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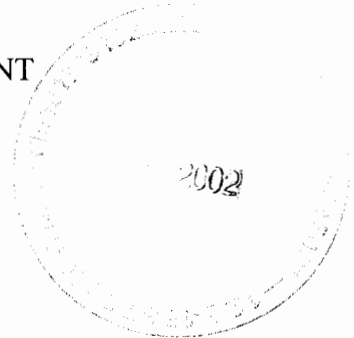
**DEPARTMENT OF THE AIR FORCE**

HEADQUARTERS 49TH FIGHTER WING (ACC)  
HOLLOMAN AIR FORCE BASE, NEW MEXICO

18 JUL 2002

MEMORANDUM FOR NEW MEXICO ENVIRONMENT DEPARTMENT

Attn: Mr. James P. Bearzi  
Hazardous & Radioactive Materials Bureau  
P.O. Box 26110  
Santa Fe NM 87502



FROM: 49 CES/CD  
550 Tabosa Avenue  
Holloman AFB NM 88330-8458

SUBJECT: Letter Work Plan for Additional Soil Borings and Monitoring Well Installations at SWMU 123

1. The attached work plan is submitted for your review. The plan was prepared in response to a Notice of Deficiency (NOD), dated August 17, 2001, from the New Mexico Environment Department (NMED) Hazardous Waste Bureau. The attached work plan addresses the additional information requested by NMED in the referenced NOD. This plan is not intended to be all-inclusive but to serve as a response to NMED's NOD comments. A detailed, final work plan will be submitted at a later date.
2. If you have any questions or require additional information, please contact Mr. Jose Gallegos or Mr. Dan Holmquist at (505) 572-5395.

*Howard E. Moffitt*  
HOWARD E. MOFFITT  
Deputy Base Civil Engineer

Attachment:  
*Letter Work Plan for Additional Soil Borings and Monitoring Well Installations at SWMU 123*  
(2 copies each)

cc (w/attachment):  
Attn: Mr. Cornelius Amindyas  
Hazardous & Radioactive Materials Bureau  
P.O. Box 26110  
Santa Fe NM 87502

Attn: Mr. Allen Chang  
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1445 Ross Ave, Ste 1200  
Dallas TX 75202-2733

**Letter Work Plan for Additional Soil Borings and  
Monitoring Well Installations at SWMU 123  
Holloman Air Force Base  
24 April 2002**

**1.0 INTRODUCTION**

In a letter report, dated April 27, 1999, with the subject heading "Results of Additional Soil Sampling for Remediation of the POL-Contaminated Solid Waste Management Unit (SWMU) 123, at Holloman Air Force Base," a recommendation was made for no further action (NFA) at the SWMU 123 site based on additional sampling that took place for remediation of the site. After reviewing this document, the New Mexico Environment Department (NMED) Hazardous Waste Bureau provided a Notice of Deficiency (NOD), dated August 17, 2001, requiring additional information prior to making a final determination for NFA. The following letter work plan addresses the additional information requested by NMED. This letter work plan is not intended to be all-inclusive but to serve as response to NMED's NOD comments. A detailed, final work plan will be submitted at a later date.

**2.0 SOIL BORING INSTALLATION AND SAMPLING**

**2.1 Soil Borings**

A maximum of 15 soil borings will be installed in the vicinity of the petroleum, oil and lubricants (POL) washrack located at SWMU 123. Four of the 15 soil borings will be installed for the purpose of soil sampling and monitoring well installation with utilization of a hollow-stem-auger drilling rig. A maximum of 11 of the 15 soil borings will be installed via direct-push technology for soil sampling purposes only. Table 1 lists all proposed soil borings with the corresponding rationale for installation.

