☑ Daily	☐ Periodically
☑ Respiratory protection, Sec. 5.8; 29 CFR 1910.120 g; Z88.2-1980	☑ Daily	☐ Periodically
☐ Level A	☐ Daily	☐ Periodically
☐ Level B	☐ Daily	☐ Periodically
☑ Level C	☐ Daily	☑ Periodically
☑ Level D	☐ Daily	☑ Periodically
☑ Monitoring, Sec. 7.0; 29 CFR 1910.120 h	☑ Daily	☐ Periodically
☑ Decontamination, Sec. 9.0; 29 CFR 1910.120 k	☑ Daily	☐ Periodically
☑ Emergency response, Sec. 10.0; 29 CFR 1910.120 l	☐ Daily	☑ Periodically
☑ Elements of an emergency response, Sec. 100; 29 CFR 1910.120 l	☐ Daily	☑ Periodically
☑ Procedures for handling site emergency incidents, Sec. 10.0; 29 CFR 1910.120 l	☐ Daily	☑ Periodically
☐ Offsite emergency response, 29 CFR 1910.120 l	☐ Daily	☐ Periodically
☑ Handling drums and containers, 29 CFR 1910.120 j	☐ Daily	☑ Periodically
☑ Opening drums and containers	☐ Daily	☑ Periodically
☑ Electrical material handling equipment	☐ Daily	☑ Periodically
☑ Radioactive waste	☑ Daily	☐ Periodically
☐ Shock sensitive waste	☐ Daily	☐ Periodically
☐ Laboratory waste packs	☐ Daily	☐ Periodically
☐ Sampling drums and containers	☐ Daily	☐ Periodically
☑ Shipping and transport, 49 CFR 172.101	☐ Daily	☑ Periodically
☑ Tank and vault procedures	☐ Daily	☑ Periodically
☑ Illumination, 29 CFR 1910.120 m	☐ Daily	☑ Periodically
☑ Sanitation, 29 CFR 1910.120 n	☐ Daily	☑ Periodically

LEVEL D DECONTAMINATION

Check indicated functions or add steps as necessary:

Function	Description of Process, Solution, and Container
☐ Segregated equipment drop	
☐ Boot cover and glove wash	
☐ Boot cover and glove rinse	
☐ Tape removal - outer glove and boot	
☑ Boot cover removal	Remove, place in bag, place bag in drum.
☑ Outer glove removal	Remove, place in bag, place bag in drum.
HOTLINE	
☐ Suit/safety boot wash	
☐ Suit/boot/glove rinse	
☐ Safety boot removal	
☑ Suit removal (Tyvek)	Remove, place in bag, place bag in drum.
☐ Inner glove wash	
☐ Inner glove rinse	
☐ Inner glove removal	
☐ Inner clothing removal	
CRC/SAFE ZONE BOUNDARY	
☑ Field wash	Soap and water/water rinse (before leaving Mound)
☐ Redress	

Disposal Plan, End of Day: According to SOP 1.15

Disposal Plan, End of Week: According to SOP 1.15

Disposal Plan, End of Project: According to SOP 1.15

LEVEL C DECONTAMINATION

Check indicated functions or add steps as necessary:

Function	Description of Process, Solution, and Container
☑ Segregated equipment drop	Place equipment on plastic
☐ Boot cover and glove wash	
☐ Boot cover and glove rinse	
☑ Tape removal - outer glove and boot	Remove and place in bag then drum
☑ Boot cover removal	Remove and place in bag then drum
☑ Outer glove removal	Remove and place in bag then drum
HOTLINE	
☐ Suit/safety boot wash	
☐ Suit/boot/glove rinse	
☐ Safety boot removal	
☑ Suit removal	Remove and place in bag then drum
☑ Inner glove wash	Soap and Water (Bucket)
☑ Inner glove rinse	Water rinse (Bucket)
☑ Face piece removal	Remove and place in bag then drum
☑ Inner glove removal	Remove and place in bag then drum
☐ Inner clothing removal	
CRC/SAFE ZONE BOUNDARY	
☑ Field wash	Soap and water/water rinse
☐ Redress	

Disposal Plan, End of Day: According to SOP 1.15

Disposal Plan, End of Week: According to SOP 1.15

Disposal Plan, End of Project: According to SOP 1.15

APPENDIX A

DOE ER PROGRAM
STANDARD OPERATING PROCEDURES LISTING*

SOP No.	TITLE
1.1	General Instructions for Field Personnel (Rev. 2)
1.6	General Equipment Decontamination (Rev. 2)
1.7	Sampling for Removable Alpha Contamination (Rev. 1)
1.8	Personnel Decontamination - Level D Protection (Rev. 1)
1.9	Personnel Decontamination - Level C Protection (Rev. 1)
1.10	Personnel Decontamination - Level B Protection (Rev. 1)
1.12	Air Particulate Sampling with a Real-Time Aerosol Monitor (Rev. 0)
6.1	Health and Safety Monitoring of Combustible Gas Levels (Rev. 1)
6.2	Health and Safety Monitoring of Organic Vapors with a Photoionization Detector (Rev. 1)
6.3.	H & S Monitoring of Organic Vapors with a Flame Ionization Detector (Rev. 0)
6.4	Total Alpha Surface Contamination Measurements (Rev. 1)
6.7	Near Surface and Soil Sample Screening for Low-Energy Gamma Radiation Using the FIDLER (Rev. 0)
6.11	Beta-Gamma Radiation Measurements (Rev. 1)
6.15	Measurement of Gamma Ray Fields Using a Sodium Iodide (NaI) Detector (Rev. 0)

* From OU-9 Quality Assurance Project Plan (QAPP) and OU-9 Site-Wide Safety Plan.

APPENDIX B

WESTON FIELD OPERATING PROCEDURES LISTING

FLD. No.	TITLE
01	Noise Protection
02	Inclement Weather
05	Heat Stress
06	Cold Stress
07	Wet Feet
09	Hot Work
10	Manual Lifting and Handling of Heavy Objects
11	Rough Terrain
12	Housekeeping
13	Structural Integrity
16	Compressed Gasses
20	Traffic
22A	Heavy Equipment Operation - General
23	Lifting Equipment Operation
25	Working at Elevation
26	Using Ladders
27	Using Scaffolding
28	Excavation/Trenching
32	Fire Extinguishers Required and Requirements
33	Demolition
34	Utilities - General
35A	Electrical Safety
35B	Electrical Safety - High Voltage
36	Welding/Cutting/Burning
37	High Pressure Water
38	Hand and Power Hand Tools

APPENDIX C

FIELD SAMPLING PLAN
FOR DETERMINATION OF THE EXTENT OF CONTAMINATION

FIRE FIGHTING TRAINING AREA REMOVAL ACTION
OPERABLE UNIT 5
FIELD SAMPLING PLAN FOR DETERMINATION OF EXTENT OF CONTAMINATION

MOUND PLANT
MIAMISBURG, OHIO

February 1994

DEPARTMENT OF ENERGY

ENVIRONMENTAL RESTORATION PROGRAM
EG&G MOUND APPLIED TECHNOLOGIES

DRAFT
(REVISION 0)

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LIST OF ACRONYMS

AM/RSE	Action Memorandum/Removal Site Evaluation
ASTM	American Society for Testing Materials
BGS	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CGI	Combustible Gas Instrument
DOE	U.S. Department of Energy
DOT	Department of Transportation
EG&G	EG&G Mound Applied Technologies, Inc.
ER	Environmental Restoration
FFA	Federal Facilities Agreement
FFTA	Fire Fighting Training Area
FID	Flame-Ionization Detector
FSP	Field Sampling Plan
HASP	Health and Safety Plan
IATA	International Air Transport Association
NCP	National Contingency Plan
OAC	Ohio Administrative Code
OEPA	Ohio Environmental Protection Agency
OU	Operable Unit
PID	Photoionization Detector
ppb	parts per billion
ppm	parts per million
QA	Quality Assurance
QC	Quality Control
QAPP	Quality Assurance Project Plan
SOP	Standard Operating Procedure
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compound
WESTON	Roy F. Weston, Inc.

MOUND PLANT OPERABLE UNIT 5
FIRE FIGHTING TRAINING AREA REMOVAL ACTION
FIELD SAMPLING PLAN FOR DETERMINATION OF EXTENT OF CONTAMINATION

1.0. INTRODUCTION

The Fire Fighting Training Area (FFTA), located near Building 34, is an area of contamination being addressed by the Environmental Restoration (ER) Program, Operable Unit (OU) 5 Investigation at the U.S. Department of Energy (DOE) Mound Plant in Miamisburg, Ohio. Figure 1.1 shows the location of the FFTA at the EG&G Mound Plant. The DOE is the designated lead agency as defined in the National Contingency Plan (NCP) and is conducting a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, i.e., Superfund) Section 104 removal action to abate contamination at the site. The purpose of the removal is to abate contamination of soils in both the vadose and saturated zones and shallow ground water that may contain elevated levels of petroleum hydrocarbons. The removal action will be carried out as required by the NCP, 40 CFR 300.410 and 40 CFR 300.415.

