Form 3160-5
(June 2015)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

RECEIVED
ELECTRONIC REPORT
AUG 03 2018
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0137
Expires: January 31, 2018

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on page 2

5. Lease Serial No.
751081035

6. If Indian, Allottee or Tribe Name
UTE MOUNTAIN UTE

7. If Unit or CA/Agreement, Name and/or No.

1. Type of Well
☒ Oil Well ☐ Gas Well ☐ Other

8. Well Name and No.
HSGU 185

2. Name of Operator
BIYA OPERATORS INC
Contact: JUBAL S TERRY
E-Mail: Jterry@diversifiedresourcesinc.com

9. API Well No.
30-045-10211-00-S1

3a. Address
801 W. MINERAL AVE. STE 202
LITTLETON, CO 80120

3b. Phone No. (include area code)
Ph: 303-797-5417 Ext: 232
Fx: 303-797-5418

10. Field and Pool or Exploratory Area
HORSESHOE GALLUP

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 35 T31N R16W NENW 660FNL 1980FWL

11. County or Parish, State
SAN JUAN COUNTY, NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Hydraulic Fracturing	☒ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☐ Other
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.

Pursuant to the Notice of Incidents of Noncompliance #18RJ010 BIYA Operators, Inc. respectfully submits the 185 line leak work plan.

NMOCD

OCT 04 2018

DISTRICT III

SEE ATTACHED CONDITIONS OF APPROVAL

14. I hereby certify that the foregoing is true and correct.

Electronic Submission #429917 verified by the BLM Well Information System
For BIYA OPERATORS INC, sent to the Durango
Committed to AFMSS for processing by BARBARA TELECKY on 08/03/2018 (18BDT0094SE)

Name *(Printed/Typed)* JUBAL S TERRY — Title V.P. EXPLORATION

Signature (Electronic Submission) — Date 08/03/2018

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By [signature] — Title Mgr — Date 10/2/2018

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon. — Office

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on page 2)

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

NMOCD

Revisions to Operator-Submitted EC Data for Sundry Notice #429917

	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
Admin Contact:	JUBAL S TERRY V.P. EXPLORATION E-Mail: Jterry@diversifiedresourcesinc.com Ph: 303-797-5417 Ext: 232 Fx: 303-797-5418	JUBAL S TERRY V.P. EXPLORATION E-Mail: Jterry@diversifiedresourcesinc.com Ph: 303-797-5417 Ext: 232 Fx: 303-797-5418
Tech Contact:	JUBAL S TERRY V.P. EXPLORATION E-Mail: Jterry@diversifiedresourcesinc.com Ph: 303-797-5417 Ext: 232 Fx: 303-797-5418	JUBAL S TERRY V.P. EXPLORATION E-Mail: Jterry@diversifiedresourcesinc.com 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

August 3, 2018 SMA #5127323

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

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.

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 Index	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

GCL Index Flux	ASTM D5887	Weekly	1×10^{-8} $m^3/m^2/sec$ max
GCL Hydraulic Conductivity	ASTM D5887	Weekly	5×10^{-9} cm/sec max
GCL Hydrated Internal Shear Strength	ASTM D6243	Periodic	500 lb/ft^2

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

Shawna Chubbuck
Senior Scientist

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

Registration # and State: 22047 New Mexico

Signature: Heather O. McDaniel

Date: 8/3/2018

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

FIGURE

ATTACHMENTS

FIGURE

185 Line Leak
Summary of Laboratory Analysis
Results in mg/Kg

Date	Time	Sample ID	Sample Depth (Feet BGS)	Method 8015 GRO	Method 8015 DRO	Method 8021 Benzene	Method 8021 BTEX	Method 300.0 Chlorides
NMOCD Guidelines				100		10 ppm	50 ppm	
11/18/2016	11:02	SB1-7	7	7.5	15	0.28	0.75	46
11/18/2016	11:40	SB1-15	15	15	<9.8	0.61	1.81	<30
11/18/2016	12:23	SB2-7	7	<4.7	<9.8	0.037	0.12	120
11/18/2016	12:58	SB2-15	15	17	<9.2	0.71	2.01	35
11/18/2016	13:25	SB3-5	5	<4.9	11	0.043	0.15	<30
11/18/2016	14:40	SB3-10	10	<4.7	<9.6	<0.024	0.057	<30
11/18/2016	14:34	SB4-5	5	<4.7	<9.6	0.10	0.26	<30
11/18/2016	15:09	SB4-10	10	14	<10	0.59	1.59	190
11/18/2016	15:34	SB5-4	4	<4.8	<10	0.096	0.286	<30
11/18/2016	15:51	SB5-7	7	<4.9	<9.7	0.12	0.31	38
11/18/2016	15:54	SB5-10	10	<4.9	<9.4	0.18	0.47	40
11/18/2016	16:17	SB6-5	5	<4.9	<9.7	0.07	0.17	<30
11/18/2016	16:39	SB6-10	10	14	32	0.37	0.86	38
11/19/2016	9:45	SB7-7	7	<5.0	<9.9	<0.025	<0.050	160
11/19/2016	10:10	SB7-15	15	12	150	-	-	-
11/19/2016	10:44	SB8-5	5	<4.6	<9.7	0.037	0.11	<30
11/19/2016	11:22	SB8-10	10	9.5	<10	0.42	1.18	<30
11/19/2016	11:50	SB9-3	3	**5100**	**13000**	-	-	-
11/19/2016	12:49	SB9-16	16	**95**	**820**	-	-	-
11/19/2016	13:23	SB9-21	21	<5.0	31	0.053	0.15	41
11/19/2016	13:27	SB9-25	25	5	<9.2	0.18	0.52	<30

Red indicates that laboratory detection limit exceeded at least one screening level/standard

Soil Boring ID	Latitude	Longitude
SB1	36.8551	-108.49983
SB2	36.85509	-108.49969
SB3	36.58816	-108.49937
SB4	36.85531	-108.49944
SB5	36.85524	-108.49935
SB6	36.85534	-108.49958
SB7	36.85532	-108.49966
SB8	36.85528	-108.49979
SB9	36.85516	-108.49964