**Table 1  
Proposed Soil Borings and Rationale**

Soil Boring Number	Rationale
SB-1	Will be used for the installation of monitoring well MW-1. Based on previous soil samples, SB-1 will be located in the most contaminated area at the site. Soil and groundwater samples will help delineate the vertical and horizontal extent of the contaminant plume. Most likely location for the presence of free-phase product.
SB-2	Will be used for the installation of monitoring well MW-2. Located in the down-gradient ground-water flow direction. Soil and groundwater samples well help delineate the vertical and horizontal extent of the contaminant plume.
SB-3	Will be used for the installation of monitoring well MW-3. Located in the down-gradient ground-water flow direction. Soil and groundwater samples well help delineate the vertical and horizontal extent of the contaminant plume.

Soil Boring Number	Rationale
SB-4	Will be used for the installation of monitoring well MW-4. Located in the up-gradient groundwater flow direction. Soil and ground-water samples will help delineate the vertical and horizontal extent of the contaminant plume.
DPT-1, 2, 3, and 4	Will be used to collect soil samples along the perimeter of the previously sampled area of the washrack to help delineate the vertical and horizontal extent of the contaminant plume.
DPT-5, 6, and 7	Optional samples. These borings will be installed to obtain additional soil samples for a more complete picture of the contaminant plume if contamination is suspected from field screening results and visual observations of borings DPT-1, 2, 3, and 4. These borings will be located in the field as necessary.
DPT-8, 9, 10, and 11	Optional samples. These borings will be installed to collect soil samples if, upon examination of the drainage system of the washrack, areas of possible contamination caused by drainage are discovered.

### 2.1.1 Soil Borings for Monitoring-Well Installation

A total of four soil borings numbered SB-1 through SB-4 will be installed for the purpose of soil sampling and monitoring-well installation. Boring SB-1 will be located near soil boring SWMU123-SB-C. This boring was sampled on January 27, 1999 and shows the highest concentration of total recoverable petroleum hydrocarbons (TRPH) (7400 mg/kg at 9 ft below ground surface (bgs)) during past sampling events. Two borings, SB-2 and SB-3, will be located approximately 40 feet southwest and southeast of soil boring SB-1 in the suspected down-gradient groundwater flow direction. The suspected groundwater flow direction is based on historic groundwater flow patterns in the vicinity of SWMU 123. Boring SB-4 will be located up-gradient of soil boring SWMU123-SB-C to further delineate the contaminant plume.

Each of the four borings will be advanced to at least 5 feet below the water table estimated at 12 ft bgs. The soil sampling rationale is described in Section 2.2. Table 2 summarizes the soil analysis strategy. A general site map with proposed soil-boring/monitoring-well locations has been attached as Figure 1.

### 2.1.2 Direct-Push-Technology (DPT) Soil Borings

A maximum of 11 soil borings numbered DPT-1 through DPT-11 will be installed via DPT for the purpose of soil sampling. DPT soil borings DPT-1 through DPT-4 will be installed along the outside perimeter of the previous soil samples obtained under the washrack. DPT soil borings DPT-5 through DPT-7 are optional borings. These borings will be installed as necessary if contamination is suspected from field screening or visual observations of samples collected from DPT soil borings DPT-1 through DPT-4. If the presence of contamination warrants the installation of these soil borings, they will be located outward from the perimeter of DPT soil borings DPT-1 through DPT-4.

DPT soil borings DPT-8 through DPT-11 are optional borings that may be installed after inspection of the drainage system of the washrack. If drainage is found to be localized in specific areas, a boring will be installed within these specific areas in order to further delineate the contaminant plume.

The DPT soil borings will be advanced to the water table estimated at 12 ft bgs. The soil sampling rationale is described below. Table 2 summarizes the soil analysis strategy. Figure 2 shows the proposed locations of DPT soil borings DPT-1 through DPT-4 in relation to previous washrack soil sample locations.

