FB-01-007

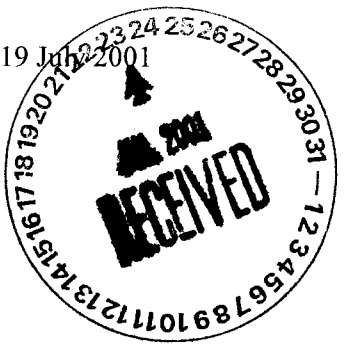
FB01 ENTER

DEPARTMENT OF THE ARMY
HEADQUARTERS, U. S. ARMY AIR DEFENSE ARTILLERY CENTER AND FORT BLISS
1733 PLEASONTON ROAD
FORT BLISS, TEXAS 79916-6816

REPLY TO
ATTENTION OF:

ATZC-DOE (200)

19 July 2001



MEMORANDUM FOR: New Mexico Environmental Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
PO Box 26110
Santa Fe, New Mexico 87505
Attention: Mr. Glenn vonGonten, Program Manager

SUBJECT: RI/FS Work Plan for Three New Mexico Landfills, SWMUs # 18, 27, & 29, EPA/NM RCRA Permit # 4213720101, United States Army Air Defense Artillery Center, and Fort Bliss

1. Attached please find:

   a. *Additional Investigations for FTBL-013/SWMU-18, FTBL-012/SWMU27, FTBL-011/SWMU-29 at Fort Bliss Military Reservation, New Mexico*, Malcolm Pirnie, Inc., July 2001
   b. *RCRA Facility Investigation for Five Solid Waste management Units Fort Bliss, Texas and New Mexico*. Thompson Professional Group, Inc. July 1997
   c. *EPA Region 6 Risk Assessment Program, Human Health Medium – Specific Screening Levels*. USEPA, Region 6 Multimedia Planning and Permitting division, July 12 1999 (in back of reference 1.a. above)
   d. *Historical Review Report*. J.K. Wagner, Inc. August 2000
   e. *Submittal of Final RFI Report for Solid Waste Management Units 19, 25B, 27B, and 76*. Roy .F. Weston, Inc. May 1997
   f. *Subsurface Investigation of the New Mexico Oxidation Lagoons (SWMU Nos*. 19, 25B, and 27B). Tetra Tech EM, Inc. San Francisco, CA, July 1998

2. Together these six documents make up the work plan to complete the investigation of the three New Mexico Fort Bliss Range Camp Landfills. The fourth landfill, FTBL-014, SWMU 25, is not part of this package as it is not part of the Installation Restoration Program as are the first three. It is anticipated however, that the final approved version of this work plan will be used as a pattern by the Solid Waste Program Manager, Directorate Of Environment, Fort Bliss to complete the investigation of SWMU 25. The work on SWMU 25 is contingent of course on future funding and priority ranking of non- IRP environmental projects.

3. It is our intention to brief the highlights of this work plan to you at our Tuesday, 24 July 2001 meeting. We feel this is reasonable as the work plan activities and design has been discussed with you at several previous meeting.

4. If you have any questions please contact me at 915-568-7979. I have taken the liberty to include a hard copy of the approved FY 01 Installation Action Plan (which is stuck loose in the back of reference 1.a above.

Sincerely,

David Dodge
Engineering and Environment, Inc.
IRP Project Manager
Directorate of Environment
Fort Bliss, Texas

Cf: Robert Lenhart, COTR
Steve Petersen, Malcolm Pirnie

ADDITIONAL INVESTIGATIONS

For

FTBL-013/SWMU-18
FTBL-012/SWMU-27
FTBL-011/SWMU-29

At

FORT BLISS MILITARY RESERVATION
NEW MEXICO

July 2001

Malcolm Pirnie, Inc.

MALCOLM PIRNIE

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FIGURES

TABLES

ACRONYMS

ASTM	American Society for Testing and Materials
bgs	below ground surface
DOT	Department of Transportation
EMI	electromagnetic induction
EPA	Environmental Protection Agency
FTBL	Fort Bliss Landfill
GPS	Global Positioning System
HRMB	Hazardous and Radioactive Materials Bureau
HSA	Hollow Stem Auger
IDW	Investigation Derived Wastes
IT	The IT Group
JKW	Janet K. Wagner, Inc.
MPI	Malcolm Pirnie, Inc.
NFA	No Further Action
NMED	New Mexico Environment Department
OVM	Organic Vapor Meter
PPE	Personal Protective Equipment
RBSL	Risk Based Screening Level
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SSHSP	Site Specific Health and Safety Plan
SWMU	Solid Waste Management Unit
TPG	Thompson Professional Group, Inc.
USACE	U.S. Army Corps of Engineers
UXO	Unexploded Ordnance

CHEMICAL CONSTITUENTS

BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
DRO	Diesel Range Organics
PCBs	Polychlorinated Biphenyls
SVOCs	Semi-volatile Organic Compounds
TPH	Total Petroleum Hydrocarbons
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION

Malcolm Pirnie, Inc. (MPI) has been retained by the United States Army Corps of Engineers (USACE), Fort Worth District, under contract number DACA63-97-D-0042 to collect additional site-specific data for three inactive rubble pits located at the Fort Bliss Military Reservation in New Mexico. The three sites are listed as Fort Bliss Landfills/Solid Waste Management Units (FTBLs/SWMUs) under the Fort Bliss Military Reservation, Resource Conservation and Recovery Act (RCRA) permit. The additional data collected will be used to support closure for the FTBLs/SWMUs under the Hazardous and Radioactive Materials Bureau (HRMB) of the New Mexico Environment Department (NMED). The three rubble pit/landfills are currently listed as "active" under the permit, but may actually qualify as small municipal landfills and/or rubble pits. The three FTBLs/SWMUs of interest are FTBL-013/SWMU-18, FTBL-012/SWMU-27, and FTBL-011/SWMU-29. If it can be demonstrated that historical use of the three FTBLs/SWMUs has not resulted in a release of hazardous constituents, NMED may grant a No Further Action (NFA) closure for each of these FTBLs/SWMUs and allow for additional actions to be undertaken according to municipal solid waste landfill rules.

Thompson Professional Group, Inc. (TPG) performed RCRA Facility Investigations (RFI) at five sites in 1997 under contract with the USACE (contract number DACA63-94-D-0009). The activities were documented by TPG in a report dated July 3, 1997. The report is presented in Appendix A. Two of the sites investigated were FTBL-013/SWMU-18 and FTBL-012/SWMU-27. Three other sites investigated by TPG in 1997 are not part of this work plan, and will be addressed by Fort Bliss at a later date. A summary of sampling conducted by TPG is presented in Table 1. The objective of the TPG investigation was to reasonably determine whether hazardous waste and/or hazardous constituents have been released to the environment at any of the sites, and if so, to evaluate the nature and extent of that contamination, and to assess the potential risk posed by such contamination to the public health and to the environment. Observation trenches were dug at each FTBL/SWMU to confirm waste type, and a series of soil borings were drilled to assess potential impacts to the underlying soils. No release to the

environment has been documented that poses a threat to human health or the environment.

The work performed by TPG will be used in conjunction with the work proposed in this workplan to make a final determination whether historical use of these FTBLs/SWMUs has impacted the environment and, if so, to what extent. This workplan provides a detailed sampling and analysis plan.

