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Form 3160-5 (June 2015)	UNITED STATES EPARTMENT OF THE INT	EDIOD	RECEN ELECTRONIC	REPOR	- FORM OMB N	APPROVED O. 1004-0137
				2018	5. Lease Serial No.	anuary 31, 2018
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	II. Use form 3160-3 (APD)					N UTE ement, Name and/or No.
· · · · · · · · · · · · · · · · · · ·	TRIPLICATE - Other instru	ctions on	page 2 			•
1. Type of Well Soil Well Gas Well Oth	ner				8. Well Name and No. HSGU 185	
2. Name of Operator BIYA OPERATORS INC	Contact: JU E-Mail: Jterry@divers	JBAL S TE	RRY esinc.com		9. API Well No. 30-045-10211-0)0-S1
3a. Address 801 W. MINERAL AVE. STE 2 LITTLETON, CO 80120	202 Í F		. (include area code) 7-5417 Ext: 232 '-5418		10. Field and Pool or HORSESHOE	Exploratory Arca SALLUP
4. Location of Well <i>(Footage, Sec., 7</i> Sec 35 T31N R16W NENW 6					11. County or Parish, SAN JUAN CO	
Sec 35 13 IN RIGWINEINW O	BUFINE 1960FWL				SAN JUAN CU	
12. CHECK THE AI	PPROPRIATE BOX(ES) TO	O INDICA	TE NATURE OF	NOTICE,	REPORT, OR OTH	IER DATA
TYPE OF SUBMISSION			TYPE OF	ACTION	<u></u>	
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Subsequent Report	□ Alter Casing		raulic Fracturing	🛛 Reclama		U Well Integrity
	Casing Repair	-	Construction			Other
Final Abandonment Notice	Change Plans	D Plug	and Abandon	□ Tempora	rily Abandon	
Pursuant to the Notice of Incic submits the 185 line leak work	Ients of Noncompliance #18 c plan.	RJ010 BIY	A Operators, Inc.	. respectfully	/	0 CD 0 4 2018
					DISTRI	GT 111
		CO	SEE ATTAG		AL	
14. I hereby certify that the foregoing is	; true and correct.	917 vorifie	d by the BLM Well	Information	Suctor	
Comn Namc(Printed/Typed) JUBAL S	Electronic Submission #429 For BIYA OPE nitted to AFMSS for processin TERRY	ERATORS I Ig by BARE	ARA TELECKY or	nango 1 08/03/2018 PLORATION	(18BDT0094SE)	
Signature (Electronic S	Submission)		Date 08/03/20	18		
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Approved By PLOT			Title	NSL		Date 2 Ly 2
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Instructions on page 2) ** BLM REV	ISED ** BLM REVISED *	* BLM RE	VISED ** BLM	REVISED	** BLM REVISE	 D **
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Revisions to Operator-Submitted EC Data for Sundry Notice #429917

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	Operator Submitted	BLM Revised (AFMSS)
Sundry Type:	RECL NOI	RECL NOI
Lease:	751081035	751081035
Agreement:		
Operator:	BIYA OPERATORS, INC. 801 W. MINERAL AVE. SUITE 202 LITTLETON, CO 80120 Ph: 303-797-5417	BIYA OPERATORS INC 801 W. MINERAL AVE. STE 202 LITTLETON, CO 80120 Ph: 303.797.5417 Fx: 303-797-5418
	JUBAL S TERRY V.P. EXPLORATION E-Mail: Jterry@diversifiedresourcesinc.com	JUBAL S TERRY V.P. EXPLORATION E-Mail: Jterry@diversifiedresourcesinc.com
	Ph: 303-797-5417 Ext: 232 Fx: 303-797-5418	Ph: 303-797-5417 Ext: 232 Fx: 303-797-5418
Tech Contact:	JUBAL S TERRY V.P. EXPLORATION E-Mail: Jterry@diversifiedresourcesinc.com	JUBAL S TERRY V.P. EXPLORATION E-Mail: Jterry@diversifiedresourcesinc.com
	Ph: 303-797-5417 Ext: 232 Fx: 303-797-5418	Ph: 303-797-5417 Ext: 232 Fx: 303-797-5418
Location: . State: County:	NM SAN JUAN	NM SAN JUAN
Field/Pool:	HORSESHOE GALLUP	HORSESHOE GALLUP
Well/Facility:	HGU 185 Sec 35 T31N R16W Mer NMP NENW 660FNL 1980FWL 36.862900 N Lat, 108.495970 W Lon	HSGU 185 Sec 35 T31N R16W NENW 660FNL 1980FWL



Souder, Miller & Associates • 401 W. Broadway • Farmington, NM 87401 (505) 325-7535 • (800) 519-0098 • fax (505) 326-0045

SMA #5127323

www.soudermiller.com

August 3, 2018

BLM Tres Rios Field Office 29211 Highway 187 Dolores, CO 81323 Attn: Mr. Ryan Joyner

RE: 185 LINE LEAK WORK PLAN

Dear Mr. Joyner:

On behalf of BIYA Operators, Inc. (BIYA), Souder, Miller & Associates (SMA) is pleased to submit this work plan for remedial activities at the 185 Line Leak release site. The site is located in Unit L (NW ¼ SW ¼), Section 35, Township 31 North, Range 16 West; GPS: 36.855174, -108.499632, in San Juan County, New Mexico on Ute Mountain Ute Tribal (UMUT) lands within the jurisdiction of the Bureau of Land Management (BLM).

Background

SMA was contacted by BIYA in March 2016 regarding the line release referred to as the 185 Line Leak. On March 17, 2016, an SMA representative met with BIYA and Ute Mountain Ute Tribe (UMUT) representatives to conduct a walkthrough of the site from the source of the release and along the spill path. On March 25, 2016, SMA representatives returned to the site to conduct additional site investigation and photo documentation.

On May 6, 2016, an SMA representative conducted a site visit to observe the progression of excavation activities.

During October and November 2016 SMA oversaw soil boring activities on site. These activities are further detailed under the Soil Boring Activities section of this report.

On June 1, 2017, an SMA representative met on site with BIYA representatives, Bureau of Indian Affairs (BIA), and BLM representatives to conduct a site walk through to document progress.

On June 23, 2017, a Cultural Resource Inventory was conducted by Interior West Consulting, LLC. A copy of the survey is attached to this work plan.

On July 25, 2018, an SMA representative met with Mr. Ryan Laird of BIYA to conduct a site walk through. SMA collected GPS data and measurements to define the size of the excavation. As of that date, the excavation had a perimeter measurement of approximately 169 feet varying in depth from two (2) to ten (10) feet. The base of the

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excavation has been dug down to sandstone and measured approximately 1,612 square feet. The boundaries of the excavation are displayed on Figure 1.

Additional background information provided by BIYA is included as an attachment to this work plan.

Soil Boring Activities

On October 18, 2016, SMA representatives and UMUT representative, Mr. Colin Larrick, were present as soil bore drilling was attempted by Mo-Te Drilling Company, Inc (Mo-Te). However, Mo-Te was unable to safely access the excavation due to limited road access on site.

On October 26, 2016, an SMA representative conducted project oversight as dirt work was conducted to create safe and adequate entry for Mo-Te to conduct soil boring activities.

On November 18, 2016, an SMA representative conducted project oversight as Mo-Te drilled nine (9) soil borings to a maximum depth of twenty-five (25) feet below grade surface (bgs) of the surrounding grade. Soil boring 9 (SB-9) is located in the excavation closest to the source of release. SMA collected soil samples from each of the soil borings at varying depths. Soil samples were analyzed via EPA Method 8015 for GRO and DRO, EPA Method 8021 for BTEX, and EPA Method 300.0 for Chloride. All constituents analyzed returned below laboratory detection limits, with the exception of SB-9 at 3 feet bgs and 16 feet bgs. At three (3) feet bgs, GRO and DRO totaled 18,100 mg/Kg. At sixteen (16) feet bgs, GRO and DRO totaled 915 mg/Kg. Additional samples were collected for SB-9 at depths of twenty-one (21) and twenty-five (25) feet bgs. All constituents analyzed at these depths returned below remediation action levels. A table of laboratory results as well as the location of the soil borings are displayed on the attached Figure 1. A copy of the laboratory analytical report is attached to this work plan.

Based on the soil boring data gathered, SMA believes that hydrocarbon impacts are confined to the area of the excavation and does not pose a threat to groundwater. No groundwater was encountered during soil boring activities. Soil boring lithology can be found in the attachments of this work plan.

Proposed Remedial Action

To prevent migration of hydrocarbon impacts in the sandstone layer beneath the release area, SMA proposes placement of a geosynthetic clay liner (GCL) over the impacted/stained sandstone that is exposed in the excavation. GCLs consist of layers of geosynthetics surrounding a layer of low-permeability sodium bentonite. The materials are needle-punched together into a lining material capable of resistance to high shear forces. The GCL shall be a GSE BentoLiner NSL, or equal. Fully hydrated GCL has a maximum hydraulic conductivity of 5×10^{-9} cm/sec.

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Notification of GCL installation date and time will be given to the UMUT and BLM to allow for witnessing, as backfill with clean soil must occur immediately following GCL installation to prevent premature hydration of the GCL. The GCL will be installed by a third-party contractor with direct knowledge and experience with the manufacturer's specifications.

Typical Construction Quality Assurance/Quality Control information for GCL follows:

Onsite Quality Assurance

GCL Rolls and Panels

Construction quality assurance monitoring for the GCL rolls and panels include:

- Monitoring and documenting the unloading of trucks delivering GCL rolls to the site.
- Monitoring and documenting the handling and onsite storage procedures and location of GCL rolls.
- Recording the manufacturing roll and batch number of GCL rolls delivered to the site, date of fabrication, and physical dimensions.
- Review of manufacturer's QA testing for conformance with specifications, including:
 - Name of the manufacturer and fabricator
 - Copies of quality control certificates that are issued by the producer of the GCL materials.
- Interpreting manufacturer's QA test results in accordance with the specifications and accepting or rejecting delivered rolls based on results of QA testing.
- Visual review and marking of GCL as it is unrolled and deployed at the job site for uniformity, damage, and imperfections, including holes, thin spots, tears, punctures, and foreign matter.

The GCL shall substantially comply with the properties shown in the table below:

Material Property	Test Method	Test Frequency	Required Values
Bentonite Swell	ASTM D5890	1 per 50 tons	24 mL/2g min.
Bentonite Fluid Loss	ASTM D5891	1 per 50 tons	18 mL max.
Bentonite Mass/Area	ASTM D5993	40,000 ft ²	0.75 lb/ft ²
GCL Tensile Strength	ASTM D6768	40,000 ft ²	30 lbs/in
GCL Peel Strength	ASTM D4632	40,000 ft ²	21 lbs

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	GCL Index Flux	ASTM D5887	Weekly	1 x 10 ⁻⁸ m ³ /m ² /sec max
	GCL Hydraulic Conductivity	ASTM D5887	Weekly	5 x 10 ⁻⁹ cm/sec max
	GCL Hydrated			
	Internal Shear	ASTM D6243	Periodic	500 lb/ft ²
ŀ	Strength			

Panel Placement

Quality assurance monitoring for panel placement includes:

- Obtaining a written acceptance of the subgrade by the GCL Installer
- Evaluating and documenting weather conditions (e.g., temperature, wind, humidity, precipitation) for GCL placement and informing the construction manager if requirements for weather conditions are not met, so the construction manager can decide whether or not to stop GCL placement
- Monitoring and documenting GCL placement as well as conditions of panels as placed
 - Noting panel defects, tears, or other deformities
 - Measuring in-place panel dimensions
 - Recording panel numbers
 - Documenting placement of supplemental granular bentonite along the entire overlap width at a minimum rate of 0.25 pounds/linear foot, or as recommended by the Manufacturer
- Documenting that the panels have been installed in accordance with the manufacturer's specifications.

Documentation and Reporting

Documenting and reporting methods will be implemented to systematically record results of onsite monitoring. Reporting forms will be used for roll and panel placement. A GCL Installer's certificate of acceptance of the subgrade will be obtained prior to placement of GCL panels.

A photo log will be created containing photos of all phases of the GCL installation.

Reclamation and Reseeding

Upon the completion of the GCL, backfill of clean soil will need to immediately take place to prevent premature hydration of the GCL.

Reclamation will involve compacting the backfill, regrading cut-and-fill slopes to restore the original contour, replacing topsoil, installing temporary erosion controls, and revegetating in accordance with the BIYA MDA. Seeded area shall be mulched with

crimped straw at an application rate sufficient for seed and moisture protection. Hydroseeding may be approved upon written request.

Closure and Limitations

The scope of our services consisted of the performance of release assessments, regulatory liaison, oversight and control of delineation activities, project management, and preparation of this work plan. All work has been performed in accordance with generally accepted professional environmental consulting practices.

If there are any questions regarding this report, please contact either myself or Shawna Chubbuck at 505-325-7535.

Sincerely,

Souder, Miller & Associates

Ashley Maxwell Staff Scientist

Engineer: Heather McDaniel, P.E., C.F.M.

Registration # and State: 22047 New Mexico

Signature: Heather O. Mc Saniel Date: 8 2018

Figures: Figure 1: Site Map

Attachments:

GSE BentoLiner NSL Geosynthetic Clay Liner Product Data Sheet Soil Boring Lithology BIYA Timeline Interior West Consulting, LLC: Cultural Resource Inventory Hall Environmental Analysis Laboratory Report

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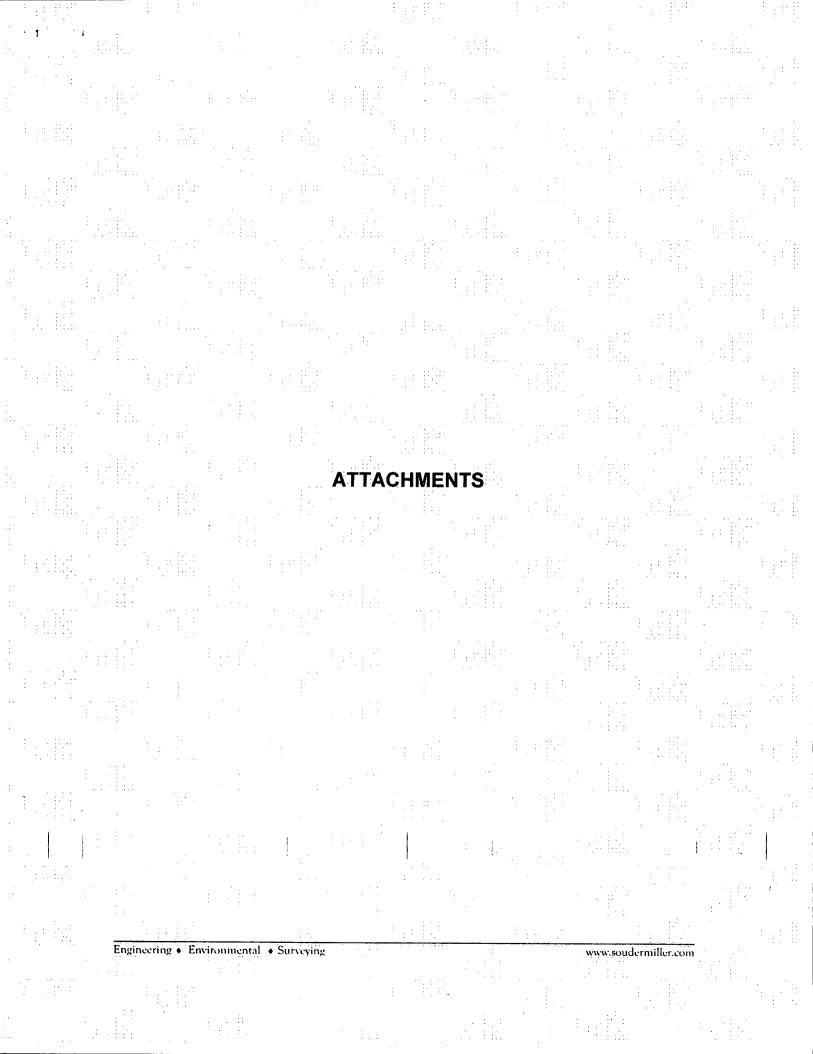
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Shawna Chubbuck Senior Scientist



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FIGURE

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	Sum	185 Line Leak Imary of Laboratory Analysis Results in mg/Kg	185 L Contamination Del	ine Leak				
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ATTACHMENTS

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GSE BentoLiner NSL Geosynthetic Clay Liner

GSE BentoLiner "NSL" is a needle-punched reinforced composite geosynthetic clay liner (GCL) comprised of a uniform layer of granular sodium bentonite encapsulated between a woven and a nonwoven geotextile. The product is intended for moderate to steep slopes and moderate to high load applications where increased internal shear strength is required.

[*]

AT THE CORE:

PRODUCT/DATA SHEET

This composite clay liner is intended for moderate to steep slopes and moderate to high load applications where increased internal shear strength is required.

Product Specifications

TeledClopetay	REBLIEBO	Garageons)	Value
Geotextile Property			
Cap Nonwoven, Mass/Unit Area	ASTM D 5261	1/200,000 ft ²	6.0 oz/yd² MARV ⁽¹⁾
Carrier Woven, Mass/Unit Area	ASTM D 5261	1/200,000 ft ²	3.1 oz/yd² MARV
Bentonite Property			The first of the second second second
Swell Index	ASTM D 5890	1/100,000 lb	24 ml/2 g min
Moisture Content	ASTM D 4643	1/100,000 lb	12% max
Fluid Loss	ASTM D 5891	1/100,000 lb	18 ml max
Finished GCL Property		he has been been been been been been been bee	
Bentonite, Mass/Unit Area ⁽²⁾	ASTM D 5993	. 1/40,000 ft².	0.75 lb/ft² MARV
Tensile Strength ⁽³⁾	ASTM D 6768	1/40,000 ft ²	30 lb/in MARV
Peel Strength	ASTM D 6496 ASTM D 4632 ⁽⁴⁾	1/40,000 ft ²	3.5 lb/in MARV 21 lb MARV
Hydraulic Conductivity ⁽⁵⁾	ASTM D 5887	1/Week	5 x 10 ⁻⁹ cm/sec max
ndex Flux ⁽⁵⁾	ASTM D 5887	1/Week	1 x 10 ⁻⁸ m ³ /m ² /sec max
nternal Shear Strength ⁽⁶⁾	ASTM D 6243	Periodically	500 psf Typical
	TYPICAL ROLL	DIMENSIONS	
Width x Length ⁽⁷⁾	Typical	Every Roll	15:5 ft x 150 ft
Area per Roll	Typical	Every Roll	2,325 ft ²
Packaged Weight	Typical	Every Roll	2,600 lb

NOTES:

• ⁽ⁱ⁾Minimum Average Roll Value.

• ⁽²⁾At 0% moisture content.

• (3)Tested in machine direction.

• ^(e)Modified ASTM D 4632 to use a 4 in wide grip. The maximum peak of five specimens averaged in machine direction.

• ⁽⁵⁾Deaired, deionized water @ 5 psi maximum effective confining stress and 2 psi head pressure.

• ⁽⁶⁾Typical peak value for specimen hydrated for 24 hours and sheared under a 200 psf normal stress.

 \cdot $^{(\prime)}\text{Roll}$ widths and lengths have a tolerance of $\pm1\%$

and protection to our global customers.

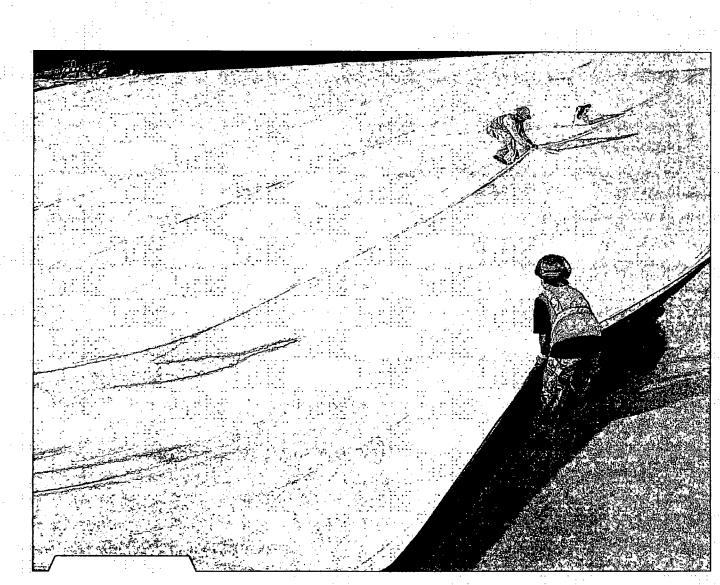


(DURABILITY RUNS DEEP) For more information on this product and others, please visit us at GSEworld.com, call 800,435,2008 or contact your local sales office.

GSE is a leading manufacturer and marketer of geosynthetic lining products and services. We ve built a reputation of reliability through our dedication to providing consistency of product, price

Our commitment to innovation, our focus on quality and our industry expertise allow us the flexibility to collaborate with our clients to develop a custom, purpose-fit solution

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BENTOLINER GCL PRODUCTS Installation quality assurance manual

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1.0 INTRODUCTION
2.0 UNLOADING PROCEDURES
3.0 STORAGE
4.0 SUBGRADE PREPARATION.
5.0 DEPLOYMENT
6.0 OVERLAPS & SEAMS
7.0 ATTACHMENT DETAILS
8.0 ANCHORING
9.0 REPAIRS
10.0 INSPECTION
11.0 COVER MATERIAL
12.0 HYDRATION & ACTIVATION

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1.0 INTRODUCTION

This manual provides an overview of the GSE Installation Quality Assurance procedures consistent with industry accepted practices to ensure that the GSE BentoLiner GCL products installed will best perform for its intended purpose. In addition, all installation work will be performed in strict accordance per the customer's specifications. Please read the procedures below completely before you begin. If you need further clarification, contact the GSE Engineering Support Staff for assistance or please refer to ASTM D 6102, Standard Guide for Installation of Geosynthetic Clay Liners and ASTM D 5888, Standard Guide for Storage and Handling of Geosynthetic Clay Liners. Remember safety first and use safe practices always on every project.

2.0 UNLOADING PROCEDURES

As with all lifting or unloading operations, appropriate equipment and experienced personnel should be employed along with proper safe handling methods. The party responsible for unloading the GSE BentoLiner should contact GSE prior to shipment to determine the correct unloading methods and equipment if different from the preapproved and specified methods as described below.

Lifting GCL rolls can typically be accomplished with by using a 2.5 in - 3.0 in (63 mm - 75 mm) outside diameter (0.D.) steel pipe (preferably solid), with a wall thickness capable of providing sufficient beam strength to support the weight of the roll, which average less than 3,000 lb (1,364 kg) and the length is approximately 18 ft (5.5 m). This core pipe is inserted through the hollow center of the GCL cardboard core. Heavy-duty slings or chains, which are approximately 10 ft (3.1 m) long, each are attached to each end of the pipe, which are then fastened to a I-beam spreader bar or a GSE approved alternative. Care should be taken to ensure that lifting chains or straps do not rub, chafe, or otherwise damage the GCL. A crane, backhoe, front-end loader or another suitable piece of construction equipment can then lift the entire assembly.

An all-terrain, extendable boom forklift, such as a Lull or Caterpillar Telehandler, can be fitted with a special, solid steel "carpet pole" or stinger, typically 14.0 ft (4.3 m) in length having an outside diameter of no more then 3.38 in (8.6 mm). The carpet pole can be inserted into the hollow cardboard core of the GCL roll.

The roll should not be fully suspended until the pole extends through the entire length of the core tube or you run the risk that the core may break creating additional handling and unloading difficulties

A properly structured and supported pole can be used to unload GCL rolls onsite. As an alternative, straps that are appropriately rated can be used as a GSE approved lifting method to unload GCL rolls. Lifting straps are supplied on every roll. Each GCL roll label contains roll weight information that should be consulted in determining appropriate lifting equipment and factors of safety.

The CQA inspector or owner's representative should verify that only appropriate handling equipment is utilized, i.e. equipment that does not pose any danger to personnel or undue risk of damage or deformation to the liner material.

3.0 STORAGE

While stored GCL needs to be kept dry and away from potential flooding or high storm runoff. On the job site storage methods include; storing the rolls tarped on pallets; storing the rolls under roof in a clean, dry protected area; and storing the rolls on a flat, dry, stable surface suitably covered with protective waterproof tarps. Rolls can be stacked as long as it is done in a manner that prevents them from rolling; shifting, or spontaneously moving. Maximum roll height should be determined by CQA personnel, but never more than can be safely managed considering site conditions, equipment and personnel.

Stored rolls should be tarped and remain in their original, unopened plastic shipping sleeves to prevent damage and undue prehydration prior to installation. Any rolls that come in contact with water should be examined by CQA or an owner's representative prior to installation. Prehydrated or physically damaged rolls should be set aside for further examination to determine the plausibility of repair or need to replace.



BentoLiner GCL Products

4.0 SUBGRADE PREPARATION

The surface upon which the GSE BentoLiner is installed should be smooth and free of wheel ruts, debris, roots, sticks, and rocks larger than 1.0 in (25 mm). Site specific compaction requirements should be followed in accordance with the project plans and specifications. At a minimum, the site should be smooth rolled the level of compaction such that installation equipment and other construction vehicles traffic does not cause rutting greater than 1.0 in (25 mm) deep. Furthermore, all protrusions extending more than 0.5 in (12 mm) from the subgrade shall be removed, crushed, or pushed into the subgrade.

In applications where the product is the sole barrier, subgrade surfaces consisting of gravel or granular soils may not be acceptable due to their large void content. For these applications, the subgrade shall be greater than 80% fines and contain no particles larger than 1 in (25 mm). In all high head, water containment applications, i.e. maximum water depth greater than 1 ft (30.5 cm), GSE recommends the use of a coated or laminated GCL such as GSE:BentoLiner CNSL.

Immediately prior to deployment of the GCL, the subgrade shall be final compacted to fill in any remaining voids or desiccation cracks and to ensure that no sharp irregularities or abrupt elevation changes exist greater than 1.0 in (25 mm). The surfaces to be lined shall be maintained in this condition and free of standing water. GCL can be deployed on a frozen subgrade, if the subgrade would meet all the conditions as previously outlined if unfrozen.

