Prepared for:

NEW MEXICO STATE HIGHWAY AND TRANSPORTATION DEPARTMENT DISTRICT 3

ON-SITE INVESTIGATION REPORT

Maintenance Patrol Yard Bernalillo, New Mexico

PROJECT No. 8546-113-TA

October 11, 1991

Prepared by:

CAMP DRESSER & McKEE INC. 2400 Louisiana Blvd., NE AFC #5, Suite 740 Albuquerque, NM 87110



TABLE OF CONTENTS

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Section	Page
1.0 INTRODUCTION 1.1 PROJECT BACKGROUND 1.2 SITE DESCRIPTION 1.3 INVESTIGATION OBJECTIVES	1-1 1-1 1-1 1-3
2.0 REGIONAL HYDROGEOLOGY	2-1
3.0 AREA WATER SUPPLIES AND LOCAL GROUNDWATER USE	3-1
4.0 FIELD INVESTIGATION 4.1 <u>SITE MAP</u> 4.2 <u>TEST BORINGS</u> 4.3 <u>VAPOR LEVEL MEASUREMENTS</u> 4.4 <u>GROUNDWATER MONITOR WELLS</u> 4.5 <u>GROUNDWATER ELEVATION MONITORING</u>	4-1 4-1 4-3 4-4 4-5
5.0 LABORATORY ANALYSIS	5-1 5-1 5-3
6.0 ADDITIONAL COMPLIANCE ISSUES 7.0 RESULTS	6-1 . 7-1
8.0 RECOMMENDATIONS	8-1
9.0 REFERENCES	9-1

i

LIST OF FIGURES

Figur	<u></u>	<u>Page</u>
1	Site Map	1-2
2	Vicinity Topographic/Supply Well Location Map	2-2
3	Groundwater Contour Map	4-6
4	Benzene Isoconcentration Map	5-6

ii

LIST OF TABLES

<u>Table</u>		<u>Page</u>
1	Soil Organic Vapor Headspace Screening Data	4-3
2	Summary of Groundwater Monitor Well Completion/Groundwater Elevation Data	4-5
3	Summary of Soil Analytical Laboratory Results	5-3
4	Summary of Groundwater Analytical Laboratory Results	5-5

iii

LIST OF APPENDICES

Appendix

- **A** Boring Logs and Groundwater Monitor Well Completion Diagrams
- **B** Analytical Laboratory Report Forms

1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

The Bernalillo Maintenance Patrol Yard On-Site Investigation described herein was undertaken by Camp Dresser & McKee (CDM) on behalf of the New Mexico State Highway and Transportation Department (NMSHTD). The investigation was conducted pursuant to the On-Site Investigation and Reporting Requirements (Sections 1205, 1206 and 1210) of the New Mexico Underground Storage Tank Regulations (NMUSTR).

The NMSHTD previously submitted a 7-Day Report dated August 15, 1991 to the New Mexico Environment Department (NMED), pursuant to Section 1204 of the NMUSTR. CDM on behalf of NMSHTD, issued a Request for Time Extension for completion of the On-Site Investigation on September 6, 1991, pursuant to Section 1221 of the NMUSTR. An informal report on the results of the On-Site Investigation was submitted to the NMED on September 24, 1991.

1.2 SITE DESCRIPTION

The Bernalillo Maintenance Patrol Yard is located at 600 Oak Street at the southern end of the town of Bernalillo, New Mexico. The site is located in Section 5 of Township 12 North, Range 4 East in Sandoval County, New Mexico. The site is developed with one structure which is oriented east-west along the north side of the property and contains an office and a garage facility. The remainder of the property is an equipment storage yard used to support highway maintenance patrol activities. The patrol yard is bounded to the east by an alley followed by a residential neighborhood. A commercial business is located to the northeast. To the west of the site is Oak Street and the Atchison, Topeka and Santa Fe Railroad easement. The north property line is bounded by a rural street and a residential neighborhood. South of the property are additional residences. Figure 1, Site Plan, illustrates the surrounding property development adjacent to the site.



The site facility previously included equipment fueling facilities, including a 1000 gallon diesel and a 1000 gallon unleaded gasoline underground storage tanks (USTs) and a pump island and associated fuel delivery piping which were removed from the ground at the site by Rhino Tank and Line Testing (Rhino) in August of 1991. An above ground storage tank (AST) has been installed to replace the underground system. These new facilities consist of a 1000 diesel of double wall type construction. The AST system is constructed within a plastic-lined and bermed containment area. A description of the initial response and abatement procedures are contained in the NMSHTD's August 1991, 7-Day Report.

Below ground utilities are located on the west side of the subject site connecting the Oak Street services to the building. These utilities include water, sewer and gas. Electric and phone service is supplied via overhead transmission lines along the west and north property lines (See Figure 1).

1.3 INVESTIGATION OBJECTIVES

The objectives of this On-Site Investigation include:

- Implementing an environmental drilling program to characterize and evaluate on-site and groundwater conditions;
- Analyzing representative soil and groundwater samples for chemical compounds typical of gasoline and diesel fuels;
- Surveying well casing elevations, gauging groundwater depths, calculating groundwater elevations and preparing a groundwater elevation map;

• Preparing a report complying with requirements of Sections 1206 and 1210 of the NMUSTR which summarizes the results of the investigation and provides the NMSHTD with supplemental site investigation recommendations based upon the findings.

The following sections present the methodology and results of this investigation, and places the findings into the appropriate regulatory context.

2.0 REGIONAL HYDROGEOLOGY

The subject site is situated in the northern section of the Albuquerque-Belen Basin in Central New Mexico. The Albuquerque-Belen Basin is a structural graben, typically identified as the Rio Grande rift. The rift is bordered by the Lucero uplift and Rio Puerco fault zone on the west side. The eastern border is flanked by the Sandia-Manzano Mountain uplift.

The Rio Grande is located approximately 1.5 miles to the east of the site. The Bernalillo Maintenance Patrol Yard is physiographically situated within the eastern limits of the inner valley of the Rio Grande, as well as upland alluvial fan deposits. The shallow soils and sediments are of alluvial origin from both the recent and ancestral Rio Grande. These sediments are reported to be up to 4,000 feet thick in the vicinity of the site (Anderholm, 1988).

The shallow recent alluvium is composed of and derived from similar source materials as the underlying Santa Fe Group Sediments of Pliocene Age (2-5 million years old). These sediments include interbedded clay, sand and sand and gravel. Anderholm (1988) mapped the middle red member of the Santa Fe Formation in the area of the site and described it as consisting of pink and buff calcareous sandstone interbedded with red clay, silt, and gravel lenses.

Both the recent alluvium and the Santa Fe Formation are considered as a single hydrologic unit with groundwater movement from one to the other being controlled stratigraphically. The combination of these sediments comprise the local alluvial-basin aquifer. There is continuous recharge of groundwater to and discharge of groundwater from the aquifer. Regional groundwater flow in the vicinity of the site is generally to the southeast and downgradient with respect to the Rio Grande, as indicated by the regional potentiometric - contour map (Figure 2 adapted from USGS WRIR Figure 9).



Groundwater withdrawal for water supply purposes also affects the groundwater movement locally. Multiple aquifers are reported within the Albuquerque-Belen Basin separated by variably thick confining beds.

3.0 AREA WATER SUPPLIES AND LOCAL GROUNDWATER USE

The patrol yard and its underground storage tanks are in an area serviced by the Village of Bernalillo public water system. The City of Bernalillo produces water from deep groundwater supply wells located east of I-25 and north of the site. The August 15, 1991 NMSHTD 7 Day report identified the presence of private wells within the 1,000 foot radius of the site. A list of these individual wells, as identified by a door to door survey, is provided in the 7 Day report.

In addition, the Rio Grande is located 1.5 miles to the west of the patrol yard.

4.0 FIELD INVESTIGATION

The On-Site Investigation performed by CDM included the compilation of a site map, the installation of four shallow groundwater monitor wells, and the completion of two supplemental soil borings. Selected soil samples were collected from each boring for chemical analysis. Groundwater elevations were measured to the nearest one-hundredth (0.01) of a foot in the installed wells and water samples were collected and submitted for chemical analysis. Details of each of these field activities are described in the following sections.

4.1 <u>SITE MAP</u>

A site map, Figure 1, was prepared locating the existing site facilities. Facility structure locations were verified by measuring distances to the nearest foot using a measuring wheel. Well casing elevations were established by surveying elevations with a Leitz Autolevel established from an arbitrary datum located at the southwest corner of the patrol yard building. This arbitrary datum point was assigned an elevation of 100.00 feet for the purpose of calculating subsequent relative top of well casing and groundwater elevations.

4.2 TEST BORINGS

In conjunction with these field investigation activities, a total of six test borings were completed at the locations identified on Figure 1 (borings BH-1 and BH-2 and monitor wells MW-1 through MW-4). These site boring locations were selected in an attempt to characterize subsurface conditions relative to the removed underground storage tank systems. Constraints in locating these borings included the location of subsurface utilities, the desire to complete borings outside of the tank backfill to encounter native soil conditions, and in an attempt to intercept "clean" conditions outside any contaminant plume associated with a release at the site. One of the borings (completed as a monitor

well, MW-1) was placed adjacent to the former tank excavation to access the groundwater and soils directly beneath the former tanks in the area most likely to have been influenced by any release from the UST systems. Three other monitor wells, MW-2, MW-3 and MW-4, were placed outside the tank excavation to access the groundwater at radial distances from and in a suspected down gradient direction of the former USTs.

