DOE/AL/62350-213
REV. 2

WORK PLAN FOR PRELIMINARY INVESTIGATION OF ORGANIC CONSTITUENTS IN GROUND WATER AT THE NEW RIFLE SITE RIFLE, COLORADO

January 1996

Work performed under DOE Contract No. DEAC04-91AL62350

Prepared for
U.S. Department of Energy
Albuquerque Operations Office
Grand Junction Projects Office

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DISCLAIMER

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LIST OF ACRONYMS

Acronym	Definition
DCO	data collection objective
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FTR	field technical representative
GC	gas chromatography
MS	mass spectrometry
PID	photoionization detector
PRS	project regulatory specialist
PVC	polyvinyl chloride
RAC	Remedial Action Contractor
RCRA	Resource Conservation and Recovery Act
SOP	standard operating procedure
TAC	Technical Assistance Contractor
UMTRA	Uranium Mill Tailings Remedial Action

1.0 INTRODUCTION

1.1 PURPOSE

A special study screening for Appendix IX (40 CFR Part 264) analytes identified the New Rifle site as a target for additional screening for organic constituents. Because of this recommendation and the findings in a recent independent technical review, the U.S. Department of Energy (DOE) has requested that the Technical Assistance Contractor (TAC) perform a preliminary investigation of the potential presence of organic compounds in the ground water at the New Rifle Uranium Mill Tailings Remedial Action (UMTRA) Project site, Rifle, Colorado. From 1958 to 1972, organic chemicals were used in large quantities during ore processing at the New Rifle site, and it is possible that some fraction was released to the environment. Therefore, the primary objective of this investigation is to determine whether organic chemicals used at the milling facility are present in the ground water.

The purpose of this document is to describe the work that will be performed and the procedures that will be followed during installation of ground water well points at the New Rifle site. The selection of analytes and the procedures for collecting ground water samples for analysis of organic constituents are also described.

1.2 BACKGROUND INFORMATION

Sampling for organic compounds was performed at New Rifle and other sites early in 1989 and the results were reported in an 8 November 1989 letter from the TAC to the DOE (Attachment 1). Samples of tailings and ground water were analyzed for Appendix IX (40 CFR Part 264) analytes; traces of several chemicals, including 2,4,5-T, di-n-octylphthalate, and toluene were reported in New Rifle ground water. In addition, there have been reports of black (possibly organic) materials in some soils and sheens on the water surface during subpile test pitting and during later stages of surface remediation. While neither of these characteristics is definitive regarding composition or source, MK-Ferguson has commissioned analysis of several soil samples and petroleum hydrocarbons have been quantified in the 4000 to 5000 milligram per kilogram (mg/kg) range (Farquhar, 1995) (Attachment 2). Sample collection protocol and laboratory quality assurance/quality control (QA/QC) procedures that were followed in the generation of these data are unknown.

Even though the Appendix IX list provides coverage of most Resource Conservation and Recovery Act (RCRA)-regulated hazardous chemicals that are commonly monitored in an aqueous medium, it does not provide straightforward coverage of complex mixtures such as kerosene or No. 2 fuel oil, which were process carrier chemicals used in large quantities at many UMTRA sites. The Appendix IX list also does not cover many of the extracting solvents commonly

used in uranium milling, notably di(2-ethylhexyl)phosphoric acid and tributyl phosphate in the case of New Rifle.

Although no specific toxicological information on di(2-ethylhexy)phosphoric acid has been located, other organophosphorus esters, including tributyl phosphate, have been identified as potentially hazardous to human health (Casarett and Doull, 1991; Sabine and Hayes, 1952; Gerhart et al., 1993; EPA, 1989; Laham et al., 1985; Laham et al., 1984; Laham et al., 1983; Proctor et al., 1988). Other potentially toxic extractants such as high-molecular-weight secondary and tertiary amines could also have been used at the site (Merritt, 1971; EPA, 1980; AIHAAP, 1962; HYDRA, 1978; Eder et al., 1979). EPA does not list these specific organic compounds in Table 1 to Subpart A or Appendix 1 of 40 CFR 192; however, more commonly used organic compounds of this class are present in Appendix I to 40 CFR Part 192. Therefore, due to potential for toxicity, TAC will screen for these compounds.

1.3 DATA COLLECTION OBJECTIVES

Data collection objectives (DCO) identify reasons for collecting data. Following are DCOs for the assessment of organic constituents at the New Rifle site:

- Ground water quality screening for the presence or absence of kerosene or No. 2 fuel oil (process carrier chemicals that likely were used in large quantities) in ground water near likely source areas at the New Rifle site. This will include screening for the benzene, toluene, ethylbenzene, xylene component and other constituents that are included in the Appendix IX list.

- Ground water quality screening for the presence or absence of extracting solvents commonly used in uranium milling (notably di(2-ethylhexyl)phosphoric acid and tributyl phosphate) in ground water near likely source areas at the New Rifle site.

- Ground water quality screening for inorganic contaminants that may or may not be associated with organic constituents at the New Rifle site.

- Ground water quality screening for the presence or absence of organic constituents upgradient of locations that may have been the focus of processing-related activities in order to assess the potential for other, non-UMTRA sources of organic constituents.

2.0 WELL POINT INSTALLATION TASKS

2.1 SITE CONDITIONS

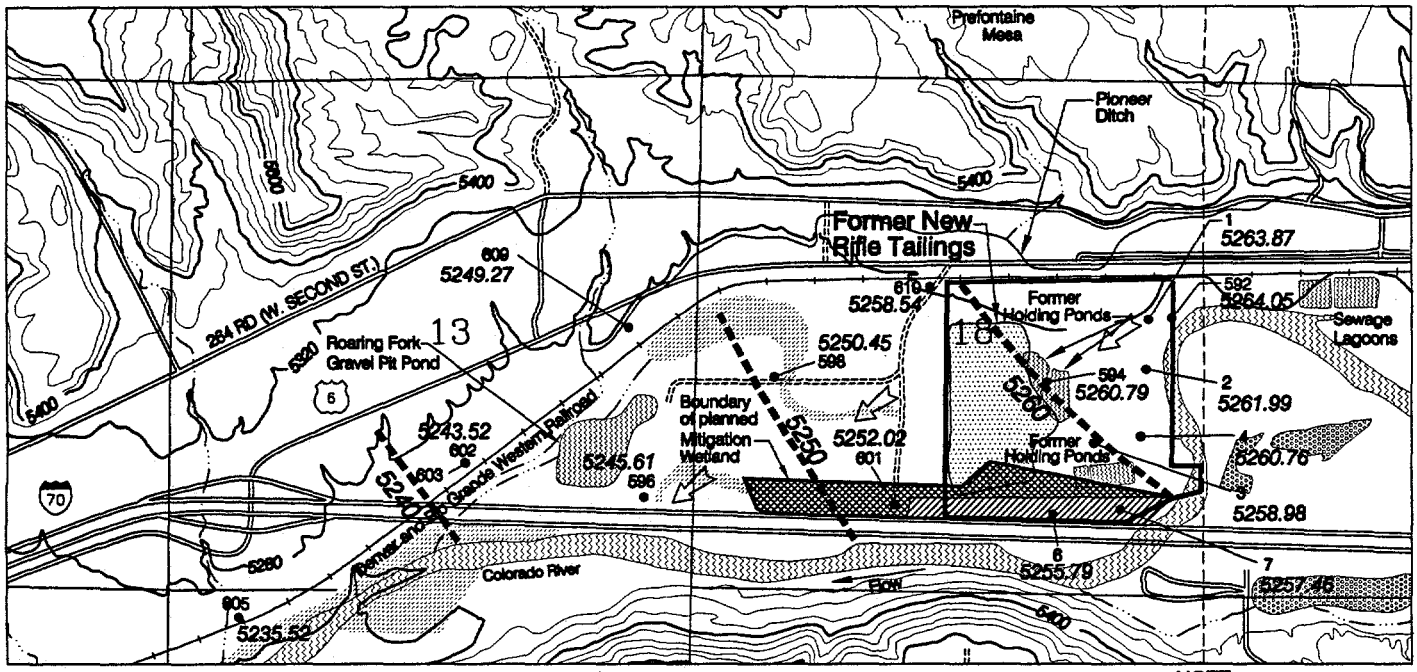
A water table contour map for the alluvial aquifer at the New Rifle site (Figure 2.1) indicates that ground water flows southwest in the area of the former tailings pile (the general area encompassed by this study) and that ground water surface elevations are near 5260 feet (ft) (1620 meters [m]) above sea level. Ground water at the New Rifle site in the alluvial aquifer flows southwest at a rate of approximately 300 ft (90 m) per year. Alluvial material in this area has been excavated to near the water table during surface remediation. Native alluvium, into which well points will be driven, consists of medium to fine sand, silt, gravels, and cobbles. A high percentage of cobbles are present in remaining native alluvial material. Usually, the percentage of cobbles increases abruptly near the water table. The underlying, semiconfined Wasatch Formation is usually encountered between 10 to 30 ft (3 to 9 m) below the former land surface. The site is currently being backfilled with clean fill material. A final grading plan for surface remediation at the site (included as Attachment 3 to this report) shows that final ground elevations range from near 5270 ft (1620 m) above sea level north of the former tailings pile to near 5260 ft (1620 m) above sea level south of the former tailings pile. The depth to the water table when backfilling is complete is anticipated to be within 5 to 10 ft (2 to 3 m) of land surface in most of the area of investigation. Depths to ground water north of the pile near Highway 6 may be greater than 15 ft (4.6 m).

Redox conditions in the alluvial aquifer are generally oxidizing (350 to 450 millivolts [mV]) and dissolved oxygen is commonly in the 0.5 to 2 milligrams per liter range, indicating that conditions are favorable for the aerobic biodegradation of organic constituents.