1.1. INSTALLATION BACKGROUND

EG&G Mound Applied Technologies, Inc. (EG&G) operates the DOE Mound Plant under a prime contract with the DOE. The DOE Mound Plant was placed on the CERCLA National Priorities List (NPL) in 1989. Pursuant to that status, a CERCLA Section 120 Federal Facility Agreement (FFA) was signed between the DOE and the U.S. Environmental Protection Agency (EPA) and the Ohio Environmental Protection Agency (OEPA) in 1993.

1.2 SITE DESCRIPTION

The FFTA includes two concrete containment structures (pits) used for fire-fighting training purposes. In the past, fire-fighting training operations were conducted using three to five gallons of diesel fuel pumped through an underground line into the pit to create a fire. The fires were extinguished with water from a nearby hydrant. The operation period of the fire-fighting training pits is not well documented but, based on interviews, reportedly occurred between 1978 and 1989. The primary contaminants of concern are petroleum hydrocarbons.

RSE investigation results show that a free-phase petroleum substance was observed at the water table within soil boring MND33-0112 at a sample interval from approximately 10 to 12 feet below ground

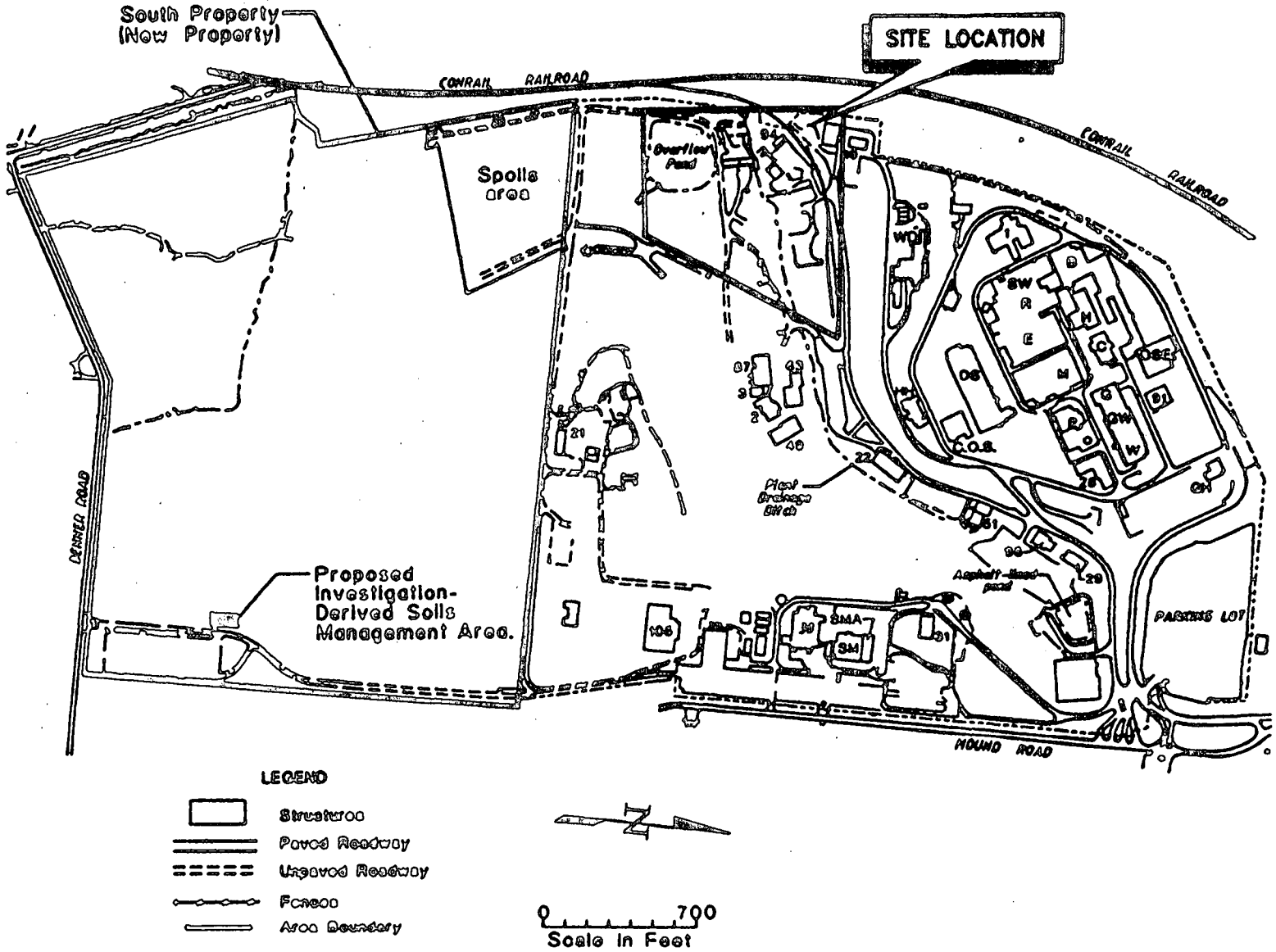

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Figure 1.1. Operable Unit 5 Fire Fighting Training Area

surface. This soil boring is located south and adjacent to the southernmost FFTA pit (Figure 1.2.). Laboratory analytical results indicated that low levels [5.6 to 120 parts per billion (ppb)] of benzene, toluene, ethylbenzene, and xylene (BTEX) were detected within the 8 to 10 foot soil sample interval at boring MND33-0112. The same soil interval had shown extractable hydrocarbon concentrations of 62 parts per million (ppm) reported as diesel fuel and 2,800 ppm reported as motor oil.

1.3. TASK DESCRIPTION AND OBJECTIVES

The task to determine the extent of contamination will include the sampling and analyses of surface and subsurface soils and ground water in the vicinity of the FFTA. Surface and subsurface soils will be sampled from both the unsaturated zone (vadose zone) and saturated zone for field screening analyses of petroleum hydrocarbons. Soils from the vadose zone interstitial water zone (capillary fringe zone) and saturated zone will also be collected for geotechnical testing. Ground water samples will be collected and field analyzed for petroleum hydrocarbons. Soil and ground water samples will also be concurrently collected for laboratory analyses for direct confirmation action of field screening results.

The sampling and analyses of soils and ground water during the extent of contamination task will be conducted to determine the vertical and horizonal extent of shallow ground water contamination with petroleum hydrocarbons. The physical characteristics of area soils are to be evaluated by performing geotechnical analyses of soils from selected areas. These geotechnical analyses will facilitate the complete and proper design of the shoring and dewatering wells.

Specific objectives include the following:

- Determination of the vertical and horizontal extent of petroleum hydrocarbon contamination;
- Determination of the ground water level;
- Determination of the presence of free-floating product on the ground water table;
- Collection of surface and subsurface soil and ground water samples for on-site analytical testing and off-site geotechnical testing; and
- Installation of piezometers for ground water level monitoring as part of the dewatering effort.

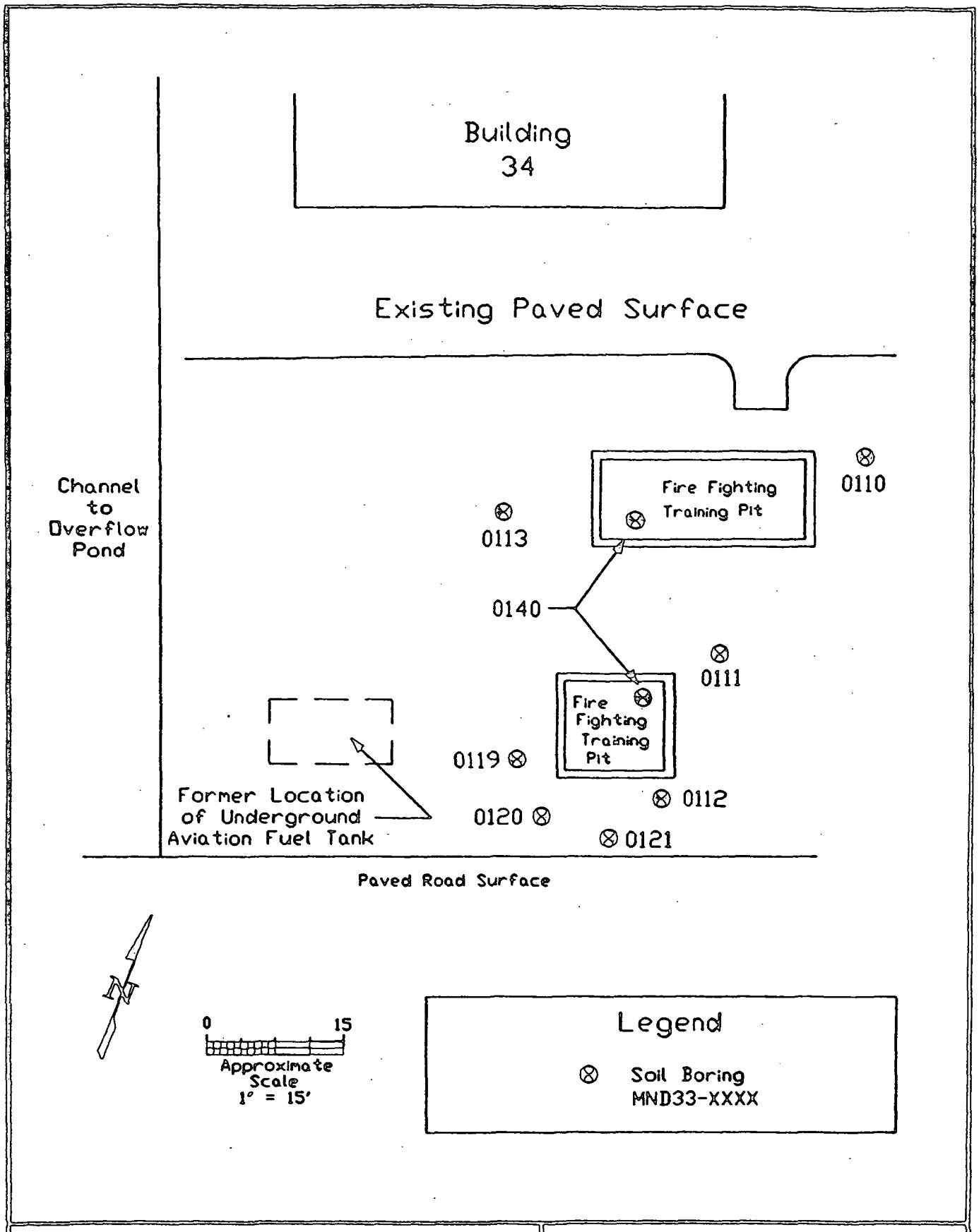

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Figure 1.2.