CDM subcontracted Rodgers and Company (Rodgers) to drill and sample the soil borings and to install the four groundwater monitor wells. The drilling was performed using a truck mounted, high torque CME-75 hollow stem auger drilling rig. The borings were advanced to the total depth explored using a 10 inch outside diameter hollow stem auger. Soil samples were collected every three feet using a split spoon sampler. All drilling tools were decontaminated prior to use at the site and following the field investigation by Rodgers at their Albuquerque yard, using a high pressure steam cleaner. Decontamination of equipment was also performed on soil samplers on-site prior to and between the completion of each soil boring and monitor well. Soil samples and contaminated soil cuttings generated during this investigation were thin spread at a prepared soil treatment area located on the east side of the site.

Physical inspection of the auger cuttings and retrieved soil samples allowed the borings to be logged using the Unified Soil Classification System (USCS, ASTM D2482-66T). Generally, as indicated by the borehole logs provided in Appendix A, the shallow borehole materials encountered include 1.5 to 3.0 feet of silty and/or manmade sandy fill. Beneath this surfacial material were interbedded layers and lenses of silty sand, clayey sand and sandy clay were encountered to the entire depth explored if 15 feet. Groundwater was encountered in the silty and clayey sand at a depth of approximately 7 feet.

4.3 VAPOR LEVEL MEASUREMENTS

On September 10 and 11, 1991 in conjunction with the drilling activities, CDM staff obtained organic vapor headspace readings from soil samples retrieved from each boring. Soil samples were screened in the field as drilling progressed to determine the relative levels of organic vapors present (presumably due to the presence of petroleum hydrocarbons) utilizing an Environmental Instruments Organic Vapor Meter (OVM) Model 580-A. The instrument is equipped with a photoionization detector (PID) and the instrument was calibrated with 100 parts per million (ppm) isobutylene prior to site use. The field headspace vapor screening of collected soil samples was performed by placing the samples from the sampler immediately into half-pint glass jars covered with aluminum foil and allowing them to equilibrate for several minutes. Vapor measurements were then recorded from the headspace in the jars by inserting the instrument probe through the aluminum foil and recording the highest reading. A summary of this data is in Table 1 and also presented on the borehole logs in Appendix A.

	TABLE 1 SOIL VAPOR HEADSPACE SCREENING DATA (in parts per million)												
	Boring Number												
Sample Depth (feet)	Sample Depth (feet) MW-1* MW-2 MW-3 MW-4 BH-1 BH												
5	445	2	0.1	0.0	113	26							
10	115	22	0.0	3.1	10	25							
	*Borehole located through the former UST excavation area.												

As indicated by the vapor headspace data summarized above (above the 100 ppm organic vapor threshold established in USTR Section 1209), levels were recorded for the screened borehole soils at depths of 5 and 10. Soils in boreholes MW-1 and BH-1

exhibited elevated levels, which may indicate that these locations are near the source area due to the shallow depths affected. Elevated volatile vapor levels are typically indicative of a gasoline source.

4.4 GROUNDWATER MONITOR WELLS

Borings MW - 1, 2, 3, and 4 were completed as groundwater monitor wells using 4 inch diameter schedule 40, flush jointed PVC well screen (with a slot size of 0.010 inches) and blank casing. Blank casing was installed from the existing ground surface to an approximate depth of 5 feet below ground surface. Screened casing was placed from below the blank casing to approximately 15 feet below ground surface. Silica sand (10/20 gradation) was place from the bottom of the screened section to a depth of 4 feet (one foot above the top of the screen). A distilled water activated bentonite seal, consisting of 1/4 inch pellets, with a thickness of approximately 1.0 foot was placed above the silica sand. The remainder of the boring was cemented to ground surface using a 5 percent, bentonite/cement grout mixture. A 8 inch diameter, boltdown, Universal Valve Company protective cover was installed at the well head and a 4 inch PVC locking plug was installed in these wells. The annulus between the exterior of the casing and the 8 inch cover and skirt was filled with concrete. Master locks (Key #2438) were installed to secure these locking plugs. Copies of boring logs and groundwater monitor well completion diagrams appear in Appendix A.

4.5 GROUNDWATER ELEVATION MONITORING

Groundwater depths were gauged to the nearest 0.01 foot using a decontaminated ORS Interface Probe. Groundwater was generally encountered at a depth of approximately 7 to 8 feet below grade. Groundwater elevations were established by subtracting the measured groundwater depths from the calculated elevation of the top of the well casing.

Calculated groundwater elevations are summarized in Table 2 (September 1991 data), and plotted as a groundwater contour map on Figure 3. This data indicates groundwater flow at the site to be in a southwesterly direction with a calculated gradient of .0027 ft/ft below the site.

	TABLE 2SUMMARY OF GROUND WATER MONITOR WELLCOMPLETION/GROUND WATER ELEVATION DATASeptember 16, 1991(All measurements in feet)													
WELL NO.	SCREENED INTER VAL	TOP OF CASING ELEV.	GROUNDWATER DEPTH	GROUND WATER ELEVATION										
MW-1	7-17	99.81	7.82	91.99										
MW-2	5-15	99.38	7.57	91.81										
MW-3	5-15	98.69	7.57	92.12										
MW-4	5-15	97.54	7.56	91.98										

8546.027

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5.0 LABORATORY ANALYSIS

5.1 SOIL CHEMICAL ANALYSES

In order to evaluate soil contamination at depth in the boreholes, six soil samples were collected from the five foot sample depth from each of the boreholes. The samples were placed in laboratory-supplied, clean glass jars. Following sample collection, the sample jars were placed in coolers with ice and were shipped via overnight delivery service to Analytical Technologies, Incorporated (ATI) in Tempe, Arizona. Copies of the laboratory reports with associated request/Chain of Custody Forms are provided in Appendix B.

Soil samples were submitted for analysis for the following parameters:

- total petroleum hydrocarbons (TPH) using Modified EPA Method 8015; and
- benzene, toluene, ethylbenzene and total xylenes (BTEX) using EPA Method 8020.

The results of the soil chemical analyses are summarized in Table 3. The results of the soil vapor headspace readings were described in Section 4.3.

Section 1209(D).3(a) NMUSTR (effective date July 22, 1990) requires soil remediation in instances where:

Aromatic Hydrocarbon Source

- the depth to groundwater is less than 50 feet <u>AND</u>
- the total aromatic hydrocarbon level is greater than 50 ppm or the benzene concentration is greater than 10 ppm when measured using an appropriate laboratory test, <u>OR</u>
- the total aromatic hydrocarbon value is less than 100 ppm when measured with an appropriate field instrument

Heavy Petroleum Source

total petroleum hydrocarbon value (TPH) less than 100 ppm (TDS <10,000 ppm, <50 feet to groundwater)

Based upon the results of the soil screening and analyses performed, no soils sampled and analyzed require remediation, with the exception of soils from MW-1 (total depth) and BH-1 (at 5 foot depth) based upon headspace screening.

_		SUI C	MMARY OF	TA SOIL CHEN s in milligran	BLE 3 IISTRY LABO 1s per kilogram	RATORY DAT	ГА* m)		
Sample #	Depth	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE	Total ⁽¹⁾ BTEX	TPH ⁽²⁾	Head- Space Reading
MW-1	5	0.60	ND (<0.025)	ND (<0.025)	0.033	ND (<0.12)	0.633	<5	445
MW-2	5	ND (<0.025)	ND (<0.025)	ND (<0.025)	ND (<0.025)	ND (<0.12)	ND	<5	2.0
MW-3	5	ND (<0.025)	ND (<0.025)	ND (<0.025)	ND (<0.025)	ND (<0.12)	ND	<5	0.0
MW-4	5	ND (<0.025)	ND (<0.025)	ND (<0.025)	ND (<0.025)	ND (<0.12)	ND	<5	1.0
BH-1	5	0.074	ND (<0.025)	0.028	0.026	ND (<0.12)	.128	<5	113
BH-2	5	ND (<0.025)	ND (<0.025)	ND (<0.025)	ND (<0.025)	ND (<0.12)	ND	<5	26
NMUSTR Standard**	-	10	-	-	-	-	50	100	100
* No	te: (1) Soi	l analysis for !	BTEX compor	unds by EPA 1	Method 8020 (2)) TPH by EPA	Method 8015		
**NMUSTR									
ND (<0.025)	indicates p	arameter not	detected with	detection limit	listed.				

5.2 GROUNDWATER ANALYSES

Prior to groundwater monitor well sampling, an attempt was made to remove a groundwater volume greater than three well casings by hand-bailing. In all instances, the monitor wells produced significant volumes of water and at least 3 well volumes were evacuated from each well utilizing a decontaminated electronic submersible pump.

Water samples were collected using 3.0 inch diameter PVC disposable bailers and transferred immediately into 40 milliliter glass (VOA) vials which were supplied by the analytical laboratory. Care was taken to ensure that no headspace was present in the sample vials. All samples were preserved with 2 drops of 8 ppm mercuric chloride to reduce the possibility of bacterial degradation of hydrocarbons during sample transport

and holding times. Samples were placed in coolers with ice and shipped to ATI in Tempe, Arizona via overnight delivery service. Copies of the Laboratory Analysis Request/Chain of Custody Form are provided in Appendix B.

Groundwater samples were submitted for analysis for the following parameters:

• BTEX, MTBE, EDC and EDB by EPA Test Method 8010/8020.

Copies of the groundwater chemistry results appear in Appendix B, and are summarized in Table 4. As indicated on Table 4, wells MW-1 and MW-2 are located in areas where the groundwater quality exceeds State Standards for benzene. In addition, MW-1 exceeds standards for xylenes and MW-2 exceeds MTBE standards.