1.1 Project Objectives

To obtain a NFA permit closure (RCRA closure), NMED requested a demonstration that hazardous constituents have not impacted the underlying soil and that groundwater is not threatened by the presence of the rubble pit/landfill. NMED has also requested that, if hazardous constituents are detected, that the reported concentrations be compared to the EPA's Region 6 Risk Based Screening Levels (RBSLs) to determine if a threat to human health exists. The overall project objective is summarized below:

- To determine whether hazardous constituents have been released into the environment. If so, to determine what extent these constituents have been released and to determine if the concentrations are above or below the EPA's Region 6 RBSLs.

1.2 Proposed Scope of Work

To meet the above stated objectives, the following Scope of Work is proposed:

- Conduct a geophysical survey of FTBL-011/SWMU-29 to confirm the shape and dimensions of the landfill.

- Excavate an observation trench at FTBL-011/SWMU-29 to inspect and categorize the trench cover and buried waste materials. The visual inspection of the waste materials is intended to provide visible indication on whether hazardous materials are present in the landfill and to document the constituents of the waste.

- Drill additional soil borings at each FTBL/SWMU to determine whether hazardous constituents, as defined by RCRA, have been released. Soil samples will be collected from selected soil borings for chemical characterization.

- Collect soil samples to confirm the presence and thickness of an underlying clay unit sufficient to block further vertical migration of leachate, and to assess whether groundwater exists. These soil samples will be submitted to a geotechnical laboratory for analyses.

- Evaluate any constituents detected above the laboratory detection limit using the EPA Region 6 RBSLs to determine whether the detected constituents are considered harmful to human health. Copies of the standards are submitted as Appendix B.

- Submit an assessment report of the results.

2.0 BACKGROUND INFORMATION

2.1 Site Description

The three FTBLs/SWMUs to be investigated are located on two separate range camps at the Fort Bliss Military Reservation, as depicted on Figure 1. FTBL-013/SWMU-18 is located in the McGregor Range Camp area; FTBL-012/SWMU-27 and FTBL-011/SWMU-29 are located in the Doña Ana Range Camp area. A conceptual model of the FTBLs/SWMUs is provided in Section 3.0.

2.2 Site History and Historical Review

Janet K. Wagner, Inc. (JKW) was contracted by MPI to perform a review of historical records, in an effort to determine the FTBL/SWMU dimensions, dates of use, and sources and types of waste. The purpose of the review was to determine whether the type and volume of waste disposed were consistent with current NMED criteria for small municipal waste landfills. The review consisted of locating and reviewing engineering drawings of each FTBL/SWMU, contacting subcontractors who have performed work at each FTBL/SWMU, and a review of historical records. The report is attached as Appendix C.

The United States Government and the USACE have used Fort Bliss Military Reservation property in New Mexico since 1911. The U.S. Army utilized the range camp areas for personnel training and other defense purposes. As a result of the daily operation and personnel occupancy, the FTBLs/SWMUs were constructed as disposal facilities for

solid waste, sanitary waste, rubble, and other waste generated by the Army personnel, maintenance, and various operations.

2.3 Summary of Key Data Identified by JKW and MPI

Burning of waste occasionally occurred at FTBL-013/SWMU-18, FTBL-012/SWMU-27, and FTBL-011/SWMU-29. Waste generated at the field locations is now collected and disposed of in the official Fort Bliss Sanitary Landfill located north of the main cantonment area within the State of Texas.

McGregor Range Camp FTBL-013/SWMU-18

This camp was opened in 1962, and the FTBL/SWMU may have been built around the same time. This landfill could contain as many as ten pits/trenches. The last trench at this location measured approximately 180 feet by 22 feet by 20 feet deep, with approximately 900 cubic yards of waste material. The maximum landfill depth, given by TPG, is 35 feet. FTBL-013/SWMU-18 is shown in Figure2.

Doña Ana Range Camp FTBL-012/SWMU-27

This landfill commenced operation in 1968. The most recent trench with a dimension of 180 feet by 22 feet by 15 feet deep and contained 707 cubic yards of waste. The maximum landfill depth, given by TPG, is 25 feet. FTBL-012/SWMU-27 is shown in Figure 3.

Doña Ana Range Camp FTBL-011/SWMU-29

Based on literature review and aerial photograph analysis, JKW determined that the facility originally described by TPG as FTBL-011/SWMU-29 was actually a construction debris site from the 1960s.

In October 2000, JKW identified the location of the original landfill (Figure 4) and MPI collected three soil samples, two from the suspected landfill (LF-1 and LF-2) and one from the surface burn area. The samples were analyzed for total petroleum hydrocarbons, polynuclear aromatic hydrocarbons, volatile organic compounds, and total

metals. Lead was detected in samples LF-1 and LF-2 at 488 mg/kg and 465 mg/kg respectively. JKW's research indicated that FTBL-011/SWMU-29 was initially constructed in 1911 and closed in the early 40's.

In April 2001, MPI performed field reconnaissance and plotted the probable location of FTBL-011/SWMU-29 on a color infrared aerial photograph. Figure 5 shows the location and a conceptual sketch of the landfill shape. The sampling locations are also identified on Figure 5, along with global positioning system (GPS) coordinates.

2.4 Chronology of Events

The following is a chronology of events for the FTBLs/SWMUs addressed in this Workplan:

July 1995	Fort Bliss obtains RCRA permit.
Dec 1996	Roy F. Weston, Inc. conducted a RCRA Facility Investigation to determine background conditions. The samples were analyzed for VOCs, SVOCs, pesticides, PCBs, RCRA metals, DRO-TPH, and nitrate. The report is attached as Appendix D.
July 1997	TPG conducted a RCRA Facility Investigation of five FTBLs/SWMUs, including FTBL-12 and FTBL-13. TPG could not locate the actual FTBL-11.
May 2000	Meeting of MPI, Fort Bliss, USACE, and NMED representatives to develop a closure strategy for three FTBLs/SWMUs. This Workplan reflects the agreement reached in the meeting.
Oct 2000	SWMU 29 FTBL-011 correctly located and soil samples collected.
April 2001	SWMU 29 FTBL-011 mapped.

3.0 CONCEPTUAL MODEL

Geologically, the Fort Bliss Military Reservation is located within the Tularosa and Hueco Basins of the New Mexico Highland section of the Basin and Range province.

The Sacramento and Hueco Mountains surround the basins to the east and the San Andreas-Organ-Franklin Mountain chain to the west.

The FTBLs/SWMUs to be investigated are located in the basin fill, which is nearly level to gently rolling and comprised of unconsolidated sand, gravel, silt, and clay. It may range in thickness up to eight thousand feet. The upper 40 feet of soils is comprised of dry, unconsolidated silts, clays, and sands with varying amounts of caliche nodules and gravels. Beyond this depth to at least 300 feet below ground surface (bgs) the strata may vary from predominantly sands and gravels with smaller clay units to predominantly clay with smaller sand and gravel units.

Approximately eight inches of rain falls annually at the site and the evaporation rate is 105 inches per year. Therefore, recharge from rainfall is not part of the normal hydrological cycle in the area of the three FTBLs/SWMUs. Recharge occurs along the flanks of the Sacramento Mountains to the east (Tetra Tech, July 1998). The Tetra Tech report is presented as Appendix E.