LFI Soil Boring Locations

The subsurface investigation will be conducted using the GeoProbe® system. This will allow greater detail to be developed over a similar period of time with reduced cost compared to traditional drilling technologies. In addition, the GeoProbe will install four piezometers to be used as a component of the dewatering system as described in the FFTA Work Plan.

The results of the extent of contamination characterization will be used to determine the extent of the removal action and subsequent treatment program.

2.0. SAMPLING AND ANALYSES PROGRAM

The characterization of the FFTA will allow a determination of the horizontal and vertical extent of surface and subsurface soil contamination and the horizontal extent of shallow ground water contamination. The determination of the extent of contamination will include the following activities:

- Establishment of sampling grids;
- Collection of surface and subsurface soil;
- Collection of shallow ground water sample;
- Field chemical analyses of soil and ground water;
- Geotechnical testing of soils; and
- Installation of piezometer.

A sampling grid will be laid out to establish the soil and ground water sampling locations. Sample grid nodes will be spaced at approximate 10-foot intervals. A total of 28 sampling locations will be established for the initial sample grid as shown in Figure 2.1.

Soil and ground water sampling and analyses will begin at sample grid locations closest to the training pit and proceed outward in each direction until analytical results show non-detectable concentrations of petroleum hydrocarbons. A secondary sample grid will be established following the initial phase of sampling and will establish grid nodes spaced at 5-foot intervals. The secondary sample grid will only be established in areas of known contamination as determined from results of the initial grid survey.

All project activities will be conducted in accordance with this extent of contamination Field Sampling Plan (FSP), the Operable Unit 9 (OU-9) Quality Assurance Project Plan (QAPP), ER Program Standard Operating Procedures (SOP's), and the project Health and Safety Plan (HASP).

Detailed procedures for soil and ground water sampling are presented in the following subsections.

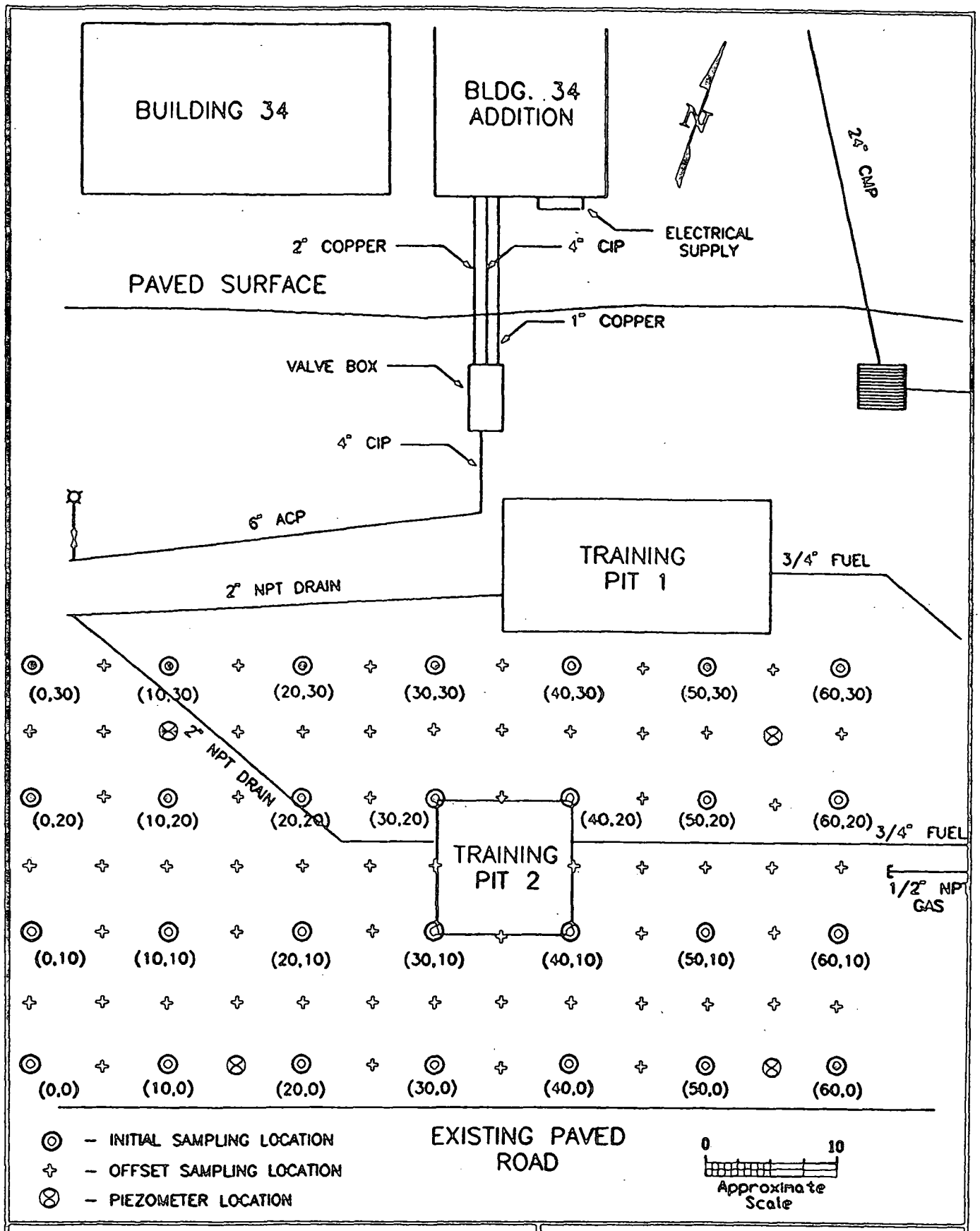

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Figure 2.1.

FFTA Sampling Locations

2.1. SAMPLING PROCEDURES

Soil and shallow ground water samples will be collected for analyses via the GeoProbe sampling device. All soil and ground water samples collected via the GeoProbe device will be field analyzed on-site for total petroleum hydrocarbon with a field infrared analyzer (IR) using modified U.S. EPA Method 418.1. Soil samples will also be collected via the GeoProbe device for geotechnical testing at an off-site laboratory.

2.1.1. Soil Sampling Procedures

Surface and subsurface soil samples will be collected via the GeoProbe sampling device for on-site analyses of petroleum hydrocarbons and for off-site analyses of geotechnical properties. Upon collection of each soil sample, the on-site WESTON representative will describe the sample according to ER Program SOP 5.1, Soil and Rock Borehole Logging and Sampling.

2.1.1.1. Sample Collection

Soil samples will be collected on a continuous basis at 2-foot intervals until field screening reveals an undetectable amount of petroleum hydrocarbons. Soil samples will be collected according to the following procedures:

- The probe being advanced with the hydraulic ram device will contain a decontaminated retractable drive-point sampler.
- Decontamination of all sampling equipment will be performed as detailed in Subsection 2.1.4.
- When the desired depth is reached, the sampler will be advanced a minimum of 12 inches ahead of the probe to soil into the sampling sleeve.
- The drive-point sampler is retrieved and samples are extruded into a clean glass vial and transferred to the on-site analyst for analyses, or prepared for shipment for geotechnical analyses.
- A decontaminated drive-point sampler will be reinstalled into the probe and the unit driven to the next desired depth where the procedure will be repeated.

The above procedure will be repeated until a depth is reached and the last subsurface soil sample of interest has been collected.

2.1.1.2. Sample Identification

Sample identification procedures for the extent of contamination task will follow procedures outlined in the ER Program SOP 1.3, Sample Control and Documentation, March 1993. SOP 1.3 defines the steps necessary for sample control and identification. Sample identification for soil samples will include the grid node identification, the sample matrix, the sample depth interval, and the quality control identifier. Sample identification for field samples and quality control samples will be labeled as shown in Table II.1.

