FORT WINGATE DEPOT ACTIVITY
GALLUP, NM

FINAL WORK PLAN
ENVIRONMENTAL CHARACTERIZATION
BUILDINGS 542 AND 600

Prepared for:

U.S. ARMY CORPS OF ENGINEERS
FORT WORTH DISTRICT

Prepared by:

PMC Environmental

835 Springdale Drive, Suite 201
Exton, PA 19341-2843

Requests for this document must be referred to:
Commander, U.S. Army Corps of Engineers
Fort Worth District
Fort Worth, TX 76102; or
Commander, Tooele Army Depot, UT 84074

15 November 2000

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LIST OF ACRONYMS

AWS	Ammunition Work Shop
bgs	below ground surface
COR	Contracting Officer's Representative
CY	calendar year
EI	Environmental Investigation
ERM	ERM Program Management Company
ESPS	Army Environmental Services Program Support
FSP	Field Sampling Plan
FWDA	Fort Wingate Depot Activity
HASP	Health and Safety Plan
IDW	Investigation-Derived Waste
NOI	Notice of Intent to Discharge
NMLWDR	New Mexico Liquid Waste Disposal Regulations
PMC	PMC Environmental
PPE	personal protective equipment
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
SVOCs	semivolatile organic compounds
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TSD	treatment, storage and disposal
USACE	U.S. Army Corps of Engineers
VOCs	volatile organic compounds
WP	Work Plan

1.0 INTRODUCTION

This deliverable, the Building 542 and 600 Characterization Work Plan, describes soil and ground water investigation and characterization work to be performed during calendar year (CY) 2000 and 2001 at Buildings 542 and 600 located at Fort Wingate Depot Activity (FWDA), Gallup, New Mexico. The work elements described within this document will be conducted by PMC Environmental (PMC) (formerly known as ERM Program Management Company [ERM]) of Exton, Pennsylvania. This document is being prepared to fulfill requirements of Delivery Order No. 0005, under the Army Environmental Services Program Support (ESPS) contract (Contract DACA31-94-D-0067). Contracting Officer's Representative (COR) and technical oversight responsibilities for the tasks described in this document were provided by the U.S. Army Corps of Engineers (USACE), Fort Worth District.

This Work Plan (WP) is prepared as a component of the FWDA Environmental Investigation (EI) Program. Associated documents that address field implementation issues and are incorporated by reference include the following:

- *Final Health and Safety Plan (HASP), FWDA, Gallup, New Mexico* (PMC, 1998a);
- *Final Field Sampling Plan (FSP), FWDA, Gallup, New Mexico* (PMC, 1998b); and
- *Final Quality Assurance Project Plan (QAPP), FWDA, Gallup, New Mexico* (PMC, 1998c).

2.0 TECHNICAL PLAN

2.1 SITE BACKGROUND

FWDA occupies approximately 34 square miles of land in northwestern New Mexico (Figure 2-1). The installation is located 8 to 11 miles east of Gallup, and 134 miles west of Albuquerque along Interstate 40.

Demilitarization operations were conducted from 1949 to 1967 in the Workshop Area (Figure 2-2). According to the Master Environmental Plan for FWDA, munitions were received in Building 500 where they were unpacked and broken down. The munitions were then transported to Building 503 (Former TNT Washout and Flaker Building) where a hot water washout operation was conducted to flush the munitions contents [2,4,6-trinitrotoluene (TNT) and hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)]. The hot water for this process was supplied by the Boiler Building (Building 501). The fluid containing the munitions' contents (pink water) was pumped into a storage and drying tank located in the flaker room on the second floor of Building 503. The dried flakes dropped into a hopper in the washout room below and were boxed and shipped to various Army ammunition plants for reuse.

The pink water from the TNT washout process was drained into three settling tanks (including Washout Tank 505) located on the northern and eastern exterior sides of Building 503. Approximately 9,000 liters of overflow per day were disposed of in unlined leaching beds. Prior to 1962, overflow from the tanks drained into a leaching bed on the western side of Building 503. This Pre-1962 Leaching Bed was triangular in shape and approximately 150 feet by 250 feet by 250 feet in size. In 1962, two rectangular shaped leaching beds, each approximately 100 feet by 250 feet in size and 3 feet deep, were constructed across Arterial Road No. 4, north of Building 503. These leaching beds were connected to the settling tanks by a trough with which the overflow was transported. These beds were used until 1967, when washout operations were discontinued.

2.1.1 *Previous Investigation of TNT Leaching Beds Area*

A series of field investigations were conducted in the area of the TNT Leaching Beds from CY 1992 to CY 1998. The objectives of these investigations were to characterize the hydrogeologic setting and potential impacts to the environment caused by the former washout operations, identify potential migration paths and receptors, and identify remedial options for the impacted media.

The initial phase of field investigation was conducted in 1992 and included collection of surface and subsurface soils, sediment, and ground water samples. The presence of surface and subsurface soil contamination, and potential impacts to ground water were identified.

In CY 1996, drilling and sampling of soil borings was conducted to further define the vertical extent of soil contamination within the TNT Leaching Beds and to characterize the geotechnical properties of these soils. Four monitoring wells were drilled and ground water samples collected to characterize potential ground water impacts. Ground water in all four wells, including the upgradient well, contained explosives or elevated concentrations of nitrate/nitrite.

A ground water characterization investigation was conducted at the TNT Leaching Beds Area in CY 1997. Pilot borings were drilled and grab samples of ground water were collected and analyzed to delineate the extent of ground water contamination. The vertical and horizontal extent of explosives was delineated and the extent of nitrate/nitrite was delineated in all but the northern direction.

In CY 1998, additional pilot borings were drilled and sampled, and a monitoring well network was installed in the TNT Leaching Beds Area. The extent of elevated nitrate/nitrite was delineated in the northern direction using pilot borings and ground water grab samples. Ground water data from the monitoring wells verified that the lateral and vertical extent of impacted ground water associated with the TNT Leaching Beds has been delineated.

