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Administrative Record

FORT WINGATE DEPOT ACTIVITY, GALLUP, NEW MEXICO

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Fort Wingate Depot Activity, Gallup, New Mexico, Resource Conservation and Recovery Act, Modification to Final Interim Status Closure Plan

Environmental Resources Management

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FORT WINGATE DEPOT ACTIVITY
RESOURCE CONSERVATION AND RECOVERY ACT
Modification to Final Interim Status Closure Plan

Submitted to:

State of New Mexico
Environment Department
Santa Fe, New Mexico

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1.0 INTRODUCTION

This Closure Plan Modification presents proposed changes, based upon the results of field screening activities, to the Final Fort Wingate Depot Activity (FWDA) Resource Conservation and Recovery Act (RCRA) Interim Status Closure Plan, dated 1 March 1993 .

Closure performance standards have been established for this site based on the current and potential future use of this site. Clean closure of this site would allow unrestricted future use of the site. Standards for soil and water clean up will be developed for potential clean closure. In addition, due to the current UXO conditions on the site that may prevent future unrestricted use of the site, preliminary cleanup goals will also be established for probable future restricted land use. Closure performance standards for restricted future use would not qualify for clean closure of the site.

The Final Closure Plan details the activities to be performed for closure of the RCRA Interim Status regulated unit at FWDA, located in Gallup, New Mexico. Specifically, the Final Closure Plan addresses the closure of the FWDA Open Burning and Demolition Area (OBDA).

1.1 BACKGROUND

The Final Closure Plan was approved in a correspondence, dated 20 January 1994 from Ms. Kathleen M. Sisneros, Director, Water and Waste Management Division, State of New Mexico Environment Department (NMED).

The Final Closure Plan as approved included the following documents:

- Final Fort Wingate Depot Activity Resource Conservation and Recovery Act Interim Status Closure Plan, dated 1 March 1993;
- Attachment-1, Proposed Interim Status Closure Field Screening Approach, dated 20 October 1993;
- RCRA Interim Status Closure Schedule of Activities, dated November 1993; and
- Conditions of Closure Plan Approval, dated 20 January 1994.

The Conditions of Closure Plan Approval described additional requirements to be performed including quarterly progress reports, completion of a survey plat, evaluation of ecological risks posed by site

conditions remaining after completion of the closure activities, and submittal of a closure plan modification based on the results of the field screening activities. A copy of the Conditions of Closure Plan Approval is included as Appendix A to this Closure Plan Modification.

The field screening activities were completed in November of 1993 and the findings and results are presented and summarized in this Closure Plan Modification.

Open burning and open detonation (OB/OD) operations were conducted at FWDA to dispose of munitions and munitions-related materials. Since 1955, the OB/OD operations were conducted at separate locations within the OBDA in an area encompassing approximately 125 acres. The OB/OD operations in this area were permitted under RCRA Interim Status and will undergo closure.

In planning the implementation of closure, the exact boundaries of the "regulated" OB/OD operations were undefined. Open detonation of high explosives was performed at various locations on the ground within the general OB/OD area, which had over time resulted in wide-spread surface soil disposition and disturbance (see Figure 2-1). Open burning of waste propellants and pyrotechnics was performed both in burning trays or on the ground within the delineated Burning Ground Area. The identifiable areas of impact from treatment operations included the visually observable detonation craters and the Burning Ground Area.

Limited sampling and analysis of surface soils had been previously performed within the OBDA, and not to an extent that would provide any identification or delineation of previous OB/OD operations. Field screening was therefore proposed to establish the absence/presence of residual contaminants within areas identified as being potentially impacted from the historic treatment operations and to define the areas for which closure is to be performed.

Additionally, the demilitarization/treatment operations at the OBDA, through detonation of accumulated munitions, ammunition, etc. had over time resulted in the areal expulsion or "kick-out" of dirt and debris and potentially un-treated unexploded ordnance (UXO). The UXO kick-out consisted of:

- randomly located, surficially deposited (primarily 0-6 inch depth) metal debris and ordnance fragments ("non-live" ordnance);
- "live ordnance" that was determined to be safe to remove, and
- items that were visually identified as non-movable, due to safety concerns (i.e., sensitive or motion detection fusing).

Field screening was also proposed to confirm the absence of residual contaminants in the outlying areas beyond the directly impacted OB/OD area so these areas could be excluded from closure.

The non-movable items were identified as "blow-in-place items" (BIPs), requiring detonation in-place to be rendered safe. The potential environmental impact from these in-place detonation operations (i.e., residual explosives, metals) was also established as an objective of the field screening program. In addition, the cistern and observed areas of potential surface water within the arroyo were to be investigated.

The planned areas of investigation under the field screening program included:

- Established quadrants within the OBDA
- The visible detonation craters
- The arroyo and observed residue/debris areas within the arroyo
- The Burning Ground Area
- Identified BIP locations
- Sediment and surface water and ground water conditions within the arroyo.

Table 2-1 summarizes the proposed field screening and ground water and surface water sampling.

2.1 *UNEXPLODED ORDNANCE SURVEY*

Surface and subsurface surveys of selected areas of potential UXO concern and UXO safety escorts were performed at the FWDA by UXB International, Inc. (UXB) of Chantilly, VA. A surface and subsurface (0-6 inch depth) UXO survey was performed of the OB/OD area (established as the inner-fenced portion of the OBDA). Identified "live" and "non-live" ordnance items were removed from the survey areas and separately staged at established locations within the OB/OD area. The live items were then detonated by Army EOD units using three of the existing detonation craters. The non-live items were to be confirmed by the Army EOD for final Army disposition. Identified ordnance items determined to be too sensitive to move were marked for destruction in place as BIPs by the Army EOD units.

2.1.1 *Methodology*

USAEC requires that two distinct methods of geophysical survey be conducted. The Foerster Ferex Ordnance Locator was used, in conjunction with the White's commercial metal detector, for all subsurface geophysical surveys.

Table 2-1
Summary of Proposed Interim Status Closure
Field Screening/Ground Water Sampling

Location	No. of Field Screening Samples	Field Duplicate Samples at 10%	Field Blanks (1 in 20)
Surface Soil Samples			
Identified BIP Locations	12	2	1
OBDA Quadrants	68	7	3
Observed Residue/Debris Areas	24	2	1
Arroyo	6	1	1
Burning Ground Area	8	1	1
Craters	22	2	1
	140	15	8
		Total =	163
Groundwater/Surface Water Samples			
Groundwater Wells	4	1	1
Arroyo	2		
	6	1	1
		Total =	8

Volatile Organic Compounds (VOC) Screening

VOC Screening performed using field instrumentation at the same eight (8) Burning Ground Area sampling locations selected for explosives field screening

NOTE: Trip Blanks generated based upon the frequency of sample shipment.

The Foerster Ferex Ordnance Locator is the most recent military approved locator and is in use by the U.S. Military EOD forces, designated the MK 26 Ordnance Locator, for detecting subsurface ordnance items. The locator is a hand-held unit and uses 2 fluxgate magnetometers, aligned and mounted a fixed distance apart to detect changes in the earth's ambient magnetic field caused by ferrous metal or disturbances associated with soil conditions. Both an audio and metered signal are provided to the operator. The metered signal indicates whether the disturbance is geodetic or metal-related. The detection capability of the Foerster Ferex is dependent on the size of the item versus its depth. Although the instrument can detect disturbances caused by changes in soil conditions, its ability to detect metallic items is not affected by local soil conditions because the instrument is set to zero (nulled) over local soil free of metallic items, thus removing the effects of the local soil conditions.

White's Eagle II Metal Detector is a portable, microprocessor controlled metal detector with a Liquid Crystal Display and a keypad user interface. This metal detector operates on the induction principle whereby a transmitter coil induces eddy currents within buried metal objects and these induced eddy currents are received by a receiver unit. The advantage of this detector is that it can detect both ferrous and non-ferrous metals.

2.1.2 *Results*

In the performance of the UXO survey activities within the defined OB/OD area, approximately 10, 223 ordnance items were identified and recovered (live and non-live) and approximately 874 BIP items were marked for destruction in-place. Appendix B provides the UXB summary sheets of identified, marked, and stockpiled ordnance items resulting from the installation survey activities. Army EOD support for the UXO items identified and recovered from the entire installation survey program was provided by the 52D Ordnance Group, Fort Gillem, GA over four (4) separate mobilizations occurring from May through December 1993.

In addition, the ground coverage resulting from the visual UXO survey identified residue/refuse areas along the length of the arroyo. These areas were marked on figures generated of the OB/OD area and incorporated into the field screening program.

For potential future land use/transfer considerations, the areal boundary within which BIP items were identified was also located, based on observations resulting from the visual - surface/0-6 inch UXO surveys. This boundary was established as a "worst-case scenario" by visually approximating as a discrete point the furthest identified BIP location radially from the boundary of the existing OBDA.

2.2 FIELD SCREENING SAMPLES

Three hundred by three hundred (300 x 300) foot sampling grids were established within the defined boundary of the OBDA. This grid encompasses the delineated active OB/OD area, including the Burning Ground Area and the detonation craters. Surface soil, surface water, and ground water samples were collected from within this grid area to evaluate the areal extent of impacts within the OBDA. Surface soil samples were also collected from within the arroyo downgradient of the OBDA to evaluate potential transport of constituents of concern.

2.2.1 *Surface Soil*

Specific conditions and past activities conducted in designated areas within the defined boundary of the OBDA allowed six categories of samples to be established. Grab surface soil samples (0 to 6 inch depth) were collected from locations in each of these six categories described below and analyzed for target compound list (TCL) explosives and target analyte list (TAL) metals. The sample locations are presented in Figure 2-2.

Three surface soil samples were also collected within the arroyo downgradient of the OBDA. These samples were analyzed for TCL explosives, TAL metals, total phosphorus, and nitrate/nitrite.

2.2.1.1 *OBDA Grid Quadrants*

To assess the impact of historical OB/OD operations to surface soils, approximately 68 quadrants were delineated. A surface soil sample was collected from each quadrant. The samples were collected either in the approximate center of the quadrant or at an area of visually observed potential significance (i.e., surface staining, stressed vegetation, etc.), if present. A total of 68 surface soil samples were collected from grid quadrants.

2.2.1.2 *Burning Ground Area*

To evaluate the impact of historical OB/OD operations to surface soils within the Burning Ground Area, eight surface soil samples were collected from locations throughout the Burning Ground Area.

2.2.1.3 *Detonation Craters*

To evaluate the level of residual contamination within the detonation craters, surface soil samples were collected from two locations at each of the existing 11 detonation craters. One sample was collected from the

center of each crater and a second sample was collected from a side-wall. A total of 22 surface soil samples were collected from 11 craters.

2.2.1.4 *Blow-In-Place (Bip) Items*

To confirm the absence of environmental impact resulting from the detonation of identified BIPs, the locations of 12 BIPs within the OBDA were marked prior to detonation. Random and equal locations were marked for three types of BIP items that had been typically identified within the OBDA. Following detonation, a surface soil sample was collected from the center of the detonation location at each of the marked BIPs. A total of 12 surface soil samples were collected from BIP locations.

2.2.1.5 *Residue/Debris Areas*

One to four locations (depending on size) were sampled in each of the residue/debris areas identified along the length of the arroyo. A total of 24 samples were collected.

2.2.1.6 *Arroyo*

Surface soil samples were collected from several locations along the floor of the arroyo to establish whether compounds of concern are being transported into and along the arroyo. A total of six surface soil samples were collected from the arroyo.

2.2.2 ***Surface Water***

An area of ponded water was observed within the OBDA during the 5 May 1993 sampling event. A surface water sample (BTSW03) was collected from the ponded water (See Figure 2-2) and analyzed for TCL volatile organic compounds (VOCs), TCL semi-volatile organic compounds (SVOCs), TCL explosives, TAL metals, total phosphorus, and nitrate/nitrite.

2.2.3 ***Shallow Subsurface Water***

It was reported that a spring is located within the arroyo. ERM personnel observed what appeared to be a large corrugated metal culvert buried approximately six feet below ground surface within the arroyo. Two 55-gallon drums placed on top of one another penetrated the culvert and extended to approximately six inches above the ground surface. The top of the drum protruding from the ground was covered by a metal plate. Water was observed in the buried culvert at a depth of approximately 10 feet below ground surface. These observations indicate that this is not

actually a spring, but can be considered a cistern which collects shallow subsurface water. The location of the cistern is shown on Figure 2-2.

This cistern indicates that the subsurface conditions in this area require evaluation for the presence of shallow subsurface water. A hole was hand-augured to the depth of refusal, approximately four feet below ground surface, within the arroyo, downgradient of the cistern. A two-inch diameter stainless-steel well point was installed in the augured hole (FW38).

Four ground water samples were collected from the cistern (BTSW02) during four sampling events: 7 December 1992, 5 May 1993, 27 May 1993, and 19 November 1993. One sample was collected from well FW38 during the 19 November 1993 sampling event. Samples collected during the first three sampling events were analyzed for TCL VOCs, TCL SVOCs, TCL explosives, TAL metals, total phosphorus, and nitrate/nitrite. Ground water samples collected during the most recent sampling event were analyzed for TCL explosives, TAL metals, and standard New Mexico water quality criteria including: total dissolved solids (TDS), nitrate/nitrite, major cations/ions, phosphorus, phosphate, and nitroaromatics.

Surface soil samples collected within the OBDA and ground water samples from the 19 November 1993 sampling event were sent to Environmental Science & Engineering, Inc. in Englewood Colorado for analysis. Downgradient surface soil, surface water, and all other ground water samples were sent to EA Science & Engineering, Inc. in Sparks, Maryland for analysis.

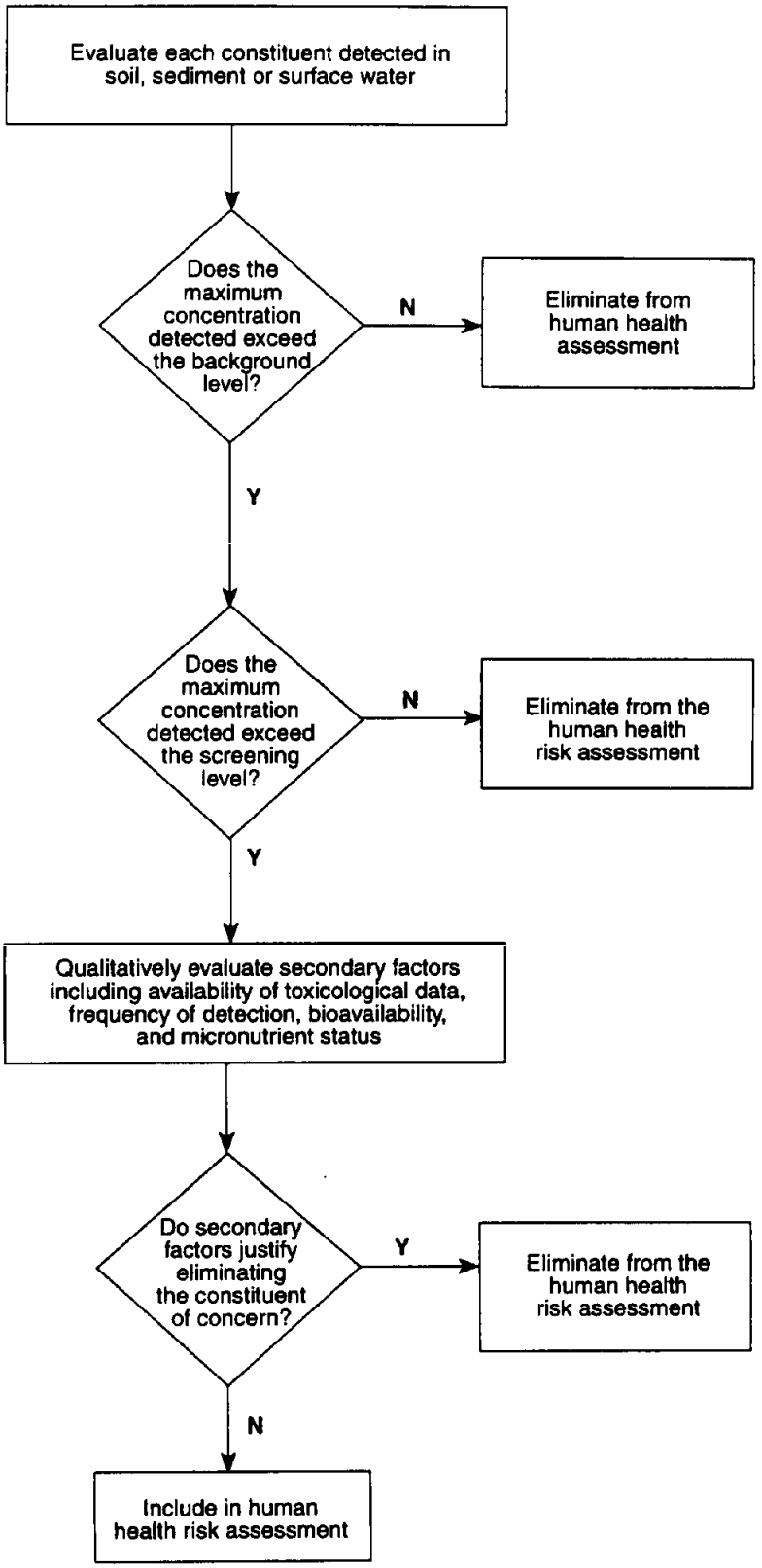
The determination of whether constituents occur at concentrations which warrant remediation has been based on comparisons of constituent concentrations to established background and screening levels. Screening of analytical data is a means to identify constituents which do not require further evaluation. Screening levels used to eliminate constituents from further consideration are derived from:

- Background data;
- Regulatory criteria;
- Criteria providing protection of human health and the environment; and
- Secondary factors which are site and constituent specific.

Thus, the screening levels identify constituent concentrations that do not pose unacceptable risks to the potentially exposed populations at the FWDA. Constituent concentrations exceeding screening levels were included for corrective measures and more detailed evaluation. The screening assessment as described below was only used to eliminate constituents from the human health risk assessment. The overall screening approach for the human health and ecological risk assessments is shown in Figure 3-1.

Section 3.1 presents the selection of constituents for which screening levels were derived. Section 3.2 describes the process used for identifying and selecting screening levels. More detail is provided on the identification of regulatory criteria and the calculation of human health based screening criteria in Section 3.3 and 3.4, respectively. Section 4.0 then discusses the nature and extent of contamination and compares the analytical results for soil, sediment, and surface water to the appropriate background and screening levels for each constituent (derived in this section). The comparisons presented in Section 4.0 form the basis for selecting areas of concern and constituents of concern for further evaluation.

Figure 3-1
Overall Screening Approach
Fort Wingate Depot Activity
Gallup, New Mexico



Three USEPA guidance documents served as the primary reference sources for the screening approach presented in this section:

- Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual. Part A - Baseline Risk Assessment (USEPA, 1989);
- Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual. Part B - Preliminary Remediation Goals (USEPA, 1991); and
- Risk Assessment Guidance for Superfund: Volume II, Ecological Evaluation Manual. (USEPA, 1991).

These guidance manuals are referred to herein as RAGS Part A, RAGS Part B, and RAGS Volume II, respectively.

These guidance documents have been selected preferentially to the RCRA proposed Subpart S (Corrective Action for Solid Waste Management Units) because they represent more recent guidance than the proposed rule. The Subpart S cleanup rule was proposed in 1990 and has not yet been promulgated. In addition, the Subpart S rule considers only limited exposure scenarios which do not include any of the exposure scenarios pertinent to this site. Therefore, due to the more recent Superfund guidance documents and the greater applicability of exposure scenarios suggested by those documents, the RCRA Subpart S guidance will not be considered while evaluating cleanup goals for this site.

3.1 *Identification of Constituents for Screening*

This section presents the approach used to eliminate certain constituents from further evaluation and presents the list of constituents which were evaluated in the remainder of the Report. The starting point for this analysis included all constituents analyzed for in the FWDA EI Program. Section 4.0 presented the number and type of samples, and the constituents for analysis. The complete analytical data set generated for the OBDA is presented in Appendix C.

Constituents which were not positively identified in any sample taken during the FWDA EI Program were eliminated from further consideration. All remaining constituents positively identified in one or more samples taken at the FWDA were evaluated in the remainder of the Closure Plan Addendum. Table 3-1 lists the constituents that were detected at the OBDA, the number of samples analyzed for each constituent, and the number of samples each constituent was detected in. Table 3-1 forms the basis for the development of screening levels

Table 3-1
Compounds Detected
Open Burning and Detonation Area
Fort Wingate Depot Activity
Gallup, New Mexico

Compound Name	Soil		Surface Water		Shallow Subsurface Water	
	Number of Samples	Number of Detections	Number of Samples	Number of Detections	Number of Samples	Number of Detections
EXPLOSIVE COMPOUNDS						
Cyclotetramethylenetetranitramine (HMX)	140	21	1	0	5	1
Cyclonite/Hexahydro-1,3,4-triazine (RDX)	140	22	1	0	5	2
1,3,5-Trinitrobenzene (1,3,5-TNB)	140	15	1	0	5	0
1,3-Dinitrobenzene (1,3-DNB)	140	8	1	0	5	1
Nitrobenzene (NB)	140	2	1	0	5	0
N-Methyl-N,2,4,6-tetranitroaniline (Tetryl)	140	1	1	0	5	0
2,4,6-Trinitrotoluene (2,4,6-TNT)	140	18	1	0	5	1
2,6-Dinitrotoluene (2,6-DNT)	140	3	1	0	5	0
2,4-Dinitrotoluene (2,4-DNT)	140	6	1	0	5	0
2-Nitrotoluene (2-NT)	140	0	1	0	5	0
4-Nitotoluene (4-NT)	140	0	1	0	5	0
3-Nitrotoluene (3-NT)	140	0	1	0	5	0
2-Amino-4,6-DNT	140	28	1	0	5	0
4-Amino-2,6-DNT	140	24	1	0	5	1
INORGANICS						
Aluminum (Al)	140	0	1	1	5	3
Antimony (Sb)	140	149	1	0	5	0
Arsenic (As)	140	0	1	0	5	3
Barium (Ba)	140	2	1	1	5	4
Beryllium (Be)	140	0	1	1	5	1
Cadmium (Cd)	140	40	1	0	5	1
Calcium (Ca)	140	0	1	1	5	5
Chromium (Cr)	140	3	1	0	5	2
Cobolt (Co)	140	0	1	0	5	1
Copper (Cu)	140	25	1	0	5	4
Iron (Fe)	140	2	1	1	5	5
Lead (Pb)	140	9	1	0	5	1
Magnesium (Mg)	140	0	1	1	5	5
Manganese (Mn)	140	0	1	1	5	5
Mercury (Hg)	140	35	1	0	5	0
Nickel (Ni)	140	1	1	0	5	3
Potassium (K)	140	0	1	1	5	3
Selenium (Se)	140	0	1	0	5	1
Silver (Ag)	140	12	1	0	5	0
Sodium (Na)	140	0	1	1	5	4
Thallium (Tl)	140	0	1	0	5	0
Vanadium (V)	140	0	1	0	5	2
Zinc (Zn)	140	0	1	0	5	5
VOLATILE ORGANIC COMPOUNDS						
Chloromethane (CH3CL)	NS	NS	1	0	3	1

NS = Not Sampled

presented in the remainder of this section. Discussion of the constituents detected, their respective concentrations in each environmental medium, and the comparison of those concentrations to the background and screening levels for the constituent is presented in Section 4.0. In Section 4.0, only compounds detected at concentrations above the respective background levels were discussed. The reader should note that all constituents for analysis which are not discussed in Section 4.0 were eliminated based on the criteria discussed above (i.e., they were either identified as laboratory contaminants, they were not detected anywhere on the installation, or they were not detected above the background level anywhere on the installation).

3.2 *Identification of Screening Levels*

Screening levels were derived from four sources. These levels are described in the following sections.

3.2.1 *Background*

The primary screening levels for inorganic constituents detected at the OBDA are the concentrations of the constituents in background soils, sediments, and surface waters.

Eight total soil borings were installed as part of the FWDA site background sampling; two (2) each at the following locations: West of Lake McFerren, East of the Hogback, North of Santa Fe Springs, and West of Igloo Block C. Subsurface soil samples were collected from each of the borings at depths of 0 to 1 feet, 3 to 5 feet and 8 to 10 feet and analyzed for nitrate/nitrite, total phosphorus, and TAL metals.

Surface water and sediment samples were collected as part of the site background sampling at four (4) locations within the Southern Property; the observed influent and effluent to Lake McFerren as well as Lake McFerren and a pond identified during the visual survey located in the vicinity of the BMT Site. Sediment samples were additionally collected from Bread Springs Wash at four locations and from Milk Ranch Canyon. The sediment and surface water samples were all analyzed for nitrate/nitrite, total phosphorus, and TAL metals.

The background soil and water concentrations are presented in Tables 3-2 and 3-3, respectively.

Background values were only measured for inorganic constituents, since most of the organics and explosives evaluated at the OBDA do not occur naturally in soils or water. In addition, mercury was excluded from the background analysis since it is not expected to occur naturally in soils at

Table 3-2
Soil Background Screening Levels
Open Burning and Detonation Area
Fort Wingate Depot Activity
Gallup, New Mexico

Constituent	Synonym	Backgound Screening Level mg/kg
Silver	(AG)	0.803
Aluminum	(AL)	247,000
Arsenic	(AS)	81
Barium	(BA)	3,660
Beryllium	(BE)	18.10
Calcium	(CA)	600,000
Cadmium	(CD)	1.750
Cobalt	(CO)	142
Chromium	(CR)	168
Copper	(CU)	289
Iron	(FE)	215,000
Mercury	(HG)	0.050
Potassium	(K)	34,800
Magnesium	(MG)	300,000
Manganese	(MN)	18,000
Sodium	(NA)	21,200
Nickel	(NI)	435
Nitrite, Nitrate	(NIT)	90
Phosphorus	(P4)	3,570
Lead	(PB)	81
Antimony	(SB)	19.60
Selenium	(SE)	0.449
Thallium	(TL)	34.30
Vanadium	(V)	384
Zinc	(ZN)	444

Table 3-3
Water Background Screening Levels
Open Burning and Detonation Area
Fort Wingate Depot Activity
Gallup, New Mexico

Constituent	Synonym	Backgound Screening Level mg/l
Silver	(AG)	15.3
Aluminum	(AL)	210,000
Arsenic	(AS)	32.7
Barium	(BA)	3,330
Beryllium	(BE)	10.7
Calcium	(CA)	510,000
Cadmium	(CD)	35.1
Cobalt	(CO)	201
Chromium	(CR)	179
Copper	(CU)	157
Iron	(FE)	249,000
Mercury	(HG)	0.409
Potassium	(K)	43,800
Magnesium	(MG)	108,000
Manganese	(MN)	147,000
Sodium	(NA)	17,600
Nickel	(NI)	173
Nitrite, Nitrate	(NIT)	4,500
Phosphorus	(P4)	3,180
Lead	(PB)	194
Antimony	(SB)	220
Selenium	(SE)	1.75
Thallium	(TL)	3.97
Vanadium	(V)	438
Zinc	(ZN)	801

the site. Constituents that were not detected in background samples were not assigned a background value. Following USEPA guidance, the screening criteria based on background concentrations were set equal to three times the maximum concentration detected in any background sample (USEPA, 1992). This approach is appropriate in lieu of a more statistically rigorous approach where sufficient background samples are not available to fully represent the background population. In addition, the high degree of variability in the reported concentrations for background suggests that the use of three times the maximum concentration is a valid approach. It is important to emphasize that the constituents for which a background value was assigned are naturally occurring minerals in soils and that the use of three times the maximum concentration as a background screening value is reasonably conservative for the inorganic constituents evaluated. Background data, including the background screening levels selected for each constituent, are presented in Appendix F.

3.2.2 *Regulatory Criteria*

The secondary source of screening levels includes promulgated media-specific standards such as Federal Maximum Contaminant Levels (MCLs) for shallow subsurface water, and Federal Ambient Water Quality Criteria (AWQC) for surface water. These standards are derived from a compilation of Potentially Applicable or Relevant and Appropriate Requirements (PARARs). A compilation of PARARs is presented in Section 3.4.

3.2.3 *Screening Levels Providing Protection of Human Health*

Where a promulgated media-specific standard was not available for a given constituent in a specific medium, a risk-based screening level (Preliminary Remediation Goal or PRG) was derived based on a residential exposure scenario at the site. Risk-based screening levels are derived in Section 3.4. These risk-based concentrations formed the third primary source for screening levels.

3.2.4 *Secondary Factors*

Secondary factors are constituent specific factors which may result in the exclusion of a constituent from the risk assessment, even if it exceeded one or more of the preceding three screening levels. Examples of these factors include low frequency of detection, and spatial location that precludes contact. It is important to note that while this is the fourth part of the screening process, secondary factors are not considered in establishing site-wide screening levels.

3.2.5 *Selection of Screening Levels*

The selection process for determining which of the three values (background, PARAR, and PRG) should serve as the screening level is shown in Figure 3-2. The selection logic supplements the background screening step indicated in Figure 3-1. If a background screening level was not available, or if the constituent concentrations exceeded the background screening level, then PARARs and PRGs were considered for that constituent.

The PARAR searches and the development of risk-based screening levels presented in Sections 3.3 and 3.4 were implemented for all constituents identified as having been detected in one or more of the areas listed on Table 3-1.

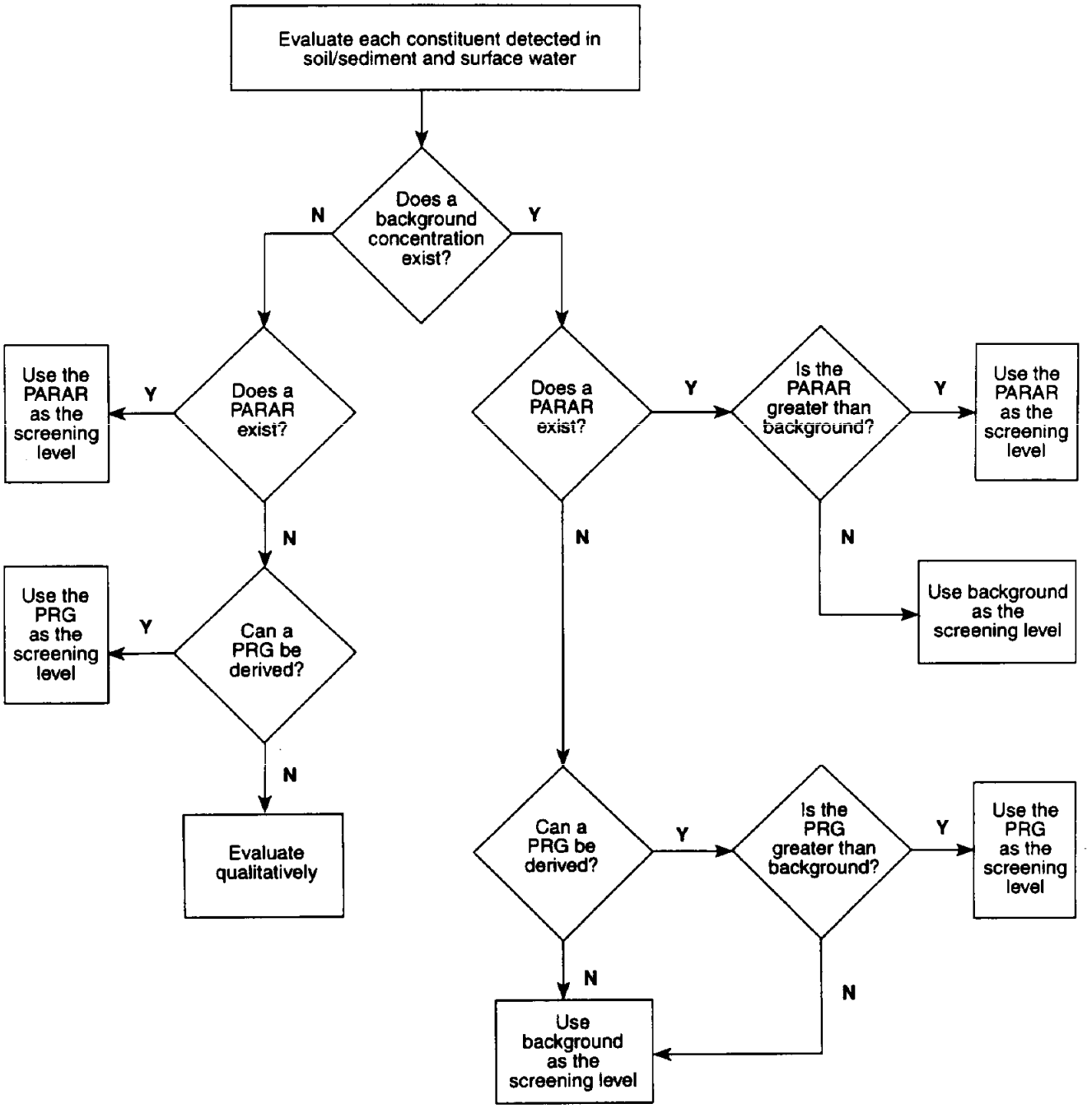
3.3 *Potentially Applicable or Relevant and Appropriate Requirements*

Cleanup standards for remedial actions must attain a general standard of cleanup that assures protection of human health and the environment, is cost-effective, and uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, SARA requires that any hazardous substance or pollutant remaining on site meet the level or standard of control established by ARAR standards, requirements, criteria, or limitations established under any federal environmental law, or any more stringent standards, requirements, criteria, or limitations promulgated in accordance with a state environmental statute. For the purposes of screening, data were compared to all standards which could have been considered potential ARARs (PARARs).

A requirement may be either applicable or relevant and appropriate to remedial activities at a site, but not necessarily both. "Applicable" requirements are standards and other substantive environmental protection requirements promulgated under Federal or State law that specifically address a circumstance of a site such as a hazardous substance, pollutant, contaminant, remedial action, or location. "Applicability" implies that the circumstances at the site satisfy all of the jurisdictional prerequisites of a requirement.

"Relevant and appropriate" requirements are standards and other substantive environmental protection requirements promulgated under Federal or State law that address situations sufficiently similar to a specific CERCLA site to be of use. "Relevance" infers that the requirement regulates or addresses situations sufficiently similar to those found at the CERCLA site. "Appropriateness" assumes that the circumstances of the release or threatened release are such that use of the standard is

Figure 3-2
Screening Level Selection
Fort Wingate Depot Activity
Gallup, New Mexico



Notes:

PARAR - Potential ARAR

PRG - Preliminary Remediation Goal

appropriate. A requirement must be both relevant and appropriate in order to apply to a site; if it is relevant but not appropriate then it will not apply.

"To be considered" materials (TBCs) are non-promulgated advisories or guidances that are not legally binding. TBCs do not have the status of ARARs.

Three types of ARARs are evaluated in the RI process: chemical-specific, location-specific, and action-specific. Chemical-specific ARARs are usually health- or risk-based numerical values or methodologies. These values establish the acceptable amount or concentration of a chemical that may be left in or discharged to the ambient environment. Location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they are in a specific location. Action-specific ARARs are usually technology- or activity-based requirements or limitations on actions taken with respect to hazardous wastes. These requirements are activated by the particular remedial activities selected for a site.

Safe Drinking Water Act (SDWA) Standards

Primary drinking water regulations include Maximum Contaminant Levels (MCLs) for specific contaminants. CERCLA guidance states that Primary MCLs are applicable for sites whose shallow subsurface water or surface water is used to supply drinking water to 25 or more people or 15 or more service connections. If the MCLs are applicable, they are applied at the tap. Further, the MCLs are considered relevant and appropriate as in situ cleanup standards where either shallow subsurface water or surface water is or has the potential to be used for drinking. If standards are not applicable or relevant and appropriate, they are identified as TBCs until remedial actions are presented which render them PARARs or remove them from consideration. When no promulgated standard exists for a given contaminant, proposed MCLs are given greatest consideration among the TBCs.