TABLE II.1

FIELD SAMPLE IDENTIFICATION PLAN

Sample Matrix	Identification Scheme
Soil - field screening	MND FT - YYYY - SZZZ
Soil - geotechnical	MND FT - YYYY - SZZZ
Ground water	MND FT - YYYY - WZZZ
Field Quality Control Samples	**Identification Scheme**
Duplicate	MND FT - YYYY - DZZZ

Notes:

MND = Mound Plant
FT = Fire Fighting Training Area
YYYY = Sample location number (grid node location)
DZZZ = Duplicate sample depth
SZZZ = Soil sample depth
WZZZ = Water sample depth

2.1.1.3. Sample Handling and Disposal

All samples collected and shipped for analyses as part of the investigation will be considered hazardous samples and will be handled, packaged, and shipped according to this designation. DOT and IATA have established specific regulations governing the packaging of hazardous samples for shipment. Mound Plant ER Program SOP 1.5, Guide to the Handling, Packaging, and Shipping of Samples, provides information and references that must be reviewed prior to selection of appropriate packaging materials, shipping containers, and shipping labels. Mound Plant ER Program SOP 1.5 and the current DOT/IATA regulations will be the guidelines for shipment of all samples collected during the extent of contamination.

Soil samples collected for geotechnical testing will be containerized in 500 ml clear wide-mouth bottles, or appropriate testing containers.

Soil samples collected for on-site analyses will be containerized in 250 ml clear wide-mouth bottles. Following the completion of on-site analyses soil samples will be containerized in DOT specifications 17H, 55-gallon drums and stored on-site.

2.1.2. Ground Water Sampling Procedures

Shallow ground water samples will be collected at each grid node sampling location. Samples will be collected for analyses at the top of the water table and at greater depths as necessary. The detection of petroleum hydrocarbons at the water table will require the collection and analyses of additional ground water samples from greater depths below ground surface.

Ground water samples will be collected via the GeoProbe sampling device which provides several sampling techniques for ground water collection.

2.1.2.1. Sample Collection

When the sampling probe reaches a depth that is known to be near the water table, a vacuum pump adaptor is placed on the top of the probe. The vacuum pump is turned on and the probe continues to be pushed toward the water table. Above the water table, the pressure gauge on the vacuum pump will read below 5 inches of mercury. When the water table is penetrated, the pressure gauge will show

approximately 25 inches of mercury. This method allows the sampling personnel to locate the water table. Ground water sampling procedures are summarized as follows:

- Once the water table is encountered, the probe will be placed at a depth that will allow sufficient flow of water for sampling.
- The probe will be lifted slightly off the aluminum sampling point using a pulling mechanism.
- Ground water samples will then be collected by one of three methods of ground water grab sampling. The method chosen will depend primarily on the depth to ground water and efficient use of time and materials. Samples can be collected using a peristaltic or vacuum pump, if ground water levels on-site are shallow. Other methods include the use of a small diameter baller or polyethylene tubing and a check-valve assembly.
- If polyethylene tubing is used, a clean new length will be used at each sample location.
- Ballers will be decontaminated in accordance with procedures in Subsection 2.1.4.
- The ground water sample is collected in a clean, glass 40-ml volatile organic compound (VOC) vial which is filled to exclude any headspace air and then capped with a Teflon-lined septa cap. The sample is then transferred for on-site analyses.

2.1.2.2. Sample Identification

The procedures discussed in Section 2.1.1.2 will be followed for ground water samples.

2.1.2.3. Sample Handling and Disposal

The procedures discussed in Section 2.1.1.2 will be followed for ground water samples.

2.1.3. Piezometer Installation

Upon completion of the subsurface investigation of the FFTA, four piezometers will be installed using the GeoProbe to monitor water levels at the site during dewatering operations. The piezometer installation will also be used as a component of the dewatering system as described in the FFTA Work Plan.

The piezometers will be constructed of 3-foot sections of 1-inch diameter steel well point. Screen length will equal approximately 10 feet and will protrude approximately 8 feet into the saturated zone. The water table at the site is expected to be from 7 to 10 feet below ground surface (BGS).

The well point piezometers will be installed using the GeoProbe. Riser pipe will be constructed of galvanized steel. The well point piezometer will be installed flush-mounted, level with the ground surface. The piezometers will be capped and flagged upon completion.

2.1.4. Personnel and Equipment Decontamination

Personnel decontamination and general equipment documentation procedures for the FFTA extent of contamination task will be conducted in accordance with ER Program SOP's 1.6, General Equipment Decontamination, and 1.8 Personnel Decontamination Level D Protection.

Decontamination of the GeoProbe equipment will be conducted in accordance with the following procedures:

- Step 1 - The hydraulic ram equipment/materials will be moved to a designated decontamination area.
- Step 2 - All probes, casing, and related sampling equipment will be supported above ground and individually cleaned using pressurized water and detergent mixture followed by a tap water rinse and allowed to dry.
- Step 3 - The control panel and working areas of the vehicle will be cleaned, if deemed necessary, water rinsed and allowed to dry.

All cleaning will be performed using pressurized water. Cleaning will continue until all visible contamination, oil, grease, etc. is removed. Decontamination drippings will be containerized on site.

2.2. ANALYTICAL PROCEDURES

2.2.1. Field Screening Analyses

Soil and ground water samples will be analyzed on-site for total petroleum hydrocarbons with a field infrared (IR) analyzer using modified U.S. EPA Method 418.1. Sample analyses will be performed using the Horiba OCMA-220 0.1 Content Analyzer which uses IR energy to detect petroleum hydrocarbons from 0 to 20 and 0-100 parts per million (ppm) in soil and ground water respectively. This field screening method will be used to determine the extent of contamination because of the cost effectiveness and quick turnaround of analysis.

Documentation of analytical results will be recorded and include the sample identification, date of sampling and analyses, time of analyses, analytical results and any comments concerning physical characteristics of the sample (i.e. odor, color).

Detailed procedures for operation of the Horiba OCMA-220 are included in Appendix A.

Seven soil and three ground water samples collected will undergo laboratory analyses for total petroleum hydrocarbons and benzene, toluene, ethyl benzene, and xylenes (BTEX). The laboratory analyses will conform to methods described in the QAPP and results will serve as confirmation for the field screening results.

2.2.2. Geotechnical Testing

Geotechnical testing of site soils will be conducted on soils from three specific hydrogeologic zones: the vadose zone, the capillary fringe zone, and the saturated ground water zone. Two sets of samples will be collected from each zone and will be tested for Modified Proctor Density (ASTM D-1557), falling head permeability, percent moisture, Atterberg Limits, and grain size distribution. Only those soils at maximal Modified Proctor Density will be subjected to falling head permeability testing.

2.2.3 Sediment Testing

One sample of sediment from each of the two pits will be taken for both chemical and radiation analysis. Chemical analysis will include BTEX and oil and grease. Radiation will include full isotopes as described in the OU-9 QAPP.

2.3. DOCUMENTATION

2.3.1. Chain-of-Custody

Samples Labels (Field Custody Procedures)

All samples will be identified with a label attached directly to the container. Examples of sample labels are presented in Mound Plant ER Program SOP 1.3, Sample Control and Documentation (Revision 1). Sample label information will be completed using waterproof black ink. The labels will contain the following information:

- sample number;
- time and date of collection;
- installation name;
- parameters to be analyzed;
- preservative (if any);
- sample source/location; and
- sampler's initials.

Chain-of-Custody Record

To maintain a record of sample collection, transfer between personnel, shipment, and receipt by the laboratory, a chain-of-custody record will be filled out for each FFTA sample to be sent to an off-site laboratory as it is collected by the field sampler. Each time the samples are transferred, the signatures of the persons relinquishing and receiving the samples, as well as the date and time of transfer, will be documented.

Chain-of-custody seals are used to determine if any tampering has occurred during shipment of samples. These signed and dated seals will be placed at the junction between the lid and the jar or cooler on all FFTA sample containers and shipment containers (coolers) by the person responsible for packaging. If the coolers or jars are opened before receipt at the laboratory, the seals will not be intact. If the chain-of-custody seals are not intact, the laboratory project manager for the Mound Plant ER Program will notify the FFTA WESTON field manager within 24-hours of container receipt. The WESTON field manager will then complete a nonconformance report.

Transfer of Custody and Shipment

Prior to shipment of samples, the chain-of-custody record will be signed and dated by a member of the field team who has verified that those samples indicated on the record are indeed being shipped. Mound Plant ER Program SOP 1.3, Sample Control and Documentation (Revision 1) describes the completion of this form and the steps necessary for sample control, sample identification, and data recording. A copy of each chain-of-custody form will be retained in the project file at the site, and the original will be sent with the samples (sealed inside the sample cooler). After packaging has been completed, custody seals, signed and dated by a member of the field team, will be placed on the cooler.

All samples being shipped to the analytical laboratory will be sent by Federal Express©. Samples will be transported, the same day that they are collected, by field personnel from Mound Plant to the courier location for subsequent shipment to the laboratory. (It should be noted that Federal Express does not claim responsibility for samples and does not sign off on the chain-of-custody; however, the laboratory retains the shipping ticket, indicating acceptance and delivery of shipment.) Rental vehicles used by the field personnel may be used for transporting nonhazardous and nonradioactive samples from the Mound Plant to the Federal Express office only if the samples are properly packaged and labeled. Upon receipt of the samples at the laboratory, the receiver will complete the transfer by dating and signing the chain-of-custody record. This chain-of-custody record will remain with the sample at the laboratory.