SUMMA	TABLE 4 SUMMARY OF GROUNDWATER ANALYTICAL LABORATORY RESULT All Data in Micrograms per liter (ug/l or ppb)												
Sample No.	Sample No.BenzeneTolueneEthyl- benzeneTotal XylenesEDCMTBE												
MW-1	MW-1 2300 400 610 1830 ND(<50) ND (<10)												
MW-2	250	1.3	110	36.8	530	7.8	ND (<1.0)						
MW-3	ND (<0.5)	6.4	ND (<0.5)	ND (<0.5)	ND (<1.0)	ND (<0.2)	ND (<1.0)						
MW-4	ND (<0.5)	8.7	ND (<0.5)	ND (<0.5)	ND (<1.0)	ND (<0.2)	ND (<1.0)						
NMWQCC/ NMEIB Standard	NMWQCC/ NMEIB 750 750 620 100 10												
NMWQCC = New Mexico Water Quality Control Commission													
ND = Indicat	es parameter	non-detecta	able at listed	detection li	mit								

Benzene concentration contours in groundwater from the sampled site wells are depicted in Figure 4.



6.0 ADDITIONAL COMPLIANCE ISSUES

In order to formally comply with the On-Site Investigation Reporting requirements set forth in Section 1205.B of the NMUSTR, the following information is presented and organized below in the same format as the regulations.

ITEM NO. 1 INFORMATION ABOUT THE EXTENT OF SOIL CONTAMINATION AT THE RELEASE SITE

In conjunction with storage tank and supply line removal/excavation, Rhino removed approximately 204 cubic yards of hydrocarbon fuel affected soils. These soils were excavated from the area immediately adjacent to and beneath the former fueling facilities. These soils were reported by the NMSHTD to have been transported off-site to a location approximately 6.1 miles west of Bernalillo and thin spread adjacent to the roadway (see Items No.3 and No. 4 of this section.)

Based upon soil vapor headspace measurements compiled in conjunction with the on-site investigation activities (Table 1), monitor well MW-1 and soil boring BH-1 were the only boreholes which detected elevated levels indicating above standard levels in soils as defined by Section 1209 of NMUSTR. The MW-1 soils exhibited elevated vapor readings throughout the entire borehole while BH-1 contained elevated soils vapor levels isolated to the shallow 5 foot depth.

The laboratory analyses of collected soil samples indicate that no concentrations above acceptable levels in soils are present in any of the well boreholes and/or sample boreholes (see Table 3).

Considering this data, the extent of remaining affected soils, not already removed from the source, are confined to the area immediate adjacent to MW-1 and BH-1.

ITEM NO. 2 INFORMATION REGARDING SOIL AND AQUIFER CHARACTERISTICS

Information regarding soil characteristics are presented in Section 4.0 (Field Investigations) and Appendix A (Boring Logs). Information regarding general aquifer characteristics are presented in Section 2.0 (Hydrogeology).

ITEM NO. 3 DESCRIPTION OF ACTION TAKEN AND FUTURE ACTION TO BE TAKEN TO REMOVE SOILS FROM THE TANK EXCAVATION

In conjunction with the tank removals, approximately 204 cubic yards of soils were overexcavated by Rhino. These soils are reported to have been transported off-site to a location 6.1 miles west of Bernalillo and are thin spread along the highway road easement (See NMSHTD 7-Day Report Dated August 15, 1991).

ITEM NO. 4 REMOVAL/DISPOSAL OF HIGHLY CONTAMINATED SOILS

The excavated soils (Item 3 above) are thin spread along roadway easement at a location 6.1 miles west of Bernalillo.

ITEM NO. 5 DRAWINGS OF THE RELEASE SITE

Refer to Figure 1.

ITEM NO. 6 MONITORING WELL DATA INCLUDING CONSTRUCTION METHODS, MATERIALS, AND SOIL BORINGS LOGS

Refer to Appendix A for Boring Logs/Well Complete Diagrams.

ITEM NO. 7 STATEMENT BY OWNER, OPERATOR, OR PERSON PREPARING THE REPORT STATING PERSONAL FAMILIARITY WITH DATA

I have served as project manager for the on-site investigation at the NMSHTD's Bernalillo Maintenance Patrol Yard. As Project Manager, I am personally familiar with the data described herein.

Steven L. Brewer Project Manager

CAMP DRESSER & McKEE INC.

7.0 RESULTS

Based upon this limited investigation, the following results have been compiled:

- The site is underlain by alluvium consisting of interbedded sequences of clayey sand, silty sand, sandy clay and clean sand to a depth of 17 feet.
- Shallow groundwater lies at a depth approximately 7 feet below site grade, and flows in a southwesterly direction with a calculated gradient of .0027 ft/ft.
- Gasoline-related petroleum hydrocarbon compounds in the soil do not exceed the NMED numerical soil standards set forth in the NMUSTR (Section 1209) except for soil borings MW-1 (at the former tankhold area) and BH-1 (located southeast of the former tankhold area). Both borings contain soils exceeding the numerical vapor standard recorded by field headspace methods.
- Gasoline related petroleum hydrocarbon concentrations in the groundwater do exceed the NMWQCC/NMEIB numerical groundwater quality standards for groundwater in MW #1 for benzene and xylenes and in MW #2 for benzene and MTBE.

8.0 RECOMMENDATIONS

- CDM recommends that the contents of this report be transmitted to the NMED pursuant to Sections 1206 and 1210 of the New Mexico Underground Storage Tank Regulations (effective date July 13, 1990).
- The existing underground storage tanks removed from the tankhold area should be disposed of in a manner consistent with accepted industry standards to avoid future safety and environmental hazards. Disposal of tanks should conform to American Petroleum Institute Recommended Practice 1604 for Removal and Disposal of Used Underground Petroleum Storage Tanks.
- The excavated and transported soils should be sampled for TPH to confirm current conditions relative to fuel hydrocarbon compounds. Analysis of a minimum of two composite soil samples is recommended.
- Further characterization of groundwater impacts at the site should be completed.

Finally, the NMED may require additional hydrogeologic data to be collected and/or a Reclamation Proposal be submitted. Decisions as to the necessity of this additional work will be based, in part, upon the NMED's review and response to this on-site investigation report.

9.0 REFERENCES

Anderholm, Scott K., 1988: Ground-Water Geochemistry of the Albuquerque-Belen Basin, Central New Mexico: United States Geological Survey, Water Resources Investigative Report 86-4094, 109 p.

APPENDIX A

BORING LOGS AND GROUNDWATER MONITOR WELL COMPLETION DIAGRAMS

		MONITOR WELL	N	Э.	В	H—1					BOF ABANDO DET	RING DNMENT AILS
DFPTH FT	SYMBOL(USCS)	SAMPLE DESCRIPTION	SAMPLE NO.	SAMPLING TOOL	MOISTURE	CONTAMINAT ORGANIC VAPOR CONC. (PPM)	VISIBLE Y=Yes N=No	DEPTH, FT.	STRATIGRAPHY	WATER LEVEL		
- 5 - 10 - 10 - 10 - 20 - 20 - 20 - 20 - 20 - 20 - 20 - 2		0-2.5 SAND-manmade fill. 2.5'-4.0' CLAY-medium plasticity, moderate fuel odor, dark brown to black. 4.0'-8.0' SAND CLAYEY 8.0'-10' SAND-clean medium grained, slight fuel odor, well sorted. TD @ 10' Abandoned with bentonite and grout.	1	SS	W	113	Y	- 5 - - 10- - 15- - 20- - 20- - - - - - - - - - - - - - - - - - -			Grout	Bentonite Plug
	Client: NMSHTD Job No.: 8546-113-TA Date Drilled: 9/11/91 Well No.: BH-1 Site: District 3 Yard-Bernalillo, NM Top of Casing Elevation: N/A Total Depth: 10' Casing Type & Size: N/A Slot Size: N/A Drilling Method: Hollow Stem Auger Comments: 80' South of excavation Driller: Rodgers & Company Logged by: P. Maggiore											1-1 uger
		BORING LOG	environn miers, i	nantai at le monog	CI igineers, ement o	DM Securitization ansultantia	SHT DO C ERN	D-I AA	DIS (S ILL	TR TR O,	ICT 3 EET NM	Figure No. A-1

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	MONIT			AB	BORI ANDON DETA	NG NMEN T ILS							
UEPTH, FT. SYMBOL(USCS)	s DES	AMPLE CRIPTION	SAMPLE NO.	SAMPLING	MOISTURE	CONTAMINATI ORGANIC VAPOR CONC. (PPM)	VISIBLE Y=Yes N=No	DEPTH, FT.	STRATIGRAPHY	WATER LEVEL			
SC CL -5- SP -10- -15- -20- -25- -30- -30- -35- -30- -35- -40- -45- -55- -55- -60-	0-3' SAND- 3'-4' CLAY- brown. 4'-10' SAND grained, well 5'. TD @ 10' abo bentonite an	highly plastic clean medium sorted, black at andon well d grout	1	SS	W	26 25	Y	- 5 - -10- -15- -20- -25- -30- -35- -35- -40- -45- -55- -55- -55- -55-		Ţ	Grout		Bentonite Plug
Client: NMSHTD Job No.: 8546-113-TA Date Drilled: 9/11/91 Well No.: BH-2 Site: District 3 Yard-Bernalillo. NM Top of Casing Elevation: N/A Total Depth: 10' Cosing Type & Size: N/A Slot Size: N/A Drilling Method: Hollow Stem Auger Comments: BH-2 located midway between MW-1 and MW-2 Driller; Rodgers & Company Logged by: P. Maggiore													
	BORING	LOG	environm miers. 8	nantai en k manog	CI ngineers, erent c	DM 60 soferitists ansultants B	SHT	D-I DAM	DIS (S	TR STR .O,	ICT EET NM	3	Figure No. A-2