The subgrade surface and preparation should be inspected and certified by the CQA inspector prior to GSE BentoLiner placement. Upon approval by the CQA inspector, it is the geosynthetic installer's responsibility to communicate to the engineer of any changes in the condition of the subgrade that might render it out of compliance, with any of the requirements of the project specification or ASTM Standard D 6102.

5.0 DEPLOYMENT

As rolls are selected for deployment, the labels should be removed and recorded by the installer, along with any other pertinent information. The rolls should only be transported from the storage area using approved lifting equipment as described in section 2.0. The roll is supported during deployment, so that the fabric designated as the upper surface faces out, away from the installation vehicle. The free end of the roll can then be secured; while the vehicle supporting the roll slowly backs away, deploying the GCL as it moves. Alternatively, the free end can be manually pulled across an area to be lined by the installation crew while the equipment simply suspends the roll. Equipment traveling directly on GCL for deployment of overlying geosynthetics should be limited to lightweight ATVs maximum bearing capacity of 8.0 psi (34.5 kPa) or equivalent.

Successive panels are overlapped according to project specifications and/or within the overlap lines stenciled on the upper surface of each panel. Wherever possible, installation of GSE BentoLiner should begin at high elevation and proceed to low elevation. This allows any precipitation to accumulate and drain quickly without adversely affecting the GCL. The edges of exposed GCL should be weighted down with sandbags or equivalent ballast to prevent uplift in the event of substantially strong winds.

Only as much GSE BentoLiner as can be fully covered by the end of the day should be deployed or such amount that can be covered in a reasonably short time in the event of heavy precipitation. When GCL is being installed under a geomembrane, the leading edge should be folded back under the membrane at the end of the construction day. Temporary ballasting, such as sandbags, to prevent uplift and the infiltration of runoff water should secure the leading edge of the membrane.

GSE BentoLiner panels should be installed in a relaxed condition, free of wrinkles and folds. When fitting the product into small areas or around construction details, use a sharp utility or hook blade knife to cut the liner to the appropriate dimensions. Adjacent panels should overlap at the edges as described in section 6.0 below.

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Installation Quality Assurance Manual

6.0 OVERLAPS & SEAMS

Unless specified differently adjacent lengthwise (longitudinal) seams should be overlapped a minimum of 6.0 in (150 mm). Granular bentonite should be used to augment all overlapped seams. Loose granular bentonite is placed between ajoining panels into the overlap area at a rate of 0.25 lb per linear foot (350 g per linear meter) of seam. Widthwise overlaps at the butt ends of rolls should be a minimum 12.0 in (300 mm). Seams should be shingled in a down slope direction, so that water flows across the seam from upslope sheet to the down slope sheet.

When the liner is cut to fit in small areas, i.e. into corners or around structures, adjacent panels should overlap a minimum of 1.0 ft (300 mm), adding abundant loose granular bentonite into the overlapped areas.

7.0 ATTACHMENT DETAILS

The product should be installed around penetrations, structures, pipes, structures and other appurtenances according to the contract drawings. GSE BentoLiner may be secured to appurtenances by use of a stainless steel batten or clamps, mechanical fasteners, or other appropriate device if necessary to minimizing movement. The use of additional granular bentonite or bentonite paste is recommended to maximize the seal around structures or protuberances.

8.0 ANCHORING

GSE BentoLiner is typically anchored in a trench around the perimeter of the lined area, which provides the required pullout resistance. In most cases, GCL can be anchored in the same trench as any adjacent geosynthetic liner components (if used). Dimensions and locations of the trench should be provided in the project drawings. Alternately, the material may be anchored by deploying additional run out of material, a minimum of 3.0 ft (1.0 m), past the slope crest and toe. Typically GCL should not be deployed in tension. The force holding the GCL in place should be provided by friction between the GCL and adjacent materials

Steps should be taken to ensure that precipitation does not accumulate in the trench prior to backfilling. The GCL should only cover the front face and bottom of the anchor trench. The trench should be back filled and properly compacted prior to placing cover soil on the slopes.

9.0 REPAIRS

In the event an area of GSE BentoLiner becomes damaged, torn, or punctured during installation, the affected area should be repaired. On relatively level surfaces, the damaged area should be covered with a separate piece of GSE BentoLiner extending at least 12.0 in (300 mm) beyond the damaged area in every dirRection. Granular bentonite should be used to augment the patch overlays as is required for all other seams. Patches on side slopes can be temporarily secured with construction adhesive such as Liquid Nails or tape.

Areas that are exposed to standing water or excess precipitation with resulting bentonite hydration, typically as defined as greater than 30% moisture, prior to soil covering, should be examined for bentonite displacement and damage by subsequent activities. If it is determined that the GCL has been hydrated and damaged, the GCL should be covered with new material over the affected area or removed and replaced. All GSE BentoLiner material exposed to hydrocarbon fuels, chemicals, pesticides, non-compatible leachates, or other harmful liquids during the installation should be removed and replaced with non-affected material.

10.0 INSPECTION

Prior to soil covering the panels, penetrations and any other details should be visually inspected to ensure full coverage and properorientation. Once the installed GSE BentoLiner material has been approved the next layer of geosynthetics or soil covering may be applied.

11.0 COVER MATERIAL

Only the amount of GSE BentoLiner GCL that can be anchored, inspected, and covered the same day should be installed. In cases where the GSE BentoLiner GCL is the sole hydraulic barrier, the GCL should be covered with the specified thickness of cover soil (a minimum 1.0 ft (300 mm)) immediately following deployment: Where GSE BentoLiner GCL is used in conjunction with other membrane components, it should be covered with the geomembrane after placement, as soon as possible to protect it from the climatic elements.

BentoLiner GCL Products



When a geomembrane is being installed over the GCL, the leading edge of the GSE BentoLiner should be folded back under the geomembrane so that the geomembrane extends beyond the GCL a minimum of 2.0 ft (600 mm). The leading edge of the membrane should subsequently be weighted with sand bags or suitable ballast to safeguard against wind uplift and to prevent runoff water from undermining the liner.

When GSE BentoLiner is used with no overlying geomembrane, the soil cover should be placed within 2.5 ft (800 mm) of the leading edge of the GCL. The leading edge can then be covered with plastic sheeting that is folded under the exposed edge approximately 12.0 in (300 mm). Sand bags or suitable ballast should be placed on the liner to hold the plastic in place and to partially confine the GCL. The next morning the ballast and the plastic can be removed and subsequent rolls of GCL placed as described in section 5.0.

Cover soil placed directly on GCL should have a gradation to not damage or puncture the GCL. Cover soil should be free of all rocks greater than 0.75 in (18 mm) diameter, sharp or angular objects, sticks, roots or debris. Appropriate placement methods should be used at all times to protect the GCL. Compatibility of GSE BentoLiner GCL with the soil should be verified. Cover material should be pushed across the seams from top to bottom to prevent the cover material from lodging between the overlapped panel seams.

12.0 HYDRATION & ACTIVATION

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In applications where the product is used as the sole hydraulic barrier, such as secondary containment, the GCL must first be hydrated with fresh water. Non-aqueous chemicals will not activate the bentonite. Therefore, bentonite hydration via rainwater or sprinkler and irrigation is necessary. When hydrated, the GSE BentoLiner is an excellent barrier to hydrocarbon fuels, fertilizers, and other such chemicals.

Only after the cover material has been placed should the GSE BentoLiner be allowed to hydrate. Once hydration has occurred no vehicles should be allowed to traffic the area directly above the GCL, unless minimum 1.0 ft (300 mm) separation exists between the GCL and the vehicle to adequately distribute the vehicle load. This should be increased to a minimum of 2.0 ft (600 mm) in high traffic areas such as roadways.

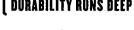
Periodic inspection of the liner to ensure proper coverage and adequate moisture content is recommended when GSE BentoLiner is used alone under a minimum 1.0 ft (300 mm) depth of cover soil. In arid regions, it may be necessary to irrigate the containment area, at a predetermined interval and/or a laminated or coated GCL used and deployed with the plastic component up in order to minimize dessication and wet - dry cycling.

Installation Quality Assurance Manual

GSE is a leading manufacturer and marketer of geosynthetic lining products and services. We've built a reputation of reliability through our dedication to providing consistency of product, price and protection to our global customers.

Our commitment to innovation, our focus on quality and our industry expertise allow us the flexibility to collaborate with our clients to develop a custom, purpose-fit solution.

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(DURABILITY RUNS DEEP)

For more information on this product and others, please visit us at GSEworld.com, call 800.435.2008 or contact your local sales office.



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	Pro	oject #	ΒΙΥ				hea W	L	Rig	ehole# <u>5</u> 8- /SamplerType:	Gef	<u>c</u> o 50	
	<u>SM</u>	A Fiel	d Tech:	Hin	The second se	ierle			Dril	ier: MO TE	;	<u> </u>	Borehole Diameter:
	Sample Depth	Тіте	Co	lor	Secondary Soil Type	Primar Tyj		Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, freguent and with to desribe increasing amounts)
	1	10:17	Ligh) Dark gray olive	tan yellow red	Gravelly Sand Silty Clayey	Boulder Cobble Pebble Gravel	Silt	Poorly	Very Coarse Coarse Medium Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Lt brown V. fine grain Sondstone moderate to well sorted, Slight calc comentation. Some s: 11 Fractions. 2.5YR613
	2	10:1B	Ligh) Dark gray olive	tan yellow red	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel		mod	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Lt. brown v. fine quain, Some (Sondstone) Silt fraction, moderation well sorted Slight calc cementation. 2.5 YR 6/3
(پر ایک ا	3	10:FT	Ogb Dark gray olive	tan yellow red	Gravelly Sindy Silty Clayey	Boulder Cobble Pebble Gravel		Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist		Lt. brown U.fine grain, Some (Sendistani) Silt Fraction, modulatly to well Soctod Slight calc commutation 2.5/R 6/3
	4	10:20	Jġh Dark gray olive	tan yellow red	Gravelly Silty Clayey	Boulder Cobble Pebble Gravel	Silt Clay	Poorly mod	Very Coarse Coarse Medium Fine Very Fine	Semi-consolidated Dense Plastic Unconsolidated	Ory Moist Wet		Lt brown U. fine grain, some (Sondistione) silt Fraction, moduatly to well souted slight calc cementation 2.54R 6/3
	5	10:21	<i>Ligh)</i> Dark gray olive	tan yellow red	Gravelly Silty Clayey	Boulder Cobble Pebble Gravel	Sill Clay	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	s Moist Wet	- 	Lt. brown U. Cine Grain, some silt(sondstone) Graction, moderating to well Sortee Slight calc cementation. Z. 5×R613
	4	1102	ight Dark gray olive	tan yellow	Gravelly Sand Silty Clayey	Boulder Cobble Pebble Gravel	Clay	Poorly	Very Coarse Coarse Medium Fine Very Eine	Semi-consolidated Dense Plastic Uncon <u>soli</u> dated	Moist Wet		Lt reddish brown, V. Fine grain, with Sondstone) Silt, moderat ly sorted. V. Slight calc Cementation 28VP 614
· · ·	7		Light Dark gray olive	tan orow yellow	Gravelly Santo Silly Clayey	Boulder Cobble Pebble Gravel	1.502011	Pooriy	Very Coarse Coarse Medium Fine Very Fine	Bock Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Lt redush brown, V. Eine grain Sondstone with silt. moderatly sontary slight calc commutain 2.58R 5/6
	8		- 11. H	tan yellow	Gravelly Sand Silty Clayey	Boulder Cobble Pebble Gravel	Sand Sill Clay	Poorly Well	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		LI reddish brown, v fine grain sondstone (soft) moderally souted, aon calc cement some clay content 2.5/R 5/6

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Notes:

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Pro	oject #	BEYA 11			ال <i>ـ</i>		Bor Rig Drill	ehole# <u>513-1</u> /SamplerType: <u>C</u> er: <u>h</u> \o_1	FC	<u>o</u> 500	Start Date/Time: <u>11-(8-(6</u> Stop Date/Time: <u>11:40</u> Borehole Diameter:
Sample Depth	Time	Color	Secondary Soil Type	Primary Type	•	Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, freguent and with to desribe Increasing amounts)
9	1101	Ugiv tan Dark Fown gray yellow olive M	Gravelly Sandy Silty Clayey		Clay	Poarly Well	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Molst Wet		Lit. reddish brown U fine main, Srity Sondstone, modulatly Souted. noncalc computation.
1D	1105	Dark brown Dark brown Tray yellow Ölive red 91000	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Silt Clay	Poorly	Very Coarse Coarse Medium Fine Very Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet	<u>,</u>	Slight Clay content 2.54 R 5/4 Lt greenish grey V. fine grain very chard Sond Stone, high cale cementation mod to well sorted GLEY1 7/1 1064
11	1136	Dank brown	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Silt Clay	Poorly	Very Coarse Coarse Medium Fine Very Fing	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet	· · · · · · · · · · · · · · · · · · ·	Lt. queenish quee Vitine grain very hard sondstone i high Cale comentation mod-well souther GLEY1 7/1 1064
12	1137	Dark bown gray yellow olive CCO	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	San Silt Clay	Pool S	Very Coarse Coarse Medium Fine Very Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Lt redish brown, U.f. negrain very hard Bondstone, Very high cale commit, mod-well sorted. 10R 5/4
13	1138	Dark Grow gray yellow olive (ED)	Gravelly Silty Clayey	Boulder Cobble Pebble Gravel	Sang Silt Clay	Poorty	Very Coarse Coarse Medium Fine	Roco Semi-consolidated Dense Plastic Unconsolidated	Moist	-	Lt. reddishbrown, Ufine grained have sand stone. well sorted, weak calc comentation. 542 6/4
14	1139	Cons tan Dark too gray yellow ollve teg	Gravelly Silty Clayey	Boulder Cobble Pebble Gravel	Silt Clay	Poorty	Very Coarse Coarse Medium Fine Very Fino	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Lt. reddish brown V. fine grained hand sond stone, well - mod Souted, Slight calc commutation. 10 R 6/6
15	1140	olive 🚳	-	Cobble Pebble Gravel	Silt Clay	Poorty	Very Coarse Coarse Medium Fine	Cook Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Lt reddish brown. U fine gia nod Thaud Soud Stone, well - mal Southed U.S. Tight cele cementation. 10 R 6/6
	:	<i>Light</i> tan <i>Dark</i> brown gray yellow olive red	Gravelly Sandy Silty Clayey	Bouider Cobble Pebble Gravel	Sand Silt Clay	Poorty	Very Coarse Coarse Medlum Fine	Rock Semi-consolidated Dense Plastic	Dry Moist	,	

Pro	oject #_	BEYA I				Rig	rehole# <u>5B</u> g/SamplerType: <u></u> ler: <u>mp</u> T		0 BOK	کارا - الکت Start Date/Time: Stop Date/Time: کتتی: Borehole Diameter:
Sample Depth	Lime	Color	Secondary Soil Type	Primary S Type	Sorted IIC	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, freguent and with to desribe increasing amounts)
1	1205	Ligh) tan Dark brown gray yellow olive red	Gravelly Sandy Silty Clayey	Cobble S	and Poorly Silt lay	Coarse Medium Fine	Rock Semi-consolidated Dense Plastic	Dry Moist	· · · · · · · · · · · · · · · · · · ·	SAMPLE LOST
Z	1205	Ligh) tan Dark brown gray yellow olive @	Gravelly Silty Clayey	Cobble	Well Poorty lilt lay	Very Fine Very Coarse Coarse Medium Fine Very Fine	Unconsolidated <u>Rock</u> Semi-consolidated Dense Plastic Unconsolidated	Wet Da Moist Wet		Lt. reddish brown V. Fine gramed sondstone, not to well sorted. Very highly calc cementation. 2.5 Y.R 6/4
3	1207	Dight tan Dark gray yellow olive @	Gravelly Silty Clayey	Cobble S	and Poorly illt lay	مسيحي المتحد والمتحد والمتح	Consolidated Dense Plastic Unconsolidated	Moist Wet	<u> </u>	2.5 YR 6/4 Lt. reddish brown v. fine grande southation. 2.5 YR 6/4 Lt. reddish brown v. fine grained
4	1208	Dark tan Dark town gray yellow olive	Gravelly Sandy Silty Clayey	Cobble	Ing Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Sond stone, well Sortes, non calc
5		Contraction Dank bow gray yellow olive @	Gravelly Silly Clayey	Bouider 6 Cobble 5 Pebble C Gravel	Poorly Int lay	Very Coarse Coarse Medium Fine Very Fige	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		2.5YR 6/4 Lt. reddish brown U.fine grained Sondistone, well Sortes, noncale cementation. 2.5XR 6/4
4		Light tan Dark browd gray yellow olive 60	Gravelly Sandy Silly Clayey	Cobble S	ilt lay	Very Coarse Coarse Medlum Fine	Roco Semi-consolidated Dense Plastic Unconsolidated	Dæ Moist Wet		2.5×R 6/4 Lt. reddish brown U. Fine grain Sondotone, well sorted, U. Slight call Cemantation 2.5×R 6/4
7	123		Gravelly Sandy Silty Clayey	Cobble S Pebble C Gravel	ay	Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Moist		Lt. reddish brown V. fine grain sondstone, was sorter non calc comontation. 2.5/R G/4
8	100	Ligh) tan Dark Grown gray yellow olive @	Gravelly Sandy Silty Clayey		ilit ay	Very Coarse Coarse Medium	Semi-consolidated Dense Plastic	Moist		Lit redd 5h brown V. fine grain Sond stone: modera tiy Sarted. Some Mad anain inclusions

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			BEYA 1	85 Li	neheall		Bor	ehole# <u>58</u> -	2	<u></u> ,	Start Date/Time: 1225 11-18-16
		ject #		1.110	្នាល			/SamplerType:		50 <u>دي</u>	
	<u>SM</u>	A Field	d Tech: <u>H</u> rw		تعدو	T	Drill	ler: Mo T	E	· · · · · · · · · · · · · · · · · · ·	Borehole Diameter:
· · · · ·	Sample Depth	Time	Color	Secondary Soil Type	Primary Soli Type	Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, freguent and with to desribe increasing amounts)
، ، ، ، ، ، ، ، ، ، ، ، ، ، ، ، ، ، ،	9	1225	Cath) tan Dark Grow gray yellow Olive Cath	Gravelly Sand Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel		Very Coarse Coarse Medlum Fine	Semi-consolidated Dense Plastic	Moist		Lt. neddish brown V. Fine grain well sondstone. Some mice, (biotite) Borter very strong cale commutation.
3		- 25				Web	Very Floe	Unconsolidated	Wet		(Some grey ish moteling) 2. 5% R. 6/2 Lt. redish brown with some mixed bed
	1D	1226	Dark provn Dark provn Ollve / , @	Gravelly Saudy Silty Clayey	Boulder Sant Cobble Silt Pebble Clay Gravel	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic	Molst		given ish grey U. f.m. grain Sonalstone.
						Wes	Very Fige	Unconsolidated	Wet	· · ·	well soched GLEXI 61564
· · · ·)	/3	1252	Cight tan Dark drown gray yellow	Gravelly Sando Silty	Boulder and Cobble Silt Pebble Clay	Poorly	Very Coarse Coarse Medium	Semi-consolidated.	Moist		Well Sarbock GLEYIGISGY Lit reddight brown V. Finc to Gine grain sond stone calcite Gractime fillings-mod souted.
	[1]		olive ன	Clayey	Gravel	Well	Ē	Plastic	1. 10/04		R.54R 6/4
	·		CighD tan	Gravelly	Boulder Sand		Very Fine Very Coarse	Unconsolidated	Wet		A. J. K. 6/4
	17	1253	Dark Grown	Silty Clayey	Cobble Sill Pebble Clay Gravel	8	Coarse Medium Fine	Semi-consolidated Dense Plastic	Moist		Lt brownish grey V. Fine gram Sondistone, Final sor ted, strong calc comontation
						Well	ery Fine	Unconsolidated	Wet	:	10X K 6/2
* • • •	13	1254	Light tan Dark brown grap yellow olive red	Gravelly Sandy Silly Clayey	Boulder Sang Cobble / Sill Pebble / Clay Gravel	Poorly	Very Coarse Coarse Medlum	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		10/2 6/2 Lt. brown grey v. fine-fine grain sondstone, mod sorted, moderate calc comentation. 10/2 6/3
	17	5	Dark Grow Gran yellow olive red	Gravelly Silty Clayey	Boulder, Sand Cobble Sill Pebble Clay Gravel	Poorly Well	Very Coarse Coarse Medium	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Ltbrown grey V. fine-fine gran Sondstone, mod south, weakly calc commutation. 10/R 613
	15	12540	Light tan Dark brown gan yellow olive red	Gravelly Silty Clayey	Boulder Sant Cobble Silt Pebble Clay Gravel	Poorly	Very Coarse Coarse Medium Fine	Rock Serni-consolidated Dense Plastic	Dry Molsi		10/R 613 Lt. brown grey V. fire + Fine grain Sondistine, mad sorted, non calc. commentation.
						Well.	Very Fine	Unconsolidated	Wet	·	10Y R 6/3
	t		<i>Light</i> tan <i>Dark</i> brown gray <u>ye</u> llow olive red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly	Very Coarse Coarse Medium Fine	Rock , Semi-consolidated Dense Plastic	Dry Moist	· · · · · · · · · · · · · · · · · · ·	
					· .	Well	Very Fine	Unconsolidated	; Wet		
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			<u>3</u> I	YAI	8 5	hine l	معما	L		ehole# <u>5</u> B-			Pasel 062 Start Date/Time: 13:21 11-18-1
	Proj SM/	ect #_ A Field	Tecl	n: Hrw	s/Di	ede				/SamplerType:		0.501	Stop Date/Time: 14:02 Borehole Diameter:
	Sample Depth	Time	C	Color	Secondary Soil Type	Primary Typ		Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, freguent and with to desribe increasing amounts)
	1	2	<i>Light</i> Dark gray olive	tan Grow yellow	Gravelly Sendy Silty Clayey	Boulder Cobble Pabble Gravel	Silt Clay	Poorly	Very Coarse Coarse Medlum Fine	Semi-consolidated Dense Plastic	Moist		Lt reddish brown Vilin grain Sondstone well souted Dlight cale commitation
		1					~	Well	Very Fine	Unconsolidated	Wet		2.5 YR 6/4
ş. I	Z	22	Dark Dark gray	tan Grown yellow	Gravelly Sendy Silty	Boulder Cobble Pebble	Silt Clay	Poorly	Very Coarse Coarse Medium	Semi-consolidated Dense	Moist		Lt. reddish brown V-fine grain sonastone, well sonted, slight calc cementation
		(J	olive _	Ø	Clayey	Gravel		ve	Fine Very Fine	Plastic Unconsolidated	Wet		2.54R 614
(<u>)</u>	3	273	Ligh Dark gray olive	tan growp yellow	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Clay	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Lt. reddish torown v. Fin grain Sond Stone, well tomod Soutal, Stisht Calc commitation. 2.54 R 6/4
	4		Dark gray olive	tan Yellow	Gravelly Sanoy Silty Clayey	Boulder Cobble Pebble Gravel	Silt Clay	Poorty	Very Coarse Coarse Medium Fine Very Fing	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Lt- vedetish brown v. Frne Snary Sondistone. Well to mus sorted, Very Slight call commutation Some mino- bratite 2.5x R 6/4
-	5	1325	Dark Dark gray olive	tan yellow	Gravelly Selfy Silty Clayey	Boulder Cobble Pebble Gravel	Clay	36) <u>3</u>	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic	Molst		Sondistone, were to mode Sonted, Very slight cole compatient on
	6	d a D	<u>Oark</u> Dark gray olive	tan Pellow Yellow	Gravelly Sanay Silty Clayey	Boulder Cobble Pebble Gravel	Sill Clay	Pooriy	Very Fing Very Coarse Coarse Medium Fine	Unconsolidated Semi-consolidated Dense Plastic Unconsolidated	-Wet DD Moist Wet		Some minor biotite 2.54 R 64 Lt reddish brown V. fine gram Sondstone, well sorted, very Slight Call Commution. Some minor biotile 2.54 R 5/6
	7	JOL	(igh) Dark gray olive	tan Joen yellow	Gravelly Sanoy Silty Clayey	Boulder Cobble Pebble Gravel	G Sit	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist		
	00	10	Ligh) Dark gray olive	tan Byallow Byallow	Gravelly Siny Clayey	Boulder Cobble Pebble Gravel	Silt Clay	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Ht. reddish brown V. Fine Very Slight oald comentation 2.54 5/6 ht. reddish brown V. Fine grain Sond Stone, well sorted Very Slight call cementation. 2.54 5/6