2.3.1.1. Field Notebooks and Data Collection Forms

Notebooks

All data collection activities performed at a site will be documented, using waterproof, non-erasable black ink, either in a field notebook or on ER Program forms. Field notebooks will be bound books and will be assigned to the team leader for the duration of the sampling event. The required contents and procedures for entering into field logs are described in SOP 6.1, Log Book Use and Control, September 1992, Revision 0. In addition, all samples collected will be recorded in the field log with the following information:

- sample location;
- sample identification number;
- date and time of collection;

- sample matrix;
- any unusual appearances of the sample;
- parameters to be analyzed; and
- date and time sample was released or received.

Data Collection Forms

As an added means of ensuring the collection of accurate field and sampling information, standardized data collection forms will be used. These forms will be used to record data in a consistent format that limits individual interpretations or preferences. By explicitly outlining reporting methods, identifying appropriate units of measure, and specifying alternative test procedures, these forms provide a measure of quality control in the data collection process.

The standard data collection forms are associated with the Mound Plant ER Program SOPs. They are a means of preventing the collection of invalid or redundant data and eliminating critical data gaps. Each data collection form precisely defines what data are necessary to accurately characterize a particular property or relationship. This reduces the likelihood of initiating field sampling or laboratory analyses only to discover that key pieces of information have not been collected and that further sampling is required.

Each Mound Plant ER Program SOP for a data collection activity provides examples of all of the forms required for the accurate recording of the procedure. A blank form will be used for each new location or sample, as specified by the SOP. During the field activity, each form will be completed as accurately and completely as possible, per the example contained in the SOP. All entries on the data collection form will be made using indelible black ink, with incorrect entries crossed out with a single line and initialed. Each form must be signed or initialed and dated by the person completing the form on the day of information entry. Any additional information not recorded on the form will be reviewed by a technical reviewer other than the person recording the data prior to any use of the data, and sufficiently soon to take any necessary corrective action. This review will ensure that forms are completed fully and accurately and will verify the integrity of the data. After the review, the reviewer will sign and date each form.

The data collection form for the recording of field analytical results using the MORIBA OCMA-226 is presented on Table II.2.

TABLE II.2

DOCUMENTATION FORM FOR ON-SITE ANALYSES USING HORIBA OCMA-220 (IR)

Sample ID	Sample Depth	Sample Matrix	Date Analyzed	Time Analyzed	Analytical Results (ppm)	Comments

3.0. QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

The overall quality assurance objectives for field sampling, field measurements, and laboratory analyses are to produce data of known and sufficient quality to support the site evaluation and the selection of remedial alternatives. Appropriate procedures and quality control checks will be used so that known and acceptable levels of accuracy and precision are maintained for each data set. The objectives for accuracy, precision, completeness, representativeness, and comparability for measurement data are explained in the OU-9 QAPP. These goals are primarily expressed in terms of acceptance criteria for the quality control checks performed. The field and laboratory quality control checks planned for this investigation are presented in Tables III.1 through III.3 of the OU-9 QAPP and are further defined in Section 8 of the OU-9 QAPP. Quality assurance goals for field measurements and field screening are also discussed in the OU-9 QAPP.

Investigative specific training will be provided to all field personnel. Training will consist of sample collection, handling and documentation training, as well as orientation on ER Program SOPs, QAPP and HASP.

Internal Quality Control Checks

Internal quality control checks are performed as part of a field investigation in order to monitor and assess the quality of the data generated. Quality control checks are used to evaluate the accuracy and precision of field screening, field measurements, sampling techniques, and laboratory analyses. Acceptance criteria for the quality control checks, and corrective actions to be taken if criteria are not met, have been established for this program so that data of known quality are obtained and are presented in the OU-9 QAPP. The following subsections summarize those internal quality control checks.

Screening and Field Measurements

Quality control procedures for screening and field measurements are limited to checking the reproducibility of the measurement by obtaining multiple readings and by calibrating the instruments (when appropriate) with either internal references or external standards. The frequency of these checks and acceptance criteria are presented on Table III.1 of the OU-9 QAPP.

Collection of duplicate samples can measure the precision of the sampling technique. A duplicate sample is collected for every sample group or every 10 water samples or fewer investigative samples. A relative percent difference is calculated for the duplicate sample analysis as defined in Section 3 of the OU-9 QAPP and is used to evaluate sampling precision. Acceptance criteria for precision of duplicate field samples has not been established.

4.0 HEALTH AND SAFETY REQUIREMENTS

A project-specific HASP has been written and approved by both WESTON and EG&G. The requirements of this HASP will be adhered to by all field personnel and subcontractors hired by WESTON and performing tasks at the Mound Plant. The level of protection is level D. Hard hats, safety glasses and steel-toed boots are required at all times on-site. The main hazards are from normal "construction type" activities (lifting, slips and falls, etc.). Investigative health and safety monitoring will include breathing zone readings using a Flame-Ionization Detector (FID), a Photoionization Detector (PID) and a Combustible Gas Instrument (CGI).

Health and Safety procedures are detailed in Mound Plant ER Program SOPs as well as the project HASP. The following table summarizes the ER Program SOPs for Health and Safety requirements.

6.1 Health and Safety Monitoring of Combustible Gas Levels.	Mar 1992	1	To describe the equipment and proper method for monitoring combustible gas levels in order to determine when an explosion hazard exists in the work environment.
6.2 Health and Safety Monitoring of Organic with a Photoionization Detector (PID).	Mar 1992	1	To describe the equipment and proper method for environmental monitoring of toxic gases and vapors using a portable PID.
6.3 Health and Safety Monitoring of Organic Vapors with a Flame-Ionization Detector (FID).	Mar 1993	2	To describe the equipment and proper method for environmental monitoring of toxic gases and vapors using a portable FID.
6.4 Total Alpha Surface Contamination Measurements	Jan 1991	0	To provide guidance for determining levels of total surface alpha contamination on equipment, vehicles, and personnel that have been in contact with material that was potentially contaminated with alpha-emitting radionuclides.
6.15 Measurements of Gamma-Ray Fields Using a Sodium Iodide (Na) Detector	Jan 1991	0	To describe the procedure for making count-rate measurements of a gamma-ray field with a (Na) detector.

APPENDIX D

SAMPLING AND ANALYSIS PLAN
FOR CONSTRUCTION AND OPERATION & MAINTENANCE

ENVIRONMENTAL RESTORATION PROGRAM

OPERABLE UNIT 5
FIRE FIGHTING TRAINING AREA REMOVAL ACTION
SAMPLING AND ANALYSIS PLAN

MOUND PLANT
MIAMISBURG, OHIO

June 1994

U.S. Department of Energy

EG&G Mound Applied Technologies

DRAFT FINAL
(REVISION 0)

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LIST OF ACRONYMS

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLP	Contract Lab Program
COC	Chain-of-Custody
cpm	Counts per minute
DCQAP	Data Collection Quality Assurance Plan
DOE	Department of Energy
DOT	Department of Transportation
ER	Environmental Restoration
FSM	Field Sample Manager
FSP	Field Sampling Plan
GPS	Global Positioning System
GM	Geiger Muller
HASP	Health and Safety Plan
IATA	International Air Transportation Association
IDM	investigation-derived materials
LSA	low scintillation activity
μCi/Ml	microCuries per Milliliter
μg/kg	micrograms per kilogram
MS/MSD	Matrix Spike/Matrix Spike Duplicate
OUPS	Ohio Utilities Protection Service
OEPA	Ohio Environmental Protection Agency
PCBs	Polychlorinated Biphenyls
Pci/g	picoCuries per gram
ppb	parts per billion
PPE	personnel protective equipment
ppm	parts per million
QA/QC	Quality Assurance/Quality Control
QA	Quality Assurance
QAM	Quality Assurance Manager
QC	Quality Control
RCG	Radioactivity Concentration Guide
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SDCA	Sample Document Control Administration
SHSC	Site Health and Safety Coordinator
SOPs	Standard Operating Procedures
SOW	Statement of Work
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total Organic Carbon
USEPA	United States Environmental Protection Agency
USCS	United States Geological Survey
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compounds
WESTON	Roy F. Weston, Inc.