LEGEND

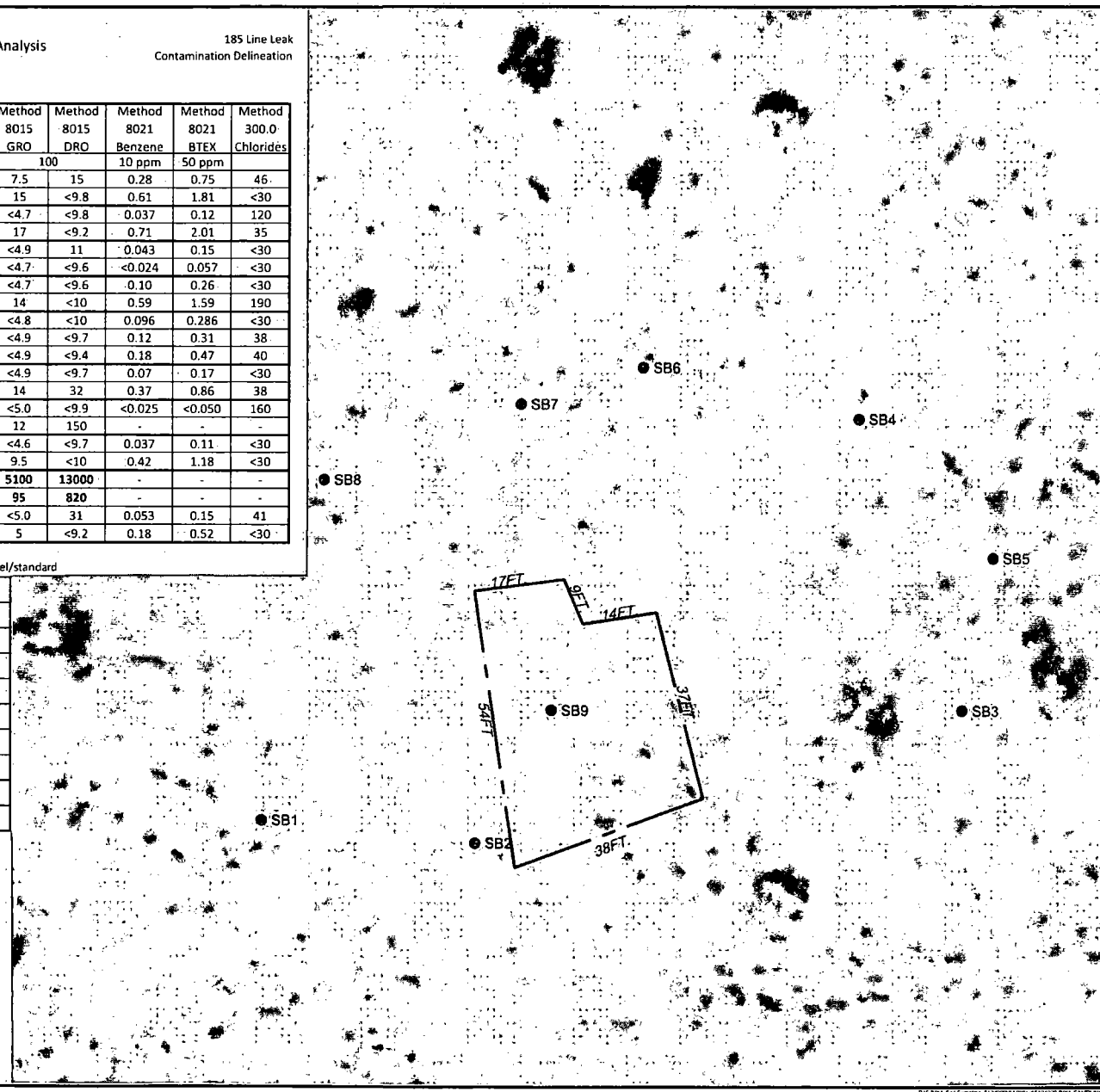
BOREHOLE LOCATION ●

LOCATION BOUNDRY ——

0 20' 40'

SCALE: 1" = 20'

185 Line Leak
Contamination Delineation



SOUDER, MILLER & ASSOCIATES
401 West Broadway Avenue
Farmington, NM 87401-5907
Phone (505) 325-7535 Toll-Free (800) 519-0098 Fax (505) 326-0045
Serving the Southwest & Rocky Mountains

Rev #	Date	Description

WATERFLOW, NEW MEXICO
BHA

EXCAVATION MAP

Designed	Drawn	Ck
AP	DJB	R

Date August 201
Scale Horiz 1" = 20'
Vert N/A
Project No 512492

FIGURE1

ATTACHMENTS

PRODUCT DATA SHEET

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:
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

Tested Property	Test Method	Frequency	Value
Geotextile Property			
Cap Nonwoven, Mass/Unit Area	ASTM D 5261	1/200,000 ft²	6.0 oz/yd² MARV[1]
Carrier Woven, Mass/Unit Area	ASTM D 5261	1/200,000 ft²	3.1 oz/yd² MARV
Bentonite Property			
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			
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 ft²	30 lb/in MARV
Peel Strength	ASTM D 6496 ASTM D 4632[4]	1/40,000 ft²	3.5 lb/in MARV 21 lb MARV
Hydraulic Conductivity[5]	ASTM D 5887	1/Week	5×10^{-9} cm/sec max
Index Flux[5]	ASTM D 5887	1/Week	1×10^{-8} m³/m²/sec max
Internal 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 ft²
Packaged Weight	Typical	Every Roll	2,600 lb

NOTES:
- [1]Minimum Average Roll Value.
- [2]At 0% moisture content.
- [3]Tested in machine direction.
- [4]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.
- [7]Roll widths and lengths have a tolerance of ±1%.

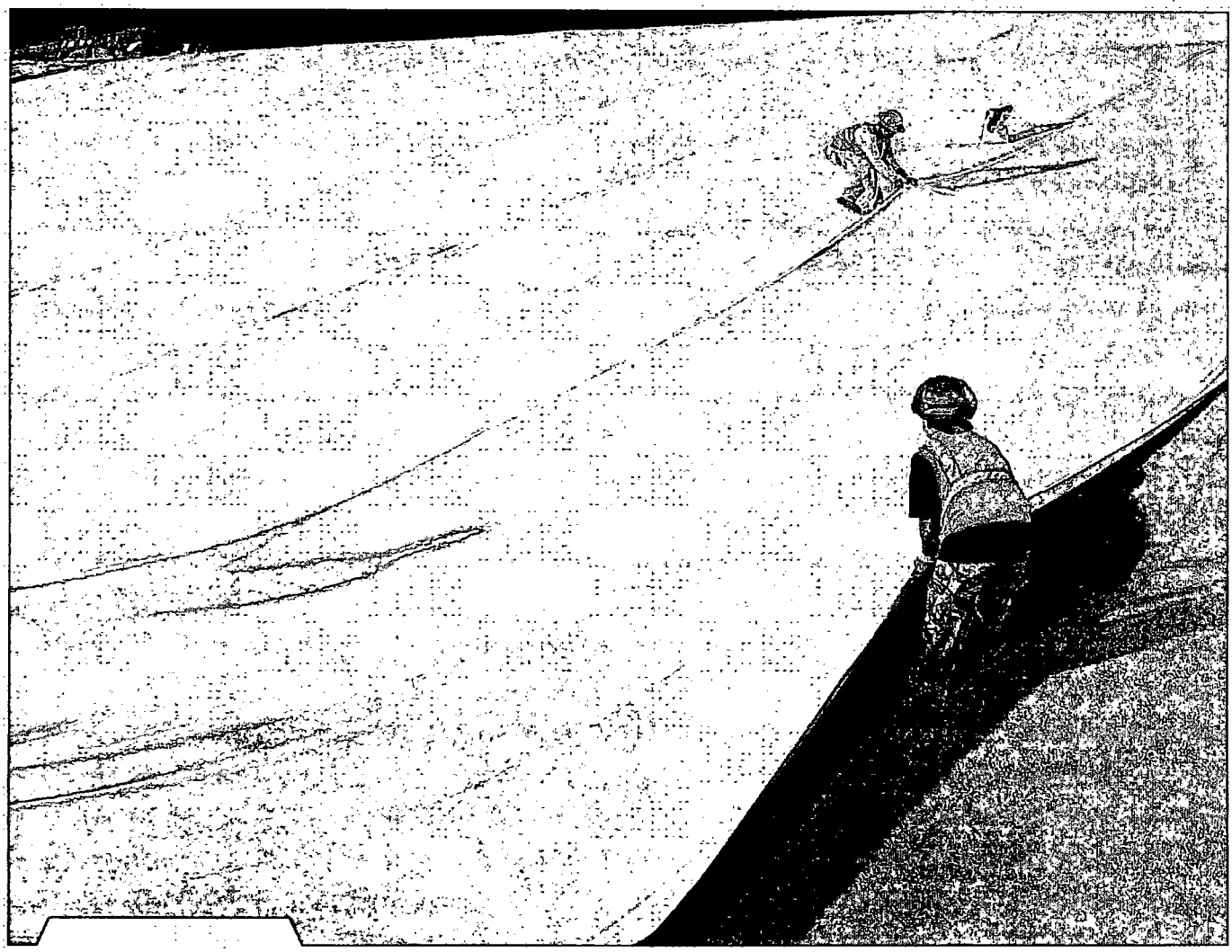
GSE is a leading manufacturer and marketer of geosynthetic lining products and services. We've built a reputation of reliability through our dedication to providing consistency of product, price and protection to our global customers.