Tetra Tech EM Inc. conducted a study in 1998 of the subsurface of the oxidation lagoons at the McGregor and Doña Ana Ranges of Fort Bliss. The resulting hydrogeological profile indicates that the moisture content in the vadose zone of the three Range Camps is below saturation levels. Tetra Tech also found that the dry, hard, clayey silts and silty clays of the area prevent infiltration of the lagoons to the regional aquifer.

Since the nearby oxidation lagoons also located at the Range Camps have not affected the regional aquifer, there is little likelihood of constituents in the rubble pits producing a leachate capable of migrating to the regional aquifer since no hydraulic head is expected. Tetra Tech showed that regional groundwater beneath the FTBLs/SWMUs is approximately 340 feet bgs, or greater.

Due to the dry climate and the evaporation rate exceeding the precipitation rate, the material contained within the waste cells is likely to be dry and no leachate is expected. It is also envisioned that the clay layers which exist within the upper 100-feet beneath the

FTBLs/SWMUs are greater than five feet thick and have a vertical permeability of less than 10^{-7} centimeters per second (cm/sec), thus acting as a barrier unit between the FTBL/SWMU and groundwater. Perched groundwater is not expected, but, if present, it would be found above such a clay layer.

This viewpoint is substantiated by a soil boring installed by MPI at the Oil Pits located at Sanitary Landfill Number Two on Fort Bliss property in the El Paso area. This boring was drilled to a depth of 100 feet in an area that historically was a pit filled with fluids. No leachate or perched water was detected in the boring. A clay layer fifteen feet thick was documented.

Perched groundwater was encountered at McGregor Range camp between 50 and 60 feet bgs under the 1.6 million-gallon oxidation lagoon (Tetra Tech, July 1998). No perched groundwater was encountered beneath the Meyers oxidation lagoon located two miles to the south. The U.S. Army encountered the regional aquifer of McGregor Range Camp in the 1950's at 450 feet below grade (Tetra Tech, July 1998). The nearest known extraction point for groundwater used for drinking water is a water utility well located about 8 miles away just south of the New Mexico – Texas border off of McCombs Road.

Disposal practices commonly included burning disposed material prior to placing the cover. This practice further reduces the probability of a leachate forming from landfill materials.

The older trenches were constructed by digging approximately 10 feet bgs into the native ground. Items of waste generated from military operations, or day-to-day activities, were discarded into the unlined, open excavations. Items included inert materials such as metal office furniture, wiring, plastics, metals, glass, and normal trash from barracks and mess halls. Once the items were discarded into the excavation, native soils were placed onto the rubble. This process was repeated until the excavation was filled. If natural obstructions made excavation and backfill difficult, another waste cell was created in a more convenient area.

The conceptual model and the stratigraphies for the FTBLs/SWMUs are presented in Figures 6 and 7. The conceptual model assumes potential ecological receptors at these FTBLs/SWMUs are similar to those observed at the nearby oxidation ponds. This model assumes incomplete pathways for ecological receptors since hazardous constituents, if any, are buried beneath the soil cover. Regarding risk, the conceptual model assumes the following:

- Soil to groundwater is an incomplete pathway.
- The ingestion, inhalation, and dermal contact pathways for landfilled materials to humans are incomplete due to the landfill cover.
- The hazardous constituents, if present, are incidental to the unregulated materials landfilled, and have not resulted in a release.

The conceptual model assumes that if the FTBLs/SWMUs pose no human or ecological threat, they can be reclassified and closed as small municipal landfills.

4.0 FIELD INVESTIGATION METHODOLOGIES

MPI acknowledges the contrast between the TPG and JKW reports as to the size of the rubble pits at the FTBLs/SWMUs. We acknowledge that resolving the matter would require an in-depth and costly analysis that could prove to be of limited value to Fort Bliss or NMED. The field investigation proposed below conservatively assumes the horizontal dimensions established by TPG. Vertical dimensions have been modified per JKW.

4.1 Geophysical Assessment of FTBL-011/SWMU-29 and FTBL-013/SWMU-18

Under subcontract to Malcolm Pirnie, Inc., the IT Group (IT) will conduct a geophysical survey of the suspected landfill area shown on Figure 6 to determine the shape and dimensions of FTBL-011/SWMU-29. Multiple geophysical methods will be employed at FTBL-011/SWMU-29. IT will also conduct a geophysical survey of the landfill at FTBL-013/SWMU-18. These non-invasive methods measure the physical, electrical, and geochemical properties of the soil and rock matrix. By employing multiple methods, the advantages and strengths of each can be used to compensate for the disadvantages and

weaknesses of the others. The different geophysical methods to be used for the site survey investigations include the following:

- EM-31 surveys will be conducted to assess the location and lateral extent of buried non-metallic wastes and disturbed soil areas that represent excavated/backfilled areas. The system operates using electromagnetic induction (EMI) theory in the frequency domain mode. The EM-31 data will be obtained simultaneously with GPS data along traverses spaced five feet apart. A geophysical map (EM-31 data) of the area surveyed will be furnished by IT in a summary report. The map will be constructed in the appropriate coordinate system used by Fort Bliss.

- Electrical resistivity (dipole-dipole) traverses will be conducted over the landfill areas detected in the EM-31 and EM-61 surveys. The purpose of these traverses is to assess the depth of the buried wastes.

Utilizing the data from the geophysical survey, the soil sampling program for FTBL-011/SWMU-29, discussed in the following sections, will be refined.

4.2 Soil Trenching at FTBL-011/SWMU-29

Based on the data gathered from the geophysical investigations described in Section 5.1, a single location will be selected at FTBL-011/SWMU-29 where an observation trench will be excavated into the buried waste to a total anticipated depth of ten feet. This observation trench will be aligned with the short axis of the landfill. The purpose of the trench excavation is to inspect and categorize the trench cover and to profile buried waste materials. The visual inspection of the waste materials is intended to provide information on whether hazardous materials are present in the landfills and to document the constituents of the waste.

Two additional trenches, one at each end, will be excavated in alignment with the long axis of the landfill. These trenches will begin approximately ten feet beyond the maximum extent of the landfill, as shown by the geophysical mapping, and be advanced toward the landfill until the limits of waste have been identified.

The trenches will be excavated with a backhoe in a manner to provide safety from trench wall collapse. Air in the excavation trenches will be continuously monitored with a gas monitor prior to and during inspections. When the excavations have been completed, yellow barrier tape will be placed around the perimeter of the trench to limit access.

The thickness and characteristics of the soil cover, the nature and encountered depths of the waste materials, and the ultimate depth of the waste trench will be recorded in a field notebook, by a Malcolm Pirnie Field Professional. Excavated materials will be piled in mounds at the surface as they are removed from the trench with the backhoe, scanned with the air monitor and an Organic Vapor Meter (OVM) to detect volatile emissions, and inspected by the professional who logged the depths and types of materials removed from the trench.

Following a thorough inspection of the completed excavations and the extracted waste materials stockpiled at the surface, the previously removed contents will be returned to the trench and covered with backfill available at the site. The cover material will be applied in lifts with intermittent compaction provided by the backhoe.

Once the footprint of FTBL 011 has been established, a no-entry perimeter five feet beyond the footprint will be established using stakes and yellow caution tape. The no-entry perimeter will identify the area at FTBL 011 that is off limits to motorized equipment of all types. The purpose of the no-entry zone is to protect the climax vegetation community that Ft Bliss DOE identified as being present the land surface at FTBL 011.