Monitoring well TMW11, drilled in a location crossgradient from the TNT Leaching Beds, was intended to provide upgradient ground water chemical characterization data (Figure 2-3). Ground water samples were collected from the monitoring wells near the TNT Leaching Beds seven times during the period of October 1998 to January 2000. One explosive constituent was detected in samples collected from TMW11 during five of the seven sampling events. Based upon the location of TMW11, 1,300 feet from the TNT Leaching Beds in a crossgradient direction, the possible presence of a source of explosives other than the TNT Leaching Beds was investigated.

2.1.2 *Potential Sources of Explosives in Ground Water at TMW11*

Building 542 (formerly Building 19), the former Ammunition Packing, Shipping, and Receiving Building, was identified as a potential source of explosives. A former FWDA employee (employed at FWDA from mid-1960s to early-1970s; employed by TPL in January 1999) indicated that some type of munitions had been steamed out in Building 542. He indicated that these

activities had taken place on the loading dock on the east side of the building, in an area that remains discolored. Building 542 had, at various times during its operation, a discharge to a cesspool (with an outfall to the arroyo), a septic tank and leach field, and a connection to the sanitary sewerage system (Figure 2-3).

Building 600 (formerly Building 539), the former Ammunition Work Shop (AWS) Change House, housed showers and possibly laundry facilities for the workers who were involved in performing explosives washout and handling of munitions. According to installation drawings, the AWS Change House had a discharge to a cesspool, an outfall to the arroyo, and a connection to the sanitary sewerage system (Figure 2-3).

2.1.3 *Hydrogeologic Setting*

The subsurface materials are Quaternary-age Alluvium consisting of sands, silts, and clays above Triassic-age sandstones and shales of the Petrified Forest Formation that dip gently toward the north at approximately 5 degrees. The unconsolidated materials are generally arranged as interbedded sands, silts, and clays near the surface underlain by alternating sequences of sand and clay/claystones at depth. Alternating sandstone and shale is present throughout the installation as outcrops and was frequently encountered in borings from very shallow (10 to 20 feet below ground surface [bgs]) to moderately deep (60 to 80 feet bgs), in the area of the TNT Leaching Beds.

In general, two water-bearing zones were encountered during previous field efforts conducted near the TNT Leaching Beds. The first water-bearing zone is generally found in the unconsolidated sediments at depths less than 70 feet bgs. The second water-bearing zone is generally found at depths between 70 and 120 feet bgs in a thin layer of sandstone located within a thick interval of shale.

2.2 *OBJECTIVES*

The objectives of the proposed characterization effort in and around Buildings 542 and 600 are to:

- determine if releases of water containing trace levels of explosives from past activities at Buildings 542 or 600 has impacted the soil,
- determine if the source for explosives in ground water at TMW11 could have been releases from activities at Buildings 600 or 542,
- delineate the extent of explosives in ground water near TMW11, and

- install an upgradient monitoring well that will provide background ground water chemical characterization data for ground water at TMW11 and the TNT Leaching Beds Area.

2.3 SCOPE OF WORK

A number of field activities will be conducted during this field effort, as described below. A summary of proposed field activities planned for CYs 2000 and 2001 is included in Table 2-1. All activities will be conducted following the methodologies described in the FSP. A tentative schedule for performance of the proposed field activities is included in Figure 2-4.

2.3.1 *Building 542*

2.3.1.1 *Building Interior*

A walk through of the building interior will be conducted to identify potential sources of releases to the building exterior such as drains and pipes.

2.3.1.2 *East Loading Dock*

Four explosive wipe samples will be collected from stained areas observed on the east loading dock of Building 542 to confirm the presence or absence of explosives. Wipe samples will be collected from chipped and cracked areas, if present. These samples will be sent to an off-site laboratory for analysis of explosives.

Four surface soil samples (0.5 feet to 1.0 feet bgs) will be collected adjacent to, and within 2 feet of, the stained areas observed on the east loading dock (Figure 2-5). The samples will be tested for the presence of RDX and TNT using immunoassay test kits. If the test kits do not detect explosives, one soil boring will be drilled adjacent to the east loading dock. If the test kits detect explosives, four soil borings will be drilled adjacent to the east loading dock.

The soil borings will be drilled to a depth of 10 feet bgs using hollow stem augers. Soils will be retrieved continuously during the drilling of each boring and detailed lithologic logs will be prepared, as described in the FSP. Soil samples for laboratory analysis will be collected from visibly impacted soils or from 5 feet bgs, and the bottom of the borehole. Soil samples will be analyzed for explosives and Target Analyte List (TAL) metals. If visibly impacted soil is encountered in the lowermost portion of a boring, the USACE Technical Manager will be contacted for further instruction. Upon completion of sampling, the borings will be abandoned by grouting according to the methods outlined in the FSP.

2.3.1.3 *West Loading Dock*

Four explosive wipe samples will be collected from stained areas observed on the west loading dock of Building 542 to confirm the presence or absence of explosives. Wipe samples will be collected from chipped and cracked areas, if present. These samples will be sent to an off-site laboratory for analysis of explosives.

Four surface soil samples (0.5 feet to 1.0 feet bgs) will be collected adjacent to, and within 2 feet of, the west loading dock. The samples will be tested for the presence of RDX and TNT using immunoassay test kits. If the test kits do not detect explosives, no further sampling will be done near the west loading dock. If the test kits detect explosives, one soil boring will be drilled adjacent to the west loading dock (Figure 2-5).

The soil boring will be drilled (if necessary) to a depth of 10 feet bgs following the procedures described in Section 2.3.1.2. Soil samples for laboratory analysis will be collected from visibly impacted soils or from 5 feet bgs, and the bottom of the borehole. Soil samples will be analyzed for explosives and TAL metals. If visibly impacted soil is encountered in the lowermost portion of the boring, the USACE Technical Manager will be contacted for further instruction. Upon completion of sampling, the borings will be abandoned by grouting according to the methods outlined in the FSP.