	Pro	ject #_			.,				Rig	ehole# <u>58-</u> /SamplerType: <u>C</u> ler: <u>nvo</u> Tu		50K			e/Time: Diameter:	द्ये व ग	i-1
	Sample Depth	Time		Color	Secondary Soil Type	Priman Typ		Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, oo inc	· · · · · · · · · · · · · · · · · · ·	uent and with	to desribe	
	9	1403	Dark Dark gray olive	tan brow Vellow	Gravelly Silly Clayey	Boulder Cobbie Pebble Gravel	Silt Clay	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic	Moist	e an	Lt. reddish br Sondstone, moc Very slight Ca	L-well s	sorted.	ain	
1		.1.2	~	چې	olay by			Ŵ	Very Fing	Unconsolidated	Wet				2.5YR	5/6	
			CigDt Dark gray	tan bown yellow	Gravelly Sendy Silty	Boulder Cobble Pebble	Silt Clay	Poorly	Very Coarse Coarse Medium	Roco Semi-consolidated Dense	Moist		Lt. reddish bu Sondstow, mod	rown, v.	fines	Jein	
	0		olive	•	Clayey	Gravel	,	TOD YOTH	Fine Very Fine	Plastic Unconsolidated	Wet		non caleareur	comm	tation 2.5VR	5/6	:
			Light	tan	Gravelly	Boulder	Sand	Poorly	Very Coarse	Rock	Dry			· · · · · ·			
			Dark	brown	Sandy	Cobble	Silt		Coarse	Semi-consolidated							
			gray	yellow	Silty	Pebble	Clay	1	Medium	Dense	Moist		· .				• •
•		. '	olive	red	Clayey	Gravel		4	Fine	Plastic							
-			Linht		Crowelly	Douldor	Cood	Well	Very Fine	Unconsolidated Rock	Wet						
:	:		Light Dark	tan brown	Gravelly Sandy	Boulder	Sand Silt	Poorly	Very Coarse Coarse	Semi-consolidated	Dry		1				÷.,
	:		gray	yellow	Silty	Pebble	Clay	1. 1	Medium	Dense	Moist		· · · · · · · · · · · · · · · · · · ·				
			olive	red	Clayey	Gravel			Fine	Plastic ,			· · · · · · · · · · · · · · · · · · ·				
					:. <u>.</u>	i statione de la companya de la comp		^{∵.} Well	Very Fine	Unconsolidated	Wet				-		
			Light	tan	Gravelly	Boulder	Sand	Poorly	Very Coarse	Rock	Dry			•			
			Dark	brown	Sandy	Cobble	Silt	:	Coarse	Semi-consolidated							•
			gray olive	yellow red	Silty Clayey	Pebble Gravel	Clay	• •	Medium Fine	Dense Plastic	Moist						
			01140	·	Clayby		÷	Well.	Very Fine	Unconsolidated	Wet	•					•
		· · · · · ·	Light	tan	Gravelly	Boulder	Sand	Poorly	Very Coarse	Rock	Dry		· · · · · · · · · · · · · · · · · · ·	<u> </u>			_
1			Dark	brown	Sandy	Cobble	Silt	-	Coarse	Semi-consolidated							
			gray	yellow	Silty	Pebble	Clay		Medium	Dense	Moist						
			olive	red	Clayey	Gravel			Fine	Plastic		:	· · · · · ·	· · · ·	•		
\vdash	. :		Light	tan	Gravelly	Boulder	Sand	Well	Very Fine Very Coarse	Unconsolidated Rock	Wet Dry	·					
1			Dark	brown	Sandy	Cobble	Sano	POUNY	Coarse	Semi-consolidated	Diy	ана страна 1911 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1912 - 1 1912 - 19					
			gray	yellow	Silty	Pebble	Clay		Medium	Dense	Moist						
			olive	red	Clayey	Gravel			Fine	Plastic			··· ·· ···			· ·:	: · · `
L							i	Well	Very Fine	Unconsolidated	Wet	· · · ·					•: :
1			Light	tan	Gravelly	Boulder	Sand	Poorly	Very Coarse	Rock	Dry						
ĺ.			Dark	brown	Sandy	Cobble	Silt	1	Coarse	Semi-consolidated							
			gray	yellow	Silty	Pebble	Clay		Medium	Dense	Moist				····	•••••	
1	- 1		olive	red	Clayey	Gravel			Fine	Plastic	-		· · · ·		• •		- 7

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		RT/		خا ی	ممامه	k .				ل.	··· ·	Pagel & Z Start Date/Time: 14:10 11~1
	oject #		<u>, .c</u>	<u> </u>		~		Bor	ehole# <u>5</u> 6- J/SamplerType: <u>(</u>	39.92	0 501	Start Date/Time:
			1:Hin	s/Di	ede		·	Dril	ler: mo TE			Borehole Diameter:
Sample Depth	Ţ	ľ	Color	Secondary Soil Type	Primar Typ		Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, freguent and with to desribe increasing amounts)
l	1430	<i>Light</i> Dark gray olive	tan brown yellow red	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Sand Silt Clay	Poorly	Very Coarse Coarse Medium Fine	Rock Semi-consolidated Dense Plastic	Dry Molst		LOST SAMPLE
2	143(<i>Light Dark</i> gray olive	tan brown yellow red	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Sand Silt Clay		Very Fine Very Coarse Coarse Medium Fine	Unconsolidated Rock Seml-consolidated Dense Plastic	Wet Drý Moist	2	Lust SAMPLE
3	1432	(Ign) Dark gray olive	tan bewy yellow	Gravelly Silty Clayey	Boulder Cobble Pebble Gravel	Silt Clay	Well Poorly	Very Fine Very Coarse Coarse Medium Fine	Unconsolidated	Wet Moist Wet		Lt. reddish brown V. Fine gram Sond stone. well sorted, very Slight cale commutation 2.5YR 6/4
4	1435	Eight Dark gray olive	tan Voiva yellow	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Sill Clay		Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Lt. reddish brown V. Fine grain Sondstone, well souted, vory Slight call comentation.
5	1434	Light Dark gray olive	tan Solow Selow	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Sint Clay		Very Coarse Coarse Medium Fine (Very Fine)	Semi-consolidated Dense Plastic Unconsolidated	Moist		2.54 C/4 Lt. meddish brown V. fine grain Sondstone, mod-well soutcel, Vary Blight calc certaintin 2.14
		<i>Light Dark</i> gray olive	tan brown yellow red	Graveliy Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Sand Silt Clay	Poorly Well	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		Silly bedding planes present 2.5XR 614 with signs of organic material.
6	1505	gray olive	tan To yellow yellow	Gravelly Silty Clayey	Boulder Cobble Pebble Gravel	Clay	Pooriy	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist	· · · · · · · · · · · · · · · · · · ·	Lt. reddish brown V. finegram Somestone, weee Soulde, non calc Demontation. 2.54 P. 6/4
7	י ^{י5} י	<i>Light Dark</i> gray olive	tan brown yellow	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Salt Silt Clay	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic	Moist		0.ementation. 2.54 R. 6/4 Lt. reddish brown. v. fine grain Sond Stone, well sorte. non cal careour cementation 254R 6/4

	oject # 1A Fiel		1: (+ i)r	dsi Di	ede			Drill	/SamplerType: er:ner:	GERC		•	Stop Date/ Borehole Di		15:0
Sample Depth	Lige	c	olor	Secondary Soil Type	Primary Typ		Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, c ir	ccasional, fregue creasing amount		to desrib
		(g)	tan	Gravelly	Boulder	20 d	Poorly	Very Coarse	KOCK	9		Lt. vodish b.			
	1507	Dark grav	vellow	Silty	Cobble Pebble	Silf Clay		Coarse Medium	Semi-consolidated Dense	Moist		sondstone, u	vell Sorte	d. ver	~~/
8	ילו	olive		Clayey	Gravel	Clay	1	Fine	Plastic	, MOISL		slishtly cal comentat	101000		
-		-	O	Clayby		· · · · ·	NO	Very Fine	Unconsolidated	Wet		Qumendal	-104	2.59	RGI
· -	1 -	Ligo	tan	Gravelly	Boulder	Sand	Poorly	Very Coarse	Rock	0	· · · · ·	Lt. reddig bro	<u>100.</u>		
			TOTOW	Sandy	Cobble	Silt	1 00my	Coarse	Semi-consolidated	2	····	Sond story we		نو γ. μ. ۲. است. مح	n
9	508	gray	yellow.	Silty	Pebble	Clay		Medium	Dense	Moist	• •	JONG STON! WIL		a tron	30~1
1	1	olive	reo	Clayey	Gravel	•	Ø	Fine	Plastic			Non calcaveor Boding plane	ith		1
		 				2	(Cel)	Very Fine	Unconsolidated	Wet	· ·	Clay, coarse for	a e organios	2.5Y 1	2 5/4
	•	Ught Dark	tan	Gravelly	Boulder	-6and	Poorly	Very Coarse	Roch	(a)		14 meddisin "	orown V	fine	neim
			Grown	Sandy.	Cobble	Silt		Coarse	Semi-consolidated			Lt-reddisk"	ell-mod.	sorted	Ì. `
10	1509	gray	yellow	Silty	Pebble	Clay	(mail)	Medium	Dense	Moist		non calc. Cen	non-Lation		
•		olive	œ	Clayey	Gravel		600	Fine	Plastic					2 -10	-1.1
		1			·		We	Very Fine	Unconsolidated	Wet			•	2.5YR	314
		Light	tan	Gravelly	Bouider Cobble	Sand Silt	Poorly.	Very Coarse Coarse	Rock Semi-consolidated	Dry			· · · · · ·		
		<i>Dark</i> gray	brown vellow	Sandy Silty	Pebble	Clay		Medium	Dense	Moist					
		olive	red	Clayey	Gravel	Ciay	ч. — П	Fine	Plastic	Wolar					
			100				Well	Very Fine	Unconsolidated	Wet					
	1	Light	tan	Gravelly	Boulder	Sand	Poorly	Very Coarse	Rock	Dry			······································		
	ľ .	Dark	brown	Sandy	Cobble	Silt	,	Coarse	Semi-consolidated						
		gray	vellow	Silty	Pebble	Clay	۰.	Medium	Dense	Moist			·		
		olive	red	Clayey	Gravel			Fine	Plastic						
							Well .	Very Fine	Unconsolidated	Wet					
		Light	tan	Gravelly	Boulder	Sand	Poorly	Very Coarse	Rock	Dry					
	: · · ·	Dark	brown	Sandy	Cobble	Silt	[`	Coarse	Semi-consolidated						
		gray	yellow	Silty	Pebble	Clay		Medium	Dense	Moist					
-] .	olive	red	Clayey	Gravel	-	··	Fine	Plastic	i I		· · · · ·			•••••
	<u> </u> :	1.1-4	4	0	-		Well	Very Fine	Unconsolidated	: Wet					
	1 1	Light _ Dark	<u>tan</u>	Gravelly	Bouider Cobble	Sand Silt	Poorty	Very Coarse . Coarse	Rock Semi-consolidated	Dry					
	ľ	gray	brown yellow	Sandy Silty	Pebble	Clay		Medium	Dense	Moist					
		iolive	red	Clayey	Gravel	Oldy	-	Fine	Plastic	Moiat		:			
			.50				Well	Very Fine	Unconsolidated	Wet			-:		
	<u> </u>	Light	tan	Gravelly	Boulder	Sand	Poorly	Very Coarse	Rock	Dry		······			
	1	Dark	brown	Sandy	Cobble	Silt		Coarse	Semi-consolidated	- 7					
		gray	yellow	Silty	Pebble	Clay		Medium	Dense	Moist	· · · · .				
	Li ,	olive	red	Clayey	Gravel			Fine	Plastic	;				· · ·	
	l' i				2. 1.		Well .	Very Fine	Unconsolidated	Wet					

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		oject: oject #	Br)	1A 18	SL:	rehealt	····· · · ··· ·	Bor	ehole# <u> </u>		CU SDY	Start Date/Time: 15:15 11~1
			t Tec	h: It in	Jer D	Joila	•••••••••••••••••••••••••••••••••••••••	Dril				Borehole Diameter:
	Sample Depth	Time		Color	Secondary Soil Type	Primary So Type	Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, freguent and with to desribe
	- 1	1,531	Light Dark gray olive	tan brown yellow red	Gravelly Sandy Silty Clayey	Boulder Sa Cobble S Pebble Cl Gravel	iiit Iay	Very Coarse Coarse Medium Fine	Rock Semi-consolidated Dense Plastic	Dry Moist		LOST SAMPLE
- - - -	2	1592	<i>Light Dark</i> gray olive	tan brown yellow red	Gravelly Sandy Silty Clayey		ilt ay	Very Fine Very Coarse Coarse Medium Fine	Unconsolidated Rock Semi-consolidated Dense Plastic	Wet Dry Moist		LOST SAMPLE
	3	(53)	Dark Dark gray olive	tan Groðin yellow	Gravelly Silty Clayey	Boulder S Cobble S Pebble Cl Gravel		Very Fine Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Wet Moist	Sl. The so	LT reddish brown U. Fine grain gondstong ned Sonting. Badding plones & rubbilized zone with Slight hydro carbon odlon. Very calcareous Cementation 2.5YR 5/4
	4	157	<i>Light Dark</i> gray olive	tan brown yellow red	Gravelly Sandy Silty Clayey	Boulder Sa Cobble S Pebble Cl Gravel	iit 👘	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet	orgonic	Lt reddish brown V. Ging gram Sond Stone, well Sorted. Coloureous Cementation Solid Sond Stone with No bedding agant colour 7. SyR 5/4
-	5	1535	Light Dark gray olive	tan brown yellow red	Gravelly Sandy Silty Clayey	Boulder Sa Cobble Si Pebble Cl Gravel		Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet	slisht hyero odor	Lt reddigh brown refine gram Sondatone, mod-poor so-ted. Bedding planes is: in Glay Leposition, Silt & possible staining: 7.5 y R 5/4
:	4	1550		tan Vellow	Gravelly Silty Clayey	Boulder Sa Cobble Si Pebble Cla Gravel	nt ay Well	Very Coarse Coarse Medium Fine	Roc Semi-consolidated Dense Plastic Unconsolidated	Moist Wet	· · · · · · · · · · · · · · · · · · ·	Lt reddish brow/grey v. fine grain Sondstone moderate sorting. strong calc. cemoriation 104/2 6/2
· · ·	7		Ligh Dark gray olive	tan Orowar Oleioar red	Gravelly Sandy Silly Clayey	Boulder Se Cobble Si Pebble Cla Gravel	ilt ay	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic	Moist		Lt brown yellow u. fine grain Dondstone, well sorted, vory Blisht Calle commutation.
	8	1352	Dark Dark gray olive	tan Growa Vellow red	Gravelly Gandy Silty Clayey	Boulder Sa Cobble Si Pebble Cla Gravel	iit [*]	Very File Very Coarse Coarse Medium Fine	Unconsolidated Rook Semi-consolidated Dense Plastic	Wet Moist		IBXR 5/4 If brown yellow U. Fine grain Sondowne, mod. Sonted, non-calc Cemonitation 10YR 5/4

-----Notes:

Pro	oject #_	·	A 18						ehole# <u>56</u> /SamplerType: <u>C</u> ler: <i>Mie</i> _TE		<u>0</u> 50K	Pase 2062	S S	top Dat	e/Time: e/Time: Diameter		_11~1
Sample Depth	Time	, c	Color	Secondary Soil Type	Priman Typ		Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use 1	increas	ing amou	ints)		
9	1553	Dark Dark gray olive	tan Veltow red	Gravelly Silty Clayey	Boulder Cobble Pebble Gravel	Sano Silt Clay	Poorly Well	Very Coarse Coarse Medium Fine Very Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet	•	Lt brown Sondstone. calc cemon	Yellou mod.s tation.	orti	Fine ng Ve	ran ~ysli	sht
ĮD	1554	<i>Light Dark</i> gray olive	tan Growh Vellov red	Gravelly Silty Clayey	Boulder Cobble Pebble Gravel	Silt Clay	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic	Moist		Sondstone. ealc cemon Lt brown Sondstone. Calc Ceme	yellow med. : ntation.	sort:	Fine Ing. ve	grain ny slis	
		<i>Light Dark</i> gray olive	tan brown yellow red	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Sand Silt Clay	Well Poorty	Very Fine Very Coarse Coarse Medium Fine	Unconsolidated Rock Semi-consolidated: Dense Plastic	. Wet Dry Moist			··· · · · · · · · · · · · · · · · · ·	<u>.</u> 	<i>τυγι</i> ζ	. 73	
· · ·		Light Dark gray	tan brown yellow	Gravelly Sandy Silty	Boulder Cobble Pebble	Sand Silt Clay	Well Pooriy	Very Fine Very Coarse Coarse Medium	Unconsolidated Rock Semi-consolidated Dense	Wet Dry Moist				· · · ·			
í 		olive <i>Light</i> Dark gray	red tan brown yellow	Clayey Gravelly Sandy Silty	Gravel Boulder Cobble Pebble	Sand Silt Clay	Well Poorly	Fine Very Fine Very Coarse Coarse Medium	Plastic Unconsolidated Rock Semi-consolidated Dense	Wet Dry Moist							
		olive Light Dark	tan	Clayey Gravelly Sandy	Gravel Boulder Cobble	Sand Silt	Well Poorty	Fine Very Fine Very Coarse Coarse	Plastic Unconsolidated Rock Semi-consolidated	Wet	· · · ·			• • • • • • • • • • • • • • • • • • • •		·	: :
		gray olive <i>Líght</i>	yellow red tan	Silty Clayey Gravelly	Pebble Gravel Boulder	Clay	Well Poorly	Medium Fine Very Fine Very Coarse	Dense Plastic Unconsolidated Rock	Moist Wet	··· ·· ··		• • •	• • - •			
		<i>Dark</i> gray olive	brown yellow red	Sandy Silty Clayey	Cobble Pebble Gravel	Silt Clay	Well	Coarse Medium Fine Very Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet	· · · · · · · · · · · · · · · · · · ·						
		<i>Light Dark</i> gray olive	tan brown yellow red	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Sand Silt Clay	Poorly	Very Coarse Coarse Medium Fine	Rock Semi-consolidated Dense Plastic	Dry Moist			· · · · · · · · · · · · · · · · · · ·	· · · · · ·	· · · · · · · · · · · · · · · · · · ·		

Pr	oject#			·· · ·	· · · · · · · · · · · · · · · · · · ·	Rig)/SamplerType:			
Sample Depth		d Tech: 14	Secondary D	2:f Ede Primary Soil Type	Sorted	Dril Grain Size (Sands Only)	ler: <u>M.O</u> Consolidation	Moisture	OVA results (ppm)	Borehole Diameter: Remarks (Use trace, occasional, freguent and with to desribe increasing amounts)
	1613	Light tan Dark brow gray yello olive red		Boulder San Cobble Sill Pebble Cla Gravel		Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		LOST SAMPLE
2	1614	Lan tan Dārk trow gray ello olive red	Gravelly n Sandy Silty Clayey	Boulder San Cobble Sill Pebble Cla Gravel	d Poorly	Very Coarse Coarse Medium	Semi-consolidated Dense Plastic Unconsolidated	Moist		LT brown yellow V. finegrain sondstone, mod sorting. strong cale cementation 10VR 6/3
3	1615	LOD tan Dark brow gray yello olive red	Gravelly Sandy Sitty Clayey	Boulder Sil Cobble Sil Pebble Cla Gravel	d Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		10YR 6/3 Lt. brown yellow v. fine grain Sondstone, well soutes, non calc cementation Lt. brown yellow v. fine grain
4	الحاد	Dark tan Dark trow gray red	v Clayey	Boulder San Cobble San Pebble Clay Gravel		Very Coarse Coarse Medium Fine Very Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist		Cale comenting 101/D 6/3
5	167	Light tan Dark Gow gray Yello olive red	Gravelly Silty Clayey	Boulder Sall Cobble Sill Pebble Clay Gravel		Very Coarse Coarse Medium Fine Very Eine	Semi-consolidated Dense Plastic Unconsolidated	Moist		Lt brown yellow U. fine grain Sondstone, well sorted. non cale cementation.
6	1635	Dark brow gray end olive red	Gravelly Sendy Sitty Clayey	Boulder San Cobble Sitt Pebble Clay Gravel	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist	• • • • •	10× R 6/3 Ltbrown yellow V.finegrain Sonelstone, weel sateq, noncalc Cementation. 10× R \$/3
7	163/0	Gab tan Dark Grow gray Coord olive red		Boulder and Cobble Sill Pebble Clay Gravel	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic: Unconsolidated	Moist		cementation. 10/2 \$13 Lt. 500 yellow U-Fine grain Sond stone, week Serted, non cale cementation 10 y P. 5/3
g.		Dark brown gray Velloy olivered	Gravelly Sand Silty Clayey	Boulder San Cobble Sitt Pebble Clay Gravel	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic	Moist		Lt. 5-own Yellow V. fine grain Sond stone. well Serted, non- Call comentation 10 y R 5/3

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		oject #							Rig	/SamplerType:		<u>E</u> Co 5	
	SM	IA Fiel	d Tech	1: H P n	351D	iad e			Drill	er: moī	C		Borehole Diameter:
	Sample Depth	Lime	-	Color	Secondary Soli Type	Primary Type		Sorted	Grain Size (Sands Only)	, Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, freguent and with to desribe increasing amounts)
	9	1638	Dark gray olive	tan Prown Yellow Yellow	Gravelly Sentor Silty Clayey	Boulder Cobble Pebble Gravel	Clay	Poorly	Very Coarse Coarse Medium Fine	Rock) Semi-consolidated Dense Plastic Unconsolidated	Moist		Lt brown Yellow U.Fine grain sondition; well sorted non-calc commutation
-	1D	1639	Light Dark gray	tan prowy vellow	Gravelly Sendy Silty	Boulder Cobble Pebble	Silt Clay	Poorly	Very Fing Very Coarse Coarse Medium	Semi-consolidated Dense	Wet Moist		commentation 10YR 5/3 Lt. brown yellow V. fine grain Sond stone moderating sorthe. Very slight calc Commentation 10YR 5/4
)			olive Light Dark	tan brown	Clayey Gravelly Sandy	Gravel Boulder Cobble	1.1	Well	Fine Very Fine Very Coarse Coarse	Plastic Unconsolidated Rock Semi-consolidated	Wet Dry	· · · ·	very slight calc commentation 10x R5/4
			gray olive	yellow red	Silty ; Clayey	Pebble Gravel	Clay	Well	Medlum Fine Very Fine	Dense Plastic Unconsolidated	Moist Wet		
:			Light Dark gray olive	tan brown yellow	Gravelly Sandy Silty	Boulder Cobble Pebble	Sand F Silt Clay	oorly	Very Coarse Coarse Medium Fine	Rock Semi-consolidated Dense Plastic	Dry Moist		
	· · · ·		Light	red tan	Gravelly	Gravel	Sand P	Well Poorly	Very Fine Very Coarse	Unconsolidated Rock	Wet .		
			Dark gray olive	brown yellow red	Sandy Silty Clayey	Cobble Pebble Gravel	Silt Clay		Coarse Medium Fine	Semi-consolidated Dense Plastic	Moist		
		· · · · · · · · · · · ·	Light Dark gray	tan brown yellow	Gravelly Sandy Silty	Boulder Cobble Pebble		Vell _ Poorly	Very Fine Very Coarse Coarse Medium	Unconsolidated Rock Semi-consolidated Dense	Wet Dry Moist		
) _)			olive	red	Clayey	Gravel		Well	Fine Very Fine Very Coarse	Plastic Unconsolidated Rock	Wet_	5 6	
			<i>Dark</i> gray olive	brown yellow red	Sandy Silty Clayey	Cobble Pebble Gravel	Silt Clay		Coarse Medium Fine	Semi-consolidated Dense Plastic	Moist	- 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995 - 1995	
			Light Dark	tan brown	Gravelly Sandy	Boulder Cobble		Well Poorly	Very Fine Very Coarse Coarse	Unconsolidated Rock Semi-consolidated	Wet Dry		
		I	gray	vellow	Silty	Pebble	Clay		Medium	Dense	Moist	2	

	Pro	piect:	3IY	A I	85 L	ineh	eak		Bor	ehole#_SB	-7	•	Page 1 6 2_ Start Date/Time: 9:15_11-19-10
	Pro	ject #				•.			Rig	/SamplerType:	SEFC	0 501	C Stop Date/Time:
'n	SM	A Fiel	d Tech	<u>: [] ، v</u>	145/	Died	و	r	Dril	ler: MOTO	<u> </u>		Borehole Diameter:
	Sample Depth	Time	с	olor	Secondary Soil Type	Primar Typ		Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, freguent and with to desribe increasing amounts)
	It	q:22	Light Dark gray olive 	tan brown yellow red	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Sand Silt Clay	Poorly Well	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		LOST SAMPLE
	Z	q:23	<i>Light Dark</i> gray. olive	tan brown yellow red	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Sand Silt Clay	Poorly	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		LOST SAMPLE
	3	7.21	Light Dark gray olive	tan yellow red	Gravelly Send Silty Clayey	Boulder Cobble Pebble Gravel	Silt Clay	Well	Very Coarse	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet	P055:616 P.X.15 200.15	L.t. Brown, poorly sorted, V. Fine ti course one in sondstone. Rether rubbilized. From Pitercavation. Possible 3 poils 7.5 Y.R. 6/4
	4	9:25	bight Dark gray olive	tan yellow red	Gravelly Sanoy Silly Clayey	Boulder Cobble Pebble Gravel	Silt Clay	Poorly	Very Coarse Coarse Medium	Semi-consolidated Dense Plastic	Moist		Lt. brown, V. fine grain Sondstand Well sonted. colcite Fracture Fillings, Strong Calc Cementation 7.54 R G/3
	5	9:26-	Dark Dark gray olive	tan erown yellow red	Gravelly Silly Clayey	Boulder Cobble Pebble Gravel	Sill Clay	Poorly	Very Fing Very Coarse Coarse Medium Fine (Very Fing	Unconsolidated Semi-consolidated Dense Plastic Unconsolidated	Wet Moist Wet		ht-Brain, V. fine grain Sand Stone well serted, Strong cale comentation Minor biplite 7.54 P. 6/3
	4		Light Dark gray olive	tan Eroyn Elloy red	Gravelly Santy Silty Clayey	Boulder Cobble Pebble Gravel	Clay		Very Coarse Coarse Medium (FIND) Very Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist		Lif Deown Yellow fine grain Sondstone, very well Sorted. Non-Calcareous cementation 2.546/3
	7	وريه	Light Dark — gray olive	tan Felfow red	Gravelly Silty Clayey	Boulder Cobble Pebble Gravel	Silt Clay	Poorly	Very Coarse Coarse Medium	Semi-consolidated Dense Plastic: Unconsolidated	Moist		Lt brown yellow fine to U. fine grain Somestione. well Santer. Calcito from the Santer. non calc cementation 2.57 6/3
(0)	9:40	Dark Dark gray olive	tan toolo red	Gravelly Sanyy Silty Clayey	Boulder Cobble Pebble Gravel	Silt Clay	Poorly	Very Coarse Coarse Medium Very Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet	· · · · ·	Ltbrown yellow fine grain Sondstone, well sonted. non Calc cementation 2.54 6/3