1.0. INTRODUCTION

1.1. PROGRAM DESCRIPTION

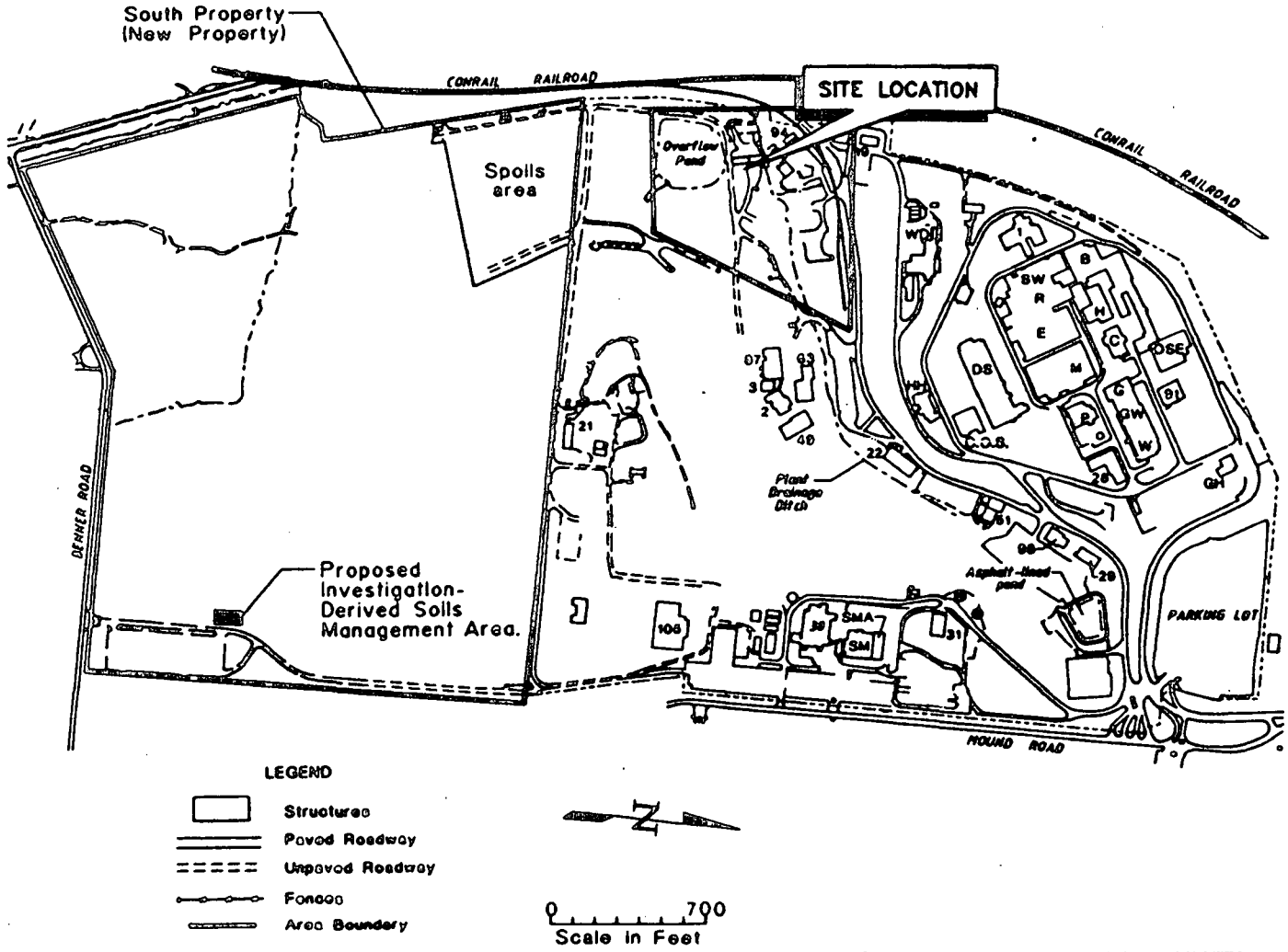
The Environmental Restoration (ER) Program consists of program phases patterned after the U.S. Environmental Protection Agency (USEPA) Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) environmental compliance programs. The primary objective of the ER Program is to implement assessment and remediation activities as required for potential release sites and contaminated facilities at Department of Energy (DOE) installations.

1.2. SCOPE OF INVESTIGATION

This Sampling and Analysis Plan (SAP) has been prepared as a part of the ER Program for the Fire Fighting Training Area (FFTA) Site at the EG&G Mound Applied Technologies, Inc. (Mound) facility located in Miamisburg, Ohio (Figures 1.1. and 1.2.).

The scope of work for the time-critical removal action of petroleum hydrocarbon-contaminated soil is detailed in the Operable Unit (OU) 5 FFTA Removal Action Work Plan dated June 1994. Additional information can be found in the OU-5 FFTA Site Action Memorandum/Removal Site Evaluation (AM/RSE) dated 8 February 1994. The FFTA Site sampling and analyses effort will be conducted to:

- Determine percent moisture, classification, proctor, and gradation of the clay to be used for construction of the treatment pads.
- Establish a baseline level of TPH and BTEX for the existing soils on the Building 34 hillside.
- Determine a baseline Total Kjeldahl Nitrogen (TKN) and Total Phosphorus (Total P) for soil to be treated via bioremediation,
- Monitor the progress of bioremediation (TPH, pH, temperature, etc.),
- Confirm bioremediated soil does not contain TPH and BTEX above treatment criteria,
- Monitor soil removal from excavations and confirm soil remaining in excavated areas does not contain TPH and BTEX above the cleanup criteria,
- Satisfy EG&G Mound Health Physics requirements for materials removed from the Mound facility.



WESTON
MANAGERS DESIGNERS/CONSULTANTS

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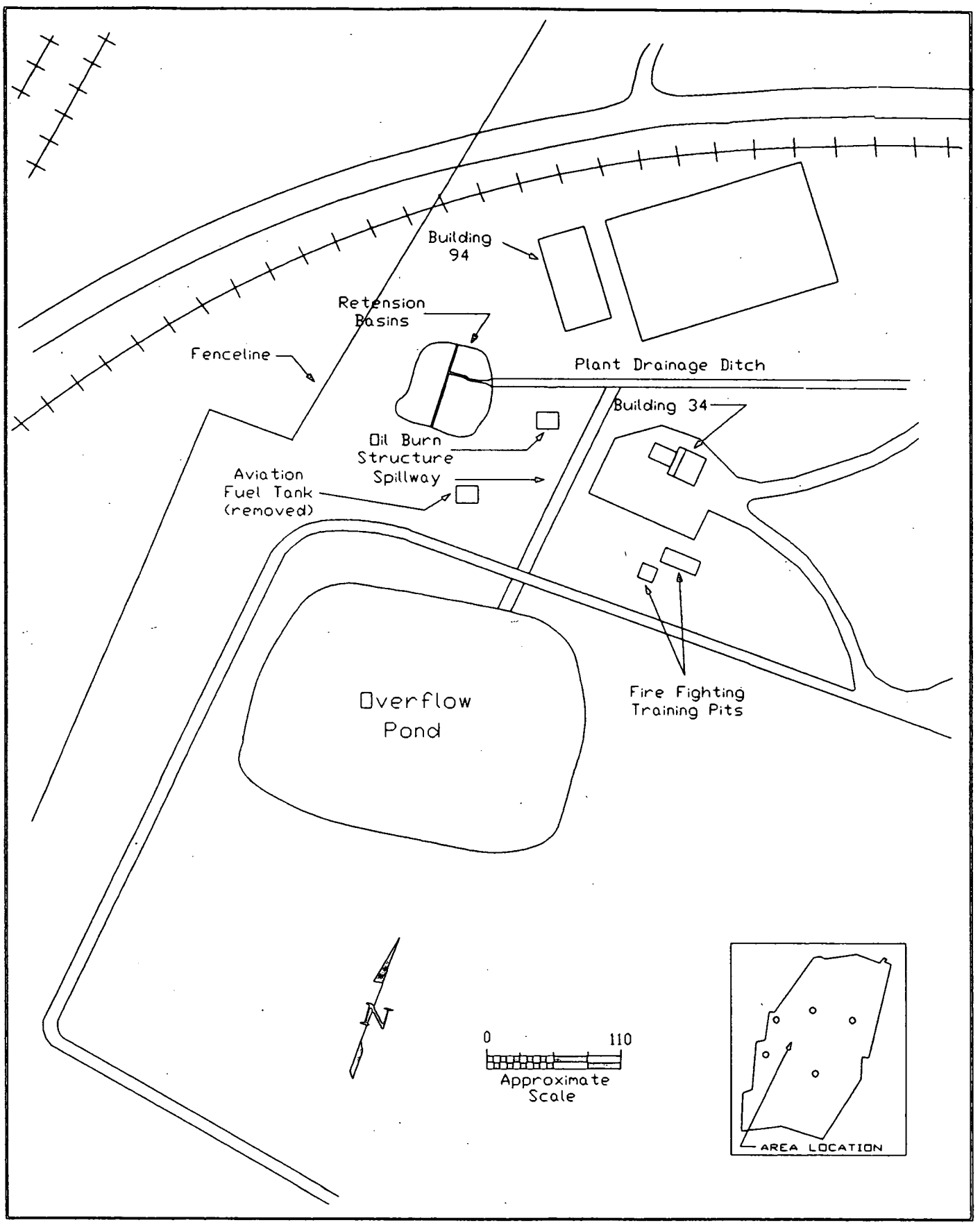
Figure 1.1.
Facility Overview

Figure 1.2.

FFTA Site



Testing of construction-related materials (i.e., concrete strength, backfill density, compacted clay permeability, etc.) is the responsibility of the construction subcontractor and are specified in the Contract Specifications and are not included in this SAP.

The FFTA Site Removal Action will be conducted in accordance with procedures detailed in this SAP, the WESTON FFTA Health and Safety Plan (HASP) for construction, and the FFTA Quality Assurance Project Plan (QAPP).