Once trenching has been completed, the depth and lateral extent of the landfill, as determined by trenching, will be compared to the depth and lateral extent of the landfill established by geophysical methods. If the comparison shows a divergence between the two, the scale of the discrepancy will be noted so that the final maps of the landfills can be adjusted accordingly.

4.3 Surveying Services

IT will obtain GPS data for areas of debris, excavation areas, and boring locations at FTBL-011/SWMU-29 simultaneously with geophysical data collection. The GPS data will be obtained in latitude/longitude and will be converted by IT to the appropriate coordinate system to construct the geophysical maps. IT will not obtain GPS information to support design of a cap at FTBL-012/SWMU-27 or FTBL-013/SWMU-18 during this project. Additional survey work will be performed during a subsequent phase of work for these two FTBLs/SWMUs.

Malcolm Pirnie will retain a surveyor to locate landmarks established and soil borings drilled by TPG. Malcolm Pirnie will then mark boring locations with wooden stakes and flagging materials. Prior to drilling at FTBLs-011/SWMU-29, the number and location of borings will be revised by MPI to reflect additional information regarding the landfill boundary obtained during the geophysical assessment.

The surveying subcontractor will identify the latitude, longitude, and elevation of soil boring drilled by Malcolm Pirnies using a GPS unit. The GPS data will be real-time differentially corrected and will be tied to a prominent site feature. Coordinates of the soil borings at FTBL-012/SWMU-27 and FTBL-013/SWMU-18 will be tied to the markings from the previous TPG study, assumed to still be in place. Coordinates of the soil borings at FTBL-011/SWMU-29 will be tied to a fixed landmark. The southwest corner of the substation west of the Doña Ana Range Camp at the head of the Main Tank Road will be used as the reference point, unless a more suitable location landmark is identified during field observations. The GPS data will be obtained in latitude/longitude and will be converted by the surveying subcontractor to the appropriate coordinate system for use by Ft Bliss.

4.4 Soil Boring Nomenclature

The names of the MPI soil borings will follow the method developed in the TPG report. An example of a TPG boring is SB18-1. 'SB' designates a soil boring. The first number, in this case 18, represents the SWMU number. The number after the hyphen designates

the order in which the borings were drilled. Therefore, SB18-1 was the first soil boring drilled at FTBL-013/SWMU-18. The MPI names are modified to distinguish the borings drilled by TPG from those drilled by MPI. For example, the first boring drilled by MPI at FTBL-013/SWMU-18, which will follow the nine previous borings, will be MPSB18-10. The total number of borings and boring names are presented in Table 2.

4.5 Drilling Program

The purpose of the drilling program is to test the conceptual model of the area. Soil samples will be collected from five feet and 15 feet below the base of the landfills and chemically analyzed to determine if hazardous constituents have impacted the underlying soil, and if so, to what extent the soil has been impacted. For planning purposes, MPI has included a 25% contingency for deeper chemical borings, if needed, to obtain a clean total-depth sample.

Two geotechnical soil borings will be drilled, one at FTBL/SWMU-013 and one between FTBL-012/SWMU-27 and FTBL-011/SWMU-29, which are located approximately a half-mile apart. The purposes of the geotechnical borings include confirming the presence of an underlying competent clay unit (greater than five feet thick) and confirming the absence of groundwater above this clay unit.

Soil borings will then be drilled at each of the FTBLs/SWMUs in the locations depicted on Figures 2, 3, and 8. The locations were determined using a 200 foot by 200 foot grid system super imposed over the site maps. Soil boring locations are proposed in those areas that were not investigated by TPG, including the entirety of FTBL-011/SWMU-29. Soil borings will be drilled adjacent to the debris areas, not through the debris areas. The total number of soil borings is presented and depths to be drilled are summarized in Table 3. The number and location of borings at FTBL-011/SWMU-29 will be revised by MPI to reflect additional information regarding the landfill boundaries obtained during the geophysical assessment. 50% of these environmental borings will be continuously cored.

Two drill rigs will be mobilized. Two MPI employees will be on-site and will describe the sediment encountered and collect samples.

The geotechnical borings will be terminated five feet into the underlying clay unit, which is expected around 65 feet bgs in McGregor, and 100 feet bgs in Doña Ana. The geotechnical borings will be cored continuously and drilled first to provide a stratigraphic profile of native sediments at each FTBL/SWMU. The borings will be advanced with a 4.25-inch inside-diameter hollow-stem auger (HSA), if possible. If the subsurface soils prevent borehole advancement by hollow-stem auger methods, alternative methods, such as air or mud rotary, may be required.

4.5.1 McGregor Range (FTBL-013/SWMU-18)

Eleven soil borings are proposed at the McGregor Range FTBL-013/SWMU-18 (refer to Figure 2). Two of the borings (MPSB18-12 and MPSB18-13) will flank the northernmost area possibly disseminated with debris. The new data collected from the proposed borings will be used with the data from two previously drilled borings to delineate the area of debris. Four soil borings (MPSB18-10, MPSB18-11, MPSB18-14, and MPSB18-15) are proposed to characterize the soil near three small areas of debris. Data from three soil borings (MPSB18-16, MPSB18-17, and MPSB18-18) will be combined with data from four previously drilled borings to characterize two oblong trenches in the middle of the FTBL 013/SWMU 18. Two borings (MPSB18-19 and MPSB18-20) are proposed along the western edge of the southernmost area possibly disseminated with debris. The eastern edge of this area has been characterized with a previously drilled boring. Boring MPSB18-11 will be drilled to the first clay unit, which is estimated to be 65 feet bgs. The soil samples from MPSB18-11 will be analyzed for geotechnical properties as well as chemical constituents.

4.5.2 Doña Ana Range (FTBL-012/SWMU-27)

Nine soil borings are proposed at the Doña Ana Range FTBL-012/SWMU-27 (refer to Figure 3). Two soil borings (MPSB27-9 and MPSB27-10) will augment previous soil borings in characterizing the easternmost area of debris. Five soil borings (MPSB27-11,

MPSB27-12, MPSB27-13, MPSB27-16, and MPSB27-17) will characterize the southernmost debris trench. The other samples (MPSB27-14 and MPSB27-15) will assist in characterizing other areas of debris. Boring MPSB27-17 will be drilled to the first clay unit, which is estimated to be 100 feet bgs. The soil samples from MPSB27-17 will be analyzed for both geotechnical properties and chemical constituents.

4.5.3 Doña Ana Range (FTBL-011/SWMU-29)

Nine soil borings will be drilled at the Doña Ana Range FTBL-011/SWMU-29. Four borings (MPSB29-1 through MPSB29-4) will be drilled on the west side of the suspected landfill, and four borings (MPSB29-5 through MPSB29-8) will be drilled on the east side of the suspected landfill. The borings will be spaced at approximately even intervals. The number and location of the borings shown on Figure 8 will be revised by MPI to reflect information regarding the landfill boundaries obtained during the geophysical assessment; however, no more than eight borings will be collected from the landfill perimeter. An additional soil boring (MPSB29-9) will be collected from within the mound north of the suspected landfill to profile this material for possible reuse as cover materials. Boring MPSB29-1 will be drilled to the first substantial clay unit (greater than five feet thick), which is expected at 100 feet bgs. Soil collected from MPSB29-1 and MPSB29-9 will undergo both geotechnical and chemical analysis.