Secondary drinking water regulations consist of Secondary Maximum Concentrations Limits (SMCLs) for specific contaminants. SMCLs are levels that are established for aesthetic or other non-health based purposes. The SMCLs are non-enforceable limits intended as guidelines for use by states in monitoring water supplies. As non-enforceable limits, they can only be TBCs.

Maximum Contaminant Level Goals (MCLGs) are health-based goals for drinking water. As non-enforceable limits, they can only be TBCs.

Federal and State Ambient Water Quality Criteria

CERCLA requires that sites attain federal national water quality criteria for the protection of human health where they are relevant and appropriate. Whether a criteria is relevant and appropriate is based upon the State's designated or potential use of the surface water and whether the criteria are protection of that use. In waters designated as public water supply, a water quality criterion is protective of that use. In waters designated as public water supply, water quality criteria indicating drinking water and fish consumption are relevant and appropriate. Waters designated for recreation typically have criteria for fish consumption alone as relevant and appropriate.

National water quality criteria for the protection of aquatic life may be relevant and appropriate based upon the specified use of the water. In surface or shallow subsurface waters with a potential for discharge to surface waters that are designated for the protection of freshwater aquatic life, the standard reflecting freshwater acute/chronic impact is identified as relevant and appropriate. For surface or shallow subsurface waters with a potential for discharge to surface waters that are designated for the protection of marine aquatic life, the standards reflecting marine acute/chronic impact are identified as relevant and appropriate.

New Mexico State Standards

State water quality standards were evaluated as being potentially applicable, relevant, and appropriate requirements. PARARs for New Mexico were chosen from two regulatory sources: the state Water Supply Regulations ("Regulations Governing Water Supplies, as amended through April 16, 1991") and the Water Quality Control Commission Regulations ("New Mexico Water Quality Control Commission , Regulations as amended through August 18,1991). Water supply regulations are health based and apply to all public water supply systems, regardless of size, in the state of New Mexico; in addition, portions of this regulation apply to the siting of private well water supplies. State maximum contaminant levels apply as follows:

- The MCL for nitrate applies to all systems,
- All other MCLs for inorganics apply to community systems only,
- Insecticide and herbicide MCLs apply to community systems only,
- The MCL for trihalomethanes applies to community water systems that add a disinfectant and that serve 10,000 or more individuals,
- VOC MCLs apply to all community and non-community water systems.

The water quality control regulations are intended to protect the quality of shallow subsurface water in the state of New Mexico. These regulations are aimed at providing guidance for water discharged to either the earth's surface or subsurface where the present or future use of the shallow subsurface water is as a domestic or agricultural water supply. These standards have been set to protect the quality of the shallow subsurface water and should not be confused with discharge standards; standards set by this regulation apply to ambient conditions in the shallow subsurface water at the location of a wastewater discharge. Human health based standards are numbers that represent the maximum concentrations of constituents that may be detected in shallow subsurface water which will still allow for the present and future use of the shallow subsurface water. All state standards were compared to federal standards with the most stringent standards being selected for screening purposes.

Table 3-4 shows the availability of PARARs and TBCs by chemical for shallow subsurface water. Table 3-5 shows the availability of PARARs and TBCs by chemical for surface water.

No chemical-specific PARARs were identified for soil with the exception of PCBs and lead. Section 7.0 of the Toxic Substances Control Act (TSCA) lists soil criteria for polychlorinated biphenyls (PCBs) (40 CFR Part 761). TSCA lists two primary concentrations of interest for soils. The first is a disposal restriction which states that "Any non-liquid PCBs at concentrations of 50 ppm or greater in the form of contaminated soil, rags, or other debris shall be disposed of in a TSCA-approved incinerator or in a TSCA-approved chemical waste landfill...". With regard to cleanup of spills, TSCA requires removal of contaminated material and backfilling with "clean soil". The regulation defines "clean soil" as having less than 1 ppm total PCBs.

The proposed RCRA Subpart S regulation contains a risk-based methodology for deriving soil action levels. The RCRA Subpart S methodology, however, is similar in nature to the RAGS Part B approach used in Section 3.4 to derive risk-based soil screening levels. Since the RAGS Part B approach reflects more recent USEPA guidance than the RCRA Subpart S approach, the RAGS Part B methodology was selected in lieu of RCRA Subpart S.

No toxicological indices are currently available for lead in USEPA's toxicity databases; therefore, quantitative risk assessment of lead cannot be performed utilizing the standard USEPA methods described in RAGS Part A. Evaluation of exposure to lead concentrations can be made for specific populations (e.g., children, nursing mothers) using biokinetic models to predict blood lead levels, but considerable controversy surrounds identification of acceptable blood lead levels. Availability of

Table 3-4
Ground Water PARARS/TBCS
Open Burning and Detonation Area
Fort Wingate Depot Activity
Gallup, New Mexico

CONSTITUENTS	National Drinking Water Standards (ug/l)			New Mexico State Water Quality Standards (d) (ug/l)			
	SDWA MCL (Primary) (a)	SDWA MCL (Secondary) (b)	SDWA MCLG (c)	NM Commercial Water Supply Systems	Human Health	Other Standards For Domestic Water Supply	Irrigation Use
EXPLOSIVE COMPOUNDS							
Cyclotetramethylenetetranitramine (HMX)							
Cyclonite/Hexahydro-1,3,4-triazine (RDX)							
1,3,5-Trinitrobenzene (1,3,5-TNB)							
1,3-Dinitrobenzene (1,3-DNB)							
Nitrobenzene (NB)							
N-Methyl-N,2,4,6-tetranitroaniline (Tetryl)							
2,4,6-Trinitrotoluene/alpha-Trinitrotoluene (2,4,6-TNT)							
2,6-Dinitrotoluene (2,6-DNT)							
2,4-Dinitrotoluene (2,4-DNT)							
2-Nitrotoluene (2-NT)							
4-Nitotoluene (4-NT)							
3-Nitrotoluene (3-NT)							
2-Amino-4,6-DNT							
4-Amino-2,6-DNT							
INORGANICS							
Aluminum (Al)		50 to 200					5,000
Antimony (Sb)	6 (e)		6 (e)				
Arsenic (As)	50			50	100		100
Barium (Ba)	2,000		2,000	100	1,000		1,000
Beryllium (Be)	4 (e)		4 (e)				
Boron (Bo)							750
Cadmium (Cd)	5		5	10	10		10
Calcium (Ca)							
Chromium (Cr)	100		100	50	50		50
Cobalt (Co)							50
Copper (Cu)		1,000	1,300			1,000	1,000
Iron (Fe)		300				1,000	1,000

Table 3-4
Ground Water PARARS/TBCS
Open Burning and Detonation Area
Fort Wingate Depot Activity
Gallup, New Mexico

CONSTITUENTS	National Drinking Water Standards (ug/l)			New Mexico State Water Quality Standards (d) (ug/l)			
	SDWA MCL (Primary)(a)	SDWA MCL (Secondary)(b)	SDWA MCLG (c)	NM Commercial Water Supply Systems	Human Health	Other Standards For Domestic Water Supply	Irrigation Use
Lead (Pb)	50/15•		0	50	50		50
Magnesium (Mg)							
Manganese (Mn)		50	200			200	200
Mercury (Hg) (f)	2	2	2	2	2		2
Nickel (Ni)	100 (e)		100 (e)				200
Nitrate	10,000		10,000	10,000	10,000		10,000
Nitrite	1,000		1,000				
Phosphorus							
Potassium (K)							
Selenium (Se)	50	50	50	10	50		50
Silver (Ag)	50	100		50	50		50
Sodium (Na)							
Thallium (Tl)	2 (e)		0.5 (e)				
Total Phosphates							
Vanadium (V)							
Zinc (Zn)		5,000				10,000	10,000

•56 FR 26460, 6/7/91, effective 12/7/93; action levels in no more than 10% of tap samples

(a) 40 CFR Parts 141, 142, 143
(b) 40 CFR Part 143,3
(c) 40 CFR Part 141
(d) New Mexico Water Quality Control Commision, New Mexico Water Quality Regulations, Part 3, Section 3-103, 11/16/1967, amended through August 1991
(e) USEPA Drinking Water; National Primary Drinking Water Regulations Synthetics Organic Chemicals and Inorganic Chemicals; National Primary Drinking Water Regulations Implementation 57 FR 31776;17 July 1992
(f) Value is that for inorganic mercury

If no values are shown for a potential contaminant, there are no standards at this time

Table 3-5
Surface Water PARARS/TBCS
Open Burning and Detonation Area
Fort Wingate Depot Activity
Gallup, New Mexico

CONSTITUENTS	Federal AWQC • for Protection of Human Health (a) (µg/l)		Federal AWQC Freshwater (a) (µg/l)		State of New Mexico (b) (µg/l)	
	Fish Consumption	Fish & Water Consumption	Acute	Chronic	State Irrigation	State Watering
EXPLOSIVE COMPOUNDS						
Cyclotetramethylenetetranitramine (HMX)						
Cyclonite/Hexahydro-1,3,4-triazine (RDX)						
1,3,5-Trinitrobenzene (1,3,5-TNB)						
1,3-Dinitrobenzene (1,3-DNB)						
Nitrobenzene (NB)						
N-Methyl-N,2,4,6-tetranitroaniline (Tetryl)						
2,4,6-Trinitrotoluene/alpha-Trinitrotoluene (2,4,6-TNT)						
2,6-Dinitrotoluene (2,6-DNT)						
2,4-Dinitrotoluene (2,4-DNT)	9.1 (c)	0.11 (c)				
2-Nitrotoluene (2-NT)						
4-Nitotoluene (4-NT)						
3-Nitrotoluene (3-NT)						
2-Amino-4,6-DNT						
4-Amino-2,6-DNT						
INORGANICS						
Aluminum (Al)			750	87	5,000	5,000
Antimony (Sb)	4,300 (d)	14 (d)				
Arsenic (As)	0.14 (c,d,e)	0.018 (c,d,e)	360 (f)	190 (f)	100	20
Barium (Ba)		2,000 (g)				
Beryllium (Be)	(h)	(h)				
Boron (Bo)				750 (i)	750	5,000
Cadmium (Cd)	(h)	(h)	3.9 (f,j)	1.1 (f,j)	10	50
Calcium (Ca)						
Chromium III (Cr+3)	(h)	(h)	1,700 (f,j)	210 (f,j)		
Chromium VI (Cr+6)	(h)	(h)	16 (f)	11 (f)		
Cobalt (Co)					50	1,000
Copper (Cu)			18 (f,j)	12 (f,j)	200	500
Iron (Fe)		300 (g)		1,000		
Lead (Pb)	(h)	(h)	82 (f,j)	3.2 (f,j)	5,000	100
Magnesium (Mg)						
Manganese (Mn)		30 (g)				

Table 3-5
Surface Water PARARS/TBCS
Open Burning and Detonation Area
Fort Wingate Depot Activity
Gallup, New Mexico

CONSTITUENTS	Federal AWQC for Protection of Human Health (a) (µg/l)		Federal AWQC Freshwater (a) (µg/l)		State of New Mexico (b) (µg/l)	
	Fish Consumption	Fish & Water Consumption	Acute	Chronic	State Irrigation	State Watering
Mercury (Hg)	0.15	0.14	2.4 (f)	0.012 (k)		
Nickel (Ni)	600 (d)	610 (d)	1,400 (f,j)	160 (f,j)		
Nitrate		10,000 (g)				
Nitrite						
Phosphorus						
Potassium (K)						
Selenium (Se)	(h)	(h)	20	5	130/250 (l)	50
Silver (Ag)			4.1 (f,j)			
Sodium (Na)						
Thallium (Tl)	6.3 (d)	1.7 (d)	1,400 (m)	40 (m)		
Total Phosphates						
Vanadium (V)						
Zinc (Zn)			120 (f,j)	110 (f,j)	100 2,000	100 25,000

Notes:

(a) 57 FR 60848-60923 Water Quality Standards; 40 CFR Part 131, 22 Dec. 1992, unless otherwise stated
(b) Water Quality Standards for Interstate and Intrastate Streams in New Mexico; amended 5/22/91; New Mexico Water Quality Control Commission effective 29 June 1991
(c) The criteria is based on carcinogenicity (1x10^-6 risk)
(d) Criteria revised to reflect current agency RfD, as contained in IRIS; BCF for fish tissue from 1980 criteria documents was retained in all cases
(e) The criteria refers to the inorganic form only
(f) Criteria for these metals are expressed as a function of the water effect ratio (WER) as defined in 40 CFR 131.36(c)
(g) Value is that for the maximum contaminant level (MCL)
(h) The EPA is not promulgating human health criteria for this contaminant. Permit authorities should address this contaminant in NJDES permit actions using the state's existing narrative criteria for toxics
(i) Criterion based on long term irrigation of sensitive crops (minimum standard)
(j) Freshwater aquatic criteria for these metals are expressed as a function of total hardness and as a function of the pollutants water effect ratio (WER). Values correspond to a total hardness of 100 mg/l and WER of 1.0
(k) If the criteria continuous concentration (CCC) for total mercury exceeds 0.012 µg/l more than once in a 3-year period in the ambient water, the edible portion of the aquatic species of concern must be analyzed to determine whether the concentration of methyl mercury exceeds the FDA action level of 1.0 mg/kg
(l) Criteria not developed; value presented is the lowest observable effects level (LOEL)
(m) Criteria not developed; value presented is the lowest observable effects level (LOEL)
If no values are shown for a potential contaminant, there are no standards at this time

the USEPA Uptake/Biokinetic Model (UBK) for lead exposure is restricted at the time of this writing to a preliminary draft (Version 0.5). Application of Version 0.5 of the UBK is presented in Section 3.4.4.

Office of Solid Waste and Emergency Response (OSWER) Directive 9355.04-02 (USEPA 1989) provides a range of acceptable lead concentrations in soil for residential and industrial land uses, respectively, of 500 to 1000 mg/kg. As a screening tool, concentrations of lead in the FWDA soils and sediments were compared against the more conservative 500 mg/kg guideline.

3.4 *Risk-Based Screening Levels*

Risk-based screening levels were calculated for soil, surface water, and shallow subsurface water at the OBDA based on equations presented in RAGS Part B. The screening level calculations were based on a residential land use scenario which evaluates potential exposure of adult and child residents. The residential land use scenario was selected for this site to represent the most conservative exposure scenario. Due to ongoing UXO concerns, this site is not suitable for current or future residential use; however, to identify all potential constituents of concern for remediation, this exposure scenario was employed. Section 3.4.1 discusses the selection of exposure scenarios and exposure routes for the screening assessment. Section 3.4.2 shows the specific screening level equations used for soil and water, and presents a sample calculation for a soil PRG. Section 3.4.3 presents the derived risk-based screening level values for soils/sediments and surface/subsurface water for all chemicals of concern, and discusses those chemicals for which risk-based screening levels could not be generated. Section 3.4.4 discusses the results of the UBK model for lead in soils at the FWDA.

3.4.1 *Identification of Potential Exposure Pathways for the Screening Assessment*

The types of exposures that were assessed in the screening assessment were determined based on current and future potential land use scenarios. The exposures selected may take into account site-specific factors such as land use restrictions and other institutional remedial actions. During the screening step, however, the intent was to derive media-specific concentrations which were protective of human health under the most conservative exposure setting. This step ensured that areas that were eliminated during the screening evaluation would not have required remediation.

Residential land use generally yields the highest degree of exposure to soil and shallow subsurface water and therefore the lowest health-based

screening levels. The development of risk-based screening levels described in Section 3.4.2 used conservative residential exposure assumptions at all areas of concern to derive conservative media-specific screening levels for constituents detected at the facility.

Having selected a residential exposure setting as the most conservative approach for deriving screening levels, the next step was to select appropriate exposure routes for the media of concern. Exposure routes which may be considered under a residential scenario included soil ingestion, water ingestion, dermal contact with water (showering, swimming), inhalation of dust and volatile chemicals, and others. USEPA has indicated (in RAGS Part B) that the most appropriate exposure routes for use in deriving screening levels are those which contribute the most to the dose received by the exposed population (adults and children). In addition, the USEPA recommends that the potential for soil contaminants to leach into shallow subsurface water should be evaluated if the potential exists for this type of migration to occur.

Following this approach described in RAGS Part B, ingestion of soil was selected as the exposure route for developing screening levels for soils and sediment. Screening levels for water were derived assuming ingestion of water as the sole domestic supply as well as inhalation of chemicals volatilizing from the water under normal domestic use conditions (e.g., showering, dishwashing). Leaching to ground water is not a significant migration pathway for the OBDA, and was therefore not considered in deriving screening levels. Due to the extensive earth moving that has occurred at OBDA, exposure to fugitive dust may be a significant exposure route. The impact of fugitive dust on the residential screening levels was evaluated and determined to have minimal impact on the risk-based screening level. Therefore, fugitive dust was not considered in deriving the screening levels. Dermal absorption of contaminants from soils and water is inconsequential compared to ingestion of soil and water (RAGS Part B); therefore, this exposure route was also eliminated from the screening assessment.

3.4.2 *Risk-Based Screening Level Calculations*

This section presents the calculation of screening levels for soil and water based on the exposure routes and assumptions described in Section 3.4.1. The equations used to derive the screening levels are presented in detail in RAGS Part B, pages 19 through 26. The screening level equations presented in RAGS Part B were derived from the standard risk and hazard index equations presented in RAGS Part A. These equations were rearranged to solve the chemical concentration in soil or water (screening level) which, based on the specified exposure assumptions, would result in the acceptable target risk level (i.e., $1x10^{-6}$) or target hazard index (i.e.,

1.0). Using this approach, derived screening levels are protective of the defined exposure scenario.

3.4.2.1 *Screening Level Calculations for Soil and Sediment*

Risk-based screening levels for soil and sediment which are protective with respect to exposures to carcinogenic constituents were calculated using the following equation and exposure assumptions:

$$SL = \frac{TR * AT * 365\ days / year}{CSF_O * 10^{-6}\ kg / mg * EF * IF_{soil\ /\ adj}}$$

where (default value in square brackets):

SL	=	Screening level (mg/kg)	[--]
TR	=	Target excess individual lifetime cancer risk (Class A & B carcinogens; USEPA 1991)	[1 x 10^{-6}]
AT	=	Averaging time	[70 years]
CSF_O	=	Oral cancer slope factor	[chemical-specific, $(mg/kg\text{-}day)^{-1}$]
EF	=	Exposure frequency	[350 day/year]
$IR_{soil/adj}$	=	Age adjusted soil ingestion rate	[114 mg-yr/kg-day]

The age-adjusted soil ingestion rate derivation is shown below. Similarly, risk-based screening levels for soil and sediment protective of exposures to non-carcinogenic constituents were calculated using the following equation and exposure assumptions:

$$SL = \frac{THI * AT * 365\ days / year}{\left[\frac{1}{RfD_O}\right] * 10^{-6}\ kg / mg * EF * IF_{soil\ /\ adj}}$$

where (default value in square brackets):

SL	=	Screening level (mg/kg)	[--]
THI	=	Target hazard index	[1.0]
AT	=	Averaging time	[30 years]
RfD_O	=	Oral reference dose	[chemical-specific, mg/kg-day]
EF	=	Exposure frequency	[350 day/year]
$IR_{soil/adj}$	=	Age adjusted soil ingestion rate	[114 mg-yr/kg-day]

The age adjusted soil ingestion rate accounts for differing soil ingestion rates over the lifetime of a human from childhood to adulthood, and is derived as follows:

$$IF_{soil/adj} = \frac{IR_{soil/age\ 1-6} * ED_{age\ 1-6}}{BW_{age\ 1-6}} + \frac{IR_{soil/age\ 7-31} * ED_{age\ 7-31}}{BW_{age\ 7-31}}$$

where (default value in square brackets):

$IR_{soil/age\ 1\text{-}6}$	=	soil ingestion rate ages 1-6	[200 mg/day]
$ED_{soil/age\ 1\text{-}6}$	=	exposure duration ages 1-6	[6 years]
$BW_{soil/age\ 1\text{-}6}$	=	body weight ages 1-6	[15 kg]
$IR_{soil/age\ 7\text{-}31}$	=	soil ingestion rate ages 7-31	[100 mg/day]
$ED_{soil/age\ 7\text{-}31}$	=	exposure duration ages 7-31	[24 years]
$BW_{soil/age\ 7\text{-}31}$	=	body weight ages 7-31	[70 kg]

As an example, the calculation of the screening level for HMX is shown below. The oral reference dose for HMX is given in IRIS as 0.05 mg/kg-day. The screening level is therefore:

$$SL = \frac{THI * AT * 365\ \text{days / year}}{\left[\frac{1}{RfD_o}\right] * 10^{-6}\ \text{kg / mg} * EF * IF_{soil\ /\ adj}}$$

$$SL = \frac{1.0 * 30 * 365\ \text{days / year}}{\left[\frac{1}{0.05}\right] * 10^{-6} * 350 * 114}$$

SL = 13,721 mg/kg

The screening level has been rounded to 13,500 mg/kg to account for the number of significant figures used in the RAGS Part B reduced equations.

3.4.2.2 *Screening Level Calculations for Water*

Screening levels were also calculated for shallow subsurface water and surface water assuming residential use of the water as a domestic supply. Following procedures provided in RAGS Part B, the residential water use equations account for ingestion of the water, as well as inhalation of VOCs from general domestic use of the water (e.g., washing, showering). The equation for deriving a water screening level for carcinogenic effects is as follows:

$$SL = \frac{TR * BW * AT * 365\ \text{days / yr}}{EF * ED * \left[\left(CSF_i * K * IR_a\right) + \left(CSF_o * IR_w\right)\right]}$$

where (default value in square brackets):

SL	=	Screening level (mg/l)	[--]
TR	=	Target excess individual lifetime cancer risk (Class A & B carcinogens; USEPA 1991)	[1×10^{-6}]
BW	=	Adult body weight	[70 kg]
AT	=	Averaging time	[70 years]
EF	=	Exposure frequency	[350 day/year]

ED	=	Exposure duration	[30 years]
CSF_i	=	Inhalation cancer slope factor	[chemical-specific, $(mg/kg\text{-}day)^{-1}$]
K	=	Volatilization factor	[0.0005 * 1000 l/m^3]
IR_a	=	Daily indoor inhalation rate	[15 m^3/day]
CSF_o	=	Oral cancer slope factor	[chemical-specific, $(mg/kg\text{-}day)^{-1}$]
IR_w	=	Daily water ingestion rate	[2 l/day]

Similarly, water screening levels for non-carcinogenic effects in water were calculated using the following equation:

$$SL = \frac{THI * BW * AT * 365 \text{ days / yr}}{EF * ED * \left[\left(\frac{1}{RfD_i} * K * IR_a\right) + \left(\frac{1}{RfD_o} * IR_w\right)\right]}$$

where (default value in square brackets):

SL	=	Screening level (mg/l)	[--]
THI	=	Target hazard index	[1.0]
BW	=	Adult body weight	[70 kg]
AT	=	Averaging time	[30 years]
EF	=	Exposure frequency	[350 day/year]
ED	=	Exposure duration	[30 years]
RfD_i	=	Inhalation reference dose	[chemical-specific, mg/kg-day]
K	=	Volatilization factor	[0.0005 * 1000 l/m^3]
IR_a	=	Daily indoor inhalation rate	[15 m^3/day]
RfD_o	=	Oral reference dose	[chemical-specific, mg/kg-day]
IR_w	=	Daily water ingestion rate	[2 l/day]

The volatilization factor listed for deriving residential water-use screening levels is an upper-bound value derived from a study by Andelman (1990). The use of this upper bound estimate as a conservative screening tool is recommended by USEPA in RAGS Part B.

3.4.3 *Risk-Based Screening Level Values*

Carcinogenic risk-based screening levels were calculated for a constituent only when carcinogenicity information (i.e., a CSF) was available. Likewise, non-carcinogenic risk-based screening levels were calculated only where systemic toxicity information (i.e., an RfD) was available. Chemical-specific CSFs and RfDs were obtained from the USEPA Integrated Risk Information System (IRIS) and the Health Effects Assessment Summary Tables (HEAST) (USEPA, 1992). The available toxicity information for the constituents of concern are presented in Table 3-6. Calculated carcinogenic and non-carcinogenic risk-based screening levels are presented in Table 3-7. When both a carcinogenic and

Table 3-6
Toxicity Information for Constituents of Potential Concern
Fort Wingate Depot Activity
Gallup, New Mexico

Constituent	IRDMIS Synonym	Oral RfD		Inhalation RfD		Oral CSF		Inhalation CSF		Carcinogenic Classification
		(mg/kg/d)		(mg/kg/d)		(mg/kg/d)^-1		(mg/kg/d)^-1		
Explosives										
1,3,5-Trinitrobenzene	135TNB	5.00E-05	a	NA	a	NA	a	NA	a	
1,3-Dinitrobenzene	13DNB	1.00E-04	a	NA	a	ND	a	ND	a	D
2,4,6-Trinitrotoluene	246TNT	5.00E-04	a	NA	a	3.00E-02	a	ND	a	C
2,4-Dinitrotoluene	24DNT	2.00E-03	a	NA	a	6.80E-01	a1	ND	a	
2,6-Dinitrotoluene	26DNT	NA		NA	a	6.80E-01	a1	NA	a	B2
Cyclonite	RDX	3.00E-03	a	NA	a	1.10E-01	a	ND	a	C
Cyclotetramethylenetetranitramine	HMX	5.00E-02		ND	a	NA	a	NA	a	D
Inorganics										
Aluminum	AL	2.90E+00		NA		NA		NA		
Antimony	SB	4.00E-04		ND	a	ND	a	ND	a	
Arsenic	AS	3.00E-04		ND	a	1.75E+00	a	5.00E+01	a2	A
Barium	BA	7.00E-02		1.40E-04	b	ND	a	ND	a	
Beryllium	BE	5.00E-03		NA		4.30E+00	a	8.40E+00	a	B2
Boron	B	9.00E-02		5.70E-03	b	ND	a	ND	a	
Cadmium	CD	5.00E-04		ND	a	NA	a	6.10E+00	a	B1
Cadmium		1.00E-03								
Calcium	CA	NA		NA	a	NA	a	NA	a	
Chromium	CR	5.00E-03		ND	a	NA	a	4.10E+01	a5	A
Cobalt	CO	ND		ND	a	ND	a	ND	a	
Copper	CU	3.70E-02		ND	a	NA	a	NA	a	D
Iron	FE	NA		NA		NA		NA		
Lead	PB	ND		ND	a	NA	a	NA	a	B2
Magnesium	MG	NA		NA		NA		NA		
Manganese	MN	5.00E-03		1.14E-04	a	NA	a	NA	a	D
		1.40E-01								
Mercury	HG	3.00E-04		8.60E-05	b	NA	a	NA	a	D
Nickel	NI	2.00E-02		ND	a	NA	a	8.40E-01	a7	A
Nitrate	NO3	1.60E+00		ND	a	ND	a	ND	a	
Nitrite	NIT	1.00E-01		ND	a	ND	a	ND	a	
Phosphorus	P4	NA		NA		NA		NA		
Potassium	K	NA		NA		NA		NA		
Selenium	SE	5.00E-03		ND	a	ND	a	ND	a	D
Silver	AG	5.00E-03		ND	a	NA	a	NA	a	D
Sodium	NA	NA		NA		NA		NA		
Thallium	TL	9.00E-05		ND	a	ND	a	ND	a	D
Total Phosphates	TPO4	NA		NA		NA		NA		
Vanadium	V	7.00E-03								
Zinc	ZN	3.00E-01		ND	a	ND	a	ND	a	D
PCBs/Pesticides										
Aldrin	ALDRN	3.00E-05		ND	a	1.70E+01	a	1.70E+01	a	B2
Alpha-Benzenehexachloride	ABHC	ND		ND	a	6.30E+00	a	6.30E+00	a	B2
Alpha-Endosulfan	AENSLF	5.00E-05		ND	a	ND	a	ND	a	

Table 3-6
Toxicity Information for Constituents of Potential Concern
Fort Wingate Depot Activity
Gallup, New Mexico

Constituent	IRDMIS Synonym	Oral RfD (mg/kg/d)		Inhalation RfD (mg/kg/d)		Oral CSF (mg/kg/d)^-1		Inhalation CSF (mg/kg/d)^-1		Carcinogenic Classification
Beta-Benzenehexachloride	BBHC	ND	a	ND	a	1.80E+00	a	1.80E+00	a	C
Beta-Endosulfan	BENSLF	5.00E-05	a	ND	a	ND	a	ND	a	
Bromacil	BRMCIL	NA		NA		NA		NA		
Chlordane	CLDAN	6.00E-05	a	ND	a	1.30E+00	a	1.30E+00	a	B2
DDD	PPDDD	ND		ND	a	2.40E-01	a	ND	a	B2
DDE	PPDDE	ND		ND	a	3.40E-01	a	ND	a	B2
DDT	PPDDT	5.00E-04	a	ND	a	3.40E-01	a	3.40E-01	a	B2
Delta-Benzenehexachloride	DBHC	2.50E-03	a	ND	a	ND	a	ND	a	D
Dieldrin	DLDRN	5.00E-05	a	ND	a	1.60E+01	a	1.60E+01	a	B2
Endosulfan Sulfate	ESFSO4	5.00E-05	a	ND	a	ND	a	ND	a	
Endrin	ENDRN	3.00E-04	a	ND	a	ND	a	ND	a	D
Heptachlor	HPCL	5.00E-04	a	ND	a	4.50E+00	a	4.50E+00	a	B2
Heptachlor epoxide	HPCLE	1.30E-05	a	ND	a	9.10E+00	a	9.10E+00	a	B2
Isodrin	ISODR									
Lindane	LIN	3.00E-04	a	ND	a	1.30E+00	b	ND	a	
PCB 1016	PCB016	7.00E-05	a	ND	a	7.70E+00	a	NA	a	B2
PCB 1254	PCB254	ND		ND	a	7.70E+00	a	NA	a	B2
PCB 1260	PCB260	ND		ND	a	7.70E+00	a	NA	a	B2
Semivolatiles										
1,5-Dimethylnapthalene	15DNAP	4.00E-02	a	ND	a	ND	a	ND	a	D
1,8-Dimethylnapthalene	18DNAP	4.00E-02	a	ND	a	ND	a	ND	a	D
2,3-Dimethylnapthalene	23DNAP	4.00E-02	a	ND	a	ND	a	ND	a	D
2,6,10,14-Tetramethylheptadecane	2TMHPD	NA		NA		NA		NA		
2,6,10,14-Tetramethylpentadecane	2TMPD	NA		NA		NA		NA		
2-Methylnapthalene	2MNAP	4.00E-02	a	ND	a	ND	a	ND	a	D
Acenaphthene	ANAPNE	6.00E-02	a	ND	a	ND	a	ND	a	D
Anthracene	ANTRC	3.00E-01	a	ND	a	ND	a	ND	a	D
Benzo(a)anthracene	BAANTR	ND		ND	a	1.06E+00	c	5.70E-01	c	B2
Benzo(a)pyrene	BAPYR	ND		ND	a	7.30E+00	a	3.90E+00	a10	B2
Benzo(b)fluoranthene	BBFANT	ND		ND	a	1.02E+00	c	5.50E-01	c	B2
Benzo(g,h,i)fluoranthene	BGHIPY	4.00E-02		ND	a	ND	a	ND	a	D
Benzo(k)fluoranthene	BKFANT	ND		ND	a	4.80E-01	c	2.60E-01	c	B2
Bis(2-ethylhexyl)phthalate	B2EHP	2.00E-02		ND	a	1.40E-02	a	NA	a	B2
Chrysene	CHRY	ND		ND	a	3.21E-02	c	1.72E-02	c	B2
Dibenz[a,h]anthracene	DBAHA	ND		ND	a	8.10E+00	c	4.33E+00	c	B2
Di-n-octylphthalate	DNOP	2.00E-02								
Fluoranthene	FANT	4.00E-02		ND	a	ND	a	ND	a	D
Fluorene	FLRENE	4.00E-02		ND	a	ND	a	ND	a	D
Indeno[1,2,3-C,D]pyrene	ICDPYR	ND		ND	a	1.69E+00	c	9.05E-01	c	B2
Naphthalene	NAP	4.00E-02		ND	a	ND	a	ND	a	D
Oil and Grease	OILGR	NA		NA		NA		NA		
Phenanthrene	PHANTR	4.00E-02		ND	a	ND	a	ND	a	D
Pyrene	PYR	3.00E-02		ND	a	ND	a	ND	a	D

Table 3-6
Toxicity Information for Constituents of Potential Concern
Fort Wingate Depot Activity
Gallup, New Mexico

Constituent	IRDMIS Synonym	Oral RfD (mg/kg/d)		Inhalation RfD (mg/kg/d)		Oral CSF (mg/kg/d)^-1		Inhalation CSF (mg/kg/d)^-1		Carcinogenic Classification
Volatiles										
1-Ethyl-3-methylbenzene	ET3MBZ	NA		NA		NA		NA		
2-Hexanone	MNBK	5.00E-02	a	4.76E-03	a	ND	a	ND	a	
Acetone	ACET	1.00E-01	a	ND	a	ND	a	ND	a	D
Acrylonitrile	ACRYLO	ND		5.72E-04	a	5.40E-01	a	2.40E-01	a	B1
Chloromethane	CH3CL	ND		ND	a	ND	a	ND	a	
Ethylbenzene	ETB	1.00E-01	a	2.86E-01	a	NA	a	NA	a	D
Methylene Chloride	CH2CL2	6.00E-02	a	8.60E-01	b	7.50E-03	a	1.65E-03	a	B2
Toluene	MEC6H5	2.00E-01	a	1.40E+00	a	ND	a	ND	a	D

Codes B2EHPH, C22, and PH were removed from the hits list due the lack of a matching IRDMIS code, or irrelevancy to the risk assessment.
a - IRIS Database accessed 5/93
b - HEAST FY1992
c - Clement Associates, 1988
d- RfD was derived based on toxicity information from the ATSDR toxicity profile. See text for details.
e -USEPA, 1993, Region III RBC Table.
NA - Not Available
ND - No Data

a1 The CPF for this constituent is listed as the Dinitrotoluene mixture 2,4-/2,6- on IRIS.
a2 An absorption factor of 30% is applicable.
a3 This value is for the ingestion of water.
a4 This value is for food consumption.
a5 This value is for hexavalent chromium.
a6 This value is for soluble nickel salts.
a7 The CPF for nickel refinery dust was used.
a8 This value is based on nitrate data.
a9 This value has been withdrawn from IRIS.
a10 Derived from oral slope factor by ERM.
(i) Based on inhalation study.
(o) Based on oral study.

b1 This value has been withdrawn from HEAST.
b2 This RfD was calculated based on drinking water standard.