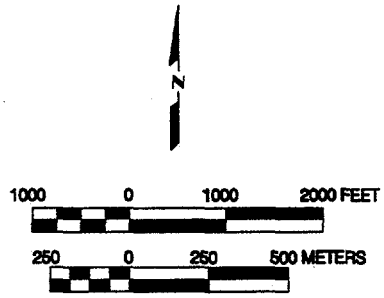
2.2 WELL POINT LOCATIONS

Four well point locations have been selected that have high probability of organic contamination (Figure 2.2). These locations include one in a former depression in Area 4 (an area where MK-Ferguson has identified organic material in soils) (well point RFN-01-0656), one location just downgradient of the former positions of a series of storage tanks possibly used to store organic liquids (well point RFN-01-0657), one location in the former gypsum pond area (well point RFN-01-0658), and one downgradient location within the footprint of the former tailings pile (well point RFN-01-0659). The latter two locations are in areas of the high recorded levels of inorganic contamination. Table 2.1 shows approximate northing and easting coordinates for each proposed well point. Several of these approximate well point locations may be adjusted slightly as a result of information obtained from recent MK-Ferguson soil sampling.

One well point (well point RFN-01-0655) will be installed upgradient from the former pile and from any potential contamination from the New Rifle site. This



NOTE:
1. WELLS 1,2,3,4,6, AND 7 ARE MK WELL POINTS.



LEGEND

- 5260 — ALLUVIAL (WATER TABLE) OR WASATCH FORMATION (POTENTIOMETRIC) CONTOUR - DASHED WHERE INFERRED (ELEVATION IN FEET ABOVE MSL)
- 602 / 5243.52 — ALLUVIAL MONITOR WELL AND GROUND WATER ELEVATION IN FEET ABOVE MSL
- GROUND WATER FLOW DIRECTION
- NEW RIFLE WETLANDS
- SURFACE WATER
- GRAVEL PIT
- PROPOSED CATTAIL
- PROPOSED WET MEADOW SHRUB
- DESIGNATED SITE BOUNDARY
- INTERSTATE
- U.S. HIGHWAY

NOTES:
1. WATER DATA COLLECTED SEPTEMBER 1989.
2. TOPOGRAPHIC CONTOUR INTERVAL IS 40 FEET.

FIGURE 2.1
WATER TABLE CONTOUR MAP OF THE ALLUVIAL AQUIFER
NEW RIFLE, COLORADO, PROCESSING SITE VICINITY

PC: H:\USER\SSUNIGA\RFL\G05040306\FIG-1.DWG (XREF-RFL-2000.DWG) 11-27-95

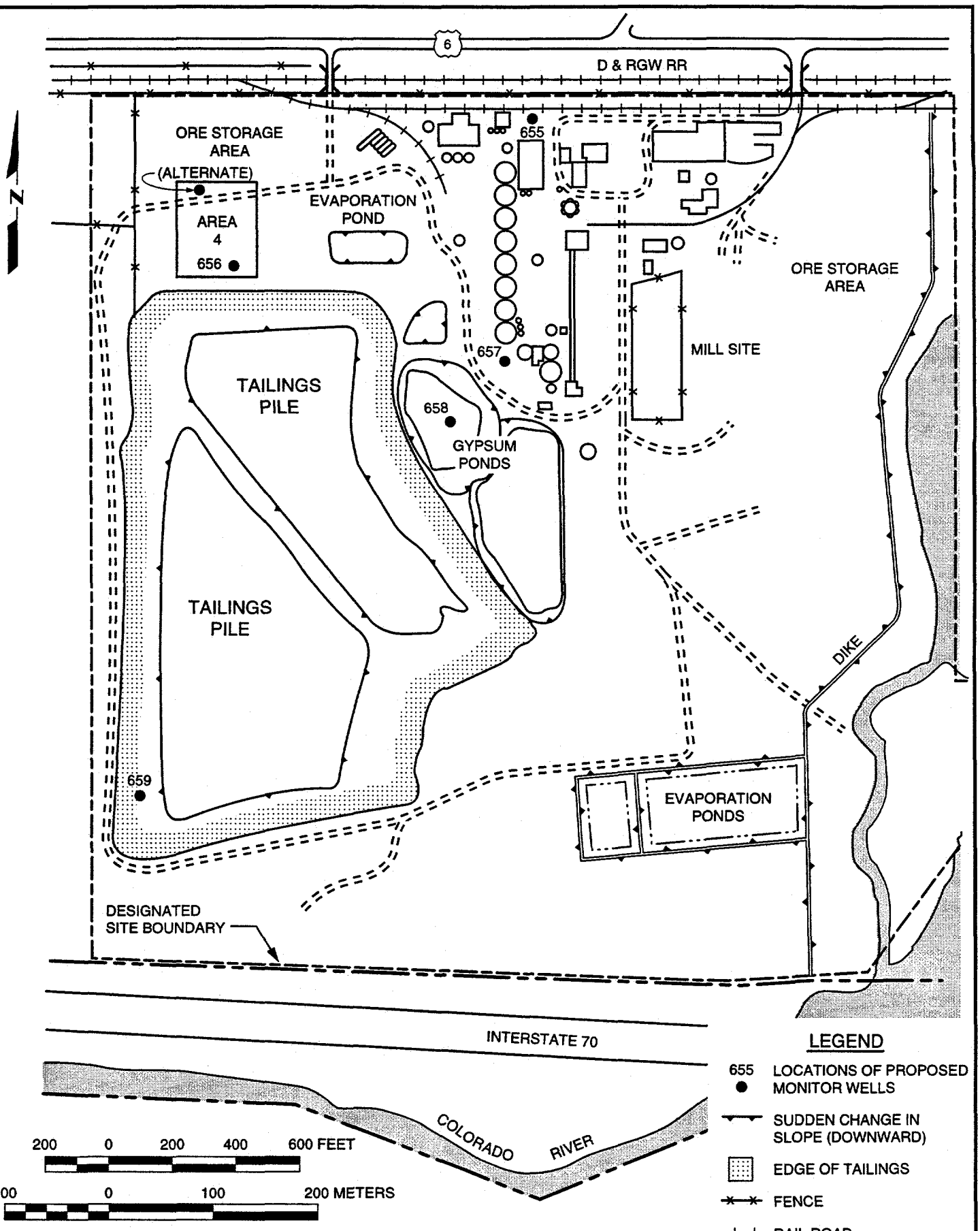


FIGURE 2.2
LOCATIONS OF PROPOSED MONITOR WELLS
NEW RIFLE, COLORADO, SITE

Table 2.1 Approximate northing and easting coordinates for proposed well points (based on MK-F construction coordinates)

Well point number	North coordinate	East coordinate	Location/justification
RFN-01-0655	25,500	48,000	Upgradient from any known potential site contamination.
RFN-01-0656	25,040	47,175	Depression in Area 4 (MK-Ferguson has identified organic material in soils in Area 4).
RFN-01-0657	24,775	47,850	Downgradient of the former positions of a series of storage tanks.
RFN-01-0658	24,550	47,675	Former gypsum pond area (highest recorded levels of certain inorganic constituents).
RFN-01-0659	23,550	46,875	Downgradient location within the footprint of the former tailings pile (highest recorded levels of certain inorganic constituents).
(alternate)	25,295	47,075	Depression in Area 4 (MK-Ferguson has identified organic material in soils in Area 4).

well point will be located downgradient from an existing petroleum product tank farm.

An alternate location will be in Area 4 within the area of another former depression where MK-Ferguson has identified organic material in soils (Figure 2.2)

2.3 PERMITS, CLEARANCES, AND ACCESS AGREEMENTS

Proposed well points RFN-01-0655 through -0659 (Figure 2.2) will require access agreements prior to fieldwork. These new well points will also require well permits.

The Colorado Division of Water Resources will be contacted by the project regulatory specialist (PRS) for permitting information. The PRS and the site hydrogeologist will apply for and obtain any necessary permits. Property Management will obtain any needed access agreements before any fieldwork is initiated.

2.4 WELL INSTALLATION METHODS

Because of the heterogeneous nature of the aquifer materials and the presence of cobbles, a backhoe will be used to assist in well point installation at the site. Each shallow well will be approximately 10 to 15 ft (3 to 5 m) deep and (655 may be 5 to 10 ft [2 to 3 m] deeper than other wells) and consist of

approximately 10 ft (3 m) of 2-inch (5-centimeter [cm])-diameter schedule 40 stainless steel well screen and approximately 2 to 8 ft (1 to 2 m) of 4-inch (5-cm)-diameter schedule 40 stainless steel casing. The wells will be screened such that screens straddle the seasonal high and low water table.

Well points will be installed by first excavating with a backhoe to the water table. During excavation a photoionization detector (PID) will be used to take field readings to qualitatively assess any organic levels. When the water table is reached, the casing and screen will be placed upright in the excavated pit and the point will then be driven further. The pit excavation will then be backfilled with cuttings to the original surface. Sand and bentonite may be added to the annulus as required.

A 5-ft (2 m)-long steel protective casing will be installed over the well and a 4-inch (10 cm)-thick concrete pad will be constructed around the base. A locking protective cap will be attached to the top of the casing.

Well construction materials will consist of the following:

- 2-inch (5 cm) stainless steel casing.
- 2-inch (5 cm) stainless steel screen (0.010 slot) with stainless steel points.
- 6-inch (15 cm) polyvinyl chloride (PVC) temporary casing.
- 2-inch (5 cm) carbon steel drive casing.
- Locking 6-inch (15 cm) protective steel casing.
- Silica sand.
- Cement grout.
- Concrete.
- Bentonite chips.
- Rubber caps.
- Locks.

When applicable the following standard operating procedures (SOP) (JEG, n.d.) will be followed during well point installation:

14.1.2 Instructions for Field Technical Representative (FTR)

14.1.3 Drilling and Test Pit Technical Representative

14.1.4 Verification of Grout Mix for Monitor Wells

14.1.5 FTR Daily Diary

14.1.6 Procedures for Completing the Daily Field Activity Report

14.1.7 Field/Off-Site Procurement of Supplies & Services

14.4.1 Soil and Rock Core Borehole and Test Pit Logging

14.4.2 Preparation of Logs for UMTRAP (UMTRA Project) Documents

16.1.1 Monitor Well Installation

16.1.2 Well Development

16.1.19 Permitting Procedures for Installation or Decommissioning of Monitor Wells

16.1.22 Controlled Disposal of Potentially Contaminated Materials or memorandum from Don Metzler to Clinton Smythe entitled "Evaluating Drill Cuttings and Well Development and Purge Waters"

17.4.1 Location ID for Test Borings, Test Pits, and Monitoring Locations

Internal communications will be maintained among the field representatives, site hydrogeologists, the TAC Contracts Department, Property Management, the site manager, and the DOE. Before any wells are installed, the Remedial Action Contractor (RAC) site manager will be notified of the upcoming activities, and the work party will check in with the RAC. Any problems or complications encountered during fieldwork will be reported to the TAC site manager, who will forward the information to the DOE.