2.3.1.4 *Cesspool*

The cesspool associated with Building 542 will be investigated. It is located approximately 300 feet southwest of Building 542. The cesspool is visible on the surface and is constructed of open-jointed rock, is 8 feet by 8 feet in size, with a surface depth of approximately 7 feet bgs and a reported total depth of 17 feet bgs. Four soil borings will be drilled adjacent to the cesspool to a depth of 19 feet bgs following the procedures described in Section 2.3.1.2 (Figure 2-5). Soil samples for laboratory analysis will be collected from visibly impacted soil or from 6 feet bgs, and the bottom of the boring. Soil samples will be analyzed for explosives, TAL metals, Target Compound List (TCL) volatile organic compounds (VOCs), and TCL semivolatile organic compounds (SVOCs). If visibly impacted soils are encountered at the depth of 19 feet bgs, the USACE Technical Manager will be contacted for further instruction. Upon completion of sampling, the borings will be abandoned by grouting according to the methods outlined in the FSP.

One sample of sediments present within the cesspool will be collected and analyzed for explosives and TAL metals. One sample of water (if present) will be collected from the cesspool and characterized for off-site disposal.

The water sample will be analyzed for explosives, Resource Conservation and Recovery Act (RCRA) metals, RCRA VOCs, RCRA SVOCs, and flash point. Upon receipt of the analytical data, the water will be pumped from the cesspool and disposed of off-site.

The cesspool will be decommissioned by filling it with material in accordance with the New Mexico Liquid Waste Disposal Regulations (NMLWDR). The location of the cesspool will be surveyed to maintain a record of its location.

2.3.1.5 *Arroyo Outfall from Cesspool*

The outfall into the arroyo from the cesspool associated with Building 542 will be investigated. One soil sample will be collected immediately downstream of the location of the outfall to the arroyo. The soil sample will be analyzed for explosives, TAL metals, TCL VOCs, and TCL SVOCs.

2.3.1.6 *Septic Tank*

The septic tank is located approximately 200 feet southwest of Building 542. It is reportedly constructed of concrete and is 4 feet by 11 feet in size. One sample of sediments present within the septic tank will be collected and analyzed for explosives, TAL metals, TCL VOCs, and TCL SVOCs. One sample of water (if present) will be collected from the septic tank and characterized for off-site disposal. The water sample will be analyzed for explosives, RCRA metals, RCRA VOCs, RCRA SVOCs, and flash point. Upon receipt of the analytical data, the water will be pumped from the septic tank and disposed of off-site.

The septic tank will be decommissioned by filling it with material in accordance with the NMLWDR. The location of the septic tank will be surveyed to maintain a record of its location.

2.3.1.7 *Drain Field*

The drain field associated with the septic tank at Building 542 will be investigated. Ten soil borings will be drilled along and within the drain field to a depth of 10 feet bgs following the procedures described in Section 2.3.1.2 (Figure 2-5). Soil samples for laboratory analysis will be collected from visibly impacted soil or from 5 feet bgs, and the bottom of the boring. Soil samples will be analyzed for explosives, TAL metals, TCL VOCs, and TCL SVOCs. If visibly impacted soils are encountered at the depth of 10 feet bgs, the USACE Technical Manager will be contacted for further instruction. Upon completion of sampling, the borings will be abandoned by grouting according to the methods outlined in the FSP.

2.3.2 *Building 600*

2.3.2.1 *Building Interior*

A walk through of the building interior will be conducted to confirm whether laundry facilities were formerly located within the building. Potential sources of releases to the building exterior such as drains and pipes will be identified.

2.3.2.2 *Cesspool*

The cesspool associated with Building 600 will be investigated. It is located approximately 100 feet northeast of Building 600. The cesspool is not visible on the surface; however, a slight depression was observed in the approximate location shown on facility drawings, indicating that the cesspool may have been filled in. The cesspool is reportedly constructed of open-jointed rock, is 6 feet by 6 feet in size, and has a total depth of 10 feet. The location of the cesspool will be confirmed by observation and manual excavation. Four soil borings will be drilled adjacent to the cesspool to a depth of 12 feet bgs following the procedures described in Section 2.3.1.2 (Figure 2-5). Soil samples for laboratory analysis will be collected from visibly impacted soil or from 6 feet bgs, and the bottom of the boring. Soil samples will be analyzed for explosives, TAL metals, TCL VOCs, and TCL SVOCs. If visibly impacted soils are encountered at the depth of 12 feet bgs, the USACE Technical Manager will be contacted for further instruction. Upon completion of sampling, the borings will be abandoned by grouting according to the methods outlined in the FSP.

One sample of sediments present within the cesspool will be collected and analyzed for explosives, TAL metals, TCL VOCs, and TCL SVOCs. One sample of water (if present) will be collected from the cesspool and characterized for off-site disposal. The water sample will be analyzed for explosives, RCRA metals, RCRA VOCs, RCRA SVOCs, and flash point. Upon receipt of the analytical data, the water will be pumped from the cesspool and disposed of off-site.

The cesspool will be decommissioned by filling it with material in accordance with the NMLWDR. The location of the cesspool will be surveyed to maintain a record of its location.

2.3.2.3 *Arroyo Outfall from Cesspool*

The outfall into the arroyo from the cesspool associated with Building 600 will be investigated. One soil sample will be collected immediately downstream of the location of the outfall to the arroyo. The soil sample will be analyzed for explosives, TAL metals, TCL VOCs, and TCL SVOCs.

2.3.2.4 *Sanitary Sewer*

The sanitary sewer associated with Building 600 will be investigated. One sediment sample will be collected from the sanitary sewer manhole at the far end of the pipe from Building 600. The sediment sample will be analyzed for explosives, TAL metals, TCL VOCs, and TCL SVOCs.

2.3.3 ***Ground Water Investigation***

Six monitoring wells will be drilled in the area of TMW11 during CY 2000 (Figure 2-6). The proposed monitoring well locations are based on their relationship to TMW11, geology of the area and its influence on ground water flow, and ground water flow direction based upon existing monitoring wells. Table 2-2 outlines the rationale by which monitoring well locations were selected and provides an estimated total depth for each of the monitoring wells.

2.3.3.1 *Sampling Strategy*

Boreholes for the installation of monitoring wells will be drilled to the point where ground water is encountered, and one borehole will be drilled to a depth that intercepts a second water-bearing zone. It is anticipated that a typical depth to first water will be between 60 and 100 feet bgs. The second water-bearing zone is expected to occur between 70 and 120 feet bgs.