Table 3-7
Risk-Based Screening Levels
Fort Wingate Depot Activity
Gallup, New Mexico

Constituent	IRDMIS Synonym	Soil PRGs Residential		Ground Water PRGs Residential Drinking Water	
		Carcinogenic	Noncarcinogenic	Carcinogenic	Noncarcinogenic
		(mg/kg)	(mg/kg)	(mg/l)	(mg/l)
Explosives					
1,3,5-Trinitrobenzene	135TNB		1.35E+01		1.83E-03
1,3-Dinitrobenzene	13DNB		2.70E+01		3.65E-03
2,4,6-Trinitrotoluene	246TNT	2.13E+01	1.35E+02	2.83E-03	1.83E-02
2,4-Dinitrotoluene	24DNT	9.41E-01	5.40E+02	1.25E-04	7.30E-02
2,6-Dinitrotoluene	26DNT	9.41E-01		1.25E-04	
Cyclonite	RDX	5.82E+00	8.10E+02	7.73E-04	1.10E-01
Cyclotetramethylenetetranitramine	HMX		1.35E+04		1.83E+00
Inorganics					
Aluminum	AL		7.83E+05		1.06E+02
Antimony	SB		1.08E+02		1.46E-02
Arsenic	AS	3.66E-01	8.10E+01	4.49E-07	1.10E-02
Barium	BA		1.89E+04		2.56E+00
Beryllium	BE	1.49E-01	1.35E+03	2.37E-06	1.83E-01
Boron	B		2.43E+04		3.29E+00
Cadmium	CD				1.83E-02
Cadmium			2.70E+02		
Calcium	CA				
Chromium	CR		1.35E+03		1.83E-01
Cobalt	CO				
Copper	CU		9.99E+03		1.35E+00
Iron	FE				
Lead	PB				
Magnesium	MG				
Manganese	MN				1.83E-01
			3.78E+04		
Mercury	HG		8.10E+01		1.10E-02
Nickel	NI		5.40E+03		7.30E-01
Nitrate	NO3		4.32E+05		5.84E+01
Nitrite	NIT		2.70E+04		3.65E+00
Phosphorus	P4				
Potassium	K				
Selenium	SE		1.35E+03		1.83E-01
Silver	AG		1.35E+03		1.83E-01

Table 3-7
Risk-Based Screening Levels
Fort Wingate Depot Activity
Gallup, New Mexico

Constituent	IRDMIS Synonym	Soil PRGs Residential		Ground Water PRGs Residential Drinking Water	
		Carcinogenic	Noncarcinogenic	Carcinogenic	Noncarcinogenic
		(mg/kg)	(mg/kg)	(mg/l)	(mg/l)
Sodium	NA				
Thallium	TL		2.43E+01		3.29E-03
Total Phosphates	TPO4				
Vanadium	V		1.89E+03		2.56E-01
Zinc	ZN		8.10E+04		1.10E+01
PCBs/Pesticides					
Aldrin	ALDRN	3.76E-02	8.10E+00	1.05E-06	1.10E-03
Alpha-Benzenehexachloride	ABHC	1.02E-01		2.84E-06	
Alpha-Endosulfan	AENSLF		1.35E+01		1.83E-03
Beta-Benzenehexachloride	BBHC	3.56E-01		9.94E-06	
Beta-Endosulfan	BENSLF		1.35E+01		1.83E-03
Bromacil	BRMCIL				
Chlordane	CLDAN	4.92E-01	1.62E+01	1.38E-05	2.19E-03
DDD	PPDDD	2.67E+00		3.54E-04	
DDE	PPDDE	1.88E+00		2.50E-04	
DDT	PPDDT	1.88E+00	1.35E+02	5.26E-05	1.83E-02
Delta-Benzenehexachloride	DBHC		6.75E+02		9.13E-02
Dieldrin	DLDRN	4.00E-02	1.35E+01	1.12E-06	1.83E-03
Endosulfan Sulfate	ESFSO4		1.35E+01		1.83E-03
Endrin	ENDRN		8.10E+01		1.10E-02
Heptachlor	HPCL	1.42E-01	1.35E+02	3.98E-06	1.83E-02
Heptachlor epoxide	HPCLE	7.03E-02	3.51E+00	1.97E-06	4.75E-04
Isodrin	ISODR				
Lindane	LIN	4.92E-01	8.10E+01	6.54E-05	1.10E-02
PCB 1016	PCB016	8.31E-02	1.89E+01	1.10E-05	2.56E-03
PCB 1254	PCB254	8.31E-02		1.10E-05	
PCB 1260	PCB260	8.31E-02		1.10E-05	
Semivolatiles					
1,5-Dimethylnapthalene	15DNAP		1.08E+04		1.46E+00
1,8-Dimethylnapthalene	18DNAP		1.08E+04		1.46E+00
2,3-Dimethylnapthalene	23DNAP		1.08E+04		1.46E+00
2,6,10,14-Tetramethylheptadecane	2TMHPD				
2,6,10,14-Tetramethylpentadecane	2TMPD				

Table 3-7
Risk-Based Screening Levels
Fort Wingate Depot Activity
Gallup, New Mexico

Constituent	IRDMIS Synonym	Soil PRGs Residential		Ground Water PRGs Residential Drinking Water	
		Carcinogenic	Noncarcinogenic	Carcinogenic	Noncarcinogenic
		(mg/kg)	(mg/kg)	(mg/l)	(mg/l)
2-Methylnapthalene	2MNAP		1.08E+04		1.46E+00
Acenaphthene	ANAPNE		1.62E+04		2.19E+00
Anthracene	ANTRC		8.10E+04		1.10E+01
Benzo[a]anthracene	BAANTR	6.04E-01		2.66E-05	
Benzo[a]pyrene	BAPYR	8.77E-02		3.88E-06	
Benzo[b]fluoranthene	BBFANT	6.27E-01		2.76E-05	
Benzo[g,h,i]fluoranthene	BGHIPY		1.08E+04		1.46E+00
Benzo[k]fluoranthene	BKFANT	1.33E+00		5.84E-05	
Bis(2-ethylhexyl)phthalate	B2EHP	4.57E+01	5.40E+03	6.07E-03	7.30E-01
Chrysene	CHRY	1.99E+01		8.80E-04	
Dibenz[a,h]anthracene	DBAHA	7.90E-02		3.49E-06	
Di-n-octylphthalate	DNOP		5.40E+03		7.30E-01
Fluoranthene	FANT		1.08E+04		1.46E+00
Fluorene	FLRENE		1.08E+04		1.46E+00
Indeno[1,2,3-C,D]pyrene	ICDPYR	3.78E-01		1.67E-05	
Naphthalene	NAP		1.08E+04		1.46E+00
Oil and Grease	OILGR				
Phenanthrene	PHANTR		1.08E+04		1.46E+00
Pyrene	PYR		8.10E+03		1.10E+00
Volatiles					
1-Ethyl-3-methylbenzene	ET3MBZ				
2-Hexanone	MNBK		1.35E+04		1.83E+00
Acetone	ACET		2.70E+04		3.65E+00
Acrylonitrile	ACRYL0	1.19E+00		5.90E-05	
Chloromethane	CH3CL				
Ethylbenzene	ETB		2.70E+04		3.65E+00
Methylene Chloride	CH2CL2	8.53E+01	1.62E+04	6.21E-03	2.19E+00
Toluene	MEC6H5		5.40E+04		7.30E+00

Codes B2EHPH, C22, and PH were removed from the hits list due the lack of a matching IRDMIS code, or irrelevancy to the risk assessment.
NA - Not Available
ND - No Data

non-carcinogenic risk-based screening level were calculated for a given constituent, the lower of the two values was selected for use in the screening evaluation.

For some constituents detected at the OBDA, toxicological indices were not available in the cited references.

Drinking water screening values were derived for several of the essential nutrient compounds at the site due to levels that appeared to be elevated above background in shallow subsurface water and surface water. Although these levels do not necessarily indicate a potential human health problem if they are exceeded, they provide a starting point for evaluating the relative risks associated with the concentrations detected at the OBDA. The water screening levels for calcium, iron, magnesium, phosphorus, and potassium were derived from dietary intake recommendations published by the National Academy of Sciences (NAS, 1980). Since the recommended dietary allowances (RDAs) and estimated safe intakes (ESIs) are provided on a age-dependent basis, the computation of an acceptable drinking water concentration for these constituents was also performed on an age group-specific basis. Average water ingestion rates, inclusive of water-based foods and beverages, were taken from USEPA's Exposure Factors Handbook (1989). The lowest computed acceptable concentration for any age group was then used as the screening level. The calculations are shown in Tables 3-8 and 3-9.

3.4.4 *Uptake Biokinetic Modeling for Lead*

As of the time of this writing, only the Version 0.5 (Preliminary Draft) version of USEPA's Uptake Biokinetic (UBK) Model (USEPA, 1991) was available. Therefore, the results of the UBK modeling presented herein are not based on an officially released version of the model and must be interpreted with appropriate reservation.

The UBK model was developed by the USEPA Environmental Criteria and Assessment Office (ECAO). The purpose of the model is to predict blood lead levels in children (ages 0 to 7 years) resulting from exposures to lead from various sources, including air, water, soil/dust, diet, paint, and maternal contribution (i.e., transfer of lead from the mother to the fetus which determines blood lead level at birth). The model relates the amount of lead taken up by the body to the amount of lead in the various exposure media using absorption factors. The biokinetic portion of the model then relates the distribution of lead in various organs to the lead uptake amounts. The biokinetic computations are based on transition times describing the amount of time taken for lead to transfer between various organs. It should be noted that the derivation of the absorption factors

Table 3-8
Derivation of Drinking Water Screening Levels for Micronutrients From Recommended Daily Allowances
Fort Wingate Depot Activity
Gallup, New Mexico

Chemical	Age (yr)	RDA (1) (mg/day)	Mean Water Ingestion (2) (l/day)	Acceptable GW Concentration (3) (mg/l)
Calcium	Under 1	450	0.307	1.47e+3
	1 to 4	800	0.743	1.08e+3
	5 to 9	800	0.861	9.29e+2
	10 to 14	1120	1.025	1.09e+3
	15 to 19	1120	1.241	9.02e+2
	20 to 24	800	1.484	5.39e+2
	25 to 29	800	1.531	5.23e+2
	30 to 39	800	1.642	4.87e+2
	40 to 59	800	1.732	4.62e+2
	60 and over	800	1.547	5.17e+2
			Minimum	4.62e+2
Magnesium	Under 1	65	0.307	2.12e+2
	1 to 4	162.5	0.743	2.19e+2
	5 to 9	230	0.861	2.67e+2
	10 to 14	330	1.025	3.22e+2
	15 to 19	390	1.241	3.14e+2
	20 to 24	350	1.484	2.36e+2
	25 to 29	350	1.531	2.29e+2
	30 to 39	350	1.642	2.13e+2
	40 to 59	350	1.732	2.02e+2
	60 and over	350	1.547	2.26e+2
			Minimum	2.02e+2
Phosphorus	Under 1	320	0.307	1.04e+3
	1 to 4	800	0.743	1.08e+3
	5 to 9	800	0.861	9.29e+2
	10 to 14	1120	1.025	1.09e+3
	15 to 19	1120	1.241	9.02e+2
	20 to 24	800	1.484	5.39e+2
	25 to 29	800	1.531	5.23e+2
	30 to 39	800	1.642	4.87e+2
	40 to 59	800	1.732	4.62e+2
	60 and over	800	1.547	5.17e+2
			Minimum	4.62e+2
Iron	Under 1	12.5	0.307	4.07e+1
	1 to 4	13.75	0.743	1.85e+1
	5 to 9	10	0.861	1.16e+1
	10 to 14	16.4	1.025	1.60e+1
	15 to 19	16.4	1.241	1.32e+1
	20 to 24	10	1.484	6.74e+0
	25 to 29	10	1.531	6.53e+0
	30 to 39	10	1.642	6.09e+0
	40 to 59	10	1.732	5.77e+0
	60 and over	10	1.547	6.46e+0
			Minimum	5.77e+0

Notes:
(1) - RDA values time weighted averages from "Drinking Water and Health, Volume 3", National Academy Press, Washington, D.C., 1980.
(2) - From "Exposure Factors Handbook", EPA/600/8-89/043, EPA, 1989. Water ingestion rate includes water-based drinks and foods.
(3) - Acceptable concentration is calculated as RDA divided by water ingestion rate. Minimum value for any age group is selected as potential screening level.

Table 3-9
Derivation of Drinking Water Screening Levels for Micronutrients From Estimated Safe Intakes
Fort Wingate Depot Activity
Gallup, New Mexico

Chemical	Age (yr)	Estimated Safe Intake (1) (mg/day)	Mean Water Ingestion (2) (l/day)	Acceptable GW Concentration (3) (mg/l)
Sodium	Under 1	547.5	0.307	1.78e+3
	1 to 4	1068.75	0.743	1.44e+3
	5 to 9	1620	0.861	1.88e+3
	10 to 14	2520	1.025	2.46e+3
	15 to 19	3300	1.241	2.66e+3
	20 to 24	3300	1.484	2.22e+3
	25 to 29	3300	1.531	2.16e+3
	30 to 39	3300	1.642	2.01e+3
	40 to 59	3300	1.732	1.91e+3
	60 and over	3300	1.547	2.13e+3
			Minimum	**1.44e+3**
Potassium	Under 1	1100	0.307	3.58e+3
	1 to 4	1825	0.743	2.46e+3
	5 to 9	2740	0.861	3.18e+3
	10 to 14	4260	1.025	4.16e+3
	15 to 19	5600	1.241	4.51e+3
	20 to 24	5600	1.484	3.77e+3
	25 to 29	5600	1.531	3.66e+3
	30 to 39	5600	1.642	3.41e+3
	40 to 59	5600	1.732	3.23e+3
	60 and over	5600	1.547	3.62e+3
			Minimum	**2.46e+3**

Notes:
(1) - ESI values time weighted averages from "Drinking Water and Health, Volume 3", National Academy Press, Washington, D.C., 1980.
(2) - From "Exposure Factors Handbook", EPA/600/8-89/043, EPA, 1989. Water ingestion rate includes water-based drinks and foods.
(3) - Acceptable concentration is calculated as ESI divided by water ingestion rate. Minimum value for any age group is selected as potential screening level.

and transition times is not well documented in the Version 0.5 Users Guide.

The values for the input parameters for the UBK model were left at the default values provided in the model for the air, water, diet, paint, and maternal contribution pathways. For air, the model assumes as a default an ambient air concentration of 0.20 ug/m^3. The model also assumes an indoor air lead concentration of 30% of the outdoor concentration. The primary ambient sources of atmospheric lead include industrial emissions and vehicular emissions. Since the FWDA is located in a remote, non-industrialized area, these concentrations of atmospheric lead may be unrealistically high.

The UBK model assumes as a default 4 ug/l of lead in water supplies. The shallow subsurface water and surface water at the OBDA (the most probable sources of drinking water at the site) were not found to contain detectable quantities of lead. In addition, future residential dwellings constructed at the OBDA would not use lead plumbing; residents would not be subjected to lead in their drinking water from that source. Therefore, this assumption of lead in drinking water may be unrealistic.

Dietary lead intakes in the UBK model default to a range of 5.88 ug/day to 7.48 ug/day. No site specific dietary lead content data exist by which to judge the validity of these default values for dietary intake of lead.

The default assumption in the UBK model is that paint does not contribute to lead intake. This is a valid assumption for newer dwellings wherein lead-based paints are not used, as would be the case for future dwellings constructed at the OBDA.

The maternal contribution default assumption in the UBK model is that the blood lead level in the mother is 7.5 ug/dL and that this results in a blood lead level in the infant at birth of 6.375 ug/dL. The validity of this assumption at the OBDA is unknown.

The output of the UBK model are the predicted blood lead levels in the exposed population. The blood lead levels may be expressed as the geometric mean of the predictions, or a full statistical distribution may be generated. Two substantive issues remain with regard to the interpretation of the model output:

1. What should the acceptable target blood lead level be; and
2. Should the geometric mean estimate be used, or should an upper confidence limit on the distribution of estimates be used. If an upper confidence limit is to be used, what percentile value should be selected (e.g., 95th, 99th).

These issues must be resolved by USEPA as a policy and guidance matter prior to widespread use of the UBK model for site remediation can be achieved. Current scientific literature indicates that a target blood lead level of 10 ug/dL may be sufficiently protective. However, considerable controversy surrounds the use of this value. As a point of departure for evaluating the UBK model results, the target value of 10 ug/dL was selected.

To account for the uncertainty associated with the selection of default intake parameters for media other than soil, and the selection of a statistical measure for the final model estimate, several model runs were made and the results presented as a comparison. Three runs were made for each of two scenarios. The first scenario included lead intake from soil/dust and from each of the other identified intake routes (air, water, diet, and maternal). The second scenario included only intake of lead from soil/dust and the maternal contribution. All other lead intake routes were set to zero in Scenario 2. The true lead intake for a residential land use at the FWDA most likely lies somewhere between Scenario 1 and Scenario 2. Thus, the results from the two scenarios should provide bounds on the true estimates for the site. For each scenario, three statistical measures were selected to represent the estimated acceptable soil lead level: the mean, the 95th percentile, and the 99th percentile.

The UBK model, as currently published by USEPA, contains utilities to solve iteratively for the mean soil concentration (holding all other intakes constant) which results in the specified target blood lead level. These utilities were used to derive soil lead concentrations which resulted in the target blood lead level of 10 ug/dL under the exposure conditions of Scenario 1 and Scenario 2.

The acceptable soil lead concentrations predicted by the model ranged from 340 mg/kg (99th percentile) to 994 mg/kg (geometric mean) for Scenario 1, and from 525 mg/kg (99th percentile) to 1174 mg/kg (geometric mean) for Scenario 2. The PARAR for lead of 500 mg/kg (selected in Section 5.2.3.1) falls within the lower portion of this range predicted by the UBK model. Given the uncertainties associated with the application of the UBK model, and the lack of policy or guidance on selecting the target blood lead level, a screening level for lead in soils of 500 mg/kg was selected as appropriate for use at the FWDA. This screening level is comparable to the 95th percentile soil lead level for Scenario 1 (480 mg/kg) which includes several external lead sources not likely to be present at the FWDA, and is lower than the 95th percentile soil lead level for Scenario 2 (660 mg/kg) which includes only soil/dust intake and maternal contribution. Therefore, 500 mg/kg was selected as the soil screening level for lead.

Table 3-10
Uptake/Biokinetic Model Results
Fort Wingate Depot Activity
Gallup, New Mexico

Measure	Acceptable Soil Lead Concentration	
	Scenario 1 (mg/kg)	Scenario 2 (mg/kg)
Geometric Mean	994	1174
95th Percentile	480	660
99th Percentile	340	525

Notes:
The acceptable soil lead concentration is based on a target blood lead level of 10 ug/dL
Scenario 1 included all other sources of lead intakes
Scenario 2 included only lead intakes from soil and maternal contribution

4.0 RESULTS OF FIELD SCREENING

Analytical results were compared to the screening levels described in Section 3 ("the screening level 1). The results which exceeded the screening levels are discussed below. A copy of the analytical data is presented in Appendix C.

4.1 SURFACE SOIL RESULTS

4.1.1 OBDA Grid Quadrants

Sixty eight surface soil samples were collected from grid quadrants established in the OBDA. Explosive compounds were detected in five samples, four of which were collected from quadrants where active detonation or refuse disposal had occurred (See Table 4-1 and Figure 4-1). Explosives were detected at concentrations above the screening levels in one sample (See Figure 4-2).

Metals were detected at concentrations above the background levels in several samples (See Table 4-1). Metals were detected at concentrations above the screening levels in one sample collected from a quadrant where active burning had occurred(See Figure 4-3).

4.1.2 Burning Ground Area

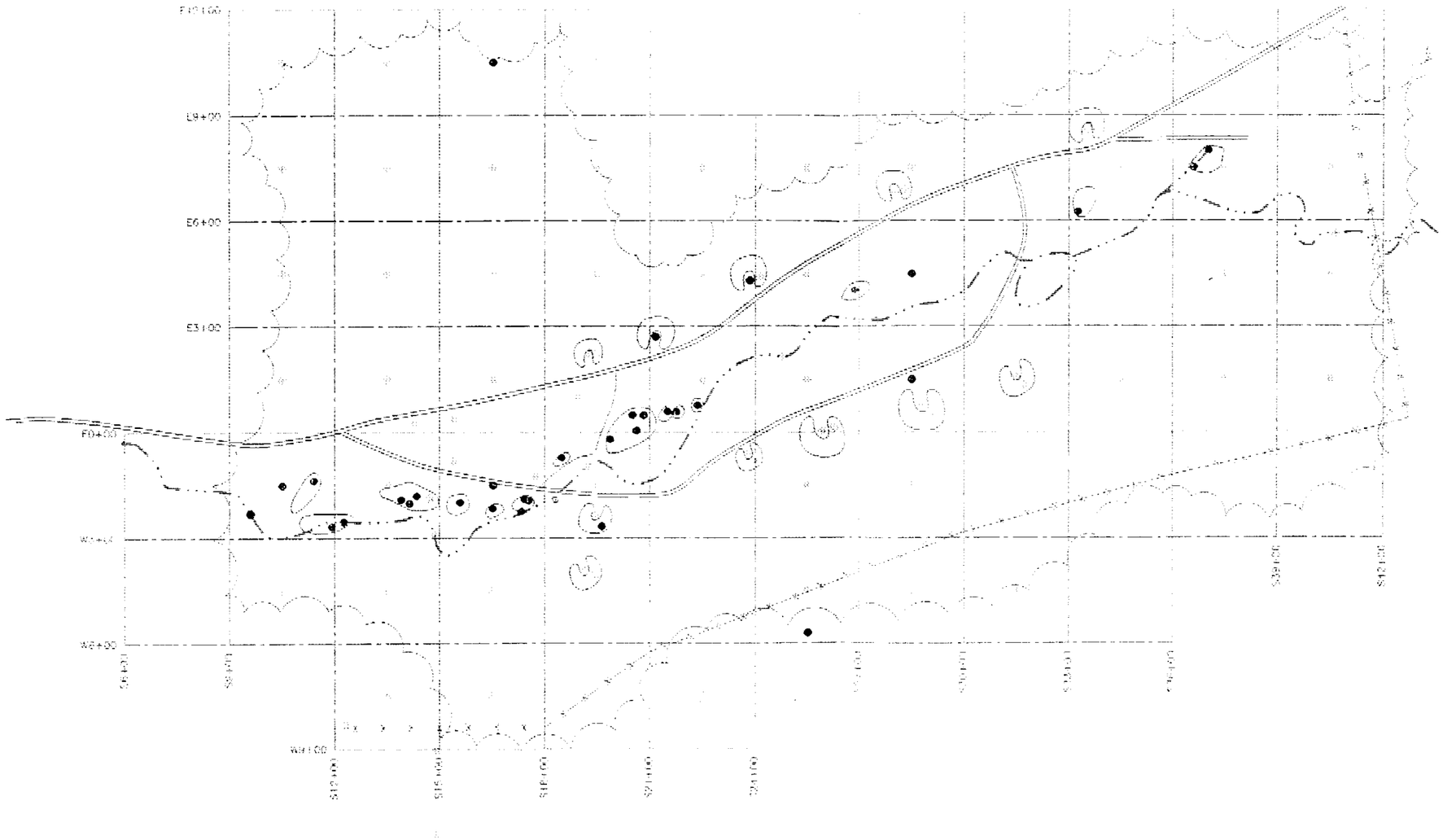
Eight surface soil samples were collected from within the Burning Ground Area. Explosive compounds were detected in two samples, however, the concentrations were below the screening levels (See Table 4-2 and Figure 4-1).

Metals were detected at concentrations above the background levels in several samples (See Table 4-2). One sample collected from within the Burning Ground Area contained metals at concentrations above the screening levels (See Figure 4-3).

4.1.3 Detonation Craters

A total of 22 surface soil samples were collected from 11 detonation craters currently located in the OBDA. Three of the samples contained detectable concentrations of explosives (See Table 4-3 and Figure 4-1). However, the concentrations detected were below the screening levels.

Figure 4-1
Samples with Explosives Detected
RCRA Interim Status Closure Plan
Fort Wingate Depot Activity
Gallup, New Mexico



LEGEND:

- RESIDUE PILE
- DEMO BURNING AREA GRID
- DEMOLITION CRATERS
- BURNING GROUND AREAS
- BLOW IN-PLACE
- ARROYO

350 175 0 350

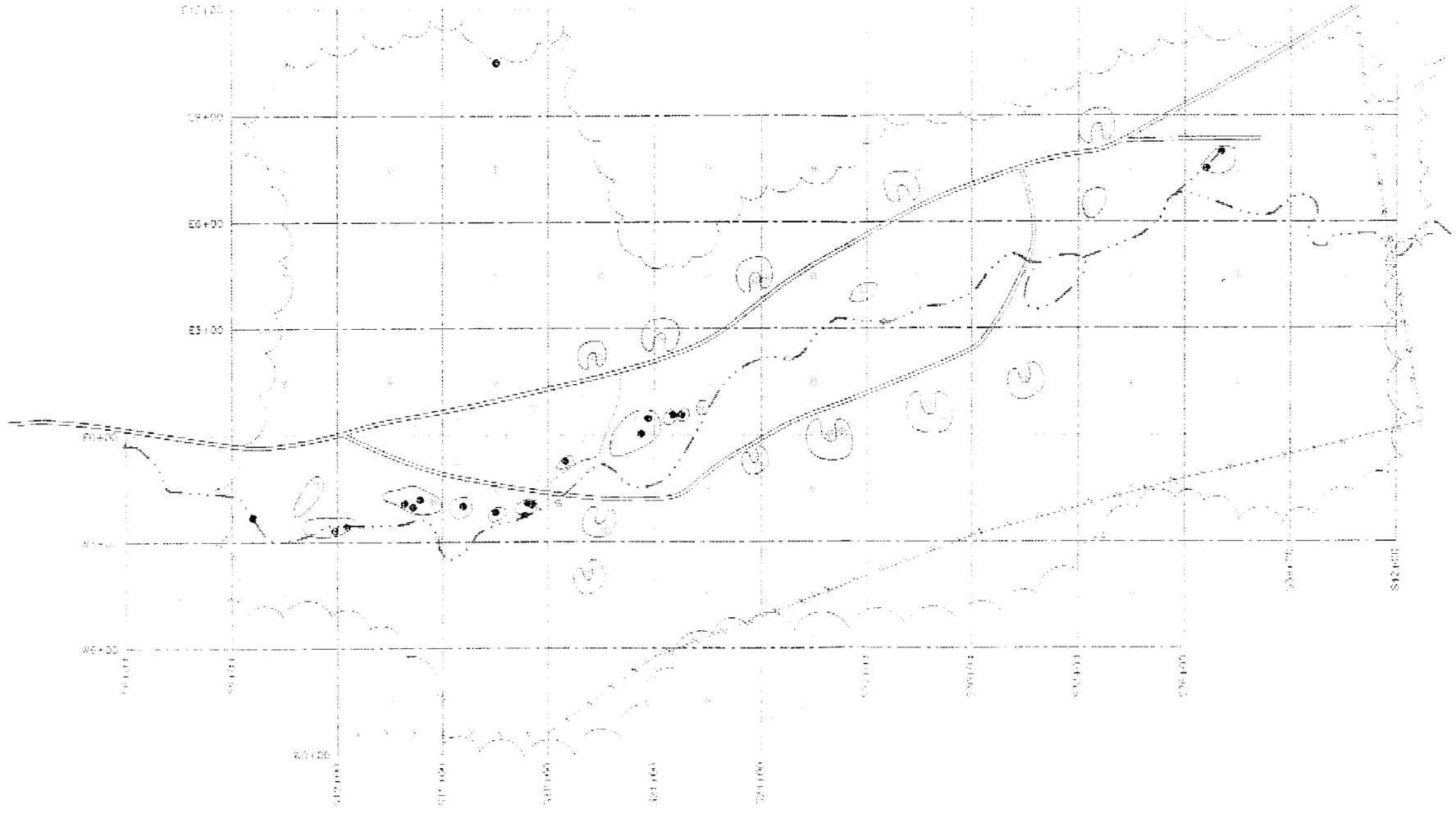
Scale in Feet

DEVELOPED BY: M.J.S.

CHECKED BY: DATE:

PM306.80.01/02.21.94-CMP/05.05.94-CMP/1204-2

Figure 4-2
Samples with Explosives Concentrations Exceeding RI/FS Screening Levels
RCRA Interim Status Closure Plan
Fort Wingate Depot Activity
Gallup, New Mexico



Legend:

- RESIDUE PILE
- DEMO BURNING AREA GRID
- ARROYO

350 175 0 350

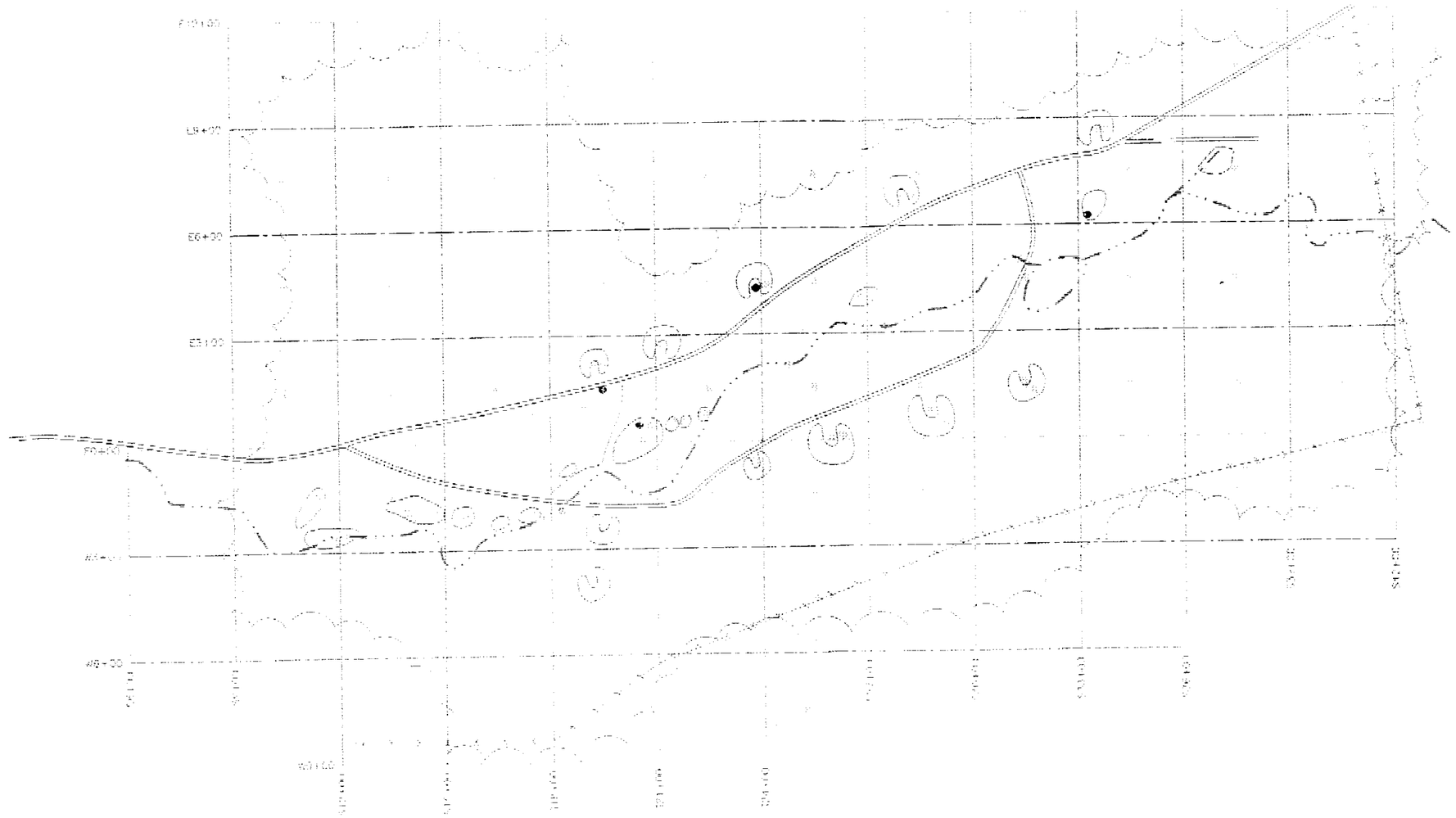
Scale in Feet

DEVELOPED BY: M.J.S.