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		ect:	BEYA	185 L	inche	aL		Bor	ehole# <u>56</u> /SamplerType: /	-7	0 50	Start Date/Time:
			Tech: 14r	nds/	Diede			Dril	ler:MOE	<u></u>		Borehole Diameter:
: .	Sample Depth	Time	Color	Secondary Soil Type	Primary Typ		Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, freguent and with to desribe increasing amounts)
	9		Dark book gray yello olive red			Silt	Poorly	Very Coarse Coarse Medium Fine Very Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Lt brown vellow V. Frine grain Sond & tone. Well Sorted. Badding planes with organic maleriel & brotite: Norcalc 2.5 Y 6/3
	10		gray Cello olive red	Gravelly Sento Silty Clayey	Boulder Cobble Pebble Gravel	Silt Clay	Poorly	Very Coarse Coarse Medium Fine Very Fime	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Ltbrown yellow. V. Fine grain sondstone. well sonted, non cale Cementation.
	1(1005	Dark Down gray yello olive red	Gravelly Silty Clayey	Bouider Cobble Pebble Gravel	Silt	Poorty	Very Coarse Coarse Medium Fine Very Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		2.57 613 Lt.brownyellow V. fine grain Sondstone. well Sorted. non calc cementation. 2.58 613
	12	10:05-	Dark from gray yellow olive red	Gravelly Silty Clayey	Boulder Cobbie Pebble Gravel	Silt Clay	Ø	Very Coarse Coarse Medium Fine Very Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist		2.5× 6/3 Lt. brown Kellow. U-fine grain Sondstone, well Sortes. non calc cementation minor biotite 2.5× 6/3
	3	.0.07	Dark Trow gray Clove olive red	Gravelly Silty Clayey	Boulder Cobble Pebble Gravel	Sand Silt Clay	VD	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Lt. brown rellow. v. fine grain Bondstone, wellsorted, non eale cementation menor biotite 2.58 6/3
)	i-{	00	olive red	Gravelly Sand Silly Clayey	Boulder Cobble Pebble Gravel	Silt Clay	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Lt. brown Yellow, U fine grain Sondstone, well souted, non cale Cementation- Minor Diotite 2.54 6/3
	5	n:G	<i>Light</i> tan <i>Dark</i> brown gray yellow olive red		Boulder Cobble Pebble Gravel	Sand Silt Clay	Poorly	Very Coarse Coarse Medium Fine	Rock Semi-consolidated Dense Plastic	Dry Moist		Lt. brown yellow, V. fine grain Sond Stone, Well Sorted Blidet
$\left \right $			<i>Light</i> tan <i>Dark</i> brown gray yellow	Gravelly Sandy Silty	Boulder Cobble Pebble	Sand Silt Clay	Weli Poorly	Very Fine Very Coarse Coarse Medium	Unconsolidated Rock Semi-consolidated Dense	Wet Dry Moist		calc Cementation 2.5× 6/3
	-		olive red	Clayey	Gravel			Fine	Plastic	1		

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			·						· · · · ·			Are colon-Z
	Pro	ject #_				Lineha iede	rak .	Bor Rig Drill	ehole# <u>58</u> /SamplerType: <u>6</u> ler: <u>W</u> 07	5-8 5EFC	<u>0</u> 60	Page \ UST Start Date/Time: K Stop Date/Time: Borehole Diameter:
· · · · ·	Sample Depth	Tìme	<u>т</u>	ölor	Secondary Soil Type	Primary Soil Type	Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, freguent and with to desribe increasing amounts)
	- 1	1040	Light Dark gray olive	tan brown yellow red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel		Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet	· · :	LOST SAMPLE
· · · · · · · · · · · · · · · · · · ·	2	1041	Dark Dark gray olive	tan brown yellow red	Gravelly Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly	Very Coarse Coarse Medium Fine	Roce Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Lt. brown grey v. fine grain sondstone - Very hand. Wellsonted strong calc cementation. 2.34 G/2
)	3	1042	Light Dark Tay olive	tan brown yellow red	Gravelly GIDY Silty Clayey	Boulder Sæ Cobble Silt Pebble Clay Gravel	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist		2.54 6/2 Lt. brown grey V. fine opain Sindstone. Veny hand well Sorted Strongcale cemonitation 2.54 6/2
:	4	10-13	Oark Dark gray olive	tan yellow red	Gravelly Sandy Silty Clayey	Boulder San Cobble Silt Pebble Clay Gravel		Very Coarse Coarse Medium Fine	Kock Semi-consolidated Dense Plastic Unconsolidated	Moist		Somestone. Veny have well southed Strong call commutation 2.54 6/2
	5	t D	Dark Dark Olive	tan yellow red	Gravelly Sancy Silty Clayey	Boulder San Cobble Silt Pebble Clay Gravel	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic	Moist Wet		Lt. brown grey V. fine grain Sundstone. Very haid. well Sorted Strong calc cementation 2.54 6/2
	4	110	Dark Dark gray olive	tan trown red	Gravelly Sitty Clayey	Boulder Sant Cobble Silt Pebble Clay Gravel	Poorly	Very Coarse Coarse Medium Fine	Unconsolidated Fock Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Lt brown y ellow V, fine grain Sondstone, well Sortia, calc Cementation. 2.54 6/3
990mm/**	7	117	Ghi Dark gray olive	tan town yellow red	Gravelly Siny Clayey	Boulder Sill Cobble Sill Pebble Clay Gravel	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist		Lt brown yellow V. fine spain sond stone well sonted, very Slight calc cement minor mica 2.54 43
	8	1120	Light Dark gray olive	tan brown yellow red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel		Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Lt brown Yellow, V. Fine quain Well-mod Gortee, Very Slight calc cementation. Some elay 2.54 6/3

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	Pro	ject: ject #	BIY	<u>A' 18</u>	<u>35 Li</u> r	rehea	sc.		Bor	ehole# <u>58</u> -	-8	0 40k	C Start Date/Time: Stop Date/Time:				
	SM	A Fiel	d Tech	Hind	SODi	de			Rig/SamplerType: <u>G戸CO</u> 50に Driller: <u> MO TE</u>				Borehole Diameter:				
	Sample Depth		С	olor	Secondary Soil Type	Primary Typ		Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, frequent and with to desribe increasing amounts)				
	9	1121	Cight Dark gray olive	tan Cowh Celev red	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Silt Clay	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet		Lt brown yellow V. fine spain sond stone, well Sorted, very stight calc cementation 2.54 6/3				
	JD	1122	Light Dark gray olive	tan brown yellow red	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Sand Silt Clay	Poorly Well	Very Coarse Coarse Medium Fine Very Fine	Ročk Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		Stight cale commander of 2.57 6/3 Lt. brown Yellow, V. fine grain Sondstore. Well Sorted, very Slight cale commander. minor mica 2.57 6/3				
·····:.)		· ·	Light Dark gray olive	tan brown yellow red	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Sand Silt Clay	Poorly	Very Coarse Coarse Medium Fine	Rock Semi-consolidated Dense Plastic	Dry Moist		minar mica 6.34 6/3				
			<i>Light</i> Dark gray olive	tan brown yellow red	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Sand Silt Clay	Well Poorly	Very Fine Very Coarse Coarse Medium Fine	Unconsolidated Rock Semi-consolidated Dense Plastic	Wet Dry Moist						
		· · · ·	<i>Light Dark</i> gray	tan brown yellow	Gravelly Sandy Silty	Boulder Cobble Pebble	Sand Silt Clay	Well Poorly	Very Fine Very Coarse Coarse Medium	Unconsolidated Rock Semi-consolidated Dense	Wet Dry Moist	-					
			olive Light Dark	tan	Clayey Gravelly Sandy	Gravel Boulder Cobble	Sand Silt	Well Poorty	Fine Very Fine Very Coarse Coarse	Plastic Unconsolidated Rock Semi-consolidated	Wet						
			gray olive	yellow red	Silty Clayey	Pebble Gravel	Clay.	Well	Medium Fine Very Fine	Dense Plastic Unconsolidated	Moist Wet	1					
		•	<i>Light Dark</i> gray olive	tan brown yellow red	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Sand Silt Clay	Poorly	Very Coarse Coarse Medium Fine	Rock Semi-consolidated Dense Plastic	Dry Moist						
		: :	Light Dark	tan brown	Gravelly Sandy	Boulder	Sand Silt	Well Poorly	Very Fine Very Coarse Coarse	Unconsolidated Rock Semi-consolidated	Wet Dry						
			gray — olive	yellow red	Silty Clayey	Pebble Gravel	Clay	Welt,	Medium Fine Very Fine	Dense Plastic Unconsolidated	Moist Wet						

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Pro Pro	oject: oject:#	5-	דו א					Bor Ric	ehole#6 /SamplerType:	<u>, </u>	<u> </u>	Start Date/Time: Stop Date/Time:
	A Fiel				·····.			Dril		· · · · · · · · · ·	······································	Borehole Diameter:
Sample Depth	Time	C	olor	Secondary Soil Type	Primary Typ		Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, freguent and with to desr increasing amounts)
1	11-18	Light: Cady gray olive	tan www.yellow	Gravelly Silty	Boulder Cobble Pebble	Silt Clay	Poorly	Very Coarse Coarse Medium	Semi-consolidated Dense	Dry Nois	Oil ned	Dic Yellow brown, V. Pinegrain Sondstone, Oil Stained, Clausin
	lles		red	Clayey	Gravel		- 1	Fine Very Fino	Plastic Unconsolidated	Wet	obor	Colordarkaning) 101012 4/
		Light Dack	tan boogen	Gravelly Sandy	Boulder Cobble	Send	Poorly	Very Coarse Coarse	Semi-consolidated	Dry		DK Yellow brown, y. C.
2	1129	gray olive	yellow red	Silty Clayey	Pebble Gravel	Clay		Medium Fine	Dense Plastic		soaled	DK-Yellow brown, U.E. megrai sordstone, Oil Soakeo, (Ceusing colo dorkening)
		Light	tan	Gravelly	Boulder	Send	Poorly	Very Coarse	Unconsolidated	Wet Dry	7	DK Vellow brown, V. fine grenn
3	50	Dark gray	yellow	Sabiy	Cobble Pebble	Sill		Coarse Medium	Semi-consolidated Dense	Moist.	oi stat	Sond stone O: 1 Saturated, (cause
	N.	olive	red	Clayey	Gravel		Well	Fine Verv Fine	Plastic Unconsolidated	We	7	Color darkening) 10x R 4/4
	5	Light	tan	Gravelly	Boulder	জ্ঞা	Poorly	Very Coarse	Rock	Dry .	(odio	DK yellow brown, v. fine gre
1	1,51	gray _	bown yellow	Serroy	Cobble Pebble	Silt Clay		Coarse	Semi-consolidated Dense	Monst	01	Sond stone, ail staining (causing a
1		olive	red	Clayey	Gravel	-		Fine	Plastic		gaining	the day has New
<u></u>		Light	tan	Gravelly	Boulder	6993	Poorly	Very Fine Very Coarse	Unconsolidated	Wet	4	Dicyellow brown, v. fine gran
_	is	O T	@wn	any	Cobble	Silt		Coarse	Semi-consolidated		Oil n'	Sond stone, oil staining causing
5	•	gray olive	yellow	Silty- Clayey	Pebble Gravel	Clay	. •	Medium . Fine	Dense Plastic	Moijt	Sta	1 - Mandrada in the still we have a
					f		. (Ve)	Very Fine	Unconsolidated	Wet	080	
	· · · ·	Light	tan	Gravelly	Boulder	Sard Silt	Poorly	Very Coarse	600	Ð	oilm	JZ vellow to rown, v. fine grain
<i>[</i> :	1208	Dade gray	vellow	Sandy Silty	Cobble Pebble	Clay		Coarse Medium	Semi-consolidated Dense	Moist	10 min	
	100	olive	red	Clayey	Gravel			Fine	Plastic		stain	getting drier.
		Light	tan	Gravelly	Boulder	<u></u>		Very Fine	Unconsolidated	Wet	020,	10y R 414
_		engri Parts	tan brown	Sandy	Cobble	Sil	Poorly	Coarse	Semi-consolidated	Q	ail A	Dicyellow brown, v. fr. gran
+	าปี	gray	yellow	Silly	Pebble	Clay		Medium	Dense	Moist	101	Bondstone, silstaining, rock
	aff e r	olive	red	Clayey	Gravel	•	Wen	Fine (ery Fine)	Plastic Unconsolidated	Wet	2 Sol	getting drier, 1042- 5/ DK-med brown, V. fine grain Sondstone, 0:1 Staining, roc getting drier, 104/2 5/
· ·	4	(igh)	tan	Gravelly	Boulder	B	Poorly	Very Coarse	Rock	0		DK-med brown, V. fine Grain
	1202	gray	yellow	Sandy Silly	Cobble Pebble	Silt Clay	·.	Coarse Medium	Semi-consolidated Dense	Moist	01,079	Sondstone, a: 1 Stain in
j : : : [10-	olive .	red	Clayey	Gravel	,		Fine	Plastic	;	sta's	
							Ne	Very Fine	Unconsolidated	Wet	aller	Jon 10 1/2 5/

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	Pro	ject:	BIYA	1856	ine he	all.		Bor	ehole#_SB	-9	-	Start Date/Time: 12:03 (1-19-16
		ject #_	Tech:i	A STARSTON				Rig Drill	/SamplerType:			C Stop Date/Time: Borehole Diameter:
	-				l	<u> </u>			eιγγ.τ.	<u>ن ن</u>		
	Sample Depth	Ë	Color	Secondary Soil Type	Primary Type		Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, freguent and with to desribe increasing amounts)
	9	1203	(ion) tar (ion) tar gray yello olive rec	w Silty	Cobble	Silt Clay	Poorly	Vary Coarse Coarse Medium Fine	Roc Semi-consolidated Dense Plastic Unconsolidated	Moist Wet	Oil nors staints polor	
**************************************	10	1204	gray yello olive rec	w Sandy.	Bouider Cobble Pebble Gravel	Silt Clay	Poorly.	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet	oil inits	DK- mid brown, U. fine grain Sondstone, Oil Staining, Wellsorted
·)	н		Com tar Dairk Grow gray wellt olive rec	Silty	Boulder Cobble Pebble Gravel	Silt Clay	Poorly	Very Coarse Coarse Medium Fine	Semi⊢consolidated Dense Plastic Unconsolidated	Moist	Glibhit Oider	med-Ll. Yellow brown, V. fine grain sond stone, Very light Oilodor, very slight celle 2.54 C/3
1	12		olive rec		Boulder Cobble Pebble Gravel	Silt Clay		Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet	slisht oilor	grain Sondistone, well sorted.
· · ·	13		Dark bov gray Jelk olive rec	n Silly	Boulder Cobble Pebble Gravel	Sill Clay	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet	61:30-X	Lt. brown- yellow, V. fine grain Soncestone. well-sorted, Slight oil odor Slight cole cementation. 2.5YR 6/3
))	t		light tar Dark prov gray yello olive rec	w Silty	Cobble	Silt Clay		Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist	SI STA	Lt. Yellow brown, V. fine grain Sandstone, well-mod Sortea, Very Slight oil Odor 2.54R Very Slight Calcremontation
Mard *		1209		n Sandy Silty	Boulder Cobble Pebble Gravel	Silt Clay	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet	5 50 00	Let Vellow brown. V. fine grain Sond stone, well -mod Sortes
	14	1249	Light lan Dark how gray yello olive (Tet	w Silty	Cobble	Silt Clay	voorly	Very Coarse Coarse Medium Fine	Reco- Semi-consolidated Dense Plastic Unconsolidated	Moist Wet	15.5N 0.007	Lt redeish brown, V. fine grain

Notes:

Pro	ject #_	5 E Ý A 18				Rig	ehole# <u>S</u> B J/SamplerType: <u>C</u>	<u>2 E F</u>		•
SM	<u>A Fiek</u> T	Tech: H		<u>rede</u>	r	Dril	ler: M	OT	<u>1</u>	Borehole Diameter:
Sample Depth	e E I	Color	Secondary Soil Type	Primary Soil Type	Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, freguent and with to des increasing amounts)
17	1256	Lighton tan Dark Ligwo gray yellow olive	Gravelly Sandy Silty Clayey	Boulder Can Cobble Silt Pebble Clay Gravel	Poorly	Very Coarse Coarse Medium Fine Very Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist Wet	silisht	Lt redish brown. U. fine gu Sonalstone, mod to well sorted. Somple rubbilized, strong calc com Slight e: 1 odor 5 y R 61
18		Cark boy Dark boy gray yellow ollve C	Gravelly Sendy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist.		Lt reddish brown v.f.n. g Sond stone, well sorted, strong calc comming. fractured No 0:10 Dor? 2.54 R
19	.25 ²	Contraction Dark brown Gray yellow Correct red	Gravelly Santy Silty Clayøy	Boulder Same Cobble Silt Pebble Clay Gravel	Poorty	Very Coarse Coarse Medium Fine Very Filling	Semi-consolidated Dense Plastic Unconsolidated	Moist		Lt greenish grey. V. fine gran Bond & time well souted. Very he Very strong calc cement GLEY 1.5
ZŨ	1253	(gh) tan Gray yellow (IV) red	Gravelly Silty Clayey	Boulder Sill Cobble Sill Pebble Clay Gravel	Poorly	Very Coarse Coarse Medium	Semi-consolidated Dense Plastic Unconsolidated	Dry Mois Wet		Med. olive brown V. Cine - Civ grain Bondofone. well sorted moistw/waterodor? non-calcoment 2.54R
21	323	Light tan Dark proon gray yellow Give red	Gravelly Silty Clayey	Boulder Send Cobble Silt Pebble Clay Gravel	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Dry Mois Wet		med olive brown. V. Fine- gran. Screlstone. wellsortes. moistu/water? noncalc cement 2.5YR
22	324	<i>Light</i> tan <i>Dark</i> brown gray yellow olive red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly Well	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		MOSTO F SAMPLE LOST Shaley material, Ltgrey Only fragments collected
23	1325	Dark crows gray elloy plive red -	Gravelly Silty Clayey	Boulder Sapa Cobble Silt Pebble Clay Gravel	Poorly	Very Coarse Coarse Medium Fine	Reeb Semi-consolidated Dense Plastic	Moist		Et reddish brown U. fine grad Bardstone, most to well Started, Silt fraction
24	324	Dark tan Dark town gray yellow Sive red	Gravelly Sendy Silty Clayey	Boulder Series Cobble Silt Pebble Clay Gravel	Poorty	Very Fine Very Coarse Coarse Medium Fine	Unconsolidated Rock Semi-consolidated Dense Plastic	Wet		Non cale coment 2.5% 6 Lt olive brown U. fine grain Bond stone, mod to well sorted Non cale coment 2.5% 5/

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-	Pro	ject#				ne her Diede			Bor Rig Dril	ehole# <u>5B</u> /SamplerType: <u>(</u> er: <u>Mo</u> TE	-9 &EF	501	Ра <i>зе</i> ч С	· · · · · · · · · · · · · · · · · · ·	Start Date Stop Date Borehole	e/Time	11327))-1 <u>9</u>
	Sample Depth	е Ц		olor	Secondary Soil Type	Primary Typ		Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)		increi	asing amou	ints)	ith to desribe	
	25	327	Gark Dark gray C	tan vellow red	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Sand Silt Clay	Poorly	Very Coarse Coarse Medium Fine	Semi-consolidated Dense Plastic	Moist		Lt Olive Sonaston cale cerr	brown ne, we unting	r		· · · ·	
		<u></u> 	Light Dark gray	tan brown yellow	Gravelly Sandy Silty	Boulder Cobble Pebble	Sand Silt Clay	Poorly	Very Fine Very Coarse Coarse Medium	Unconsolidated Rock Semi-consolidated Dense	Wet Dry Moist			<u> </u>	<u> </u>	2. <u>57</u>	<u> </u>	
))	· · · ·		olive Light Dark	red tan	' Clayey Gravelly Sandy	Gravel Boulder Cobble	Sand	Well Poorty	Fine Very Fine Very Coarse Coarse	Plastic Unconsolidated Rock Semi-consolidated	Wet_ Dry			· · · · · · · · · · · · · · · · · · ·				
				yellow red	Sandy Silty Clayey	Pebble Gravel	Clay	Wett	Medium Fine Very Fine	Dense Plastic Unconsolidated	Moist -							
			Light Dark gray olive	tan brown yellow red	Gravelly Sandy Silty Clayey	Boulder Cobble Pebble Gravel	Sand Silt Clay	Poorly	Very Coarse Coarse Medium Eine	Rock Semi-consolidated Dense Plastic	Dry Moist					•	• .	
	<u></u>	•	Light Dark	tan brown yellow	Gravelly Sandy	Boulder Cobble Pebble	Sand Silt	Weli Poorly	Very Fine Very Coarse Coarse Medium	Unconsolidated Rock Semi-consolidated Dense	Wet Dry							
			gray olive <i>Light</i>	red tan	Silty Clayey Gravelly	Gravel	Clay Sand	Well	Fine Very Fine Very Coarse	Plastic Unconsolidated Rock	Moist Wet						rugus d'a tele un	
,			Dark gray olive	brown yellow red	Sandy Silty Clayey	Cobble Pebble Gravel	Silt Clay	Well	Coarse Medium Fine	Semi-consolidated Dense Plastic Unconsolidated	Moist		· · · · ·		···· ···	····		
´ -			Light Dark gray	tan brown yellow	Gravelly Sandy Silty	Boulder Cobble Pebble	Sand Silt Clay	Poorly	Very Fine Very Coarse Coarse Medium	Rock Semi-consolidated Dense	Wet Dry Moist		· · · · ·		· · · · ·			
-		· · ·	olive Light Dark	red tan brown	Clayey Gravelly Sandy	Gravel Boulder Cobble	Sand Silt	Well Poorly	Fine Very Fine Very Coarse Coarse	Plastic Unconsolidated Rock Semi-consolidated	Wét Dry				· · · ·			
			gray olive	yellow red	Silty Clayey	Pebble Gravel	Clay	Well	Medium Fine Very Fine	Dense Plastic Unconsolidated	Moist,				•	:		

Notes:

HGU 185 Historical Spill Cleanup Sequence

- 1. 7/6/2015-Historical line release was discovered. Shut-in all wells connected to D Manifold
- **2.** 7/7/2015-Riley Industrial was brought in to begin the cleanup.
- **3.** 7/7/15-7/17/15- Riley continued the cleanup.
- **4.** 8/3/2015- Sauder Miller Associates performed release delineation sampling and a report.
- 10/13/15 -11/23/15- Continued removing contaminated soil and hauling to land farm.
 222 yds³. of contaminated soil was hydrovaced by Crossfire and removed from lease and taken to land farm.
- 6. Shut down cleanup operations for winter.
- **7.** 4/4/16-Cleanup operations resume with Champion. Rosenbaum Construction hauled 510 Yds³ of contaminated soil and sandstone to Land farms and landfill. All work guided by Sauder Miller.
- **8.** Continued Excavation through October.
- **9.** 11/18/16-11/19/16-Drilled 9 core holes to delineate the remaining contaminated area. Showed sandstone was not impacted at depths greater than 16 ft at the release location.
- **10.** Shut Down for winter.
- **11.** 4/2017-SMA Prepares final updated plan.
- 12. 6/15/17-10/24/17- Continued removal of contaminated soil and rock.
- **13.** 11/17-Winterized location by covering area with liner. Shut down for winter.
- **14.** Present-Souder Miller preparing closure plans.

Interior West Consulting, LLC PO Box 239 301 South 4th Dolores, CO 81323 Tel. 970-882-1542

Cultural Resource Inventory:

BIYA Operators Remediation at the Hicks #2 Pipeline Leak, #185 Pipeline Leak, and Ute #1 Tank Battery Spill, San Juan County, New Mexico

jadams co@yahoo.com

Prepared for:

Souder, Miller and Associates, Inc. on behalf of BIYA Operators

Submitted to:

Tribal Historic Preservation Office, Towaoc, Colorado & Museum of New Mexico, Laboratory of Anthropology

NMCRIS Activity No. 138506

July 2017

CULTURAL RESOURCE INVENTORY:

BIYA OPERATORS REMEDIATION AT THE HICKS #2 PIPELINE LEAK, #185 PIPELINE LEAK, AND UTE #1 TANK BATTERY SPILL, SAN JUAN COUNTY, NEW MEXICO

Prepared for:

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NMCRIS Activity No. 138506

July 2017

ABSTRACT

Interior West Consulting, LLC (Interior West) was contracted by Souder, Miller & Associates, Inc. (SMA), on behalf of BIYA Operators, to complete a cultural resource inventory for the proposed Remediation at the Hicks #2 Pipeline Leak, #185 Pipeline Leak, and Ute #1 Tank Battery Spill on the Ute Mountain Ute Reservation, San Juan County, New Mexico. The Bureau of Indian Affairs and the Ute Mountain Ute Tribe are requiring that BIYA Operators mechanically remove soils that are stained and contaminated by petroleum fluids that leaked from various well field facilities. The project was completed, in part, to comply with Section 106 of the National Historic Preservation Act. The Ute Mountain Ute Tribal Historic Preservation Office (THPO) is the lead agency, in consultation with the New Mexico State Historic Preservation Office (SHPO). The entire area of potential effect (APE) is 1.85 acres, including approximately 0.1 acre at the Hicks #2 Pipeline, 1.5 acres at the #185 Pipeline, and a 0.25 acre encompassing the Ute #1 Tank Battery. A total of 22.1 acres were intensively inventories for cultural resources, including approximately 3.4 acres at the Hicks #2 Pipeline, 8.7 acres at the #185 Pipeline, and a 10-acre block encompassing the Ute #1 Tank Battery. The current investigation consisted of a literature and database review, intensive pedestrian inventory, cultural resource site documentation, and National Register of Historic Places (NRHP) evaluations. One (1) newly identified and recorded archeological site (LA188129) was encountered within the survey area. The site is situated more than 160 feet (50 meters) southeast of the existing well pad disturbance and outside of the proposed APE. The site area should be avoided by at least 100 feet by all ground disturbing activities and personnel associated with the remediation work. The results of the inventory indicate that the Remediation at the Hicks #2 Pipeline Leak, #185 Pipeline Leak, and Ute #1 Tank Battery Spill, as proposed, would have no effect to significant cultural properties, and no further work is recommended. If undetected buried cultural resources are uncovered at any time during project construction, the THPO shall be immediately contacted. Construction shall be temporarily halted pending the notification process and further directions issued by the THPO.

Cultural Resource Inventory BIYA Operators Remediation At The Hicks #2 Pipeline, #185 Pipeline, and Ute #1 Tank Battery San Juan County, New Mexico

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INTRODUCTION

Interior West Consulting, LLC (Interior West) was contracted by Souder, Miller & Associates, Inc. (SMA), on behalf of BIYA Operators, to complete a cultural resource inventory for the proposed Remediation at the Hicks #2 Pipeline Leak, #185 Pipeline Leak, and Ute #1 Tank Battery Spill on the Ute Mountain Ute Reservation, San Juan County, New Mexico. The Bureau of Indian Affairs and the Ute Mountain Ute Tribe are requiring that BIYA Operators mechanically remove soils that are stained and contaminated by petroleum fluids that leaked from various well field facilities. The project was completed, in part, to comply with Section 106 of the National Historic Preservation Act. The Ute Mountain Ute Tribal Historic Preservation Office (THPO) is the lead agency, in consultation with the New Mexico State Historic Preservation Office (SHPO). The investigation was conducted in accordance with policies and regulations implementing Section 106 of the National Historic Preservation Act (NHPA)(Public Law 89-665), as amended, the Ute Mountain Ute Tribe Cultural Resource Management Plan (Potter 2014) and the governing rules found in 36 Code of Federal Regulation (CFR) Part 800, "Protection of Historic Properties."