The boreholes will be drilled using rotosonic drilling methods that combine rotary and sonic processes to advance the drill bit and outer temporary casing into the subsurface. The temporary casing seals off water encountered and prohibits interconnection of discrete ground water-bearing zones during the drilling and well installation processes.

Soils and bedrock cores will be retrieved via continuous coring methods during the drilling of each borehole. This is completed in 5 feet long segments prior to advancement of the temporary casing. Detailed lithologic logs will be prepared, as described in the FSP. No soil samples will be collected from the monitoring well borings for laboratory analysis.

2.3.3.2 *Installation of Monitoring Wells*

The boreholes will be completed as monitoring wells according to the rationale provided in Table 2-2. Monitoring well completion and development will be performed following the methods outlined in the FSP.

Slug testing will be performed on all newly installed monitoring wells to estimate the hydraulic properties of the geologic materials in which the

wells are screened. This will be performed according to the methods outlined in the FSP.

2.3.3.3 *Ground Water Sampling*

The six newly installed monitoring wells and existing well TMW11 will be sampled during each of two events in CY 2001. Sampling of ground water will be performed according to the methods outlined in the FSP. All of the ground water samples will be analyzed for explosives, TAL metals (total and dissolved), nitrate/nitrite non-specific, and nitrate.

2.3.4 ***Survey of Points***

Buildings 542 and 600 cesspools, septic tank, septic drain field lines, borings, and monitoring wells will be surveyed to accurately place their locations on maps of FWDA. Surveying will be performed according to the methods outlined in the FSP. The cesspools and septic tank will be surveyed to (±) 1.0 feet horizontally. The wells and borings will be surveyed to (±) 0.1 feet horizontally and (±) 0.01 feet vertically.

2.3.4.1 *Ground Water Elevation Survey*

A ground water elevation survey will be conducted at the outset of each of two planned ground water sampling events. This will include all monitoring wells: near Buildings 542 and 600; near the TNT Leaching Beds; and associated with the two underground storage tank sites located in the Administration Area. This will provide a contemporaneous ground water elevation data set that will allow estimation of ground water flow throughout the northern portion of FWDA.

2.3.5 ***Laboratory Analysis***

The analytical methods to be used for analysis of wipe, soil, sediment, tank waters, and ground water samples are presented in Table 2-3. Analytical methods and frequency of quality assurance/quality control (QA/QC) samples will be as specified in the QAPP. A summary of required QA/QC samples is included in Table 2-4.

2.3.5.1 *Evaluation of Analytical Results*

Analytical results from the soil and sediment samples will be evaluated using the methodology outlined in the *Final Risk Assessment Work Plan* (PMC, 2000). Concentrations of constituents exceeding the evaluation criteria will be discussed in a characterization report for Buildings 542 and 600.

2.3.5.2 *Investigation-Derived Waste Characterization and Disposal*

Four types of investigation-derived waste (IDW) will be generated during the sampling of environmental media at Buildings 542 and 600: soil cuttings, monitoring well purge water, decontamination fluids, and disposable sampling equipment and personal protective equipment (PPE). The characterization and disposal of each of these waste types is described below.

Soil cuttings will be generated during the drilling of soil borings and monitoring well boreholes. Soil cuttings will be placed in a roll-off container temporarily staged in the vicinity of the drilling sites. Characterization of soil cuttings will be based upon analytical results for a composite sample collected from each waste container. Composite waste samples will be analyzed for explosives and Toxicity Characteristic Leaching Procedure (TCLP), and the TCLP leachate will be analyzed for RCRA VOCs, RCRA SVOCs, and RCRA metals. Analytical results will be compared to the RCRA regulatory levels above which a waste is considered hazardous based upon toxicity. These levels, determined for solid materials using the TCLP, are defined in 40 CFR 261.24.

Monitoring well development and pre-sample purge water will be generated during the installation and sampling of monitoring wells. Analytical results from well TMW11, located north of Building 600, is expected to represent worst case with regard to contamination of ground water. Therefore, the maximum concentration of each constituent detected in ground water samples previously collected from TMW11 will be used to characterize the water and complete a waste profile. The water will be pumped into tanks and temporarily staged in the vicinity of the well locations.

Decontamination will be conducted over a structure lined with impervious material. Fluids will be pumped into a tank and temporarily staged adjacent to the decontamination pad. The maximum concentration of each constituent detected in ground water previously collected from TMW11 will be used to characterize the decontamination fluids and complete a waste profile.