CHECKED BY: DATE:

PM306.80.01/02.21.94-CMP/05.05.94-CMP/1204-3

Figure 4-3
Samples with Metals Concentrations Exceeding RI/FS Screening Levels
RCRA Interim Status Closure Plan
Fort Wingate Depot Activity
Gallup, New Mexico



PM306.80.01/02.21.94-CMP/05.05.94-CMP/1204-1

TABLE 4-1
OPEN BURNING AND DETONATION AREA
GRID QUADRANTS
FORT WINGATE DEPOT ACTIVITY
GALLUP, NEW MEXICO

Compound Name	Number of Samples	Certified Reporting Limit	RI/FS Background		RI/FS Screening	
			RI/FS Background Value	Number of Detections Above Background Value	RI/FS Screening Value	Number of Detections Above Screening Value
EXPOSIVE COMPOUNDS						
HMX/Cyclotetramethylenetetranitramine	68	0.947	0.00	1	13500	0
RDX/Cyclonite / Hexahydro-1,3,4-triazine	68	0.323	0.00	1	5.82	0
1,3,5-Trinitrobenzene	68	0.961	0.00	0	13.50	0
1,3-Dinitrobenzene	68	0.268	0.00	0	27	0
Nitrobenzene	68	0.283	0.00	0	135	0
N-Methyl-N,2,4,6-tetranitroaniline	68	1.79	0.00	0	NA	0
2,4,6-Trinitrotoluene / alpha-Trinitrotoluene	68	1.2	0.00	2	21.30	1
2,6-Dinitrotoluene	68	1.17	0.00	0	0.941	0
2,4-Dinitrotoluene	68	1.09	0.00	0	0.941	0
2-Nitrotoluene	68	1.69	0.00	0	NA	0
4-Nitrotoluene	68	1.17	0.00	0	NA	0
3-Nitrotoluene	68	1.31	0.00	0	NA	0
2-Amino-4,6-DNT	68	0.28	0.00	4	0.941	1
4-Amino-2,6-DNT	68	0.25	0.00	4	0.941	1
INORGANICS						
Aluminum	68	20	247000	0	NA	0
Antimony	68	41.3	19.60	77	108	1
Arsenic	68	3.6	81	0	NA	0
Barium	68	0.962	3660	0	18900	0
Beryllium	68	0.5	18.10	0	NA	0
Cadmium	68	0.515	1.75	8	270	0
Calcium	68	72	600000	0	NA	0
Chromium	68	0.669	168	2	1350	0
Cobolt	68	0.665	142	0	NA	0
Copper	68	0.937	289	10	9990	0
Iron	68	11.3	215000	0	NA	0
Lead	68	2.95	81	0	500	0
Magnesium	68	37.1	300000	0	NA	0
Manganese	68	2	18000	0	37800	0
Mercury	68	0.0269	0.05	12	81	0
Nickel	68	1.54	435	0	5400	0
Pottassium	68	119	34800	0	NA	0
Selenium	68	7.44	0.449	0	1350	0
Silver	68	0.521	0.803	3	1350	0
Sodium	68	44.8	21200	0	NA	0
Thallium	68	14.7	34.30	0	NA	0
Vanadium	68	1.77	384	0	1890	0
Zinc	68	1.94	444	0	81000	0

NA - Not Avalible

TABLE 4-2
OPEN BURNING AND DETONATION AREA
BURNING GROUND AREA
FORT WINGATE DEPOT ACTIVITY
GALLUP, NEW MEXICO

Compound Name	Number of Samples	Certified Reporting Limit	RI/FS Background		RI/FS Screening	
			RI/FS Background Value	Number of Detections Above Background Value	RI/FS Screening Value	Number of Detections Above Screening Value
EXPOSIVE COMPOUNDS						
HMX/Cyclotetramethylenetetranitramine	8	0.947	0.00	0	13500	0
RDX/Cyclonite / Hexahydro-1,3,4-triazine	8	0.323	0.00	0	5.82	0
1,3,5-Trinitrobenzene	8	0.961	0.00	0	13.50	0
1,3-Dinitrobenzene	8	0.268	0.00	0	27	0
Nitrobenzene	8	0.283	0.00	1	135	0
N-Methyl-N,2,4,6-tetranitroaniline	8	1.79	0.00	0	NA	0
2,4,6-Trinitrotoluene / alpha-Trinitrotoluene	8	1.2	0.00	0	21.30	0
2,6-Dinitrotoluene	8	1.17	0.00	0	0.941	0
2,4-Dinitrotoluene	8	1.09	0.00	0	0.941	0
2-Nitrotoluene	8	1.69	0.00	0	NA	0
4-Nitrotoluene	8	1.17	0.00	0	NA	0
3-Nitrotoluene	8	1.31	0.00	0	NA	0
2-Amino-4,6-DNT	8	0.28	0.00	2	0.941	0
4-Amino-2,6-DNT	8	0.25	0.00	2	0.941	0
INORGANICS						
Aluminum	8	20	247000	0	NA	0
Antimony	8	41.3	19.60	8	108	1
Arsenic	8	3.6	81.00	0	NA	0
Barium	8	0.962	3660	0	18900	0
Beryllium	8	0.5	18.10	0	NA	0
Cadmium	8	0.515	1.75	4	270	0
Calcium	8	72	600000	0	NA	0
Chromium	8	0.669	168	0	1350	0
Cobolt	8	0.665	142	0	NA	0
Copper	8	0.937	289	4	9990	0
Iron	8	11.3	215000	1	NA	0
Lead	8	2.95	81	0	500	0
Magnesium	8	37.1	300000	0	NA	0
Manganese	8	2	18000	0	37800	0
Mercury	8	0.0269	0.05	7	81	0
Nickel	8	1.54	435	0	5400	0
Pottassium	8	119	34800	0	NA	0
Selenium	8	7.44	0.449	0	1350	0
Silver	8	0.521	0.803	2	1350	0
Sodium	8	44.8	21200	0	NA	0
Thallium	8	14.7	34.30	0	NA	0
Vanadium	8	1.77	384	0	1890	0
Zinc	8	1.94	444	0	81000	0

NA - Not Avalible

TABLE 4-3
OPEN BURNING AND DETONATION AREA
DETONATION CRATERS
FORT WINGATE DEPOT ACTIVITY
GALLUP, NEW MEXICO

Compound Name	Number of Samples	Certified Reporting Limit	RI/FS Background		RI/FS Screening	
			RI/FS Background Value	Number of Detections Above Background Value	RI/FS Screening Value	Number of Detections Above Screening Value
EXPOSIVE COMPOUNDS						
HMX/Cyclotetramethylenetetranitramine	22	0.947	0.00	0	13500	0
RDX/Cyclonite / Hexahydro-1,3,4-triazine	22	0.323	0.00	0	5.82	0
1,3,5-Trinitrobenzene	22	0.961	0.00	0	13.50	0
1,3-Dinitrobenzene	22	0.268	0.00	0	27	0
Nitrobenzene	22	0.283	0.00	0	135	0
N-Methyl-N,2,4,6-tetranitroaniline	22	1.79	0.00	1	NA	0
2,4,6-Trinitrotoluene / alpha-Trinitrotoluene	22	1.2	0.00	0	21.30	0
2,6-Dinitrotoluene	22	1.17	0.00	0	0.941	0
2,4-Dinitrotoluene	22	1.09	0.00	0	0.941	0
2-Nitrotoluene	22	1.69	0.00	0	NA	0
4-Nitrotoluene	22	1.17	0.00	0	NA	0
3-Nitrotoluene	22	1.31	0.00	0	NA	0
2-Amino-4,6-DNT	22	0.28	0.00	2	0.941	0
4-Amino-2,6-DNT	22	0.25	0.00	3	0.941	0
INORGANICS						
Aluminum	22	20	247000	0	NA	0
Antimony	22	41.3	19.60	22	108	2
Arsenic	22	3.6	81	0	NA	0
Barium	22	0.962	3660	0	18900	0
Beryllium	22	0.5	18.10	0	NA	0
Cadmium	22	0.515	1.75	6	270	0
Calcium	22	72	600000	0	NA	0
Chromium	22	0.669	168	1	1350	0
Cobolt	22	0.665	142	0	NA	0
Copper	22	0.937	289	3	9990	0
Iron	22	11.3	215000	1	NA	0
Lead	22	2.95	81	0	500	0
Magnesium	22	37.1	300000	0	NA	0
Manganese	22	2	18000	0	37800	0
Mercury	22	0.0269	0.05	2	81	0
Nickel	22	1.54	435	1	5400	0
Pottassium	22	119	34800	0	NA	0
Selenium	22	7.44	0.449	0	1350	0
Silver	22	0.521	0.803	1	1350	0
Sodium	22	44.8	21200	0	NA	0
Thallium	22	14.7	34.30	0	NA	0
Vanadium	22	1.77	384	0	1890	0
Zinc	22	1.94	444	0	81000	0

NA - Not Avalible

Metals were detected at concentrations above the background levels in several samples (See Table 4-3). Two samples contained concentrations of metals above the screening levels (See Figure 4-3).

4.1.4 *Blow-In-Place Items*

Explosive compounds were detected in one of the 12 surface soil samples collected near BIP locations (See Table 4-4 and Figure 4-1). The concentrations detected were below the screening levels.

Three metals were detected at concentrations above the background levels, however, none of the concentrations exceeded the screening levels (See Table 4-4).

4.1.5 *Residue/Debris Areas*

Twenty three of the 24 samples collected from residue/debris areas contained detectable concentrations of explosive compounds (See Table 4-5 and Figure 4-1). Seventeen of the samples contained concentrations of explosives that exceeded the screening levels (See Figure 4-2).

Metals were detected at concentrations above the background levels in several samples (See Table 4-5). The screening levels were exceeded in two of the samples (See Figure 4-3).

4.1.6 *Arroyo*

Explosive compounds were detected in one of the six surface soil samples collected within the arroyo (See Table 4-6 and Figure 4-1). Explosives concentrations were above the screening levels in this sample (See Figure 4-3).

Three metals were detected at concentrations above the background levels, however, none of the concentrations exceeded the screening levels (See Table 4-6).

4.1.7 *Downgradient of OBDA*

No explosive compounds were detected in the samples collected downgradient of the OBDA.

No metals, total phosphorus, or nitrate/nitrite were detected at concentrations that exceeded background levels downgradient of the OBDA.

TABLE 4-4
OPEN BURNING AND DETONATION AREA
BLOW IN-PLACE ITEMS
FORT WINGATE DEPOT ACTIVITY
GALLUP, NEW MEXICO

Compound Name	Number of Samples	Certified Reporting Limit	RI/FS Background		RI/FS Screening	
			RI/FS Background Value	Number of Detections Above Background Value	RI/FS Screening Value	Number of Detections Above Screening Value
EXPOSIVE COMPOUNDS						
HMX/Cyclotetramethylenetetranitramine	12	0.947	0.00	0	13500	0
RDX/Cyclonite / Hexahydro-1,3,4-triazine	12	0.323	0.00	0	5.82	0
1,3,5-Trinitrobenzene	12	0.961	0.00	0	13.50	0
1,3-Dinitrobenzene	12	0.268	0.00	0	27	0
Nitrobenzene	12	0.283	0.00	0	135	0
N-Methyl-N,2,4,6-tetranitroaniline	12	1.79	0.00	0	NA	0
2,4,6-Trinitrotoluene / alpha-Trinitrotoluene	12	1.2	0.00	0	21.30	0
2,6-Dinitrotoluene	12	1.17	0.00	0	0.941	0
2,4-Dinitrotoluene	12	1.09	0.00	0	0.941	0
2-Nitrotoluene	12	1.69	0.00	0	NA	0
4-Nitrotoluene	12	1.17	0.00	0	NA	0
3-Nitrotoluene	12	1.31	0.00	0	NA	0
2-Amino-4,6-DNT	12	0.28	0.00	1	0.941	0
4-Amino-2,6-DNT	12	0.25	0.00	1	0.941	0
INORGANICS						
Aluminum	12	20	247000	0	NA	0
Antimony	12	41.3	19.60	12	108	0
Arsenic	12	3.6	81	0	NA	0
Barium	12	0.962	3660	0	18900	0
Beryllium	12	0.5	18.10	0	NA	0
Cadmium	12	0.515	1.75	3	270	0
Calcium	12	72	600000	0	NA	0
Chromium	12	0.669	168	0	1350	0
Cobolt	12	0.665	142	0	NA	0
Copper	12	0.937	289	0	9990	0
Iron	12	11.3	215000	0	NA	0
Lead	12	2.95	81	0	500	0
Magnesium	12	37.1	300000	0	NA	0
Manganese	12	2	18000	0	37800	0
Mercury	12	0.0269	0.05	1	81	0
Nickel	12	1.54	435	0	5400	0
Pottassium	12	119	34800	0	NA	0
Selenium	12	7.44	0.449	0	1350	0
Silver	12	0.521	0.803	0	1350	0
Sodium	12	44.8	21200	0	NA	0
Thallium	12	14.7	34.30	0	NA	0
Vanadium	12	1.77	384	0	1890	0
Zinc	12	1.94	444	0	81000	0

NA - Not Avalible

TABLE 4-5
OPEN BURNING AND DETONATION AREA
RESIDUE PILES
FORT WINGATE DEPOT ACTIVITY
GALLUP, NEW MEXICO

Compound Name	Number of Samples	Certified Reporting Limit	RI/FS Background		RI/FS Screening	
			RI/FS Background Value	Number of Detections Above Background Value	RI/FS Screening Value	Number of Detections Above Screening Value
EXPOSIVE COMPOUNDS						
HMX/Cyclotetramethylenetetranitramine	24	0.947	0.00	19	13500	0
RDX/Cyclonite / Hexahydro-1,3,4-triazine	24	0.323	0.00	20	5.82	16
1,3,5-Trinitrobenzene	24	0.961	0.00	15	13.50	6
1,3-Dinitrobenzene	24	0.268	0.00	8	27	0
Nitrobenzene	24	0.283	0.00	1	135	0
N-Methyl-N,2,4,6-tetranitroaniline	24	1.79	0.00	0	NA	0
2,4,6-Trinitrotoluene / alpha-Trinitrotoluene	24	1.2	0.00	15	21.30	8
2,6-Dinitrotoluene	24	1.17	0.00	3	0.941	2
2,4-Dinitrotoluene	24	1.09	0.00	6	0.941	6
2-Nitrotoluene	24	1.69	0.00	0	NA	0
4-Nitrotoluene	24	1.17	0.00	0	NA	0
3-Nitrotoluene	24	1.31	0.00	0	NA	0
2-Amino-4,6-DNT	24	0.28	0.00	18	NA	14
4-Amino-2,6-DNT	24	0.25	0.00	13	NA	8
INORGANICS						
Aluminum	24	20	247000	0	NA	0
Antimony	24	41.3	19.60	24	108	0
Arsenic	24	3.6	81.00	0	NA	0
Barium	24	0.962	3660	2	18900	1
Beryllium	24	0.5	18.10	0	NA	0
Cadmium	24	0.515	1.75	19	270	0
Calcium	24	72	600000	0	NA	0
Chromium	24	0.669	168	0	1350	0
Cobolt	24	0.665	142	0	NA	0
Copper	24	0.937	289	8	9990	1
Iron	24	11.3	215000	0	NA	0
Lead	24	2.95	81	9	500	0
Magnesium	24	37.1	300000	0	NA	0
Manganese	24	2	18000	0	37800	0
Mercury	24	0.0269	0.05	10	81	0
Nickel	24	1.54	435	0	5400	0
Pottassium	24	119	34800	0	NA	0
Selenium	24	7.44	0.449	0	1350	0
Silver	24	0.521	0.803	5	1350	0
Sodium	24	44.8	21200	0	NA	0
Thallium	24	14.7	34.30	0	NA	0
Vanadium	24	1.77	384	0	1890	0
Zinc	24	1.94	444	3	81000	0

NA - Not Avalible

TABLE 4-6
OPEN BURNING AND DETONATION AREA
ARROYO
FORT WINGATE DEPOT ACTIVITY
GALLUP, NEW MEXICO

Compound Name	Number of Samples	Certified Reporting Limit	RI/FS Background		RI/FS Screening	
			RI/FS Background Value	Number of Detections Above Background Value	RI/FS Screening Value	Number of Detections Above Screening Value
EXPOSIVE COMPOUNDS						
HMX/Cyclotetramethylenetetranitramine	6	0.947	0.00	1	13500	0
RDX/Cyclonite / Hexahydro-1,3,4-triazine	6	0.323	0.00	1	5.82	1
1,3,5-Trinitrobenzene	6	0.961	0.00	0	13.50	0
1,3-Dinitrobenzene	6	0.268	0.00	0	27	0
Nitrobenzene	6	0.283	0.00	0	135	0
N-Methyl-N,2,4,6-tetranitroaniline	6	1.79	0.00	0	NA	0
2,4,6-Trinitrotoluene / alpha-Trinitrotoluene	6	1.2	0.00	1	21.30	0
2,6-Dinitrotoluene	6	1.17	0.00	0	0.941	0
2,4-Dinitrotoluene	6	1.09	0.00	0	0.941	0
2-Nitrotoluene	6	1.69	0.00	0	NA	0
4-Nitrotoluene	6	1.17	0.00	0	NA	0
3-Nitrotoluene	6	1.31	0.00	0	NA	0
2-Amino-4,6-DNT	6	0.28	0.00	1	0.941	1
4-Amino-2,6-DNT	6	0.25	0.00	1	0.941	1
INORGANICS						
Aluminum	6	20	247000	0	NA	0
Antimony	6	41.3	19.60	6	108	0
Arsenic	6	3.6	81	0	NA	0
Barium	6	0.962	3660	0	18900	0
Beryllium	6	0.5	18.10	0	NA	0
Cadmium	6	0.515	1.75	0	270	0
Calcium	6	72	600000	0	NA	0
Chromium	6	0.669	168	0	1350	0
Cobolt	6	0.665	142	0	NA	0
Copper	6	0.937	289	0	9990	0
Iron	6	11.3	215000	0	NA	0
Lead	6	2.95	81	0	500	0
Magnesium	6	37.1	300000	0	NA	0
Manganese	6	2	18000	0	37800	0
Mercury	6	0.0269	0.05	3	81	0
Nickel	6	1.54	435	0	5400	0
Pottassium	6	119	34800	0	NA	0
Selenium	6	7.44	0.449	0	1350	0
Silver	6	0.521	0.803	1	1350	0
Sodium	6	44.8	21200	0	NA	0
Thallium	6	14.7	34.30	0	NA	0
Vanadium	6	1.77	384	0	1890	0
Zinc	6	1.94	444	0	81000	0

NA - Not Avalible

4.2 *SURFACE WATER RESULTS*

No explosive compounds, VOCs, or SVOCs were detected in the surface water sample collected from the area of ponded water located in the OBDA.

One metal was detected at a concentration that exceeded the background level, however, the concentration was below the screening level.

Total phosphorus and nitrate/nitrite were not detected in the surface water sample at concentrations above background levels.

4.3 *SHALLOW SUBSURFACE WATER RESULTS*

Four shallow subsurface water samples were collected from the cistern during four sampling events: 7 December 1992, 5 May 1993, 27 May 1993, and 19 November 1993. One sample was collected from well FW38 during the 19 November 1993 sampling event. Insufficient water was present in the well located north of the OBDA fence for a sample to be collected. The analytical results obtained for the samples collected are presented below.

4.3.1 *Cistern*

No explosives were detected in the sample collected from the cistern during the 7 December 1992 sampling event. Two explosives were detected, one of which exceeded the screening level in the 5 May 1993 sample. One explosive exceeded the screening level in the 27 May 1993 sample. No explosives were detected in the sample collected during the 19 November 1993 sampling event.

Five metals were detected at concentrations above background levels, however, none of the concentrations exceeded the screening levels.

The cistern samples exceed the New Mexico standards for several cations and anions, and TDS. The concentrations of these parameters detected is not unexpected for unfiltered shallow subsurface water samples collected in a semi-arid environment, and therefore does not indicate contamination.

4.3.2 *Well Point*

Three explosives were detected in the shallow subsurface water sample collected from the well point. The concentration of one of the explosives was above the screening level.

Two metals were detected at concentrations above background levels, however, none of the concentrations exceeded the screening levels.

The well point samples exceed the New Mexico standards for several cations and anions, and TDS. The concentrations of these parameters detected is not unexpected for unfiltered shallow subsurface water samples collected in a semi-arid environment, and therefore does not indicate contamination.

4.4 *AREA REQUIRING CORRECTIVE MEASURES*

The areas potentially requiring corrective measures are considered to be those areas that have concentrations of constituents exceeding screening levels. These areas are summarized below:

One OBDA grid quadrant sample contained concentrations of explosives and one sample contained concentrations of metals that exceeded the screening levels.

One sample collected from within the Burning Ground Area contained metals at concentrations above the screening levels.

Two samples collected from detonation craters contained concentrations of metals above the screening levels.

Seventeen of the samples collected from the residue/debris piles contained concentrations of explosives that exceeded the screening levels and two samples contained concentrations of metals exceeding the screening levels.

Explosives concentrations were above the screening levels in one arroyo sample.

Samples of shallow subsurface water collected from the cistern and well point contained concentrations of explosive compounds in excess of the screening levels.

5.0 PROPOSED CORRECTIVE MEASURE APPROACHES

5.1 PRELIMINARY CLEANUP LEVEL GENERATION

Preliminary cleanup levels were derived to be protective of human health under realistic site-specific future land use scenarios. For this closure plan, future land uses for this site have been considered and preliminary cleanup levels have been established based on potential exposure to soils on the site. Final cleanup levels will be established during remedial design and will reflect the specific design details.

5.1.1 *Future Land Use Evaluation*

The OBDA area is not expected to be developed in any way in the future. The future land use of the site was considered in the RI/FS report which considers other portions of the FWDA (ERM,1994). The results of the future land use study for the entire facility indicate that the OBDA will remain a limited access area with no anticipated human use. If the area would be removed from limited access status it would be a recreational area. Realistic exposure scenarios associated with the limited access future land uses for OBDA are a construction worker remediating the site for a short period of time and potential wind blown dust exposure to off-site recreational users.

Although a fence is currently in place to control access to this area, an on-site recreational exposure scenario was also evaluated. On-site recreational exposure is not a realistic potential future land use; however, it would be the most likely future land use if site access was not restricted. Thus, preliminary cleanup levels derived for on-site recreational use may be considered as the constituent levels that are protective of human health with no administrative controls placed on the site.

5.1.2 *Media Pathways Analysis*

Based on the field screening efforts there are four media of potential concern: soil, sediment, surface water, and shallow subsurface water. Preliminary cleanup levels were only developed for those media that potential receptors could contact. An individual comes into contact with a medium through a migration/release pathway. If the migration/release pathway is not complete (i.e., some aspect of the pathway does not exist on the site), then exposure via that pathway is not possible. Migration or release pathways for each of the media will be discussed in the following paragraphs.

Soil represents the medium of greatest areal extent on the site. Migration/release pathways that are appropriate for soil are direct contact, and migration of windblown dust. Workers and on-site recreational users are expected to directly contact the soil during remedial or recreational activities. Dust may be contacted by workers and both on- and off-site recreational users. Therefore, preliminary cleanup levels will be developed for this soils to reflect direct contact and dust inhalation.

Sediment is found only in small areas of the arroyo where there is perennial or frequently flooded conditions. These areas will not be included in the remedial activities; therefore direct contact by workers is not possible. Migration of sediments via wind erosion is not expected due to the wet nature of sediment. Recreational users of the site are also not expected to contact the sediment. Therefore, the pathway that a receptor could be exposed to sediment is not complete. Sediment is also a concern for ecological receptors. Because direct contact is possible for ecological receptors additional sampling will be undertaken during the Corrective Measures Study to evaluate the significance of this pathway.

Surface water, like sediment, has only one exposure pathway for human receptors (direct contact). Similar to the sediment, workers and on-and off-site recreational users are not expected to come into significant direct contact with the water due to the sparse and ephemeral nature of surface water in the OBDA. Therefore, additional sampling will be undertaken to determine the significance of ecological contact with water in the wet areas of the arroyo, but preliminary cleanup levels will not be established for protection of human health.

Shallow subsurface water is the water that exists in the subsurface soils in the arroyo. Migration and release pathways for this water are very limited. Due to its shallow, discontinuous nature it is not expected to have sufficient yield to support human uses, thus no direct contact with this water will be considered. This water may migrate to the limited surface water on the site. Because additional sampling of surface water is being undertaken to evaluate the potential surface water impact on ecological receptors, the quality of shallow subsurface water will also be evaluated through the surface water study. No human health evaluation will be undertaken for the subsurface water because there is no potential exposure to the subsurface water.

5.1.3 *Development of Risk-Based Preliminary cleanup levels*

Preliminary cleanup levels for this site have been established to be protective of human health based on the site-specific exposure assumptions listed above. Three different sets of preliminary cleanup levels have been established; one for each of the worker, on-site

recreational, and off-site recreational exposure scenarios. The most stringent level was selected for each constituent.

Preliminary cleanup levels have been derived to be protective of each of the exposure scenarios that could potentially occur as a result of the migration or release pathways described above. For workers and on-site recreational users, three exposure points may exist: incidental ingestion of soil, dermal contact with soil, and inhalation of fugitive dust. Off-site recreational users will not contact the soil directly, thus, their only exposure point is inhalation of fugitive dust. Specific intake assumptions for each receptor group are presented on Table 5-1.

Preliminary cleanup levels have been calculated based on standard intake and toxicity assumptions. The equations derived to calculate the preliminary cleanup levels are based on USEPA guidance for developing preliminary remediation goals (1989). The equations have been modified to incorporate the dermal exposure point and to account for site-specific dust generation conditions. These site specific equations are presented below.

On-Site Exposure for Carcinogenic Effects:

$$PRG_{soil} = \frac{TR \times BW \times AT \times 365\,{}^{days}/_{year}}{EF \times ED\left[\left(CPF_o \times SA \times ABS \times CF \times AF\right) + \left(CPF_i \times IR_{air} \times \left(\frac{E_i \times L \times CF}{u \times H}\right)\right) + \left(CPF_o \times 1E^{-6}\,{}^{kg}/_{mg} \times IR_{soil}\right)\right]}$$

Where:

PRG_{soil}	= Concentration of constituent in soil (mg/kg)
TR	= Target Risk (unitless, $1E^{-6}$)
AT	= Averaging Time (70 years)
BW	= Body weight of an adult (70 kg)
EF	= Exposure Frequency (days/year)
ED	= Exposure Duration (year)
CPF_o	= Oral CPF ($(mg/kg\text{-}day)^{-1}$)
CPF_i	= Inhalation CPF ($(mg/kg\text{-}day)^{-1}$)
SA	= Surface Area (cm^2)
ABS	= Absorption Factor (0.001 for inorganics (USEPA, 1992), 0.2 for explosives)
CF	= Conversion Factor ($1E^{-6}kg/mg$)
AF	= Adherence Factor (1.45 mg/cm^2-day (USEPA, 1989))
IR_{air}	= Inhalation rate (m^3/day)
E_i	= Dust Emission Rate for the OBDA ($1 \times 10^{-9} mg/m^2/sec$)
L	= Length of the Contaminated Site Perpendicular to the Wind (71.1 m, based on the area of the refuse piles)
u	= Mean Annual Wind Speed (4 m/sec (Ruffner, 1985))
H	= Height of Human Inhalation (1.5 m)

Table 5-1
Exposure Scenario Assumptions
Fort Wingate Depot Activity
Gallup, New Mexico

		Worker	On-Site Recreation	Off-Site Recreation
EF	Exposure Frequency (days/year) (1,2)	39.6	5	5
ED	Exposure Duration (years)	1	30	30
SA	Surface Area (cm^2) (3)	820	820	NA
IRsoil	Ingestion Rate for Soil (mg/day)	480	100	NA
IRair	Inhalation Rate for Air (m^3/day)	20	20	20

NA- Not applicable

(1) The worker value represents 8 hours per day for 120 days.
(2) The recreational value represents 4 hours per day for 30 days.
(3) This value represents the 50th percentile area for the hands of an adult male (USEPA, 1989).
(4) Exposure Factors Handbook

Table 5-2
Cleanup Levels For Soil
Worker Exposure
Fort Wingate Depot Activity
Gallup, New Mexico

Constituent	IRDMIS Synonym	Oral RfD (mg/kg/d)		Inhalation RfD (mg/kg/d)		Oral CPF (mg/kg/d)^-1		Inhalation CPF (mg/kg/d)^-1		Carcinogenic Classification	Noncarcinogenic Cleanup Level (mg/kg)	Carcinogenic Cleanup Level (mg/kg)	Worker Cleanup Level (mg/kg)
HMX	HMX	5.00E-02		5.00E-02	**	NA		NA			4.49E+04	NA	4.49E+04
RDX	RDX	3.00E-03		3.00E-03	**	1.10E-01		1.10E-01	**	C	2.70E+03	5.72E+02	5.72E+02
1,3,5-Trinitrobenzene	135TNB	5.00E-05	a	5.00E-05	**	NA	a	NA	**		4.49E+01	NA	4.49E+01
1,3-Dinitrobenzene	13DNB	1.00E-04	a	1.00E-04	**	ND	a	ND	**	D	8.99E+01	NA	8.99E+01
Nitrobenzene	NB	5.00E-04		5.00E-04	**	NA		NA			4.49E+02	NA	4.49E+02
N-methyl-N,2,4,6-tetranitroaniline											NA	NA	NA
2,4,6-Trinitrotoluene	246TNT	5.00E-04	a	5.00E-04	**	3.00E-02	a	3.00E-02	**	C	4.49E+02	2.10E+03	4.49E+02
2,4-Dinitrotoluene	24DNT	2.00E-03	a	2.00E-03	**	6.80E-01	a1	6.80E-01	**		1.80E+03	9.25E+01	9.25E+01
2,6-Dinitrotoluene	26DNT	1.00E-03	b	1.00E-03	**	6.80E-01	a1	6.80E-01	**	B2	8.99E+02	9.25E+01	9.25E+01
2-Nitrotoluene		1.00E-02	b	1.00E-02	**	NA		NA			8.99E+03	NA	8.99E+03
4-Nitrotoluene		1.00E-02	b	1.00E-02	**	NA		NA			8.99E+03	NA	8.99E+03
3-Nitrotoluene		1.00E-02	b	1.00E-02	**	NA		NA			8.99E+03	NA	8.99E+03
2-Amino-4,6-DNT		NA		NA		6.80E-01	a1	6.80E-01	**		NA	9.25E+01	9.25E+01
4-Amino-2,6-DNT		NA		NA		6.80E-01	a1	6.80E-01	**		NA	9.25E+01	9.25E+01
Aluminum	AL	NA		NA	**	NA		NA	**		NA	NA	NA
Antimony	SB	4.00E-04	a	4.00E-04	**	ND	a	ND	**		5.36E+02	NA	5.36E+02
Arsenic	AS	3.00E-04	a	3.00E-04	**	1.75E+00	a	1.50E+01	a2	A	4.02E+02	5.34E+01	5.34E+01
Barium	BA	7.00E-02	a	1.40E-04	b	ND	a	ND	a		7.53E+04	NA	7.53E+04
Beryllium	BE	5.00E-03	a	5.00E-03	**	4.30E+00	a	8.40E+00	a	B2	6.70E+03	2.18E+01	2.18E+01
Cadmium	CD	1.00E-03	a3	1.00E-03	**	NA	a	6.30E+00	a	B1	1.34E+03	3.02E+04	1.34E+03
Calcium	CA	NA	a	NA	**	NA	a	NA	a		NA	NA	NA
Chromium	CR	5.00E-03	a4	5.00E-03	**	NA	a	4.20E+01	a4	A	6.70E+03	4.54E+03	4.54E+03
Cobalt	CO	ND	a	ND	**	ND	a	ND	a		NA	NA	NA
Copper	CU	3.71E-02	b1	3.71E-02	**	NA	a	NA	a	D	4.97E+04	NA	4.97E+04
Iron	FE	NA		NA	**	NA		NA			NA	NA	NA
Lead	PB	ND	a	ND	**	NA	a	NA	a	B2	NA	NA	NA
Magnesium	MG	NA		NA	**	NA		NA			NA	NA	NA
Manganese	MN	1.40E-01	a3	1.43E-05	a	NA	a	NA	a	D	3.22E+04	NA	3.22E+04
Mercury	HG	3.00E-04	b	8.60E-05	b	NA	a	NA	a	D	4.02E+02	NA	4.02E+02
Nickel	NI	2.00E-02	a5	2.00E-02	**	NA	a	1.68E+00	a6	A	2.68E+04	1.13E+05	2.68E+04
Potassium	K	NA		NA	**	NA		NA			NA	NA	NA

Table 5-2
Cleanup Levels For Soil
Worker Exposure
Fort Wingate Depot Activity
Gallup, New Mexico

Constituent	IRDMIS Synonym	Oral RfD (mg/kg/d)		Inhalation RfD (mg/kg/d)		Oral CPF (mg/kg/d)^-1		Inhalation CPF (mg/kg/d)^-1		Carcinogenic Classification	Noncarcinogenic Cleanup Level (mg/kg)	Carcinogenic Cleanup Level (mg/kg)	Worker Cleanup Level (mg/kg)
Selenium	SE	5.00E-03	a	5.00E-03	**	ND	a	ND	a	D	6.70E+03	NA	6.70E+03
Silver	AG	5.00E-03	a	5.00E-03	**	NA	a	NA	a	D	6.70E+03	NA	6.70E+03
Sodium	NA	NA		NA	**	NA		NA			NA	NA	NA
Thallium	TL	9.00E-05	a	9.00E-05	**	ND	a	ND	a	D	1.21E+02	NA	1.21E+02
Vanadium	V	7.00E-03	b	7.00E-03	**	NA		NA			9.38E+03	NA	9.38E+03
Zinc	ZN	3.00E-01	a	3.00E-01	**	ND	a	ND	a	D	4.02E+05	NA	4.02E+05

a - IRIS Database accessed 5/93
b - HEAST FY1992

NA - Not Available
ND - No Data

a1 The CPF for this constituent is listed as the Dinitrotoluene mixture 2,4-/2,6- on IRIS.
a2 An absorption factor of 30% is applicable.
a3 This value is for food consumption.
a4 This value is for hexavalent chromium.
a5 This value is for soluble nickel salts.
a6 The CPF for nickel subsulfide was used.
(i) Study based on the inhalation study.
(o) Study based on oral study.

**** This value is based the oral toxicity value for the same constituent.**

b1 This value is based on a drinking water advisory of 1.3 mg/l

Table 5-3
Cleanup Levels for Soil
On-Site Recreational Use of OBDA
Fort Wingate Depot Activity
Gallup, New Mexico

Constituent	IRDMIS Synonym	Oral RfD (mg/kg/d)		Inhalation RfD (mg/kg/d)		Oral CPF (mg/kg/d)^-1		Inhalation CPF (mg/kg/d)^-1		Carcinogenic Classification	Noncarcinogenic Cleanup Level (mg/kg)	Carcinogenic Cleanup Level (mg/kg)	On-Site Recreational Cleanup Level (mg/kg)
HMX	HMX	5.00E-02		5.00E-02	**	NA		NA			7.56E+05	NA	7.56E+05
RDX	RDX	3.00E-03		3.00E-03	**	1.10E-01		1.10E-01	**	C	4.54E+04	3.21E+02	3.21E+02
1,3,5-Trinitrobenzene	135TNB	5.00E-05	a	5.00E-05	**	NA	a	NA	**		7.56E+02	NA	7.56E+02
1,3-Dinitrobenzene	13DNB	1.00E-04	a	1.00E-04	**	ND	a	ND	**	D	1.51E+03	NA	1.51E+03
Nitrobenzene	NB	5.00E-04		5.00E-04	**	NA		NA			7.56E+03	NA	7.56E+03
N-methyl-N,2,4,6-tetranitroaniline											NA	NA	NA
2,4,6-Trinitrotoluene	246TNT	5.00E-04	a	5.00E-04	**	3.00E-02	a	3.00E-02	**	C	7.56E+03	1.18E+03	1.18E+03
2,4-Dinitrotoluene	24DNT	2.00E-03	a	2.00E-03	**	6.80E-01	a1	6.80E-01	**		3.03E+04	5.19E+01	5.19E+01
2,6-Dinitrotoluene	26DNT	1.00E-03	a	1.00E-03	**	6.80E-01	a1	6.80E-01	**	B2	1.51E+04	5.19E+01	5.19E+01
2-Nitrotoluene		1.00E-02	b	1.00E-02	**	NA		NA			1.51E+05	NA	1.51E+05
4-Nitrotoluene		1.00E-02	b	1.00E-02	**	NA		NA			1.51E+05	NA	1.51E+05
3-Nitrotoluene		1.00E-02	b	1.00E-02	**	NA		NA			1.51E+05	NA	1.51E+05
2-Amino-4,6-DNT		NA		NA		6.80E-01		6.80E-01	**		NA	5.19E+01	5.19E+01
4-Amino-2,6-DNT		NA		NA		6.80E-01		6.80E-01	**		NA	5.19E+01	5.19E+01
Aluminum	AL	NA		NA	**	NA		NA	**		NA	NA	NA
Antimony	SB	4.00E-04	a	4.00E-04	**	ND	a	ND	**		2.02E+04	NA	2.02E+04
Arsenic	AS	3.00E-04	a	3.00E-04	**	1.75E+00	a	1.50E+01	a2	A	1.51E+04	6.73E+01	6.73E+01
Barium	BA	7.00E-02	a	1.40E-04	b	ND	a	ND	a		3.53E+06	NA	3.53E+06
Beryllium	BE	5.00E-03	a	5.00E-03	**	4.30E+00	a	8.40E+00	a	B2	2.52E+05	2.74E+01	2.74E+01
Cadmium	CD	1.00E-03	a3	1.00E-03	**	NA	a	6.30E+00	a	B1	5.05E+04	7.99E+09	5.05E+04
Calcium	CA	NA	a	NA	**	NA	a	NA	a		NA	NA	NA
Chromium	CR	5.00E-03	a4	5.00E-03	**	NA	a	4.20E+01	a4	A	2.52E+05	1.20E+09	2.52E+05
Cobalt	CO	ND	a	ND	**	ND	a	ND	a		NA	NA	NA
Copper	CU	3.71E-02	b1	3.71E-02	**	NA	a	NA	a	D	1.87E+06	NA	1.87E+06
Iron	FE	NA		NA	**	NA		NA			NA	NA	NA
Lead	PB	ND	a	ND	**	NA	a	NA	a	B2	NA	NA	NA
Magnesium	MG	NA		NA	**	NA		NA			NA	NA	NA
Manganese	MN	1.40E-01	a3	1.43E-05	a	NA	a	NA	a	D	7.07E+06	NA	7.07E+06
Mercury	HG	3.00E-04	b	8.60E-05	b	NA	a	NA	a	D	1.51E+04	NA	1.51E+04
Nickel	NI	2.00E-02	a5	2.00E-02	**	NA	a	1.68E+00	a6	A	1.01E+06	2.99E+10	1.01E+06
Potassium	K	NA		NA	**	NA		NA			NA	NA	NA
Selenium	SE	5.00E-03	a	5.00E-03	**	ND	a	ND	a	D	2.52E+05	NA	2.52E+05
Silver	AG	5.00E-03	a	5.00E-03	**	NA	a	NA	a	D	2.52E+05	NA	2.52E+05

Table 5-3
Cleanup Levels for Soil
On-Site Recreational Use of OBDA
Fort Wingate Depot Activity
Gallup, New Mexico

Constituent	IRDMIS Synonym	Oral RfD (mg/kg/d)		Inhalation RfD (mg/kg/d)		Oral CPF (mg/kg/d)^-1		Inhalation CPF (mg/kg/d)^-1		Carcinogenic Classification	Noncarcinogenic Cleanup Level (mg/kg)	Carcinogenic Cleanup Level (mg/kg)	On-Site Recreational Cleanup Level (mg/kg)
Sodium	NA	NA		NA	**	NA		NA			NA	NA	NA
Thallium	TL	9.00E-05	a	9.00E-05	**	ND	a	ND	a	D	4.54E+03	NA	4.54E+03
Vanadium	V	7.00E-03	b	7.00E-03	**	NA		NA			3.53E+05	NA	3.53E+05
Zinc	ZN	3.00E-01	a	3.00E-01	**	ND	a	ND	a	D	1.51E+07	NA	1.51E+07

a - IRIS Database accessed 5/93
b - HEAST FY1992

NA - Not Available
ND - No Data

a1 The CPF for this constituent is listed as the Dinitrotoluene mixture 2,4-/2,6- on IRIS.
a2 An absorption factor of 30% is applicable.
a3 This value is for food consumption.
a4 This value is for hexavalent chromium.
a5 This value is for soluble nickel salts.
a6 The CPF for nickel subsulfide was used.
(i) Study based on the inhalation study.
(o) Study based on oral study.