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MONITOR WELL	N	Э.	М	W-1		MONITOR DETA	R WELL NILS				
DEPTH, FT. SYMBOL(USCS) DESCLIDION	SAMPLE NO.	SAMPLING TOOL	MOISTURE	CONTAMINAT ORGANIC VAPOR CONC. (PPM)	VISIBLE Y=Yes N=No DEPTH, FT. STRATIGRAPHY	Ground L Concre Mo Co	evel ite Fill nitor Well ver Locking Plug				
SM 0-0.25' ASPHALT 0.3'-3.0' SAND-silty fine to medium grained, light brown. 3.0'-4.0' SAND-clayey, fine SC grianed, low plasticity. 4.0'-6.5' SAND-clean, well sorted, equigranular, strong hydrocarbon odor. 6.5'-9.0' SAND-clayey, dark brown, medium grained. 9.0'-17.0' SAND-clean, medium grained very strong odor, grading to coarser grained. -30- -40- -40- -50- -60-	1	SS	W	445	Y - 5 - Y - 10- -15- -20- -20- -25- -30- -35- -35- -40- -40- -45- -55- -55- -55- -55-	10-20 silica sand Bentonite seal Grout	40PVC with 0.010" slots 6.5' of 4" dia. sched.				
Client: <u>NMSHTD</u> Job No.: <u>8546-113-TA</u> Date Drilled: <u>9/10/91</u> Well No.: <u>MW-1</u> Site: <u>District 3 Yard-Bernalillo</u> , NMTop of Casing Elevation: <u>99.81</u> Total Depth: <u>17'</u> Casing Type & Size: <u>4" PVC</u> Slot Size: <u>0.010</u> "Drilling Method; <u>Hollow Stem Auger</u> Comments: <u>Immediately southwest of tank excavation</u> Logged by: <u>P. Maggiore</u>											
BORING LOG/ WELL COMPLETION DIAGRAM	anvironm mr.ers. &	antol en e manog	CI gíneers, errent c	NM scientists maufants B	SHTD-DIST 00 OAK ST ERNALILLC	RICT 3 REET), NM	Figure No. A-3				

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	MONITOR	WELL	N	Э.	М	W-2			Anna Anna Anna Anna Anna Anna Anna Anna		МО	NITOR DETAI	WELL. LS
DEPTH, FT. SYMBOL(USCS)	SAMPLE DESCRIPTIC	ИС	SAMPLE NO.	SAMPLING TOOL	MOISTURE	CONTAMINAT ORGANIC VAPOR CONC. (PPM)	VISIBLE Y=Yes N=No	DEPTH, FT.	STRATIGRAPHY	WATER LEVEL	Gr	Concret	evel e Fill itor Well er Locking Plug
Sh - Cl - 5 - 10- - 5 - 10- - 10- - 10- - 10- - 20- - 20- - 20- - 20- - 20- - 20- - 20- - 30- - 30- - 30- - 30- - 30- - 40- - 40- - 55- - 50- - 55- - 50- - 55- - 50- - 55- - 50- - 55- - 50- - 55- - 50- - 5	0-0.2' ASPHALT 0.2'-3.0' SAND-silt poorly sorted. 3.0'-4.5' CLAY-med plasticity, no odor, 4.5'-15.0' SAND-sil clay, well sorted, fir medium grained.	y minor dium brown. ty, minor ne to	1	SS SS	W	2	N	- 5 - - 10 - - 10 - - 15 - - 20 - - 20 - - 20 - - 25 - - 30 - - 30 - - 35 - - 35 - - 30 - - 35 - - 30 - - 35 - - 35 - - 35 - - 30 - - 35 - - 3			10-20 silica sand Bentonite seal Grout	10' of 4" dia. sched.	40PVC with 0.010 slots 4.5' OF 4" dia. sched.
Client: <u>NMSHTD</u> Job No.: <u>8546-113-TA</u> Date Drilled: <u>9/9/91</u> Well No.: <u>MW-2</u> Site: <u>District 3 Yard-Bernalillo</u> , <u>NM</u> Top of Casing Elevation: <u>99.38</u> Total Depth: <u>15'</u> Casing Type & Size: <u>4" PVC</u> Slot Size: <u>0.010</u> "Drilling Method: <u>Hollow Stem Auger</u> Comments: Driller: <u>Rodgers & Company</u> Logged by: <u>P. Maggiore</u>											-2		
W	BORING LOG ELL COMPLET DIAGRAM	ION plan	nvironm mers, s	nental en le manag	CI gineers, ernent o	DM 60 scientiste ansultante	SHT DO (BERN	D-E DAK	DIS (S ILL	TR TR O,	ICT EET NM	3	Figure No. A-4

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	MONITOF	R WELL	N	Э.	М	W-3						MOI	NITOR V DETAILS	VELL S
DEPTH, FT.	SAMF DESCRI	PLĘ PTION	SAMPLE NO.	SAMPLING TOOL	MOISTURE	CONTAM ORGAN VAPC CON (PPM	NIC DR C.	VISIBLE Y=Yes N=No	DEPTH, FT.	STRATIGRAPHY	WATER LEVEL		ound Leve Concrete Monito Cover	el Fill pr Well Locking Plug
MM - 5 - SI - 10 - GI - 10 - GI - 10 - GI - 20 - - 20 - - 25 - - 30 - - 25 - - 30 - - 30 - - 33 - - 40 - - 45 - - 55 - - 50 - - 55 - - 50 -	IF 0-2.5' SAND-m 2.5'-8.0' SAND- c odor, wet at 3.9 8.0'-12.0' GRAV poorly sorted, fo well rounded, no 12.0'-15.0' CLA' grained, low plat	an made fill. -clayey no 5', brown. EL—sandy ast drilling, o odor. Y—sandy, fine sticity.	1	SS	w	0.0		Z	- 5 - - 10- - 10- - 15- - 20- - 25- - 30- - 30- - 35- - 35- - 30- - 35- - 35-			10-20 silica sand Bentonite seal	10' of 4" dia. sched.	6.5' of 4" dia. sched.
Client: <u>NMSHTD</u> Job No.: <u>8546-113-TA</u> Date Drilled: <u>9/10/91</u> Well No.: <u>MW-3</u> Site: <u>District 3 Yard-Bernalillo, NM</u> Top of Casing Elevation: <u>99.69</u> Total Depth: <u>15'</u> Casing Type & Size: <u>4" PVC</u> Slot Size: <u>0.010</u> "Drilling Method; <u>Hollow Stem Auger</u> Comments: <u>30' upgradient of excavation</u> Driller: <u>Rodgers & Company</u> Logged by: <u>P. Maggiore</u>														
BORING LOG/ WELL COMPLETION DIAGRAM									TR TR O,	CT (EET NM	3 F A	igure No. \-5		

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	MONITOR WELL NO. MW-4							MONITOR WELL DETAILS		
DEPTH, FT.	SAMPLE DESCRIPTION	SAMPLE NO.	SAMPLING TOOL	MOISTURE	CONTAMINAT ORGANIC VAPOR CONC. (PPM)	VISIBILE Y=Yes N=No DEPTH, FT. STRATIGRAPHY	WATER LEVEL	Ground Concr Concr	Level ete Fill ponitor Well pover Locking Plug	
- 10- - 20- - 10- - 30- - 40- - 40- - 40- - 55- - 50- - 55- - 50- - 55- - 50- - 55- - 50- - 55- -	 I.5' - 3.0' SAND-man made fill. I.5' - 3.0' SAND-silty, medium grained, light tan. G.0' - 4.0' CLAY-sandy, medium plastic, no odor, brown to black. P 4.0' - 8.0' SAND-clayey, fine grianed, no odor, low plasticity, dark brown, no odor. 8.0' - 15.0' SAND-clean, medium grained, wet, some pebbles, no fuel odor. 	1	SS	W	0.1	N - 5 - 20- -20- -20- -20- -30- -30- -30- -30- -		10-20 silica sand Bentonite seal Grout	40PVC with 0.010" slots 6.5' of 4" dia. sched.	
CI Si To Co Dr	ent: <u>NMSHTD</u> Job No e: <u>District 3 Yard-Bernalillo, NM</u> tal Depth: <u>15'</u> Casing Type & Size: <u>4</u> mments: <u>40' south of BH-1</u> Iler: <u>Rodgers & Company</u>	o.: <u>8</u> -" P	546- VC	-113	<u>-TA</u> Date	Drilled: <u>9/11/9</u> Top of Casing Drilling Method: <u>1</u> Logged by: <u>P</u> .	91 Eleva Hollo	Well No.: <u>MV</u> ation: <u>99.54</u> w Stem At ggiore	V-4	
v	BORING LOG/ WELL COMPLETION DIAGRAM									

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APPENDIX B

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ANALYTICAL LABORATORY REPORT FORMS

Analytical **Technologies**, Inc.

ATI I.D. 109689

RECEIVED

SEP 2 3 1991

CAMP DRESSER & MOKEE INC. ALBUQUERQUE

Camp, Dresser & McKee 2400 Louisiana Blvd. AFC #5, Suite 740 Albuquerque, NM 87110

September 19, 1991

Project Name/Number: NMSHID-Bernalillo 8546113TAOPS

Attention: Peter Maggiore

On 09/12/91, Analytical Technologies, Inc. received a request to analyze soil sample(s). The sample(s) were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

If you have any questions or comments, please do not hesitate to contact us at (602) 496-4400.