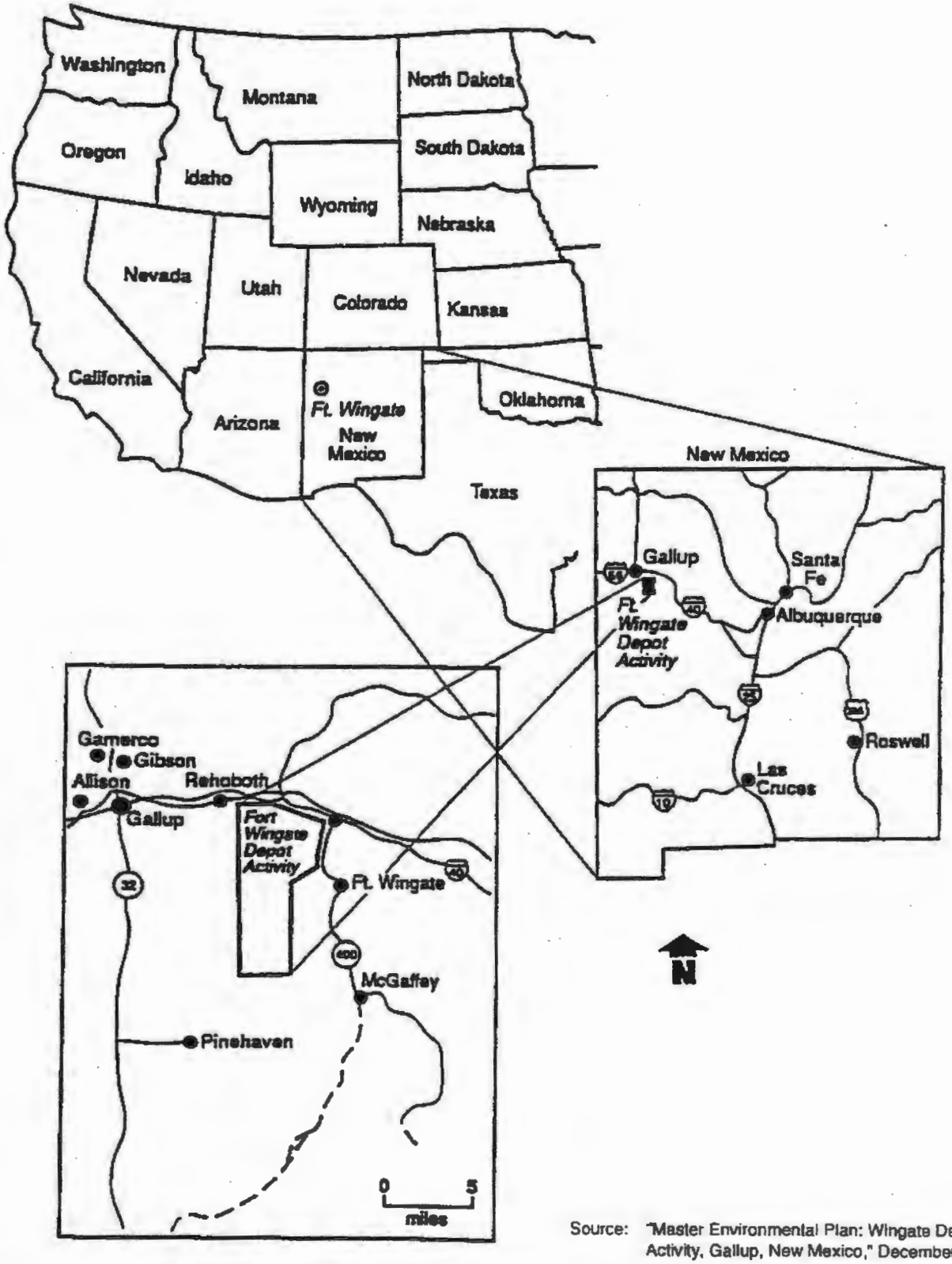
IDW classified as hazardous waste will be disposed of at a RCRA permitted treatment, storage, and disposal (TSD) facility following appropriate labeling, transportation, and manifesting procedures. Based upon analytical results from soil samples previously collected, solid IDW, consisting of soil cuttings, are not anticipated to be hazardous. In the event that the solid IDW is not hazardous, it will be manifested and transported to the Red Rock Landfill in Thoreau, New Mexico for disposal as nonhazardous special waste.

Liquid IDW, including well waters and decontamination fluids, are anticipated to be nonhazardous. Decontamination, monitoring well development, and pre-sample purge water from the first sampling event will be pumped into a tank truck and disposed of at a wastewater treatment facility.

Once ground water analytical results are available for the newly installed wells, these data will be used to determine the management of liquid IDW generated during future sampling events. The data will be compared to the RCRA regulatory levels above which a waste is considered hazardous based upon toxicity. If the ground water is not hazardous, it will be managed and discharged to the ground surface in the vicinity where it is generated according to the approved Notice of Intent to Discharge (NOI). This NOI includes comparing the data to the standards provided in the New Mexico Water Quality Control Commission Regulation 3103 and submittal of this information to the New Mexico Environment Department, Ground Water Quality Bureau.

Disposable sampling equipment and PPE will be decontaminated after use to remove environmental contaminants. After decontamination, disposable sampling equipment and PPE will be placed into trash bags with other general refuse and disposed of in a dumpster awaiting pickup by a commercial sanitary waste disposal company.

Figure 2-1
Installation Location
Fort Wingate Depot Activity
Gallup, New Mexico



Source: "Master Environmental Plan: Wingate Depot Activity, Gallup, New Mexico," December 1990.