2.5 WELL DEVELOPMENT

No sooner than 48 hours after new well point completion, the well will be developed until the discharge is clear. The amount of water removed and approximate well yields will be recorded. An assessment of development water will be performed in the field as described in the *Technical Approach for the Management of UMTRA Ground Water Investigation-Derived Wastes* (DOE, 1994). Development water will be stored in 55-gallon (210-liter) drums at the New Rifle site, if determined necessary. If development water must be containerized, provisions will be made to properly dispose of the water.

Following development, at the well will be purged until turbidity is at an acceptable range.

2.6 SURVEYING

Before installation, surveying techniques will be used to accurately place the proposed well point locations relative to former positions of features that have been removed by surface remediation. After installation, the new well points will be surveyed by a local surveying contractor to establish top-of-casing elevation and final Colorado state plane coordinates.

2.7 WATER SAMPLING AND ANALYSIS

The TAC field staff will collect filtered samples from each new well point for the organic chemical assessment. In addition, quality assurance samples will consist of one field blank, one equipment blank, one trip blank, and one duplicate. The duplicate sample will be collected at location RFN-01-0659.

Sampling protocol

Sample collection will proceed one week after all of the newly installed ground water well points have been properly developed. Because these wells are constructed of stainless steel and will be screened across the water table, representative samples can be obtained without purging. Therefore, wells will not be purged before sampling, thus insuring the maximum possibility of detecting any organic contamination that might be present. An effort will be made to minimize drawdown during sampling to prevent water from cascading down the sides of the well screen during recharge, thereby minimizing loss of volatile organic constituents.

Disposable plastic bailers will be on hand at the site. Either the bailers or a peristaltic pump may be used for sampling for organic compounds. The pump and associated equipment will be decontaminated according to standard UMTRA protocols; these procedures conform to U.S. Environmental Protection Agency (EPA) guidance governing decontamination of equipment intended for use for sampling organic compounds in ground water. After sampling for organic constituents, samples will be taken for inorganic constituents using a peristaltic pump.

The organic samples will be placed with zero headspace in laboratory-supplied containers (see Attachment 4), placed on ice to preserve temperature less than 4 degrees Celsius, and shipped under strict chain of custody to the contract laboratory for analysis. Holding times are specified in the laboratory contract.

Analysis

Samples will be subjected to multiple analyses to learn as much as possible about their composition.

1. All samples will be screened by EPA gas chromatography (GC) Method 8015, modified for diesel-range organics.

2. All samples will be further analyzed for ammonium, arsenic, calcium, chloride, fluoride, iron, magnesium, molybdenum, nitrate, sodium, sulfate, uranium and vanadium to determine key inorganic characteristics in the shallow ground water in order to resolve relationships between inorganic and organic contaminants.

3. All samples will be analyzed by EPA GC/mass spectrometry (MS) Methods 8260 (volatile compounds) and 8270 (semivolatile compounds) plus a routine extra peak (nontarget compound) report.

4. The analyses listed above will be performed by a commercial laboratory under contract to Jacobs Engineering Group Inc.

5. In parallel, splits of all samples will be sent to the RUST-Geotech Laboratory at the Grand Junction Projects Office compound. The chemists there will use their extensive analytical chemistry capabilities to attempt identification and quantification of process-related organics compounds, specifically those not on the target list for the EPA methods listed above.

Quality assurance samples

Quality assurance samples will consist of one field blank, one equipment blank, one trip blank, and one duplicate. The duplicate sample will be collected at location RFN-01-0659. One trip blank will be carried and analyzed by method 8260 for volatile compounds.

2.8 SITE RESTORATION

Pits that are excavated by backhoe will be restored to their approximate original contours, and only moderate site disturbance is anticipated. However, areas of disturbed soil will be raked smooth by hand; all trash will be collected and disposed of properly. Established roadways and paths will be used whenever possible.

Immediately following well installation and development, any contaminated water will be properly disposed of. All drums will be removed from the site.

2.9 FIELD DOCUMENTATION

In addition to the daily diary kept by the FTR, the following documentation will be compiled and data collected:

- The well point locations will be photographed and located on a map.

- The elevations of the top of casing for each well and the ground surface and northing and easting coordinates will be surveyed by the surveying subcontractor.

- Water sampling field forms will be completed, recording the following field parameters for ground water at the processing site:

Static water level	Total depth of well	Alkalinity
Dissolved oxygen	Oxidation-reduction potential	pH
Specific conductivity	Turbidity	Temperature

Copies of all pertinent field documentation will be maintained in the UMTRA Project Document Control Center.

2.10 ANTI-CONTAMINATION MEASURES

Prior to the beginning of well installation procedures, an area free of contamination will be selected as the cleaning and staging area. All screen and casing materials to be used in constructing the well points will be steam cleaned and thoroughly scrubbed using an Alconox solution prior to installation. Before taking the backhoe onto the site, the backhoe bucket, arm, and controls will be cleaned as required. The FTR will inspect the backhoe for the presence of hydraulic oil or grease and all equipment will be steam cleaned to remove such material before each hole is dug. Proposed well points are in areas of suspected low-level ground water contamination. Therefore, to ensure that cross contamination does not occur, wells that are least likely to show organic contamination will be installed first. The backhoe arm and bucket will be steam cleaned between well sites and after the last pit has been completed.

3.0 HEALTH AND SAFETY

3.1 SITE-SPECIFIC HEALTH AND SAFETY MEASURES

Prior to excavation at each site, a safe area will be identified by barricading (with tape), the swing radius of the backhoe. The backhoe will be kept 2 to 4 ft (1 m) away from the trench at all times. The excavated alluvial material will be kept on one side of the hole and a minimum of 2 ft (1 m) away from the excavation. All individuals involved with the work will stand beyond the pile of excavated material. No planks or bridges will be constructed across the excavated zone. Any ropes used during the installation will be loosely held by individuals to avoid their being pulled into the excavated zone. Ropes will not be left on the ground in a way that would increase the possibility of a worker's being caught by the rope. No one will enter the excavated area until it approximates land surface elevation.

The excavation will be monitored for organic fumes with a PID. If fumes are detected, all individuals with potential to be exposed will don respirators and Tyvek™ protective clothing for further work. Respirators will be of the air-purifying half-mask type with organic cartridges. Individuals will be fit-tested before respirator use.

The attached "Hazard Review and Worker Safety Supplement for the Rifle Site" will be reviewed prior to conducting any fieldwork. All personnel involved with well point installation will have the following equipment:

- Hard hat.
- Steel-toed boots.
- Safety glasses.
- Work gloves.
- Sunblock lotion.
- Fresh drinking water.
- Respirator.
- Tyvek™ protective clothing.

The following items will be on the site:

- First-aid kit.
- Fire extinguisher.
- Cellular telephone.
- PID.

The location of the nearest hospital in case of emergency is Clagett Memorial Hospital (303-625-1510) located at 701 E. 5th Street, Rifle, Colorado. A map showing the route to the hospital from the site is included in the attached

"Hazard Review and Worker Safety Supplement for the Rifle Site." The phone number for all emergencies is 911.

3.2 HEALTH AND SAFETY AUDITS

The time on-site to complete well installation is likely to be less than 3 days, and it is not anticipated that an audit will be required. However, the FTR will be responsible for observing that individuals involved in work activities are in compliance with UMTRA Project health and safety requirements and that Occupational Safety and Health Administration codes 29 CFR Parts 1910 and 1926 are followed during all phases of well installation. The applicable SOPs (JEG, n.d.) are as follows:

7.3.1 Occupational Safety and Health Complaints

7.3.2 Occupational Safety and Health Complaints for TAC Subcontractors

14.1.2 Instructions for FTR

4.0 WELL INSTALLATION TASK SCHEDULE

Well installation will follow placement of clean backfill at the New Rifle processing site. Placement of backfill could continue until January, thereby delaying completion of tasks included in this schedule. Therefore, the following schedule reflects the earliest possible date for the completion of each task.

The tasks and accompanying tentative completion dates for this work plan are as follows:

Task	Completion
Site visit	November 15
Equipment procurement	December 15
Well permits	January 3
Access agreements	January 3
Conduct field operation readiness evaluation	January 9
Install wells	January 22
Survey wells	January 22
Sample wells	January 29

5.0 LIST OF CONTRIBUTORS

The following individuals contributed to the preparation of this report.

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S. Cox, A Holm	Document review
J. Jones	Editing
K. DeGruyter, S. Suniga	Graphics
L. Sanchez	Text processing

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29 CFR Part 1910, *Occupational Safety and Health Standards*, Occupational Safety and Health Administration, U.S. Department of Labor.

29 CFR Part 1926, *Safety and Health Regulations for Construction*, Occupational Safety and Health Administration, U.S. Department of Labor.