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.

[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 ENVIRONMENTAL™



GSE
ENVIRONMENTAL™

BENTOLINER GCL PRODUCTS

INSTALLATION QUALITY ASSURANCE MANUAL

Contents

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 pre-approved 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 (O.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.

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.

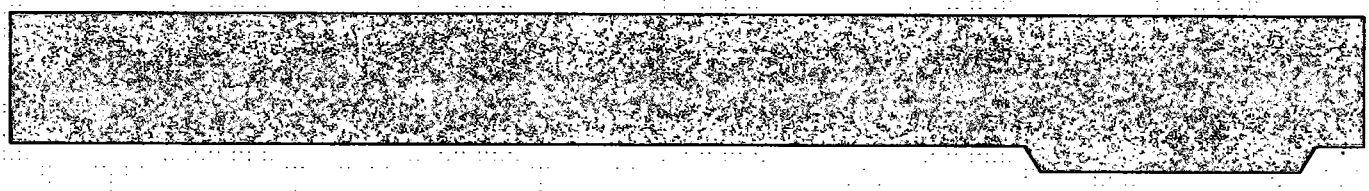
5.0 DEPLOYMENT

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.



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 proper orientation. 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.

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

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.

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]

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ENVIRONMENTAL™

REV 17JAN2013

Project: BIYA 185 Lineleak
Project #
SMA Field Tech: Hinds / Diede

Borehole# SB-1
Rig/SamplerType: GEFCO 50K
Driller: MO TE

Start Date/Time: 11-18-2016
Stop Date/Time: 10:17
Borehole Diameter:

Sample Depth	Time	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 desribe increasing amounts)
1	10:17	(Light) Dark gray olive; tan (brown) yellow red	Gravelly (Sandy) Silty Clayey	Boulder (Sand) Cobble Silt Pebble Clay Gravel	Poorly mod (Well)	Very Coarse Coarse Medium Fine (Very Fine)	(Rock) Semi-consolidated Dense Plastic Unconsolidated	(Dry) Moist Wet		Lt brown v. fine grain Sandstone moderate to well sorted, slight calc cementation. Some silt fractions. 2.5YR 6/3
2	10:18	(Light) Dark gray olive; tan (brown) yellow red	Gravelly (Sandy) Silty Clayey	Boulder (Sand) Cobble Silt Pebble Clay Gravel	Poorly mod (Well)	Very Coarse Coarse Medium Fine (Very Fine)	(Rock) Semi-consolidated Dense Plastic Unconsolidated	(Dry) Moist Wet		Lt. brown v. fine grain, some (Sandstone) silt fraction, moderate to well sorted slight calc cementation. 2.5YR 6/3
3	10:19	(Light) Dark gray olive; tan (brown) yellow red	Gravelly (Sandy) Silty Clayey	Boulder (Sand) Cobble Silt Pebble Clay Gravel	Poorly mod (Well)	Very Coarse Coarse Medium Fine (Very Fine)	(Rock) Semi-consolidated Dense Plastic Unconsolidated	(Dry) Moist Wet		Lt. brown v. fine grain, some (Sandstone) silt fraction, moderatly to well sorted slight calc cementation 2.5YR 6/3
4	10:20	(Light) Dark gray olive; tan (brown) yellow red	Gravelly (Sandy) Silty Clayey	Boulder (Sand) Cobble Silt Pebble Clay Gravel	Poorly mod (Well)	Very Coarse Coarse Medium Fine (Very Fine)	(Rock) Semi-consolidated Dense Plastic Unconsolidated	(Dry) Moist Wet		Lt brown v. fine grain, some (Sandstone) silt fraction, moderatly to well sorted slight calc cementation 2.5YR 6/3
5	10:21	(Light) Dark gray olive; tan (brown) yellow red	Gravelly (Sandy) Silty Clayey	Boulder (Sand) Cobble Silt Pebble Clay Gravel	Poorly mod (Well)	Very Coarse Coarse Medium Fine (Very Fine)	(Rock) Semi-consolidated Dense Plastic Unconsolidated	(Dry) Moist Wet		Lt. brown v. fine grain, some silt (Sandstone) fraction, moderatly to well sorted slight calc cementation. 2.5YR 6/3
6	11:02	(Light) Dark gray olive (red); tan (brown) yellow	Gravelly (Sandy) Silty Clayey	Boulder (Sand) Cobble (Silt) Pebble Clay Gravel	Poorly (mod) Well	Very Coarse Coarse Medium Fine (Very Fine)	(Rock) Semi-consolidated Dense Plastic Unconsolidated	(Dry) Moist Wet		Lt reddish brown, v. fine grain, with (Sandstone) silt, moderatly sorted. v. slight calc cementation 2.5YR 6/4
7	11:02	(Light) Dark gray olive (red); tan (brown) yellow	Gravelly (Sandy) Silty Clayey	Boulder (Sand) Cobble Silt Pebble Clay Gravel	Poorly (mod) Well	Very Coarse Coarse Medium Fine (Very Fine)	(Rock) Semi-consolidated Dense Plastic Unconsolidated	(Dry) Moist Wet		Lt reddish brown, v. fine grain Sandstone with silt. moderatly sorted, v. slight calc cementain 2.5YR 5/6
8	11:03	(Light) Dark gray olive (red); tan (brown) yellow	Gravelly (Sandy) Silty Clayey	Boulder (Sand) Cobble Silt Pebble Clay Gravel	Poorly (mod) Well	Very Coarse Coarse Medium Fine (Very Fine)	(Rock) Semi-consolidated Dense Plastic Unconsolidated	(Dry) Moist Wet		Lt. reddish brown, v fine grain sandstone (soft) moderatly sorted, non calc cement some clay content 2.5YR 5/6

Notes:

Project: BIYA 185 Linebalk
Project #
SMA Field Tech: Hinds/ Diede

Borehole# SB-1
Rig/SamplerType: GEFCO 50K
Driller: NOTE

Start Date/Time: 11-18-16
Stop Date/Time: 11:40
Borehole Diameter:

Sample Depth	Time	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 desribe increasing amounts)
9	1104	Light tan Dark brown gray yellow olive red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly mod Well	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		Lt. reddish brown V. fine grain, Silty Sandstone, moderatly sorted. noncalc comentation. Slight clay content 2.5YR 5/4
10	1105	Light tan Dark brown gray yellow olive red green	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly mod Well	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		Lt greenish grey v. fine grain, very hard Sandstone, high calc cementation mod to well sorted GLEY1 7/1 10GY
11	1136	Light tan Dark brown gray yellow olive red green	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly mod Well	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		Lt.greenish grey V. fine grain very hard Sandstone, high calc comentation mod-well sorted GLEY1 7/1 10GY
12	1137	Light tan Dark brown gray yellow olive red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly mod Well	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		Lt reddish brown. V. fine grain very hard Sandstone, Very high calc cement, mod-well sorted. 10R 5/4
13	1138	Light tan Dark 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		Lt. reddish brown, V fine grained hard sandstone. well sorted, weak calc comentation. 5YR 6/4
14	1139	Light tan Dark brown gray yellow olive red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly mod Well	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		Lt. reddish brown V. fine grained hard Sandstone, well-mod Sorted, Slight calc cementation. 10R 6/6
15	1140	Light tan Dark brown gray yellow olive red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly mod Well	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		Lt. reddish brown. V. fine grained hard sandstone, well-mod sorted, v.slight calc cementation. 10R 6/6
		Light tan Dark 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		

Notes:

Project: BIYA 185 Linehaul
Project #
SMA Field Tech: Hinds / Diede

Borehole# SB-2
Rig/SamplerType: GEFCO 50K
Driller: MPTF

Start Date/Time: 11-18-16 12:05
Stop Date/Time: 12:56
Borehole Diameter:

Sample Depth	Time	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 desribe increasing amounts)
1	1205	(Light) tan Dark 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		SAMPLE LOST
2	1206	(Light) tan Dark (brown) gray yellow olive (red)	Gravelly (Sandy) Silty Clayey	Boulder (Sand) Cobble Silt Pebble Clay Gravel	Poorly (mod) (Well)	Very Coarse Coarse Medium Fine (Very Fine)	(Rock) Semi-consolidated Dense Plastic Unconsolidated	(Dry) Moist Wet		Lt. reddish brown v. fine grained sandstone. mod to well sorted. very highly calc cementation. 2.5YR 6/4
3	1207	(Light) tan Dark (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		Lt. reddish brown v. fine grained sandstone, well sorted, non calc cementation. 2.5YR 6/4
4	1208	(Light) tan Dark (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		Lt. reddish brown v. fine grained sandstone, well sorted, non calc cementation. 2.5YR 6/4
5	1209	(Light) tan Dark (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		Lt. reddish brown v. fine grained sandstone, well sorted, non calc cementation. 2.5YR 6/4
6	1222	(Light) tan Dark (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		Lt. reddish brown v. fine grain sandstone, well sorted, v. slight calc cementation 2.5YR 6/4
7	1223	(Light) tan Dark (brown) gray yellow olive (red)	(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		Lt. reddish brown v. fine grain sandstone, wal sorted, non calc cementation. 2.5YR 6/4
8	1224	(Light) tan Dark (brown) gray yellow olive (red)	(Sandy) Silty Clayey	Boulder (Sand) Cobble Silt Pebble Clay Gravel	Poorly (mod) Well	Very Coarse Coarse Medium Fine (Very Fine)	(Rock) Semi-consolidated Dense Plastic Unconsolidated	(Dry) Moist Wet		Lt reddish brown v. fine grain sandstone. moderatly sorted. Some med grain inclusions non-calc cementation 5YR 5/4

Notes:

page 2 of 2

Project: BEYA 185 Linehaul
Project #:
SMA Field Tech: Hinds/Diede

Borehole#: SB-2
Rig/SamplerType: GEFCO 50K
Driller: MOTE

Start Date/Time: 1225 11-18-16
Stop Date/Time:
Borehole Diameter:

Sample Depth	Time	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 desribe increasing amounts)
9	1225	Light tan Dark 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		Lt. reddish brown v. fine grain well Sorted sandstone. some mica, (biotite) very strong calc cementation. (Some greyish mottling) 2.5YR 6/2
10	1226	Light tan Dark 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		Lt. reddish brown with some mixed tan greenish grey V. fine grain sandstone. V. strong calc cementation. well sorted GLEY1 6/ 5GY
11	1252	Light tan Dark brown gray yellow olive red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly mod Well	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		Lt. reddish brown V. fine to fine grain sandstone. calcite fracture fillings- mod sorted. 2.5YR 6/4
12	1253	Light tan Dark brown gray yellow olive red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly mod Well	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		Lt brownish grey V. fine grain sandstone, mod. sorted, strong calc cementation 10YR 6/2
13	1254	Light tan Dark brown gray yellow olive red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly mod Well	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		Lt. brown grey v. fine-fine grain sandstone, mod sorted, moderate calc cementation. 10YR 6/3
14	1255	Light tan Dark brown gray yellow olive red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly mod Well	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		Lt brown grey V. fine-fine grain sandstone, mod sorted, weakly calc cementation. 10YR 6/3
15	1256	Light tan Dark 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		Lt. brown grey V. fine - fine grain Sandstone, mod sorted, non calc. cementation. 10YR 6/3
1		Light tan Dark 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		

Notes:

Project: SIYA 185 Lineleak
Project #:
SMA Field Tech: Hines/Diede

Borehole#: SB-3
Rig/SamplerType: GEFCO 50K
Driller: MOTE

Start Date/Time: 13:21 11-18-16
Stop Date/Time: 14:02
Borehole Diameter:

Sample Depth	Time	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 desribe increasing amounts)
1	1321	(Light) tan; Dark 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		Lt reddish brown v. fine grain Sandstone well sorted, slight calc cementation 2.5YR 6/4
2	1322	(Light) tan; Dark 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		Lt. reddish brown v. fine grain sandstone, well sorted, slight calc cementation 2.5YR 6/4
3	1323	(Light) tan; Dark brown; gray yellow; olive red	Gravelly; Sandy; Silty; Clayey	Boulder Sand; Cobble Silt; Pebble Clay; Gravel	Poorly; mod Well	Very Coarse; Coarse; Medium; Fine; Very Fine	(Rock); Semi-consolidated; Dense; Plastic; Unconsolidated	(Dry); Moist; Wet		Lt. reddish brown v. fine grain Sandstone, well to mod sorted, slight calc cementation. 2.5YR 6/4
4	1324	(Light) tan; Dark brown; gray yellow; olive red	Gravelly; Sandy; Silty; Clayey	Boulder Sand; Cobble Silt; Pebble Clay; Gravel	Poorly; mod Well	Very Coarse; Coarse; Medium; Fine; Very Fine	(Rock); Semi-consolidated; Dense; Plastic; Unconsolidated	(Dry); Moist; Wet		Lt. reddish brown v. fine grain Sandstone, well to mod sorted, very slight calc cementation. Some minor biotite 2.5YR 6/4
5	1325	(Light) tan; Dark brown; gray yellow; olive red	Gravelly; Sandy; Silty; Clayey	Boulder Sand; Cobble Silt; Pebble Clay; Gravel	Poorly; mod Well	Very Coarse; Coarse; Medium; Fine; Very Fine	(Rock); Semi-consolidated; Dense; Plastic; Unconsolidated	(Dry); Moist; Wet		Lt. reddish brown v. fine grain Sandstone, well to mod sorted, very slight calc. cementation, some minor biotite 2.5YR 6/4
6	1400	(Light) tan; Dark 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		Lt reddish brown v. fine grain Sandstone, well sorted, very slight calc cementation. Some minor biotite 2.5YR 5/6
7	1401	(Light) tan; Dark 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		Lt. reddish brown v. fine grain Sandstone, well sorted, very slight calc cementation 2.5YR 5/6
8	1402	(Light) tan; Dark 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		Lt. reddish brown v. fine grain Sandstone, well sorted, very slight calc. cementation. 2.5YR 5/6

Notes:

Project: BIYA 185 Line Leak
Project #:
SMA Field Tech: Hinds Diede

Borehole#: SB-3
Rig/Sampler Type: GEFCO 50k
Driller: MoTR

Start Date/Time:
Stop Date/Time: 1404 11-18-16
Borehole Diameter:

Sample Depth	Time	Color	Secondary Soil Type	Primary Soil Type	Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, frequent and with to desribe increasing amounts)
9	1403	Light tan Dark brown gray yellow olive red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly mod Well	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		Lt. reddish brown v. fine grain sandstone, mod-well sorted. very slight Calc cementation 2.5YR 5/6
10	1404	Light tan Dark brown gray yellow olive red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly mod Well	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		Lt. reddish brown, v. fine grain sandstone, mod-well sorted. non calcareous cementation 2.5YR 5/6
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		

Notes:

page 1 of 2

Project: BIVA 185 Lineleak
Project #
SMA Field Tech: Hinds/Diede

Borehole# SB-4
Rig/SamplerType: GEFCO SOIL
Driller: MDTF

Start Date/Time: 14:10 11-18-16
Stop Date/Time:
Borehole Diameter:

Sample Depth	Time	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 desribe increasing amounts)
1	1430	Light tan Dark 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		LOST SAMPLE
2	1431	Light tan Dark 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		Lost SAMPLE
3	1432	(Light) tan (Dark) 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		Lt. reddish brown V. fine grain Sandstone, well sorted, very slight calc cementation 2.5YR 6/4
4	1433	(Light) tan (Dark) 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		Lt. reddish brown V. fine grain Sandstone, well sorted, very slight calc cementation. 2.5YR 6/4
5	1434	(Light) tan (Dark) brown gray yellow olive (red)	Gravelly (Sandy) Silty Clayey	Boulder (Sand) Cobble Silt Pebble Clay Gravel	Poorly (mod) (Well)	Very Coarse Coarse Medium Fine (Very Fine)	(Rock) Semi-consolidated Dense Plastic Unconsolidated	(Dry) Moist Wet		Lt. reddish brown V. fine grain Sandstone, mod-well sorted, Very slight calc cementation Silty bedding planes present 2.5YR 6/4
		Light tan Dark 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		with signs of organic material.
6	1505	(Light) tan (Dark) 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		Lt. reddish brown V. fine grain Sandstone, well sorted, non calc cementation. 2.5YR 6/4
7	1506	Light tan (Dark) 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		Lt. reddish brown. V. fine grain Sandstone, well sorted, non calcareous cementation 2.5YR 6/4

Notes:

Project: BLYA 185 Lineleak
Project #:
SMA Field Tech: Hinds/Diede

Borehole#: SB-4
Rig/SamplerType: GEFCO 50 K
Driller: mo TE

Start Date/Time: 11-18-14
Stop Date/Time: 15:09
Borehole Diameter:

Sample Depth	Time	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 desribe increasing amounts)
8	1507	**Light** tan Dark **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		Lt. reddish brown v. fine grain sandstone, well sorted. very slightly calcareous cementation. 2.5YR 6/4
9	1508	**Light** tan Dark **brown** gray yellow olive **red**	Gravelly **Sandy** Silty Clayey	Boulder **Sand** Cobble Silt Pebble Clay Gravel	Poorly **mod** **Well**	Very Coarse Coarse Medium Fine **Very Fine**	**Rock** Semi-consolidated Dense Plastic Unconsolidated	**Dry** Moist Wet		Lt. reddish brown. v. fine grain sandstone. well sorted to mod. sorted non calcareous cementation. Bedding plane with clay, coarse sand & organics 2.5YR 5/4
10	1509	**Light** tan Dark **brown** gray yellow olive **red**	Gravelly **Sandy** Silty Clayey	Boulder **Sand** Cobble Silt Pebble Clay Gravel	Poorly **mod** **Well**	Very Coarse Coarse Medium Fine **Very Fine**	**Rock** Semi-consolidated Dense Plastic Unconsolidated	**Dry** Moist Wet		Lt. reddish brown v. fine grain sandstone, well-mod. sorted. non calc. cementation 2.5YR 5/4
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		

Notes:

Project: BIYA 185 Line leak
Project #:
SMA Field Tech: Hinds / Diede

Borehole#: SB-5
Rig/SamplerType: GEFCO 50K
Driller: MOTE

Start Date/Time: 15:15 11-18-16
Stop Date/Time:
Borehole Diameter:

Sample Depth	Time	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 desribe increasing amounts)
1	1531	Light tan / Dark 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		LOST SAMPLE
2	1532	Light tan / Dark 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		LOST SAMPLE
3	1533	(Light) tan / (Dark brown) / gray yellow / olive (red)	(Gravelly) / (Sandy) / Silty / Clayey	Boulder (Sand) / Cobble Silt / Pebble Clay / Gravel	Poorly / (mod) / Well	Very Coarse / Coarse / Medium / Fine / (Very Fine)	(Rock) / Semi-consolidated / Dense / Plastic / Unconsolidated	(Dry) / Moist / Wet	Slight hydro carbon odor	Lt reddish brown v. fine grain sandstone mod sorting. Bedding planes & rubblized zone with slight hydro carbon odor. very calcareous cementation 2.5YR 5/4
4	1534	Light tan / Dark 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	organic odor	Lt reddish brown v. fine grain Sandstone. well sorted. Calcareous Cementation Solid Sandstone with no bedding organic odor. 7.5YR 5/4
5	1535	Light tan / Dark brown / gray yellow / olive red	Gravelly / Sandy / Silty / Clayey	Boulder Sand / Cobble Silt / Pebble Clay / Gravel	(Poorly) / (mod) / Well	Very Coarse / Coarse / Medium / Fine / Very Fine	Rock / Semi-consolidated / Dense / Plastic / Unconsolidated	Dry / Moist / Wet	Slight hydro carbon odor	Lt reddish brown v. fine grain Sandstone, mod-poor sorted. Bedding planes with clay deposition, Silt & possible staining. 7.5YR 5/4
6	1550	(Light) tan / (Dark brown) / gray yellow / olive (red)	(Gravelly) / (Sandy) / Silty / Clayey	Boulder (Sand) / Cobble Silt / Pebble Clay / Gravel	Poorly / (mod) / Well	Very Coarse / Coarse / Medium / Fine / (Very Fine)	(Rock) / Semi-consolidated / Dense / Plastic / Unconsolidated	(Dry) / Moist / Wet		Lt reddish brown/grey v. fine grain Sandstone moderate sorting. Strong calc. cementation 10YR 6/2
7	1551	(Light) tan / (Dark 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		Lt brown yellow v. fine grain Sandstone, well sorted, very slight calc cementation. 10YR 5/4
8	1552	(Light) tan / (Dark brown) / gray (yellow) / olive red	(Gravelly) / (Sandy) / Silty / Clayey	Boulder (Sand) / Cobble Silt / Pebble Clay / Gravel	Poorly / (Mod) / Well	Very Coarse / Coarse / Medium / Fine / (Very Fine)	(Rock) / Semi-consolidated / Dense / Plastic / Unconsolidated	(Dry) / Moist / Wet		Lt brown yellow v. fine grain Sandstone, mod. sorted, noncalc cementation 10YR 5/4

Notes:

Project: BIYA 185 Line Leak
Project #:
SMA Field Tech: Hinds/ Diede

Borehole#: SB-5
Rig/SamplerType: GEECO 50K
Driller: mo TE

Start Date/Time:
Stop Date/Time: 15:34 11-18-16
Borehole Diameter:

Sample Depth	Time	Color	Secondary Soil Type	Primary Soil Type	Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, frequent and with to desribe increasing amounts)
9	1553	**Light** tan Dark **brown** gray **yellow** olive red	Gravelly **Sandy** Silty Clayey	Boulder **Sand** Cobble Silt Pebble Clay Gravel	Poorly **mod** Well	Very Coarse Coarse Medium Fine **Very Fine**	**Rock** Semi-consolidated Dense Plastic Unconsolidated	**Dry** Moist Wet		Lt brown yellow v. fine grain Sandstone. mod. Sorting. very slight calc cementation. 10YR 5/4
10	1554	Light tan Dark **brown** gray **yellow** olive red	Gravelly **Sandy** Silty Clayey	Boulder **Sand** Cobble Silt Pebble Clay Gravel	Poorly **mod** Well	Very Coarse Coarse Medium Fine **Very Fine**	**Rock** Semi-consolidated Dense Plastic Unconsolidated	**Dry** Moist Wet		Lt brown yellow v. fine grain Sandstone. mod. sorting. very slight calc cementation. 10YR 6/3
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		

Notes:

Project: BEYA 185 Line Leak
Project #:
SMA Field Tech: Hinds/Diede

Borehole#: SB-6
Rig/SamplerType: GEFCO 50K
Driller: MOTE

Start Date/Time: 7.6.13 11-18-16
Stop Date/Time:
Borehole Diameter:

Sample Depth	Time	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 desribe increasing amounts)
1	1613	Light tan Dark 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		LOST SAMPLE
2	1614	Light tan Dark brown gray yellow olive red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly mod Well	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		LT brown yellow V. fine grain sandstone. mod sorting. strong calc cementation 10YR 6/3
3	1615	Light tan Dark 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		Lt. brown yellow v. fine grain Sandstone, well sorted, non calc cementation 10YR 6/3
4	1616	Light tan Dark brown gray yellow olive red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly Wel	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		Lt. brown yellow v. fine grain Sandstone, well sorted - mild calc cementing 10YR 6/3
5	1617	Light tan Dark brown gray yellow olive red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly Wel	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		Lt brown yellow v. fine grain Sandstone, well sorted, non calc cementation. 10YR 6/3
6	1635	Light tan Dark brown gray yellow olive red	Gravelly Sandy Silty Clayey	Boulder Sand Cobble Silt Pebble Clay Gravel	Poorly Wel	Very Coarse Coarse Medium Fine Very Fine	Rock Semi-consolidated Dense Plastic Unconsolidated	Dry Moist Wet		Lt brown yellow v. fine grain Sandstone, well sorted, non calc cementation. 10YR 5/3
7	1636	Light tan Dark 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		Lt. brown yellow v. fine grain Sandstone, well sorted, non calc cementation 10YR 5/3
9	1637	Light tan Dark 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		Lt. brown yellow v. fine grain Sandstone, well sorted, non-calc cementation 10YR 5/3

Notes:

Page 2 of 2

Project: BIYA 185 Line Leak
Project #:
SMA Field Tech: Hinds/Diode

Borehole#: SB-6
Rig/Sampler Type: GEECO 50K
Driller: Mo TC

Start Date/Time:
Stop Date/Time: 16:39 11-18-16
Borehole Diameter:

Sample Depth	Time	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 desribe increasing amounts)
9	1638	**Light** tan Dark **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		Lt brown yellow v-fine grain sandstone, well sorted, non-calc cementation 10YR 5/3
10	1639	Light tan Dark **brown** gray **yellow** olive red	Gravelly **Sandy** Silty Clayey	Boulder **Sand** Cobble Silt Pebble Clay Gravel	Poorly **mod** Well	Very Coarse Coarse Medium Fine **Very Fine**	**Rock** Semi-consolidated Dense Plastic Unconsolidated	**Dry** Moist Wet		Lt. brown yellow v. fine grain sandstone, moderately sorted very slight calc cementation 10YR 5/4
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		

Notes:

Project: BIYA 185 Linehaik
Project #
SMA Field Tech: Hinds/Diede

Borehole# SB-7
Rig/SamplerType: GEFCO 50K
Driller: MO-TE

Start Date/Time: 9:15 11-19-16
Stop Date/Time:
Borehole Diameter:

Sample Depth	Time	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 desribe increasing amounts)
1	9:22	Light tan Dark 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		LOST SAMPLE
2	9:23	Light tan Dark 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		LOST SAMPLE
3	9:24	Light tan Dark 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	possible P.X 20'-15'	Lt. Brown, poorly sorted, v. fine to coarse grain sandstone. Rather rubbilized. from P.I excavation. Possible spoils 7.5YR 6/4
4	9:25	Light tan Dark 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		Lt. brown, v. fine grain Sandstone well sorted. calcite fracture fillings, Strong calc cementation 7.5YR 6/3
5	9:26	Light tan Dark 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		Lt-Braon, v. fine grain Sandstone well sorted, Strong calc cementation minor biotite 7.5YR 6/3
6	9:44	Light tan Dark 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		Lt brown yellow fine grain Sandstone. very well sorted. non-calcareous cementation 2.5Y 6/3
7	9:45	Light tan Dark 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		Lt brown yellow fine to v. fine grain sandstone. well sorted. calcite fracture fillins non calc cementation 2.5Y 6/3
8	9:46	Light tan Dark 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		Lt brown yellow fine grain Sandstone. well sorted. non calc cementation 2.5Y 6/3

Notes:

Project: BIYA 185 Linebeak
Project #
SMA Field Tech: Hinds / Dede

Borehole# SB-7
Rig/SamplerType: GEECO 50K
Driller: MO TE

Start Date/Time:
Stop Date/Time: 1009 11-19-14
Borehole Diameter:

Sample Depth	Time	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 desribe increasing amounts)
9	9:47	Light tan Dark 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		Lt brown yellow v. fine grain Sandstone. well sorted. Bedding Planes with organic material & biotite. Non calc 2.5Y 6/3
10	9:48	Light tan Dark 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		Lt brown yellow. V. fine grain sandstone. well sorted, non calc cementation. 2.5Y 6/3
11	10:05	Light tan Dark 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		Lt. brown yellow. V. fine grain Sandstone. well sorted. non calc cementation 2.5Y 6/3
12	10:06	Light tan Dark 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		Lt. brown yellow. V. fine grain Sandstone. well sorted. non calc cementation minor biotite 2.5Y 6/3
13	10:07	Light tan Dark 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		Lt. brown yellow. V. fine grain Sandstone, well sorted, non calc cementation minor biotite 2.5Y 6/3
14	10:08	Light tan Dark 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		Lt. brown yellow. V. fine grain Sandstone. well sorted. non calc cementation. minor biotite 2.5Y 6/3
15	10:09	Light tan Dark 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		Lt. brown yellow. V. fine grain Sandstone. well Sorted, Slight calc cementation 2.5Y 6/3
		Light tan Dark 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		

Notes:

Page 1 of 2

Project: BCYA 185 Line leak
Project #
SMA Field Tech: Hinds/Dredge

Borehole# SB-8
Rig/SamplerType: GEFCO 50K
Driller: MOTE

Start Date/Time: 10:40 10-19-16
Stop Date/Time:
Borehole Diameter:

Sample Depth	Time	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 desribe increasing amounts)
1	1040	Light tan / Dark 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		LOST SAMPLE
2	1041	Light tan / Dark 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		Lt. brown grey v. fine grain sandstone - very hard. well sorted strong calc cementation. 2.5Y 6/2
3	1042	Light tan / Dark 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		Lt. brown grey v. fine grain Sandstone. very hard. well sorted strong calc cementation 2.5Y 6/2
4	1043	Light tan / Dark 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		Lt. brown grey v. fine grain Sandstone. very hard well sorted strong calc cementation 2.5Y 6/2
5	1044	Light tan / Dark 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		Lt. brown grey v. fine grain Sandstone. very hard. well sorted Strong calc cementation 2.5Y 6/2
6	1118	Light tan / Dark 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		Lt brown yellow v. fine grain Sandstone, well sorted, calc cementation. 2.5Y 6/3
7	1119	Light tan / Dark 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		Lt brown yellow v. fine grain sandstone. well sorted, very slight calc cement minor mica 2.5Y 6/3
9	1120	Light tan / Dark 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		Lt brown yellow, v. fine grain well-mod sorted, very slight calc cementation. some clay 2.5Y 6/3

Notes:

Project: BEYA 185 Lineleak
Project #:
SMA Field Tech: Hinds/Diede

Borehole# SB-8
Rig/Sampler Type: GEFCO 50K
Driller: MOTE

Start Date/Time:
Stop Date/Time: 11:22 11-19-14
Borehole Diameter:

Sample Depth	Time	Color	Secondary Soil Type	Primary Soil Type	Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, frequent and with to desribe increasing amounts)
9	1121	**Light** tan Dark **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		Lt brown yellow v. fine grain sandstone, well sorted, very slight calc cementation 2.5Y 6/3
10	1122	Light tan Dark 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		Lt. brown yellow, v. fine grain sandstone. Well Sorted, very Slight calc cementation. minor mica 2.5Y 6/3
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		

Notes:

Project: BIYA 185 Lineleak
Project #:
SMA Field Tech:

Borehole#: SB-9
Rig/SamplerType:
Driller:

Start Date/Time:
Stop Date/Time:
Borehole Diameter:

Sample Depth	Time	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 desribe increasing amounts)
1	1148	Light Dark / tan brown / gray yellow / olive 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 / Mois / Wet	Oil stained & odor	DK yellow brown, v. fine grain sandstone, oil stained, (causing color darkening) 10YR 4/4
2	1149	Light Dark / tan brown / gray yellow / olive 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	oil soaked	DK yellow brown, v. fine grain sandstone, oil soaked, (causing color darkening) 10YR 4/4
3	1150	Light Dark / tan brown / gray yellow / olive 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	Oil saturated	DK yellow brown, v. fine grained sandstone, oil saturated, (causing color darkening) 10YR 4/4
4	1151	Light Dark / tan brown / gray yellow / olive 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	Oil color & staining	DK yellow brown, v. fine grain sandstone, oil staining (causing color to darken) 10YR 4/4
5	1152	Light Dark / tan brown / gray yellow / olive 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	Oil staining & odor	DK yellow brown, v. fine grain sandstone, oil staining (causing color to darken) 10YR 4/4
6	1208	Light Dark / tan brown / gray yellow / olive 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	Oil staining & odor	DK yellow brown, v. fine grain sandstone, oil staining, rock getting drier. 10YR 4/4
7	1209	Light Dark / tan brown / gray yellow / olive 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	Oil staining & odor	DK yellow brown, v. fine grain sandstone, oil staining, rock getting drier. 10YR- 5/4
8	1208 1209	Light Dark / tan brown / gray yellow / olive 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	Oil staining & odor	DK-med brown, v. fine grain Sandstone, oil staining, rock getting drier, 10 YR 5/3

Notes:

Project: BIA 185 Line leak
Project #:
SMA Field Tech: Hinds/Diede

Borehole#: SB-9
Rig/SamplerType: GEFCO 50K
Driller: MO TE

Start Date/Time: 12:03 11-19-16
Stop Date/Time:
Borehole Diameter:

Sample Depth	Time	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 desribe increasing amounts)
9	1203	(Light) Dark gray olive / tan (brown) yellow 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	Oil stainings & odor	DK-med brown, v. fine grain Sandstone, oil stainings, rock getting drier. well sorted 10YR 5/3
10	1204	(Light) (Dark) gray olive / tan (brown) yellow 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	Oil stainings & odor	DK- med brown, v. fine grain Sandstone, oil staining. well sorted non calc cementing 10YR 5/3
11	1225	(Light) Dark gray olive / tan (brown) (yellow) 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	Slight oil odor	med-Lt. yellow brown, v. fine grain sandstone, very light oil odor, very slight calc cement well sorted non calc cement 2.5YR 6/3
12	1226	(Light) Dark gray olive / tan (brown) (yellow) 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	Slight oil odor	med-Lt yellow brown. v. fine grain Sandstone, well sorted. Slight oil odor non calc cementing 2.5YR 6/3
13	1227	(Light) Dark gray olive / tan brown (yellow) 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	Slight oil odor	Lt. brown-yellow, v. fine grain Sandstone well sorted, Slight oil odor Slight calc cementation 2.5YR 6/3
14	1228	(Light) Dark gray olive / tan (brown) yellow red	(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	very slight oil odor	Lt. yellow brown, v. fine grain Sandstone, well-mod sorted, very slight oil odor very slight calc cementation 2.5YR 6/3
15	1229	(Light) Dark gray olive / tan (brown) (yellow) red	Gravelly (Sandy) Silty Clayey	Boulder (Sand) Cobble Silt Pebble Clay Gravel	(Rock) (Well)	Very Coarse Coarse Medium Fine (Very Fine)	(Rock) Semi-consolidated Dense Plastic Unconsolidated	(Dry) Moist Wet	very slight oil odor	Lt yellow brown. v. fine grain Sandstone, well-mod sorted very slight oil odor, very slight calc cementation 2.5YR 6/3
16	1249	(Light) Dark gray olive / tan (brown) yellow (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	very slight oil odor ?	Lt reddish brown. V. fine grain sandstone well sorted, Slight calc cementation 5YR 6/3

Notes:

Project: BIYA 185 Lineleak
Project #
SMA Field Tech: Hinds/Diede

Borehole# SB-9
Rig/SamplerType: GEFCO 50K
Driller: MOTE

Start Date/Time:
Stop Date/Time:
Borehole Diameter:

Sample Depth	Time	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 desribe increasing amounts)
17	1256	(Light) Dark gray olive — tan (brown) yellow (red)	Gravelly (Sandy) Silty Clayey	Boulder (Sand) Cobble Silt Pebble Clay Gravel	Poorly (mod) (Well)	Very Coarse Coarse Medium Fine (Very Fine)	(Rock) Semi-consolidated Dense Plastic Unconsolidated	(Dry) Moist Wet	Slight oil odor	Lt reddish brown. v. fine grain Sandstone, mod to well sorted. Sample rubbilized, strong calc cement. Slight oil odor 5YR 6/3
18	1251	(Light) tan Dark 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		Lt reddish brown v. fine grain Sandstone, well sorted, strong calc cementing, fractured. No oil odor? 2.5YR 6/3
19	1252	(Light) Dark (gray) (olive) tan brown yellow 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		Lt greenish grey. v. fine grain Sandstone well sorted. Very hard Very strong calc cement GOLEY 1 5GY
20	1253	(Light) (Dark) gray (olive) tan (brown) yellow 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		Med. olive brown V.fine-fine grain Sandstone. well sorted. moist w/ water odor? non-calc cement 2.5YR 4/4
21	1323	Light Dark gray (olive) tan (brown) yellow 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		med olive brown. V. fine-fine gran. Sandstone. well sorted. moist w/ water? non calc cement 2.5YR 4/4
22	1324	Light Dark gray olive — tan brown yellow 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, Lt grey Only fragments collected
23	1325	(Light) Dark gray olive tan (brown) (yellow) red	Gravelly (Sandy) Silty Clayey	Boulder (Sand) Cobble Silt Pebble Clay Gravel	Poorly (mod) (Well)	Very Coarse Coarse Medium Fine (Very Fine)	(Rock) Semi-consolidated Dense Plastic Unconsolidated	(Dry) Moist Wet		Lt reddish brown v. fine grain Sandstone. mod to well sorted, silt fraction. non calc cement 2.5Y 6/3
24	1326	(Light) Dark (gray) (olive) tan (brown) yellow red	Gravelly (Sandy) Silty Clayey	Boulder (Sand) Cobble Silt Pebble Clay Gravel	Poorly (mod) (Well)	Very Coarse Coarse Medium Fine (Very Fine)	(Rock) Semi-consolidated Dense Plastic Unconsolidated	(Dry) Moist Wet		Lt olive brown V. fine grain Sandstone, mod to well sorted. non calc cement 2.5Y 5/3

Notes:

Project: BIYA 185 Line Leak
Project #
SMA Field Tech: Hinds/Diede

Borehole#: SB-9
Rig/SamplerType: GEFCO 50K
Driller: mo TE

Start Date/Time:
Stop Date/Time: 1327 11-19-16
Borehole Diameter:

Sample Depth	Time	Color	Secondary Soil Type	Primary Soil Type	Sorted	Grain Size (Sands Only)	Consolidation	Moisture	OVA results (ppm)	Remarks (Use trace, occasional, frequent and with to desribe increasing amounts)
25	1327	Light tan Dark 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		Lt olive brown V. fine grain Sandstone, well sorted. non cale cementing 2.5Y 5/4
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		
		Light tan Dark 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		

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.
5. 10/13/15 -11/23/15- Continued removing contaminated soil and hauling to land farm. 222 yds^3. 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 Yds^3 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.

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Tel. 970-882-1542
jadams_co@yahoo.com

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:

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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Prepared by:

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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.