4.6 Soil Sampling for Geotechnical Analyses

Two soil borings will be used for both geotechnical and chemical analyses. These borings are MPSB18-11 and MPSB27-17. The borings will be advanced into the first competent (five-foot) clay unit. The first clay unit is anticipated to be at 65 feet bgs for MPSB18-11. The clay unit is expected at 100 feet bgs for MPSB27-17 and MPSB29-1. A Shelby tube will be pushed at least five feet into the clay. The soil sample will be extruded in the field and wrapped in cellophane, followed by foil.

The borehole will be advanced using a 4.25-inch inside diameter rotary flight HSA auger sampled on five-foot centers with a two-foot long split spoon sampler. Soil samples will be collected at five feet and 15 feet below the base of the landfill for chemical analysis

(refer to Section 5.7 for details). Soil samples will be retained every five feet in glass jars for OVM readings and core description purposes.

Two near-surface soil samples will be collected at each FTBL/SWMU. One sample wiil be collected as a bulk sample from near-surface native material. An auger will be advanced to a depth of five feet and the soil will collected in a bucket and submitted to a geotechnical laboratory for particle size testing (ASTM D422-63), Atterberg Limits (ASTM 4318), and modified proctor testing (ASTM D1557). The second sample will be collected with a two-foot Shelby tube at each FTBL/SWMU from the cap and will be wrapped in cellophane and foil and sent to the geotechnical laboratory for particle size testing (ASTM D422-63), Atterberg Limits (ASTM 4318), and falling head permeability tests (ASTM D5084). Please see Table 4 for additional geotechnical testing information.

4.6.1 Geotechnical Analyses at McGregor Range

The clay unit in the McGregor area is expected to exist at 65 feet bgs; therefore, MPSB18-11 is expected to be terminated at 70 feet. Starting at 45 feet bgs, this borings will be advanced continuously using a split spoon sampler to collect the soil samples. OVM readings will be taken with every soil sample. Up to three samples will be collected for analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX) and diesel range organics/total petroleum hydrocarbons (DRO-TPH.. When a sampler is pushed through more than one foot of clay, it will be assumed the clay is part of the substantial clay unit. Up to four feet of clay samples will be collected with a two-foot Shelby tube to confirm that the clay unit is greater than five feet thick. If the clay unit is found to be less than three feet thick, the boring will continue to be advanced on five-foot centers, until another clay unit is encountered. If another clay unit is not encountered within the following 50 feet, the boring will be terminated.

The clay samples will be carefully extracted from the Shelby tube and the clay content will be estimated in the field. The samples will then be wrapped in cellophane and foil and sent to the geotechnical laboratory for particle size testing (ASTM D422-63), Atterberg Limits (ASTM 4318), and falling head permeability tests (ASTM D5084). The

objective of these geotechnical tests is to determine if the clay unit underlying the landfills is of sufficient impermeability to act as an aquiclude and thereby limit the vertical migration of possible chemicals of concern.

Soil samples for chemical analyses will be collected from this Boring at five feet and 15 feet below the bottom of the landfill in accordance with Section 4.7.

4.6.2 Geotechnical Analyses at Doña Ana Range

The clay unit in the Doña Ana area is expected to exist at 100 feet bgs; therefore, MPSB27-17 will be terminated at approximately105 feet. This boring will be drilled in a similar fashion as the other geotechnical boring. The borehole will also be sampled on five-foot centers with a split spoon sampler to 100 feet bgs. Samples will be collected every five feet in glass jars for organic vapor meter (OVM) readings and sedimentological evaluation. Starting at 100 feet bgs soil samples will be collected continuously with the split spoon sampler. OVM readings and sedimentological evaluation will be conducted with every soil sample. Up to three samples with OVM readings over zero will be collected for analysis of BTEX and DRO-TPH. When more than one foot of clay is collected, the procedures will follow the method employed for the geotechnical boring at FTBL-013/SWMU-18. If the clay unit is found to be less than three feet thick, the boring will continue to be advanced on five-foot centers, until another clay unit is encountered. If another clay unit is not encountered within 25 feet the boring will be terminated.

The clay samples will be carefully extracted from the Shelby tube and the clay content will be estimated in the field. The samples will then be wrapped in cellophane and foil and sent to the geotechnical laboratory for particle size testing (ASTM D422-63), Atterberg Limits (ASTM 4318), and falling head permeability tests (ASTM D5084). The objective of these geotechnical tests is to determine if the clay unit underlying the landfills is of sufficient thickness and impermeability to act as an aquiclude and thereby limit the vertical migration of possible chemicals of concern.

Soil samples for chemical analysis will be collected from these Borings at five feet and 15 feet below the bottom of the landfill in accordance with Section 4.7.

4.7 Soil Sampling for Chemical Analyses

Soil samples collected during the TPG investigation contained toluene. TPG also noted an oily, organic compound at one location in one rubble pit. Benzene can be used as an indicator for other VOCs that undergo similar fate and transport mechanisms. DRO-TPH can be used as an indicator for petroleum hydrocarbons found in oily organic compounds. Based on these previous results and conclusions, selected samples will be collected and analyzed for BTEX and DRO-TPH. A simplified sampling schematic is presented in Figure 9.

4.7.1 Sampling at Five Feet Below Base

At approximately five feet below the estimated base of the landfill, a soil sample will be collected and screened for VOCs using a OVM. The OVM reading will be recorded in the field notebook. Soil samples will be collected and analyzed for BTEX and DRO-TPH in the on-site mobile laboratory using standard SW-846 protocols. In addition, enough soil will be collected in laboratory-supplied jars for potential full-suite analysis. Full-suite analysis will include testing for VOCs, SVOCs, RCRA-8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), pesticides, herbicides, and PCBs.

4.7.2 Sampling at Ten Feet Below Base

The boring will continue to be advanced to approximately 10 feet below the estimated base of the landfill. A soil sample will be collected and screened for VOCs using a OVM. The OVM reading will be recorded in the field notebook. In addition, enough soil will be collected in laboratory-supplied jars for potential BTEX and DRO-TPH analysis as well as potential full-suite analysis.

4.7.3 Sampling at Fifteen Feet Below Base

The boring will continue to be advanced to approximately 15 feet below the estimated base of the landfill. A soil sample will be collected and screened for VOCs using a OVM. The OVM reading will be recorded in the field notebook. Soil samples will be collected and analyzed for BTEX and DRO-TPH in the on-site mobile laboratory using standard SW-846 protocols. In addition, enough soil will be collected in laboratory-supplied jars for potential full-suite analysis.

If neither the OVM readings nor the results of the BTEX and DRO-TPH analytical tests indicate a detection, the drilling at this sampling location will terminate. This depth will be referred to as "total-depth." Once the total-depth sample is confirmed as clean (i.e., non-detect), the boring will be properly abandoned by applying cement-bentonite grout through the augers as they are extracted from the borehole.