Coberry V. Wor

Robert V. Woods Laboratory Manager

Mary J. Cyce Mary Tyer

Project Manager

RVW:clf Enclosure

Corporate Offices: 5550 Morehouse Drive San Diego, CA 92121 (619) 458-9141

Analytical **Technologies**, Inc.

-				
-	PROJECT # PROJECT NAME	: NMSHID-BERN. ATI I.D. : 109689	REPORT DATE	: 09/18/91
	CLIENT	: CAMP, DRESSER AND MCKEE	DATE RECEIVE	b : 09/12/91

	ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
9	01	 MW-1	SOIL	09/10/91
	02	MW-2	SOIL	09/10/91
	03	MW-3	SOIL	09/11/91
	04	MW-4	SOIL	09/11/91
4	05	BH-1	SOIL	09/11/91
	06	BH-2	SOIL	09/11/91

---- TOTALS -----

MATRIX # SAMPLES -----SOIL 6

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

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ATI I.D. : 10968901

	TEST : FUEL HYDROCARBONS (MODIFIED EPA METHOD	8015)
(1999) (1999)	CLIENT : CAMP, DRESSER AND MCKEE PROJECT # : 8546113TAOPS PROJECT NAME : NMSHID-BERN. CLIENT I.D. : MW-1 SAMPLE MATRIX : SOIL	DATE SAMPLED : 09/10/91 DATE RECEIVED : 09/12/91 DATE EXTRACTED : 09/12/91 DATE ANALYZED : 09/14/91 UNITS : MG/KG DILUTION FACTOR : 1
	COMPOUNDS	RESULTS
	FUEL HYDROCARBONS HYDROCARBON RANGE HYDROCARBONS QUANTITATED USING	<5 - -
(1999) (1999)	SURROGATE PERCENT RECOVERIES	
	DI-N-OCTYL-PHTHALATE (%)	97



ATI I.D. : 10968902

	TEST : FUEL HYDROCARBONS (MODIFIED EPA METHOD	8015)
(1000)	CLIENT : CAMP, DRESSER AND MCKEE PROJECT # : 8546113TAOPS PROJECT NAME : NMSHID-BERN. CLIENT I.D. : MW-2 SAMPLE MATRIX : SOIL	DATE SAMPLED : 09/10/91 DATE RECEIVED : 09/12/91 DATE EXTRACTED : 09/12/91 DATE ANALYZED : 09/14/91 UNITS : MG/KG DILUTION FACTOR : 1
	COMPOUNDS	RESULTS
(7779) (7779)	FUEL HYDROCARBONS HYDROCARBON RANGE HYDROCARBONS QUANTITATED USING	<5 - -
	SURROGATE PERCENT RECOVERIES	
	DI-N-OCTYL-PHTHALATE (%)	108



ATI I.D. : 10968903

TEST : FUEL HYDROCARBONS (MODIFIED EPA METHOD 8015)

ST 101					
	CLIENT PROJECT # PROJECT NAME CLIENT I.D. SAMPLE MATRIX	: CAMP, DRESSER AND MCKEE : 8546113TAOPS : NMSHID-BERN. : MW-3 : SOIL	DATE SAMPLED DATE RECEIVED DATE EXTRACTED DATE ANALYZED UNITS DILUTION FACTOR	••••••	09/11/91 09/12/91 09/12/91 09/14/91 MG/KG 1
	COMPOUNDS		RESULTS		
(****)	FUEL HYDROCARE HYDROCARBON RA HYDROCARBONS Q	SONS NGE DUANTITATED USING	<5 - -		
ر بعد ا	SURROG	ATE PERCENT RECOVERIES			

DI-N-OCTYL-PHTHALATE (%) 101



ATI I.D. : 10968904

TEST : FUEL HYDROCARBONS (MODIFIED EPA METHOD 8015)

(1000)	CLIENT PROJECT # PROJECT NAME CLIENT I.D. SAMPLE MATRIX	: CAMP, DRESSER AND MCKEE : 8546113TAOPS : NMSHID-BERN. : MW-4 : SOIL	DATE SAMPLED DATE RECEIVED DATE EXTRACTED DATE ANALYZED UNITS DILUTION FACTOR	: 09/11/91 : 09/12/91 : 09/12/91 : 09/14/91 : MG/KG : 1
	COMPOUNDS		RESULTS	
	FUEL HYDROCARE HYDROCARBON RA HYDROCARBONS Q	ONS NGE WANTITATED USING	<5 - -	
	SURROG	ATE PERCENT RECOVERIES		
	DI-N-OCTYL-PHI	HALATE (%)	132	



ATI I.D. : 10968905

(199)	TEST : FUEL HYDROCARBONS (MODIFIED EPA METHOD	8015)
(CLIENT : CAMP, DRESSER AND MCKEE PROJECT # : 8546113TAOPS PROJECT NAME : NMSHID-BERN. CLIENT I.D. : BH-1 SAMPLE MATRIX : SOIL	DATE SAMPLED : 09/11/91 DATE RECEIVED : 09/12/91 DATE EXTRACTED : 09/12/91 DATE ANALYZED : 09/14/91 UNITS : MG/KG DILUTION FACTOR : 1
	COMPOUNDS	RESULTS
	FUEL HYDROCARBONS HYDROCARBON RANGE HYDROCARBONS QUANTITATED USING	<5 - -
	SURROGATE PERCENT RECOVERIES	
(DI-N-OCTYL-PHTHALATE (%)	119



ATI I.D. : 10968906

لخسما	TEST : FUEL HYDROCARBONS (MODIFIED EPA METHOD	8015)
	CLIENT : CAMP, DRESSER AND MCKEE PROJECT # : 8546113TAOPS PROJECT NAME : NMSHID-BERN. CLIENT I.D. : BH-2 SAMPLE MATRIX : SOIL	DATE SAMPLED : 09/11/91 DATE RECEIVED : 09/12/91 DATE EXTRACTED : 09/12/91 DATE ANALYZED : 09/14/91 UNITS : MG/KG DILUTION FACTOR : 1
	COMPOUNDS	RESULTS
(see	FUEL HYDROCARBONS HYDROCARBON RANGE HYDROCARBONS QUANTITATED USING	<5 - -
	SURROGATE PERCENT RECOVERIES	
	DI-N-OCTYL-PHTHALATE (%)	121

Analytical **Technologies**, Inc.

GAS CHROMATOGRAPHY - RESULTS

REAGENT BLANK

TEST : FUEL HYDROCARBONS (MODIFIED EPA METHOD 8015)

	CLIENT PROJECT # PROJECT NAME CLIENT I.D.	: CAMP, DRESSER AND MCKEE : 8546113TAOPS : NMSHID-BERN. : REAGENT BLANK	ATI I.D. DATE EXTRACTED DATE ANALYZED UNITS DILUTION FACTOR	: 109689 : 09/12/91 : 09/13/91 : MG/KG : N/A
	COMPOUNDS		RESULTS	
(1999)	FUEL HYDROCARE HYDROCARBON RA HYDROCARBONS (30NS ANGE QUANTITATED USING	<5 - -	

SURROGATE PERCENT RECOVERIES

DI-N-OCTYL-PHTHALATE (%)

- (access)

- .



QUALITY	CONTROL	DATA
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lanasi L	TTEST • FILFI. HYDROCARBONS (MODIFI)	ED EPA MET	ייייים <u>-</u> ומא מסאי	ATI]	[.D.	:	109689	
	CLIENT : CAMP, DRESSER AND PROJECT # : 8546113TAOPS PROJECT NAME : NMSHID-BERN. REF I.D. : 10999823	MCKEE		DATE SAMPI UNITS	ANAI LE MI 5	LYZED : ATRIX : :	09/14/ NON-AQ MG/KG	91 DEOUS
(THEOR.)	COMPOUNDS	SAMPLE RESULT	CONC. SPIKED	SPIKED SAMPLE	ہ REC	DUP. SPIKED. SAMPLE	DUP. % REC.	RPD
(STREET,	FUEL HYDROCARBONS	<5	50	55	110	54	108	2
(Table)								
(and a								
								·

% Recovery = (Spike Sample Result - Sample Result) ______ X 100 Spike Concentration RPD (Relative % Difference) = (Spiked Sample - Duplicate Spike) Result Sample Result ______ X 100 Average of Spiked Sample



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GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 10968901

	TEST : BTEX (8020) AND MTBE									
	CLIENT : CAMP, DRESSER AND MCKEE PROJECT # : 8546113TAOPS PROJECT NAME : NMSHID-BERN. CLIENT I.D. : MW-1 SAMPLE MATRIX : SOIL	DATE SAMPLED : DATE RECEIVED : DATE EXTRACTED : DATE ANALYZED : UNITS : DILUTION FACTOR :	09/10/91 09/12/91 09/12/91 09/14/91 MG/KG 1							
	COMPOUNDS	RESULTS								
	BENZENE TOLUENE	0.060 <0.025								
(Hanne)	ETHYLBENZENE TOTAL XYLENES METHYL-t-BUTYL ETHER	<0.025 0.033 <0.12								
	SURROGATE PERCENT RECOVERIES									
	BROMOFLUOROBENZENE (%)	91								
(चलाचर)										
(******										
(Marrier)										
(2008)										



ATI I.D. : 10968902

 TEST : BTEX (8020) AND MTBE	
CLIENT : CAMP, DRESSER AND MCKEE PROJECT # : 8546113TAOPS PROJECT NAME : NMSHID-BERN. CLIENT I.D. : MW-2 SAMPLE MATRIX : SOIL	DATE SAMPLED : 09/10/91 DATE RECEIVED : 09/12/91 DATE EXTRACTED : 09/12/91 DATE ANALYZED : 09/14/91 UNITS : MG/KG DILUTION FACTOR : 1
COMPOUNDS	RESULTS
BENZENE TOLUENE	<0.025 <0.025
TOTAL XYLENES METHYL-t-BUTYL ETHER	<0.025 <0.025 <0.12
SURROGATE PERCENT RECOVERIES	