Figure 2-2
Historical Land Use
Fort Wingate Depot Activity
Gallup, New Mexico

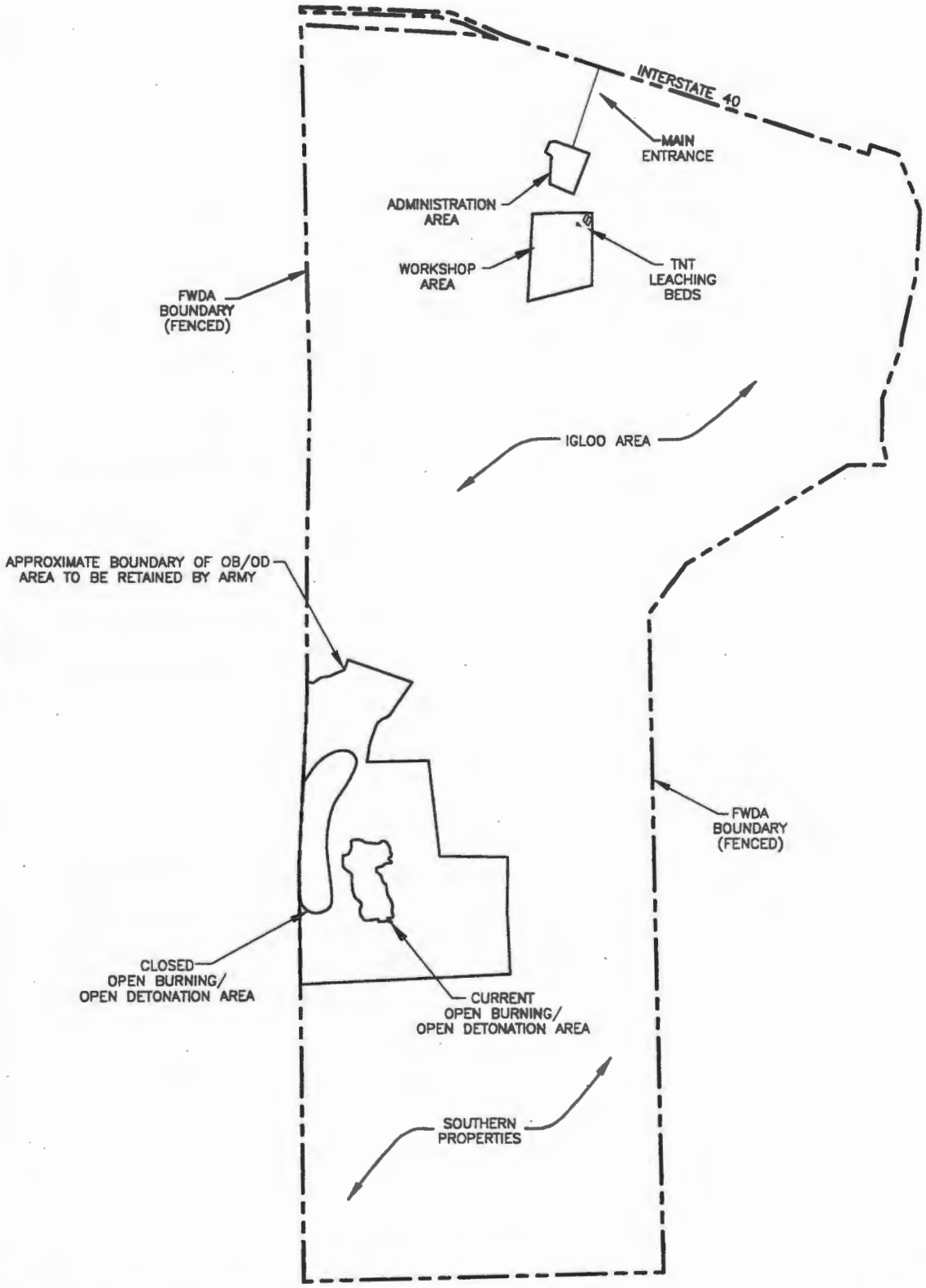
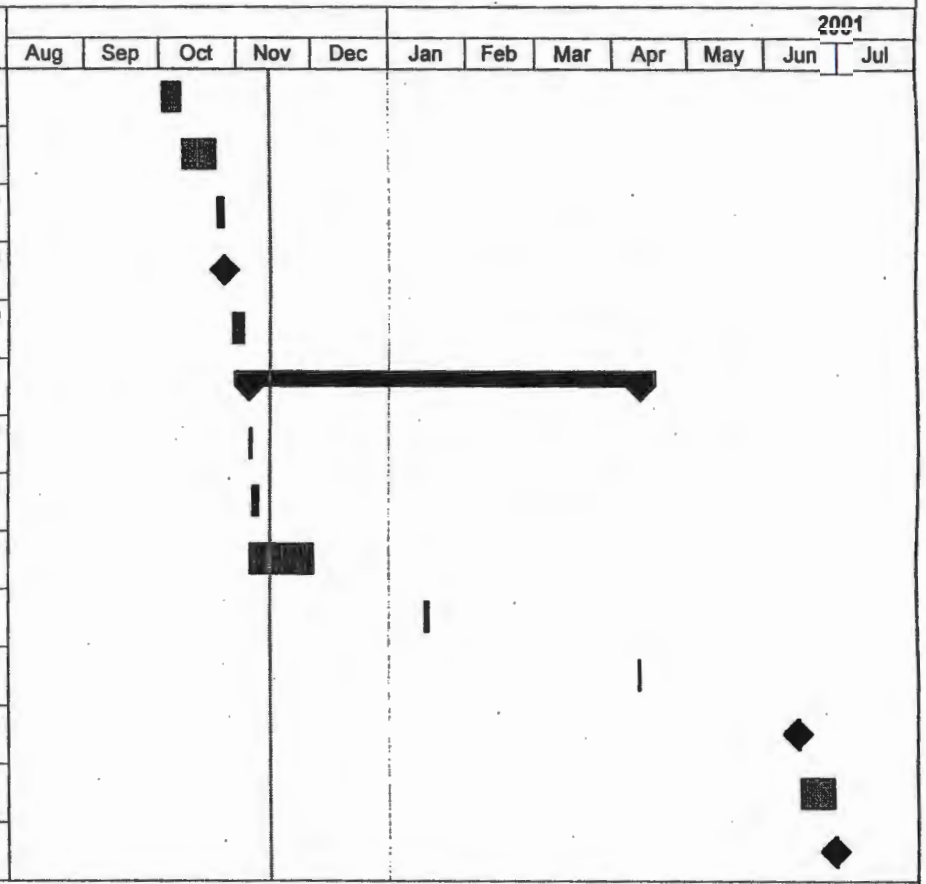


Figure 2-4
Tentative Schedule of Field Activities
Fort Wingate Depot Activity

ID	Task Name	Duration	Start	Finish
1	**Preparation of Buildings 542 and 600 Work Plan**	6d	Mon 10/2/00	Mon 10/9/00
2	**Work Plan Review**	10d	Tue 10/10/00	Mon 10/23/00
3	**Work Plan Revision**	3d	Tue 10/24/00	Thu 10/26/00
4	**Final Work Plan Approval**	1d	Fri 10/27/00	Fri 10/27/00
5	**Mobilization**	5d	Mon 10/30/00	Fri 11/3/00
6	**2000 Field Efforts**	**113d**	**Mon 11/6/00**	**Wed 4/11/01**
7	Building 542 Investigation	1d	Mon 11/6/00	Mon 11/6/00
8	Building 600 Investigation	3d	Tue 11/7/00	Thu 11/9/00
9	Installation, Development, and Slug Testing of Monitoring Wells	20d	Mon 11/6/00	Fri 12/1/00
10	Ground Water Sampling (Round 1)	2d	Mon 1/15/01	Tue 1/16/01
11	Ground Water Sampling (Round 2)	1d	Wed 4/11/01	Wed 4/11/01
12	**Analytical Data Available**	1d	Thu 6/14/01	Thu 6/14/01
13	**Analytical Data Validation**	10d	Fri 6/15/01	Thu 6/28/01
14	**Analytical Data Final**	1d	Fri 6/29/01	Fri 6/29/01