**** This value is based the oral toxicity value for the same constituent.**

b1 This value is based on a drinking water advisory of 1.3 mg/l

Table 5-4
Off-Site Recreational User
Cleanup Levels
Fort Wingate Depot Activity
Gallup, New Mexico

Constituent	IRDMIS Synonym	Oral RfD (mg/kg/d)		Inhalation RfD (mg/kg/d)		Oral CPF (mg/kg/d)^-1		Inhalation CPF (mg/kg/d)^-1		Carcinogenic Classification	Noncarcinogenic Cleanup Level (mg/kg)	Carcinogenic Cleanup Level (mg/kg)	Off-Site Recreational Cleanup Level (mg/kg)
HMX	HMX	5.00E-02		5.00E-02	**	NA		NA			1.08E+15	NA	1.08E+15
RDX	RDX	3.00E-03		3.00E-03	**	1.10E-01		1.10E-01	**	C	6.47E+13	4.57E+11	4.57E+11
1,3,5-Trinitrobenzene	135TNB	5.00E-05	a	5.00E-05	**	NA	a	NA	**		1.08E+12	NA	1.08E+12
1,3-Dinitrobenzene	13DNB	1.00E-04	a	1.00E-04	**	ND	a	ND	**	D	2.16E+12	NA	2.16E+12
Nitrobenzene	NB	5.00E-04		5.00E-04	**	NA		NA			1.08E+13	NA	1.08E+13
N-methyl-N,2,4,6-tetranitroaniline		NA		NA		NA		NA			NA	NA	NA
2,4,6-Trinitrotoluene	246TNT	5.00E-04	a	5.00E-04	**	3.00E-02	a	3.00E-02	**	C	1.08E+13	1.68E+12	1.68E+12
2,4-Dinitrotoluene	24DNT	2.00E-03	a	2.00E-03	**	6.80E-01	a1	6.80E-01	**		4.31E+13	7.40E+10	7.40E+10
2,6-Dinitrotoluene	26DNT	1.00E-03	a	1.00E-03	**	6.80E-01	a1	6.80E-01	**	B2	2.16E+13	7.40E+10	7.40E+10
2-Nitrotoluene		1.00E-02	h	1.00E-02	**	NA		NA			2.16E+14	NA	2.16E+14
4-Nitrotoluene		1.00E-02	h	1.00E-02	**	NA		NA			2.16E+14	NA	2.16E+14
3-Nitrotoluene		1.00E-02	h	1.00E-02	**	NA		NA			2.16E+14	NA	2.16E+14
2-Amino-4,6-DNT		NA		NA		6.80E-01		6.80E-01	**		NA	7.40E+10	7.40E+10
4-Amino-2,6-DNT		NA		NA		6.80E-01		6.80E-01	**		NA	7.40E+10	7.40E+10
Aluminum	AL	NA		NA	**	NA		NA	**		NA	NA	NA
Antimony	SB	4.00E-04	a	4.00E-04	**	ND	a	ND	**		8.62E+12	NA	8.62E+12
Arsenic	AS	3.00E-04	a	3.00E-04	**	1.75E+00	a	1.50E+01	a2	A	6.47E+12	3.35E+09	3.35E+09
Barium	BA	7.00E-02	a	1.40E-04	b	ND	a	ND	a		3.02E+12	NA	3.02E+12
Beryllium	BE	5.00E-03	a	5.00E-03	**	4.30E+00	a	8.40E+00	a	B2	1.08E+14	5.99E+09	5.99E+09
Cadmium	CD	1.00E-03	a3	1.00E-03	**	NA	a	6.30E+00	a	B1	2.16E+13	7.99E+09	7.99E+09
Calcium	CA	NA	a	NA	**	NA	a	NA	a		NA	NA	NA
Chromium	CR	5.00E-03	a4	5.00E-03	**	NA	a	4.20E+01	a4	A	1.08E+14	1.20E+09	1.20E+09
Cobalt	CO	ND	a	ND	**	ND	a	ND	a		NA	NA	NA
Copper	CU	3.71E-02	b1	3.71E-02	**	NA	a	NA	a	D	8.00E+14	NA	8.00E+14
Iron	FE	NA		NA	**	NA		NA			NA	NA	NA
Lead	PB	ND	a	ND	**	NA	a	NA	a	B2	NA	NA	NA
Magnesium	MG	NA		NA	**	NA		NA			NA	NA	NA
Manganese	MN	1.40E-01	a3	1.43E-05	a	NA	a	NA	a	D	3.08E+11	NA	3.08E+11
Mercury	HG	3.00E-04	b	8.60E-05	b	NA	a	NA	a	D	1.85E+12	NA	1.85E+12
Nickel	NI	2.00E-02	a5	2.00E-02	**	NA	a	1.68E+00	a6	A	4.31E+14	2.99E+10	2.99E+10
Potassium	K	NA		NA	**	NA		NA			NA	NA	NA

Table 5-4
Off-Site Recreational User
Cleanup Levels
Fort Wingate Depot Activity
Gallup, New Mexico

Constituent	IRDMIS Synonym	Oral RfD (mg/kg/d)		Inhalation RfD (mg/kg/d)		Oral CPF (mg/kg/d)^-1		Inhalation CPF (mg/kg/d)^-1		Carcinogenic Classification	Noncarcinogenic Cleanup Level (mg/kg)	Carcinogenic Cleanup Level (mg/kg)	Off-Site Recreational Cleanup Level (mg/kg)
Selenium	SE	5.00E-03	a	5.00E-03	**	ND	a	ND	a	D	1.08E+14	NA	1.08E+14
Silver	AG	5.00E-03	a	5.00E-03	**	NA	a	NA	a	D	1.08E+14	NA	1.08E+14
Sodium	NA	NA		NA	**	NA		NA			NA	NA	NA
Thallium	TL	9.00E-05	a	9.00E-05	**	ND	a	ND	a	D	1.94E+12	NA	1.94E+12
Vanadium	V	7.00E-03	b	7.00E-03	**	NA		NA			1.51E+14	NA	1.51E+14
Zinc	ZN	3.00E-01	a	3.00E-01	**	ND	a	ND	a	D	6.47E+15	NA	6.47E+15

a - IRIS Database accessed 5/93
b - HEAST FY1992

NA - Not Available
ND - No Data

a1 The CPF for this constituent is listed as the Dinitrotoluene mixture 2,4-/2,6- on IRIS.
a2 An absorption factor of 30% is applicable.
a3 This value is for food consumption.
a4 This value is for hexavalent chromium.
a5 This value is for soluble nickel salts.
a6 The CPF for nickel subsulfide was used.
(i) Study based on the inhalation study.
(o) Study based on oral study.

**** This value is based the oral toxicity value for the same constituent.**

b1 This value is based on a drinking water advisory of 1.3 mg/l

Table 5-5
Soil Remediation Goals
For OBDA Closure
Fort Wingate Depot Activity
Gallup, New Mexico

Constituent	Clean Closure Preliminary Cleanup Goal (mg/kg)	Restricted Access Preliminary Cleanup Level (mg/kg)
HMX	1.19E+04	4.49E+04
RDX	1.51E+02	5.72E+02
1,3,5-Trinitrobenzene	1.19E+01	4.49E+01
1,3-Dinitrobenzene	2.37E+01	8.99E+01
Nitrobenzene	1.19E+02	4.49E+02
N-methyl-N,2,4,6-tetranitroaniline	NA	NA
2,4,6-Trinitrotoluene	1.19E+02	4.49E+02
2,4-Dinitrotoluene	2.44E+01	9.25E+01
2,6-Dinitrotoluene	2.44E+01	9.25E+01
2-Nitrotoluene	NA	NA
4-Nitrotoluene	NA	NA
3-Nitrotoluene	NA	NA
2-Amino-4,6-DNT	2.44E+01	9.25E+01
4-Amino-2,6-DNT	2.44E+01	9.25E+01
Aluminum	NA	NA
Antimony	1.42E+02	5.36E+02
Arsenic	1.40E+01	5.29E+01
Barium	1.99E+04	7.53E+04
Beryllium	5.76E+00	2.18E+01
Cadmium	3.54E+02	1.34E+03
Calcium	NA	NA
Chromium	1.23E+03	1.23E+03
Cobalt	NA	NA
Copper	1.31E+04	4.97E+04
Iron	NA	NA
Lead	NA	NA
Magnesium	NA	NA
Manganese	3.09E+04	8.19E+04
Mercury	1.06E+02	4.02E+02
Nickel	7.08E+03	2.68E+04
Potassium	NA	NA
Selenium	1.77E+03	6.70E+03
Silver	1.77E+03	6.70E+03
Sodium	NA	NA
Thallium	3.18E+01	1.21E+02
Vanadium	2.48E+03	9.38E+03
Zinc	1.06E+05	4.02E+05

IR_{soil} = Ingestion rate (100 mg/day)

On-Site Soil Exposure for Noncarcinogenic Effects:

$$PRG_{soil} = \frac{THI \times BW \times AT \times 365\ ^{days}/_{year}}{EF \times ED\left[\left(\frac{1}{RfD_o} \times SA \times ABS \times CF \times AF\right) + \left(\frac{1}{RfD_i} \times IR_{air} \times \left(\frac{E_i \times L \times CF}{u \times H}\right)\right) + \left(\frac{1}{RfD_o} \times 1E^{-6}\ ^{kg}/_{mg} \times IR_{soil}\right)\right]}$$

Where:

THI	= Target Hazard Index (unitless, 1)
AT	= Averaging time (year, this is equal to the exposure duration)
ED	= Exposure Duration (year)
RfD_i	= Inhalation Reference Dose (mg/kg-day)
RfD_o	= Oral Reference Dose (mg/kg-day)

Off-site Fugitive Dust Exposure for Carcinogenic Effects:

$$PRG_{soil} = \frac{TR \times BW \times AT \times 365\ ^{days}/_{year}}{EF \times ED\left[CPF_i \times IR_{air} \times \left(\frac{E_i \times L \times CF}{u \times H}\right)\right]}$$

Off-site Fugitive Dust Exposure for Noncarcinogenic Effects:

$$PRG_{soil} = \frac{THI \times BW \times AT \times 365\ ^{days}/_{year}}{EF \times ED\left[\frac{1}{RfD_i} \times IR_{air} \times \left(\frac{E_i \times L \times CF}{u \times H}\right)\right]}$$

Tables 5-2 through 5-4 present the constituent specific toxicity values used and the receptor specific preliminary cleanup levels. The cleanup values for each of the potential receptors have been compared and the most stringent level selected as the clean closure preliminary cleanup level for the OBDA. The restricted access preliminary cleanup level was derived by selecting the minimum value from on-site worker and off-site recreational exposure scenarios. The preliminary cleanup levels are presented on Table 5-5.

6.0 CLOSURE IMPLEMENTATION

6.1 CONDITIONS FOR CLOSURE

The NMED established several Conditions for Closure Plan Approval that will be addressed during the performance of closure.

- **Quarterly Progress Reports**

  Quarterly Progress Reports will be submitted to the NMED summarizing all activities completed or in progress, the information collected, the schedule status and an explanation of any schedule delays, including problems encountered. The Quarterly Progress Reports will also include hard copies of the results of all analyses

  The Quarterly Progress Reports will be initiated 90 days from the effective date of the closure plan and continue through the time of closure certification acceptance by the NMED.

- **Determination of Ecological Risk**

  The ecological risks associated with any contaminants left at the OB/OD Area after completion of final closure activities will be determined and documented in the Final Closure Report, as required in Section 4 of the Final Closure Plan.

- **Survey Plat**

  If the area(s) identified for closure can not be "clean closed", the area(s) will be closed as a landfill and a survey plat will be prepared and certified by a professional land surveyor, detailing the location and waste contents of the contaminated soils.

  The survey plat will contain a metes and bounds description and will show the locations of the entire closed landfill area and the extent of any cover required in relation to permanently surveyed benchmarks. The survey plat will also contain a note stating the Army's obligation to restrict disturbance of the closed landfill area.

  The survey plat will be submitted to the NMED - Water and Waste Management Division Director and to the official land file for incorporation into the property deed.

- **Notifications/Modifications To The Approved Closure Plan**

  The Closure Plan will be modified in accordance with HWMR-7, Part VI, Section 265.112 (c) if affected by changes to operating plans, the

expected date of closure, the facility design or if there are any substantive modifications required due to unexpected events during closure.

A revised Closure Plan will be submitted to the HRMB no later than 30 days after any unexpected event affects the Closure Plan. Written approval is to be received from the HRMB prior to implementing any activities.

The HRMB will be immediately notified of the anticipated impact and corrective actions, if at any time during closure, it becomes evident that closure activities will slip beyond the established closure date.

6.2 *IDENTIFIED AREAS REQUIRING CLOSURE*

The boundary of the area(s) requiring closure can be defined by comparing analytical results of the field screening samples to preliminary cleanup levels which were calculated based on potential exposure scenarios. The samples with concentrations of explosives compounds and metals that exceed the Clean Closure Preliminary Cleanup Levels are presented in Figures 6-1 and 6-2, respectively. The samples containing explosives in excess of the restricted access preliminary cleanup levels are presented in Figure 6-3.

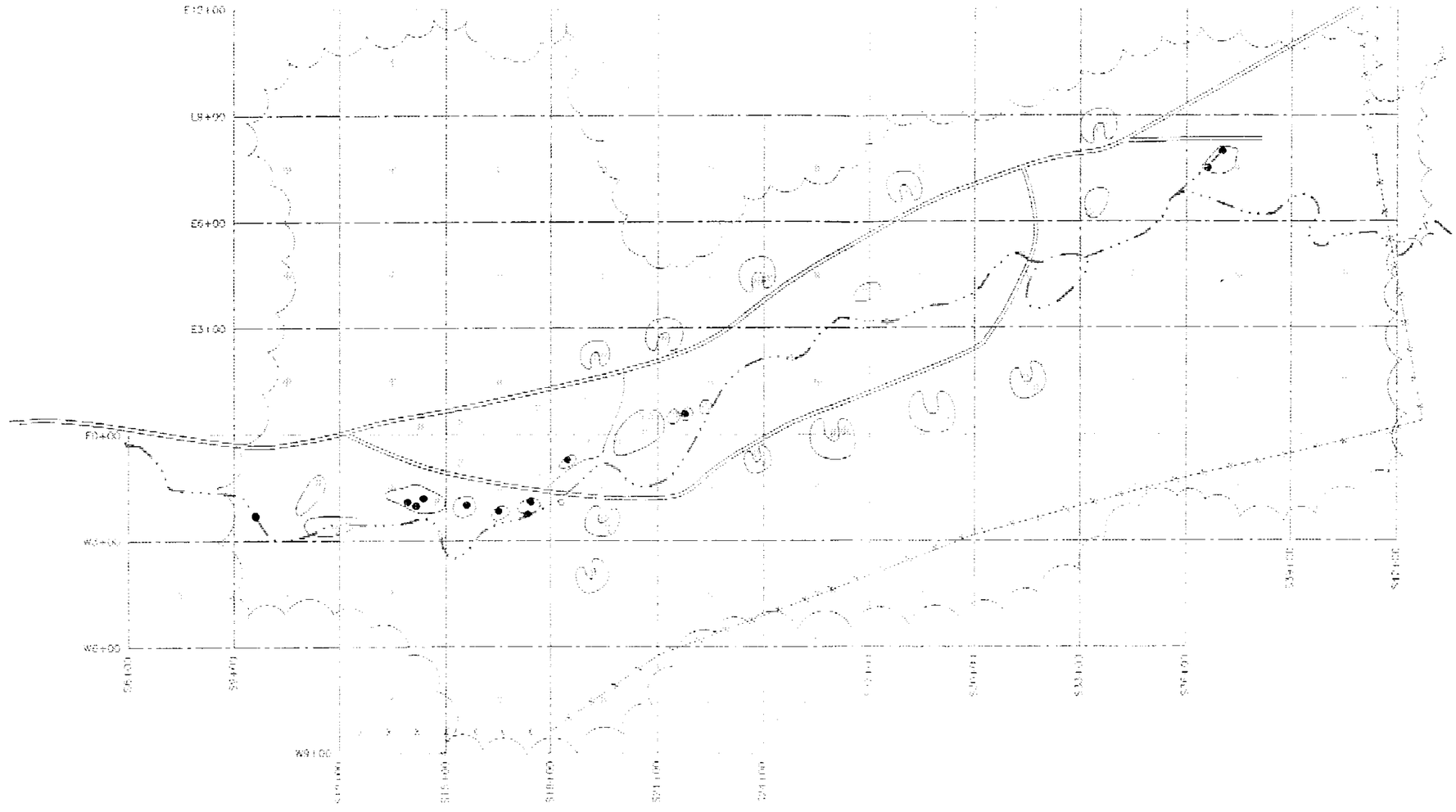
The number of individual explosive compounds requiring corrective measures has decreased, however, the samples containing explosives requiring corrective measures has remained unchanged. Only one sample contains metals at concentrations that exceed the Restricted Access Preliminary Cleanup Levels (see Figure 6-4).

6.3 *PRE-CLOSURE SAMPLING*

6.3.1 *Surface Water and Sediment*

Thirteen surface water and sediment sampling locations in the arroyo have been identified and are shown on Figure 6-1. Surface water samples will be collected at each location where there is sufficient surface water to allow a sample to be taken. If the sediment is wet but there is insufficient surface water to get a sample, then only a sediment sample will be taken. Sediment samples will be analyzed for explosives and TAL metals. The surface water will be analyzed for total and dissolved TAL metals, and explosives.

Figure 6-1
Samples with Explosives Concentrations Exceeding Clean Closure Cleanup Levels
RCRA Interim Status Closure Plan
Fort Wingate Depot Activity
Gallup, New Mexico



Legend:

- RESIDUE PILE
- ARROYO

350 175 0 350

Scale in Feet

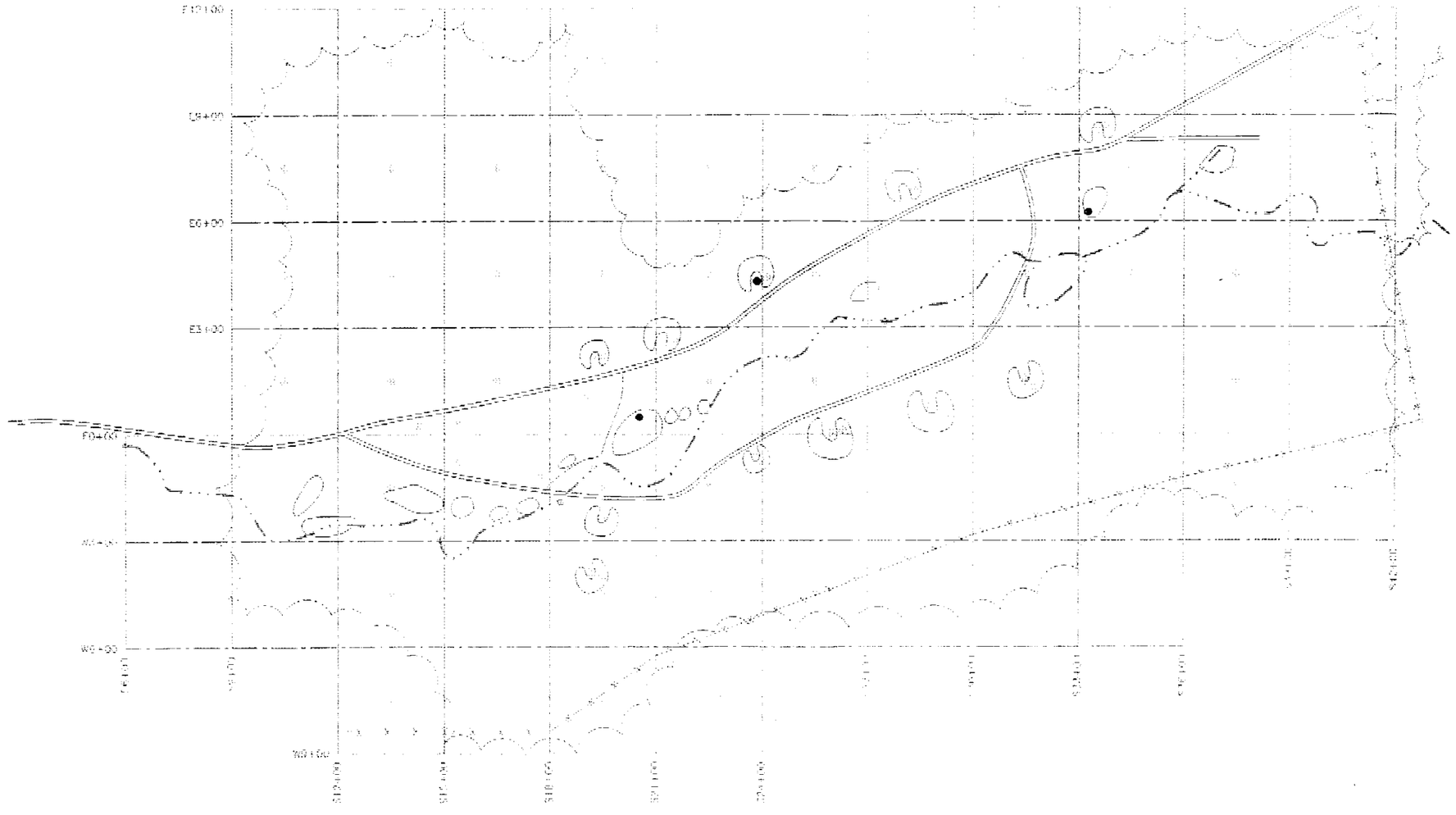
DEVELOPED BY: M.J.S.

CHECKED BY: DATE:

THE [illegible] GROUP

PM306.80.01/02.21.94-CMP/05.05.94-CMP/1204-4

Figure 6-2
Samples with Metals Concentrations Exceeding Clean Closure Cleanup Levels
RCRA Interim Status Closure Plan
Fort Wingate Depot Activity
Gallup, New Mexico



LEGEND:

- RESIDUE PILE
- DEMOLITION CRATERS
- BURNING GROUND AREAS

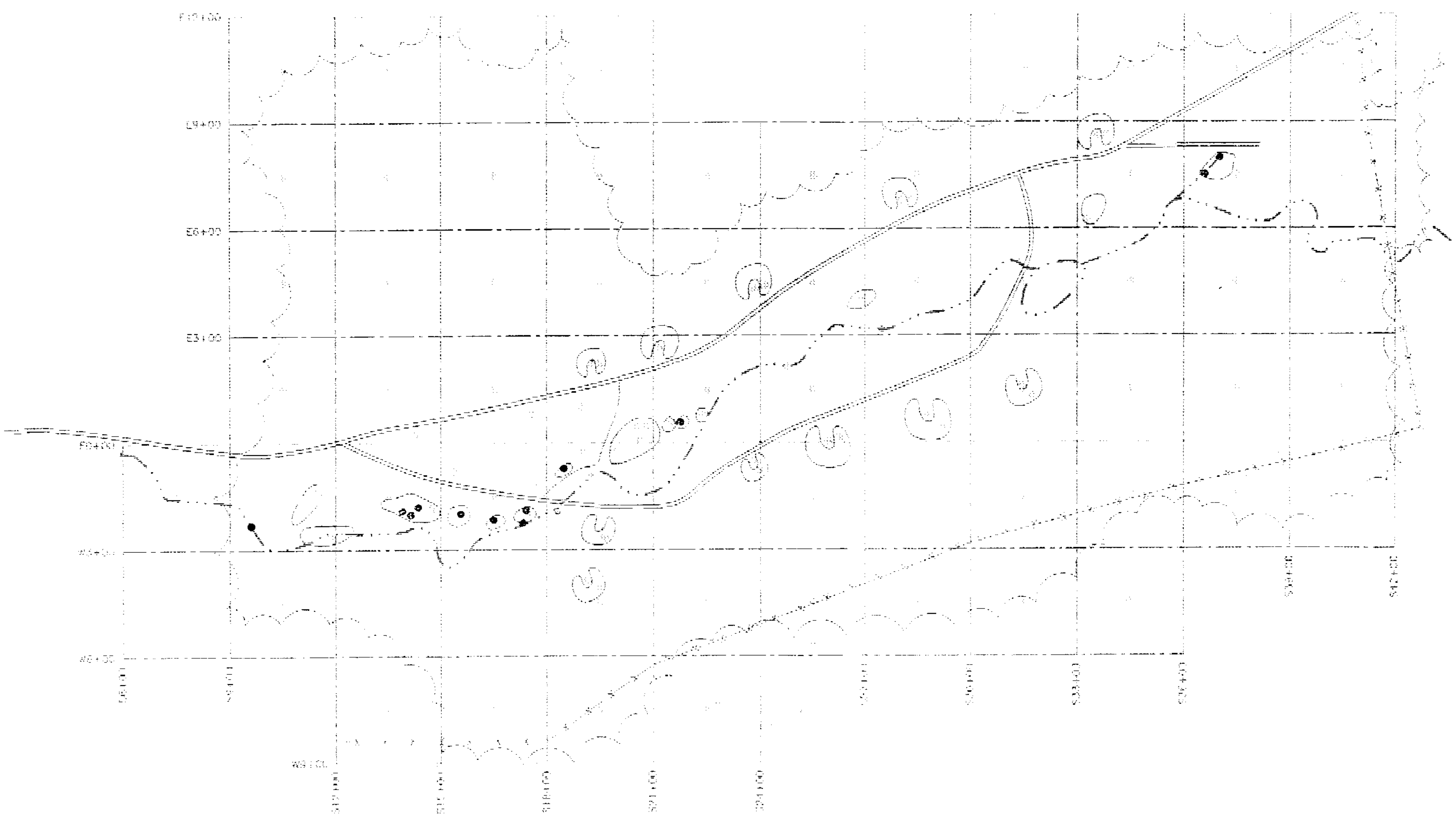
350 175 0 350

Scale in Feet

DEVELOPED BY: M.J.S.

CHECKED BY: DATE:

Figure 6-3
Samples with Explosives Concentrations Exceeding Restricted Acess Cleanup Levels
RCRA Interim Status Closure Plan
Fort Wingate Depot Activity
Gallup, New Mexico



Legend:

- RESIDUE PILE
- ARROYO

350 175 0 350

Scale in Feet

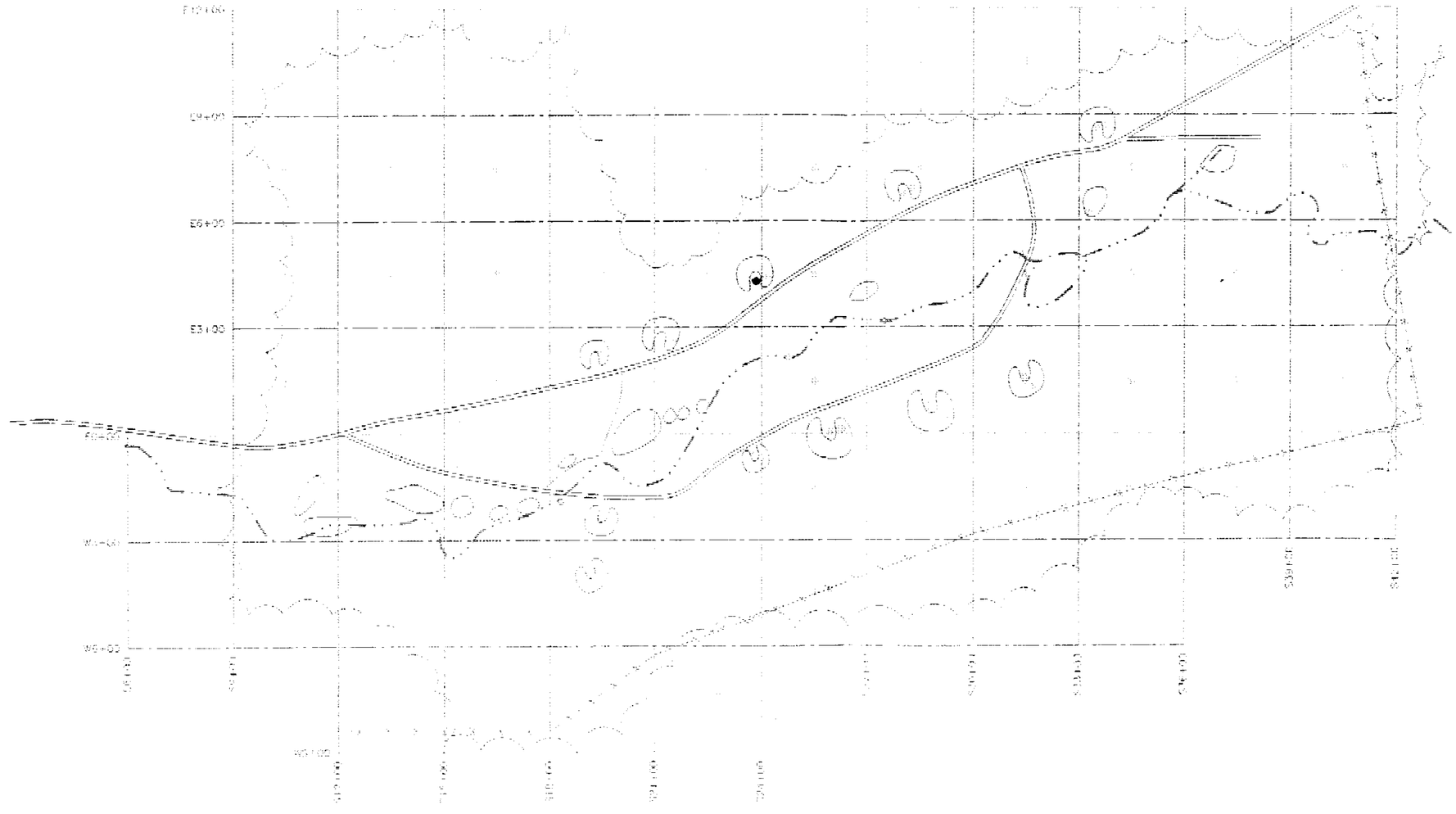
DEVELOPED BY: M.J.S.

CHECKED BY: DATE:

THE ERM GROUP

PM306.80.01/02.21.94-CMP/05.05.94-CMP/1204-6

Figure 6-4
Samples with Metals Concentrations Exceeding Restricted Access Cleanup Levels
RCRA Interim Status Closure Plan
Fort Wingate Depot Activity
Gallup, New Mexico



LEGEND:

● DEMOLITION CRATERS

350 175 0 350

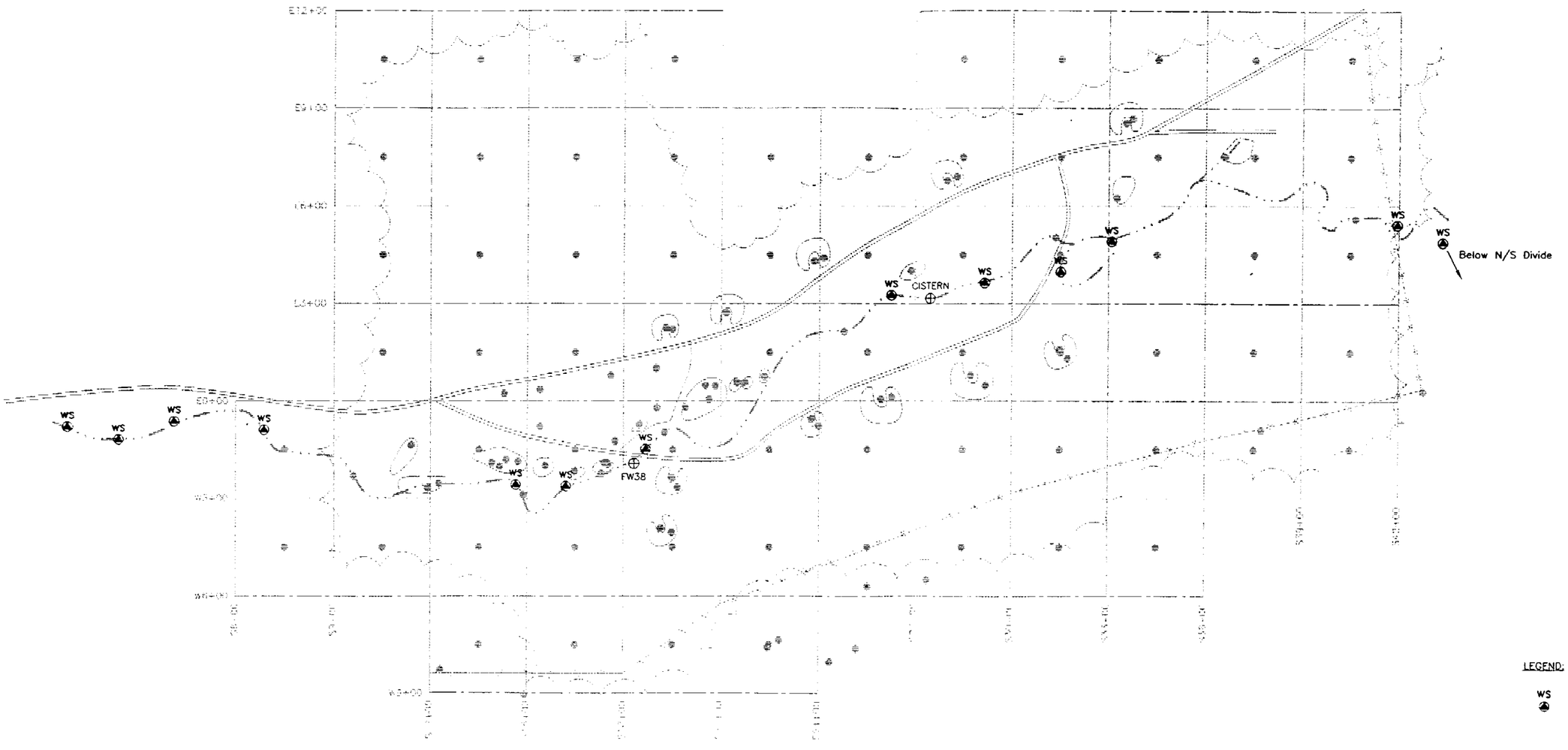
Scale in Feet

DEVELOPED BY: M.J.S.