40 CFR Part 192, *Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings*, U.S. Environmental Protection Agency.

40 CFR Part 264, *Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities*, U.S. Environmental Protection Agency.

		TAILINGS		GROUNDWATER	
		Conc. Ug/Kg	MDL Ug/Kg	Conc. Ug/L	MDL Ug/L
MON	Bis(2-ethylhexyl) phthalate	nd	330	46	10
	Diethyl phathalate	220-410j	330	nd	10
	Methyl iodide	nd	5	4j	5
	2,4,5-T	44	40	nd	2
LKV		na		nd	
RFN	Acetone	nd	10	5-17b	10
	Acrylonitrile	6j	100	nd	100
	Benzene	3j	5	nd	5
	2,4-D	410	200	nd	10
	2,4,5-T	nd	160	5	2
	2,4,5-TP	62	40	nd	2
	Carbon disulfide	nd	5	4j	5
	Chloroform	3j	5	nd	5
	Di-n-octylphthalate	nd	330	11-12	10
	Methyl bromide	7j	10	nd	5
	Methyl chloride	nd	5	2-4j,b	10
	Methyl ethyl ketone	nd	10	4j	10
	Trichlorofluoromethane	nd	5	8b	5
	Toluene	nd	5	8-18	5
	Xylene	nd	5	2j,b	5
RFO	Acetone	7j	10	13b	10
	Acrylonitrile	19j-15j	100	nd	10
	Alpha-BHC	nd	16	0.23	.05
	Anthracene	130j	330	nd	10
	Benzene	3j-5	5	nd	5
	Benzo[a]anthracene	770	330	nd	10
	Benzo[a]pyrene	1000	330	nd	10
	Benzo[ghi]perylene	250j	330	nd	10
	Chrysene	1400	330	nd	10
	Diethyl phthalate	520	330	nd	10
	Dibenzo[a,h]anthracene	180j	330	nd	10
	Fluoranthene	990	330	nd	10
	Indeno(1,2,3-cd)pyrene	830	330	nd	10
	Methyl Ethyl Ketone	4j	10	nd	10
	Methylene chloride	4j	5	nd	5
	Pyrene	630	330	nd	10
SPK		na		nd	
TUB	Bis(2-ethylhexyl) phthalate	na		23-12	10

MDL = laboratory method detection limit
j = compound appears present but concentration is below detection limit
b = present in lab blank
e = above analytical threshold
na = no sample was analyzed
nd = none detected

ATTACHMENT 1

RESULTS OF 1989 APPENDIX IX SCREENING

JACOBS ENGINEERING GROUP INC.

ALBUQUERQUE OPERATIONS

5301 CENTRAL AVENUE N.E. — SUITE 1700, ALBUQUERQUE, NEW MEXICO 87108
TELEPHONE (505) 846-4030

JEGA/UMT/1189-0472

November 8, 1989

DOCUMENT CONTROL

Mr. Mark Matthews
Acting UMTRA Project Manager
U.S. Department of Energy
Uranium Mill Tailings Project Office
5301 Central Avenue, N.E., Suite 1720
Albuquerque, New Mexico 87108

Attention: Steve Hamp

Re: Results of Appendix IX Screening
Contract No. DE-AC0482-AL14086

Dear Mark:

Enclosed are the findings of the Appendix IX Special Study. The object of this effort was to screen twelve UMTRA Project sites for the organic constituents listed in 40 CFR 264 Appendix IX. The sites screened were Ambrosia Lake, Durango, Grand Junction, Green River, Gunnison, Lakeview, Mexican Hat, Monument Valley, Old and New Rifle, Spook and Tuba City. This screening effort evaluated both tailings and groundwater samples, where available. While a number of sites showed detectable concentrations of hazardous constituents, only the New Rifle site shows concentrations sufficiently high to require further characterization. The further characterization will be conducted using site-specific funds.

This submittal concludes the work on the Appendix IX Special Study. If you have any questions, please contact Frank Titus or me.

Very truly yours,
JACOBS ENGINEERING GROUP INC.

Steven R. Hill, Manager
Albuquerque Operations Office

SRH/FT/BD/11
Enclosure

cc: KAgogino
KBostick
SHill
DLechel
BMukhopadhyay

October 1989

UPDATE ON THE RESULTS OF SCREENING THE HAZARDOUS ORGANIC CONSTITUENTS IN THE TAILINGS AND GROUNDWATERS OF THE UMTRA TITLE I SITES

The results of screening for the hazardous organic constituents listed in Appendix IX, 40 CFR 264 and (consistent with those listed in the draft-final version of Appendix I, 40 CFR 192) in the tailings and groundwaters at the UMTRA processing sites currently completed, are shown in Table 1.

The organic compounds in Table 1 include those that appear to be present but are below the laboratory method detection limit (MDL), (footnote "j" in Table 1, and those that were also detected in laboratory blanks; footnote "b"). This table also contains, a) phthalates that are common organic contaminants, and b) common laboratory reagents methyl chloride and methyl iodide with concentration levels at or near the (MDL). These compounds should be dropped from further consideration. Table 2 contains only those compounds that need further evaluation for their potential presence as groundwater contaminants at the UMTRA sites. Where more than one sample was analyzed, Table 2 shows the maximum observed concentration of a constituent present in either or both tailings and groundwaters beneath and downgradient from the tailings.

Table 2 shows that a groundwater sample from HAT contains lindane (an insecticide). It's concentration (.18 ug/l) however, is below the EPA MCL for lindane (4 ug/l) and therefore, does not require further consideration. Likewise, the alpha BHC (also an insecticide; lindane is gamma BHC) which appears to be present in the groundwater sample from beneath the Old Rifle processing site, occurs at about the same concentration level as lindane but is less toxic, and therefore, can be eliminated from further consideration.

A small amount (3.6 times the MDL) of toluene appears present in the groundwater beneath the tailings pile of the New Rifle site (RFN). This RFN groundwater also appears to contain a trace (2.5 times the MDL) amount of 2, 4, 5-T (a defoliant). A systematic sampling and analysis of groundwater at this site needs to be carried out in order to, a) confirm the presence of these compounds, and b) if present, define the size of the contaminant plume(s).

A number of organic compounds at a concentration level up to about 4 times the MDL appears to be present in the tailings at a number of sites (Table 2). However, one AMB tailings sample contains toluene at a concentration level of 30 times the MDL and two HAT tailings samples contain acetone at concentration level set about 1000 times the MDL. None of these compounds is present in the groundwater for a given site. Therefore, it can be assumed that they are not available to, or are insoluble in, groundwaters beneath the tailings.

In summary, additional groundwater sampling and analyses should be conducted at the RFN site in order to, a) confirm the presence of the hazardous organic contaminants that appear to be present at these sites, and b) if present, to define their concentration level(s) and plume size(s). No further analyses appear to be needed at the other sites for which screening of the hazardous organic constituents was completed.

JACOBS ENGINEERING GROUP INC.
ALBUQUERQUE OPERATIONS

II. WORK ORDER PLAN - CHEMICAL ANALYSIS OF UMTRA TAC SAMPLES

SAMPLE MATRIX: Ground Water

SITE HYDROLOGIST: TMonks
NAME (print) SIGNATURE DATE

SITE ID(s): RFN-01

LOCATION ID(s): See Below

SITE GEOCHEMIST: DErskine
NAME (print) SIGNATURE DATE

SAMPLES ID(S): 000X

Bottle Name	Cu	Fe	Pb	Mn	Hg	Mo	Ni	Se	Ag	Sr	Sn	Tl	U	V	Zn	TDS	TOC & DOC
M-2		X				X							X	X			
Total # of Tests		8				8							8	8			

COMMENTS:

Please analyze samples RFN01-655-0001, RFN01-656-0001, RFN01-657-0001, RFN01-658-0001, RFN01-659-0001, RFN01-659-0002, RFN01-999-0001, and RFN01-999-0003.

TABLE 1 : SCREENING RESULTS OF THE EPA APPENDIX IX (40CFR264) HAZARDOUS ORGANIC COMPOUNDS IN THE UMTRA TITLE I SITES

		TAILINGS		GROUNDWATER	
Site	Compound	Conc. Ug/Kg	MDL Ug/Kg	Conc. Ug/L	MDL Ug/L
AMB	MethylEthylKetone	nd	10	7j	10
	Acetone	1j	10	nd	10
	Carbon disulfide	1j	5	nd	5
	Methyl Chloride	6	5	nd	5
	Styrene	14b	5	nd	5
	Toluene	150	5	nd	5
	Trichlorofluoromethane	62b	5	nd	5
	Xylene(total)	5	6	nd	5
DUR	Pentachlorophenol	na	na	7j	10
	Trichlorofluoromethane	na	na	3j	5
GRJ	Toluene	3j-1j	5	nd	5
	Bis(2-Ethylhexyl) phthalate	nd	330	120-16	10
GRN	Acetone	6-4j	10	nd	10
	Bis(2-Ethylhexyl) phthalate	nd	330	12-10	10
	Toluene	9	5	nd	5
GUN	Diethylphthalate	356	330	nd	10
	Bi(2-ethylhexyl) phthalate	nd	330	360-110	10
	Trichlorofluoromethane	1.7j	5	nd	5
HAT	Acetone	12000e	10	nd	10
	2,4-D	195-216	200	nd	10
	Lindane	nd	8	.18	.05
	Methyl Iodide	nd	5	5	5
	Bis(2-ethylhexyl) phathalate	440	330	nd	10
	Toluene	11-250	5	nd	5

TABLE 2 : POTENTIAL HAZARDOUS ORGANIC CONSTITUENTS[a]

		TAILINGS		GROUNDWATER	
Site	Constituent	Conc. Ug/Kg	MDL Ug/Kg	Conc. Ug/L	MDL Ug/L
AMB	Toluene	150	5	-	
GRN	Toluene	9	5	-	
HAT	Acetone	12000e	10	-	
	2,4-D	216	200	-	
	Toluene	250	5	-	
	Lindane	-		.18	.05
MON	2,4,5-T	44	40	-	
RFN	2,4-D	410	200	-	
	2,4,5-T	-		5	2
	2,4,5-TP	62	40	-	
	Toluene	-		18	5
RFO	Alpha-BHC	-		.2	.05
	Benzo[a]anthracene	770	330	-	
	Benzo[a]pyrene	1000	330	-	
	Chrysene	1400	330	-	
	Fluoranthene	990	330	-	
	Indeno(1,2,3-cd)pyrene	830	330	-	
	Pyrene	630	330	-	

a: see text for discussion on significance

Legend: - = probably not present
MDL = laboratory method detection limit
e = above anlytical threshold

ATTACHMENT 2

MK-FERGUSON ORGANIC ANALYSIS

MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

DATE: 11/2/95 TIME: 4:05

☑ **RUSH/Deliver Immediately** ☐ **Deliver ASAP**

PLEASE DELIVER THE FOLLOWING TO:

NAME: Sharon Arp **FROM:** Teresa Farquhar

LOCATION: DOE **LOCATION:** *ALBUQUERQUE, NM PROJECT OFFICE*

FAX TO (PH. NUMBER): _____ **FAX USER (PH. NUMBER):** *505/766-3318 or 505/766-1813*

☛ **TOTAL # OF PAGES** 15 **(EXCLUDING COVER SHEET)**

☛ **IF YOU DO NOT RECEIVE ALL PAGES, CALL FAX USER AT 1-800-443-4379 or 505/845-5868**

REMARKS:

Sharon,

Call John Isham & myself

to discuss these results.