BROMOFLUOROBENZENE (%)



ATI I.D. : 10968903

	TEST : BTEX (8020) AND MTBE	
(and	CLIENT : CAMP, DRESSER AND MCKEE PROJECT # : 8546113TAOPS	DATE SAMPLED : 09/11/91 DATE RECEIVED : 09/12/91
	PROJECT NAME : NMSHID-BERN. CLIENT I.D. : MW-3 SAMPLE MATRIX : SOIL	DATE EXTRACTED : 09/12/91 DATE ANALYZED : 09/14/91 UNITS : MG/KG DILUTION FACTOR : 1
hered	COMPOUNDS	RESULTS
(2006))	BENZENE TOLUENE ETHYLBENZENE	<0.025 <0.025 <0.025 <0.025
	TOTAL XYLENES METHYL-t-BUTYL ETHER	<0.025 <0.12
	SURROGATE PERCENT RECOVERIES	

BROMOFLUOROBENZENE (%)



ATI I.D. : 10968904

	TEST : BTEX (8020) AND MTBE	
, ,	CLIENT : CAMP, DRESSER AND MCKEE PROJECT # : 8546113TAOPS PROJECT NAME : NMSHID-BERN. CLIENT I.D. : MW-4 SAMPLE MATRIX : SOIL	DATE SAMPLED : 09/11/91 DATE RECEIVED : 09/12/91 DATE EXTRACTED : 09/12/91 DATE ANALYZED : 09/14/91 UNITS : MG/KG DILUTION FACTOR : 1
	COMPOUNDS	RESULTS
(7999) (7999)	BENZENE TOLUENE ETHYLBENZENE TOTAL XYLENES	<0.025 <0.025 <0.025 <0.025 <0.025
	METHYL-t-BUTYL ETHER SURROGATE PERCENT RECOVERIES	<0.12

BROMOFLUOROBENZENE (%)



ATI I.D. : 10968905

	TEST : BTEX (8020) AND MTBE			
(199	CLIENT : CAMP, DRESSER AND MCKEE	DATE SAMPLED	: 09/	/11/91
اظهرا	PROJECT # : 8546113TAOPS PROJECT NAME : NMSHID-BERN. CLIENT I.D. : BH-1 SAMPLE MATRIX : SOIL	DATE RECEIVED DATE EXTRACTED DATE ANALYZED UNITS	: 09/ : 09/ : 09/	/12/91 /12/91 /16/91
		DILUTION FACTOR	:	1
	COMPOUNDS	RESULTS		
	BENZENE TOLUENE FTHYLBENZENE	0.074 <0.025		
(internet)	TOTAL XYLENES METHYL-t-BUTYL ETHER	0.028 0.026 <0.12		
	SURROGATE PERCENT RECOVERIES			

BROMOFLUOROBENZENE (%)



ATI I.D. : 10968906

	TEST : BTEX (8020) AND MTBE	
	CLIENT : CAMP, DRESSER AND MCKEE PROJECT # : 8546113TAOPS PROJECT NAME : NMSHID-BERN. CLIENT I.D. : BH-2 SAMPLE MATRIX : SOIL	DATE SAMPLED : 09/11/91 DATE RECEIVED : 09/12/91 DATE EXTRACTED : 09/12/91 DATE ANALYZED : 09/16/91 UNITS : MG/KG DILUTION FACTOR : 1
(and a second	COMPOUNDS	RESULTS
	BENZENE TOLUENE ETHYLBENZENE TOTAL XYLENES METHYL-t-BUTYL ETHER	<0.025 <0.025 <0.025 <0.025 <0.025 <0.12
	SURROGATE PERCENT RECOVERIES	

BROMOFLUOROBENZENE (%)

Analytical **Technologies**, Inc.

GAS CHROMATOGRAPHY - RESULTS

REAGENT BLANK

	TEST : BTEX (8020) AND MTBE	
1999	CLIENT : CAMP, DRESSER AND MCKEE PROJECT # : 8546113TAOPS PROJECT NAME : NMSHID-BERN. CLIENT I.D. : REAGENT BLANK	ATI I.D. : 109689 DATE EXTRACTED : 09/12/91 DATE ANALYZED : 09/13/91 UNITS : MG/KG DILUTION FACTOR : N/A
	COMPOUNDS	RESULTS
(******)	BENZENE TOLUENE	<0.025 <0.025
Time	TOTAL XYLENES METHYL-t-BUTYL ETHER	<0.025 <0.025 <0.12
	SURROGATE PERCENT RECOVERIES	
	BROMOFLUOROBENZENE (%)	93
(1007)		



QUALITY CONTROL DATA

	TEST : BTEX (80	20) AND MTBE	-			ATI 1	[.D.	:	109689)
ņ	CLIENT : PROJECT # : PROJECT NAME : REF I.D. :	CAMP, DRESSER 8546113TAOPS NMSHID-BERN. 10999817	AND	MCKEE		DATE SAMPI UNITS	ANAI Le Ma S	LYZED : ATRIX :	09/16/ NON-A(MG/KG	/91 QUEOUS
Nam)	COMPOUNDS			SAMPLE RESULT	CONC. SPIKED	SPIKED SAMPLE	% REC	DUP. SPIKED. SAMPLE	DUP. % REC.	RPD
	BENZENE			<0.025	1.0	1.1	110	1.1	110	0
	TOLUENE			<0.025	1.0	1.0	100	1.0	100	0
	TOTAL XYLENES			<0.025	1.U 3.0	1.0	100	3.0	100	0
	METHYL-T-BUTYL	ETHER		<0.12	1.0	1.1	110	1.2	120	9

% Recovery = (Spike Sample Result - Sample Result) ______ X 100 Spike Concentration RPD (Relative % Difference) = (Spiked Sample - Duplicate Spike) Result Sample Result ______ X 100 Average of Spiked Sample

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Analytical Techn Phoenix, Ariz	nologies, Inc. zona			C	Cha	in c	of C	Cus	tod	İy					hilai	PAGE	⊥ of
PROJECT MANAGER:	ETER NAGGK	RE								4	NALY	SIS RE	QUEST				
COMPANY: CAMP	DRESSER & Louisiana	MCKE BUD N	E SE														
BILL TO:	SAME	6711(ز 		8020	6015											ITAINERS
ADDRESS:					By	BV											OF CON
SAMPLERS: (Signature)	<u>90 (50</u> F	5) 89- <u>-</u> PHONE NUME	30 7/ BER		BTEX	Hdl											NUMBER
SAMPLE ID	DATE	IME	MATHIX			, V								_			
MIN -2	9/0/21	1330	SOIL	2	$\frac{1}{x}$	X											
MILI-3	9/11/01	1030	5010	2	$\frac{1}{x}$	X									-		-
MIN-4	9/11/91	1130	SOIL	4	X	X											1
BH-1	9/11/91	0830	SOIL	5	X	X											-1
BH -2	9/11/91	1430	SOL	16	X	X											1
		1.100						1									
· · · · · · · · · · · · · · · · · · ·					1												
			1														
PROJECT INFO	ORMATION		SAM	PLE REC	EIPT		REL	INQUIS	HED BY	: 1	I. REI	INQUISH	ED BY:	2.	RELINC	UISHED	BY: 3.
PROJECT NUMBER: 854	- DE IISTAOP	S TOTAL	NUMBER O	F CONTAI	NERS	6		artife	Um	Y/Millime: -	A Sian	aure:	Ti	me:	Signature		Time:
PROJECT NAME: NMSH	TD - BERNALIL	LC CHAIN	OF CUSTO	DY SEALS		N	- Print	Ind Name	- Juga	Date:	Print	ed Name:		ate:	Printed N	ame.	Date:
PURCHASE ORDER NUMBER:		INTAC	T?				PET	EP MA	661026	<u>9 Tii/9</u>	7/				Composi		
				1968	-9	17	- Ĉi	imp D	esser7	Hcke	2	ioany.			Company		
		DSAL INSTR	RUCTIONS			1943-194	RE	CEIVED	BY:		1. RE	CEIVEDE	BY:	2	RECE	VED BY:	LAB)
🔀 ATI Disposal @	🔉 \$5.00 each	Return	Picku	p (will call))		Sign	aure:		Time:	Sigr	aure:	Ti	ime:	BATTAL	÷///D/	Co type 10
Comments:							Par	ted Name	:	Date:	Prin	ted Name:	. C)ate:	Protect	aperno	- 0 0319;,,
							Corr	npany:			Corr	pany:			Analytic	Technolo	gies loc. F.
															/	9	1[2]2]

Analytical Technologies, Inc. 9830 S. 51st Street Suite B-113 Phoenix, AZ 85044 (602) 496-4400

ATI I.D. 109752

RECEIVED

SEP 3 0 1991

CAMP DRESSER & MCKEE INC. ALBUQUERQUE

Camp, Dresser & McKee 2400 Louisiana Blvd. AFC #5, Suite 740 Albuquerque, NM 87110

September 26, 1991

Project Name/Number: Bernalillo Patrol 8546113TAOPS

Attention: Peter Maggiore

On 09/17/91, Analytical Technologies, Inc. received a request to analyze aqueous sample(s). The sample(s) were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

D indicates compound analyzed at a greater dilution.