CHECKED BY: DATE:

PM306.80.01/02.21.94-CMP/05.05.94-CMP/T206-7

Figure 6-5
Proposed Surface Water and Sediment Sampling Locations
RCRA Interim Status Closure Plan
Fort Wingate Depot Activity
Gallup, New Mexico



LEGEND:

WS — SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS

350 175 0 350

Scale in Feet

DEVELOPED BY: M.J.S.

CHECKED BY: DATE:

PM306.80.01/02.21.94-CMP/05.05.94-CMP/1206

A literature search will be performed to identify published bioassay information for the constituents positively detected in surface water and sediment samples. Analytical results will be compared to these literature values to evaluate whether there is the potential to adversely impact aquatic life on the site. Surface water sampling will be conducted from the furthest downstream stations and proceed to upstream stations to minimize the potential for cross-contamination due to suspended material in the stream caused by the sampling activities. In addition, surface water samples will be collected at each location prior to collection of the stream sediments sample at that location to further minimize cross-contamination.

6.3.2 *Confirmatory Sampling*

Samples will be collected upon completion of closure activities to ensure that selected cleanup levels have been attained. The samples will be analyzed for explosives and TAL metals.

6.4 *PERFORMANCE OF CLOSURE*

6.5 *CONFIRMATORY CLOSURE SAMPLING*

CRITICAL ISSUES:

The following critical issues require resolution to allow the finalization of the Closure Plan Modification.

1. **Army policy regarding closure of an OB/OD Area**

   It has been previously stated that the Army perceives minimal economic value relative to property transfer of the FWDA. Further, the Army's policy regarding the standard level of restoration of a former OB/OD Area has not been clearly delineated. Several points can be established at this time:

   - The OB/OD Area will remain under restricted access and use due to the safety concern resulting from UXO/ordnance related debris.
   - An accurate delineation/characterization of the residue pile areas, ground water/cistern, and wetlands has not been performed.

   The potential closure scenarios include:

   - Performance of closure (and site restoration) according to Army Policy for OB/OD Areas.
   - Compliance with the respective (NMED) regulatory agency requirements.
   - A level of negotiated closure and site restoration.

   The principal issue being that the Army would assumably wish to maintain a consistent level of closure (and costs) relative to all OB/OD areas.

   For example, a defensible position (of negotiation to the NMED) can be presented for several (example) scenarios regarding closure of the OB/OD Area:

   - **Closure in-place (removal of trash debris, maintenance of site controls, Post-Closure monitoring).**
   - **Partial Restoration (removal of trash debris, hot spots of contamination or contamination to negotiated/accepted RCRA or RI/FS clean-up levels, possibly some manner of Post-Closure monitoring).**
   - **Full Restoration (removal of trash debris, contamination to negotiated/accepted RCRA or RI/FS clean-up levels, remediation of ground water, as required, wetlands mitigation, site restoration)**

   Guidance is needed on the level of restoration that will maintain conformance with Army policy so that the proper site information can

be obtained to allow the finalization of the Closure Plan Modification and the implementation of closure.

2. **Identified Trash Within the Arroyo.** Areas of ordnance related trash, debris and residue have been identified throughout the arroyo within the OB/OD Area.

   The NMED in the Draft Comments to the RI/FS Report, dated 17 February 1993, referenced in regards to the Group C Disposal Area, N.M. Water Quality Control Commission (NMWQCC) regulations Section 2-201 which states "No person shall dispose of any refuse in a natural watercourse or in a location and manner where there is a reasonable probability that the refuse will be moved into a natural watercourse by leaching or otherwise...". The NMED further noted that the apparent findings within the Group C Disposal Area of no elevated levels of contamination did not relieve the Army of the obligation to conform to Section 2-201.

   The NMED may require conformance to Section 2-201 within the OB/OD Area.

3. **Ground water/wetlands.**

   The U.S. Department of the Interior, Fish and Wildlife Service, Albuquerque, NM in a correspondence to Ms. Barbara Hoditschek, RCRA Permits Program Manager - NMED, dated 9 December 1993 recommended consideration of sediment and/or water (collected from the wetland) toxicity tests using daphids or larval flathead minnows as test organisms.

   Further, the hydrogeological aspects of the ground water/surface water/cistern identified within the arroyo have not been established. The potential wetland areas within the arroyo have also not been delineated. The potential scope of work previously discussed by the AEC (M. Gaborek) included:

   1. Perform an ecological survey/visual inspection of the OBDA wetland area in the spring and identify and record plant species to establish pre-closure/baseline conditions. Toxicity analysis to include sampling for daphnia and flathead minnows.
   2. Collect additional ground water and surface water samples at the spring and the shallow well installed within the arroyo.
   3. Perform soil sampling within the wetland area to establish baseline conditions prior to closure.

7.0 SCHEDULE

The schedule of activities for closure of the OB/OD facilities is dependent on the review, finalization, and approval of this Closure Plan Modification. It is anticipated that the future schedule of activities will be as follows:

Activity	Estimated Schedule
Submittal of Modification to Final Closure Plan	23 May 1994
NMED review and approval of Modification to Final Closure Plan	
Preparation of Closure Implementation Design	
Contractor Procurement/Contract Award	
Implement RCRA Closure of OB/OD Area	
Submission of Final Closure Documentation and Certification of Closure	4 weeks following the completion of closure and the receipt of closure confirmation analytical results

Closure activities will be completed in accordance with the Final Closure Plan as approved in the 20 January 1994 correspondence from Ms. Kathleen M. Sisneros, Director, Water and Waste Management Division, NMED to Major Paul E. Wojciechowski, Acting Chief, Base Closure Division, U.S. Army Environmental Center.

Appendix A
Conditions of Closure Plan Approval

CONDITIONS FOR CLOSURE PLAN APPROVAL

Open Burning/Open Detonation Area

Fort Wingate Depot Activity

NM6213820974

The Closure Plan for the Open Burning/Open Detonation (OB/OD) Area as submitted by Fort Wingate Depot Activity (FWDA) dated March 1, 1993, and Attachment-1 entitled, "Proposed Interim Status Closure Field Screening Approach" dated October 20, 1993, and the following Conditions for Closure Plan Approval constitute the Approved Closure Plan. The Conditions for Closure Plan Approval take precedence over any conflicting or less stringent requirements found in the Closure Plan as submitted by FWDA.

1. QUARTERLY PROGRESS REPORTS

FWDA will submit quarterly progress reports summarizing all activities completed or in progress, the information collected, the schedule status and an explanation of any schedule delays including problems encountered. Hard copies of the results of all analyses will be included in the quarterly progress reports. Progress reports will be submitted each quarter beginning 90 days from the effective date of the closure plan and continuing through the time of closure certification acceptance by NMED.

2. DISPUTE RESOLUTION

A. The parties shall use their best efforts to informally and in good faith resolve all disputes of differences of opinion. If, however, disputes arise concerning the approved closure plan which the parties are unable to resolve informally, including but not limited to, disputes over the implementation of workplans, approval of documents, scheduling of any work, selection, performance, or completion of any closure actions, or other obligation assumed hereunder, FWDA shall submit a written notice of such dispute to the HRMB within ten business days of the receipt of the disapproval, decision, or directive. The notice shall set forth the specific points of the dispute, the position FWDA maintains should be adopted as consistent with closure requirements, the basis thereof, and any matters which it considers necessary for the HRMB's proper determination. The HRMB shall provide to FWDA a written statement of its decision on the pending dispute, which shall be incorporated into the closure plan unless FWDA requests

an opportunity for a conference in accordance with paragraph B. The existence of a dispute defined herein, and the consideration of such matters which are placed into dispute shall not excuse, toll, or otherwise suspend any compliance obligations or deadlines while the dispute resolution process is pending.

B. If FWDA objects to any HRMB determination regarding any requirement by the HRMB that FWDA perform work, FWDA shall, within 10 days of its receipt of the HRMB's decision pursuant to paragraph A, notify the HRMB in writing of its objections, and request that the Division Director of the Water and Waste Management Division convene an informal conference. The Division Director shall state in writing the final decision regarding the factual issues in dispute. Such decision shall be the final resolution of the dispute and shall be implemented immediately by FWDA according to the schedule contained therein.

3. SURVEY PLAT

No later than the time of certification of closure if the unit is not clean closed and must be closed as a landfill, a survey plat will be prepared and certified by a professional land surveyor, detailing the location and waste contents of the contaminated soils. The plat must contain a mects and bounds description and will show the locations of the entire landfill and the extent of any cover required in relation to permanently surveyed benchmarks. The plat will contain a note stating FWDA's obligation to restrict disturbance of the site. The survey plat will be submitted to the Water and Waste Management Division Director and to the official land file for incorporation into the property deed.

4. MODIFICATIONS TO THE APPROVED CLOSURE PLAN

A. The closure plan will be modified in accordance with HWMR-7, Part VI, Section 265.112(c) if affected by changes to operating plans, expected closure date, facility design or if there are any substantive modifications required due to unexpected events during closure. The plan will also be modified as needed to fulfill the requirements of closure. FWDA will submit a revised closure plan to the HRMB no later than 30 days after any unexpected event affects the closure plan. FWDA will receive the HRMB's written approval before implementing activities which constitute a revised closure plan submittal. If, at any time during closure, it becomes evident that closure activities will slip beyond the closure date as specified in Condition for Closure Plan Approval #4.B., FWDA will immediately notify the HRMB of the anticipated impact and what corrective options FWDA will pursue. Any amendments will be submitted in writing to the HRMB. A copy of the amended closure plan shall accompany the written request. The HRMB must approve any substantive modifications to this plan. The HRMB will provide a verbal response followed by a written response for requested modifications.

B. FWDA shall complete the field screening activities described

in the Attachment-1 of the approved closure plan and submit a closure plan modification request to the HRMB by March 25, 1994. The closure plan modification request shall detail the requirements outlined in Section 3.3 and 3.4 of the approved closure plan and shall be prepared in conformance with HWMR-7, Part VI, Section 265 Subpart G. The closure plan modification request shall include a detailed schedule including milestone dates for completing remaining closure activities.

5. ECOLOGICAL RISK

FWDA shall determine the ecological risks associated with any contaminants left at the OB/OD Area after completion of final closure activities. This information shall be documented in the Final Closure Report required by Section 4 of the approved closure plan. Information on ecological risk may include toxicity tests on organisms present at the site or published data applicable to the site specific conditions.

6. CLEAN CLOSURE DETERMINATION

Approved closure activities shall determine that hazardous wastes and hazardous constituents in the OB/OD Area are protective of human health and the environment in order for NMED to grant clean closure of the site and to terminate interim status for the unit.

Appendix B
UXB Summary Sheets of Identified, Marked, and Stockpiled Ordnance Items

UXB International, Inc.

[redacted]

Project: FORT WINGATE N. M. Contract No.: DAAA15-91-D-0011

Date: 5-27-93 UXB Supervisor: Robert DIEKMANN

Time: 0900 Signature: Robert Diekmann

The ordnance items / explosive materials listed below were located by UXB International, Inc., and on this date were turned over to the U.S. Government for final disposal.

LOCATED/ REMOVED FROM	UXO Nomenclature	Quantity	ITEM Action: STOCKPILED/ MARKED IN PLACE
FTR-1	37 mm	2	Stockpiled
FTR-1	75 MM	20	Stockpiled
FTR-1	Bomb Fuze	40	Stockpiled
FTR-1	Burster Cup	8	Stock Piled
FTR-1	Base Fuze	41	Stock Piled
FTR-1	3" APHE	2	Stock Piled
FTR-1	Fuze Det Lead in	3	Stock Piled
FTR-1	Flare Candle	1	Stock Piled
FTR-1	UNKNOWN ITEMS	7	Stock Piled
INCINERATOR	40MM	2	Stock Piled
INCINERATOR	20 MM	7928	Stock Piled

Comments: all the above items and following 4 pages of items where Recovered from listed areas and Stockpiled in the Current OB-OD awaiting disposal actions by Army EOD, OR Items where MARKED in place awaiting disposal actions by Army EOD,

The undersigned acknowledges receipt of the items listed above.

Government Agency: _____

Government Representative: _____

Signature: _____

UXB International, Inc.

[redacted]

Project: Fort Wingate N. M. Contract No. DAAA15-91-D-0011

Date: 5-27-93 UXB Supervisor: Robert Dieckmann

Time: 0900 Signature: Robert Dieckmann

The ordnance items / explosive materials listed below were located by UXB International, Inc., and on this date were turned over to the U.S. Government for final disposal.

Located/ Removed From	UXO Nomenclature	Quantity	Item Action: Stockpiled/ Marked in Place
Current QA-QC	20mm	51	Stockpiled
	37-40 mm	2495	
	57 mm	36	
	60 mm	214	
	75-76 mm	166	
	81 mm	40	
	90 mm	105	
	105 mm	99	
	3.5 Rocket Parts	77	
	M-83 Butten Fly Bomblets	152	
Current QA-QC	Fuzes, (Artilleny and Bomb)	4282	Stockpiled

Comments:

The undersigned acknowledges receipt of the items listed above.

Government Agency: _____

Government Representative: _____

Signature: _____

UXB Form 1.0015

UXB International, Inc.

[redacted]

Project: Fort Wingate N.M. Contract No.: DAAA15-91-D-0011

Date: 5-27-93 UXB Supervisor: Robert DIEKMANN

Time: 0900 Signature: Robert Diekmann

The ordnance items / explosive materials listed below were located by UXB International, Inc., and on this date were turned over to the U.S. Government for final disposal.

Located / Removed From	UXO Nomenclature	Quantity	Item Action: Stockpiled / Marked in Place
Current OB-OD	20 lb Frag bombs	140	Stockpiled
	Bulk High Explosive	491 lbs	
	BLU-3 + BLU-4 Bomblets	208	
	5" Rocket Warheads	10	
	120 mm (Partial)	1	
	Smoke Canisters	2	
	2.75" Rocket Warhead	7	
	155 MM	1	
	3" Projectile	1	
	M2 bounding mine	29	Stockpiled
Current OB-OD	BLU-3 Bomblet	90	Marked in Place

Comments:

The undersigned acknowledges receipt of the items listed above.

Government Agency: _____

Government Representative: _____

Signature: _____

UXB International, Inc.

[redacted]

PAGE 4 OF 4

Project: Fort Wingate N.M. Contract No.: DAAA15-91-D-0011

Date: 5-27-93 UXB Supervisor: Robert DIEKMANN

Time: 0900 Signature: Robert Diekmann

The ordnance items / explosive materials listed below were located by UXB International, Inc., and on this date were turned over to the U.S. Government for final disposal.

LOCATED/ REMOVED FROM	UXO Nomenclature	Quantity	ITEM DISPOSITION: STOCKPILED/ MARKED IN PLACE
CURRENT OB-OD	BLU-4	182	Marked in Place
	M83 bomblets	334	
	60 mm	1	
	40 mm	5	
	PG-9	1	
	5" 2un. warhead	1	
	57 mm	3	
	75 mm	1	
	81 mm	1	
CURRENT OB-OD	20 lb FRAG bomb	1	Marked in Place

Comments: To the Best of my knowledge all ordnance items Stockpiled in the Demolition area are present. IN Regards to the Blow in place items, Complete assurance of location for Receipt of each item is not Possible due to exact location was Not Provided to ME.

The undersigned acknowledges receipt of the items listed above.

Government Agency: _____

Government Representative: _____

Signature: _____

UXB Form 1.0016

UXB International, Inc.

[redacted]

PAGE 1 of 5

Project: Fort Wingate N.M. Contract No.: DAAA15-91-D-0011

Date: 9-30-93 UXB Supervisor: Robert DIELMANN

Time: 0800 Signature: Robert Dielmann

The ordnance items / explosive materials listed below were located by UXB International, Inc., and on this date were turned over to the U.S. Government for final disposal.

LOCATED/ REMOVED FROM	UXO Nomenclature	Quantity	ITEM DETION: STOCKPILED/ MARKED IN PLACE
CURRENT OB-OD	20mm	6	Stockpiled
	37-40 mm	854	
	57 mm	9	
	60 mm	24	
	75-76 mm	29	
	81 mm	1	
	90 mm	8	
	105 mm	47	
	3.5" Rocket Parts	7	
↓	M83 Butler Fly Bomblets	83	↓
CURRENT OB-OD	Fuzes (Artillery and Bomb	934	Stockpiled

Comments: All the above items and following 5 Pages of Items where Recovered from listed areas and Stockpiled in the Current OB-OD awaiting Disposal Actions by Army EOD, or items where marked in place awaiting disposal actions by Army EOD

The undersigned acknowledges receipt of the items listed above.

Government Agency: _____

Government Representative: _____

Signature: _____

UXB Form 1.0015

UXB International, Inc.

[redacted]

PAGE 2 of 5

Project: Fort Wingate N.M. Contract No.: DAAA15-91-D-0011

Date: 9-30-93 UXB Supervisor: Robert Dieterman

Time: 0800 Signature: Robert P. Dieterman

The ordinance items / explosive materials listed below were located by UXB International, Inc., and on this date were turned over to the U.S. Government for final disposal.

LOCATED/ REMOVED FROM	UXO Nomenclature	Quantity	ITEM DISPOSITION: STOCKPILED/ MARKED IN PLACE
Current 08-00	20 lb FRAG Bombs	30	Stockpiled
	Bulk High Explosive	12 lb.	
	BLU-3 and BLU-4 Bomblets	10	
	5" Rocket Warhead	4	
	3" Projectile	1	
	M2 bounding mine	59	
	155 MM	1	Stockpiled
	BLU-3 Bomblet	6	Marked in Place
	BLU-4 Bomblet	70	
	M83 Bomblet	176	
Current 08-00	20 lb FRAG Bomb	2	Marked in Place

Comments:

The undersigned acknowledges receipt of the items listed above.

Government Agency: _____

Government Representative: _____

Signature: _____

UXB Form 1.0015

UXB International, Inc.

[redacted]

PAGE 3 of 5

Project: Fort Wingate N.M. Contract No.: DAAA15-91-D-0011

Date: 9-30-93 UXB Supervisor: Robert L. DIEKMANN

Time: 0800 Signature: Robert L Diekmann

The ordnance items / explosive materials listed below were located by UXB International, Inc., and on this date were turned over to the U.S. Government for final disposal.

Located/ Removed From	UXO Nomenclature	Quantity	ITEM Action: Stock Piled/ MARKED IN PLACE
Deactivation Furnace	20 mm	36	Stock Piled
↓	37-40MM	10	
Deactivation Furnace	57 mm	1	
Disposal Site	3.5" Rocket Motor	1	
old OB-OD	20 mm	1	
↓	37-40 mm	135	
	57 mm	3	
	60 mm	1	
	75-76 mm	18	
↓	81 mm	4	↓
old OB-OD	90 mm	11	Stock Piled

Comments:

The undersigned acknowledges receipt of the items listed above.

Government Agency: _____

Government Representative: _____

Signature: _____

UXB Form 1.0015

UXB International, Inc.

[redacted]

PAGE 4 of 5

Project: Fort Wingate N.M. Contract No.: DAAA15-91-D-0011

Date: 9-30-93 UXB Supervisor: Robert DIETZMANN

Time: 0800 Signature: Robert Dietzmann

The ordnance items / explosive materials listed below were located by UXB International, Inc., and on this date were turned over to the U.S. Government for final disposal.

LOCATED/ REMOVED FROM	UXO Nomenclature	Quantity	ITEM DISPOSITION: STOCKPILED/ MARKED IN PLACE
old 08-00	105 mm	2	Stockpiled
	3.5" Rocket Parts	3	
	M83	8	
	Fuzes	131	
	20 lb Frag bomb	8	
	Bulk High Explosive	.5 lb	
	BLU-3 and BLU-4 Bomblets	3	
	5" Rocket warhead	1	
	M2 bounding Mine	14	
	155 mm	~~38~~	
old 08-00	Burster tube	2	Stockpiled

Comments:

The undersigned acknowledges receipt of the items listed above.

Government Agency: _____

Government Representative: _____

Signature: _____

UXB Form 1.0015

UXB International, Inc.

[redacted]

PAGE 5 of 5

Project: Fort Wingate N.M. Contract No.: DAAA15-91-D-0011

Date: 9-30-93 UXB Supervisor: Robert Dietzmann

Time: 0800 Signature: Robert Dietzmann

The ordnance items / explosive materials listed below were located by UXB International, Inc., and on this date were turned over to the U.S. Government for final disposal.

LOCATED/ REMOVED FROM	UXO Nomenclature	Quantity	ITEM DETION: STOCKPILED/ MARKED IN PLACE
od OB-OD	TRACER	1	Stock Piled
↓	BLU-4 Bomblet	6	marked in Place
Old OB-OD	M83 Bomblet	32	Marked in Place

Comments: To the bat of my knowledge all ordnance items stock-piled in the Demolition area are present, in regards to the Blow in Place items complete assurance of location for receipt of each item is not possible due to exact Location was Not provided to me.

The undersigned acknowledges receipt of the items listed above.

Government Agency: U.S. ARMY EOD

Government Representative: AUDRIE J. MORGAN, 1LT

Signature: Audrie J Morgan

UXB Form 1.0015

UXB International, Inc.

[redacted]

Project: Fort Wingate N.M Contract No.: DAA15-91-D-0011

Date: 11-16-93 UXB Supervisor: Robert Dykeman

Time: 0815 Signature: Robert Dykeman

The ordnance items / explosive materials listed below were located by UXB International, Inc., and on this date were turned over to the U.S. Government for final disposal.

Located/ Removed From	UXO Nomenclature	Quantity	Item Action: Stockpiled/ Marked in Place
Old OB-OD	50 Cal API	4	Stockpiled
	20 mm Projectiles	2	
	37-40 mm Projectiles	1094	
	60 mm Mortar	1	
	75 mm Projectiles	32	
	81 mm Mortar	1	
	90 mm Projectile	38	
	105 mm Projectile	2	
	3.5 Rocket Parts	2	
	M-83 Butterfly Bomblet	3	
Old OB-OD	Fuzes, (Artillery and Bomb)	3539	Stockpiled

Comments: All the above items and following 3 pages of items where recovered from listed areas and stockpiled in the current OB-OD awaiting Disposal actions by Army EOD, or items where marked in place awaiting Disposal actions by Army EOD.

The undersigned acknowledges receipt of the items listed above.

Government Agency: _____

Government Representative: _____

Signature: _____

UXB Form 1.0015

UXB International, Inc.

[redacted]

PAGE 2 OF 4

Project: FORT WINGATE N.M. Contract No.: DAAA15-91-D-0011

Date: 11-16-93 UXB Supervisor: Robert DIETZMANN

Time: 0815 Signature: Robert P. Dietzmann

The ordinance items / explosive materials listed below were located by UXB International, Inc., and on this date were turned over to the U.S. Government for final disposal.

LOCATED/ REMOVED FROM	UXO Nomenclature	Quantity	ITEM DETON: STOCKPILED/ MARKED IN PLACE
old OB-OD	20 lb FRAG Bombs	15	Stockpiled
	Bulk HIGH Explosive	47 lbs	
	155 mm Projectile	9	
	M2 Bounding Mine	12	
	Burster Tubes	67	
	2.75 Rocket Motor	2	
	Fuze extenders	1	
	Booster Tubes	3	
	M2 Parts (Bounding mine)	217	
	81 mm tail boom	1	
old OB-OD	40 MM Red Phosphorous	2	Stockpiled

Comments:

The undersigned acknowledges receipt of the items listed above.

Government Agency: _____

Government Representative: _____

Signature: _____

UXB Form 1.0015

UXB International, Inc.

[redacted]

Project: Fort Wingate N.M. Contract No.: DAAA15-91-D-0011

Date: 11-16-93 UXB Supervisor: Robert Dietzmann

Time: 0815 Signature: Robert Dietzmann

The ordinance items / explosive materials listed below were located by UXB International, Inc., and on this date were turned over to the U.S. Government for final disposal.

Located/ Removed From	UXO Nomenclature	Quantity	ITEM Action: Stockpiled/ Marked in Place
Old OB-OD	37 MM Shot Canisters	38	Stockpiled
	100 lb GP Bomb (Partial)	2	
	Unknown	12	
	3" Rocket	1	Stockpiled
	BIP's S-M83, 1-BLU-4	6	Marked in Place
	Smoke Canisters / Candles	779	Stockpiled
Old OB-OD	107 MM Mortar	252	Stockpiled
OB-OD	Bulk High Explosive	5 lbs	Stockpiled
	BLU-4 Bomblet	1	
	Booster Tube	4	
OB-OD	BLU-3. Bomblet	1	Stockpiled

Comments:

The undersigned acknowledges receipt of the items listed above.

Government Agency: _____

Government Representative: _____

Signature: _____

UXB Form 1.0016

UXB International, Inc.

[redacted]

Project: Fort Wingate N.M. Contract No.: DAAA15-91-D-0011

Date: 11-16-93 UXB Supervisor: Robert Dieterman

Time: 0815 Signature: Robert Dieterman

The ordnance items / explosive materials listed below were located by UXB International, Inc., and on this date were turned over to the U.S. Government for final disposal.

Located/ Removed From	UXO Nomenclature	Quantity	Item Action: Stockpiled/ Marked in Place
Deactivation Furnace	20mm Projectile	1493	Stock Piled
	37-40 MM Projectile	526	
	57 mm Projectile	9	
	75 mm Projectile	32	
	Fuzes (Artillery and Bomb)	49	
Deactivation Furnace	20mm shell cases	19	Stock Piled
OB-OD	20MM Projectile	3	
	37-40 MM Projectile	4	
	75MM Projectile	2	
	90MM Shell Casing	1	
OB-OD	Fuzes (artillery and Bomb)	14	Stock Piled

Comments: To the best of my Knowledge all ordnance items stockpiled in the demolition area are present, in regards to the Blow in Place items complete assurance of Location for receipt of each items is not possible due to exact location was NOT provided to me.

The undersigned acknowledges receipt of the items listed above.

Government Agency: U.S. Army EOD

Government Representative: AUDREE J. MORGAN, 1LT

Signature: Audree J Morgan

UXB Form 1.0015

UXB International, Inc.

[redacted]

PAGE 1 OF 1

Project: FORT WINGATE Contract No.: DAAA15-91-D-0011

Date: 12-14-93 UXB Supervisor: ROBERT DIECKMANN

Time: 0845 Signature: Robert Dieckmann

The ordnance items / explosive materials listed below were located by UXB International, Inc., and on this date were turned over to the U.S. Government for final disposal.

LOCATED/ REMOVED FROM	UXO Nomenclature	Quantity	ITEM Action: STOCKPILED/ MARKED IN PLACE
OB-OD	20 mm	1	Stock Piled
OB-OD	BLU-3	1	Stock Piled
OB-OD	BLU-4	1	Stock Piled
OB-OD	M83	1	Stock Piled
Ground Pr Area	M 49 Trip Flare	1	Stock Piled

Comments: All the above items where Recovered From Listed Areas and Stockpiled in the current OB-OD awaiting Disposal actions by Army EOD.

The undersigned acknowledges receipt of the items listed above.

Government Agency: Army - 41st EOD

Government Representative: AUDRIE J MORGAN, 1LT

Signature: Audrie J Morgan

UXB Form 1.0016

Appendix C
Analytical Data

G

Environmental Science & Engineering DATE 12/07/93 STATUS : PAGE 1
PROJECT NUMBER 7936033G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S	DBASO12	DBASO11	DBASO10	DBASO09	DBASO06	DBASO13	DBASO13	DBASO05	DBASO20
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	1	2	3	4	15	5	6	14	7
COLLECTION DATE:	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93
COLLECTION TIME:	09:10	09:25	09:35	09:45	10:10	10:15	10:15	10:25	10:35
HMX	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947
UG/G									
RDX	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323
UG/G									
135TNB	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961
UG/G									
13DNB	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268
UG/G									
NB	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283
UG/G									
TETRYL	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79
UG/G									
246TNT	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20
UG/G									
26DNT	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
UG/G									
24DNT	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09
UG/G									
2NT	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69
UG/G									
4NT	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
UG/G									
3NT	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31
UG/G									
2-AMINO-4,6-DNT	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	0.34
UG/G									
4-AMINO-2,6-DNT,SED	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250
UG/G									
BARIUM,TOTAL	525	477	200	383	443	434	400	387	201
UG/G									
CALCIUM,TOTAL	55700	19700	5960	9960	23900	42900	27600	26500	23800
UG/G									
CADMIUM,TOTAL	<0.515	2.38	1.22	<0.515	0.744	1.00	0.687	1.48	0.607
UG/G									
COBALT,TOTAL	6.04	3.74	4.29	7.32	11.6	5.50	4.52	3.76	3.81
UG/G									
COPPER,TOTAL	60.6	159	66.0	65.2	183	285	72.9	82.1	61.1
UG/G									
POTASSIUM,TOTAL	3260	1140	904	2400	2140	2190	1490	1220	1310
UG/G									
MAGNESIUM,TOTAL	8050	2920	2870	6200	3380	7320	6750	4100	3590
UG/G									
SODIUM,TOTAL	338	216	197	276	278	286	279	225	202
UG/G									
ZINC,TOTAL	101	241	48.9	65.2	222	96.1	76.6	65.1	94.7
UG/G									
MANGANESE,TOTAL	610	341	319	510	710	470	423	383	317
UG/G									
BERYLLIUM,TOTAL	1.35	0.759	0.880	1.03	0.855	0.765	0.619	0.772	<0.500
UG/G									
ANTIMONY,TOTAL	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3
UG/G									
NICKEL,TOTAL	12.6	8.39	8.12	11.9	77.0	13.4	6.40	6.97	8.22
UG/G									
ALUMINUM,TOTAL	25800	8240	8990	20300	9680	17000	11700	11400	6760
UG/G									
IRON,TOTAL	17100	7880	7910	13800	40400	13000	11700	8070	11000
UG/G									
CHROMIUM,TOTAL	15.9	9.43	9.83	15.8	320	21.3	10.00	8.83	7.87
UG/G									
SILVER,TOTAL	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521
UG/G									
VANADIUM,TOTAL	21.9	9.55	18.1	21.0	31.3	17.3	14.2	14.5	15.1
UG/G									
ARSENIC	1.00	0.639	0.804	1.27	3.65	0.798	1.23	0.411	0.917
UG/G									

PROJECT NUMBER 7936033G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S PARAMETERS UNITS	DBASO12 FTWIN 1	DBASO11 FTWIN 2	DBASO10 FTWIN 3	DBASO09 FTWIN 4	DBASO06 FTWIN 15	DBASO13 FTWIN 5	DBASO13 FTWIN 6	DBASO05 FTWIN 14	DBASO20 FTWIN 7
COLLECTION DATE:	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93
COLLECTION TIME:	09:10	09:25	09:35	09:45	10:10	10:15	10:15	10:25	10:35
LEAD UG/G	58.2	32.6	15.0	17.3	22.7	29.8	30.5	17.5	16.1
SELENIUM UG/G	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202
THALLIUM UG/G	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153
MERCURY,SED UG/G-DRY	0.186	0.049	0.035	0.051	0.373	0.361	0.395	0.036	0.642
MOISTURE %WET WT	15.2	15.7	14.0	18.4	18.8	12.5	12.1	18.1	11.3

PROJECT NUMBER 79360336 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S	DBAS019	BIPS001	DBAS004	DBAS018	BIPS002	DBAS003	BIPS003	BIPS004	DBAS027
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	8	38	13	9	39	12	40	41	17
COLLECTION DATE:	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93
COLLECTION TIME:	10:45	10:49	10:50	10:55	11:00	11:05	11:13	11:25	11:40
HMX	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947
UG/G									
RDX	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323
UG/G									
135TNB	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961
UG/G									
13DNB	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268
UG/G									
NB	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283
UG/G									
TETRYL	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79
UG/G									
246TNT	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20
UG/G									
26DNT	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
UG/G									
24DNT	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09
UG/G									
2NT	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69
UG/G									
4NT	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
UG/G									
3NT	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31
UG/G									
2-AMINO-4,6-DNT	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	0.38	<0.28
UG/G									
4-AMINO-2,6-DNT,SED	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	0.850	<0.250
UG/G									
BARIUM,TOTAL	570	154	275	281	77.9	369	25.7	49.7	305
UG/G									
CALCIUM,TOTAL	31700	42700	23900	11400	29100	41300	18300	3680	27900
UG/G									
CADMIUM,TOTAL	0.748	<0.515	1.98	<0.515	4.51	<0.515	17.5	<0.515	0.670
UG/G									
COBALT,TOTAL	6.08	5.35	3.69	16.9	2.81	3.82	<0.665	1.95	4.77
UG/G									
COPPER,TOTAL	72.0	17.1	132	157	4.62	153	15.0	4.11	111
UG/G									
POTASSIUM,TOTAL	2330	2640	1090	1700	979	912	435	675	1730
UG/G									
MAGNESIUM,TOTAL	6950	5550	4020	5740	2830	3100	782	1030	3260
UG/G									
SODIUM,TOTAL	271	388	221	406	206	234	150	157	539
UG/G									
ZINC,TOTAL	152	28.4	71.5	95.8	27.3	23.7	58.2	15.0	79.4
UG/G									
MANGANESE,TOTAL	695	272	361	746	196	547	28.3	108	351
UG/G									
BERYLLIUM,TOTAL	1.13	0.738	0.713	1.10	<0.500	0.644	<0.500	<0.500	<0.500
UG/G									
ANTIMONY,TOTAL	<41.3	<41.3	<41.3	93.0	<41.3	<41.3	<41.3	<41.3	<41.3
UG/G									
NICKEL,TOTAL	10.7	11.2	7.25	24.7	5.11	10.2	<1.54	3.48	9.31
UG/G									
ALUMINUM,TOTAL	17800	11700	9650	18600	4660	8110	2350	3870	8190
UG/G									
IRON,TOTAL	12900	10200	9320	151000	4270	9370	1250	4110	12400
UG/G									
CHROMIUM,TOTAL	12.8	11.6	9.48	55.6	5.80	13.7	2.74	3.56	9.70
UG/G									
SILVER,TOTAL	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521
UG/G									
VANADIUM,TOTAL	20.7	18.3	12.8	22.1	9.52	15.6	4.81	10.2	15.2
UG/G									
ARSENIC	0.902	0.825	0.626	1.93	0.750	0.928	0.320	0.317	0.817
UG/G									

PROJECT NUMBER 7936033G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S PARAMETERS UNITS	DBASO19 FTWIN 8	BIPSO01 FTWIN 38	DBASO04 FTWIN 13	DBASO18 FTWIN 9	BIPSO02 FTWIN 39	DBASO03 FTWIN 12	BIPSO03 FTWIN 40	BIPSO04 FTWIN 41	DBASO27 FTWIN 17
COLLECTION DATE:	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93
COLLECTION TIME:	10:45	10:49	10:50	10:55	11:00	11:05	11:13	11:25	11:40
LEAD UG/G	18.9	5.50	16.5	13.2	3.03	8.86	3.43	2.20	9.42
SELENIUM UG/G	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202
THALLIUM UG/G	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153
MERCURY,SED UG/G-DRY	0.206	<0.027	<0.027	0.061	<0.027	<0.027	<0.027	0.606	0.145
MOISTURE %WET WT	17.7	19.2	17.0	19.7	7.9	15.7	16.8	15.2	17.8