4.7.4 Sampling at Greater than Fifteen Feet Below Base

Based on the conceptual model (refer to Figures 6 and7), MPI believes that chemical constituents from the landfill, should they be present, would not be detected more than 15 feet below the base of the landfill. However, if either the OVM readings or results of the BTEX or DRO-TPH analytical tests indicate a detection at 15 feet below the base of the landfill, than the boring will be advanced further. The boring will be advanced in approximately 5-foot increments, under the direction of the project manager. At each increment, a soil sample will be collected, screened for VOCs using a OVM, and analyzed for BTEX and DRO-TPH in the on-site mobile laboratory using standard SW-846 protocols. The OVM reading will be recorded in the field notebook. In addition, enough soil will be collected in laboratory-supplied jars for potential full-suite analysis.

The drilling will terminate at the depth at which neither the OVM readings nor the results of the BTEX and DRO-TPH analytical tests indicate a detection. This depth will be referred to as "total-depth." This scope of work incorporates a 25% contingency for drilling beyond the proposed total depth of 15 feet below the base of the landfill. Once the total-depth sample is confirmed as clean (i.e., non-detect), the boring will be properly

abandoned by applying pressurized cement-bentonite grout through the augers as they are extracted from the borehole.

4.7.5 Additional BTEX and DRO-TPH Analyses

After each boring is completed, the OVM readings from each sampling depth will be compared. The sample corresponding to the highest OVM reading will be tested for BTEX and DRO-TPH at the on-site mobile laboratory using standard SW-846 protocols. If the OVM reading recorded at five feet below the estimated base of the landfill is the highest OVM reading, then no additional BTEX and DRO-TPH analyses will be conducted. This is because all samples collected at five feet below the estimated base of the landfill are analyzed for BTEX and DRO-TPH, regardless of their OVM reading. For planning purposes, it is assumed that 25% of the borings will meet the criteria for an additional BTEX and DRO-TPH sample analyses; the actual number may be higher or lower.

4.7.6 Full-Suite Analyses

Forty percent of the total-depth soil samples at each FTBL/SWMU will be analyzed for the full-suite of parameters. The location of these borings is based on achieving a balanced geographic distribution and is detailed in Table 5. When the selection of one boring among several that are geographically clustered together is permitted, MPI personnel will select the boring for full-suite analysis based on a consideration of OVM readings, BTEX and DRO-TPH results, and other relevant field observations.

Analysis of samples at the total-depth is intended to demonstrate that contaminants are not migrating downwards (i.e., for groundwater protection). However, samples may also be analyzed for the full-suite of parameters at a shallower depth, if warranted. If any OVM readings are greater than 250 ppm, those soil samples will also undergo full-suite analysis, under the following stipulations:

(1) No more than 20% of the samples selected for the full-suite of parameters may be selected from a shallower depth, and

(2) No more than one depth per boring is to be analyzed for the full-suite of parameters.

The soil samples selected for full-suite analyses will be sent to the Chemron Laboratories, as discussed in Section 4.8. Full-suite analysis includes testing for Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), RCRA-8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), pesticides, herbicides, and PCBs.

4.8 General Sampling Protocol

Soil samples collected for potential full-suite analysis will be collected in laboratory-supplied glass jars, labeled, and stored on ice to maintain a temperature of 4 C. Sample jars will be labeled with the following information:

- Date and time of soil collection,
- Initials of person collecting sample,
- Boring name,
- Sample collection depth,
- Analyses required, and
- Sample matrix (e.g., soil sample).

Samples not undergoing full-suite analysis will be disposed of with the soil cuttings, as described in Section 4.11.1. Samples undergoing full-suite analysis will be transported to the Range Camp cold storage at the end of the drilling day. These samples will be shipped in coolers by a courier for next-day delivery to Chemron Laboratories, located in San Antonio, Texas. Chain-of-custody forms will be completed with the same information as recorded on the sample jar label. The original chain-of-custody forms will accompany the samples to the laboratory, and carbon copies will be kept by MPI. Table 6 summarizes the chemical analyses to be performed at each FTBL/SWMU and the applicable method numbers.

The laboratory will be notified of the estimated number of samples each day samples are shipped. If samples are shipped on a Friday, assurance will be obtained from the

laboratory that personnel will be available to receive the shipment on Saturday. Standard turnaround time will be requested for laboratory analyses.

4.9 Quality Assurance / Quality Control

Quality assurance samples will also be collected and analyzed. Ten percent of the soil samples for full-suite analysis will be collected in duplicate and sent to Severn Trent Laboratories. Ten percent of the soil samples for BTEX and DRO-TPH will be collected in duplicate and analyzed by the on-site mobile laboratory. Quality control samples analyzed at the on-site mobile laboratory will be treated as blind duplicates (i.e., labeled with a false boring location number).

Laboratory analyses will be performed in accordance with EM200-1-6 (Chemical Quality Assurance for HTRW – October 1997) and EPA standard operating procedures. Chemron Laboratories and Severn Trent Laboratories will prepare Level III reports. The Level III reports will include the case narrative, field sample results, quality control sample results, and matrix spikes.

A Chemical Quality Summary Report will be prepared.

4.10 Decontamination Procedures

The boring equipment will be decontaminated after each borehole is drilled to prevent cross-contamination between bored holes. The sampling equipment will be decontaminated after each sample is collected to prevent cross contamination between sampling intervals. Decontamination will include washing of equipment and washing or changing of PPE (e.g., gloves). Equipment washing will be followed by a final rinse with distilled water. Decontamination water will be contained and disposed of as discussed in Section 4.11.2.

4.11 Investigation Derived Waste

Investigation derived wastes (IDW) will be properly collected, stored, labeled, and profiled. IDW will include soil cuttings, decontamination water, and PPE. Solid IDW

and liquid IDW will be kept separated. Malcolm Pirnie will arrange for and oversee the disposal of IDW

4.11.1 Soil Cuttings

Drill cuttings will be stockpiled on and encapsulated in a 6 mil. sheet of polyethylene and placed in a designated area at each FTBL/SWMU. One composite stockpile soil sample from each FTBL/SWMU will be collected for BTEX, DRO-TPH, reactivity, corrosiveness, ignitability, and toxicity. Samples will be analyzed by Chemron Laboratories. Sample storage, labeling, and chain-of-custody procedures will be the same as described in Section 4.8.

Disposal will be based on the constituents detected in the stockpiled soil sample. If there are no detections, the stockpiled soil will be spread on the ground. If there are detections, the stockpiled soil will be disposed of in accordance with state and federal regulations at a facility permitted to accept the waste. Disposal manifests will be prepared by MPI and signed by Fort Bliss personnel.

4.11.2 Decontamination Water

Wash waters generated from the equipment decontamination process, if any, will be collected and contained in Department of Transportation (DOT) approved 55-gallon steel drums at each FTBL/SWMU. The drums will be staged on wooden pallets in a designated location. The drums will be labeled to indicate the contents and dates the wastes were generated.

One composite decontamination water sample from each FTBL/SWMU will be collected for VOCs, SVOCs, RCRA-8 metals, pesticides, herbicides, PCBs, BTEX, and DRO-TPH. Samples will be analyzed by Chemron Laboratories. Sample storage, labeling, and chain-of-custody procedures will be the same as described in Section 4.8.

If no hazardous constituents are detected in the drummed water, it will be discharged to the ground after first receiving approval from NMED. If constituents are detected, it will

be disposed of in accordance with state and federal regulations at a facility permitted to accept the waste. Disposal manifests will be prepared by MPI and signed by Fort Bliss personnel. The past experience of MPI at Fort Bliss suggests that analytical data will demonstrate that the drummed water can be discharged to the ground.