Prepared for:
U.S. Army Corps of Engineers
Fort Worth District

Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Milestone
Rolled Up Progress

e 2-1
Proposed Field Investigations
Buildings 542 and 600
Fort Wingate Depot Activity
Gallup, New Mexico

Area of Concern	Activity	Number of Samples	Target Constituents
Building 542			
• East Loading Dock	Collect four wipe samples from stained area on east loading dock	4 wipe	Explosives
	Collect four surface soil samples adjacent to stained areas on east loading dock	4 soil	TNT and RDX test kits
	If TNT and RDX are not detected by the test kits, drill one soil boring to a depth of 10 feet bgs; collect two soil samples from the soil boring	2 soil	Explosives and Total Analyte List (TAL) Metals
	If TNT and RDX are detected by the test kits, drill four soil borings to a depth of 10 feet bgs; collect two soil samples from each soil boring	8 soil	Explosives and TAL Metals
• West Loading Dock	Collect four wipe samples from stained area on west loading dock	4 wipe	Explosives
	Collect four surface soil samples adjacent to stained areas on west loading dock	4 soil	TNT and RDX test kits
	If TNT and RDX are not detected by the test kits, no further sampling will be done		
	If TNT and RDX are detected by the test kits, drill one soil boring to a depth of 10 feet bgs; collect two soil samples from the soil boring	2 soil	Explosives and TAL Metals

Table 2-1
Proposed Field Investigations
Buildings 542 and 600
Fort Wingate Depot Activity
Gallup, New Mexico

Area of Concern	Activity	Number of Samples	Target Constituents
• Cesspool	Drill four soil borings to a depth of 19 feet bgs; collect two soil samples from each soil boring	8 soil	Explosives, TAL Metals, Target Compound List (TCL) Volatile Organic Compounds (VOCs), and TCL Semivolatile Organic Compounds (SVOCs)
	Collect one sediment sample from the cesspool	1 sediment	Explosives, TAL Metals, TCL VOCs, and TCL SVOCs
	Collect one water sample from the cesspool	1 water	Explosives, Resource Conservation and Recovery Act (RCRA) VOCs, RCRA SVOCs, RCRA Metals, and Flash Point
• Arroyo Outfall from Cesspool	Collect one surface soil sample immediately downstream of outfall	1 soil	Explosives, TAL Metals, TCL VOCs, and TCL SVOCs
• Septic Tank	Collect one sediment sample from the septic tank	1 sediment	Explosives, TAL Metals, TCL VOCs, and TCL SVOCs
	Collect one water sample from the septic tank	1 water	Explosives, RCRA VOCs, RCRA SVOCs, RCRA Metals, and Flash Point

...e 2-1
Proposed Field Investigations
Buildings 542 and 600
Fort Wingate Depot Activity
Gallup, New Mexico

Area of Concern	Activity	Number of Samples	Target Constituents
• Drain Field	Drill 10 soil borings to a depth of 10 feet bgs; collect two soil samples from each soil boring	20 soil	Explosives, TAL Metals, TCL VOCs, and TCL SVOCs
Building 600			
• Cesspool	Drill four soil borings to a depth of 12 feet bgs; collect two soil samples from each soil boring	8 soil	Explosives, TAL Metals, TCL VOCs, and TCL SVOCs
	Collect one sediment sample from the cesspool	1 sediment	Explosives, TAL Metals, TCL VOCs, and TCL SVOCs
	Collect one water sample from the cesspool	1 water	Explosives, RCRA VOCs, RCRA SVOCs, RCRA Metals, and Flash Point
• Arroyo Outfall from Cesspool	Collect one surface soil sample immediately downstream of outfall	1 soil	Explosives, TAL Metals, TCL VOCs, and TCL SVOCs
• Sanitary Sewer	Collect one sediment sample from the sanitary sewer manhole	1 sediment	Explosives, TAL Metals, TCL VOCs, and TCL SVOCs

Table 2-1
Proposed Field Investigations
Buildings 542 and 600
Fort Wingate Depot Activity
Gallup, New Mexico

Area of Concern	Activity	Number of Samples	Target Constituents
Ground Water Investigations			
• Installation of Monitoring Wells	Drill six new boreholes and complete as ground water monitoring wells		
• Slug Testing	Perform slug testing on newly installed monitoring wells		
• Ground Water Sampling	Collect two rounds of ground water samples from six new monitoring wells and TMW11	14 ground water	Explosives, TAL Total and Dissolved Metals, Nitrate/Nitrite Non-Specific, and Nitrate

Table 2-2
Proposed Monitoring Wells
Buildings 542 and 600
Fort Wingate Depot Activity
Gallup, New Mexico

Monitoring Well Identification	Estimated Depth (feet)	Monitoring Well Location Rationale
TMW14	75	Establish background ground water constituent concentrations
TMW15	75	Establish and monitor the eastern downgradient edge of explosives in first water-bearing zone Confirm that the source of contamination detected in TMW11 is not the TNT Leaching Beds
TMW16	75	Establish and monitor the western downgradient edge of explosives in first water-bearing zone
TMW17	150	Establish and monitor if explosives are present in second water-bearing zone near TMW11
TMW18	100	Establish and monitor the northeastern downgradient edge of explosives in first water-bearing zone
TMW19	100	Establish and monitor the northwestern downgradient edge of explosives in first water-bearing zone

2-3

Sample Summary Matrix
Buildings 542 and 600
Fort Wingate Depot Activity
Gallup, New Mexico