## **2.2 Soil-Sampling Rationale**

The rationale for soil sampling is to determine the magnitude and extent of POL contamination within the soil beneath and surrounding the washrack on SWMU 123 to aid in evaluation of the human health and ecological risk assessment and to support a proposal of NFA. In past sampling events, the maximum depth of soil sample collection was 9 ft bgs with ethylbenzene, toluene and xylene levels increasing with depth. To gain a better understanding of the vertical and lateral extent of the POL contamination within the soil, soil sampling will continue to the groundwater table. In order to evaluate risk as requested by NMED, pH and RCRA constituents, including volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs) and metals, will be sampled in addition to total petroleum hydrocarbons (TPH). TPH, using US Environmental Protection Agency (EPA) modified method 8015B, will be analyzed to determine the type of contamination present represented by potential diesel-, oil and gasoline-range hydrocarbons. Previous samples were analyzed for TPH.

## **2.3 Soil Samples**

Soil samples will be collected continuously during boring advancement. In each boring, the soil sample collected just above the water table will be submitted to a laboratory for the analyses listed below. In addition, the most contaminated sample from each boring (based on field screening and visual observation) will be submitted for analyses. As suggested by NMED, all analytical results will be reported as values less than numerical reporting limits rather than reporting results as nondetections.

Table 2 summarizes the soil analysis strategy. Each of the 30 samples submitted to the laboratory will be analyzed for VOCs, SVOCs, RCRA metals, Diesel-Range Organics (DRO), Gasoline-Range Organics (GRO), Oil-Range Organics (ORO), and pH. Three duplicate samples and 1 matrix spike/matrix spike duplicate (MS/MSD) sample will also be collected for a total of 34 soil samples submitted for analyses. It is expected that duplicate and MS/MSD samples will be collected from the most contaminated sample locations.

**Table 2  
Soil Analysis Strategy**

Analysis	EPA Method	Primary	Duplicates	MS/MSD	Total	QA
VOC	8260B	30	3	1	34	1
SVOC	8270C	30	3	1	34	1
RCRA Metals	RCRA Metals	30	3	1	34	1
DRO	8015B	30	3	1	34	1
GRO	8015B	30	3	1	34	1
ORO	8015B	30	3	1	34	1
pH	9045 B/C	30	0	0	30	0

## 2.4 Previous Soil Sampling

As requested by the NMED, below is a table listing the analytical results including the analytical methods and detection limits reported for nondetections for samples submitted during the January and February 1999 soil sampling event described in the April 27, 1999 letter report submitted by Foster Wheeler Environmental Corporation. Additional analytical results for soil samples collected at SWMU 123 can be found in the December 1995 report titled, Phase I RCRA Facility Investigation Report, Table 2 Solid Waste Management Units.

**Table 3  
Previous Soil Sampling Analytical Results**

Sample Number	EPA Analytical Method	Date Sampled	TRPH (mg/kg)	Benzene (mg/kg)	Ethylbenzene (mg/kg)	Toluene (mg/kg)	Total Xylenes (mg/kg)
SWMU123-SB-A-7	TRPH=418.1 BTEX=8021	01/21/99	3680	<0.1	<0.1	0.5	21
SWMU123-SB-A-9	TRPH=418.1 BTEX=8021	01/27/99	3500	<0.2	61	21	110
SWMU123-SB-B-4	TRPH=418.1 BTEX=8021	01/22/99	<10	<0.005	0.02	0.01	0.02
SWMU123-SB-C-2	TRPH=418.1 BTEX=8021	01/22/99	144	0.02	0.9	0.3	1.2
SWMU123-SB-C-6	TRPH=418.1 BTEX=8021	01/22/99	<10	<0.005	0.03	0.02	0.06
SWMU123-SB-C-9	TRPH=418.1 BTEX=8021	01/27/99	7400	<0.2	110	190	270
SWMU123-SB-E-2	TRPH=418.1 BTEX=8021	01/22/99	90	<0.005	0.2	0.02	0.2
SWMU123-SB-E-6	TRPH=418.1 BTEX=8021	01/22/99	<10	<0.005	<0.005	<0.005	1.6
SWMU123-SB-E-9	TRPH=418.1 BTEX=8021	01/27/99	4000	<0.2	42	15	69
SWMU123-SB-I-2	TRPH=418.1 BTEX=8021	02/11/99	304	0.5	9.6	7.9	9.9