Teresa

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-AL
Page 6 of 7
Part 6 of 6

Date OCT 16 1995
Agency Identification Number S95-1106-CE
Account No. 03018

MK-Ferguson Company
P.O. Box 151
Rifle, CO 81650
Attention: Kathy Benson

FAX (303) 625-4623
Telephone

Sampling Collection and Shipment

Sampling Site _____ Date of Collection October 03, 1995

Date Samples Received at Laboratory October 04, 1995

Analysis

Method of Analysis EPA 8240

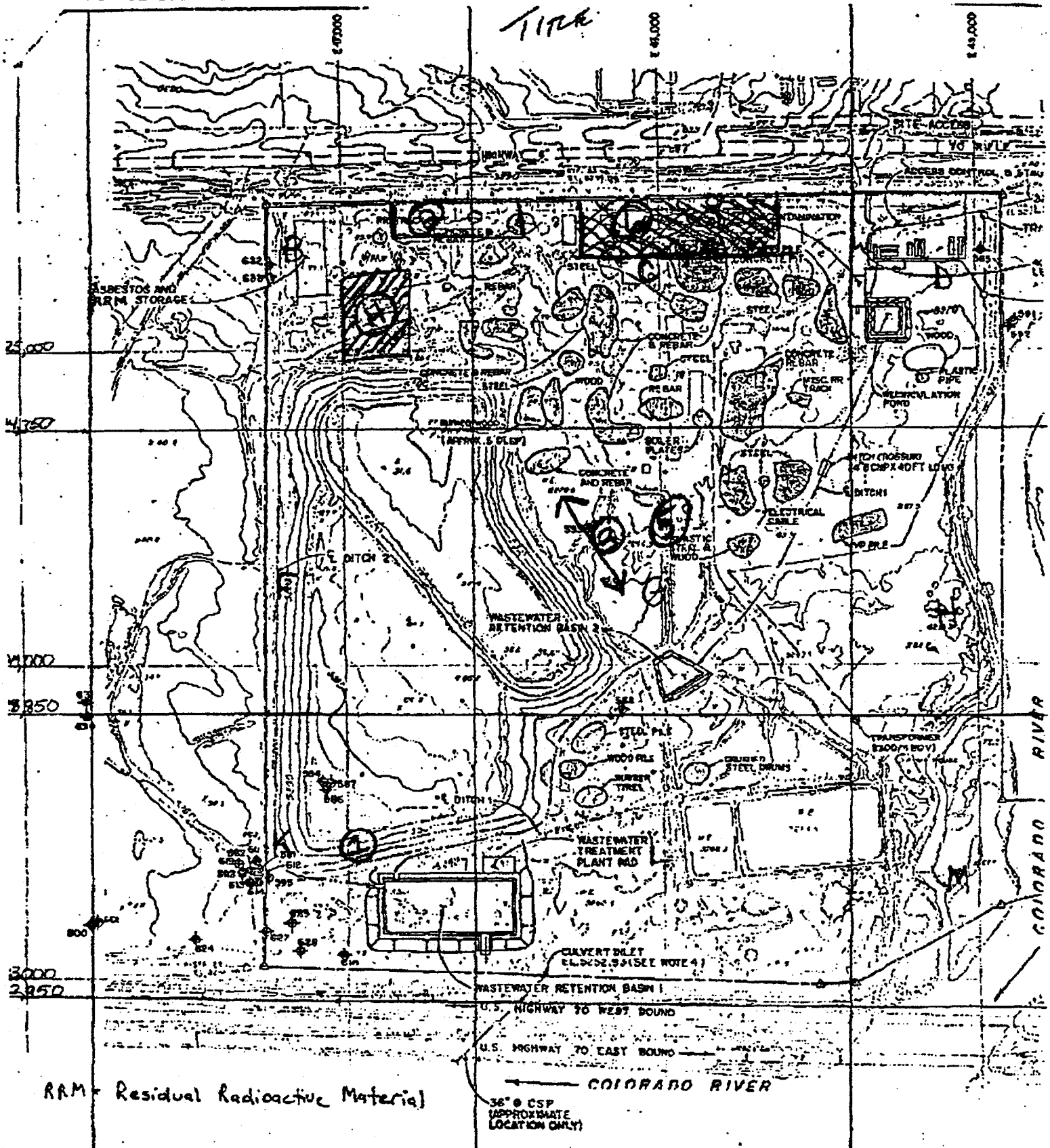
Date(s) of Analysis October 09, 1995

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	Ethyl Benzene UG/KG	Styrene UG/KG	Total Xylene UG/KG	1,2-Dichloroethane-D4 UG/KG	Toluene-D8 UG/KG	Bromofluorobenzene UG/KG			
BL-101672-1	BL-101672-1	SOIL	ND	ND	ND	49.	51.	47.			
QC-101672-1	QC-101672-1	SOIL	NR	NR	NR	48.	51.	45.			
RFL-PS 95 05	EO 9757	SOIL	5.3	ND	22.	51.	46.	37.			†
RFL-PS-95-05	EO 9757MS	SOIL	NR	NR	NR	44.	49.	40.			
RFL-PS-95-05	EO 9757MSD	SOIL	NR	NR	NR	42.	52.	42.			
Limit of Detection			.20	.51	.40						
Limit of Quantitation			5	5	5						

† See comment on last page.
ND Parameter not detected.
NR Parameter not requested.
** See comment on last page.
( ) Parameter between LOD and LOQ.

TITLE



RRM = Residual Radioactive Material

A2-3

TOTAL P.02

MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

NEW RIFLE PROCESS SITE SOIL SAMPLES
1993-95

Rifle UMTRA

Map #	Soil Sample #	Area	Concern	Status
1	RFL-PS-93-1 and 2	K	Organics	Soil removed
2	RFL-PS-1 through 6	C	pH	Acid pond removed
3	RFL-PS-94-7 through 10	G	Organics	Gyp pond removed
4	RFL-PS-95-1 through 3	B	Organics	Rad cleaned only
5	RFL-PS-95-4	G	Organics	Soil removed
6	RFL-PS-95-5	C	Organics, Sulfates	Rad cleaned only

Note: The Area designation, "K," "C," "G," etc. are referring to radiological verification maps, not engineering excavation maps.

GUSON COMPANY
A KOCH EXLUSEN COMPANY

PHONE: 970 625 4618

ATTACHMENT 3

LABORATORY SERVICES AUTHORIZATION AND CHAIN OF CUSTODY FORM

DATA CHEM LABORATORIES
960 W. LEVOY DRIVE
SALT LAKE CITY, UTAH 84123

FROM: KATHY BENSON (Requestor)
MK-FERGUSON COMPANY
P.O. BOX 151
RIFLE, CO 81650

PAGE 1 OF 1
Date 8/30/95

3050- 511-11081
P.O. NO.

61
REQUEST NO.

9/13/95
NEED DATE

☐ PRIORITY
☒ STANDARD

SAMPLE TYPE: ___ Filter ___ Cassette ___ Water ___ Soil ✓ Bulk Sample ___ Other (Specify) ___

ANALYSIS REQUESTED: BTEXN - TPH Kerosene

SPECIAL INSTRUCTIONS/COMMENTS:

PRIOR TO SUBMITTING WRITTEN REPORT, ALL RESULTS ARE TO BE TELEPHONED TO THE REQUESTING SITE. ADDITIONALLY, ALL BULK SAMPLES WILL BE RETURNED FOR DISPOSAL.

SAMPLE ID NUMBER	NO. OF SMPLS	DATE COLLECTED (mm/dd/yy)	SAMPLE DESCRIPTION	ACTIVITY (pCi/g)	VOLUME ( )	SEALED BY (INITIALS)
RFL-BS-95-01	1	8/30/95	Area B	.70	✓	KB
RFL-BS-95-02	1	8/30/95	Area B	.70	✓	KB
RFL-BS-95-03	1	8/30/95	Area B	.70	✓	KB

APPROVED BY:
SITE ESH MANAGER — DATE: 08/30/95
MK-F SITE MANAGER — DATE: 8/30/95
TECHNICAL REVIEW — DATE

1) Relinquished by: (Site Representative Signature) Kathy Benson — Date/Time: 8-30-95/0855 A2-5

2) Carrier: UPS (SEE LOG BOOK) — Date/Time

3) Received in Laboratory: — Date/Time: 8-31-95 1320

Samples sent back to the site for disposal shall be accompanied by the Laboratory Chain-of-Custody and Condition of Sample forms, as per the contract.

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-AL
Page 1 of 2
Part 1 of 1

Date SEP 25 1995
Agency Identification Number M95-0020-AB
Account No. 03020

MK-Ferguson Company
P.O. Box 151
Rifle, CO 81650
Attention: Kathy Benson

FAX (303) 625-4623
Telephone

Sampling Collection and Shipment

Sampling Site _____ Date of Collection August 30, 1995

Date Samples Received at Laboratory August 31, 1995

Analysis

Method of Analysis OG-DC-TPHD

Date(s) of Analysis September 15, 1995 - September 19, 1995

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	TPH-Kerosene mg/kg 3510	o-Terphenyl mg/kg 3510						
BL-99942-1	BL-99942-1	SOIL	ND	40						
QC-99942-1	QC-99942-1	SOIL	450	45						
RFL-PS-95-01	MC 00142	SOIL	4200	52						
RFL-PS-95-01	MC 00142MS	SOIL	5000	55						
RFL-PS-95-01	MC 00142MSD	SOIL	5200	54						
RFL-PS-95-02	MC 00143	SOIL	4800	55						
RFL-PS-95-03	MC 00144	SOIL	4200	51						
Limit of Detection			10							

† See comment on last page.
ND Parameter not detected.
NR Parameter not requested.