4.11.3 Other Wastes

Other investigation waste, including disposable PPE, will be generated. The PPE will be decontaminated by washing off the surface contamination. It will then be disposed of as municipal solid waste. If hazardous constituents are suspected, the material will be collected and stored in Department of Transportation (DOT) approved 55-gallon steel drums. The drums will be labeled to indicate the contents and dates the wastes were generated. Drums will be closed when not being filled. The waste will be disposed of in accordance with state and federal regulations at a facility permitted to accept the waste. Disposal manifests will be prepared by MPI and signed by Fort Bliss personnel.

5.0 HEALTH AND SAFETY REQUIREMENTS

MPI will develop a Site Specific Health and Safety Plan (SSHSP) to be followed during the field investigations of the Fort Bliss FTBLs/SWMUs. The SSHSP will include EM-385-1-1 (September 1996) and will be developed based on existing information and the findings of the historical review. Elements of the SSHSP will include information regarding chemicals of concern, environmental monitoring procedures to be implemented, personal protective equipment (PPE), hospital location, hospital phone number, and MPI's Health and Safety officer and contact personnel.

According to Fort Bliss, it is highly unlikely that unexploded ordnance will be encountered because the pits were not used for ordnance testing. Unexpended munitions, however, may have been disposed in the rubble pits. TPG encountered 40-millimeter casings with intact primers in one of the excavations at Doña Ana (FTBL-012/SWMW-27). On the other hand, JKW reports that waste disposed in the rubble pits was routinely burned. Since drilling will occur adjacent to the FTBLs/SWMUs, and not into the FTBLs/SWMUs, intact munitions, if any, should not be an issue. As a safety

precaution, if during drilling the cuttings include landfill material, borehole advancement will be terminated and the borehole will be properly abandoned. A new boring will then be drilled three feet away from the original location, in a radial direction away from the landfill footprint.

Prior to initiating the trench excavation at FTBL-011/SWMU-29, the site will be surveyed by qualified unexploded ordnance (UXO) personnel, supplied by IT, to determine the presence of any unexploded or unexpended ordnance. The UXO team will remain at the site for the duration of the excavation to detect any buried munitions that might be present in the waste materials. Air monitoring of the excavation for combustible gases and volatile organic compounds (VOCs) is to be conducted continuously as the digging progresses.

6.0 PROJECT DELIVERABLES

Malcolm Pirnie will prepare a report that reviews data accumulated previously and documents field activities and results obtained during the current investigation. The report will be compiled upon completion of the field activities and receipt of the analytical results. The report will characterize the waste disposed in FTBL-011/SWMU-29; interpret the geophysical results obtained for FTBL-011/SWMU-29; present the results of the drilling activities; an interpretation of the local geology at FTBL-011/SWMU-29, FTBL-012/SWMU-27, and FTBL-013/SWMU-18; an interpretation of the chemical analyses conducted for this study and previous studies; and conclusions. The report will include summary tables of the chemical analyses from this investigation as well as previous investigations. The appendices of the report will include drilling logs, surveyed drawings of the boring locations, the laboratory results, and chain-of-custody forms.

At the present time the three FTBLs are listed as active Solid Waste Management Units (SWMUS) on Table A1, Module 4, of the Ft Bliss RCRA permit (EPA ID # NM # 4213720101). If available data indicate that hazardous constituents have not been released to the environment, the report will include a section that demonstrates that the

three FTBLs should be deleted from Table A1, Module 4, and entered on the Table A2, Module 4, with the notation that no further action (NFA) is required. Malcolm Pirnie anticipates that Ft Bliss will be able to petition for NFA status under New Mexico Criterion No. 5, which states:

> *"The Solid Waste Management Unit or Area of Concern has been characterized or remediated in accordance with applicable state or federal regulations and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use."*

If it is possible to obtain a NFA status for the three FTBLs, with respect to RCRA, the report will also include a section on how the three FTBLs can and should be managed as small municipal landfills under the New Mexico solid waste regulations. This section will include a demonstration that the three FTBLs qualify for the small landfill exemption, which will preclude the installation of groundwater monitoring wells.

On the other hand, if available data indicate that hazardous constituents have been released to the environment, the three FTBLs will remain on Table A1, Module 4, of the RCRA permit. The future course of action in this case would include a Corrective Measures Study and subsequent corrective action.

An initial draft report will be submitted to Fort Bliss and Ft Worth for review. After Malcolm Pirnie had incorporated Ft Bliss and Ft Worth comments, an interim draft report will be submitted to NMED for review and comment. Four copies of the final report will be submitted to Ft Bliss after NMED comments have been incorporated.

7.0 DATA MANAGEMENT PLAN

7.1 Field Data

MPI will maintain all field notes in a dedicated, bound notebook with water-resistant pages. A daily log of the field activities will be recorded in the field notebook with indelible ink. Each page will be dated and initialed by the MPI field representative responsible for the daily activities. The following information will be recorded in the field notebook:

- Name and location of site,
- Date and time of arrival and departure,
- Personnel working on-site,
- Weather conditions on day of sampling,
- Date and time of health and safety meeting,
- Personnel attending health and safety meeting,
- Date and time of sample collection and sample identification numbers,
- OVM measurements,
- Tracking numbers of coolers shipped to laboratory, and
- Any additional pertinent field observations.

In addition to the field notebook, boring logs will be generated during drilling. The boring logs will contain both sedimentological and field screening information and will be generated in the field. The boring logs will be generated on standard MPI boring log forms and will be maintained in a three ring binder. At minimum, the following information will be recorded in the boring logs:

- Drilling subcontractor,
- Name of driller,
- Name of MPI geologist preparing the boring logs,
- Date of boring initiation and completion,
- Type of rig used to drill the boring,
- Type of drilling equipment used,
- Sampling device used to collect each soil sample,
- Soil sample intervals,
- OVM measurements,
- Soil description,
- Total depth of boring, and
- Materials used to abandon boring.

7.2 Electronic Data

Appropriate field data and analytical results will be entered into Microsoft Excel spreadsheets. Electronic files, including reports, figures, and correspondence, will be maintained in the MPI projects directory on the Houston server. The projects directory is backed-up daily onto magnetic tape.

7.3 Central Filing System

The field notebook, the original field boring logs, all correspondence, and original copies of documents will be maintained in the MPI Houston office, central filing system. The file nomenclature will consist of the project number followed by an alphabetical listing as shown below:

- 0285-863 A Proposal/Contract Documents
- 0285-863 B Billing Documents
  - B.1 Billing Documents to Client
  - B.2 Billing Documents from Subcontractors/Vendors
- 0285-863 C Correspondence
  - C.1 Correspondence with Client
  - C.2 Correspondence with Regulatory Agencies
  - C.3 Correspondence with Subcontractors/Vendors
  - C.4 Interoffice Correspondence
- 0285-863 D Design Notes/Calculations
- 0285-863 E Meeting Agendas, Minutes, Notes
- 0285-863 F Progress Reports
- 0285-863 G Project Administration
- 0285-863 H Reference Documents
- 0285-863 I Documents Prepared by Malcolm Pirnie
  - I.1 Originals
  - I.2 Copies
- 0285-863 J Field Data
- 0285-863 K Specifications
- 0285-863 L Analytical Results

The files will be maintained in the Houston office throughout the duration of the project. Once the project has been completed, the files will be archived by Iron Mountain in Houston, Texas.