Sample Number	EPA Analytical Method	Date Sampled	TRPH (mg/kg)	Benzene (mg/kg)	Ethylbenzene (mg/kg)	Toluene (mg/kg)	Total Xylenes (mg/kg)
SWMU123-SB-I-6	TRPH=418.1 BTEX=8021	02/11/99	3000	1.1	22	32	46
SWMU123-SB-J-2	TRPH=418.1 BTEX=8021	02/12/99	48	0.04	0.3	0.7	0.5
SWMU123-SB-J-8	TRPH=418.1 BTEX=8021	02/12/99	1825	0.7	24	26	47

Notes:

TRPH = Total Recoverable Petroleum Hydrocarbons

< denotes that the sample analysis value is less than the reported method reporting limit.

### 3.0 MONITORING-WELL INSTALLATION AND SAMPLING

#### 3.1 Monitoring Wells

A monitoring well will be installed within soil borings SB-1, SB-2, SB-3 and SB-4. The monitoring wells will be labeled with the same numeral as the corresponding soil boring (SB-1/MW-1, etc.). Groundwater is estimated at 12 ft bgs; therefore, monitoring wells will be approximately 19 ft deep. The screened interval of the well will extend approximately 3 ft above and 7 ft below the groundwater table. Table 4 lists the proposed monitoring wells with the corresponding rationale for installation.

**Table 4  
Proposed Monitoring Wells and Rationale**

Monitoring Well Number	Rationale
MW-1	Based on previous soil samples, MW-1 will be located in the most contaminated area of the site. Groundwater sample will help delineate the extent of the contaminant plume (only collected if free-phase product is not present). Most likely location for the presence of free-phase product. Necessary for an accurate potentiometric map.
MW-2	Located in the down-gradient groundwater flow direction. Groundwater sample will help delineate the extent of the contaminant plume. Necessary for an accurate potentiometric map.
MW-3	Located in the down-gradient groundwater flow direction. Groundwater sample will help delineate the extent of the contaminant plume. Necessary for an accurate potentiometric map.
MW-4	Located in the up-gradient groundwater flow direction. Groundwater sample will help delineate the extent of the contaminant plume. Necessary for an accurate potentiometric map.

### 3.2 Monitoring-Well Installation Rationale

As stated by NMED, the potential for groundwater contamination and free-phase product on the groundwater table has not been addressed in previous investigations. The monitoring wells will be installed to determine any up-gradient contaminant effects and free-phase product at the water-table interface, to delineate groundwater flow direction, and to allow for collection of groundwater samples to determine if groundwater has been impacted if free-phase product is not detected. These actions will help assess whether there is a potential risk due to ground-water exposure and to support future action at SWMU 123 or a proposal for NFA.

### 3.3 Groundwater Samples

Groundwater samples will be submitted to an off-site laboratory for the analyses listed below. As suggested by NMED, all analytical results will be reported as values less than numerical reporting limits rather than reporting results as nondetections. Table 5 summarizes the groundwater analysis strategy. Each of the four samples submitted to the laboratory will be analyzed for VOCs, SVOCs, RCRA Metals, DRO, GRO and ORO. One duplicate sample and one MS/MSD will be collected from monitoring well MW-1 for a total of six groundwater samples. A trip blank will be included in the groundwater sample shipment and analyzed for VOC contamination. A groundwater sample will not be collected if free-phase product is found in a monitoring well.

**Table 5**  
**Ground-Water Analysis Strategy**

Analysis	Method	Primary	Duplicates	MS/MSD	Trip Blanks	Total	QA
VOC	8260B	4	1	1	1	7	1
SVOC	8270C	4	1	1	0	6	1
RCRA Metals	RCRA Metals	4	1	1	0	6	1
DRO	8015B	4	1	1	0	6	1
GRO	8015B	4	1	1	0	6	1
ORO	8015B	4	1	1	0	6	1

### 4.0 FINAL WORK PLAN

A final work plan will be presented to NMED at a later date. This work plan will include at a minimum: a detailed site plan, an "as-built" diagram for the washrack, boring and monitoring-well installation methods, finalized boring locations and ID numbers, specific soil-sampling procedures, monitoring-well construction specifications, well-development procedures and groundwater sampling procedures.