** See comment on last page.
( ) Parameter between LOD and LOQ.

This report is 10 total pages.

Analyst: Lawrence E. Miller
A2-6

Reviewer: Daniel J. Bruch

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-C
Page 2 of 2

Date SEP 13 1995

Agency Identification Number M95-0020-CB

General Set Comments

Sample BL-100331-1 was analyzed as the method blank. Sample QC-100331-1 was analyzed as the laboratory control sample (LCS). Sample MC 00142 was used to prepare the matrix spike and matrix spike duplicate samples (MS and MSD). The LCS, MS, and MSD were spiked at 400 ug/kg with benzene, toluene, and ethylbenzene, and at 1200 ug/kg with total xylene.

Reported values have not been corrected for moisture content.

Sample Comments

Laboratory Number	-- Comment --
BL-100331-1	(J)
MC 00143	(J)
MC 00144	(J)

MK-FERGUSON COMPANY
A MORRISON KNUDSEN COMPANY

ATTACHMENT 3

LABORATORY SERVICES AUTHORIZATION AND CHAIN OF CUSTODY FORM

DATA CHEM LABORATORIES
960 W. LEVOY DRIVE
SALT LAKE CITY, UTAH 84123
ATTN: East Dock
mixed waste lab

FROM: KATHY BENSON (Requisitioner)
MK-FERGUSON COMPANY
P.O. BOX 151
RIFLE, COLORADO 81650

PAGE 2 OF 2
Date 10/3/95

3050-511-11081 (P.O. NO.)
067 (REQUEST NO.)
10/16/95 (NEED DATE)
☐ PRIORITY ☒ STANDARD

SAMPLE TYPE: ___ Filter ___ Cassette ___ Water ✓ Soil ___ Bulk Sample ___ Other (Specify) _____

ANALYSIS REQUESTED: EPA 8240 Volatile organics, EPA 300.0 Sulfates and pH. Sample checked for radioactivity by Rifle Health Physics lab. Report is attached.

SPECIAL INSTRUCTIONS/COMMENTS:

PRIOR TO SUBMITTING WRITTEN REPORT, ALL RESULTS ARE TO BE TELEPHONED TO THE REQUESTING SITE. ADDITIONALLY, ALL BULK SAMPLES WILL BE RETURNED FOR DISPOSAL.

SAMPLE ID NUMBER	NO. OF SMPLS	DATE COLLECTED (mm/dd/yy)	SAMPLE DESCRIPTION	ACTIVITY pCi/g	VOLUME	SEALED BY (INITIALS)
RFK-PS-95-05	1	10-3-95	Area C West of Nordic Shop Soil/w tailings	9.9	N/A	KB
60975J						

APPROVED BY:
SITE ESH MANAGER — DATE 10/03/95
TECHNICAL REVIEW — DATE
MK-F SITE MANAGER — DATE 10/3/95

1) Relinquished by: (Site Representative Signature)	Date/Time	2) Carrier:	Date/Time
Kathy Benson	10-3-95 0345	UPS (SEE LOG BOOK)	
3) Received in Lab By:	Date/Time	Samples sent back to the site for disposal shall be accompanied by the Laboratory Chain-of-Custody and Condition of Sample forms, as per the contract.	
	A2-8 10/4/95 1000		

NOTE: All reports and invoices must reference P.O. and Request numbers. The original report and the original Authorization/Chain-of-Custody

DATA CHEM LABORATORIES
A Sorenson Company

ENVIRONMENTAL SOIL REPORT

Form EPRS-A
Page 1 of 1
Part 1 of 1

Date OCT 16 1995
Agency Identification Number S95-1106-DE
Account No. 03018

MK-Ferguson Company
P.O. Box 151
Rifle, CO 81650
Attention: Kathy Benson

FAX (303) 625-4623
Telephone

Sampling Collection and Shipment

Sampling Site _____ Date of Collection October 03, 1995

Date Samples Received at Laboratory October 04, 1995

Analytical Results

Parameter Name / Analysis Date / Units / Method / Prep Method	Field Number / Lab Number	EL-101673-1 EL-101673-1	CC-101673-1 CC-101673-1	RFL-PS-95-05 EO 9757	RFL-PS-95-05 EO 9757ND	RFL-PS-95-05 EO 9757MS			Limit of Detection
Sulfates 10/13/1995 IC-EP-300	µg/g	ND	47.	670	630	880			1.

† See comment on last page.
ND Parameter not detected.
NR Parameter not requested.
1 Analyses completed on or before this date.

** Parameter not analyzed (See comment page).
{ } Parameter between LOD and LOQ.
[ ] Method Reference (See comments page.)

This report is total pages.

This report is 2 1

Analyst: Debbie A. Christensen

A2-9

Reviewer: Dawnmarie Rushing

DATA CHEM LABORATORIES
A Sorenson Company

ENVIRONMENTAL WATER REPORT

Form EPRW-A
Page 1 of 2
Part 1 of 1

Date OCT 10 1995
Agency Identification Number S95-1106-EE
Account No. 03018

MK-Ferguson Company
P.O. Box 151
Rifle, CO 81650
Attention: Kathy Benson

FAX (303) 625-4623
Telephone

Sampling Collection and Shipment

Sampling Site _____ Date of Collection October 03, 1995

Date Samples Received at Laboratory October 04, 1995

Analytical Results

Parameter Name / Analysis Date / Units / Method / Prep Method	Field Number / Lab Number	RFL-PS-95-05 EO 9757							Limit of Detection
pH 10/09/1995 9045 [1]	pH units	6.6							± 0.1

† See comment on last page.
ND Parameter not detected.
NR Parameter not requested.
' Analyses completed on or before this date.

** Parameter not analyzed (See comment page).
{ } Parameter between LOD and LOQ.
[ ] Method Reference (See comments page.)

Analyst: Kim L. Hansen

A2-10

Reviewer: Suzanne W. Bowe

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-AL
Page 1 of 7
Part 1 of 6

Date OCT 16 1995
Agency Identification Number S95-1106-CE
Account No. 03018

MK-Ferguson Company
P.O. Box 151
Rifle, CO 81650
Attention: Kathy Benson

FAX (303) 625-4623
Telephone

Sampling Collection and Shipment

Sampling Site _____ Date of Collection October 03, 1995

Date Samples Received at Laboratory October 04, 1995

Analysis

Method of Analysis EPA 8240

Date(s) of Analysis October 09, 1995

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	Chloromethane UG/KG	Bromomethane UG/KG	Vinyl Chloride UG/KG	Chloroethane UG/KG	Dichloromethane UG/KG	Acetone UG/KG	Carbon Disulfide UG/KG	Trichlorofluoromethane UG/KG	
BL-101672-1	BL-101672-1	SOIL	ND	ND	ND	ND	ND	ND	ND	ND	
QC-101672-1	QC-101672-1	SOIL	NR	NR	NR	NR	NR	NR	NR	NR	
RFL-PS-95-05	EO 9757	SOIL	ND	ND	ND	ND	1.4	24.	ND	1.2	†
RFL-PS-95-05	EO 9757MS	SOIL	NR	NR	NR	NR	NR	NR	NR	NR	
RFL-PS-95-05	EO 9757MSD	SOIL	NR	NR	NR	NR	NR	NR	NR	NR	
Limit of Detection			.20	.17	.085	.21	.11	3.6	.10	.093	
Limit of Quantitation			10	10	10	10	5	100	5	5	

† See comment on last page.
ND Parameter not detected.
NR Parameter not requested.

** See comment on last page.
( ) Parameter between LOD and LOQ.

This report is 23 total pages.

Analyst: Steven J. Sagers
A2-11

Reviewer: ~~Thomas H. Bosch~~ SMP 10-16-95

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-AL
Page 2 of 7
Part 2 of 6

OCT 16 1995
Date

Agency Identification Number S95-1106-CE
Account No. 03018

MK-Ferguson Company
P.O. Box 151
Rifle, CO 81650
Attention: Kathy Benson

FAX (303) 625-4623
Telephone

Sampling Collection and Shipment

Sampling Site _____ Date of Collection October 03, 1995

Date Samples Received at Laboratory October 04, 1995

Analysis

Method of Analysis EPA 8240

Date(s) of Analysis October 09, 1995 and by

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	1,1-Dichloroethane UG/KG	1,1-Dichloroethene UG/KG	total-1,2-Dichloroethene UG/KG	Chloroform UG/KG	1,2-Dichloroethane UG/KG	Iodomethane UG/KG	Acrolein UG/KG	Acrylonitrile UG/KG	
BL-101672-1	BL-101672-1	SOIL	ND	ND	ND	ND	ND	ND	ND	ND	
QC-101672-1	QC-101672-1	SOIL	NR	47.	NR	NR	NR	NR	NR	NR	
RFL-PS-95-05	EO 9757	SOIL	ND	ND	ND	ND	ND	ND	ND	ND	†
RFL-PS-95-05	EO 9757MS	SOIL	NR	49.	NR	NR	NR	NR	NR	NR	
RFL-PS-95-05	EO 9757MSD	SOIL	NR	53.	NR	NR	NR	NR	NR	NR	
Limit of Detection			.11	.082	.24	.090	.14	1.3	2.2	2.3	
Limit of Quantitation			5	5	5	5	5	5	20	20	

† See comment on last page.
ND Parameter not detected.
NR Parameter not requested.
** See comment on last page.
( ) Parameter between LOD and LOQ.