PROJECT NUMBER 7936033G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S	BIPSO05	DBASO16	DBASO26	BIPSO06	DBASO17	BIPSO07	DBASO25	DBASO32	DBASO24
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	42	10	16	43	11	44	19	29	20
COLLECTION DATE:	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93
COLLECTION TIME:	11:40	11:45	11:55	11:58	12:00	12:13	14:40	14:45	14:55
HMX	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947
UG/G									
RDX	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323
UG/G									
135TNB	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961
UG/G									
13DNB	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268
UG/G									
NB	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283
UG/G									
TETRYL	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79
UG/G									
246TNT	<1.20	30.0	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20
UG/G									
26DNT	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
UG/G									
24DNT	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09
UG/G									
2NT	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69
UG/G									
4NT	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
UG/G									
3NT	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31
UG/G									
2-AMINO-4,6-DNT	<0.28	2.41	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28
UG/G									
4-AMINO-2,6-DNT,SED	<0.250	2.07	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250
UG/G									
BARIUM,TOTAL	169	524	725	40.3	582	75.3	479	336	152
UG/G									
CALCIUM,TOTAL	4420	19500	33900	3430	15000	13500	24300	39900	3730
UG/G									
CADMIUM,TOTAL	<0.515	0.892	<0.515	<0.515	2.50	6.36	<0.515	1.89	0.829
UG/G									
COBALT,TOTAL	6.70	9.06	20.2	2.21	8.13	2.68	4.94	9.43	3.74
UG/G									
COPPER,TOTAL	12.1	315	1070	2.63	465	109	108	557	109
UG/G									
POTASSIUM,TOTAL	2000	2310	1780	664	2490	827	1180	1340	582
UG/G									
MAGNESIUM,TOTAL	3300	6450	7570	1010	9070	1260	3920	3010	1460
UG/G									
SODIUM,TOTAL	209	299	1090	133	344	179	233	351	183
UG/G									
ZINC,TOTAL	33.3	65.1	<1.94	15.5	117	22.0	39.9	37.8	21.5
UG/G									
MANGANESE,TOTAL	260	1120	930	34.1	512	174	483	336	143
UG/G									
BERYLLIUM,TOTAL	1.02	1.44	0.878	<0.500	1.20	<0.500	0.809	<0.500	<0.500
UG/G									
ANTIMONY,TOTAL	<41.3	<41.3	112	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3
UG/G									
NICKEL,TOTAL	9.08	16.9	36.4	4.08	22.1	6.09	8.60	151	6.54
UG/G									
ALUMINUM,TOTAL	12000	22300	11300	4130	26200	4300	12000	7910	5800
UG/G									
IRON,TOTAL	12400	19100	163000	3610	26400	4670	9340	4910	7770
UG/G									
CHROMIUM,TOTAL	12.0	22.0	36.4	3.18	29.6	6.20	11.8	360	8.52
UG/G									
SILVER,TOTAL	<0.521	<0.521	1.50	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521
UG/G									
VANADIUM,TOTAL	27.6	28.1	<1.77	10.3	23.2	11.5	19.2	17.0	14.4
UG/G									
ARSENIC	3.03	0.973	0.893	0.645	1.10	1.48	1.11	1.34	0.906
UG/G									

PROJECT NUMBER 7936033G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S PARAMETERS UNITS	BIPSO05 FTWIN 42	DBASO16 FTWIN 10	DBASO26 FTWIN 16	BIPSO06 FTWIN 43	DBASO17 FTWIN 11	BIPSO07 FTWIN 44	DBASO25 FTWIN 19	DBASO32 FTWIN 29	DBASO24 FTWIN 20
COLLECTION DATE:	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93
COLLECTION TIME:	11:40	11:45	11:55	11:58	12:00	12:13	14:40	14:45	14:55
LEAD UG/G	11.3	24.5	11.0	1.34	27.3	5.97	9.16	17.4	11.0
SELENIUM UG/G	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202
THALLIUM UG/G	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153
MERCURY,SED UG/G-DRY	0.039	0.052	<0.027	<0.027	0.046	<0.027	0.034	<0.027	<0.027
MOISTURE %WET WT	25.6	20.9	16.6	10.0	19.0	15.6	12.2	16.3	15.9

SAMPLE ID'S	DBASO33	DBASO23	DBASO30	DBASO28	DBASO31	DBASO36	DBASO37	DBASO41	DBASO38
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	30	21	22	31	23	24	32	25	33
COLLECTION DATE:	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93
COLLECTION TIME:	15:00	15:05	15:15	15:15	15:30	15:40	15:40	15:50	15:50
HMX UG/G	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947
RDX UG/G	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323
135TNB UG/G	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961
13DNB UG/G	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268
NB UG/G	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283
TETRYL UG/G	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79
246TNT UG/G	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20
26DNT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
24DNT UG/G	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09
2NT UG/G	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69
4NT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
3NT UG/G	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31
2-AMINO-4,6-DNT UG/G	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28
4-AMINO-2,6-DNT,SED UG/G	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250
BARIUM,TOTAL UG/G	92.0	604	414	52.9	386	273	305	199	222
CALCIUM,TOTAL UG/G	19500	27400	11000	14900	39800	19900	32800	13000	37700
CADMIUM,TOTAL UG/G	<0.515	<0.515	<0.515	<0.515	<0.515	<0.515	2.35	<0.515	1.82
COBALT,TOTAL UG/G	2.07	5.81	4.66	1.83	5.18	3.33	4.89	3.64	5.98
COPPER,TOTAL UG/G	47.6	34.2	29.2	47.1	104	38.3	552	272	357
POTASSIUM,TOTAL UG/G	998	1770	1600	847	1770	719	1830	1300	2200
MAGNESIUM,TOTAL UG/G	2000	5150	3990	1120	5530	2540	3680	3000	4380
SODIUM,TOTAL UG/G	246	287	201	153	295	187	321	213	420
ZINC,TOTAL UG/G	13.3	22.2	13.8	14.5	26.2	11.6	29.5	17.2	27.5
MANGANESE,TOTAL UG/G	175	551	360	130	654	307	411	259	369
BERYLLIUM,TOTAL UG/G	<0.500	1.23	1.43	<0.500	1.15	0.899	0.858	0.730	0.681
ANTIMONY,TOTAL UG/G	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3
NICKEL,TOTAL UG/G	4.30	8.07	8.32	3.73	10.3	4.94	17.6	9.08	14.3
ALUMINUM,TOTAL UG/G	4480	19200	17200	3770	15600	7700	11600	11900	10500
IRON,TOTAL UG/G	2800	14200	12100	4290	10900	3110	11500	7930	33400
CHROMIUM,TOTAL UG/G	5.92	15.1	10.7	5.55	13.4	5.89	29.6	12.4	26.8
SILVER,TOTAL UG/G	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	0.766	<0.521	1.71
VANADIUM,TOTAL UG/G	9.88	28.5	14.6	10.6	28.2	10.1	17.2	12.8	21.3
ARSENIC UG/G	0.955	1.26	0.327	1.35	1.01	0.874	1.32	0.412	0.820

PROJECT NUMBER 7936033G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S / PARAMETERS	UNITS	DBASO33 FTWIN 30	DBASO23 FTWIN 21	DBASO30 FTWIN 22	DBASO28 FTWIN 31	DBASO31 FTWIN 23	DBASO36 FTWIN 24	DBASO37 FTWIN 32	DBASO41 FTWIN 25	DBASO38 FTWIN 33
COLLECTION DATE:		11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93
COLLECTION TIME:		15:00	15:05	15:15	15:15	15:30	15:40	15:40	15:50	15:50
LEAD	UG/G	3.34	6.67	6.21	3.01	8.87	5.91	18.2	4.93	8.17
SELENIUM	UG/G	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202
THALLIUM	UG/G	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153
MERCURY,SED	UG/G-DRY	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027
MOISTURE	%WET WT	12.8	20.0	11.2	11.4	14.9	17.5	15.0	17.3	13.6

PROJECT NUMBER 79360336 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S	DBAS042	DBAS039	DBAS043	DBAS043	DBAS047	DBAS053	DBAS044	BIPS008	DBAS059
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	26	34	35	36	27	28	37	45	49
COLLECTION DATE:	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/18/93
COLLECTION TIME:	16:00	16:00	16:35	16:35	16:40	16:50	17:00	17:18	08:10
HMX	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	1.57	<0.947	<0.947
UG/G									
RDX	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	4.14	<0.323	<0.323
UG/G									
135TNB	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961
UG/G									
13DNB	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268
UG/G									
NB	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283
UG/G									
TETRYL	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79
UG/G									
246TNT	<1.20	<1.20	<1.20	1.54	<1.20	<1.20	<1.20	<1.20	<1.20
UG/G									
26DNT	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
UG/G									
24DNT	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09
UG/G									
2NT	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69
UG/G									
4NT	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
UG/G									
3NT	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31
UG/G									
2-AMINO-4,6-DNT	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	0.37	<0.28	<0.28
UG/G									
4-AMINO-2,6-DNT,SED	<0.250	<0.250	0.254	<0.250	<0.250	<0.250	0.313	<0.250	<0.250
UG/G									
BARIUM,TOTAL	400	310	212	203	79.0	163	179	56.3	230
UG/G									
CALCIUM,TOTAL	48400	45100	26100	23100	11800	8850	24700	13700	5680
UG/G									
CADMIUM,TOTAL	1.28	1.33	2.22	1.91	0.735	0.864	1.11	<0.515	<0.515
UG/G									
COBALT,TOTAL	4.05	4.35	3.92	3.73	2.27	3.82	4.84	2.77	3.84
UG/G									
COPPER,TOTAL	159	360	210	132	300	426	112	7.53	38.3
UG/G									
POTASSIUM,TOTAL	1440	2200	1570	1400	253	1160	2390	698	1120
UG/G									
MAGNESIUM,TOTAL	4190	4650	2810	2490	1540	2550	3590	1020	3420
UG/G									
SODIUM,TOTAL	568	351	235	232	210	210	310	138	254
UG/G									
ZINC,TOTAL	22.7	24.7	26.0	22.9	12.3	19.3	33.6	14.3	17.7
UG/G									
MANGANESE,TOTAL	604	319	300	353	134	272	277	161	137
UG/G									
BERYLLIUM,TOTAL	1.07	<0.500	<0.500	<0.500	<0.500	0.702	0.706	<0.500	<0.500
UG/G									
ANTIMONY,TOTAL	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3
UG/G									
NICKEL,TOTAL	8.30	11.8	9.70	7.12	10.00	15.0	9.43	3.92	8.14
UG/G									
ALUMINUM,TOTAL	11600	7920	7370	6190	5290	7810	11900	3550	10000
UG/G									
IRON,TOTAL	9440	8530	5620	4760	4530	10100	11600	4330	7140
UG/G									
CHROMIUM,TOTAL	11.7	15.4	11.7	8.31	17.2	87.3	13.8	3.78	10.2
UG/G									
SILVER,TOTAL	0.738	0.758	1.06	0.787	<0.521	<0.521	<0.521	<0.521	<0.521
UG/G									
VANADIUM,TOTAL	14.1	17.9	17.2	16.0	5.33	17.7	23.3	11.2	24.1
UG/G									
ARSENIC	0.694	0.929	1.13	0.973	0.294	0.616	1.25	0.623	0.889
UG/G									

PROJECT NUMBER 7936033G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S / PARAMETERS	UNITS	DBASO42 FTWIN 26	DBASO39 FTWIN 34	DBASO43 FTWIN 35	DBASO43 FTWIN 36	DBASO47 FTWIN 27	DBASO53 FTWIN 28	DBASO44 FTWIN 37	BIPSO08 FTWIN 45	DBASO59 FTWIN 49
COLLECTION DATE:		11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/17/93	11/18/93
COLLECTION TIME:		16:00	16:00	16:35	16:35	16:40	16:50	17:00	17:18	08:10
LEAD	UG/G	11.4	9.80	25.0	17.0	4.70	11.0	11.1	4.55	8.23
SELENIUM	UG/G	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202
THALLIUM	UG/G	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153
MERCURY,SED	UG/G-DRY	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027	0.034	<0.027
MOISTURE	%WET WT	18.6	20.8	17.3	17.3	10.5	15.2	16.9	12.9	13.7

SAMPLE ID'S	DBASO59	DBASO60	DBASO55	DBASO61	DBASO62	DBASO56	DBASO50	DBASO50	DBASO49
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	52	50	78	51	53	79	80	85	81
COLLECTION DATE:	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93
COLLECTION TIME:	08:10	08:25	08:35	08:40	09:05	09:10	09:20	09:20	09:40
HMX UG/G	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947
RDX UG/G	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323
135TNB UG/G	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961
13DNB UG/G	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268
NB UG/G	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283
TETRYL UG/G	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79
246TNT UG/G	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20
26DNT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
24DNT UG/G	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09
2NT UG/G	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69
4NT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
3NT UG/G	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31
2-AMINO-4,6-DNT UG/G	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28
4-AMINO-2,6-DNT,SED UG/G	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250
BARIUM,TOTAL UG/G	274	246	146	102	337	91.7	352	366	211
CALCIUM,TOTAL UG/G	6120	32100	26300	27700	30300	42400	53100	59600	27900
CADMIUM,TOTAL UG/G	<0.515	<0.515	<0.515	<0.515	<0.515	<0.515	<0.515	<0.515	<0.515
COBALT,TOTAL UG/G	3.92	4.91	3.74	2.40	3.90	1.99	6.87	7.38	3.71
COPPER,TOTAL UG/G	59.3	105	52.8	29.8	273	13.8	48.6	58.1	74.9
POTASSIUM,TOTAL UG/G	1090	1930	1120	1080	2030	704	3420	3990	1610
MAGNESIUM,TOTAL UG/G	2470	3600	2430	2320	4380	2410	9060	8960	3010
SODIUM,TOTAL UG/G	186	254	176	152	285	205	1470	1370	263
ZINC,TOTAL UG/G	16.5	20.6	16.7	12.6	23.1	8.10	21.9	24.1	19.1
MANGANESE,TOTAL UG/G	134	369	415	205	281	166	563	537	319
BERYLLIUM,TOTAL UG/G	0.755	0.791	<0.500	<0.500	<0.500	<0.500	0.693	0.739	<0.500
ANTIMONY,TOTAL UG/G	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3
NICKEL,TOTAL UG/G	6.19	8.48	6.12	4.45	10.5	3.77	13.4	15.4	8.21
ALUMINUM,TOTAL UG/G	7080	10300	5900	3640	7390	3090	18100	18600	7630
IRON,TOTAL UG/G	5390	10700	7030	3270	4590	3080	15400	15100	8610
CHROMIUM,TOTAL UG/G	7.57	11.0	7.16	5.25	13.6	3.89	14.5	19.6	9.64
SILVER,TOTAL UG/G	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521
VANADIUM,TOTAL UG/G	13.5	21.0	14.9	10.2	20.3	12.4	33.2	30.8	20.7
ARSENIC UG/G	0.796	0.541	0.849	0.840	0.778	0.756	1.10	1.11	0.885

PROJECT NUMBER 7936033G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S / PARAMETERS	UNITS	DBASO59 FTWIN 52	DBASO60 FTWIN 50	DBASO55 FTWIN 78	DBASO61 FTWIN 51	DBASO62 FTWIN 53	DBASO56 FTWIN 79	DBASO50 FTWIN 80	DBASO50 FTWIN 85	DBASO49 FTWIN 81
COLLECTION DATE:		11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93
COLLECTION TIME:		08:10	08:25	08:35	08:40	09:05	09:10	09:20	09:20	09:40
LEAD	UG/G	7.21	4.62	5.26	3.82	6.87	2.83	6.22	6.17	17.6
SELENIUM	UG/G	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202
THALLIUM	UG/G	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153
MERCURY,SED	UG/G-DRY	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027
MOISTURE	%WET WT	17.1	14.4	13.7	11.7	15.9	9.3	16.3	18.1	16.3

SAMPLE ID'S PARAMETERS UNITS	DBASO68 FTWIN 54	DBASO48 FTWIN 82	DBASO63 FTWIN 55	DBASO57 FTWIN 56	DBASO58 FTWIN 57	DBASO64 FTWIN 83	DBASO52 FTWIN 58	DBASO65 FTWIN 84	DBASO46 FTWIN 59
COLLECTION DATE:	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93
COLLECTION TIME:	09:55	10:00	10:05	10:15	10:25	10:35	10:40	10:45	10:50
HMX UG/G	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947
RDX UG/G	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323
135TNB UG/G	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961
13DNB UG/G	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268
NB UG/G	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283
TETRYL UG/G	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79
246TNT UG/G	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20
26DNT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
24DNT UG/G	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09
2NT UG/G	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69
4NT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
3NT UG/G	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31
2-AMINO-4,6-DNT UG/G	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28
4-AMINO-2,6-DNT,SED UG/G	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250
BARIUM,TOTAL UG/G	68.2	256	124	260	96.6	260	71.1	226	56.5
CALCIUM,TOTAL UG/G	13500	44500	62400	205000	33000	32600	11100	17700	52300
CADMIUM,TOTAL UG/G	<0.515	<0.515	<0.515	<0.515	<0.515	<0.515	<0.515	<0.515	<0.515
COBALT,TOTAL UG/G	2.69	3.45	6.80	4.30	3.07	4.49	2.44	3.01	3.35
COPPER,TOTAL UG/G	53.8	43.4	3.38	7.25	111	31.9	251	56.8	92.2
POTASSIUM,TOTAL UG/G	741	1510	2850	2440	1140	1990	863	2100	1310
MAGNESIUM,TOTAL UG/G	1490	3650	9730	18800	2160	3680	1120	2070	4540
SODIUM,TOTAL UG/G	171	206	425	1160	225	239	204	149	270
ZINC,TOTAL UG/G	14.0	13.7	25.3	13.3	24.9	19.3	16.4	16.7	18.3
MANGANESE,TOTAL UG/G	230	525	345	431	246	364	149	433	378
BERYLLIUM,TOTAL UG/G	<0.500	<0.500	0.687	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
ANTIMONY,TOTAL UG/G	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3
NICKEL,TOTAL UG/G	4.53	6.12	15.2	6.78	5.22	7.79	5.61	5.72	8.18
ALUMINUM,TOTAL UG/G	3110	10100	10700	7070	5280	11200	3770	7330	6170
IRON,TOTAL UG/G	4120	4260	14000	2290	5960	9310	5180	4000	5240
CHROMIUM,TOTAL UG/G	4.98	7.09	12.3	8.36	9.27	10.2	9.01	7.38	11.0
SILVER,TOTAL UG/G	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521
VANADIUM,TOTAL UG/G	11.2	10.7	15.0	6.36	15.2	20.3	13.9	10.7	10.7
ARSENIC UG/G	0.944	<0.209	1.17	1.04	0.762	1.42	1.35	0.618	0.985

PROJECT NUMBER 79360333G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S / PARAMETERS	UNITS	DBASO68 FTWIN 54	DBASO48 FTWIN 82	DBASO63 FTWIN 55	DBASO57 FTWIN 56	DBASO58 FTWIN 57	DBASO64 FTWIN 83	DBASO52 FTWIN 58	DBASO65 FTWIN 84	DBASO46 FTWIN 59
COLLECTION DATE:		11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93
COLLECTION TIME:		09:55	10:00	10:05	10:15	10:25	10:35	10:40	10:45	10:50
LEAD	UG/G	3.46	6.30	4.48	5.25	5.27	6.80	4.47	8.35	4.67
SELENIUM	UG/G	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202
THALLIUM	UG/G	<0.153	<0.153	<0.153	0.532	<0.153	<0.153	<0.153	<0.153	<0.153
MERCURY,SED	UG/G-DRY	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027
MOISTURE	%WET WT	9.9	18.4	9.7	6.7	16.3	15.2	12.7	19.3	15.0

SAMPLE ID'S	DBASO46	DBASO66	DBASO67	DBASO67	DC1SO01	DBASO45	DC1SO02	DBASO51	DC2SO01
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	60	86	87	88	89	61	90	62	91
COLLECTION DATE:	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93
COLLECTION TIME:	10:50	10:55	11:05	11:05	13:05	13:10	13:10	13:20	13:20
HMX UG/G	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947
RDX UG/G	<0.323	<0.323	<0.323	<0.323	0.618	<0.323	<0.323	<0.323	<0.323
135TNB UG/G	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961
13DNB UG/G	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268
NB UG/G	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283
TETRYL UG/G	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79
246TNT UG/G	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20
26DNT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
24DNT UG/G	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09
2NT UG/G	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69
4NT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
3NT UG/G	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31
2-AMINO-4,6-DNT UG/G	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	0.44
4-AMINO-2,6-DNT,SED UG/G	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	0.468
BARIUM,TOTAL UG/G	57.4	133	294	356	557	83.1	389	160	861
CALCIUM,TOTAL UG/G	47300	6260	135000	118000	69300	11100	63000	33200	52600
CADMIUM,TOTAL UG/G	<0.515	<0.515	<0.515	<0.515	4.17	0.707	2.36	<0.515	2.05
COBALT,TOTAL UG/G	3.04	4.05	5.45	4.51	7.72	2.08	6.36	3.72	6.13
COPPER,TOTAL UG/G	132	4.55	9.46	9.38	339	144	222	120	220
POTASSIUM,TOTAL UG/G	954	1660	3520	2150	2450	1000	2370	2300	2170
MAGNESIUM,TOTAL UG/G	3500	2760	11400	9210	7500	1390	7010	3960	5430
SODIUM,TOTAL UG/G	265	211	1220	695	510	180	437	272	503
ZINC,TOTAL UG/G	16.6	16.8	13.1	10.7	228	17.0	48.7	18.0	56.8
MANGANESE,TOTAL UG/G	334	278	474	488	941	184	853	217	646
BERYLLIUM,TOTAL UG/G	<0.500	<0.500	<0.500	<0.500	1.35	<0.500	1.01	<0.500	1.09
ANTIMONY,TOTAL UG/G	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3
NICKEL,TOTAL UG/G	8.74	6.99	9.76	8.34	16.6	5.12	11.9	8.94	15.2
ALUMINUM,TOTAL UG/G	4730	7910	12100	8220	21300	3800	20200	7850	19100
IRON,TOTAL UG/G	3930	8320	8540	8350	20000	4650	16700	8770	12500
CHROMIUM,TOTAL UG/G	10.4	8.11	8.45	7.97	22.3	8.64	18.0	13.9	17.4
SILVER,TOTAL UG/G	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521
VANADIUM,TOTAL UG/G	8.57	16.3	25.7	22.2	23.9	14.4	19.5	17.1	20.5
ARSENIC UG/G	0.786	0.323	0.602	0.546	0.638	0.670	0.927	1.42	0.744

PROJECT NUMBER 7936033G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S PARAMETERS UNITS	DBASO46 FTWIN 60	DBASO66 FTWIN 86	DBASO67 FTWIN 87	DBASO67 FTWIN 88	DC1SO01 FTWIN 89	DBASO45 FTWIN 61	DC1SO02 FTWIN 90	DBASO51 FTWIN 62	DC2SO01 FTWIN 91
COLLECTION DATE:	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93
COLLECTION TIME:	10:50	10:55	11:05	11:05	13:05	13:10	13:10	13:20	13:20
LEAD UG/G	3.38	3.78	5.41	4.91	10.5	2.89	21.2	37.4	11.7
SELENIUM UG/G	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202
THALLIUM UG/G	<0.153	<0.153	0.366	0.343	<0.153	<0.153	0.206	<0.153	0.227
MERCURY,SED UG/G-DRY	<0.027	<0.027	<0.027	<0.027	<0.269	<0.027	0.102	<0.027	0.944
MOISTURE %WET WT	15.0	12.2	18.4	16.6	19.1	11.6	16.2	13.4	22.1

SAMPLE ID'S	DC3S002	DBAS040	DC3S001	DC3S002	DBAS035	DC4S001	DC4S002	DC4S002	DBAS029
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	92	63	93	94	64	95	96	97	65
COLLECTION DATE:	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93
COLLECTION TIME:	13:25	13:35	13:40	13:45	14:00	14:00	14:05	14:05	14:10
HMX UG/G	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947
RDX UG/G	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323
135TNB UG/G	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961
13DNB UG/G	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268
NB UG/G	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283
TETRYL UG/G	<1.79	<1.79	33.5	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79
246TNT UG/G	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20
26DNT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
24DNT UG/G	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09
2NT UG/G	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69
4NT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
3NT UG/G	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31
2-AMINO-4,6-DNT UG/G	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28
4-AMINO-2,6-DNT,SED UG/G	<0.250	<0.250	0.622	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250
BARIUM,TOTAL UG/G	317	58.5	232	501	38.8	415	346	322	59.8
CALCIUM,TOTAL UG/G	38400	88000	24400	54000	20800	47700	45700	73800	15200
CADMIUM,TOTAL UG/G	5.91	<0.515	<0.515	2.13	<0.515	2.30	0.736	1.08	<0.515
COBALT,TOTAL UG/G	23.6	6.08	107	4.44	1.78	4.26	4.10	3.48	2.45
COPPER,TOTAL UG/G	2380	5.38	495	149	31.3	231	113	74.6	30.3
POTASSIUM,TOTAL UG/G	975	1820	603	1320	580	1350	1460	1120	562
MAGNESIUM,TOTAL UG/G	3700	9250	3190	3980	960	3780	3920	3340	1090
SODIUM,TOTAL UG/G	1530	388	1450	305	167	560	343	329	164
ZINC,TOTAL UG/G	10.2	25.9	21.2	31.4	11.4	27.7	15.6	13.8	11.5
MANGANESE,TOTAL UG/G	1370	350	8760	422	144	642	591	717	133
BERYLLIUM,TOTAL UG/G	0.735	<0.500	<0.500	1.02	<0.500	0.851	0.896	0.782	<0.500
ANTIMONY,TOTAL UG/G	140	<41.3	665	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3
NICKEL,TOTAL UG/G	33.2	13.0	466	13.2	2.67	9.22	8.69	7.34	4.01
ALUMINUM,TOTAL UG/G	5570	7610	1820	10800	2740	9760	11200	8230	3030
IRON,TOTAL UG/G	213000	6580	1250000	4860	2520	5600	9080	3200	4340
CHROMIUM,TOTAL UG/G	37.7	9.12	693	11.8	3.18	10.7	10.4	5.88	2.83
SILVER,TOTAL UG/G	<0.521	<0.521	<0.521	<0.521	<0.521	1.14	<0.521	<0.521	<0.521
VANADIUM,TOTAL UG/G	<1.77	14.0	<1.77	11.3	6.16	13.7	11.4	9.03	14.2
ARSENIC UG/G	0.654	1.37	0.490	0.757	0.571	0.258	0.261	0.237	1.07

PROJECT NUMBER 7936033G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S / PARAMETERS / UNITS	DC2SO02 FTWIN 92	DBASO40 FTWIN 63	DC3SO01 FTWIN 93	DC3SO02 FTWIN 94	DBASO35 FTWIN 64	DC4SO01 FTWIN 95	DC4SO02 FTWIN 96	DC4SO02 FTWIN 97	DBASO29 FTWIN 65
COLLECTION DATE:	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93
COLLECTION TIME:	13:25	13:35	13:40	13:45	14:00	14:00	14:05	14:05	14:10
LEAD UG/G	8.30	4.24	10.2	11.3	2.59	17.5	7.29	6.54	1.96
SELENIUM UG/G	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202
THALLIUM UG/G	<0.153	<0.153	<0.153	<0.153	<0.153	0.257	0.201	<0.153	<0.153
MERCURY,SED UG/G-DRY	0.034	<0.027	0.101	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027
MOISTURE %WET WT	14.7	5.7	19.6	11.3	10.8	21.3	15.8	13.7	9.4

SAMPLE ID'S	DC5S001	DC5S002	DBAS015	DBAS022	DBAS014	DBAS014	DBAS021	DBAS034	DC10S001
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	98	99	66	67	68	69	70	71	101
COLLECTION DATE:	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93
COLLECTION TIME:	14:10	14:15	14:40	14:45	14:55	14:55	15:05	15:20	15:25
HMX UG/G	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947
RDX UG/G	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323
135TNB UG/G	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961
13DNB UG/G	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268
NB UG/G	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283
TETRYL UG/G	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79
246TNT UG/G	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20
26DNT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
24DNT UG/G	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09
2NT UG/G	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69
4NT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
3NT UG/G	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31
2-AMINO-4,6-DNT UG/G	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28
4-AMINO-2,6-DNT,SED UG/G	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250
BARIUM,TOTAL UG/G	106	337	85.7	74.5	32.6	37.9	75.7	158	184
CALCIUM,TOTAL UG/G	29100	82600	5980	3260	22200	21700	15300	79100	26500
CADMIUM,TOTAL UG/G	<0.515	1.59	<0.515	<0.515	<0.515	<0.515	<0.515	<0.515	2.54
COBALT,TOTAL UG/G	2.77	3.48	3.04	2.32	1.42	1.99	6.84	4.91	3.38
COPPER,TOTAL UG/G	42.6	116	42.8	91.9	4.78	14.3	19.3	15.2	342
POTASSIUM,TOTAL UG/G	1380	2960	1080	854	401	515	387	2410	1370
MAGNESIUM,TOTAL UG/G	2350	3450	1550	850	1700	2040	1680	6210	2520
SODIUM,TOTAL UG/G	208	321	184	141	169	209	220	345	216
ZINC,TOTAL UG/G	12.6	13.2	26.0	14.0	10.3	16.2	45.6	17.8	59.2
MANGANESE,TOTAL UG/G	250	1000	186	153	117	171	194	330	281
BERYLLIUM,TOTAL UG/G	<0.500	0.805	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
ANTIMONY,TOTAL UG/G	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3
NICKEL,TOTAL UG/G	5.71	6.99	4.70	3.87	<1.54	2.58	4.01	11.4	11.6
ALUMINUM,TOTAL UG/G	5290	7400	5690	3750	2920	3770	2510	7560	32000
IRON,TOTAL UG/G	5950	3090	6140	4980	2410	2720	36100	5660	5110
CHROMIUM,TOTAL UG/G	7.71	9.62	5.37	4.77	3.10	3.31	4.23	8.26	75.9
SILVER,TOTAL UG/G	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521
VANADIUM,TOTAL UG/G	11.8	14.5	12.1	11.8	7.53	7.61	6.24	14.7	14.7
ARSENIC UG/G	0.363	0.705	1.23	0.509	0.603	1.36	1.93	0.689	0.712

SAMPLE ID'S	DC5SO01	DC5SO02	DBASO15	DBASO22	DBASO14	DBASO14	DBASO21	DBASO34	DC10SO01
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	98	99	66	67	68	69	70	71	101
COLLECTION DATE:	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93
COLLECTION TIME:	14:10	14:15	14:40	14:45	14:55	14:55	15:05	15:20	15:25
LEAD UG/G	2.98	10.2	4.93	2.14	1.08	2.01	23.1	3.83	6.92
SELENIUM UG/G	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202
THALLIUM UG/G	<0.153	0.230	0.215	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153
MERCURY,SED UG/G-DRY	<0.027	<0.027	0.038	<0.027	0.034	0.034	0.114	<0.027	<0.027
MOISTURE %WET WT	13.4	19.6	9.7	8.1	13.0	13.6	8.5	10.2	15.0

PROJECT NUMBER 7936033G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S	DC10SO02	DC11SO01	DC11SO02	DC9SO01	DC9SO01	DC9SO02	DC8SO01	DC8SO02	DBASO02
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	102	103	104	105	109	106	107	108	73
COLLECTION DATE:	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93
COLLECTION TIME:	15:30	15:40	15:45	15:50	15:50	15:55	16:00	16:05	16:10
HMX UG/G	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947
RDX UG/G	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323
135TNB UG/G	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961
13DNB UG/G	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268
NB UG/G	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283
TETRYL UG/G	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79
246TNT UG/G	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20
26DNT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
24DNT UG/G	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09
2NT UG/G	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69
4NT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
3NT UG/G	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31
2-AMINO-4,6-DNT UG/G	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28
4-AMINO-2,6-DNT, SED UG/G	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250
BARIUM, TOTAL UG/G	106	368	160	252	257	266	231	215	49.2
CALCIUM, TOTAL UG/G	9510	27000	25600	37600	40200	35600	50100	40800	23100
CADMIUM, TOTAL UG/G	<0.515	0.840	<0.515	<0.515	1.21	0.803	1.69	0.853	<0.515
COBALT, TOTAL UG/G	2.24	3.70	3.72	3.79	4.07	3.34	4.59	3.35	2.36
COPPER, TOTAL UG/G	163	434	230	164	171	88.9	128	61.3	5.86
POTASSIUM, TOTAL UG/G	1170	1520	2340	1740	1810	1620	2060	1430	937
MAGNESIUM, TOTAL UG/G	1410	3450	3530	3970	4360	3400	4160	3350	1710
SODIUM, TOTAL UG/G	147	447	199	409	421	463	520	341	164
ZINC, TOTAL UG/G	25.1	22.4	24.3	21.8	22.9	18.8	31.8	18.7	14.8
MANGANESE, TOTAL UG/G	202	185	239	318	321	297	393	361	191
BERYLLIUM, TOTAL UG/G	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
ANTIMONY, TOTAL UG/G	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3
NICKEL, TOTAL UG/G	6.00	13.1	10.2	9.94	10.6	7.91	9.84	7.68	4.32
ALUMINUM, TOTAL UG/G	3510	7950	8280	8200	8820	6820	7170	6600	3910
IRON, TOTAL UG/G	3500	3780	5800	7910	7810	4570	5940	5770	4110
CHROMIUM, TOTAL UG/G	8.81	15.7	14.4	13.0	12.9	8.96	11.1	7.16	3.73
SILVER, TOTAL UG/G	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521
VANADIUM, TOTAL UG/G	8.44	26.9	16.0	19.5	21.5	17.1	19.3	17.5	8.30
ARSENIC UG/G	0.619	0.389	0.667	0.900	0.570	0.651	0.846	1.00	0.555

PROJECT NUMBER 79360J3G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S	DC10S002	DC11S001	DC11S002	DC9S001	DC9S001	DC9S002	DC8S001	DC8S002	DBAS002
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	102	103	104	105	109	106	107	108	73
COLLECTION DATE:	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93
COLLECTION TIME:	15:30	15:40	15:45	15:50	15:50	15:55	16:00	16:05	16:10
LEAD UG/G	7.03	5.97	6.96	11.0	8.76	7.90	11.2	8.27	2.49
SELENIUM UG/G	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202
THALLIUM UG/G	<0.153	0.204	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153
MERCURY,SED UG/G-DRY	0.043	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027
MOISTURE %WET WT	10.6	15.8	14.8	17.0	17.2	17.1	23.6	11.9	11.2