PROJECT DESCRIPTION

The project would include mechanical removal of soils that are stained and contaminated by petroleum fluids that leaked from various well field facilities. The entire area of potential effect (APE) is 1.85 acres, including approximately 0.1 acre at the Hicks #2 Pipeline, 1.5 acres at the #185 Pipeline, and a 0.25 acre encompassing the Ute #1 Tank Battery. A total of 22.1 acres were intensively inventories for cultural resources, including approximately 3.4 acres at the Hicks #2 Pipeline, 8.7 acres at the #185 Pipeline, and a 10-acre block encompassing the Ute #1 Tank Battery. The current investigation consisted of a literature and database review, intensive pedestrian inventory, cultural resource site documentation, and National Register of Historic Places (NRHP) evaluations.

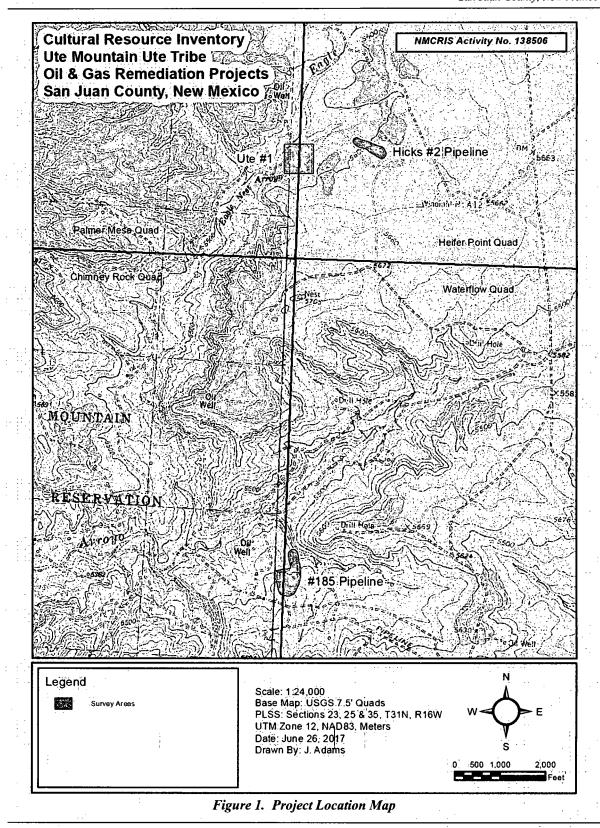
The current investigation consisted of a literature and database review, intensive pedestrian inventory, cultural resource site documentation, and National Register of Historic Places (NRHP) evaluations. One (1) newly identified and recorded archeological site (42SA31775) was encountered within the survey area. The site falls outside of the APE and would not be impacted by the proposed undertaking. No further work is recommended. The work was completed under the authority of Interior West's annual cultural resource permit issued by the Ute Mountain Ute THPO. Mark Lowe assisted with the fieldwork and site form production. The project area was visited on June 23, 2017.

PROJECT LOCATION

The project is located on the Ute Mountain Ute Indian Reservation in New Mexico, about 8 miles south of New Mexico's border with Colorado. The project is located entirely within in Township (T) 31 North (N), Range (R) 16 West (W), New Mexico Principal Meridian, in San Juan County, New Mexico. The project area is depicted on the Chimney Rock (1993), Heifer Point (1993), Palmer Mesa (1993), and Waterflow (1975), New Mexico, U.S. Geological Survey 7.5' topographic quadrangle maps (Figure 1).

- Hicks #2 Pipeline Leak: T31N, R16W, Section 23; Heifer Point Quad
- #185 Pipeline Leak: T31N, R16W, Section 35; Chimney Rock and Waterflow Quad
- Ute #1 Tank Battery Spill: T31N, R16W, Section 22-23; Heifer Point and Palmer Mesa Quad

Cultural Resource Inventory BIYA Operators Remediation At The Hicks #2 Pipeline, #185 Pipeline, and Ute #1 Tank Battery San Juan County, New Mexico



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ENVIRONMENTAL SETTING

The project area is located along the eastern margins of the San Juan Basin, and is included in the Colorado Plateau Semi-Desert Physiographic Province (Bailey 1995). Elevations within the project area range from approximately 5,460 feet to 5,620 feet above mean sea level. The climate of the area is classified as arid continental, characterized by cool, dry winters and warm, dry summers. Mean annual precipitation is less than 12 inches. Temperatures generally range from 60 to 100 degrees Fahrenheit (°F) in the summer and from 25 to 60°F in the winter. The factors of summer and fall rainfall and warm temperatures contributed to the success of farming and thus played a large role in determining prehistoric and historic settlement.

The area is drained by Eagle Nest Arroyo, which is a primary tributary of the San Juan River about 10 miles southwest of the project area.

The surface surrounding the project area is composed of sandstone overlying fine-grained mixed clastics, all deposited during the Cretaceous. The surface is predominantly composed of decomposing bedrock or regolith with shallow localized eolian and alluvial deposits. Landscapes are largely wind deflated. Soils known to occur in the project area are dominated by the Farview-Beclabito-Rock outcrop complex, 1 to 10 percent slopes, and the Farview-Rock outcrop complex, 1 to 10 percent slopes (NRCS 2017). Sediments, or parent materials, are derived from locally weathering sandstone and shale bedrock; and subsequent soil textures consist of fine-textured and sandy.

The project area falls within the lower range of the piñon and juniper belt (4,500 to 6,500 ft) of the southwest uplands. Vegetation communities surrounding the project area consists of open valleys of sagebrush surrounded by upland hills and ridges with piñon-juniper woodlands. Vegetation communities are determined primarily by soils, elevation, slope, and aspect. Plants observed within the survey area included piñon and juniper trees, big sagebrush, rabbitbrush, short grasses, weeds, and sparse forbs. Average surface visibility in the area is between 50 and 75 percent bare ground. The landscapes surrounding the project area support populations of mule deer, coyote, foxes, and lagomorphs. Birds of prey found in the area include eagles and hawks. Other large birds include crows, ravens, turkey vultures, and Merriam's turkey. A wide variety of smaller birds are also common in the area.

1 Beerly

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CULTURAL AND HISTORICAL OVERVIEW

Archaeological, evidence indicates that human populations, have inhabited the diverse landscapes and ecosystems of the northern San Juan Basin in northwest New Mexico for more than 12,000 years (Irwin-Williams 1967; Lipe et al. 1999; Pitblado 1999; Potter 2014; Wormington 1947; 1957). The region has been host to some of the oldest documented prehistoric agricultural communities, urban and political centers, and prehistoric human migrations in North America. Cultural resources are abundant in the region, including a great number of significant prehistoric sites associated with the Anasazi occupation of the area. Numerous large sites have been recorded on the reservation. The Ute Mountain Ute Tribe Cultural Resource Management Plan (Potter 2014) provides a detailed historic context for archaeological resources on the reservation and the greater geographic area of concern. Table 1 lists information and key references regarding the archaeological chronology of the northern San Juan Basin.

Period	Tradition	Phases	Dates BP	Dates *B.C./A.D.	Key References		
Paleoindian	Early & Late	Clovis, t Folsom, Plano Angostura	≥12500- 7500	*10500– *5500	Irwin-Williams 1967; 1973; Lipe and Pitblado 1999; Pitblado 1999; Potter 2014		
Archaic	Archaic	Early, Middle & Late Archaic	75002500	**5500– *1000	Irwin-Williams (1973; Lipe and Pitblado 1999; Potter 2014		
Basketmaker	Basketmaker II	Los Pinos	3000-1500	1000–500	Atkins 1993; Kidder 1927; Lipe et al. 1999; Lipe et al. 1999; Potter 2014; Roberts 1937		
Daskelinakei	Basketmaker III	Sambrito	1500–1300	500–750	Atkins 1993; Kidder 1927; Wilshusen 1999; Lipe et al. 1999; Potter 2014; Roberts 1937		
	Pueblo I	Piedra	-1100–1250	750900	Adler 1996; Kidder 1927; Roberts 1937; Wilshusen 1999; Lipe et al. 1999; Potter 2014		
Anasazi	Pueblo II	Mancos	1100-850	900–1150	Adler 1996; Kidder, 1927; Lipe and Varien 1999; Potter 2014; Roberts 1937; Wilshusen 1999;		
	Pueblo III	McElmo Mesa Verde	850–700	1150–1300	Adler 1996; Kidder 1927; Lipe and Varien 1999; Potter 2014; Roberts 1937; Varien and Wilshusen 2002; Wilshusen 1999		
Protohistoric	Ute, Navajo	N/A	716–136	1300-1880	Potter 2014; Wilshusen and Towner 1999		
Historic	Ute, Other	Settlement	>50–136	1880–1966	Potter 2014, Wilshusen and Towner 1999		

Table 1. Northern San Juan Regional Chronology.

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LITERATURE REVIEW

A pre-field records search was conducted to identify cultural resources in the immediate vicinity of the project area. The research consisted of online searches and review of the archaeological database in the New Mexico Cultural Resource Information System (NMCRIS) maintained by the Archaeological Records Management Section (ARMS) at the Museum of New Mexico (MNM), Laboratory of Anthropology (LA)

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

The results of the records search indicated that a total of three (3) previous investigations were completed within 1 mile of the project area between 1979 and 2006, including:

- NMCRIS Activity No. 810: An Archaeological Survey for a Main Pipeline and Two Gas Well Tie-in Pipelines in Northwest San Juan County. Completed in 1979 by the Division of Conservation Archaeology. Linear survey located about 850 meters east of the Hicks #2 Pipeline Leak.
- NMCRIS Activity No. 20147: Archaeological Survey of Eight Seismograph Lines for ARMA Geophysical, San Juan County, New Mexico. Completed in 1987 by La Plata Archaeological Consultants. Linear survey that overlaps the northwest corner of the survey block at the Ute #1 Tank Battery.
- NMCRIS Activity No. 102839: Archaeological Survey of Resolute Natural Resources Co.'s Pipeline Lease Renewal Project, Ute Mountain Ute Reservation, San Juan County, New Mexico. Completed in 2006 by Western Archaeological Services. Linear survey about 200 meters south of the #185 Pipeline Leak.

All three (3) projects are associated with oil and gas exploration and well-field development.

PREVIOUSLY RECORDED SITES

A total of two (2) previously recorded cultural resource sites are known to occur within 1 mile of the current project area, including:

- LA66072: Historic Navajo habitation site with a hogan, lambing pen, and an artifact scatter located about 250 meters northeast of the Ute #1 Tank Battery and northwest of the Hicks #2 Pipeline.
- LA67186 is a prehistoric artifact scatter located about 1,100 meters north of the Hicks #2 Pipeline.

No previously recorded sites are known to occur in the vicinity of the #185 Pipeline.

SURVEY METHODS

The cultural resource inventory consisted of a pre-field literature review, intensive pedestrian survey, cultural resource documentation, GPS mapping, and NRHP management recommendations. The work was completed under the authority of, and with permission from, the Ute Mountain Ute THPO. Jeffrey A. Adams served as principal investigator and field supervisor, and Mark Lowe assisted with the fieldwork. The project area was visited on June 23, 2017. Weather conditions were hot and sunny, and ideal for the discovery of cultural resources.

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Pre-field investigations included a thorough review of archaeological and historical site records, databases, maps, and reports maintained in the NMCRIS on-line database. The literature review covered areas up to 1 mile from the project area.

All portions of the survey area were inventoried using standard pedestrian transects spaced at a maximum of 15 meters apart. Survey areas were delineated and navigated with the aid of a Garmin etrex 30 handheld GPS unit. Special attention was given to areas of enhanced surface visibility, such as eroded areas, animal trails, anthills, rodent mounds, and disturbance associated with the existing well-field facilities. Equipment used during the fieldwork included a Garmin etrex 30 handheld GPS units for navigating transects, a Trimble Jun SB unit for mapping resources (2-5 real-time precision); a digital camera with minimum 12.0 megapixel capability; cellular phones; four-wheel drive vehicle; and misc. field equipment, such as a compass, tape measures, pin flags, flagging tape, clipboard, pencils, etc.

Site Recording

When artifacts or features were encountered, they were marked with pin flags or flagging tape, and the surrounding areas were examined carefully for additional materials. This was accomplished by covering the area with informal landform guided transects and/or more formal, spaced transects (usually 2-5 m spacing). When all visible cultural materials were identified and marked, and the resource was classified as a site or isolated find, the appropriate documentation was prepared.

A cultural resource site is defined as a location of purposeful prehistoric or historic human activity. An activity is considered to have been purposeful if it resulted in a deposit of cultural materials beyond the level of one or a few accidentally lost artifacts

1. A cultural resource qualifying as a site under this definition should:

- a. Consist of 30 or more artifacts of a single class within a 15 meter diameter area, OR
- b. More artifacts of two or more classes within a 15 meter diameter area, OR
- c. One or more features in association with artifacts, OR
- d. Two or more temporally associated features without associated artifacts, OR
- e. A single linear feature

All other resources encountered in the survey area not adhering to this definition were recorded as IOs on Carson NF forms. Other documentation for IOs included artifact inventories, in-field artifact analysis, photographs, scaled sketch mapping, and GPS mapping.

An LA site record was completed for the newly identified archaeological site within the survey area (see Appendix A). At a minimum, a completed site record consisted of an LA = site form; USGS location established with a GPS; a scaled site plan map; illustrative, captioned color photographs supporting the determination of eligibility; and photos or illustrations of diagnostic artifacts and features.

When encountered, hipped stone debitage and ceramics are analyzed in the field using a simple type-and-size tally system. Debitage were sorted by material type, size, and flake stage (P=primary; S=secondary; T=tertiary). Material types are dependent on locally available stone and other materials typical of sites in the region. Size class corresponds to each individual specimen's maximum length; where items smaller than 1 cm maximum length are size class 1, items between 1 and 2 cm maximum length are size class 2, items between 2 and 3 cm maximum length are size class 3, and so on. Ceramics were described and inventoried using basic terms (e.g., plain grayware, basket impressed, whiteware, black-on-white, black-on-red, temper, polished, etc.) based on regional ceramic typology and chronology for the San Juan Basin (Reed and Goff 1999; Wilson and

Blinman 1993). Diagnostic ceramics (e.g., painted sherds, rims), chipped stone tools (e.g., points, bifaces, scrapers), and groundstone tools (e.g., metates, manos, mauls, axes) were analyzed in the field: each specimen was GPS mapped; measured to the nearest millimeter using manual calipers, ruler, or tape measure; described in written form; digitally photographed (except groundstone fragments); and sketched for reference. Standard measurements included length, width, thickness, depth, base width, neck width, etc. Each tool was assigned an alphanumeric reference beginning with an 'A' (e.g., A3). Features were documented and described in the field. Documentation included feature dimensions; written descriptions; digital photography; and GPS mapping. Features are also assigned an alphanumeric reference beginning with an alphanumeric reference beginning with an 'F' (e.g., F3).

Digital photography was completed with a Nikon Coolpix AW110 digital camera with 12.0 megapixel capacity and super-macro function for in-field artifact photos. At least two site area overviews were taken at each site location. All temporally and functionally diagnostic artifacts (e.g., chipped stone tools, ground stone tools, projectile points, ceramic sherds, beads, etc.) were photographed using the super-macro function. All identifiable cultural features (e.g., hearth, room block, pit depression, midden, charcoal stain, etc.) were also photographed. Selected photographic documentation is provided with the LA site record in Appendix A.

Map data were collected using a Trimble Juno SB handheld GPS unit and field mapping software with realtime differential correction (WAAS), allowing sub-meter precision in the field. Elements of the sites and isolates were mapped and recorded using points, lines, and areas with basic attribute data. The resulting data files (shapefiles) were downloaded to Interior West's GIS computer and projected in ESRI ArcMap 10.2 for figure drafting. Site plan maps always contain, but are not limited to: a site boundary, diagnostic artifact locations, feature locations, contour lines, vegetation changes, existing infrastructure, disturbances, drainages, etc. Environmental attributes, such as topography, vegetation, and disturbances, are also mapped with the GPS unit and confirmed by underlying the appropriate digital aerial and satellite imagery during the drafting process. A site plan map is included in this report and with the LA site record in Appendix A.

NRHP Evaluations

Cultural resources within the APE must be evaluated for significance under the following federal regulations: the National Historic Preservation Act of 1966, as amended (NHPA, 36 CFR 800), and the National Register of Historic Places (NRHP, 36 CFR 60). This legislation ensures the protection of historic and prehistoric sites and those properties that have value to the traditional beliefs of a community.

Under NRHP 36 CFR 60.4, cultural resources may be eligible for nomination to the National Register if they "...possess integrity of location, design, setting, materials, workmanship, feeling and association" and if the resources in question are resources:

- a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
- b) that are associated with the lives of persons significant in our past; or
- c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- d) that have yielded, or may be likely to yield, information important in prehistory or history.

Prehistoric resources are most often evaluated under Criterion D for their potential to yield information important to prehistory, but all four criteria are considered. Significant information potential in a prehistoric site requires that the site contain intact cultural deposits or discrete activity areas that can be securely associated with a temporal period or discrete cultural group. The potential for intact cultural deposits may be inferred

from surface evidence of cultural features or undisturbed Holocene strata with a surface manifestation. The potential for temporal or cultural associations may be inferred from the presence of diagnostic artifacts or datable materials. Historic resources may be evaluated under any of the Criteria. However, in the absence of structural features, documented association with significant historic events, or the important contributions of persons significant in history, historical resources more than 50 years old are evaluated under essentially the same criteria as prehistoric resources. Isolated occurrences are considered *not eligible* for the NRHP.

SURVEY RESULTS

The intensive cultural resource inventory of the Ute #1 Tank Battery resulted in the identification and documentation of one (1) new archaeological site (LA188129). No cultural resources were found at the Hicks #2 Pipeline Leak and the #185 Pipeline Leak. The records search indicated that there are no previously recorded sites in the immediate vicinity of any of the survey areas.

Site LA188129 (UTB-S-01) is an historic Navajo sweat lodge site located along the south edge of a shallow tributary wash that flows northwest into Eagle Nest Arroyo (Figure 3). There is a large sandstone boulder that forms a large south-facing rockshelter just to the north on the opposite side of the wash. There are large boulders surrounding the site. The features are situated on the leeward side of a low ridge hill with recent eolian deposition noted. Soils consist of tan sand and occasional gravels up to 1 meter deep overlying sandstone and shale bedrock. Cryptobiotic soils cover the ground surface across parts of the site. Vegetation consists of juniper trees, rabbitbrush, fourwing saltbush, snakeweed, bunch grasses, and sparse forbs, allowing up to 75 percent bare ground visibility. The southeast corner of the existing Ute #1 well pad is about 60 meters (125 feet) to the northwest of the site. The site is good condition, except for minor erosion of the landform by sheet wash and wind deflation. The sweat lodge structure is partially standing and the associated features are generally undisturbed and intact. There are also several rags scattered under the overhang, possibly from drill rig workers.

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Cultural Resource Inventory BIYA Operators Remediation At The Hicks #2 Pipeline, #185 Pipeline, and Ute #1 Tank Battery San Juan County, New Mexico



Figure 3. Overview of LA188129 with tank battery visible in background, facing northwest.

The site consists of four (4) features (Table 2) and one (1) Pueblo II corrugated grayware rim sherd. Feature F1 is a partially standing sweat lodge on a low ridge slope along the south edge of the wash. Feature F2 is a mounded pile of discarded burned rock on the slope to the southeast of F1. Feature F3 is a large rock-heating hearth located upslope of F1 and F2, consisting of burned rocks and ashy sediments. Feature F4 is a possible hearth with one upright slab, several displaced slabs, and ash and charcoal stained sediments.

Feature No.	Feature Type	Size	Feature ID, Notes
FI	Sweat Lodge	240 x 200 cm, 120 cm tall	Small conical-shaped structure consisting of about 50 juniper limbs up to 150 cm long and 17cm diameter. Several forked limbs. Cribbed with limbs along the bottom. Entrance on northeast side. Large sandstone rocks incorporated on east side.
<u>.</u> F2	Burned Rock Midden	5.0 x 4.0 m	Mound of highly oxidized sandstone. 100+ rocks up to 50 cm maximum length, but mostly 10-20 cm. Adjacent to the southeast side of F1. Waste rocks dump pile.
F3	Hearth	4.0 x 2.5 m	Burned rock concentration with ash and charcoal staining. Upslope to the south of F1 and southwest of F2. Rocks are washing downslope to the north toward F1.
F4	Hearth	140 x 120 cm	Small upright slab and a scatter of 4 other small tabular pieces of sandstone. Ash and charcoal staining within scatter. Recent eolian deposition in area.

Site LA188129 (UTB-S-01) is recommended to be **eligible** for the NRHP, as it is associated with Navajo ceremonies, and is likely to yield significant important archaeological information (criterion d). There is a partially standing sweat lodge with associated features, and there is recent eolian deposition across the site that is likely to contain significant intact buried archaeological deposits. The site is more than 150 feet southeast of the Ute #1 well pad and would not be impacted by the current project, as proposed. The site area should be

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Cultural Resource Inventory Cultural Resource Inventory BIYA Operators Remediation At The Hicks #2 Pipeline, #185 Pipeline, and Ute #1 Tank Battery San Juan County, New Mexico

avoided by all ground disturbing activities and on-site personnel associated with the project.

MANAGEMENT RECOMMENDATIONS The entire area of potential effect (APE) is 1.85 acres, including approximately 01 acre at the Hicks #2 The entire area of potential effect (AFE) is 1.03 acres, including approximately 011 acre at the micks #2 Pipeline, 1.5 acres at the #185 Pipeline, and a 0.25 acre encompassing the Ute #1 Tank Battery A total of 22.1 Pripeline: 1.2 acres at the #165 Pripeline, and a 0.45 acre encompassing the Ote #11 tank Dattery A what of Hicks #2, acres were intensively inventories for cultural resources including approximately 3.4 acres at the Hicks #2, acres were intensively inventories for cultural resources, including approximately 34 acres at the #1 Tank Battery Pipeline, 8.7 acres at the #185 Pipeline, and a 10-acre block encompassing the Ute #1 Tank Battery One (1) newly identified and recorded archeological site (LA188129) was encountered within the survey area

One (1) newly identified and recorded arcneological site (LA100149) was encountered within the survey area and of the Ute #1 Tank Battery. The site is situated more than 100 feet (30 meters) southeast of excavated area and or the Ute #11 tank pattery. The site is situated more than 100 reet (50 meters) southeast of excavated area and outside of the proposed APE. The site area should be avoided by at least 100 feet by all ground disturbing outside of the proposed APE. The site area should be avoided by at least 100 reet by all ground disturbute at the activities and personnel associated with the remediation work. No cultural resources were encountered at the activities and personnel associated with the remediation work. No cultural resources were encountered at the BIYA Operators Hicks #2. Pipeline of the #185 Pipeline The results of the inventory indicate that the BIYA Operators Hicks #2 Pipeline or the #185 Pipeline The results of the inventory indicate that the BLY A Operators Remediation at the Hicks #2 Pipeline Leak, #185 Pipeline Leak, and Ute #1 Tank Battery Spill, as proposed Kemeulauonal me micks #2 mpelline Leak, #105 mpelline Leak, and Ole #1 Lauk Dattery, 5ptil, as proposed, would have no effect to significant cultural properties, and no further work is recommended. If undetected would have no ejject to significant cultural properties, and no jurther work is recommended. It indetected buring project construction, the THPO shall be buried cultural resources are uncovered at any time during project construction, the THPO shall be ouried cultural resources are uncovered at any time during project construction, me a resources and further immediately contacted. Construction shall be temporarily halted pending the notification process and further infinediately contacted. Construction snan of temporarity naned pending the normcanon process and turned directions issued by the THPO. This report documents the methods and results of the cultural resources

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investigation.