If you have any questions or comments, please do not hesitate to contact us at (602) 496-4400.

Mary S. Lyn Mary Tyer

Project Manager

RVW:clf Enclosure

when V. Work

Robert V. Woods Laboratory Manager

our sample control department before the scheduled disposal date. date of this report. If an extended storage period is required, please contact The samples from this project will be disposed of in thirty (30) days from the ATI STANDARD DISPOSAL PRACTICE ₽ AQUEOUS _____ **#** SYMPLES XIATAM ----- SLATOT -----τ6/9τ/60 AQUEOUS 4-WM ₽0 τ6/9τ/60 AQUEOUS MW-3 03 τ6/9τ/60 AQUEOUS MW-2 03 τ6/9τ/60 AQUEOUS T-WM τ0 DATE COLLECTED XIATAM CLIENT DESCRIPTION # ITA 227901 : . G.I ITA 16/9Z/60 : REPORT DATE PROJECT NAME : BERN. PATROL **S46113TAOPS** PROJECT # DATE RECEIVED : 09/17/91 : CAMP, DRESSER AND MCKEE CLIENT Analytical Technologies, Inc.



ATI I.D. : 10975201

لتصحير			
(1999) (1999)	CLIENT : CAMP, DRESSER AND MC PROJECT # : 8546113TAOPS PROJECT NAME : BERN. PATROL CLIENT I.D. : MW-1 SAMPLE MATRIX : AQUEOUS	KEE DATE SAMPL DATE RECEI DATE EXTRA DATE ANALY UNITS DILUTION F	ED : 09/16/91 VED : 09/17/91 CTED : N/A ZED : 09/20/91 : UG/L ACTOR : 50
	COMPOUNDS	RESULTS	
لتسرحا	BENZENE	2300	
	BROMODICHLOROMETHANE	<10.0	
	BROMOFORM	<10.0	
(1314A)	BROMOMETHANE	<10.0	
formed)	CARBON TETRACHLORIDE	<10.0	
	CHLOROBENZENE	<25.0	
	CHLOROETHANE	<10.0	
	CHLOROFORM	<10.0	
	CHLOROMETHANE	<10.0	
	DIBROMOCHLOROMETHANE	<10.0	
	2-CHLOROETHYL VINYL ETHER	<25.0	
	1,3-DICHLOROBENZENE	<25.0	
	1,2 & 1,4-DICHLOROBENZENE	<25.0	
(1999)	DICHLORODIFLUOROMETHANE	<10.0	
	1,1-DICHLOROETHANE	<10.0	· · · · · · · · · · · · · · · · · · ·
	1,2-DICHLOROETHANE	<10.0	
	1,1-DICHLOROETHENE	<10.0	
()	1,2-DICHLOROETHENE(TOTAL)	<10.0	
	1,2-DICHLOROPROPANE	<10.0	
	CIS-1,3-DICHLOROPROPENE	<10.0	
	TRANS-1, 3-DICHLOROPROPENE	<10.0	
	ETHYLBENZENE	610	
	METHYLENE CHLORIDE	<100.0	
(anna)	1, 1, 2, 2-TETRACHLOROETHANE	<10.0	
	TETRACHLOROETHENE	<10.0	
		400	
(Section of the section of the secti	1 1 2 TRICHLOROETHANE	<10.0	
	T, T, Z-IRICHLORUETHANE	<10.0	
	TRICHLOROETHENE TRICHLOROFILIOROMETHANE	<10.0	
10000	VINYL CHLORDE	<25.0	
100-113	TOTAL XVI.FNES	<10.0 1020	
	TRICHLOROTRIFILIOROFTHANE	100 0	
	METHYL. + BUTYL FTHER		
(second)	1.2-DIBROMOETHANE		
	ACETONE	<250.0	
	ETHYLENE DIBROMIDE	<2000	
1 -111	SURROGATE PERCENT RECOVERIES	K00.0	
	BROMOCHLOROMETHANE (%)	109	
(1997)	BROMOFLUOROBENZENE (%)	103	
		200	



ATI I.D. : 10975202

(in the second								
	CLIENT : CAMP, DRES	SER AND	MCKEE		DATE	SAMPLED	:	09/16/91
	PROJECT # : 8546113TAO	PS			DATE	RECEIVED	:	09/17/91
	PROJECT NAME : BERN. PATR)L			DATE	EXTRACTED	:	N/A
	CLIENT I.D. : MW-2				DATE	ANALYZED	:	09/20/91
	SAMPLE MATRIX : AQUEOUS				UNITS		:	UG/L
					DIPOIL	ION FACTOR	:	T
	COMPOUNDS			RES	SULTS			
	 DFN7FNF							
	BROMODICHLOROMETHANE			250	ך נו			
	BROMOFORM			<0	• Z つ			
_	BROMOMETHANE			<0	• 2 • 2			
(1 	CARBON TETRACHLORIDE			<0	· 2 2			
	CHLOROBENZENE			<0	• 2 5			
	CHLOROETHANE			<0	· J 2			
	CHLOROFORM			<0	. 2			
	CHLOROMETHANE			< 0	2			
	DIBROMOCHLOROMETHANE			< 0	2			
	2-CHLOROETHYL VINYL ETHER			<0	.5			
	1, 3-DICHLOROBENZENE			<0	.5			
	1,2 & 1,4-DICHLOROBENZENE			<0	.5			
(1999)	DICHLORODIFLUOROMETHANE			<0	.2			
	1,1-DICHLOROETHANE			<0	.2			
	1,2-DICHLOROETHANE			7.8				
	1,1-DICHLOROETHENE			<0	.2			
lacted.	1,2-DICHLOROETHENE(TOTAL)			<0	.2			
	1,2-DICHLOROPROPANE			< 0	. 2			
	CIS-1, 3-DICHLOROPROPENE			< 0	.2			
(c)and (c)	TRANS-1, 3-DICHLOROPROPENE			< 0	. 2			
	ETHYLBENZENE			110	D			
	METHYLENE CHLORIDE			<2	.0			
	1,1,2,2-TETRACHLOROETHANE			<0	.2			
	TETRACHLOROETHENE			<0	.2			
	TOLUENE			1.3	•			
(Hereit)	1,1,1-TRICHLOROETHANE			<0	.2			
	T, I, 2-TRICHLOROETHANE			<0	• 2			
				<0	• 2			
(2003)	VINVL CHLORIDE			<0	• 5			
	TOTAL XVIENES			26	• 2			
	TRICHLOROTRIFILIOROFTHANE			. so.	° ^			
	METHYLt-BUTYL ETHER			530	• 0			
(const	1.2-DIBROMOETHANE				Ο			
	ACETONE			~1 <5	. U N			
	ETHYLENE DIBROMIDE			(1	Ň			
	SURROGATE PERCENT	RECOVE	RIES		• •			
	BROMOCHLOROMETHANE (%)			11	9			
	BROMOFLUOROBENZENE (%)			10	3			
				20	-			



ATI I.D. : 10975203

(1999) (1999)	CLIENT : CAMP, DRESSER AND MCKE PROJECT # : 8546113TAOPS PROJECT NAME : BERN. PATROL CLIENT I.D. : MW-3 SAMPLE MATRIX : AQUEOUS	E DATE SAMPLED DATE RECEIVED DATE EXTRACTED DATE ANALYZED UNITS DILUTION FACTOR	: 09/16/91 : 09/17/91 : N/A : 09/20/91 : UG/L : 1
	COMPOUNDS	RESULTS	
		<0 5	
	BROMODICHI.OROMETHANE	<0.2	
	BROMOFORM	<0.2	
(1000)	BROMOMETHANE	<0.2	
	CARBON TETRACHLORIDE	<0.2	
	CHLOROBENZENE	<0.5	
(CCANNED)	CHLOROETHANE	<0.2	
forming 1	CHLOROFORM	<0.2	
	CHLOROMETHANE	<0.2	
	DIBROMOCHLOROMETHANE	<0.2	
	2-CHLOROETHYL VINYL ETHER	<0.5	
	1,3-DICHLOROBENZENE	<0.5	
	1,2 & 1,4-DICHLOROBENZENE	<0.5	
(see)	DICHLORODIFLUOROMETHANE	<0.2	
	1,1-DICHLOROETHANE	<0.2	
	1,2-DICHLOROETHANE	<0.2	
	1,1-DICHLOROETHENE	<0.2	
	1,2-DICHLOROETHENE(TOTAL)	<0.2	
	1,2-DICHLOROPROPANE	<0.2	
	CIS-1,3-DICHLOROPROPENE	<0.2	
(100-000)	TRANS-1, 3-DICHLOROPROPENE	<0.2	
	ETHYLBENZENE	<0.5	
	METHYLENE CHLORIDE	<2.0	
	1,1,2,2-TETRACHLOROETHANE	<0.2	
	TETRACHLOROETHENE	<0.2	
	TOLUENE	6.4	
(2005)	1,1,1-TRICHLOROETHANE	<0.2	
	1,1,2-TRICHLOROETHANE	<0.2	
	TRICHLOROETHENE	<0.2	
1200201	TRICHLOROFLUOROMETHANE	<0.5	
100 000	VINYL CHLORIDE	<0.2	
	TOTAL XYLENES	<0.5	
	TRICHLOROTRIFLUOROETHANE	<2.0	
(angel)	METHYL-t-BUTYL ETHER	<1.0	
	I, Z-DIBROMOETHANE	<1.0	
	ACETUNE FURIENE DIPROMINE	<50	
	CUDDOCIME DEDCEME DECOMERTE	<1.0	
	SURRUGATE PERCENT RECOVERIES		
	BDOMOCHI ODOMETTUNIE (%)	116	
(1997)	BROMOFLUORORFNZENE (%)		
	DIOUOL DOOLODENVERE (2)	T U Z	