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-AL
Page 3 of 7
Part 3 of 6

Date OCT 16 1995
Agency Identification Number S95-1106-CE
Account No. 03018

MK-Ferguson Company
P.O. Box 151
Rifle, CO 81650
Attention: Kathy Benson

FAX (303) 625-4623
Telephone

Sampling Collection and Shipment

Sampling Site _____ Date of Collection October 03, 1995

Date Samples Received at Laboratory October 04, 1995

Analysis

Method of Analysis EPA 8240

Date(s) of Analysis October 09, 1995

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	2-Butanone UG/KG	1,1,1-Tri chloroethane UG/KG	Carbon Tetra chloride UG/KG	Vinyl Acetate UG/KG	Bromodichloro methane UG/KG	1,2-Dichloro propane UG/KG	cis-1,3-Di chloropropene UG/KG	Trichloroethene UG/KG	
BL-101672-1	BL-101672-1	SOIL	ND	ND	ND	ND	ND	ND	ND	ND	
QC-101672-1	QC-101672-1	SOIL	NR	NR	NR	NR	NR	NR	NR	43.	
RFL-PS-95-05	EO 9757	SOIL	ND	7.3	ND	ND	ND	ND	ND	22.	†
RFL-PS-95-05	EO 9757MS	SOIL	NR	NR	NR	NR	NR	NR	NR	46.	
RFL-PS-95-05	EO 9757MSD	SOIL	NR	NR	NR	NR	NR	NR	NR	52.	
Limit of Detection			2.6	.11	.12	.62	.12	.11	.12	.19	
Limit of Quantitation			100	5	5	5	5	5	5	5	

† See comment on last page.
ND Parameter not detected.
NR Parameter not requested.
** See comment on last page.
( ) Parameter between LOD and LOQ.

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-AL
Page 4 of 7
Part 4 of 6

Date OCT 16 1995
Agency Identification Number S95-1106-CE
Account No. 03018

MK-Ferguson Company
P.O. Box 151
Rifle, CO 81650
Attention: Kathy Benson

FAX (303) 625-4623
Telephone

Sampling Collection and Shipment

Sampling Site _____ Date of Collection October 03, 1995

Date Samples Received at Laboratory October 04, 1995

Analysis

Method of Analysis EPA 8240

Date(s) of Analysis October 09, 1995

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	Benzene UG/KG	Chlorodibromo methane UG/KG	1,1,2-Trichloro ethane UG/KG	trans-1,3-Di chloropropene UG/KG	2-Chloroethyl vinyl Ether UG/KG	Bromoform UG/KG	Dibromomethane UG/KG	trans-1,4-Di chloro-2-Butene UG/KG	
BL-101672-1	BL-101672-1	SOIL	ND	ND	ND	ND	ND	ND	ND	ND	
QC-101672-1	QC-101672-1	SOIL	47.	NR	NR	NR	NR	NR	NR	NR	
RFL FG-95-05	EO 9757	SOIL	ND	ND	ND	ND	ND	ND	ND	ND	†
RFL-PS-95-05	EO 9757MS	SOIL	47.	NR	NR	NR	NR	NR	NR	NR	
RFL-PS-95-05	EO 9757MSD	SOIL	50.	NR	NR	NR	NR	NR	NR	NR	
Limit of Detection			.14	.10	.12	.13	.10	.10	.12	.68	
Limit of Quantitation			5	5	5	5	10	5	5	5	

† See comment on last page.
ND Parameter not detected.
NR Parameter not requested.
** See comment on last page.
( ) Parameter between LOD and LOQ.

960 West LeVoy Drive / Salt Lake City, Utah 84123-2547 / (801) 266-7700
A Sorenson Company
A Sorenson Company

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-AL
Page 1 of 2
Part 1 of 1

Date SEP 13 1995
Agency Identification Number M95-0020-CR
Account No. 03020

MK-Ferguson Company
P.O. Box 151
Rifle, CO 81650
Attention: Kathy Benson

FAX (303) 625-4623
Telephone

Sampling Collection and Shipment

Sampling Site _____ Date of Collection August 30, 1995

Date Samples Received at Laboratory August 31, 1995

Analysis

Method of Analysis 8020 MOD

Date(s) of Analysis September 12, 1995

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	Benzene ug/kg 3810	Ethyl Benzene ug/kg 3810	Toluene ug/kg 3810	Total Xylene ug/kg 3810	Naphthalene ug/kg 3810				
BL-100331-1	BL-100331-1	SOIL	ND	1.5	ND	ND	7.8				†
QC-100331-1	QC-100331-1	SOIL	360	390	370	1200	NR				
RFL-PS-95-01	MC 00142	SOIL	6.3	18	7.8	43	(ND)				
RFL-PS-95-01	MC 00142MS	SOIL	1000	730	830	2100	NR				
RFL-PS-95-01	MC 00142MSD	SOIL	970	550	670	1600	NR				
RFL-PS-95-02	MC 00143	SOIL	3.5	19	5.9	44	(ND)				†
RFL-PS-95-03	MC 00144	SOIL	3.2	21	6.6	32	(ND)				†
Limit of Detection			0.75	0.60	0.62	1.5	1.4				
Limit of Quantitation			5	8	5	15	20				

† See comment on last page.
ND Parameter not detected.
NR Parameter not requested.

** See comment on last page.
( ) Parameter between LOD and LOQ.

400ug/kg BTE
1200 ug/kg. X

Analyst: Steven J. Sagers
A2-15

Reviewer: J. Chris Taylor

DATA CHEM LABORATORIES
A Sorenson Company

ANALYTICAL REPORT

Form ARF-AL
Page 1 of 2
Part 1 of 1

Date SEP 25 1995
Agency Identification Number M95-0020-AR
Account No. 03020

MK-Ferguson Company
P.O. Box 151
Rifle, CO 81650
Attention: Kathy Benson

FAX (303) 625-4623
Telephone

Sampling Collection and Shipment

Sampling Site _____ Date of Collection August 30, 1995

Date Samples Received at Laboratory August 31, 1995

Analysis

Method of Analysis OG-DC-TPHD

Date(s) of Analysis September 15, 1995 - September 19, 1995

Analytical Results

Field Sample Number	Laboratory Number	Sample Type	TPH-Kerosene mg/kg 3510	o-Terphenyl mg/kg 3510						
BL-99942-1	BL-99942-1	SOIL	ND	40						
QC-99942-1	QC-99942-1	SOIL	450	45						
RFL-PS-95-01	MC 00142	SOIL	4200	52						
RFL-PS-95-01	MC 00142MS	SOIL	5000	55						
RFL-PS-95-01	MC 00142MSD	SOIL	5200	54						
RFL-PS-95-02	MC 00143	SOIL	4800	55						
RFL-PS-95-03	MC 00144	SOIL	4200	51						
Limit of Detection			10							

† See comment on last page.
ND Parameter not detected.
NR Parameter not requested.

** See comment on last page.
( ) Parameter between LOD and LOQ.

This report is 10 total pages.

Analyst: Lawrence E. Miller

A2-16

Reviewed: Daniel J. Bruch

ATTACHMENT 3

FINAL GRADING PLAN

JACOBS ENGINEERING GROUP INC.
ALBUQUERQUE OPERATIONS

Work Order Plan: Chemical Analysis of UMTRA TAC Samples—Organic Constituents

Hydrologist	Date	Matrix	Ground Water
TMonks		Site IDs	RFN-01
Geochemist	Date	Location IDs	000X
DErskine		Sample IDs	Enter in table at bottom

Bottle Name	EPA 8015-mod (DRO)	EPA method 8260	EPA method 8270	EPA method 8021			
DRO	7	7	7				
Other							
Other							
Other							
Other							
Total Analyses	7	7	7				

Sample IDs					
RFN01-655-0001	RFN01-656-0001	RFN01-657-0001	RFN01-658-0001	RFN01-659-0001	RFN01-659-0002
RFN01-999-0001					

JACOBS ENGINEERING GROUP INC.
ALBUQUERQUE OPERATIONS

II. WORK ORDER PLAN - CHEMICAL ANALYSIS OF UMTRA TAC SAMPLES

SAMPLE MATRIX: Ground Water

SITE HYDROLOGIST: TMonks
NAME (print) SIGNATURE DATE

SITE ID(s): RFN-01

LOCATION ID(s): See Below

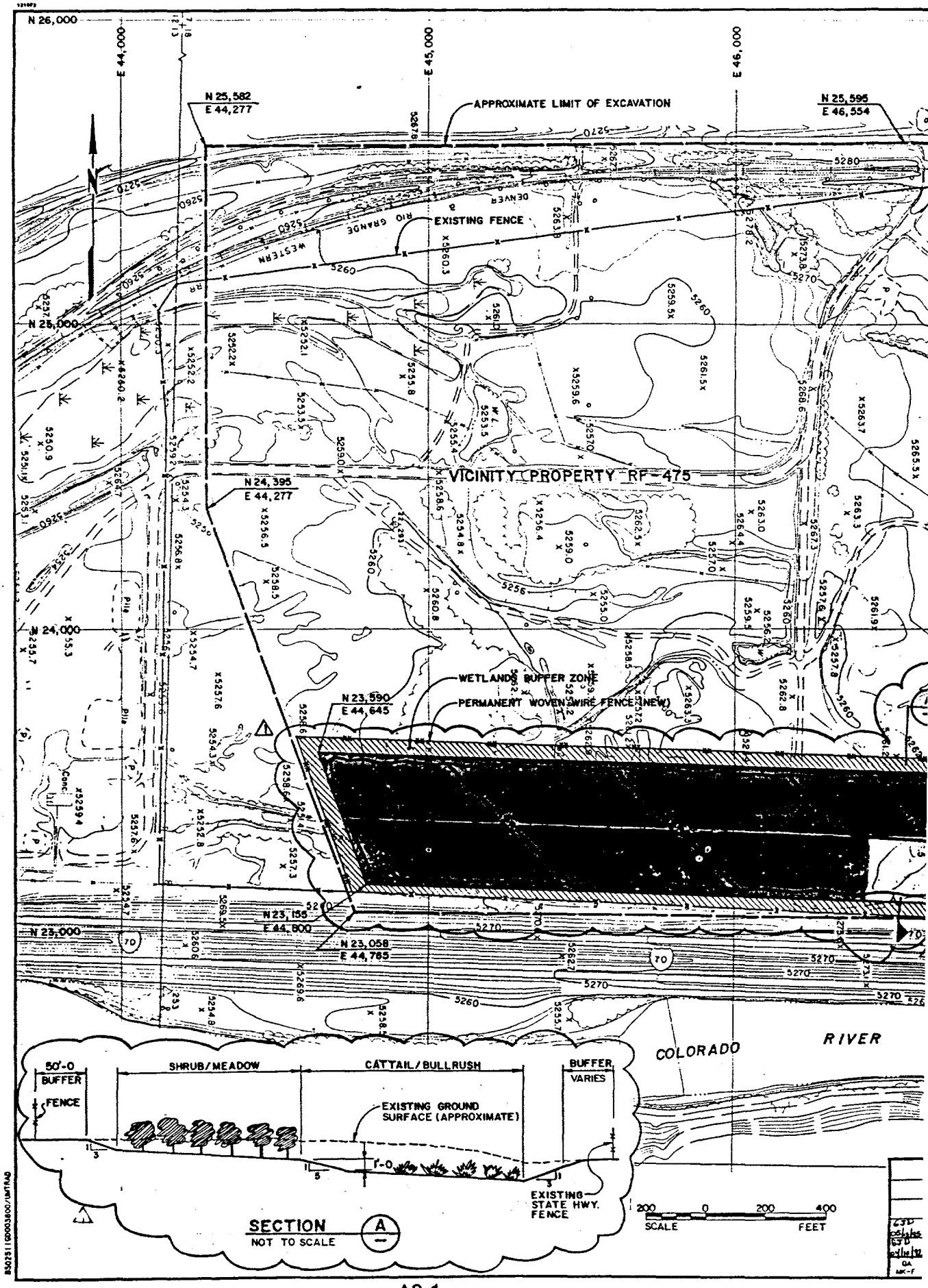
SITE GEOCHEMIST: DErskine
NAME (print) SIGNATURE DATE