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NMCRIS No. 138506

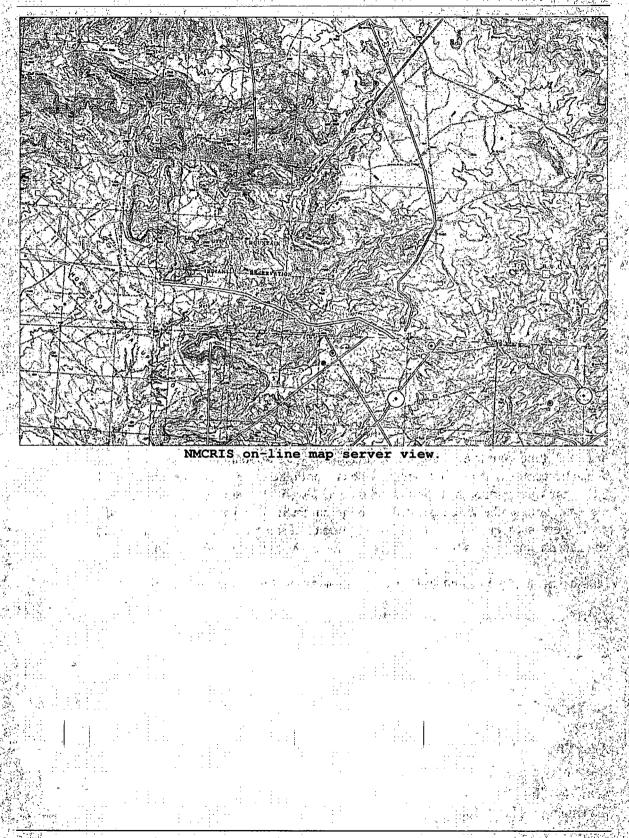
Cultural Resource Inventory BIYA Operators Remediation At The Hicks #2 Pipeline, #185 Pipeline, and Ute #1 Tank Battery San Juan County, New Mexico

APPENDIX A

. 4

LABORATORY OF ANTHROPOLOGY SITE RECORDS

Cultural Resource Inveniory BIYA Operators Remediation At The Hicks #2 Pipeline, #185 Pipeline, and Ute #1 Tank Battery San Juan County, New Mexico



NMCRIS No. 138506

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Hall Environmental Analysis Laboratory 4901 Hawkins NE Albuquerque, NM 87109 TEL: 505-345-3975 FAX: 505-345-4107 Website: <u>www.hallenvironmental.com</u>

December 08, 2016

Ashley Maxwell Souder, Miller and Associates 401 W. Broadway Farmington, NM 87401 TEL: (505) 325-5667 FAX (505) 327-1496

RE: BIYA 185 Line Leak

OrderNo.: 1611C33

Dear Ashley Maxwell:

Hall Environmental Analysis Laboratory received 21 sample(s) on 11/23/2016 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to <u>www.hallenvironmental.com</u> or the state specific web sites. In order to properly interpret your results it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0190

Sincerely,

Inder

Andy Freeman Laboratory Manager 4901 Hawkins NE Albuquerque, NM 87109

Analytical Report

Lab Order 1611C33 Date Reported: 12/8/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller and Associates			Client Sampl	e ID: SB7-7	
Project: BIYA 185 Line Leak			Collection I	Date: 11/19/2016 9:45:00) AM
Lab ID: 1611C33-001	Matrix:	SOIL	Received I	Date: 11/23/2016 7:40:00) AM
Analyses	Result	PQL Q	ual Units :	DF Date Analyzed	Batch.
EPA METHOD 300.0: ANIONS		2		A	nalyst: LGT
Chloride	160	30	mg/Kg	20 12/2/2016 6:41 (5 PM 28989
EPA METHOD 8015M/D: DIESEL RANG	SE ORGANICS	i de Alexandre	÷.	Α	nalyst: TOM
Diesel Range Organics (DRO)	ND	9.9	mg/Kg	1 #11/29/2016 1:31	:13 PM ⁹ 28850
Surr DNOP	94.5	70-130	%Rec	1 11/29/2016 1:31	:13 PM . 28850
EPA METHOD 8015D: GASOLINE RAN	GE		a) Nu	A	nalyst: NSB
Gasoline Range Organics (GRO)	ND	5.0	mg/Kg	1 11/28/2016 11:0	5:35 AM 28847
Surr: BFB	96.2	68.3-144	%Rec	1 11/28/2016 11:0	5:35 AM 28847
EPA METHOD 8260B: VOLATILES SHO	ORT LIST			A	nalyst: AG
Benzene	ND	0.025	mg/Kg	1 12/1/2016 12:19	19 PM 28847
Toluene	ND	0.050	mg/Kg	1 12/1/2016 12:19	19 PM 28847
Ethylbenzene	ND	0.050	mg/Kg	1 12/1/2016 12:19	19 PM 28847
Xylenes, Total	ND	0.10	mg/Kg	1 12/1/2016 12:19	:19 PM 28847
Surr: 1,2-Dichloroethane-d4	102	70-130	%Rec	1 12/1/2016 12:19	:19 PM 28847
Surr: 4-Bromofluorobenzene	93.8	70-130	%Rec	1 12/1/2016 12:19	19 PM 28847
Surr: Dibromofluoromethane	116	70-130	%Rec	1 12/1/2016 12:19	:19 PM . 28847
Surr: Toluene-d8	96.6	70-130	%Rec	1 12/1/2016 12:19	19 PM 28847

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Value exceeds Maximum Contaminant Level.

Qualifiers:

- Sample Diluted Due to Matrix D
- Holding times for preparation or analysis exceeded Н
- Not Detected at the Reporting Limit ND
- RPD outside accepted recovery limits R
- % Recovery outside of range due to dilution or matrix
- Analyte detected in the associated Method Blank в
- Value above quantitation range Ε ٠J
 - Analyte detected below quantitation limits, Page 1 of 28
- Sample pH Not In Range Р
- Reporting Detection Limit RL w
 - Sample container temperature is out of limit as specified

CLIENT: Souder, Miller and Associates		Client Sample ID: SB7-15							
Project: BIYA 185 Line Leak			Collection	Date: 11	/19/2016 10:10:00 A	М			
Lab ID: 1611C33-002	Matrix:	Matrix: SOIL F		Received Date: 11/23/2016 7:40:00 AM					
Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch			
EPA METHOD 8015M/D: DIESEL RANG	E ORGANICS	5			Analy	/st: TOM			
Diesel Range Organics (DRO)	150	9.9	mg/Kg	1	11/29/2016 2:40:29 F	PM 28850			
Surr: DNOP	93.2	70-130	%Rec	1	11/29/2016 2:40:29	PM 28850			
EPA METHOD 8015D: GASOLINE RANG	GE				Analy	st: NSB			
Gasoline Range Organics (GRO)	12	4.9	mg/Kg	1	11/28/2016 12:16:03	PM 28847			

68.3-144

%Rec

1

93.7

Hall Environmental Analysis Laboratory, Inc.

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*

Surr: BFB

- Value exceeds Maximum Contaminant Level. D Sample Diluted Due to Matrix
- Н Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- Analyte detected below quantitation limits Page 2 of 28 J
- Р Sample pH Not In Range
- RL **Reporting Detection Limit**

W Sample container temperature is out of limit as specified

Analytical Report Lab Order 1611C33 Date Reported: 12/8/2016

11/28/2016 12:16:03 PM 28847

Analytical Report Lab Order 1611C33

Date Reported: 12/8/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller and Associates BIYA 185 Line Leak **Project:** 1611C33-003

Lab ID:

Client Sample ID: SB8-5 Collection Date: 11/19/2016 10:44:00 AM Received Date: 11/23/2016 7:40:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS					Analyst	: LGT
Chloride	ND	30	mg/Kg	20	12/2/2016 6:53:30 PM	28989
EPA METHOD 8015M/D: DIESEL RA	ANGE ORGANIC	S			Analyst	: том
Diesel Range Organics (DRO)	ND	9.7	mg/Kg	1	11/29/2016 3:03:36 PM	28850
Surr: DNOP	97.9	70-130	%Rec	1	11/29/2016 3:03:36 PM	28850
EPA METHOD 8015D: GASOLINE R	ANGE				Analyst	: NSB
Gasoline Range Organics (GRO)	ND	4.6	mg/Kg	1	11/28/2016 1:26:36 PM	28847
Surr: BFB	97.5	68.3-144	%Rec	1	11/28/2016 1:26:36 PM	28847
EPA METHOD 8260B: VOLATILES	SHORT LIST				Analyst	: AG
Benzene	0.037	0.023	mg/Kg	1	12/1/2016 12:48:05 PM	28847
Toluene	0.073	0.046	mg/Kg	1	12/1/2016 12:48:05 PM	28847
Ethylbenzene	ND	0.046	mg/Kg	1	12/1/2016 12:48:05 PM	28847
Xylenes, Total	ND	0.093	mg/Kg	1	12/1/2016 12:48:05 PM	28847
Surr: 1,2-Dichloroethane-d4	110	70-130	%Rec	1	12/1/2016 12:48:05 PM	28847
Surr: 4-Bromofluorobenzene	95.6	70-130	%Rec	1	12/1/2016 12:48:05 PM	28847
Surr: Dibromofluoromethane	120	70-130	%Rec	1	12/1/2016 12:48:05 PM	28847
Surr: Toluene-d8	97.3	70-130	%Rec	1	12/1/2016 12:48:05 PM	28847

Matrix: SOIL

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

÷

- D Sample Diluted Due to Matrix
- н Holding times for preparation or analysis exceeded

Value exceeds Maximum Contaminant Level.

- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- % Recovery outside of range due to dilution or matrix S
- Analyte detected in the associated Method Blank В
- Е Value above quantitation range
- Analyte detected below quantitation limits Page 3 of 28 J
- Р Sample pH Not In Range
- RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

CLIENT: Souder, Miller and Associates Project: BIYA 185 Line Leak	Client Sample ID: SB8-10 Collection Date: 11/19/2016 11:22:00 AM							
Lab ID: 1611C33-004	Matrix:	SOIL	Received	Date: 11/	/23/2016 7:40:00 AM			
Analyses	Result	PQL Qual	Units	DF	Date Analyzed	Batch		
EPA METHOD 300.0: ANIONS					Analyst:	LGT		
Chloride	ND	30	mg/Kg	20	12/2/2016 7:30:44 PM	28989		
EPA METHOD 8015M/D: DIESEL RANGI	E ORGANIC	S			Analyst:	том		
Diesel Range Organics (DRO)	ND	10	mg/Kg	1	11/29/2016 3:26:34 PM	28850		
Surr: DNOP	98.8	70-130	%Rec	1	11/29/2016 3:26:34 PM	28850		
EPA METHOD 8015D: GASOLINE RANG	Ε				Analyst:	NSB		
Gasoline Range Organics (GRO)	9.5	4.9	mg/Kg	1	11/28/2016 1:50:02 PM	28847		
Surr: BFB	95.6	68.3-144	%Rec	1	11/28/2016 1:50:02 PM	28847		
EPA METHOD 8260B: VOLATILES SHO	RT LIST				Analyst:	AG		
Benzene	0.42	0.025	mg/Kg	1	12/1/2016 1:16:59 PM	28847		
Toluene	0.76	0.049	mg/Kg	1	12/1/2016 1:16:59 PM	28847		
Ethylbenzene	ND	0.049	mg/Kg	1	12/1/2016 1:16:59 PM	28847		
Xylenes, Total	0.22	0.098	mg/Kg	1	12/1/2016 1:16:59 PM	28847		
Surr: 1,2-Dichloroethane-d4	101	70-130	%Rec	1	12/1/2016 1:16:59 PM	28847		
Surr: 4-Bromofluorobenzene	92.7	70-130	%Rec	1	12/1/2016 1:16:59 PM	28847		
Surr: Dibromofluoromethane	108	70-130	%Rec	1	12/1/2016 1:16:59 PM	28847		
Surr: Toluene-d8	97.9	70-130	%Rec	1	12/1/2016 1:16:59 PM	28847		

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	Н :	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits Page 4 of 28
	ND	Not Detected at the Reporting Limit	Р	Sample pH Not In Range
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

Analytical Report Lab Order 1611C33 Date Reported: 12/8/2016

CLIENT: Souder, Miller and Associate Project: BIYA 185 Line Leak Lab ID: 1611C33-005			e ID: SB9-3 Date: 11/19/2016 11:50:00 AM Date: 11/23/2016 7:40:00 AM
Analyses	Result	PQL Qual Units	DF Date Analyzed Batc
EPA METHOD.8015M/D: DIESEL RAN Diesel Range Organics (DRO) Surr DNOP	13000 0	2 S - 490 mg/Kg - 70-130 → S %Rec	Analyst: 1 CON 50 11/29/2016 3:49:39 PM 2885 50 11/29/2016 3:49:39 PM 2885
EPA METHOD 8015D: GASOLINE RA Gasoline Range Organics (GRO) Surr: BFB	NGE 5100 228	470 68:3:144, S % %Rec	Analyst: NSB 100 11/28/2016 2:13:36 PM 2884 100 11/28/2016 2:13:36 PM 2884
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and the second sec		1	

- Sample Diluted Due to Matrix D
- Holding times for preparation or analysis exceeded H
- ND Not Detected at the Reporting Limit
- RPD outside accepted recovery limits R
- S % Recovery outside of range due to dilution or matrix
- Analyte detected in the associated Method Blank В

alution D

- E,
- Value above quantitation range Analyte detected below quantitation limits Page 5 of 28 Sample pH Noi In Range J
- Ρ
- RL
- Reporting Detection Limit w

Analytical Report Lab Order 1611C33

Date Reported: 12/8/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller and Associates Project: BIYA 185 Line Leak Lab ID: 1611C33-006 Matrix: SOIL

Client Sample ID:SB9-16 Collection Date: 11/19/2016 12:49:00 PM Received Date: 11/23/2016-7:40:00 AM

Analyses Result PQL Qual Units DF Date Analyzed Batch EPA METHOD 8015M/D: DIESEL RANGE ORGANICS 1. Analyst: TOM 3.3 Diesel Range Organics (DRO) 820 mg/Kg 10 11/29/2016 4:12:42 PM 28850 96 Surr: DNOP 11/29/2016 4:12:42 PM 28850 n 70-130 %Rec 10 Analyst: NSB EPA METHOD 8015D: GASOLINE RANGE Gasoline Range Organics (GRO) 11/28/2016 2:37:16 PM 28847 mg/Kg i * 95 4.9 Surr: BFB 11/28/2016 2:37:16 PM 28847 644 68.3-144 %Rec

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

2

 Qualifiers:
 *
 Value exceeds Maximum Contaminant Level.

 D
 Sample Diluted Due to Matrix
 4

- H Holding times for preparation of analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
 - % Recovery outside of range due to dilution or matrix -
- B Analyte detected in the associated Method Blank
- J have a set of 28 J have a set of 28 J have a set of 28
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report Lab Order 1611C33 Date Reported: 12/8/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller and Associates Client Sample ID: SB9-21 Project: BIYA 185 Line Leak Collection Date: 11/19/2016 1:23:00 PM Lab ID: 1611C33-007 Matrix: SOIL Received Date: 11/23/2016 7:40:00 AM - - -. _ _

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS					Analyst	: LGT .
Chloride	41	30	mg/Kg	20	12/2/2016 7:43:09 PM	28989
EPA METHOD 8015M/D: DIESEL RA	ANGE ORGANIC	s			Analyst	: TOM
Diesel Range Organics (DRO)	· 31	9.6	mg/Kg	1	11/29/2016 4:35:56 PM	28850
Surr: DNOP	99.0	70-130	%Rec	1	11/29/2016 4:35:56 PM	28850
EPA METHOD 8015D: GASOLINE R	ANGE				Analyst	: NSB
Gasoline Range Organics (GRO)	ND	5.0	mg/Kg	1	11/28/2016 3:00:51 PM	28847
Surr: BFB	104	68.3-144	%Rec	1	11/28/2016 3:00:51 PM	28847
EPA METHOD 8260B: VOLATILES	SHORT LIST				Analyst	: AG
Benzene	0.053	0.025	mg/Kg	1	12/1/2016 1:45:51 PM	28847
Toluene	0.10	0.050	mg/Kg	1	12/1/2016 1:45:51 PM	28847
Ethylbenzene	ND	0.050	mg/Kg	1	12/1/2016 1:45:51 PM	28847
Xylenes, Total	ND	0.099	mg/Kg	1	12/1/2016 1:45:51 PM	28847
Surr: 1,2-Dichloroethane-d4	104	70-130	%Rec	1	12/1/2016 1:45:51 PM	28847
Surr: 4-Bromofluorobenzene	90.6	70-130	%Rec	1	12/1/2016 1:45:51 PM	28847
Surr: Dibromofluoromethane	115	70-130	%Rec	1	12/1/2016 1:45:51 PM	28847
Surr: Toluene-d8	97.8	70-130	%Rec	1	12/1/2016 1:45:51 PM	28847

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	Е	Value above quantitation range
	Н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits Page 7 of 28
	ND	Not Detected at the Reporting Limit	Р	Sample pH Not In Range
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit
	S	% Recovery outside of range due to dilution or matrix	w	Sample container temperature is out of limit as specified

CLIENT: Souder, Miller and Associates Project: BIYA 185 Line Leak Lab ID: 1611C33-008	Client Sample ID: SB9-25 Collection Date: 11/19/2016 1:27:00 PM Matrix: SOIL Received Date: 11/23/2016 7:40:00 AM							
Analyses	Result	POL Qual			Date Analyzed	Batch		
EPA METHOD 300.0: ANIONS					Analyst	·IGT		
Chloride	ND	30	mg/Kg	20	12/2/2016 8:20:23 PM	28989		
EPA METHOD 8015M/D: DIESEL RANGE	E ORGANIC	S			Analyst	: TOM		
Diesel Range Organics (DRO)	ND	9.2	mg/Kg	1	11/29/2016 4:58:59 PM			
Surr: DNOP	93.0	70-130	%Rec	. 1	11/29/2016 4:58:59 PM			
EPA METHOD 8015D: GASOLINE RANG	E				Analyst	NSB		
Gasoline Range Organics (GRO)	5.0	4.9	mg/Kg	1	11/28/2016 3:48:04 PM	28847		
Surr: BFB	100	68.3-144	%Rec	1	11/28/2016 3:48:04 PM	28847		
EPA METHOD 8260B: VOLATILES SHO	RT LIST				Analyst	: AG		
Benzene	0.18	0.025	mg/Kg	1	12/1/2016 2:14:44 PM	28847		
Toluene	0.34	0.049	mg/Kg	1	12/1/2016 2:14:44 PM	28847		
Ethylbenzene	ND	0.049	mg/Kg	1	12/1/2016 2:14:44 PM	28847		
Xylenes, Total	0.13	0.098	mg/Kg	1	12/1/2016 2:14:44 PM	28847		
Surr: 1,2-Dichloroethane-d4	105	70-130	%Rec	1	12/1/2016 2:14:44 PM	28847		
Surr: 4-Bromofluorobenzene	91.4	70-130	%Rec	1	12/1/2016 2:14:44 PM	28847		
Surr: Dibromofluoromethane	113	70-130	%Rec	1	12/1/2016 2:14:44 PM	28847		
Surr: Toluene-d8	95.2	70-130	%Rec	1	12/1/2016 2:14:44 PM	28847		

Hall Environmental Analysis Laboratory, Inc.

Value exceeds Maximum Contaminant Level. B Analyte detected in the associated Method Blank

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

E Value above quantitation range

- J Analyte detected below quantitation limits Page 8 of 28
- P Sample pH Not In Range
- RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Qualifiers: * Value

- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix

Analytical Report Lab Order 1611C33 Date Reported: 12/8/2016

Analytical Report
Lab Order 1611C33
Date Reported: 12/8/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller and Associates Client Sample ID: SB5-10 Project: BIYA 185 Line Leak Collection Date: 11/18/2016 3:54:00 PM Lab ID: 1611C33-009 Matrix: SOIL Received Date: 11/23/2016 7:40:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS					Analyst	: LGT
Chloride	40	30	mg/Kg	20	12/2/2016 8:32:47 PM	28989
EPA METHOD 8015M/D: DIESEL RA	ANGE ORGANIC	s			Analyst	ТОМ
Diesel Range Organics (DRO)	ND	9.4	mg/Kg	1	11/29/2016 5:22:09 PM	28850
Surr: DNOP	95.3	70-130	%Rec	1	11/29/2016 5:22:09 PM	28850
EPA METHOD 8015D: GASOLINE R	ANGE				Analyst	: NSB
Gasoline Range Organics (GRO)	ND	4.9	mg/Kg	1	11/28/2016 4:11:28 PM	28847
Surr: BFB	95.4	68.3-144	%Rec	1	11/28/2016 4:11:28 PM	28847
EPA METHOD 8260B: VOLATILES	SHORT LIST				Analyst	: AG
Benzene	0.18	0.025	mg/Kg	1	12/1/2016 2:43:35 PM	28847
Toluene	0.29	0.049	mg/Kg	1	12/1/2016 2:43:35 PM	28847
Ethylbenzene	ND	0.049	mg/Kg	1	12/1/2016 2:43:35 PM	28847
Xylenes, Total	ND	0.098	mg/Kg	1	12/1/2016 2:43:35 PM	28847
Surr: 1,2-Dichloroethane-d4	109	70-130	%Rec	1	12/1/2016 2:43:35 PM	28847
Surr: 4-Bromofluorobenzene	89.8	70-130	%Rec	1	12/1/2016 2:43:35 PM	28847
Surr: Dibromofluoromethane	116	70-130	%Rec	1	12/1/2016 2:43:35 PM	28847
Surr: Toluene-d8	95.2	70-130	%Rec	1	12/1/2016 2:43:35 PM	28847

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*

D Sample Diluted Due to Matrix

Н Holding times for preparation or analysis exceeded

Value exceeds Maximum Contaminant Level.

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Ε Value above quantitation range

Analyte detected below quantitation limits Page 9 of 28 J

Р Sample pH Not In Range

Reporting Detection Limit RL

Sample container temperature is out of limit as specified w

Analytical Report
Lab Order 1611C33
Date Reported: 12/8/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller and Associates Project: BIYA 185 Line Leak

1611C33-010

Lab ID:

Client Sample ID: SB1-7 Collection Date: 11/18/2016 11:02:00 AM Received Date: 11/23/2016 7:40:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS					Analys	t: LGT
Chloride	46	30	mg/Kg	20	12/2/2016 8:45:11 PM	28989
EPA METHOD 8015M/D: DIESEL RA	ANGE ORGANIC	s			Analys	t: TOM
Diesel Range Organics (DRO)	15	9.8	mg/Kg	1	11/29/2016 5:45:12 PM	1 28850
Surr: DNOP	97.9	70-130	%Rec	1	11/29/2016 5:45:12 PM	1 28850
EPA METHOD 8015D: GASOLINE R	ANGE				Analys	t: NSB
Gasoline Range Organics (GRO)	7.5	4.7	mg/Kg	1	11/28/2016 6:08:23 PM	1 28847
Surr: BFB	96.6	68.3-144	%Rec	1	11/28/2016 6:08:23 PM	1 28847
EPA METHOD 8260B: VOLATILES	SHORT LIST				Analys	t: AG
Benzene	0.28	0.023	mg/Kg	1	12/1/2016 3:12:28 PM	28847
Toluene	0.47	0.047	mg/Kg	1	12/1/2016 3:12:28 PM	28847
Ethylbenzene	ND	0.047	mg/Kg	1	12/1/2016 3:12:28 PM	28847
Xylenes, Total	0.15	0.094	mg/Kg	1	12/1/2016 3:12:28 PM	28847
Surr: 1,2-Dichloroethane-d4	101	70-130	%Rec	1	12/1/2016 3:12:28 PM	28847
Surr: 4-Bromofluorobenzene	90.9	70-130	%Rec	1	12/1/2016 3:12:28 PM	28847
Surr: Dibromofluoromethane	113	70-130	%Rec	1	12/1/2016 3:12:28 PM	28847
Surr: Toluene-d8	97.8	70-130	%Rec	1	12/1/2016 3:12:28 PM	28847

Matrix: SOIL

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	В	Analyte detected in the associated Method I
	D	Sample Diluted Due to Matrix	Ε	Value above quantitation range
	Н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	Р	Sample pH Not In Range
	R	RPD outside accepted recovery limits	RL	Reporting Detection Limit

- S % Recovery outside of range due to dilution or matrix
- Blank
- Page 10 of 28
- W Sample container temperature is out of limit as specified

Analytical Report Lab Order 1611C33

Date Reported: 12/8/2016

CLIENT: Souder, Miller and Associate	es ,	Client Sample ID: SB1-15				
Project: BIYA 185 Line Leak	an a		Collectio	on Date: 11/18/2016:11:40:00 AM		
Lab ID: 1611C33-014	Matrix:	SOIL	Receive	ed Date: 11/23/2016 7:40:00 AM		
Analyses	Result	PQL Qual	Units	DF Date Analyzed Batch &		
EPA METHOD 300.0: ANIONS				Analyst LGT		
Chloride	ND	30	mg/Kg	,20 12/2/2016 8:57:36 PM 28989		
EPA METHOD 8015M/D: DIESEL RAN	IGE ORGANICS		1997	Analyst: TOM		
Diesel Range Organics (DRO)	ND 91-7	9.8 70-130	,mg/Kg %Rec	1 11/29/2016 6:08:25 PM 28850 1 11/29/2016 6:08:25 PM 28850		
EPA METHOD 8015D: GASOLINE RA	NGE			Analyst NSB		
Gasoline Range Organics (GRO)	15	4.8	mg/Kg	1 11/28/2016 6:31:47 PM 28847		
Surr: BEB	• 93.9	68.3-144	, %Rec	1 11/28/2016 6:31:47 PM 28847		
EPA METHOD 8260B: VOLATILES SI	HORT LIST			Analyst: AG		
Benzene	0.61	0.024	mg/Kg	1 12/1/2016 3:41:18 PM. 28847		
Toluene	.1.2	0.048	mg/Kg	. 1 12/1/2016 3:41:18 PM ~ 28847		
Ethylpenzene	0.089	0.048	∴mg/Kg	1 12/1/2016 3:41:18 PM 28847		
Xylenes, Total	0.41	i0.097	:॒mg/Kg	1 12/1/2016 3:41:18 PM 28847		
Surr: 1,2-Dichloroethane-d4	96.8	70-130	%Rec	1 12/1/2016 3:41:18 PM 4.28847		
Surr: 4-Bromofluorobenzene	93.9	70-130	%Rec	1 12/1/2016 3 41:18 PM 28847		
Surr: Dibromofluoromethane	<u>د</u> 107	70-130	%Rec	1 12/1/2016 3 41 18 PM 28847		
Surr: Toluene-d8	97.2	70-130	%Rec	1, 12/1/2016 3:41:18 PM 3 28847		

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information

* Value exceeds Maximum Contaminant Level. Qualifiers:

- Sample Diluted Due to Matrix D٠
- Holding times for preparation or analysis exceeded Ή÷-

Hall Environmental Analysis Laboratory, Inc.

- Not Detected at the Reporting Limit ND.
- RPD outside accepted recovery limits
- % Recovery outside of range due to dilution or matrix
- Analyte detected in the associated Method Blank В Value above quantitation range
- Ε J
- Analyte detected below quantitation limits age 11 of 28 Sample pH Not In Range
- Р RL Reporting Detection Limit
- Sample container temperature is out of limit as specified W,

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller and Associates Project: BIYA 185 Line Leak

1611C33-012

Lab ID:

Client Sample ID: SB2-7 Collection Date: 11/18/2016 12:23:00 PM

Received Date: 11/23/2016 7:40:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS					Analysi	: LGT
Chloride	120	30	mg/Kg	20	12/2/2016 9:10:01 PM	28989
EPA METHOD 8015M/D: DIESEL RA	ANGE ORGANIC	S			Analyst	TOM
Diesel Range Organics (DRO)	ND	9.8	mg/Kg	1	11/29/2016 6:31:14 PM	28850
Surr: DNOP	98.6	70-130	%Rec	1	11/29/2016 6:31:14 PM	28850
EPA METHOD 8015D: GASOLINE R	ANGE				Analyst	: NSB
Gasoline Range Organics (GRO)	ND	4.7	mg/Kg	1	11/28/2016 6:55:09 PM	28847
Surr: BFB	94.5	68.3-144	%Rec	1	11/28/2016 6:55:09 PM	28847
EPA METHOD 8260B: VOLATILES	SHORT LIST				Analyst	: AG
Benzene	0.037	0.023	mg/Kg	1	12/1/2016 4:10:13 PM	28847
Toluene	0.086	0.047	mg/Kg	1	12/1/2016 4:10:13 PM	28847
Ethylbenzene	ND	0.047	mg/Kg	1	12/1/2016 4:10:13 PM	28847
Xylenes, Total	ND	0.094	mg/Kg	1	12/1/2016 4:10:13 PM	28847
Surr: 1,2-Dichloroethane-d4	105	70-130	%Rec	1	12/1/2016 4:10:13 PM	28847
Surr: 4-Bromofluorobenzene	91.9	70-130	%Rec	1	12/1/2016 4:10:13 PM	28847
Surr: Dibromofluoromethane	114	70-130	%Rec	1	12/1/2016 4:10:13 PM	28847
Surr: Toluene-d8	97.9	70-130	%Rec	1	12/1/2016 4:10:13 PM	28847

Matrix: SOIL

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

Value exceeds Maximum Contaminant Level.