## **5.0 REFERENCES**

Foster Wheeler (Foster Wheeler Environmental Corporation)

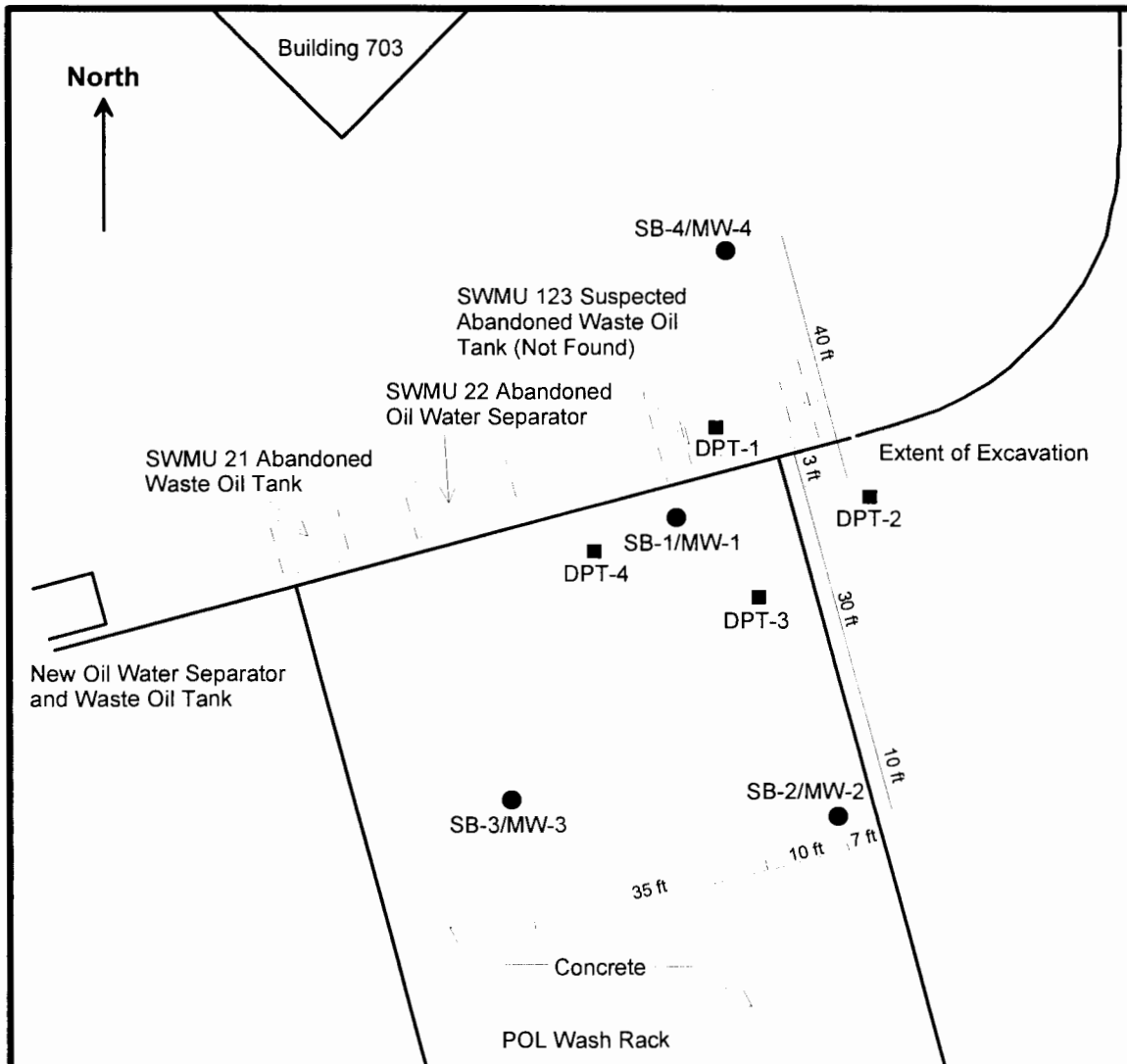
1999 (April) Letter Report Remediation of the POL-Contaminated SWMU 123,  
Holloman Air Force Base, New Mexico.