ATI I.D. : 10975204

	CLIENT : CAMP, DRESSER AND MCKEE PROJECT # : 8546113TAOPS	DATE SAMPLED : 09/1 DATE RECEIVED : 09/1	16/91 17/91
	CLIENT I.D. : MW-4 SAMPLE MATRIX : AQUEOUS	DATE EXTRACTED : N/A DATE ANALYZED : 09/2 UNITS : UG/2 DILUTION FACTOR :	20/91 L 1
10 - 4	COMPOUNDS	RESULTS	
	BENZENE	<0.5	
	BROMODICHLOROMETHANE	<0.2	
	BROMOFORM	<0.2	
	BROMOMETHANE	<0.2	
	CARBON TETRACHLORIDE	<0.2	
أغيبتنا	CHLOROFORM		
	CHLOROMETHANE	<0.2	
	DIBROMOCHLOROMETHANE	<0.2	
	2-CHLOROETHYL VINYL ETHER	<0.5	
	1,3-DICHLOROBENZENE	<0.5	
	1,2 & 1,4-DICHLOROBENZENE	<0.5	
(and the second s	DICHLORODIFLUOROMETHANE	<0.2	
	1,1-DICHLOROETHANE	<0.2	
	1, 2-DICHLOROETHANE	<0.2	
141310		<0.2	
	1 2 - DICHLOROPROPANE	<0.2	
	CIS-1.3-DICHLOROPROPENE	<0.2	
(1000)	TRANS-1, 3-DICHLOROPROPENE	<0.2	
	ETHYLBENZENE	<0.5	
	METHYLENE CHLORIDE	<2.0	
	1,1,2,2-TETRACHLOROETHANE	<0.2	
	TETRACHLOROETHENE	<0.2	
	TOLUENE	8.7	
	1, 1, 1–TRICHLOROETHANE	<0.2	
	T, T, Z-TRICHLOROETHANE	<0.2	
	TRICHLOROFLUOROMETHANE	<0.2	
	VINYL CHLORIDE	<0.2	
	TOTAL XYLENES	<0.5	
	TRICHLOROTRIFLUOROETHANE	<2.0	
(Second Second S	METHYL-t-BUTYL ETHER	<1.0	
	1,2-DIBROMOETHANE	<1.0	
	ACETONE	<50	
(d- 0)	ETHILENE DIBROMIDE	<1.0	
,	SURRUGATE PERCENT RECOVERIES		
	BROMOCHLOROMETHANE (%)	109	
1999	BROMOFLUOROBENZENE (%)	102	



REAGENT BLANK

	TEST : VOLATILE HALOCARBONS/AROMATICS (601/602) CLIENT : CAMP, DRESSER AND MCKEE PROJECT # : 8546113TAOPS PROJECT NAME : BERN. PATROL CLIENT I.D. : REAGENT BLANK	& MTBE ATI I.D. : 109752 DATE EXTRACTED : 09/20/91 DATE ANALYZED : 09/20/91 UNITS : UG/L DILUTION FACTOR : N/A
	COMPOUNDS	RESULTS
lenned	BENZENE	<0.5
	BROMODICHLOROMETHANE	<0.2
	BROMOFORM	<0.2
(Simily)	BROMOMETHANE	<0.2
	CARBON TETRACHLORIDE	
	CHLOROBENZENE	
	CHLOROETHANE	
	CHLORONFTHANF	< 0.2
	DIBROMOCHLOROMETHANE	<0.2
	2-CHLOROETHYL, VINYL, ETHER	<0.5
	1.3-DICHLOROBENZENE	<0.5
	1,2 & 1,4-DICHLOROBENZENE	<0.5
(rés)	DICHLORODIFLUOROMETHANE	<0.2
	1,1-DICHLOROETHANE	<0.2
	1,2-DICHLOROETHANE	<0.2
	1,1-DICHLOROETHENE	<0.2
	1,2-DICHLOROETHENE(TOTAL)	<0.2
	1,2-DICHLOROPROPANE	<0.2
	CIS-1, 3-DICHLOROPROPENE	<0.2
No.	TRANS-1, 3-DICHLOROPROPENE	<0.2
	ETHYLBENZENE MERUUH DND. OHLODIDD	
	METHYLENE CHLORIDE	
(1996)		
	TOLIENE	<0.5
	1,1,1-TRICHLOROETHANE	<0.2
(Reality)	1,1,2-TRICHLOROETHANE	<0.2
	TRICHLOROETHENE	<0.2
	TRICHLOROFLUOROMETHANE	<0.5
(seed)	VINYL CHLORIDE	<0.2
	TOTAL XYLENES	<0.5
	TRICHLOROTRIFLUOROETHANE	<2.0
	METHYL-t-BUTYL ETHER	<1.0
	1, Z-DIBROMOETHANE	<1.0
	ETHYLENE DIBROMIDE	<1 0
البينيةا	SURROGATE PERCENT RECOVERIES	
	BROMOCHLOROMETHANE (%)	105
(986)	BROMOFLUOROBENZENE (%)	102

Analytical **Technologies**, Inc.

	QUALIT	Y CONTRO	OL DATA	ATI 1	[.D.	:	109752	
1 1	TEST : VOLATILE HALOCARBONS/AROMAT	PICS (601	L/602) &	MTBE				
	CLIENT : CAMP, DRESSER AND M PROJECT # : 8546113TAOPS PROJECT NAME : BERN. PATROL REF I.D. : 10999928	ICKEE		DATE SAMPI UNITS	ANAI LE MA	YZED : ATRIX : :	09/19/ AQUEOU UG/L	91 S
4						DUP.	DUP.	
9	COMPOUNDS	SAMPLE RESULT	CONC. SPIKED	SPIKED SAMPLE	* REC.	SPIKED SAMPLE	¥ REC.	RPI
R	1,1 DICHLOROETHENE TRICHLOROETHENE TETRACHLOROETHENE BENZENE	<0.2 <0.2 <0.2 <0.2	20 20 20 20	19 23 22 19	95 115 110 95	17 22 20 21	85 110 100	11 4 10
S)	BROMODICHLOROMETHANE CHLOROFORM 1,1,1-TRICHLOROETHANE	<0.2 <0.2 <0.2 <0.2	20 20 20 20	22 22 20	110 110 100	20 21 19	105 100 105 95	10 5 5
-1	TOLUENE CHLOROBENZENE XYLENES	<0.5 <0.5 <0.5	20 20 20	23 17	95 115 85	20 22 19	110 95	5 4 11

% Recovery = (Spike Sample Result - Sample Result) ______ X 100 Spike Concentration RPD (Relative % Difference) = (Spiked Sample - Duplicate Spike) Result Sample Result ______ X 100 Average of Spiked Sample

19012	Comments: AU SAM	ATI Disposal			PROJECT NAME: Bernali P.O. NO.:	PROJECT NO .: 25 Ho II	PROJECT INFORMA			MW-4	NW - 3	NW - 2	MW-1	SAMPLE ID	SAMPLERS: (Signatule)	COMPANY: ADDRESS:	BILL TO:	ALBUG	COMPANY: CAMP ADDRESS: 2400 L	PROJECT MANAGER:	Phoenix, Arizo
	IRES RESERVED WIL	PLE DISPOSAL INSTRUCTIONS		RECEIVED GOOD COND./COLD	ILC PONCI CHAIN OF CUSTODY SEALS	3 TAOPS TOTAL NO. OF CONTAINERS	SAMPLE RECEIPT			2 Jay am 5630 16/91/6	5/16/910800 Water 3	\$/16/910857 Water 2	9/16/910950/water 1	DATE TIME MATRIX LAB	DUCU (505)881-3077 PHONE NUMBER		SAME	RUCEROUS NH ST 3711	DRESSER & MCKEE INC.	ETER MAGIORE	Dna
	Ľ			-	1	41			 	1	54	(7 		ω Ε	roleum Hydro	carbons (4	18.1)		0		
Company:	Printed Name: Date:	Signature: i ime:	RECEIVED BY:	Company J	Date NO CAD ALL Date	Hondure Miggilly Time	RELINQUISHED BY:			XX		XX		(MO Dies BT) Chlo Aron MTE	D 8015) Gas/ sel/Gasoline/R (E (8020) orinated Hydr matic Hydroc BE	Diesel 3TXE (MOI rocarbons (carbons (60) 8015/ 601/80)2/8020	8020) 10)))			
		- u	1.		10/91	100	1.							Pes Her	ticides/PCB bicides (615	(608/8080 /8150)))		· · · · · · · · · · · · · · · · · · ·		
Company:	Printed Name:	signature:	RECEIVED BY:	ompany:	Printed Name:	ignature:	RELINQUISHED BY							Bas Vola	e/Neutral/Aci atile Organic	id Compou s GC/MS (nds GC 624/82	C/MS (40)	625/8270)	ANALYSIS R	
•	Date:	lime:			Date	Time:	1: 2							SDI	WA Primary S	Standards				EQUEST	
Analytical Technoi	MARG UPPUS	All Martines	I RECEIVED BY	Company:	Printed Name:	Signature:	RELINQUISHE			 				SD SD The	WA Volatiles 3 Priority F 3 B EP Tox Me	(502.1/503 Pollutant Me	B. 1) etals Tox Pre	эр. (13	10))AIE_+_+_+
$\frac{1}{2}$ gies, ind.	B Mulsus	ACT JOU			Date	Time:	D BY: 3.							The	8 EP Tox Me	etals by TCL	ai Diges P				