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank

E Value above quantitation range

- J Analyte detected below quantitation limits Page 12 of 28
- P Sample pH Not In Range
- RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

Analytical Report

Date Reported: 12/8/2016

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller and Associa	ites	Client Sampl	le ID: SB2-15
Project: BIYA 185 Line Leak		Collection	Date: 11/18/2016-12:58:00 PM
Lab ID: 1611C33-013	Matrix: SOIL	Received	Date: 11/23/2016 7:40:00 AM
Analyses	Result F	QL Qual Units	DF Date Analyzed Batch .
EPA METHOD 300.0: ANIONS	; • •		Analyst: LGT
Chloride	35	30 mg/Kg	20 12/2/2016 9:22:25 PM 28989
EPA METHOD 8015M/D: DIESEL RA			Analyst: TOM
Diesel Range Organics (DRO)	ND	9.2 mg/Kg	1 11/29/2016 6:54:12 PM 28850
SurridNOP	96.5 7	0-130 %Rec	1 11/29/2016 6:54:12 PM - 28850
EPA METHOD 8015D: GASOLINE R	ANGE		Analyst NSB
Gasoline/Range Organics (GRO)	17	4.6 mg/Kg	1 11/28/2016 7 18:31 PM 28847
Sur: BFB	94.8 68.	3-144 %Rec	1 11/28/2016 7:18:31 PM 28847
EPA METHOD 8260B: VOLATILES \$	SHORT LIST	•	Analyst: AG
Benzene	0.71	0.023 mg/Kg	1 12/1/2016 4:39:09 PM 28847
Toluene	1.3	0.046 mg/Kg	1 12/1/2016 4:39:09 PM 28847
Ethylbenzene	0.090	0.046 mg/Kg	1 12/1/2016 4:39:09 PM 28847
Xylenes, Total	- 0.41	0.092 mg/Kg	1 12/1/2016 4:39:09 PM 28847
Surr: 1,2-Dichloroethane-d4	98.4 7	0-130 %Rec	1 12/1/2016 4:39:09 PM 28847
Surr: 4-Bromofluorobenzene	90.9 7	0-130 %Rec	1 12/1/2016 4:39:09 PM 28847
Surr: Dibromofluoromethane	105 7	0-130 %Rec	1 12/1/2016 4:39:09 PM (328847
Surr: Toluene-d8	97.2 7	0-130 %Rec	1 12/1/2016 4:39:09 PM , 28847

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers: Value exceeds Maximum Contaminant Level.

D. . Sample Diluted Due to Matrix

S

- H. Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
 - % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limitPage 13 of 28
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller and Associates

Project: BIYA 185 Line Leak Lab ID: 1611C33-014

Client Sample ID: SB3-5 Collection Date: 11/18/2016 1:25:00 PM Received Date: 11/23/2016 7:40:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS					Analyst	: LGT
Chloride	ND	30	mg/Kg	20	12/2/2016 9:34:50 PM	28989
EPA METHOD 8015M/D: DIESEL RA	ANGE ORGANIC	S ·			Analyst	: ТОМ
Diesel Range Organics (DRO)	11	10	mg/Kg	1	11/29/2016 7:16:56 PM	28850
Surr: DNOP	93.2	70-130	%Rec	1	11/29/2016 7:16:56 PM	28850
EPA METHOD 8015D: GASOLINE R	ANGE				Analyst	: NSB
Gasoline Range Organics (GRO)	ND	4.9	mg/Kg	1	11/28/2016 7:41:47 PM	28847
Surr: BFB	92.3	68.3-144	%Rec	1	11/28/2016 7:41:47 PM	28847
EPA METHOD 8260B: VOLATILES	SHORT LIST				Analyst	: AG
Benzene	0.043	0.025	mg/Kg	1	12/1/2016 5:07:56 PM	28847
Toluene	0.11	0.049	mg/Kg	1	12/1/2016 5:07:56 PM	28847
Ethylbenzene	ND	0.049	mg/Kg	1	12/1/2016 5:07:56 PM	28847
Xylenes, Total	ND	0.099	mg/Kg	1	12/1/2016 5:07:56 PM	28847
Surr: 1,2-Dichloroethane-d4	105	70-130	%Rec	1	12/1/2016 5:07:56 PM	28847
Surr: 4-Bromofluorobenzene	91.6	70-130	%Rec	1	12/1/2016 5:07:56 PM	28847
Surr: Dibromofluoromethane	116	70-130	%Rec	1	12/1/2016 5:07:56 PM	28847
Surr: Toluene-d8	96.2	70-130	%Rec	1	12/1/2016 5:07:56 PM	28847

Matrix: SOIL

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*

- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded

Value exceeds Maximum Contaminant Level.

- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 14 of 28
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Analytical Report

Hall Environmental Analysis Laboratory, Inc.

Lab Order 1611C33

CLIENT: Souder, Miller and Associates		·····	Client Samp	le ID: SB	3-10	م وی یا در به مدینه مرکز بو نام با هم ا مرکز بو نام با مرکز با
Project: BIYA 185 Line Leak			Collection	Date: 11/	18/2016 2:04:00 PM	
Lab ID: 1611C33-015	Matrix: S	SOIL	Received	Date:.11/	23/2016 7:40:00 AM	
Analyses	Result	PQL (Qual Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS					Analys	LGT 🖓
Chloride • •	ND	30	mg/Kg	20	12/2/2016 9:47:15 PM	28989
EPA METHOD 8015M/D: DIESEL RANGE	ORGANICS			s., 14	Analys	TOM
Diesel Range Organics (DRO)	ND.	9.6	.mg/Kg	1	11/29/2016 8:02:27 PN	1 28850
Surr: DNOP	90.3	70-130	°%Rec	1	11/29/2016 8:02:27 PM	1 ⁻² 28850
EPA METHOD 8015D: GASOLINE RANGI	I I	* - 51			Analys	:: NSB
Gasoline Range Organics (GRO)	· ND	4.7	mg/Kg	1	11/28/2016 8:05:05 PM	l - 28847
Surr BFB	92.8	68.3-144	%Rec	ື 1	,11/28/2016 8:05:05 PN	1 28847
EPA METHOD 8260B: VOLATILES SHOR	T LIST	A.		ř.	ta, €a, S Analys	i. AG
Benzene	ND	0.024	mg/Kg	1	12/1/2016 5:36:44 PM	28847
Toluene	0.057	0.047	mg/Kg	1 *	12/1/2016 5:36:44 PM	28847
Ethylbenzene	ND	0.047	mg/Kg	1	12/1/2016 5:36:44 PM;	28847
Xylenes, Total .	ND	- 0.095	mg/Kg	. <u>.</u> 1	12/1/2016 5:36:44 PM	28847
Surr: 1,2-Dichloroethane-d4	104	70-130	%Rec	1	12/1/2016 5:36:44 PM	28847, -
Surr: 4-Bromofluorobenzene	93.7	70-130	%Rec	· 1	12/1/2016 5:36:44 PM	28847.
Surr: Dibromofluoromethane	113	70-130	%Rec	1	12/1/2016 5:36:44 PM	28847
Surr: Toluene-d8	97.4	70-130	%Rec	1	12/1/2016 5:36:44 PM	28847

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND ... Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
 - % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range,
- J Analyte detected below quantitation limits age 15 of 28
- P Sample pH Not In Range
- Reporting Detection Limit start
 W Sample container temperature is out of limit as specified

Analytical Report	
Lab Order 1611C33	

Hall Environmental Analysis Laboratory, Inc.

Date Reported: 12/8/2016

CLIENT: Souder, Miller and Associates BIYA 185 Line Leak

1611C33-016

Project: Lab ID:

Client Sample ID: SB4-5 Collection Date: 11/18/2016 2:34:00 PM Received Date: 11/23/2016 7:40:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS					Analys	st: LGT
Chloride	470	30	mg/Kg	20	12/2/2016 9:59:40 PM	28989
EPA METHOD 8015M/D: DIESEL RA	ANGE ORGANIC	s			Analys	st: TOM
Diesel Range Organics (DRO)	ND	9.6	mg/Kg	1	11/29/2016 8:25:15 PI	M 28850
Surr: DNOP	98.0	70-130	%Rec	1	11/29/2016 8:25:15 PI	M 28850
EPA METHOD 8015D: GASOLINE R	ANGE				Analys	st: NSB
Gasoline Range Organics (GRO)	ND	4.7	mg/Kg	1	11/28/2016 8:28:23 PI	M 28847
Surr: BFB	92.8	68.3-144	%Rec	1	11/28/2016 8:28:23 PI	vi 28847
EPA METHOD 8260B: VOLATILES	SHORT LIST				Analys	st: AG
Benzene	0.10	0.023	mg/Kg	1	12/1/2016 6:05:43 PM	28847
Toluene	0.16	0.047	mg/Kg	1	12/1/2016 6:05:43 PM	28847
Ethylbenzene	ND	0.047	mg/Kg	1	12/1/2016 6:05:43 PM	28847
Xylenes, Total	ND	0.094	mg/Kg	1	12/1/2016 6:05:43 PM	28847
Surr: 1,2-Dichloroethane-d4	105	70-130	%Rec	1	12/1/2016 6:05:43 PM	28847
Surr: 4-Bromofluorobenzene	88.8	70-130	%Rec	1	12/1/2016 6:05:43 PM	28847
Surr: Dibromofluoromethane	119	70-130	%Rec	1	12/1/2016 6:05:43 PM	28847
Surr: Toluene-d8	92.8	70-130	%Rec	1	12/1/2016 6:05:43 PM	28847

Matrix: SOIL

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	
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*

- Value exceeds Maximum Contaminant Level. D Sample Diluted Due to Matrix
- Holding times for preparation or analysis exceeded Н
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- % Recovery outside of range due to dilution or matrix S
- В Analyte detected in the associated Method Blank
- Е Value above quantitation range
- Analyte detected below quantitation limit Page 16 of 28 J
- Р Sample pH Not In Range
- RL Reporting Detection Limit

Sample container temperature is out of limit as specified W

Hall Environmental Analysi	s Labora	ntory, Inc.		Date Reported: 12/8/2016
CLIENT: Souder, Miller and Associates Project: BIYA 185 Line Leak Lab ID: 1611C33-017	Matrix:			EID: SB4-10 Date: 11/18/2016 3:09:00 PM Date: 11/23/2016 7:40:00 AM
Analyses	Result	PQL Qu	al Units 2	DF Date Analyzed Batch
EPA METHOD 300.0: ANIONS	2, 2, 2 <u>1</u> 2			JurAnalyst LGT
Chloride	190	30	mg/Kg	20 12/2/2016 10:12:04 PM 28989
EPA METHOD 8015M/D: DIESEL RANG	E ORGANIC	S 5		Analyst: TOM
Diesel Range Organics (DRO)	•ND ***	. 10	^{-,} mg/Kg∞	1 11/29/2016 8:47:52.PM 288501
Sur: DNOP	98.5	70-130	%Rec	1 11/29/2016 8:47:52 PM 28850
EPA METHOD 8015D: GASOLINE RANG	GE .			Analyst NSB
Gasoline Range Organics (GRO)	14	5.0	.mg/Kg	1 11/28/2016 8:51:38 PM 28847
Surr:BFB	93.0	68.3-144	⊹ %Rec	1 11/28/2016 8:51:38 PM 28847
EPA METHOD 8260B: VOLATILES SHO	RT LIST			Analyst: AG
Benzene	0.59	0.025, 5	mg/Kg	1 12/1/2016 6:34:38 PM 28847
Toluene	1.0	0.050	mg/Kg*	1 12/1/2016 6:34:38 PM 28847
Ethylbenzene	0.069	0.050	mg/Kg	1 12/1/2016 6:34:38 PM - 28847
Xylenes, Total	0.32	0.099	mg/Kg	1 12/1/2016 6:34:38 PM 28847
Surr: 1,2-Dichloroethane-d4	100	70-130	%Rec	1 12/1/2016/6:34:38 PM 28847
Surr: 4-Bromofluorobenzene	× 90.6	70-130	. %Rec	1 12/1/2016 6:34:38 PM 28847
Surr: Dibromofluoromethane	. 110	70-130	%Rec	1 /12/1/2016 6:34:38 PM 28847
Surr: Toluene-d8	95.7	70-130	%Rec	1 12/1/2016 6:34:38 PM 28847

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information?

Qualifiers: * Value exceeds Maximum Contaminant Level.

S

- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
 - % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits Page 17 of 28

Analytical Report Lab Order 1611C33

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- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller and Associates **Project:** BIYA 185 Line Leak

1611C33-018

Lab ID:

Client Sample ID: SB5-4 Collection Date: 11/18/2016 3:34:00 PM Received Date: 11/23/2016 7:40:00 AM

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS				_	Analyst	: LGT
Chloride	ND	30	mg/Kg	20	12/2/2016 10:49:18 PM	28989
EPA METHOD 8015M/D: DIESEL RA	ANGE ORGANIC	s			Analyst	: TOM
Diesel Range Organics (DRO)	ND	10	mg/Kg	1	11/29/2016 9:10:44 PM	28850
Surr: DNOP	96.1	70-130	%Rec	1	11/29/2016 9:10:44 PM	28850
EPA METHOD 8015D: GASOLINE R	RANGE				Analyst	: NSB
Gasoline Range Organics (GRO)	ND	4.8	mg/Kg	1	11/28/2016 9:14:57 PM	28847
Surr: BFB	93.4	68.3-144	%Rec	1	11/28/2016 9:14:57 PM	28847
EPA METHOD 8260B: VOLATILES	SHORT LIST				Analyst	: AG
Benzene	0.096	0.024	mg/Kg	1	12/1/2016 7:03:31 PM	28847
Toluene	0.19	0.048	mg/Kg	1	12/1/2016 7:03:31 PM	28847
Ethylbenzene	ND	0.048	mg/Kg	1	12/1/2016 7:03:31 PM	28847
Xylenes, Total	ND	0.096	mg/Kg	1	12/1/2016 7:03:31 PM	28847
Surr: 1,2-Dichloroethane-d4	103	70-130	%Rec	1	12/1/2016 7:03:31 PM	28847
Surr: 4-Bromofluorobenzene	88.5	70-130	%Rec	1	12/1/2016 7:03:31 PM	28847
Surr: Dibromofluoromethane	112	70-130	%Rec	1	12/1/2016 7:03:31 PM	28847
Surr: Toluene-d8	96.2	70-130	%Rec	1	12/1/2016 7:03:31 PM	28847

Matrix: SOIL

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*

- Value exceeds Maximum Contaminant Level. D Sample Diluted Due to Matrix
- Н Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RPD outside accepted recovery limits R
- S % Recovery outside of range due to dilution or matrix
- В Analyte detected in the associated Method Blank
- Ε Value above quantitation range
- Analyte detected below quantitation limit Page 18 of 28 J
- Р Sample pH Not In Range
- Reporting Detection Limit RL

w Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

CLIENT: Souder, Miller and Associates Client Sample ID: SB5-7 Collection Date: 11/18/2016 3:51:00 PM **Project:** BIYA 185 Line Leak Received Date: 11/23/2016 7:40:00 AM Lab ID: 1611C33-019 Matrix: SOIL

Analyses	Result	PQL Qu	al Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS					Analyst	t: LGT
Chloride	38	30	mg/Kg	20	12/2/2016 11:01:43 PM	28989
EPA METHOD 8015M/D: DIESEL RA	ANGE ORGANIC	s			Analyst	TOM
Diesel Range Organics (DRO)	ND	9.7	mg/Kg	1	11/29/2016 9:33:23 PM	28850
Sur: DNOP	95.2	70-130	%Rec	1	11/29/2016 9:33:23 PM	28850
EPA METHOD 8015D: GASOLINE R	ANGE				Analyst	t: NSB
Gasoline Range Organics (GRO)	ND	4.9	mg/Kg	1	11/28/2016 9:38:17 PM	28847
Surr: BFB	93.8	68.3-144	%Rec	1	11/28/2016 9:38:17 PM	1 28847
EPA METHOD 8260B: VOLATILES	SHORT LIST				Analyst	t: AG
Benzene	0.12	0.025	mg/Kg	1	12/1/2016 7:32:27 PM	28847
Toluene	0.19	0.049	mg/Kg	1	12/1/2016 7:32:27 PM	28847
Ethylbenzene	ND	0.049	mg/Kg	1	12/1/2016 7:32:27 PM	28847
Xylenes, Total	ND	0.098	mg/Kg	1	12/1/2016 7:32:27 PM	28847
Surr: 1,2-Dichloroethane-d4	105	70-130	%Rec	1	12/1/2016 7:32:27 PM	28847
Surr: 4-Bromofluorobenzene	88.9	70-130	%Rec	1	12/1/2016 7:32:27 PM	28847
Surr: Dibromofluoromethane	115	70-130	%Rec	1	12/1/2016 7:32:27 PM	28847
Surr: Toluene-d8	97.7	70-130	%Rec	1	12/1/2016 7:32:27 PM	28847

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	в	Analyte detected
	D	Sample Diluted Due to Matrix	Е	Value above quar
	Н	Holding times for preparation or analysis exceeded	J	Analyte detected
	ND	Not Detected at the Reporting Limit	Р	Sample pH Not li
	R	RPD outside accepted recovery limits	RL	Reporting Detect

- S % Recovery outside of range due to dilution or matrix
- d in the associated Method Blank
- antitation range
- d below quantitation limitPage 19 of 28
- In Range
- ction Limit
- Sample container temperature is out of limit as specified W

Hall Environmental Analysis	s Labora	tory, Ind	2.		Date Reported: 12/8/2016
CLIENT: Souder, Miller and Associates Project: BIYA 185 Line Leak Lab ID: 1611C33-020	Matrix:	SOIL		Date: 11	36-5 /18/2016 4:17:00 PM /23/2016 7:40:00 AM
Analyses	Result	PQL (Qual Units	DF	Date Analyzed Batch
EPA METHOD 300.0: ANIONS					Analyst: MRA
Chloride	ND	30	mg/Kg	20	12/5/2016 2:15:29 PM 28994
EPA METHOD 8015M/D: DIESEL RANGE	E ORGANIC	S			Analyst: TOM
Diesel Range Organics (DRO)	ND	9.7	mg/Kg	1	11/29/2016 9:56:12 PM 28850
Surr: DNOP	102	70-130	%Rec	1	11/29/2016 9:56:12 PM 28850
EPA METHOD 8015D: GASOLINE RANG	E				Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9	mg/Kg	1	11/28/2016 11:11:17 PM 28847
Surr: BFB	94.6	68.3-144	%Rec	1	11/28/2016 11:11:17 PM 28847
EPA METHOD 8260B: VOLATILES SHO	RT LIST				Analyst: AG
Benzenø	0.070	0.024	mg/Kg	1	12/1/2016 8:01:11 PM 28847
Toluene	0.11	0.049	mg/Kg	1	12/1/2016 8:01:11 PM 28847
Ethylbenzene	ND	0.049	mg/Kg	1	12/1/2016 8:01:11 PM 28847
Xylenes, Total	ND	0.098	mg/Kg	1	12/1/2016 8:01:11 PM 28847
Surr: 1,2-Dichloroethane-d4	106	70-130	%Rec	1	12/1/2016 8:01:11 PM 28847
Surr: 4-Bromofluorobenzene	90.7	70-130	%Rec	1	12/1/2016 8:01:11 PM 28847
Surr: Dibromofluoromethane	114	70-130	%Rec	1	12/1/2016 8:01:11 PM 28847
Surr: Toluene-d8	98.8	70-130	%Rec	1	12/1/2016 8:01:11 PM 28847

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*

Value exceeds Maximum Contaminant Level. D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

Hall Environmental Analysis Laboratory, Inc.

ND Not Detected at the Reporting Limit

RPD outside accepted recovery limits R

S % Recovery outside of range due to dilution or matrix В Analyte detected in the associated Method Blank

Е Value above quantitation range

Analyte detected below quantitation limitsPage 20 of 28 J

Analytical Report Lab Order 1611C33

Р Sample pH Not In Range

RL Reporting Detection Limit

w Sample container temperature is out of limit as specified

Hall Environmental Analysis Laboratory, Inc.

 CLIENT:
 Souder, Miller and Associates
 Client Sample ID: SB6-10

 Project:
 BIYA 185 Line Leak
 Collection Date: 11/18/2016 4:39:00 PM

 Lab ID:
 1611C33-021
 Matrix: SOIL
 Received Date: 11/23/2016 7:40:00 AM

Analyses	Result PQL Q		al Units	DF	Batch	
EPA METHOD 300.0: ANIONS					Analys	t: MRA
Chloride	38	30	mg/Kg	20	12/5/2016 2:52:44 PM	28994
EPA METHOD 8015M/D: DIESEL RANGE		6			Analys	t: TOM
Diesel Range Organics (DRO)	32	10	mg/Kg	1	11/29/2016 11:04:19 P	M 28851
Surr: DNOP	105	70-130	%Rec	1	11/29/2016 11:04:19 P	M 28851
EPA METHOD 8015D: GASOLINE RANG	E ·	•			Analys	t: NSB
Gasoline Range Organics (GRO)	14 .	4.8	mg/Kg	1	11/28/2016 2:01:41 PM	1 28848
Surr: BFB	96.7	68.3-144	%Rec	1	11/28/2016 2:01:41 PM	1 28848
EPA METHOD 8021B: VOLATILES					Analys	t: NSB
Benzene	0.37	0.024	mg/Kg	1	11/28/2016 2:01:41 PM	1 28848
Toluene	0.49	0.048	mg/Kg	1	11/28/2016 2:01:41 PM	1 28848
Ethylbenzene	ND	0.048	mg/Kg	1	11/28/2016 2:01:41 PN	1 28848
Xylenes, Total	0.12	0.096	mg/Kg	1	11/28/2016 2:01:41 PM	1 28848
Surr: 4-Bromofluorobenzene	105	80-120	%Rec	1	11/28/2016 2:01:41 PM	1 28848

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

* Value exceeds Maximum Contaminant Level.D Sample Diluted Due to Matrix

H Holding times for preparation or analysis exceeded

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank

E Value above quantitation range

J Analyte detected below quantitation limit Page 21 of 28

P Sample pH Not In Range

RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

QC SUMMARY REPORT Hall Environmental Analysis Laboratory, Inc.

08-Dec-16

Client: Project:		der, Miller and Associ A 185 Line Leak	ates							
Sample ID	MB-28989	SampType: M	BLK	Tes	tCode: EF	PA Method	300.0: Anion	s	-	
Client ID:	PBS	Batch ID: 2	3989	я	lunNo: 3 9	9134				
Prep Date:	12/2/2016	Analysis Date: 1	2/2/2016	S	eqNo: 12	224235	Units: mg/K	g		
Analyte Chloride		Result PQL ND 1.5		SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sample ID	LCS-28989 SampType: LCS TestCode: EPA Method 300.0: Anions									
Client ID:	LCSS	Batch ID: 2	989	F	RunNo: 39	9134				
Prep Date:	12/2/2016	Analysis Date: 1	2/2/2016	s	eqNo: 12	224236	Units: mg/K	g		
Analyte		Result PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride		14 1.5	15.00	0	93.9	90	110			
Sample ID	MB-28994	SampType: m	blk	Test	tCode: EF	PA Method	300.0: Anion	s		
Client ID:	PBS	Batch ID: 2	994	R	lunNo: 39	9175				
Prep Date:	12/5/2016	Analysis Date: 1	2/5/2016	s	eqNo: 12	225529	Units: mg/K	g		
Analyte Chloride		Result PQL ND 1.5		SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sample ID	LCS-28994	SampType: Ic	5	Tes	tCode: EF	PA Method	300.0: Anion	s		
Client ID:	LCSS	Batch ID: 2	994	R	lunNo: 39	9175				
Prep Date:	12/5/2016	Analysis Date: 1	2/5/2016	s	eqNo: 12	225530	Units: mg/K	g		
Analyte		Result PQL		SPK Ref Val		LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride		14 1.5	15.00	0	95.9	90	110			

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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specified

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1611C33

08-Dec-16

Client: Project:	Souder, N BIYA 18:			ates					,		
Sample ID	LCS-28850	Samp	ype: L(cs	Tes	tCode: E	PA Method	8015M/D: Di	esel Rang	e Organics	
Client ID:	LCSS	Batc	h ID: 28	850	I	RunNo: 3	9005				
Prep Date:	11/23/2016	Analysis [Date: 1	1/29/2016	:	SeqNo: 1	220400	Units: mg/h	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range C Surr: DNOP	rganics (DRO)	51 4.6	10	50.00 5.000	0	102 92.6	62.6 70	124 130			
Sample ID	MB-28850	Samp	ype: M	BLK	Tes	tCode: E	PA Method	8015M/D: Di	esel Rang	e Organics	
Client ID:	PBS	Batc	h ID: 28	850	· I	RunNo: 3	9005				
Prep Date:	11/23/2016	Analysis [Date: 1	1/29/2016	:	SeqNo: 1	220401	Units: mg/H	۰ g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range C	rganics (DRO)	ND	10								
Surr: DNOP		9.3		10.00		92.7	70	130			
Sample ID	1611C33-001AMS	Samp	ype: M	s	Tes	tCode: E	PA Method	8015M/D: Di	esel Rang	e Organics	
Client ID:	SB7-7	Batc	n ID: 28	850	F	RunNo: 3	9005				
Prep Date:	11/23/2016	Analysis E	Date: 1	1/29/2016	:	SeqNo: 1	220530	Units: mg/k	۲g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range C	rganics (DRO)	48	9.9	49.31	5.162	87.5	51.6	130			Guu
Surr: DNOP		4.4		4.931		89.9	70	130			
Sample ID	1611C33-001AMS	D Sampl	ype: M	SD	Tes	tCode: E	PA Method	8015M/D: Di	esel Rang	e Organics	-
Client ID:	SB7-7	Batcl	n ID: 28	850	RunNo: 39005						
Prep Date:	11/23/2016	Analysis D	Date: 1	1/29/2016		SeqNo: 1	220531	Units: mg/H	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range C	rganics (DRO)	50	9.5	47.26	5.162	94.4	51.6	130	3.01	20	duu
Surr: DNOP		4.5		4.726		95.5	70	130	0	0	
Sample ID	1611C33-021AMS	Samp1	ype: M	S	Tes	tCode: E	PA Method	8015M/D: Di	esel Rano	e Organics	
•	SB6-10	-	n ID: 28			RunNo: 3			 - -		
	11/23/2016	Analysis D				SeqNo: 1		Units: mg/M	(g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%RFC	Low! imit	Highl imit	%RPD	RPDLimit	Qual
Diesel Range O	rganics (DRO)	59	9.8	49.02	31.95	54.9	51.6	130			Guai
Surr: DNOP	•	4.7		4.902		96.3	70	130			
Sample ID	1611C33-021AMSI) Samol	ype: M	SD	Tes	tCode: F	PA Method	8015M/D: Di	esel Rano	e Organics	
-	SB6-10		1D: 28			RunNo: 3					
Prep Date:	11/23/2016	Analysis D				SeqNo: 1		Units: mg/k	a		
		-							-		
Analyte	, 1 ····-	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Qualifiers: * Value					D · · ·	•. •					
value	exceeds Maximum Co Diluted Due to Matr		_evel.		-		n the associat titation range	ed Method Bla	nĸ		
-	g times for preparation		s exceede	м			elow quantita			Page 23 o	600 ·

- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- J Analyte detected below quantitation limits
- Page 23 of 28

- P Sample pH Not In Range
- RL Reporting Detection Limit

W Sample container temperature is out of limit as specified

QC SUMMARY REPORT Hall Environmental Analysis Laboratory, Inc.