Matrix	Environmental Samples	Analysis	Analytical Method	Container and Preservation	Analytical Holding Time
Soil Samples	48	Explosives	8330	1-8 oz. amber glass widemouth w/ Teflon-lined lid. Cool to 4 degrees C.	14 days until extraction. Analysis within 40 days of extract preparation.
	38	TCL VOCs	8260	3-5 g Encore samples. Cool to 4 degrees C.	48 hours for preparation. Analysis within 14 days.
	38	TCL SVOCs	8270	1-4 oz. amber glass widemouth w/ Teflon-lined lid. Cool to 4 degrees C.	14 days until extraction. Analysis within 40 days of extract preparation.
	48	TAL Metals	6010/6020/7471	1-4 oz. amber glass widemouth w/ Teflon-lined lid. Cool to 4 degrees C.	6 months; 28 days for Mercury.
Wipe Samples	8	Explosives	8330	1-cotton wipe in 4 oz. glass w/ Teflon-lined lid.	7 days until extraction. Analysis within 40 days of extract preparation.
Test Kit Samples	8	TNT and RDX	4050/4051	No container. Analysis performed in field.	Not Applicable.
Cesspool/Septic Tank Water Samples	8	Explosives	8330	2-1 L amber glass. Cool to 4 degrees C.	7 days until extraction. Analysis within 40 days of extract preparation.
	3	RCRA VOCs	8260	3-40 mL vials. HCl to pH <2. Cool to 4 degrees C.	14 days.
	3	RCRA SVOCs	8270	1-1 L amber glass. Cool to 4 degrees C.	7 days until extraction. Analysis within 40 days of extract preparation.
	3	RCRA Metals	6010/6020/7470	1-1 L plastic. HNO3 to pH<2. Cool to 4 degrees C.	6 months; 28 days for Mercury.
	3	Flash Point	ASTMD93-85	1 - 100 mL glass. Cool to 4 degrees C.	Not Applicable.
Ground Water Samples	14	Explosives	8330	2-1 L amber glass. Cool to 4 degrees C.	7 days until extraction. Analysis within 40 days of extract preparation.
	14	Nitrate/Nitrite	353.2	1-500 mL plastic. H2SO4 to pH<2. Cool to 4 degrees C.	28 days.
	14	Nitrate	300.0	1 - 250 mL plastic or glass. Cool to 4 degrees C.	48 hours.
	14	TAL Dissolved Metals	6010/6020/7470	1-1 L plastic. HNO3 to pH<2. Cool to 4 degrees C.	6 months; 28 days for Mercury.
	14	TAL Total Metals	6010/6020/7470	1-1 L plastic. HNO3 to pH<2. Cool to 4 degrees C.	6 months; 28 days for Mercury.

Table 2-3
Sample Summary Matrix
Buildings 542 and 600
Fort Wingate Depot Activity
Gallup, New Mexico

Matrix	Environmental Samples	Analysis	Analytical Method	Container and Preservation	Analytical Holding Time
Sediment Samples	4	Explosives	8330	1-8 oz. amber glass widemouth w/ Teflon-lined lid. Cool to 4 degrees C.	14 days until extraction. Analysis within 40 days of extract preparation.
	4	TCL VOCs	8260	3-5 g Encore samples. Cool to 4 degrees C.	48 hours for preparation. Analysis within 14 days.
	4	TCL SVOCs	8270	1-4 oz. amber glass widemouth w/ Teflon-lined lid. Cool to 4 degrees C.	14 days until extraction. Analysis within 40 days of extract preparation.
	4	TAL Metals	6010/6020/7471	1-4 oz. amber glass widemouth w/ Teflon-lined lid. Cool to 4 degrees C.	6 months; 28 days for Mercury.

Frequency of QC Samples:

Field Duplicates: 1 duplicate for every 10 environmental samples.
Field Blanks: 1 field blank for every 20 environmental samples.
Rinse Blanks: 1 rinse blank for every 20 environmental samples.
MS/MSD: 1 MS/MSD set for every 20 environmental samples.
Trip Blanks: 1 trip blank for every cooler containing samples to be submitted for VOC analysis.

Table 2-4
Required Field Quality Assurance/Quality Control Samples
Buildings 542 and 600
Fort Wingate Depot Activity
Gallup, New Mexico

Matrix	Analysis	Field Samples	Field Duplicates	Field Blanks	Rinse Blanks	MS/MSD Pairs	QA Samples
Sediment Samples	Explosives	4	1	1	1	1	1
	TAL Metals	4	1	1	1	1	1
	TCL VOCs	4	1	1	1	1	1
	TCL SVOCs	4	1	1	1	1	1

Frequency of QC Samples:

Field Duplicates: 1 duplicate for every 10 environmental samples.

Field Blanks: 1 field blank for every 20 environmental samples.

Rinse Blanks: 1 rinse blank for every 20 environmental samples.

MS/MSD: 1 MS/MSD set for every 20 environmental + QC samples.

QA Samples: 1 QA sample for every 10 environmental samples; sent to USACE-contracted laboratory.

Table 2-4
Required Field Quality Assurance/Quality Control Samples
Buildings 542 and 600
Fort Wingate Depot Activity
Gallup, New Mexico

Matrix	Analysis	Field Samples	Field Duplicates	Field Blanks	Rinse Blanks	MS/MSD Pairs	QA Samples
Soil Samples	Explosives	48	5	3	3	3	5
	TAL Metals	48	5	3	3	3	5
	TCL VOCs	38	4	2	2	2	4
	TCL SVOCs	38	4	2	2	2	4
Wipe Samples	Explosives	8					
Test Kit Samples	TNT and RDX	8					
Cesspool/Septic Tank Water Samples	Explosives	3					
	RCRA Metals	3					
	RCRA VOCs	3					
	RCRA SVOCs	3					
	Flash Point	3					
Ground Water Samples	Explosives	14	2	1	1	1	2
	Nitrate/Nitrite	14	2	1	1	1	2
	Nitrate	14	2	1	1	1	2
	TAL Dissolved Metals	14	2	1	1	1	2
	TAL Total Metals	14	2	1	1	1	2

3.0 *REPORTING*

A description of the field investigation and summary of the hydrogeologic data and analytical results will be incorporated to produce a soil and ground water characterization report Buildings 542 and 600. This will be prepared as a separate stand-alone document.

4.0 *REFERENCES*

PMC, 1998a. Final Health and Safety Plan, Fort Wingate Depot Activity, Gallup, New Mexico.

PMC, 1998b. Final Field Sampling Plan, Fort Wingate Depot Activity, Gallup, New Mexico.

PMC, 1998c. Final Quality Assurance Project Plan, Fort Wingate Depot Activity, Gallup, New Mexico.

PMC, 2000. Final Risk Assessment Work Plan, Fort Wingate Depot Activity, Gallup, New Mexico.