2.0. SITE BACKGROUND

2.1. SITE HISTORY

EG&G Mound Applied Technologies, Inc. operates the Department of Energy (DOE) Mound facility under a prime contract with DOE. The FFTA Site includes two concrete containment structures (pits) used for fire fighting training purposes. In the past, fire fighting training operations were conducted using three to five gallons of diesel fuel pumped through underground pipes and into the pits for the purpose of providing fuel for a fire. Fires were extinguished with water from a nearby hydrant. Based on the best available information, it has been determined that the pits were operated between 1978 and 1989.

2.2. PHYSICAL SETTING

The FFTA Site is located southeast of Building 34 and is a relatively flat area surrounded by rolling to steeply sloped hills.

2.3. PREVIOUS INVESTIGATION RESULTS

In order to identify the presence and types of contaminants and to provide adequate data to plan a Site Remedial Investigation/Field Study (RI/FS) at Mound, the OU-3 Miscellaneous Sites LFI was conducted. The FFTA Site was one of the sites investigated as part of the Limited Field Investigation (LFI). During the LFI, a series of soil borings were installed, and associated soil and water samples were collected in the vicinity of the FFTA. The borings were installed in January 1992 and the OU-3 LFI Report was finalized in March 1993. The investigation results indicated that a free-phase petroleum substance was observed at what was thought to be the water table within soil boring MND33-0112 at the sample interval 8 to 10 feet below ground surface (bgs). Boring MND33-0112 was located south and adjacent to Pit #2. Laboratory analytical results indicated that low levels, 5.6 to 120 parts per billion (ppb), of BTEX were detected within the 8 to 10 foot soil sample interval at boring MND33-0112. The same interval had shown extractable hydrocarbon concentrations of 62 parts per million (ppm) reported as diesel fuel and 2,800 ppm reported as motor oil.

An Action Memorandum/Removal Site Evaluation (AM/RSE) was prepared and submitted by the Dayton Area Office (DAO) of the DOE as required under the National Contingency Plan (NCP). The AM/RSE

provided an assessment of the FFTA Site as a potential source for exposure to petroleum hydrocarbons by the general population. The RSE concluded that a potential exposure exists and a removal action is warranted. The AM/RSE quantified the contamination present at the FFTA Site based on the LFI and recommended that a total of approximately 333 cubic yards of soil and an unknown quantity of free product floating on the ground water surface be removed. The proposed soil to be removed lies beneath the southernmost pit and measures 20 feet wide by 30 feet long by 15 feet deep. Limited information collected during the LFI indicated that approximately half of the soil to be removed would be saturated. A set of four removal alternatives were considered in the AM/RSE assessment: ex-situ biological remediation; in-situ bioremediation; off-site disposal; and administrative controls. Options were evaluated based on cost, implementability, and effectiveness. Ex-situ biological remediation was selected as the option which best complied with the evaluation criteria.

In order to determine the extent of contamination at the FFTA Site, additional characterization information was collected during the GeoProbe Investigation of March 1994. GeoProbe results revealed that the groundwater table was located greater than 24 feet below ground surface (bgs), well below the proposed excavation depth of 15 feet. Based on results obtained during the GeoProbe Investigation, the limits of excavation will be 20 feet by 30 feet by 14 feet. All soil to be removed (approximately 310 cubic yards) will be located in the vadose zone, and no remediation of the groundwater will be necessary. GeoProbe sample results also confirmed that sediment to be remediated contained only petroleum hydrocarbons, and no radionuclides were present in the sediments. Therefore, it is believed that the remediated soils will not generate a mixed waste.

3.0. SAMPLE OBJECTIVES AND STANDARD OPERATING PROCEDURES

The FFTA Site sampling and analyses effort is being conducted in order to determine adequate removal and treatment of petroleum hydrocarbon-contaminated soil and contact water.

Standard Operating Procedures (SOPs) directly associated with this SAP are listed below.

SOP No.	SOP Title
1.1	General Instructions for Field Personnel
1.3	Sample Control and Documentation
1.4	Sample Containers and Preservation
1.5	Guide to the Handling, Packaging, and Shipping of Samples
1.6	General Equipment Decontamination
1.8	Personnel Decontamination -- Level D Protection
1.9	Personal Decontamination -- Level C Protection
1.15	Guide to Management of Investigation-Derived Material
2.7	Sampling Commercial/Municipal/Industrial Wells
2.8	Sampling for Volatile Organics
5.2	Soil Sampling With A Spade And Scoop

4.0. SAMPLE LOCATION AND FREQUENCY

The following tasks and associated sampling efforts are planned for the completion of the FFTA Removal Action.

Concrete Pits: The surface of the concrete pits will be scarified to remove contamination. Scrape samples will be taken and field analyzed for TPH. Scarifying and sampling will continue until field readings are <10 ppm. Location and number of samples will be determined by the WESTON Field Engineer, hereinafter referred to as Engineer, based on visual observance of the concrete.

Pit Excavation: During excavation of the pit, the Engineer may request that TPH field screening samples be collected on either the base or sidewalls of the excavation to guide the direction of excavation activities. Excavation will continue until field screening results show TPH < 10 ppm. The Engineer will determine the number, frequency, and location of screening samples to be obtained by observing the color (staining) of soil as it is being removed from the excavation. Prior to backfill, verification samples will be obtained and analyzed for TPH and BTEX to confirm that enough soil has been removed. If verification (laboratory analysis) samples show TPH < 40 ppm, excavation will be complete and backfill will be added. Verification samples will consist of three samples from each sidewall and four samples from the base of excavation. Sample locations will be determined by the Engineer based on field conditions. If safety considerations preclude entry into the excavation, remote samples will be collected via backhoe bucket at the direction of the Engineer.

Pit Drain Lines: Subsequent to decommission and removal of underground drain lines, soil beneath the lines will be screened for TPH to guide further excavation and confirm that soil above the screening criteria ($\geq$ 10 ppm) has been removed. The Engineer will determine the number, location, and frequency of field screening samples to be collected based on visual inspection of the soil in the excavation.

Soil Staging: Prior to treatment of soil via bioremediation, staged soil will be monitored for Ph, TKN, Total P, and percent moisture to verify that conditions are adequate for the bioremediation process to occur. A field test will be performed to determine Ph. Four composite samples will be obtained from the soil in the staging area. The average of the four Ph readings will be used. One sample will be collected and analyzed for each of TKN, Total P, and percent moisture and analyzed at an off-site laboratory. Bioremediation will begin if laboratory results meet conditions stated in the FFTA QAPP. Location of the samples will be determined in the field by the Engineer.

Treatment Pad Construction: Prior to the construction of the treatment pads, soil sample will be taken from the hillside. Samples will be collected after initial grading but prior to placement of any material. A maximum of 2 samples of each will be analyzed for TPH and BTEX. Location of the samples will be determined in the field by the Engineer. The results will establish a baseline criteria for undisturbed soil.

Treatment: At the end of every two weeks of treatment operation, 8 samples will be collected from each treatment pad and analyzed for TPH and percent moisture to monitor the progress of treatment. Sample locations will be determined by the Engineer based on field conditions existing at the time of sampling. Field screening will also be used to monitor soil conditions. At the end of every two weeks of operation, field screens for Ph and temperature will be collected from four locations, determined by the Engineer, on each treatment pad. The average Ph and temperature readings for each pad will be used. Verification samples of soil will be collected to verify that the treatment criteria have been achieved. Eight samples will be collected from each treatment pad, at locations determined in the field, and analyzed for TPH and BTEX.

Sample locations, frequency, and analytes are summarized in Table IV.1.

Table IV.1.
FFTA REMOVAL ACTION - SAMPLE LOCATION AND FREQUENCY

Sample Location	Sampler	Analyte/Parameter	Location & Frequency
Concrete Pits	Engineer	TPH - field screen	As determined necessary in the field.
Liner Clay	Contractor	soil classification, % moisture, proctor, gradation	Once per source.
Pit Excavation	Engineer	TPH - field screen TPH, BTEX - verification	As determined necessary in the field. Prior to backfill: 3 per sidewall and 4 base of excavation at locations determined in the field.
Pit Drain Lines	Engineer	TPH - field screen	As determined necessary at locations determined in the field.
Treatment Pad Construction	Engineer	TPH, BTEX	2 samples each analyte
Soil Staging	Engineer	TKN, total P, % moisture pH - field test TKN, total P TPH, BTEX - verification	8 samples/pad per 2 weeks of operation. Average of 4 readings/pad per 2 weeks at locations to be determined in the field. 4 samples/pad midpoint of treatment 8 samples/pad to verify treatment is complete.
Treatment Pad Monitoring	Engineer	TPH, % moisture pH, temperature - field test	3 samples each analyte Average of 4 readings at locations to be determined.
PPE	EG&G	RAD screen	EG&G to determine.
Non-Contaminated Trash	EG&G	RAD screen	EG&G to determine.
Concrete Debris	EG&G	RAD screen & wipe	EG&G to determine.
Piping Debris	EG&G	RAD screen & wipe	EG&G to determine.

5.0. SAMPLE AND ANALYSIS PROGRAM

5.1. SAMPLING PROCEDURES

5.1.1. Surface Soil Sampling Equipment

All soil samples to be collected are surface (exposed) soil samples. Sample equipment and methodology for surface soil sampling will follow Mound Plant ER Program SOP 5.2 and are detailed in Section 4 of the FFTA QAPP. However, due to the extent of the excavation and health and safety concerns, it may be necessary to obtain samples from the sidewall and base of the excavated area using a backhoe bucket. If this becomes necessary, soil will be obtained from the center of the bucket and only soil which has not touched the bucket walls will be collected.