8.0 SCHEDULE

Development of the Site Specific Health and Safety Plan (SSHSP) and contracting activities with MPI subcontractors (geophysical assessor/surveyor, drilling company, and laboratory) will begin upon authorization to proceed is received. It is anticipated that the SSHSP will be finalized within two weeks from project initiation. MPI personnel will mobilize to the site during week three to meet the survey crew and stake the boring locations. Drilling personnel will be mobilized to the site and commence with the drilling activities during week four. The geophysical assessment of FTBL-011/SWMU-29 will be conducted concurrently with drilling activities at FTBL-012/SWMU-27 and FTBL-013/SWMU-18. It is anticipated that the drilling activities will take three to four weeks to complete; therefore being completed by the end of week eight. The laboratory analyses will be completed by the end of week twelve. The draft report will be completed in six working weeks and will be submitted to Fort Bliss and the USACE for review by the end of week sixteen. It is expected that Fort Bliss and the USACE will provide review comments to MPI four working weeks after they receive the draft document. MPI will submit a final report three weeks following receipt of comments from Fort Bliss and the USACE. The final report will be submitted to Fort Bliss, the USACE, and the NMED. A bar schedule for the overall project has been included as Figure10. Figure 11 depicts the schedule for this project.

9.0 REFERENCES

1. *RCRA Facility Investigation for Five Solid Waste Management Units Fort Bliss, Texas and New Mexico*. Thompson Professional Group, Inc. July 1997.

2. *EPA Region 6 Risk Assessment Program, Human Health Medium –Specific Screening Levels*. USEPA, Region 6 Multimedia Planning and Permitting Division, July 12, 1999.

3. *Historical Review Report*. J. K. Wagner, Inc., August 2000.

4. *Submittal of Final RFI Report for Solid Waste Management Units 19, 25B, 27B, and 76*. Roy F. Weston, Inc., May 1997

5. *Subsurface Investigation of the New Mexico Oxidation Lagoons (SWMU Nos. 19, 25B, and 27B)*. Tetra Tech EM, Inc., San Francisco, California, July 1998.

Table 1
Summary of Thompson Professional Group Sampling
Work Plan for Site Investigation at Three FTBLs/SWMUs
Fort Bliss, Texas

FTBL	SWMU	Total Samples Analyzed	Analyte	Number of Detections Above Background	Maximum Detection (mg/kg)	Risk-Based Concentration (mg/kg)
13	18	63	Arsenic	2	10.5	23
			Barium	4	284	5500
			Cadmium	1	4.2	39
			Carbon Disulfide	2	0.007	7800
			Lead	2	20.2	400
			Selenium	1	3	390
			Silver	1	4.5	39
			Toluene	1	0.15	16000
12	27	48	Barium	1	824	5500
			Xylenes	1	0.016	160000
11	29	0	NA	NA	NA	NA

Notes:
NA = not applicable

Table 2
Soil Boring Nomenclature
Work Plan for Site Investigation at Three FTBLs/SWMUs
Fort Bliss, Texas

Range Name	FTBL	SWMU	TPG		MPI	
			Total Number of Borings	Nomenclature	Total Number of Borings	Nomenclature
McGregor	13	18	9	SB18-1 through SB18-9	11	MPSB18-10 through MPSB18-20
Doña Ana	12	27	8	SB27-1 through SB27-8	9	MPSB27-9 through MPSB27-17
Doña Ana	11	29	0	NA	9	MPSB29-1 through MPSB29-9

Notes:
NA = not applicable

Table 3
Drilling Information
Work Plan for Site Investigation at Three FTBLs/SWMUs
Fort Bliss, Texas

Range Name	FTBL	SWMU	Anticipated Depth of Waste Cell	Geotechnical Borings		Chemical Borings		
				Number of Borings	Boring Depth (1,2)	Number of Borings (3,4)	Boring Depth	Cumulative Depth
McGregor	13	18	20	1	65	10	35	350
Doña Ana	12	27	14	1	100	8	29	232
Doña Ana	11	29	10	0	0	8	25	200
Totals					165			782

Notes:

All units in feet.

The total depth does not include the 25% contingency for deeper chemical borings, if needed, to obtain a clean total-depth sample.

(1) If the clay unit is not encountered at 65 feet bgs in McGregor, the borehole will be advanced a maximum of 50 additional feet.

(2) If the clay unit is not encountered at 100 feet bgs in Doña Ana, the borehole will be advanced a maximum of 25 additional feet.

(3) The number of borings listed in this column does not including the combined geotechnical and chemical borings.

(4) The number of chemical borings at FTBL-011/SWMU-29 may be reduced based on results of the geophysical assessment.

Table 4
Summary of Geotechnical Analyses
Work Plan for Site Investigation at Three FTBLs/SWMUs
Fort Bliss Landfill Sites

Geotechnical Analyses		Landfill Site					
ASTM Method	Title	FTBL 13 SWMU 18		FTBL 12 SWMU 27		FTBL 11 SWMU 29	
		Sub-surface	Surface	Sub-surface	Surface	Sub-surface	Surface
ASTM D422-63	Particle size	1	2	1	2	0	2
ASTM 4318	Atterberg Limits	1	2	1	2	0	2
ASTM 1557	Modified Proctor/Permiability	0	1	0	1	0	1
ASTM 5084	Falling Head Permeability	1	1	1	1	0	1

ASTM D422-63 and ASTM 4318 will be performed on each surface soil sample. ASTM 5084 is contingent on the findings of this analyses. If ASTM 5084 is not warranted, then the sample will be analyzed per ASTM D2434.

Table 5
Process for Selecting Samples for Full-Suite Analyses
Work Plan for Site Investigation at Three FTBLs/SWMUs
Fort Bliss, Texas

FTBL-013/SWMU-18	FTBL-012/SWMU-27	FTBL-011/SWMU-29
40% OF TOTAL-DEPTH SAMPLES		
5 samples	**4 samples**	**4 samples**
(1) MPSB18-18	(1) One of MPSB27-9 and MPSB27-10	(1) MPSB29-9
(2) One of MPSB18-12 and MPSB18-13	(2) One of MPSB27-14 and MPSB27-15	(2) One of MPSB29-4 and MPSB29-5
(3) One of MPSB18-16 and MPSB18-17	(3) One of MPSB27-16 and MPSB27-17	(3) One of MPSB29-1, MPSB29-2, and MPSB29-3
(4) One of MPSB18-19 and MPSB18-20	(4) One of MPSB27-11, MPSB27-12, and MPSB27-13	(4) One of MPSB29-6, MPSB29-7, and MPSB29-8
(5) One of MPSB18-10, MPSB18-11, MPSB18-14, and MPSB18-15		
Notes: When permitted, the selection of a boring for full-suite analysis will be based on PID readings, BTEX and DRO results, or field observations. The number of chemical borings at FTBL-011/SWMU-29 may be reduced based on the results of the geophysical assessment.		
20% OF SHALLOWER DEPTH SAMPLES		
maximum of 2 samples	**maximum of 1 sample**	**maximum of 1 sample**
Selection based on highest PID readings.	Selection based on highest PID readings.	Selection based on highest PID readings.
Notes: Only applicable if PID reading is above 250 ppm. No more than one depth per boring is to be analyzed for the full-suite of parameters.		