SAMPLES ID(S): 000X

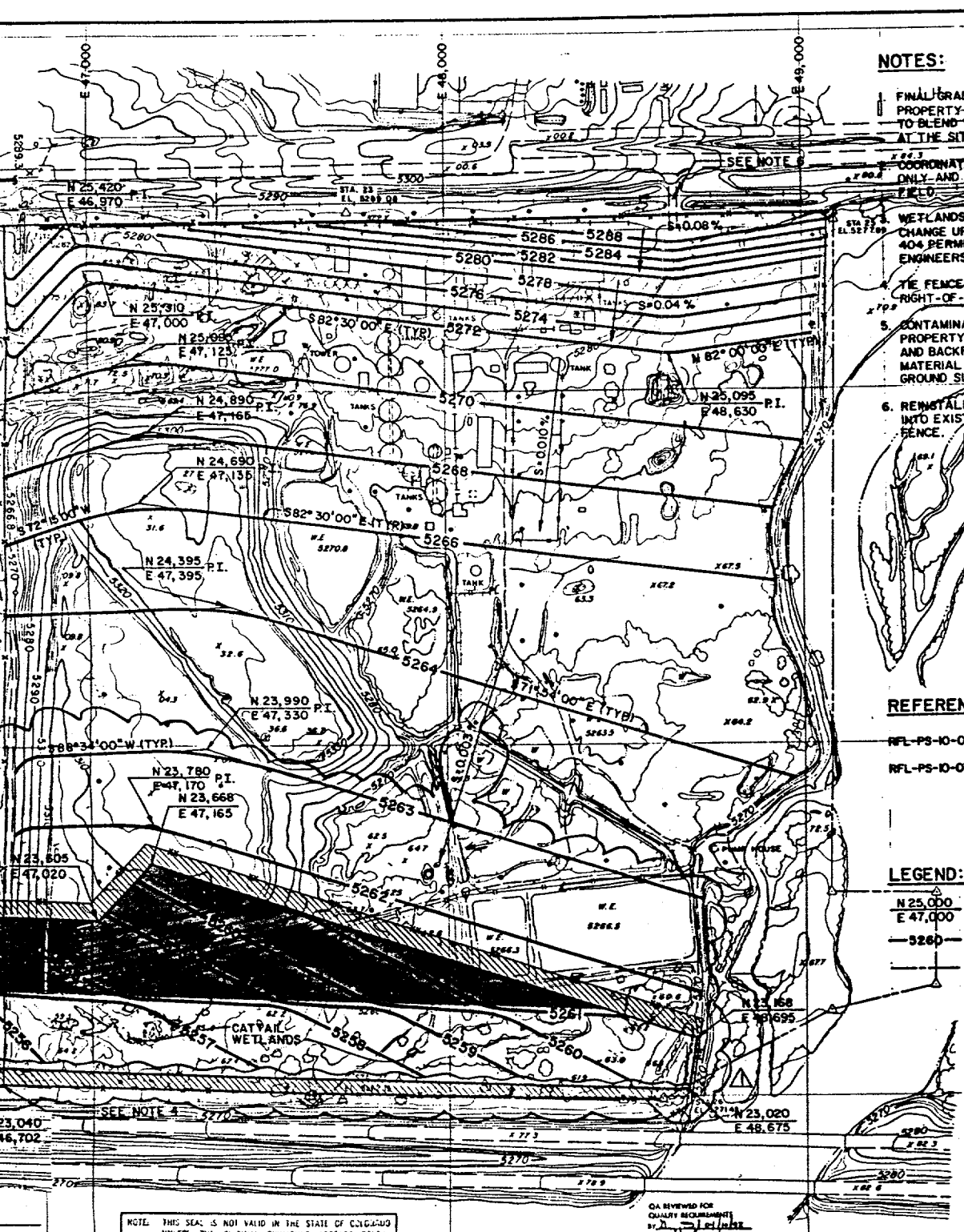
Bottle Name	Cl	SO_4	Na	K	Mg	Ca	B	F	CN	S	TKN	NH_4	NO_3 & NO_2	NO_3	SiO_2	PO_4	Br	Al	Sb	As	Ba	Be	Cd	Cr	Co
A-1	X	X						X																	
M-2			X		X	X														X					
N-1												X		X											
Total # of Tests	8	8	8		8	8		8				8		8						8					

COMMENTS:

Please analyze samples RFN01-655-0001, RFN01-656-0001, RFN01-657-0001, RFN01-658-0001, RFN01-659-0001, RFN01-659-0002, RFN01-999-0001 and RFN01-999-0003.


N 26,000
N 25,000
N 24,000
N 23,000
E 44,000
E 45,000
E 46,000
N 25,582
E 44,277
N 25,595
E 46,554
APPROXIMATE LIMIT OF EXCAVATION
EXISTING FENCE
VICINITY PROPERTY RF-475
N 24,395
E 44,277
WETLANDS BUFFER ZONE
PERMANENT WOVEN WIRE FENCE (NEW)
N 23,590
E 44,645
N 23,155
E 44,800
N 23,058
E 44,765
COLORADO RIVER
50'-0 BUFFER
FENCE
SHRUB/MEADOW
CATTAIL/BULLRUSH
BUFFER VARIES
EXISTING GROUND SURFACE (APPROXIMATE)
EXISTING STATE HWY. FENCE
SECTION A
NOT TO SCALE
200 0 200 400
SCALE FEET

A3-1



NOTES:

1. FINAL GRADING CONTOURS WITHIN THE PROPERTY LINE SHALL BE ADJUSTED TO BLEND WITH THE EXISTING CONTOURS AT THE SITE BOUNDARIES.
2. COORDINATE POINTS ARE APPROXIMATE ONLY AND MAY BE ADJUSTED IN THE FIELD.
3. WETLANDS CONFIGURATION SUBJECT TO CHANGE UPON ISSUANCE OF SECTION 404 PERMIT FROM THE CORPS OF ENGINEERS.
4. TIE FENCE INTO EXISTING HIGHWAY RIGHT-OF-WAY FENCE.
5. CONTAMINATED PORTIONS OF VICINITY PROPERTY RF-475, SHALL BE EXCAVATED AND BACKFILLED WITH UNCONTAMINATED MATERIAL TO THE CURRENT EXISTING GROUND SURFACE.
6. REINSTALL DOUBLE LEAF SWING GATE INTO EXISTING RAILROAD RIGHT OF WAY FENCE.

REFERENCE DRAWINGS:

RFL-PS-10-0713 EXCAVATION SEQUENCE AND TAILINGS EXCAVATION PLAN

RFL-PS-10-0738 EXCAVATION PLAN - VICINITY PROPERTY RF-475

LEGEND:

N 25,000 / E 47,000 — APPROXIMATE CONSTRUCTION GRID COORDINATE

5260 — APPROXIMATE FINISHED GRADE CONTOUR

SITE BOUNDARY

NOTE: THIS SEAL IS NOT VALID IN THE STATE OF COLORADO UNLESS THE ORIGINAL SIGNATURE APPEARS BELOW.

COLORADO REGISTERED KING R. CHEE 28171 PROFESSIONAL ENGINEER

QA REVIEWED FOR QUALITY REQUIREMENTS BY ... 4/1/92 QA ENTRY NO. N/A

U. S. DEPARTMENT OF ENERGY

ALBUQUERQUE, NEW MEXICO

NEW RIFLE PROCESSING SITE
RIFLE, COLORADO
PHASE II CONSTRUCTION

FINAL GRADING PLAN AND WETLANDS RELOCATION

5-12-95	REVISED WETLAND PLAN (P.I.D. 06-S-41)	YM	FC				
4-8-92	ISSUED FOR CONSTRUCTION	—	—	—	—	—	—
DATE	REVISIONS	BY	CK	E&D MGR.	CHIEF ENG.	QA MGR.	DOE APP.

DESIGNED W. Majewski DRAWN CCP
CHECKED
INSPECTED FC
RECOMMENDED
APPROVED DATE 4/1/92

DOE PROJECT ENGINEER DATE 4/4/92

MORRISON-KNUDSEN ENGINEERS, INC.
UMTRA PROJECT
100 SPEAR ST. SAN FRANCISCO, CA 94105

PROJECT NO. DE-AC04-83AL18796

DRAWING NO. RFL-PS-10-0737 REV. 1

ATTACHMENT 4

WORK ORDER