5.1.2. Sample Containers, Preservation, and Holding Times

Sample containers, quantities, preservatives, and holding times are as specified in Section 4 of the FFTA QAPP and in Mount Plant ER Program SOP 1.4.

5.1.3. Sample Identification

The procedures required for sample control, sample identification, data recording, and chain-of-custody documentation are defined in Mound Plant SOP 1.3, Sample Control and Documentation and Section 5 of the FFTA QAPP.

Each sample collected will be uniquely identified. The sample will be identified according the system MND55-YYYY-XZZZ, where: 'YYYY' is the sample location, 'X' specifies whether the sample is a field blank or field duplicate, and 'ZZZ' is a sequential sample number. 'X' may have four values: 0 = investigative sample, 1 = field duplicate, 2 = trip blank, or 4 = field blank.

5.1.4. Personnel And Equipment Decontamination

The implementation of proper decontamination practices and procedures is detailed in Section 4 of the FFTA QAPP and Mound Plant SOP 1.6, General Equipment Decontamination.

5.1.5. Sample Handling And Shipping

Section 5 of the FFTA QAPP describes the procedures for handling, packaging, and shipping samples based on the IATA regulations and Mound Plant SOP 1.5, Guide to the Handling, Packaging, and Shipping of Samples.

5.2. FIELD MEASUREMENTS

5.2.1. Mound Radiological Screening Procedure

An EG&G Mound Health Physics Technician will be present during surface sampling and sampling of soil removed from excavated areas to monitor samples, sampling equipment, and personnel. All sampling activities will comply with applicable Mound Plant SOPs for radiological safety (Mound Radiological Protection Program Manual, MD10019, current issue, and Safety and Hygiene Manual, MD10286, current issue.) Monitoring will include the use of a Fidler, Alpha Pack, and a Geiger Muller (GM) pancake probe. Mound established action levels for the Fidler are the following:

- Detections < 20,000 counts per minute (cpm) = Level D Personal Protection Equipment (PPE);
- 20,000 ≤ detections > 200,000 cpm = Level C PPE; and
- Detections ≥ 200,000 cpm = halt field activities in order to discuss with project managers radiological activity levels and to determine how to proceed with the field activities in a safe manner.

The action levels using the Alpha Pack for personal protection are the following:

- Detections < 50 cpm = Level D PPE; and
- Detections ≥ 50 cpm = Level C PPE.

The action levels using GM pancake probe for personal protection are the following:

- Detections < 2 X background levels = Level D PPE; and
- Detections ≥ 2 X background levels = Level C PPE.

When using a Level C PPE based on the Alpha Pack and the GM pancake probe detections, the Mound Health Physics Technician will take wipe samples of the sampling equipment and will collect soil samples for measuring PU-238 and Th-232 activity levels.

5.2.2. Sample and Sample Location Screening

EG&G Mound Health Physics will screen each soil sample using the Fidler for detection of low energy gamma radiation. In addition, each individual soil sample will be screened using the Fidler, the GM pancake probe and the Alpha Pack. This procedure will occur before shipment of samples.

5.3. DOCUMENTATION

5.3.1. Field Notebooks

All activities performed during the FFTA Removal Action are to be documented in a hardbound field notebook according to the procedures detailed in Mound Plant SOP 1.3, Sample Control and Documentation, and per Section 5 of the FFTA QAPP.

5.3.2. Chain Of Custody

Chain of Custody procedures are detailed in Section 5 of the FFTA QAPP.

5.3.3. Change Control Documentation

Project Planned Change Documentation is detailed in Section 13 of the FFTA QAPP.

5.3.4. Nonconformance

Nonconformances to the Work Plan, SAP, QAPP, or HASP will be handled per Section 13 of the FFTA QAPP.

5.3.5. Laboratory Custody Procedures

Sample custody procedures in the laboratory include the procedures for general security, sample receipt, storage, preparation, and analysis. Section 5 of the FFTA QAPP describes the minimum general requirements for the laboratory.

5.4. LABORATORY ANALYSES

5.4.1. Analytical Methods And Quantification Limits

Analytical methods and quantification limits for the analytes described in this Section are detailed in Section 6 of the FFTA QAPP.

5.4.2. Laboratory Quality Control Checks

Laboratory quality control requirements will be handled as per Section 3 of the FFTA QAPP.

5.4.3. Laboratory Data Reporting

Laboratory data reporting requirements are specified in Section 9 of the FFTA QAPP.

6.0. QUALITY ASSURANCE AND QUALITY CONTROL

The following subsections describe the Quality Assurance/Quality Control (QA/QC) procedures for project tasks.

6.1. FIELD PROGRAM

Quality control samples will be collected during the sampling event to verify that the sampling equipment is not contributing to the contamination and that cross contamination does not occur. This will be accomplished by the collection of an equipment rinsate blank. The second QC sample, a duplicate, will be collected to verify that the sampling procedure is being followed and to develop a confidence level for the overall sampling effort. Table VI.1 shows the schedule for QC samples to be collected during the FFTA field effort.

Review of objective field and technical data integrity will be performed at two levels:

- At the time of collection, field personnel will check to ensure that standard operating procedures (SOPs) are followed, all data are recorded, and quality control checks are performed.
- Data will be reviewed by a technical peer not involved with data collection, who will ensure that all data are recorded and reported, including calculations and sample collection information. Ten percent of all calculations will be checked. Any inconsistencies or anomalies discovered will be resolved immediately, if possible, by seeking clarification from the field personnel responsible for collecting the data.

Field and technical data will also be reviewed for reasonableness and completeness by the Project Manager. In addition, random checks of sampling and field conditions will be made by the Field Team Leader, who will review recorded data at that time to confirm the recorded observations. Whenever possible, peer review will also be incorporated into the data review process to maximize consistency among field personnel.

After the validity of data in the field notes has been evaluated according to the procedures described above, the data administrator will tabulate the data, wherever possible, by entering the data in computer data files. All data hand-entered into computer files will be checked 100 percent by another individual. Electronic files will be established to allow for direct input of data into the project database, where appropriate. Subjective data will be filed as hard copies for subsequent review by the Project Manager and for incorporation into technical reports as appropriate.

6.2. ANALYTICAL PROGRAM

The laboratory will follow the quality control measures specified in Section 3 of the FFTA QAPP.

Table VI.1
FFTA Quality Control Sample Schedule

Treatment Pad Construction					
Analysis	Number of Samples	Number of Field Blanks	Number of Trip Blanks	Number of Duplicates	Number of Matrix Spike Pairs
Total Petroleum Hydrocarbons	2	1	0	0	0
GC/MS Volatiles (BTEX)	2	1	1	0	0
Soil Staging					
Analysis	Number of Samples	Number of Field Blanks	Number of Trip Blanks	Number of Duplicates	Number of Matrix Spike Pairs
Total Nitrogen	3	0	0	0	0
Total Phosphorus	3	0	0	0	0
Excavation Closure					
Analysis	Number of Samples	Number of Field Blanks	Number of Trip Blanks	Number of Duplicates	Number of Matrix Spike Pairs
Total Petroleum Hydrocarbons	16	2	0	2	1
GC/MS Volatiles (BTEX)	16	1	2	2	1
Treatment Pad Monitoring					
Analysis	Number of Samples	Number of Field Blanks	Number of Trip Blanks	Number of Duplicates	Number of Matrix Spike Pairs
Total Nitrogen	8	0	0	0	0
Total Phosphorus	8	0	0	0	0
Total Petroleum Hydrocarbons	128	0	0	0	0
Treatment Pad Closure					
Analysis	Number of Samples	Number of Field Blanks	Number of Trip Blanks	Number of Duplicates	Number of Matrix Spike Pairs
Total Petroleum Hydrocarbons	16	2	0	2	1
GC/MS Volatiles (BTEX)	16	2	2	2	1

7.0. HEALTH AND SAFETY REQUIREMENTS

All personnel performing work at the Mound facility will comply with the Mound facility health and safety requirements. All WESTON employees will undergo safety orientation training and site-specific medical monitoring. The medical monitoring may consist of analysis of 24-hour urine samples collected from each employee before and after the field work, and a "whole body" radiation count administered prior to the start of work. Each employee will be required to be fit tested for an air-purifying respirator where respiratory protection is required. Each WESTON employee entering the Mound facility will be required to have, on his or her person, a radiation dosimeter issued by EG&G Mound.

In addition, a site-specific Health and Safety Plan (HASP) for this project was developed and reviewed prior to the start of field work. WESTON personnel conducting the FFTA sampling will follow the HASP specific to this operation, as well as the Mound facility SOPs. A copy of the FFTA HASP is included in Appendix B of the Work Plan.

8.0. REFERENCES

EG&G. Current Issue - "MD-10286, Mound Safety and Hygiene Manual." EG&G Applied Technologies, Mound Plant, Miamisburg, Ohio. Current Issue.

EG&G. Current Issue - "MD-10019, Mound Radiological Protection Manual." EG&G Applied Technologies, Miamisburg, Ohio. Current Issue.

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