SAMPLE ID'S	DC7S001	DC7S002	DBAS008	DC6S001	DC6S002	DBAS001	DBAS007	BGAS007	BGAS007
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	110	111	74	112	113	75	76	115	116
COLLECTION DATE:	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/19/93	11/19/93
COLLECTION TIME:	16:10	16:15	16:20	16:20	16:25	16:30	16:45	08:20	08:20
HMX UG/G	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947
RDX UG/G	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323
135TNB UG/G	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961
13DNB UG/G	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268
NB UG/G	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283
TETRYL UG/G	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79
246TNT UG/G	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20
26DNT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
24DNT UG/G	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09
2NT UG/G	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69
4NT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
3NT UG/G	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31
2-AMINO-4,6-DNT UG/G	<0.28	<0.28	<0.28	<0.28	0.84	<0.28	0.58	<0.28	<0.28
4-AMINO-2,6-DNT,SED UG/G	<0.250	<0.250	<0.250	<0.250	0.678	<0.250	0.518	<0.250	<0.250
BARIUM,TOTAL UG/G	162	153	70.1	221	147	398	337	373	435
CALCIUM,TOTAL UG/G	21000	34000	8020	24300	17000	59300	17900	47400	36700
CADMIUM,TOTAL UG/G	1.17	1.65	<0.515	1.49	1.36	<0.515	1.25	3.25	2.10
COBALT,TOTAL UG/G	2.93	3.35	0.863	4.28	4.08	3.22	4.28	3.19	3.88
COPPER,TOTAL UG/G	186	126	16.3	118	130	14.0	37.4	627	367
POTASSIUM,TOTAL UG/G	993	2160	400	1500	1440	1050	1920	1500	1620
MAGNESIUM,TOTAL UG/G	1780	3170	484	2940	2340	24900	3440	2370	2800
SODIUM,TOTAL UG/G	173	209	138	207	204	930	217	216	202
ZINC,TOTAL UG/G	16.3	21.5	8.07	22.5	26.8	18.6	83.9	46.9	43.8
MANGANESE,TOTAL UG/G	396	269	216	301	246	295	368	557	1050
BERYLLIUM,TOTAL UG/G	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	0.709	0.736	0.660
ANTIMONY,TOTAL UG/G	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3
NICKEL,TOTAL UG/G	5.61	8.10	<1.54	9.84	7.97	4.37	7.44	7.41	12.0
ALUMINUM,TOTAL UG/G	3820	6300	1340	6890	6500	5060	9660	5930	7970
IRON,TOTAL UG/G	3310	5580	2000	6030	8460	5850	10500	4550	8340
CHROMIUM,TOTAL UG/G	9.04	11.1	2.03	10.8	11.1	4.64	8.00	9.71	17.5
SILVER,TOTAL UG/G	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	2.73	0.993
VANADIUM,TOTAL UG/G	15.0	13.8	5.95	18.8	19.5	12.6	13.9	9.68	16.5
ARSENIC UG/G	0.556	3.69	0.512	0.916	0.999	1.24	0.517	1.03	0.808

PROJECT NUMBER 7936033G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S	DC7SO01	DC7SO02	DBASO08	DC6SO01	DC6SO02	DBASO01	DBASO07	BGASO07	BGASO07
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	110	111	74	112	113	75	76	115	116
COLLECTION DATE:	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/18/93	11/19/93	11/19/93
COLLECTION TIME:	16:10	16:15	16:20	16:20	16:25	16:30	16:45	08:20	08:20
LEAD UG/G	7.30	17.0	1.71	8.67	6.90	6.68	35.7	15.7	29.0
SELENIUM UG/G	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202
THALLIUM UG/G	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153
MERCURY,SED UG/G-DRY	<0.027	<0.027	<0.027	<0.027	<0.027	0.059	0.809	0.044	0.043
MOISTURE %WET WT	13.1	15.2	4.9	16.5	14.3	12.7	14.7	15.3	13.7

PROJECT NUMBER 7936033G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S	BGAS008	BGAS005	BGAS006	BGAS004	BGAS003	BGAS001	BGAS002	RFS023	RFS024
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	117	118	119	120	121	122	123	124	125
COLLECTION DATE:	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93
COLLECTION TIME:	08:25	08:40	08:45	08:50	08:55	09:00	09:10	09:35	09:40
HMX UG/G	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947	<0.947
RDX UG/G	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	<0.323	0.936	<0.323
135TNB UG/G	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961
13DNB UG/G	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268
NB UG/G	2.21	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	0.842
TETRYL UG/G	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79
246TNT UG/G	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20	<1.20
26DNT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
24DNT UG/G	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09
2NT UG/G	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69
4NT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
3NT UG/G	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31
2-AMINO-4,6-DNT UG/G	0.63	0.43	<0.28	<0.28	<0.28	<0.28	<0.28	1.14	0.51
4-AMINO-2,6-DNT,SED UG/G	0.643	0.480	<0.250	<0.250	<0.250	<0.250	<0.250	1.43	0.716
BARIUM,TOTAL UG/G	383	205	425	296	364	447	317	518	551
CALCIUM,TOTAL UG/G	49200	17500	36700	23700	31800	46300	28600	23800	43400
CADMIUM,TOTAL UG/G	1.22	2.26	1.28	<0.515	2.39	1.28	<0.515	2.28	2.69
COBALT,TOTAL UG/G	3.25	3.97	3.68	3.47	4.09	4.18	46.7	3.50	4.80
COPPER,TOTAL UG/G	140	174	317	114	685	171	195	70.1	77.5
POTASSIUM,TOTAL UG/G	1100	1130	1440	1310	1510	1560	969	1530	2000
MAGNESIUM,TOTAL UG/G	2360	1510	2960	2600	5650	3790	3190	3160	3820
SODIUM,TOTAL UG/G	231	193	222	156	231	221	1380	195	302
ZINC,TOTAL UG/G	57.1	407	71.7	294	112	109	43.9	118	160
MANGANESE,TOTAL UG/G	493	321	470	385	412	654	9180	354	444
BERYLLIUM,TOTAL UG/G	0.727	<0.500	<0.500	0.655	<0.500	0.779	0.710	<0.500	<0.500
ANTIMONY,TOTAL UG/G	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	332	<41.3	<41.3
NICKEL,TOTAL UG/G	5.99	7.21	23.5	5.80	17.7	8.62	48.4	6.41	7.86
ALUMINUM,TOTAL UG/G	6220	4170	9970	7070	6920	8010	2790	6920	7650
IRON,TOTAL UG/G	4800	16600	5330	7290	9220	9550	551000	9370	10200
CHROMIUM,TOTAL UG/G	6.67	9.18	9.42	6.24	24.1	10.2	100.0	8.92	8.75
SILVER,TOTAL UG/G	<0.521	<0.521	<0.521	<0.521	0.690	<0.521	<0.521	<0.521	<0.521
VANADIUM,TOTAL UG/G	9.38	8.16	10.5	11.5	11.6	12.9	<1.77	11.4	13.5
ARSENIC UG/G	1.42	3.61	0.948	8.48	1.04	0.956	0.766	1.22	1.35

PROJECT NUMBER 7936033G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S	BGAS008	BGAS005	BGAS006	BGAS004	BGAS003	BGAS001	BGAS002	RFS023	RFS024
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	117	118	119	120	121	122	123	124	125
COLLECTION DATE:	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93
COLLECTION TIME:	08:25	08:40	08:45	08:50	08:55	09:00	09:10	09:35	09:40
LEAD UG/G	15.5	40.6	10.6	45.1	27.3	19.3	16.0	47.3	44.3
SELENIUM UG/G	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202
THALLIUM UG/G	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153
MERCURY,SED UG/G-DRY	0.135	1.99	0.233	5.88	0.629	1.04	2.44	1.84	1.56
MOISTURE %WET WT	14.2	11.4	12.6	12.0	14.8	20.5	17.4	14.5	17.7

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PROJECT NUMBER 7936033G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
FTWINW1 ALL LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S		FBLANK	FBLANK	FBLANK	FBLANK	FBLANK	FBLANK	FBLANK	FW38	BTSW01
PARAMETERS	UNITS	FTWIN 18	FTWIN 72	FTWIN 100	FTWIN 114	FTWIN 157	FTWIN 158	FTWIN 159	FTWIN 164	FTWIN 165
COLLECTION DATE:		11/17/93	11/18/93	11/18/93	11/18/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93
COLLECTION TIME:		12:10	15:40	15:00	16:30	12:05	12:10	12:15	12:40	12:50
HMX	UG/L	<0.563	<0.563	<0.563	<0.563	<0.563	<0.563	<0.563	<0.563	<0.563
RDX	UG/L	<0.412	<0.412	<0.412	<0.412	<0.412	<0.412	<0.412	<0.412	<0.412
135TNB	UG/L	<0.425	<0.425	<0.425	<0.425	<0.425	<0.425	<0.425	<0.425	<0.425
13DNB	UG/L	<0.549	<0.549	<0.549	<0.549	<0.549	<0.549	<0.549	0.570	<0.549
NB	UG/L	<0.817	<0.817	<0.817	<0.817	<0.817	<0.817	<0.817	<0.817	<0.817
TETRYL	UG/L	<1.18	<1.18	<1.18	<1.18	<1.18	<1.18	<1.18	<1.18	<1.18
246TNT	UG/L	<0.451	<0.451	<0.451	<0.451	<0.451	<0.451	<0.451	1.97	<0.451
26DNT	UG/L	<0.260	<0.260	<0.260	<0.260	<0.260	<0.260	<0.260	<0.260	<0.260
24DNT	UG/L	<0.260	<0.260	<0.260	<0.260	<0.260	<0.260	<0.260	<0.260	<0.260
2NT	UG/L	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09
4NT	UG/L	<0.714	<0.714	<0.714	<0.714	<0.714	<0.714	<0.714	<0.714	<0.714
3NT	UG/L	<0.805	<0.805	<0.805	<0.805	<0.805	<0.805	<0.805	<0.805	<0.805
2-AMINO-4,6-DNT	UG/L	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
4-AMINO-2,6-DNT	UG/L	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	3.16	<0.250
BARIUM,TOTAL	UG/L	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	<3.00	261	126
CALCIUM,TOTAL	UG/L	167	56.8	61.7	74.9	81.5	89.9	97.4	223000	75600
CADMIUM,TOTAL	UG/L	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
COBALT,TOTAL	UG/L	<10.8	<10.8	<10.8	<10.8	<10.8	<10.8	<10.8	24.6	<10.8
COPPER,TOTAL	UG/L	<10.00	<10.00	<10.00	<10.00	<10.00	<10.00	<10.00	56.1	10.9
POTASSIUM,TOTAL	UG/L	<1080	<1080	<1080	<1080	<1080	<1080	<1080	5930	10600
MAGNESIUM,TOTAL	UG/L	<89.2	<89.2	<89.2	<89.2	<89.2	<89.2	<89.2	62100	35800
SODIUM,TOTAL	UG/L	<251	<251	<251	<251	<251	<251	<251	609000	420000
ZINC,TOTAL	UG/L	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0	331	38.4
MANGANESE,TOTAL	UG/L	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0	3040	1410
BERYLLIUM,TOTAL	UG/L	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
ANTIMONY,TOTAL	UG/L	<25.1	<25.1	<25.1	<25.1	<25.1	<25.1	<25.1	<25.1	<25.1
NICKEL,TOTAL	UG/L	<23.3	<23.3	<23.3	<23.3	<23.3	<23.3	<23.3	439	<23.3
ALUMINUM,TOTAL	UG/L	<200	<200	<200	<200	<200	<200	<200	5740	<200
IRON,TOTAL	UG/L	<112	<112	<112	<112	<112	<112	<112	6070	356
CHROMIUM,TOTAL	UG/L	<22.4	<22.4	<22.4	<22.4	<22.4	<22.4	<22.4	27.8	<22.4
SILVER,TOTAL	UG/L	<10.00	<10.00	<10.00	<10.00	<10.00	<10.00	<10.00	<10.00	<10.00
VANADIUM,TOTAL	UG/L	<7.62	<7.62	<7.62	<7.62	<7.62	<7.62	<7.62	13.3	<7.62
ARSENIC	UG/L	3.36	2.81	2.16	<2.00	<2.00	<2.00	<2.00	5.55	2.90

PROJECT NUMBER 7936033G 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
FTWIMW1 ALL LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S PARAMETERS UNITS	FBLANK FTWIN 18	FBLANK FTWIN 72	FBLANK FTWIN 100	FBLANK FTWIN 114	FBLANK FTWIN 157	FBLANK FTWIN 158	FBLANK FTWIN 159	FL38 FTWIN 164	BTSW01 FTWIN 165
COLLECTION DATE:	11/17/93	11/18/93	11/18/93	11/18/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93
COLLECTION TIME:	12:10	15:40	15:00	16:30	12:05	12:10	12:15	12:40	12:50
LEAD UG/L	<4.54	4.93	<4.54	<4.54	<4.54	<4.54	<4.54	<4.54	<4.54
SELENIUM UG/L	<2.54	<2.54	<2.54	<2.54	<2.54	<2.54	<2.54	<2.54	<2.54
THALLIUM UG/L	<4.14	<4.14	<4.14	<4.14	<4.14	<4.14	<4.14	<4.14	<4.14
MERCURY, TOTAL UG/L	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
BENZENE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<1.92	<1.92
TOLUENE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<2.10	<2.10
ETHYLBENZENE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<0.62	<0.62
M-XYLENE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<1.04	<1.04
O-AND/OR-P XYLENE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<1.34	<1.34
METHYLENE CHLORIDE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<2.48	<2.48
1,1-DICHLOROETHYLENE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<1.85	<1.85
1,1-DICHLOROETHANE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<1.93	<1.93
T-1,2-DICHLOROETHENE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<1.75	<1.75
CHLOROFORM UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<1.88	<1.88
1,2-DICHLOROETHANE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<2.07	<2.07
1,1,1-TRICHL'ETHANE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<1.09	<1.09
CARBON TETRACHLORIDE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<1.69	<1.69
TRICHLOROETHENE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<1.31	<1.31
1,1,2-TRICHLOROETHANE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<1.63	<1.63
TETRACHLOROETHENE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<2.76	<2.76
CHLOROBENZENE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<1.36	<1.36
NITRITE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<60.9	<609
NITRATE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<113	<1130
FLUORIDE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<1000.0	<1000.0
CHLORIDE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	214700	121900
SULFATE UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	615200	353700
PHOSPHORUS, T UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	<10.00	<10.00
PHOSPHATE-ORTHO UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	288	33.3
TDS UG/L	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	1870000	1230000

NRQ = NOT REQUESTED FOR ANALYSIS

PROJECT NUMBER 79360336 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
FTWINW1 ALL LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S	BIPFB01
PARAMETERS	FTWIN
UNITS	178
COLLECTION DATE:	11/18/93
COLLECTION TIME:	10:05
HMX	<0.563
UG/L	
RDX	<0.412
UG/L	
135TNB	<0.425
UG/L	
13DNB	<0.549
UG/L	
NB	<0.817
UG/L	
TETRYL	<1.18
UG/L	
246TNT	<0.451
UG/L	
26DNT	<0.260
UG/L	
24DNT	<0.260
UG/L	
2NT	<1.09
UG/L	
4NT	<0.714
UG/L	
3NT	<0.805
UG/L	
2-AMINO-4,6-DNT	<0.25
UG/L	
4-AMINO-2,6-DNT	<0.250
UG/L	
BARIUM,TOTAL	<3.00
UG/L	
CALCIUM,TOTAL	94.8
UG/L	
CADMIUM,TOTAL	11.3
UG/L	
COBALT,TOTAL	<10.8
UG/L	
COPPER,TOTAL	<10.00
UG/L	
POTASSIUM,TOTAL	<1080
UG/L	
MAGNESIUM,TOTAL	<89.2
UG/L	
SODIUM,TOTAL	<251
UG/L	
ZINC,TOTAL	<20.0
UG/L	
MANGANESE,TOTAL	<20.0
UG/L	
BERYLLIUM,TOTAL	<2.00
UG/L	
ANTIMONY,TOTAL	<25.1
UG/L	
NICKEL,TOTAL	<23.3
UG/L	
ALUMINUM,TOTAL	<200
UG/L	
IRON,TOTAL	<112
UG/L	
CHROMIUM,TOTAL	<22.4
UG/L	
SILVER,TOTAL	<10.00
UG/L	
VANADIUM,TOTAL	<7.62
UG/L	
ARSENIC	<2.00
UG/L	

PROJECT NUMBER 79360336 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
FTWINW1 ALL LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S		BIPFB01
PARAMETERS		FTWIN
	UNITS	178
COLLECTION DATE:		11/18/93
COLLECTION TIME:		10:05
LEAD		33.8
	UG/L	
SELENIUM		<2.54
	UG/L	
THALLIUM		<4.14
	UG/L	
MERCURY,TOTAL		<0.500
	UG/L	
BENZENE		NRQ
	UG/L	
TOLUENE		NRQ
	UG/L	
ETHYLBENZENE		NRQ
	UG/L	
M-XYLENE		NRQ
	UG/L	
O-AND/OR-P XYLENE		NRQ
	UG/L	
METHYLENE CHLORIDE		NRQ
	UG/L	
1,1-DICHLOROETHYLENE		NRQ
	UG/L	
1,1-DICHLOROETHANE		NRQ
	UG/L	
T-1,2-DICHLOROETHENE		NRQ
	UG/L	
CHLOROFORM		NRQ
	UG/L	
1,2-DICHLOROETHANE		NRQ
	UG/L	
1,1,1-TRICHL'ETHANE		NRQ
	UG/L	
CARBON TETRACHLORIDE		NRQ
	UG/L	
TRICHLOROETHENE		NRQ
	UG/L	
1,1,2-TRICHLOROETHANE		NRQ
	UG/L	
TETRACHLOROETHENE		NRQ
	UG/L	
CHLOROBENZENE		NRQ
	UG/L	
NITRITE		NRQ
	UG/L	
NITRATE		NRQ
	UG/L	
FLUORIDE		NRQ
	UG/L	
CHLORIDE		NRQ
	UG/L	
SULFATE		NRQ
	UG/L	
PHOSPHORUS, T		NRQ
	UG/L	
PHOSPHATE-ORTHO		NRQ
	UG/L	
TDS		NRQ
	UG/L	

NRQ = NOT REQUESTED FOR ANALYSIS

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Environmental Science & Engineering DATE 12/08/93 STATUS : PAGE 1
PROJECT NUMBER 79360336 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
FTWIN83 ALL LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S PARAMETERS UNITS	BIPS0090 FTWIN 173	BIPS010 FTWIN 174	BIPS011 FTWIN 175	BIPS011D FTWIN 176	RFS001 FTWIN 132	RFS002 FTWIN 133	RFS003 FTWIN 134	RFS004 FTWIN 135	RFS005 FTWIN 136
COLLECTION DATE:	11/18/93	11/18/93	11/18/93	11/18/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93
COLLECTION TIME:	09:05	09:15	09:25	09:25	08:35	08:40	08:55	09:05	09:10
HMX UG/G	<0.947	<0.947	<0.947	<0.947	1030	1980	<0.947	<0.947	<0.947
RDX UG/G	0.959	<0.323	<0.323	<0.323	5370	10900	2.13	<0.323	<0.323
135TNB UG/G	<0.961	<0.961	<0.961	<0.961	38.8	68.1	<0.961	<0.961	<0.961
13DNB UG/G	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268
NB UG/G	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	0.428	<0.283
TETRYL UG/G	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79
246TNT UG/G	<1.20	<1.20	<1.20	<1.20	4480	3840	<1.20	<1.20	<1.20
26DNT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	3.71	<1.17	<1.17	<1.17
24DNT UG/G	<1.09	<1.09	<1.09	<1.09	9.21	10.3	<1.09	<1.09	<1.09
2NT UG/G	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69
4NT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
3NT UG/G	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31
2-AMINO-4,6-DNT UG/G	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	<0.28	0.73	0.47
4-AMINO-2,6-DNT,SED UG/G	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	<0.250	0.686	0.455
BARIUM,TOTAL UG/G	51.9	88.6	36.0	45.4	267	299	368	255	222
CALCIUM,TOTAL UG/G	14500	1830	1220	1610	23000	44200	14600	29900	19800
CADMIUM,TOTAL UG/G	68.8	15.1	<0.515	<0.515	2.57	7.35	237	97.3	<0.515
COBALT,TOTAL UG/G	2.36	3.19	1.58	2.10	2.75	3.76	15.5	11.0	2.83
COPPER,TOTAL UG/G	67.2	22.2	5.92	12.8	465	141	21900	3950	81.6
POTASSIUM,TOTAL UG/G	824	960	611	849	1890	1240	1620	1800	960
MAGNESIUM,TOTAL UG/G	1100	1060	509	684	2020	2580	1740	2860	2210
SODIUM,TOTAL UG/G	165	143	126	127	254	256	435	412	195
ZINC,TOTAL UG/G	32.4	31.2	26.5	32.1	37.5	123	27700	7680	59.9
MANGANESE,TOTAL UG/G	130	164	54.0	90.0	348	371	1310	701	173
BERYLLIUM,TOTAL UG/G	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
ANTIMONY,TOTAL UG/G	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	89.9	57.8	<41.3
NICKEL,TOTAL UG/G	4.71	5.12	2.40	2.62	10.8	8.40	94.0	46.3	5.58
ALUMINUM,TOTAL UG/G	2920	4120	2370	3720	6750	15100	113000	30900	5790
IRON,TOTAL UG/G	3430	8400	2920	3620	4370	11500	54300	71600	4660
CHROMIUM,TOTAL UG/G	6.01	8.69	3.03	4.22	13.5	10.2	44.8	56.9	6.51
SILVER,TOTAL UG/G	<0.521	<0.521	<0.521	<0.521	<0.521	1.15	229	100.0	<0.521
VANADIUM,TOTAL UG/G	6.91	13.6	7.00	9.14	11.5	14.6	16.7	13.1	11.9
ARSENIC UG/G	0.736	1.02	0.595	1.29	1.15	0.963	1.98	1.70	0.875

PROJECT NUMBER 79360336 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
FTWINS3 ALL LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S	BIPS0090	BIPS010	BIPS011	BIPS0110	RFS001	RFS002	RFS003	RFS004	RFS005
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	173	174	175	176	132	133	134	135	136
COLLECTION DATE:	11/18/93	11/18/93	11/18/93	11/18/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93
COLLECTION TIME:	09:05	09:15	09:25	09:25	08:35	08:40	08:55	09:05	09:10
LEAD UG/G	4.08	6.44	2.47	7.55	8.50	11.4	4030	573	11.1
SELENIUM UG/G	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	0.246	<0.202	<0.202
THALLIUM UG/G	<0.153	<0.153	0.238	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153
MERCURY,SED UG/G-DRY	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027	<0.027
MOISTURE %WET WT	8.3	13.4	10.7	14.8	11.7	13.3	19.1	14.5	13.5

PROJECT NUMBER 79360336 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
FTWIN83 ALL LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S PARAMETERS UNITS	RFS006 FTWIN 137	RFS007 FTWIN 138	RFS008 FTWIN 139	RFS009 FTWIN 140	RFS010 FTWIN 141	RFS010 FTWIN 142	RFS011 FTWIN 143	RFS022 FTWIN 126	RFS022 FTWIN 128
COLLECTION DATE:	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93
COLLECTION TIME:	09:15	09:20	09:25	09:25	09:30	09:30	09:35	09:45	09:45
HMX UG/G	99.7	11.0	12.2	1.59	4.96	5.61	<0.947	4.40	4.77
RDX UG/G	229	12.8	12.7	<0.323	1.54	2.09	1.00	11.5	9.90
135TNB UG/G	7.18	5.59	<0.961	<0.961	<0.961	<0.961	<0.961	1.86	1.29
13DNB UG/G	1.08	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	0.331	<0.268
NB UG/G	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283
TETRYL UG/G	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79
246TNT UG/G	68.3	8.10	<1.20	<1.20	2.97	4.29	<1.20	<1.20	<1.20
26DNT UG/G	8.88	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
24DNT UG/G	159	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09
2NT UG/G	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69
4NT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
3NT UG/G	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31
2-AMINO-4,6-DNT UG/G	14.1	2.11	1.17	<0.28	7.61	7.89	<0.28	0.35	0.49
4-AMINO-2,6-DNT,SED UG/G	<0.250	2.18	0.679	<0.250	4.97	5.03	<0.250	0.551	0.773
BARIUM,TOTAL UG/G	1110	956	2140	42900	5340	2480	217	306	413
CALCIUM,TOTAL UG/G	20000	36500	42100	11200	31400	55700	16900	39100	53800
CADMIUM,TOTAL UG/G	1.73	1.82	2.39	16.6	3.08	3.21	0.774	20.1	19.8
COBALT,TOTAL UG/G	4.29	3.50	5.72	31.3	6.94	4.20	3.51	9.93	6.04
COPPER,TOTAL UG/G	915	180	321	1180	267	304	96.3	182	160
POTASSIUM,TOTAL UG/G	967	938	1960	<119	950	852	1750	1770	2240
MAGNESIUM,TOTAL UG/G	3560	8730	6860	186000	5140	18300	2550	3290	4530
SODIUM,TOTAL UG/G	406	383	294	863	555	649	208	481	440
ZINC,TOTAL UG/G	119	116	91.4	4220	289	274	53.0	237	220
MANGANESE,TOTAL UG/G	256	356	506	179	368	380	252	518	494
BERYLLIUM,TOTAL UG/G	<0.500	<0.500	0.708	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
ANTIMONY,TOTAL UG/G	<41.3	<41.3	<41.3	84.7	<41.3	<41.3	<41.3	<41.3	<41.3
NICKEL,TOTAL UG/G	21.2	8.00	10.00	21.6	7.94	7.32	5.26	23.9	14.5
ALUMINUM,TOTAL UG/G	64200	60500	11500	65700	12100	17700	7020	7080	7640
IRON,TOTAL UG/G	5590	4490	11300	13200	6800	4980	7920	42200	27300
CHROMIUM,TOTAL UG/G	37.9	8.43	15.4	55.3	10.9	11.2	8.15	24.9	28.8
SILVER,TOTAL UG/G	<0.521	<0.521	1.13	<0.521	0.857	<0.521	<0.521	<0.521	<0.521
VANADIUM,TOTAL UG/G	17.2	18.3	15.6	4.34	10.6	10.3	13.3	13.4	15.6
ARSENIC UG/G	<1.05	<1.05	0.876	75.5	1.45	0.926	1.85	4.43	0.943

PROJECT NUMBER 79560336 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
FTWINS3 ALL LAB COORDINATOR MICHAEL WALSH

SAMPLE ID's PARAMETERS UNITS	RFS006 FTWIN 137	RFS007 FTWIN 138	RFS008 FTWIN 139	RFS009 FTWIN 140	RFS010 FTWIN 141	RFS010 FTWIN 142	RFS011 FTWIN 143	RFS022 FTWIN 126	RFS022 FTWIN 128
COLLECTION DATE:	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93
COLLECTION TIME:	09:15	09:20	09:25	09:25	09:30	09:30	09:35	09:45	09:45
LEAD UG/G	370	27.9	20.8	<24.2	55.8	29.6	17.7	162	185
SELENIUM UG/G	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202
THALLIUM UG/G	<0.153	<0.153	<0.153	0.471	<0.153	<0.153	<0.153	<0.153	<0.153
MERCURY,SED UG/G-DRY	<0.027	<0.027	0.034	<0.027	<0.027	<0.027	<0.027	0.788	0.908
MOISTURE %WET WT	11.9	25.1	16.4	22.6	13.3	13.3	10.9	18.5	22.5

PROJECT NUMBER 79560336 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
FTWIN83 ALL LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S PARAMETERS UNITS	RFS021 FTWIN 127	RFS012 FTWIN 144	RFS020 FTWIN 129	RFS019 FTWIN 130	RFS013 FTWIN 145	RFS018 FTWIN 131	RFS014 FTWIN 146	RFS015 FTWIN 147	RFS016 FTWIN 148
COLLECTION DATE:	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93
COLLECTION TIME:	09:50	09:50	09:52	09:55	09:55	10:00	10:00	10:05	10:07
HMX UG/G	704	170	243	157	38.1	<0.947	672	190	665
RDX UG/G	3740	1080	1150	971	50.3	<0.323	4590	3030	4960
135TNB UG/G	11.0	17.2	1.39	5.31	9.02	<0.961	328	5.39	377
130NB UG/G	<0.268	0.572	<0.268	0.348	1.53	<0.268	13.9	<0.268	5.94
NB UG/G	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283
TETRYL UG/G	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79
246TNT UG/G	47.6	23.0	4.43	15.9	2.26	<1.20	303	7.84	1100
26DNT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	2.37
24DNT UG/G	<1.09	2.13	<1.09	<1.09	<1.09	<1.09	13.5	<1.09	14.8
2NT UG/G	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69
4NT UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
3NT UG/G	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31
2-AMINO-4,6-DNT UG/G	4.89	10.6	14.3	8.29	1.34	<0.28	12.2	5.27	8.31
4-AMINO-2,6-DNT,SED UG/G	<0.250	8.05	11.4	5.63	2.04	<0.250	<0.250	4.94	<0.250
BARIUM,TOTAL UG/G	685	734	363	596	319	437	297	398	238
CALCIUM,TOTAL UG/G	23400	21900	22100	20600	18600	17300	23200	24300	23700
CADMIUM,TOTAL UG/G	1.50	2.59	2.45	1.73	3.31	2.01	<0.515	1.45	2.87
COBALT,TOTAL UG/G	5.73	8.26	3.27	4.18	10.3	3.14	5.31	7.14	4.74
COPPER,TOTAL UG/G	27.1	247	125	34.9	186	39.2	7.53	89.0	7.90
POTASSIUM,TOTAL UG/G	1500	1710	1960	1040	2490	1220	1570	1440	1640
MAGNESIUM,TOTAL UG/G	4760	3190	2900	2590	3100	2610	3900	3960	3560
SODIUM,TOTAL UG/G	248	263	206	197	373	205	287	303	347
ZINC,TOTAL UG/G	89.9	181	92.2	110	431	59.3	35.1	89.8	33.6
MANGANESE,TOTAL UG/G	335	414	314	289	600	235	283	387	254
BERYLLIUM,TOTAL UG/G	<0.500	0.654	<0.500	<0.500	<0.500	<0.500	0.783	0.656	0.621
ANTIMONY,TOTAL UG/G	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3
NICKEL,TOTAL UG/G	8.28	18.2	6.02	5.86	30.7	5.29	7.00	18.5	5.80
ALUMINUM,TOTAL UG/G	9310	8320	5810	7260	8860	9320	9280	8570	8420
IRON,TOTAL UG/G	15500	39800	7150	11000	52800	7550	10500	29400	9510
CHROMIUM,TOTAL UG/G	11.5	16.5	7.38	4.97	24.7	6.08	8.10	11.7	7.47
SILVER,TOTAL UG/G	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521	<0.521
VANADIUM,TOTAL UG/G	14.5	14.0	13.6	10.8	13.9	13.1	19.5	21.4	18.3
ARSENIC UG/G	1.40	5.94	0.729	0.988	4.76	0.542	0.911	1.43	1.34

PROJECT NUMBER 79360336 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
FTWIN83 ALL LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S / PARAMETERS / UNITS	RFS021 FTWIN 127	RFS012 FTWIN 144	RFS020 FTWIN 129	RFS019 FTWIN 130	RFS013 FTWIN 145	RFS018 FTWIN 131	RFS014 FTWIN 146	RFS015 FTWIN 147	RFS016 FTWIN 148
COLLECTION DATE:	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93
COLLECTION TIME:	09:50	09:50	09:52	09:55	09:55	10:00	10:00	10:05	10:07
LEAD UG/G	105	95.7	26.2	24.9	102	5.80	6.03	198	6.07
SELENIUM UG/G	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202
THALLIUM UG/G	<0.153	0.184	<0.153	<0.153	<0.153	<0.153	0.201	<0.153	<0.153
MERCURY,SED UG/G-DRY	0.108	0.159	0.494	0.558	0.232	0.224	<0.027	0.043	<0.027
MOISTURE %WET WT	13.4	11.0	15.6	14.3	14.5	14.5	10.3	13.1	7.7

SAMPLE ID'S		RFS017	ARYS001	ARYS001	ARYS002	ARYS003	ARYS006	ARYS004	ARYS005
PARAMETERS	UNITS	FTWIN 149	FTWIN 150	FTWIN 151	FTWIN 152	FTWIN 153	FTWIN 156	FTWIN 154	FTWIN 155
COLLECTION DATE:		11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93
COLLECTION TIME:		10:10	12:15	12:15	12:20	12:30	12:30	12:40	12:45
HMX	UG/G	173	<0.947	391	<0.947	<0.947	<0.947	<0.947	<0.947
RDX	UG/G	1040	<0.323	2480	<0.323	<0.323	<0.323	<0.323	<0.323
135TNB	UG/G	41.0	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961	<0.961
13DNB	UG/G	1.32	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268	<0.268
NB	UG/G	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283	<0.283
TETRYL	UG/G	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79	<1.79
246TNT	UG/G	162	<1.20	5.83	<1.20	<1.20	<1.20	<1.20	<1.20
26DNT	UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
24DNT	UG/G	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09	<1.09
2NT	UG/G	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69	<1.69
4NT	UG/G	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17	<1.17
3NT	UG/G	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31	<1.31
2-AMINO-4,6-DNT	UG/G	9.85	<0.28	4.37	<0.28	<0.28	<0.28	<0.28	<0.28
4-AMINO-2,6-DNT,SED	UG/G	<0.250	<0.250	2.76	<0.250	<0.250	<0.250	<0.250	<0.250
BARIUM,TOTAL	UG/G	616	56.7	75.9	108	525	124	371	126
CALCIUM,TOTAL	UG/G	21000	10900	11900	9080	17200	15000	39300	13900
CADMIUM,TOTAL	UG/G	2.52	<0.515	<0.515	1.01	1.24	<0.515	1.03	<0.515
COBALT,TOTAL	UG/G	7.48	1.58	1.68	2.10	3.46	3.14	4.84	2.53
COPPER,TOTAL	UG/G	1980	12.3	47.8	55.0	341	12.1	103	16.3
POTASSIUM,TOTAL	UG/G	2030	489	692	966	1120	1170	2080	975
MAGNESIUM,TOTAL	UG/G	4100	792	931	1820	2110	2000	4370	1590
SODIUM,TOTAL	UG/G	442	121	142	181	254	227	291	271
ZINC,TOTAL	UG/G	128	10.3	10.7	43.9	56.6	13.9	32.6	12.3
MANGANESE,TOTAL	UG/G	485	148	299	177	253	233	374	221
BERYLLIUM,TOTAL	UG/G	0.733	<0.500	<0.500	<0.500	<0.500	<0.500	0.629	<0.500
ANTIMONY,TOTAL	UG/G	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3	<41.3
NICKEL,TOTAL	UG/G	34.8	<1.54	2.75	3.43	10.7	5.10	9.33	3.72
ALUMINUM,TOTAL	UG/G	38900	1750	2500	4150	5110	4430	9930	3450
IRON,TOTAL	UG/G	16300	2510	3380	5390	7070	6040	8150	3140
CHROMIUM,TOTAL	UG/G	31.9	2.56	3.87	6.51	23.3	5.54	12.4	3.80
SILVER,TOTAL	UG/G	<0.521	<0.521	<0.521	<0.521	0.954	<0.521	<0.521	<0.521
VANADIUM,TOTAL	UG/G	24.7	7.30	9.77	8.96	8.88	13.1	39.5	9.50
ARSENIC	UG/G	1.18	0.768	0.870	0.696	1.41	2.09	0.727	1.09

PROJECT NUMBER 79360336 0201 PROJECT NAME ERM-FT. WINGATE
FIELD GROUP FTWIN PROJECT MANAGER MICHAEL WALSH
FTWIN83 ALL LAB COORDINATOR MICHAEL WALSH

SAMPLE ID'S	RF8017	ARY8001	ARY8001	ARY8002	ARY8003	ARY8006	ARY8004	ARY8005
PARAMETERS	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN	FTWIN
UNITS	149	150	151	152	153	156	154	155
COLLECTION DATE:	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93	11/19/93
COLLECTION TIME:	10:10	12:15	12:15	12:20	12:30	12:30	12:40	12:45
LEAD UG/G	49.2	1.83	2.22	8.06	22.2	10.9	8.55	6.97
SELENIUM UG/G	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202	<0.202
THALLIUM UG/G	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153	<0.153
MERCURY,SED UG/G-DRY	0.126	<0.027	<0.027	0.271	0.131	<0.027	<0.027	<0.027
MOISTURE %WET WT	22.3	12.1	13.1	9.7	22.8	22.4	13.9	15.8