WO#:	1611C33

08-Dec-16

Client: Project:	,	1iller and A 5 Line Leak		ates							
Sample ID	1611C33-021AMS	D SampTy	pe: MS	SD	Tes	tCode: El	PA Method	8015M/D: Di	esel Rang	e Organics	
Client ID:	SB6-10	Batch I	D: 28	851	F	lunNo: 3	9005				
Prep Date:	11/23/2016	Analysis Da	te: 1 ′	1/29/2016	S	ieqNo: 1	220906	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range (Organics (DRO)	60	9.7	48.50	31.95	58.2	51.6	130	2.16	20	
Surr: DNOP		4.5		4.850		92.4	70	130	0	0	
Sample ID	LCS-28851 SampType: LCS TestCode: EPA Method 8015M/D: Diesel Range Organics										
Client ID:	LCSS	Batch I	D: 28	851	Я	lunNo: 3	9005				
Prep Date:	11/23/2016	Analysis Da	te: 11	1/29/2016	S	eqNo: 1	220914	Units: mg/k	Kg.		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range (Organics (DRO)	52	10	50.00	0	104	62.6	124			
Surr: DNOP		4.6		5.000		92.5	70	130			
Sample ID	MB-28851	SampTy	pe: ME	BLK	Tes	Code: El	PA Method	8015M/D: Di	esel Rang	e Organics	
Client ID:	PBS	Batch I	ID: 28	851	F	lunNo: 3	9005				
Prep Date:	11/23/2016	Analysis Da	te: 11	1/29/2016	S	eqNo: 1	220915	Units: mg/k	٢g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range (Drganics (DRO)	ND	10								
Surr: DNOP		9.8		10.00		97.6	70	130			

Qualifiers:

Value exceeds Maximum Contaminant Level. *

D Sample Diluted Due to Matrix

- Н Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

- S % Recovery outside of range due to dilution or matrix
- Analyte detected in the associated Method Blank В

Ε Value above quantitation range

- J Analyte detected below quantitation limits
- Р Sample pH Not In Range
- Reporting Detection Limit RL
- W Sample container temperature is out of limit as specified

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QC SUMMARY Hall Environment	⁷ REPORT al Analysis Laborat	WO#: 1611Č3 tory, Inc. 08-pec-1
	Miller and Associates 35 Line Leak	
Sample ID MB-28848	SampType: MBLK	TestCode: EPA Method 8015D: Gasoline Range
Client ID: PBS	Batch ID: 28848	RunNo: 38984
Prep Date: 11/23/2016	Analysis Date: 11/28/2016	SeqNo: 1219303 Units: mg/Kg
Analyte	Result PQL SPK value	e SPK Ref Vall %REC LowLimit HighLimit %RPD RPDLimit Qual
Gasoline Range Organics (GRO)	ND 5.0	
Surr: BFB	910 1000	91.5 68.3 144
Sample ID LCS-28848	SampType: LCS	TestCode: EPA Method 8015D: Gasoline Range
Client ID: LCSS	Batch ID: 28848	
Prep Date: 11/23/2016	Analysis Date: 11/28/2016	SeqNo: 1219304 Units: mg/Kg
Analyta		
Analyte Sector GRO)		e SPK Ref Val % REC / LowLimit HighLimit % RPD & RPDLimit Qual
Surr: BFB		D 99.0 68.3 144
Sample ID. 1611C33-021AMS	S SampType: MS	TestCode: EPA Method 8015D: Gasoline Range
Client ID: SB6-10		
- 1995년 1996년 - 11월 11일 - 1 11일 - 11일 - 11 11일 - 11일 - 11	Batch ID: 28848	RunNo: 38984
Prep Date: 11/23/2016	Analysis Date: 11/28/2016	SeqNo: 1219314 Units: mg/Kg
Analyte		e SPK Ref Val & %REC / LowLimit HighLimit %RPD / RPDLimit Qual
asoline Range Organics (GRO) Surr: BFB	26 5.0 24.93 1000 997.0	3. 14.08 48.1 61.3 150 0. 100 68.3 144
Sample ID 1611C33-021AMS Client ID 586-10 Prep Date: 11/23/2016 Analyte asoline Range Organics (GRO)	SD SampType: MSD Batch ID: 28848 Analysis Date: 11/28/2016 Result PQL SPK value 36 4.8 24.13	
Surr: BFB	980 965.3	3 102 68.3 144 0
Sample ID MB-28847	SampType: MBLK	TestCode: EPA Method 8015D: Gasoline Range
Client ID: PBS	Batch ID: 28847	RunNo: 38983
Prep Date: 11/23/2016	Analysis Date: 11/28/2016	SeqNo: 1219357 *Units: mg/Kg
Analyte	Result PQL SPK value	e SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
asoline Range Organics (GRO),	ND 5.0	
Sum BFB	890 1000	D 88.9 68.3 144
Sample ID LCS-28847	SampType: LCS	TestCode: EPA Method 8015D: Gasoline Range
Client ID: LCSS	Batch ID: 28847	RunNo: 38983
Prep Date: 11/23/2016	Analysis Date: 11/28/2016	SeqNo: 1219358 Units: mg/Kg
Analyte	Result PQL SPK value	e SPK Ref Val %REC LowLimit HighLimit %RPD RPDLimit Qual
Nalifiers: Value exceeds Maximum (B Analyte detected in the associated Method Blank
D Sample Diluted Due to Ma H Holding times for preparati	·	 E Value above quantitation range J Analyte detected below quantitation limits Page 25 of 28
ND Not Detected at the Report		J Analyte detected below quantitation limits Page 25 of 28 P Sample pH Not In Range
R RPD outside accepted reco		RL Reporting Detection Limit
	re due to dilution or matrix	W Sample container temperature is out of limit as insaified

% Recovery outside of range due to dilution or matrix Ś

w Sample container temperature is out of limit as specified

3

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QC SUMMARY REPORT Hall Environmental Analysis Laboratory, Inc.

WO#: 1611C33

08-Dec-16

Client: Project:		Miller and 5 Line Lea		utes							
Sample ID	LCS-28847	SampT	ype: LC	s	Tes	tCode: El	PA Method	8015D: Gasc	line Rang	e	
Client ID:	LCSS	Batch	1D: 28	847	F	lunNo: 3	8983				
Prep Date:	11/23/2016	Analysis D	ate: 1	1/28/2016	s	eqNo: 1	219358	Units: mg/K	íg		
Analyte	-	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Rang	e Organics (GRO)	25	5.0	25.00	0	99.1	74.6	123			
Surr: BFB	-	960		1000	t	96.3	68.3	144			
Sample ID 1611C33-001AMS SampType: MS TestCode: EPA Method 8015D: Gasoline Range											
Client ID:	SB7-7	Batch	n ID: 28	847	R	tunNo: 3	8983				
Prep Date:	11/23/2016	Analysis D	ate: 1 1	1/28/2016	s	eqNo: 1	219362	Units: mg/K	g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Rang	e Organics (GRO)	23	4.7	23.43	1.244	93.5	61.3	150			,
Surr: BFB		940		937.2		100	68.3	144			
Sample ID	1611C33-001AMS	D SampT	ype: MS	SD	Tes	Code: El	PA Method	8015D: Gaso	line Rang	e	
Client ID:	SB7-7	Batch	n ID: 28	847	R	lunNo: 3	8983				
Prep Date:	11/23/2016	Analysis D	ate: 1	1/28/2016	S	eqNo: 1	219363	Units: mg/K	(g		
Analyte		Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Sasoline Rand	e Organics (GRO)	28	4.9	24.39	1.244	111	61.3	150	20.0	20	
Jasonne rang										20	

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
 - Sample pH Not In Range
- RL Reporting Detection Limit

Р

W Sample container temperature is out of limit as specified

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QC SUMMARY REPORT

WO#: 1611C33

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08-Dec-16

Hall Environmental Analysis Laboratory, Inc.

Client: Soud	er, Miller and Associates
Project: BIYA	185 Line Leak
e line the state of a sub-	the second se

Sample ID MB-28848	, SampType: MBLK TestCode: EPA Meth	od 8021B: Volatiles
Client ID: PBS	Batch ID: 28848 RunNo: 38984	
Prep Date: 11/23/2016	Analysis Date: 11/28/2016 SeqNo: 1219341	Units: mg/Kg
Analyte	Result PQL SPK value SPK Ref Val %REC LowLin	nit HighLimit % %RPD RPDLimit Qual
Benzene	ND 0.025	senten in de la senten a sente
Toluene	ND 0.050	الله المراجع ا المراجع المراجع
Ethylbenzene	ND 0.050	
Xylenes, Total	ND 0.10	
Sur: 4-Bromofluorobenzene	1.000 97.0	80 120
Sample ID LCS-28848	SampType: LCS TestCode: EPA Meth	od 8021B: Volatiles
Client ID: LCSS	Batch ID: 28848 RunNo: 38984	
Prep Date 11/23/2016	Analysis Date: 11/28/2016 SeqNo: 1219342	Units: mg/Kg
Analyte	Result PQL SPK value SPK Ref Val %REC LowLin	nit HighLimit %RPD RPDLimit Qual
Benzene	0.97 0.025 1.000 0 96.9 75 0.94 0.050 1.000 0 94.3 80	

'87 Q

88.3

114

78.9

79.2

80

115

120

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1	Surr: 4-Bromofluorobenzene	1.0	1.000 101 80 120	
2.5	Sample ID MB-28847	SampType: MBLK	TestCode EPA Method 8021B: Volatiles	же Ц
;;	Client ID: PBS	Batch ID: 28847	RunNo: 38983	.

Ô.

Prep Date: 11/23/2016 Analysis Date: 11/28/2016 SeqNo: 1219387. Units: %Rec

1.000

1.000

3.00Õ

0.050

0.10

0.88

2.6

1.1

	Analyte	PQL SPK value	SPK Ref Val, %REC LowLimit	HighLimit %	RPD RPDLimit	Qual
,	Surr: 4-Bromofluorobenzene	1.000	109 80	120		ي يې

. '	Sample ID LCS-28847 SampType: LCS TestCode: EPA Method 8021B: Volatile	85				ŀ
			. •			Į,
	Client ID: 24CSS Batch ID: 28847 RunNo: 38983					Ŀ
	和代表的全体性的变化。但是我们的生活,不是我们的人们的生活,我们们就是我们是我们都被把我们就是一样的。""你们,你们们不是你们的。"					<u>}</u>
1	Prep Date: 11/23/2016 Analysis Date: 11/28/2016 SeqNo: 1219388 Units: %Rec					18
	化学校 청양 정말 눈 비행 같은 것 같아요. 그는 것 같아요. 가는 것 같아요. 가지 않는 것 같아요. 가지 않는 것 같아요. 가지 않는 것 같아요.		x = i = 1	S. Er.	1	-2
<u>e 1</u>	Analyte Result PQL SPK value SPK Ref Val %REC LowLimit HighLimit	%RPD	RPDL	imit	Qual	F

Qualifiers:

Ethylbenzene

Xylenes, Total

- * Value exceeds Maximum Contaminant Level.
- D Sample Diluted Due to Matrix

Surr: 4-Bromofluorobenzene

- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S. % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

QC SUMMARY REPORT Hall Environmental Analysis Laboratory, Inc.

WO#: 1611C33

08-Dec-16

	uder, Miller and YA 185 Line Le		ates															
Sample ID Ics-28847	Samp	Type: LC	s	TestCode: EPA Method 8260B: Volatiles Short List														
Client ID: LCSS	Batc	h ID: 28	847	RunNo: 39098														
Prep Date: 11/23/201	6 Analysis [Date: 12	2/1/2016	S	SeqNo: 1	222991	Units: mg/Kg											
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual								
Benzene	0.99	0.025	1.000	0	99.1	70	130											
Toluene	0.93	0.050	1.000	0	93.5	70	130											
Ethylbenzene	0.97	0.050	1.000	0	97.5	70	130											
Xylenes, Total	. 3.1	0.10	3.000	0	102	70	130											
Surr: 1,2-Dichloroethane-d4	4 0.51		0.5000		102	70	130											
Surr: 4-Bromofluorobenzen	e 0.45		0.5000		89.3	70	130											
Surr: Dibromofluoromethan	e 0.57		0.5000		114	70	130											
Surr: Toluene-d8	0.47		0.5000		93.8	70	130											
Sample ID mb-28847	Samp	Гуре: МЕ	BLK	TestCode: EPA Method 8260B: Volatiles Short List														
Client ID: PBS	Batc	h ID: 28	847	F	RunNo: 3	9098												
Prep Date: 11/23/201	6 Analysis [Date: 12	2/1/2016	S	eqNo: 1	222992	Units: mg/k	(g										
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual								
Benzene	ND	0.025		-														
Toluene	ND	0.050																
Ethylbenzene	ND	0.050																
Xylenes, Total	ND	0.10					,											
Surr: 1,2-Dichloroethane-d4	0.52		0.5000		105	70	130											
Surr: 4-Bromofluorobenzen	e 0.47		0.5000		93.8	70	130											
Surr: Dibromofluoromethan	e 0.60		0.5000		120	70	130											

Qualifiers:

* Value exceeds Maximum Contaminant Level.

D Sample Diluted Due to Matrix

- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

- S % Recovery outside of range due to dilution or matrix
- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- P Sample pH Not In Range
- RL Reporting Detection Limit
- W Sample container temperature is out of limit as specified

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HALL ENVIRONMENTAL ANALYSIS LABORATORY	Hall Environmental A Albuq TEL: 505-345-3975 F Website: www.hall	4901 Hawkins werijué, NM 871 NX: 505-345-41	NE 09 Sam j 07	ole Log-In Cl	eck List	
Client Name: SMA-FARM	Work Order Number	1611C33		RcpINc	I	
Received by/date:	11 28.16			· · · · · · · · · · · · · · · · · · ·		
Logged By: Lindsay Manglo	11/23/2016 7:40:00 AM		Julip			
Completed By: Lindsay Mangin	11/23/2016 8:02:59 AM		of ytheo	: **:		
Reviewed By C 1123 110					2000	
Chain of Custody	. * * * *		:			•
1. Custody seals intact on sample bollies?	· · · · · · · · · · · · · · · · · · ·	Yes 🔲	No 🛄	Not Present	:	
2. Is Chain of Custody complete?3. How was the sample delivered?	· · · · · · · · · · · · · · · · · · ·	Yes Z	No 🗖	Not Present	· · · · · · · · · · · · · · · · · · ·	
		XXXIIET		· · · · · · · · · · · · · · · · · · ·		
<u>Log In</u>	·			· · · · Ė		
Was an attempt made to cool the samples?		Yes 🔽	No	NAL		
5. Were all samples received at a temporature	of >0° C to 6.0°C	Yes 🗹	No 🔲	NA 🗔		
6. Sample(s) in proper container(s)?	· · ·	Yes 🗹	No 🗔		•	
and a state of the second		1		· · · · ·		: :
 Sufficient sample volume for indicated test(8. Are samples (except VOA and ONG) proper 		Yes 🗹 Yes 🗹	No 🗌	•		
9. Was preservative added to bottles?	.,	Yes	No 🗹	NA 🛄		:
10. VOA vials have zero headspace?		Yes 🗍	No 🗍	No VOA Vials	: .	
11. Were any sample containers received broke	en?	Yes	No 🗹 🛛			
an a		कार्थ होता.		# of preserved bottles checked	·	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	;	Yes 🔽	No 🗌	state in the state of the state	>12 unless noted)	ч Р
13 Are matrices correctly identified on Chain of	Custcdy?	Yes 🔽	No	Adjusted?	· · · · · · · · · · · · · · · · · · ·	
14, is it clear what analyses were requested? 15. Were all holding times able to be met?		Yes 🗹	No 🗌	Checked by:		
(If no, notify customer for authorization.)			. 1			I
Special Handling (if applicable)						
16, Was client notified of all discrepancies with	this order?	Yes	No 🗍	NA 2		
Person Notified	Date	<u>.</u>	<u> </u>			
By Whom:	Via:] eMail [] P	hone 🛄 Fax	In Person		<u>.</u>
Regarding: Client Instructions:					: 	
17. Additional.remarks:		. !	······································			
18. <u>Coolor Information</u>				· · · · · ·		. : :-
the second s		eal Date	Signed By			· · · · · ·
Page 1 of 1	al la contra			and the second secon		

Chain-of-Custody Record				Turn-Around Time:				HALL ENVIRONMENTAL														
ailing Address: 401. W. Broad way				A Standard Rush Project Name: BIYA 185 Line Leak																		
								4901 Hawkins NE - Albuquerque, NM 87109														
	Far	mmeto	n, NM 87401	Project #:					Tel. 505-345-3975 Fax 505-345-4107													
hone #	4: 5704	5 - 325	- 7535						Analysis Request													
nail or	Fax#: 4	ashley.	Maxwell & Souder Miller.com	Project Mar	nager:		Ţ	(yl	<u>@</u>				04)				5					
VQC F	uchage.		miller. com □ Level 4 (Full Validation)	As	hley Maxi	vell	4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Gas of	は		SIMS)		PO4,SC	PCB's			ce note)					
	tation			Sampler:	SAH,/LO		1∰	H	۳ ۳		70 S		0 ²	082			(sce					
NELA	AP	□ Othe	۲	On Ice: 🔽 Yes 🗆 No				⊢ +	2	818	82		0°°	s / 8		(¥	<u>ctlades</u>					
EDD	(Type)		T	Sample Temperature: 1,3				1BE	1 2		IO O	etals	Ž	cide	<u>ک</u>	<u>></u>	la		3			
Date	Time	Matrix	Sample Request ID	Container Type and		HEAL NO.	ETEX)+ MTBE	BTEX + MTBE + TPH (Gas only)	TPH 8015E	FDB (Method 504 1)	PAH's (8310 or 8270	RCRA 8 Metals	Anions (F,CI,NO ₃ ,NO ₂ ,PO ₄ ,SO ₄)	8081 Pesticides / 8082	8260B (VOA)	8270 (Semi-VOA)	300.0 61		-			
14/16	9:45	(100	587-7	1-402	(00)	-001	X		X								X					
	10:10	1	5B7 - 15		1	-02	X		X		1						X					
	10:44		5B8-5			-003	X		X								X					
	11:22		588-10			-04	X		X		1						X	_				
	11:50		SB9-3			-005	X		X								X					
	12:49		589-16			-006	14		X		1						X					
ww	mara	man	maggalannann				X		X								X					
	13:23		589-21			-007	X		\mathbf{x}	1							X					
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8/16	15:54	V	SB5-10			-009	X		X								×	_				
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If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.

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Chain-of-Custody Record				Turn-Around Time:] 🛛								/ T iP						
ient:	SMA		· · · · · · · · · · · · · · · · · · ·	Standard Rush																			
					Project Name:																		
ailing Address: 40 W. Bradway				- AIYA 185 Line Leak					www.hallenvironmental.com														
•	Farmington, NM 87401			Project #:				Tel. 505-345-3975 Fax 505-345-4107															
	1 1000 #: 505-325-7535								Analysis Request														
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nail or Fax#: ashley. Maxwell @ souder NQC Package: mMer. Lom				1		-			021)	s on				6		SO	B's			¢	hote)		
Stan	dard		Level 4 (Full Validation)		Ashl	ey Max	wel	(BTEX)+ MTBE + TMB's (8021)	(Ga	TPH 8015B (GRO DRO) MAD			8270 SIMS)		Anions (F,CI,NO ₃ ,NO ₂ ,PO ₄ ,SO ₄)	8081 Pesticides / 8082 PCB's			/ se	ž		
	itation			Samp	ler: S	AMILO]≇[H	1 2	(1)	70 8		0°N	3082			وح			Î
NELAP Other				On ice: Ves D No					+	(2)	418.	504.	r 82	s	0 ^{3,1}	s / 8		(A	210			o	
EDD (Type)			Sample Temperature: 1, 7				₩	1BE	B	por	рог	10 c	fetal	CiP	icide	(YC) 	Chlandes			s (Y		
Date	Time	Matrix	Sample Request ID	Cont	tainer	ner Preservativ		HEAL No.	₽ ±	BTEX)+ MTBE BTEX + MTBE		TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or	RCRA 8 Metals	s (F	Pest	8260B (VOA)	8270 (Semi-VOA)				Air Bubbles (Y or N)
		Mathx		Type and #		¢ Туре		1611C33	Ê	1 Ě	8 He) Hc	DB (AH's	CRA	ioir	9811	260E	270 (300.0			r Bu
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	12:58		5R2 - 15					-013	X		X									X			
	13:25		583-5					-014	X		X									X			
	14:04		583-10					-015	X		X									X			
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Department Of Interior- Bureau of Land Management - Tres Rios Field Office - COAs

<u>Well Name/Number:</u> HSGU #185 <u>Leases:</u> 751081035 API:3004510211 Operator: BIYA <u>Surface/Mineral Ownership</u>: IND/IND Location: (STR, QQ) S35,T31N, R16W PAD(X), ACCESS (), PIPELINE () C

REQUIREMENTS AT ALL SITES:

Soil/Excavation: (These are comments to clarify the requirements based on the implementation of the plan and the IMDA criteria)

- 1. Operator must replace all contaminated material with clean, in-kind soil of a quality as good as or better than what is found on pg 7, Exhibit B, of the IMDA.
- 2. Operator will excavate soils per the guidelines found on pg 13, Exhibit B, of the IMDA.
- 3. Operator will remove soils to an approved facility pursuant to pg 14, Exhibit B, of the IMDA.

Sampling: (These are comments to clarify the requirements based on the implementation of the plan and the IMDA criteria)

- 4. Exhibit B of the IMDA ranks this site over 20 points per NMOCD soil contamination standards. Operator will sample for the full table of NMOCD soil contaminants found on pg 7, Exhibit B of the HSGU IMDA:
 - a. Benzene- 10 ppm limit
 - b. BTEX- 50 ppm limit
 - c. TPH (DRO + GRO + MRO)- 100 ppm limit
- 5. Samples must follow EPA Method 602/8020 for Benzene and BTEX totals. (See IMDA, Exhibit B, Page 10)
- 6. Samples must follow EPA Method 418.1 or EPA Method Modified 8015 for TPH. (See IMDA, Exhibit B, Page 10)

Monitoring: (These are comments to clarify the requirements based on the implementation of the plan and the IMDA criteria)

- 7. Operator must submit plans to include 3-4 monitoring wells, to be installed down gradient of contamination for the entire HSGU field. Plans submitted must be pursuant to pages 10-11 of Exhibit B of the approved IMDA.
- 8. Operator will include proposed dates for the start of construction, implementation of monitoring, as well as timeline of deliverables along with the plan for monitoring wells, submitted for approval to the Tres Rios Field Office, pursuant to all applicable sections of the IMDA.

Completed Reclamation of Spill: (These are comments to clarify the requirements based on the implementation of the plan and the IMDA criteria)

9. Operator will submit closure and final reports via Sundry Notice pursuant to pg 16, Exhibit B, of the IMDA.

At this site specifically:

Background: (These are comments to clarify the requirements based on the implementation of the plan and the IMDA criteria)

10. (COA) Operator must show evidence of properly capped pipelines. (See IMDA, Exhibit B, Page 3)

Soils/Erosion: (These are comments to clarify the requirements based on the implementation of the plan and the IMDA criteria)

11. (Comment) Operator will change all "Stormwater" subsections to "soils" or "erosion".

12. (COA) Operator must remove all loose contaminated material still contained in and around the pit (soil, rocks, sticks, absorbent pads, etc.).

13. (COA) Operator must store any stockpiled contaminated materials in a lined and bermed location, or in a steal bin.

14. (COA) Operator must install a continuous string of wattles at the base of any stockpile of material to prevent erosion and movement of soil. Winter Closure:

15. (Comment) Operator will remove the winter closer section of the approved work plan. **Timeframe:**

16. (COA) Operator will have all work completed by December 17th, 2018.

Ryan N.Joyner Natural Resource Specialist BLM-Minerals Division Date