NMED (New Mexico Environment Department)

2001 (August) Notice of Deficiency on SWMU 123, [Building 704, Waste Oil Tank],  
Holloman Air Force Base, New Mexico.

Radian, 1995 (December) Phase I RCRA Facility Investigation Report, Table 2 Solid Waste  
Management Units, Holloman Air Force Base, New Mexico.





KEY

● Proposed Soil Boring/  
Monitoring Well Location

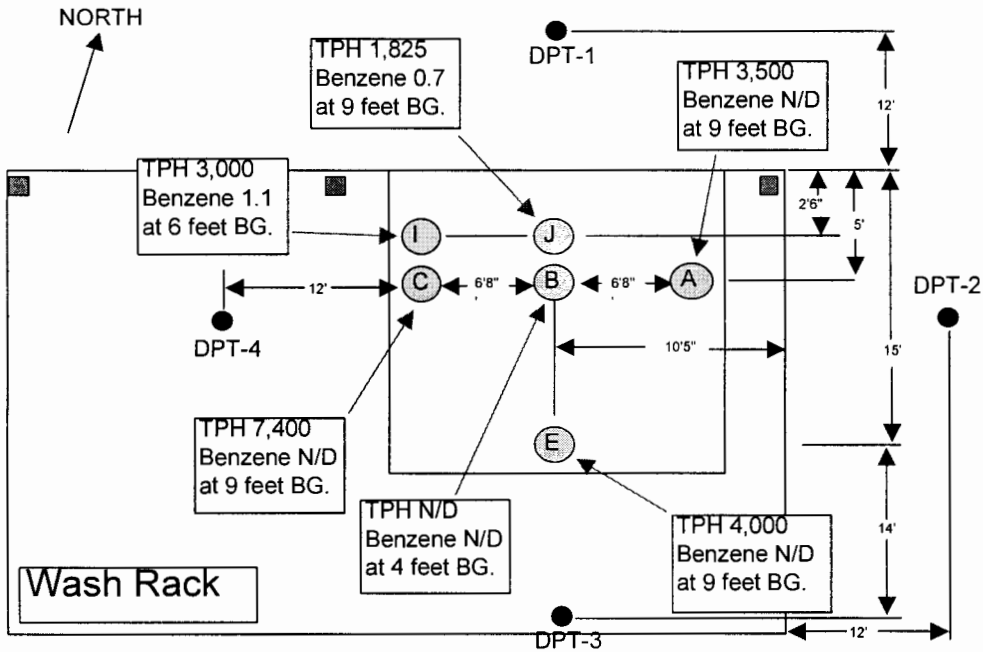
■ Proposed Direct Push  
Soil Boring Location

**Figure 1**

**Holloman Air Force Base  
SWMU 123  
General Site Map with  
Proposed Monitoring Well and  
Boring Locations**

**Not to Scale**  
**02/27/02**

**Figure 2**  
**Proposed Direct Push Soil Sampling Locations**  
**Referenced to Previous Washrack Soil Sampling Locations**



Key

(E) Previous sample location (highest analytical results are in red). Originally provided in the April 27, 1999 report from Foster Wheeler Environmental Corporation. The sample location letter is short for the full sample location number of SWMU123-SB-E.

● Proposed soil sampling location

All concentration units are mg/kg

N/D= Non-Detect

BG= Below Ground Surface