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

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

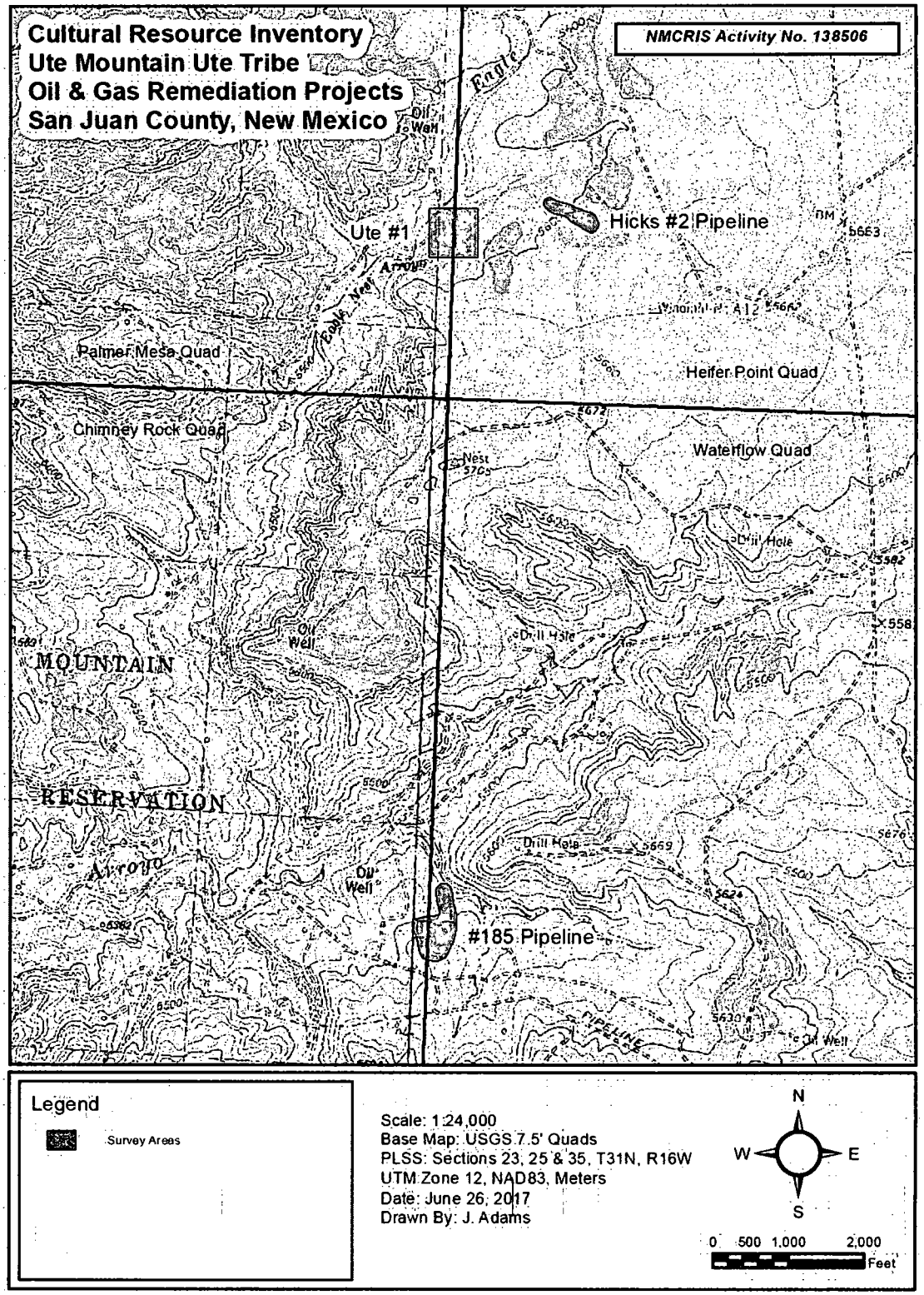

Figure 1. Project Location Map

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.

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.

Table 1. Northern San Juan Regional Chronology.

Period	Tradition	Phases	Dates BP	Dates *B.C./A.D.	Key References
Paleoindian	Early & Late	Clovis, 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	7500–2500	*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
	Basketmaker III	Sambrito	1500–1300	500–750	Atkins 1993; Kidder 1927; Wilshusen 1999; Lipe et al. 1999; Potter 2014; Roberts 1937
Anasazi	Pueblo I	Piedra	1100–1250	750–900	Adler 1996; Kidder 1927; Roberts 1937; Wilshusen 1999; Lipe et al. 1999; Potter 2014
	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

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.

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 etrex30 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 etrex30 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 '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 real-time 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.

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.

Table 2. Feature descriptions from site LA188129.

Feature No.	Feature Type	Size	Feature ID, Notes
F1	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.
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

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 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.

One (1) newly identified and recorded archeological site (LA188129) was encountered within the survey area outside of the proposed APE. The site is situated more than 100 feet (30 meters) southeast of excavated area and activities and personnel associated with the remediation work. No cultural resources were encountered at the Hicks #2 Pipeline or the #185 Pipeline. The results of the inventory indicate that the BIYA Operators 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. This report documents the methods and results of the cultural resources investigation.

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APPENDIX A

LABORATORY OF ANTHROPOLOGY SITE RECORDS

NMCRIS on-line map server view.

HALL ENVIRONMENTAL ANALYSIS LABORATORY

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

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 www.hallenvironmental.com 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,

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
Project: BIYA 185 Line Leak
Lab ID: 1611C33-001 **Matrix:** SOIL

Client Sample ID: SB7-7
Collection Date: 11/19/2016 9:45:00 AM
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	160	30		mg/Kg	20	12/2/2016 6:41:05 PM	28989
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: **TOM**
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	11/29/2016 1:31:13 PM	28850
Surr: DNOP	94.5	70-130		%Rec	1	11/29/2016 1:31:13 PM	28850
EPA METHOD 8015D: GASOLINE RANGE							Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	11/28/2016 11:05:35 AM	28847
Surr: BFB	96.2	68.3-144		%Rec	1	11/28/2016 11:05:35 AM	28847
EPA METHOD 8260B: VOLATILES SHORT LIST							Analyst: **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.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

CLIENT: Souder, Miller and Associates
Client Sample ID: SB7-15
Project: BIYA 185 Line Leak
Collection Date: 11/19/2016 10:10:00 AM
Lab ID: 1611C33-002 **Matrix:** SOIL
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						Analyst: **TOM**	
Diesel Range Organics (DRO)	150	9.9		mg/Kg	1	11/29/2016 2:40:29 PM	28850
Surr: DNOP	93.2	70-130		%Rec	1	11/29/2016 2:40:29 PM	28850
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	12	4.9		mg/Kg	1	11/28/2016 12:16:03 PM	28847
Surr: BFB	93.7	68.3-144		%Rec	1	11/28/2016 12:16:03 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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

CLIENT: Souder, Miller and Associates
Client Sample ID: SB8-5
Project: BIYA 185 Line Leak
Collection Date: 11/19/2016 10:44:00 AM
Lab ID: 1611C33-003
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 6:53:30 PM	28989
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
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 RANGE						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

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

CLIENT: Souder, Miller and Associates
Project: BIYA 185 Line Leak
Lab ID: 1611C33-004 **Matrix:** SOIL

Client Sample ID: SB8-10
Collection Date: 11/19/2016 11:22:00 AM
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 RANGE ORGANICS						Analyst: **TOM**	
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 RANGE						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 SHORT 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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

CLIENT: Souder, Miller and Associates
Project: BIYA 185 Line Leak
Lab ID: 1611C33-005
Client Sample ID: SB9-3
Collection Date: 11/19/2016 11:50:00 AM
Matrix: SOIL
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							Analyst: **TOM**
Diesel Range Organics (DRO)	13000	490		mg/Kg	50	11/29/2016 3:49:39 PM	28850
Surr: DNOP	0	70-130	S	%Rec	50	11/29/2016 3:49:39 PM	28850
EPA METHOD 8015D: GASOLINE RANGE							Analyst: **NSB**
Gasoline Range Organics (GRO)	5100	470		mg/Kg	100	11/28/2016 2:13:36 PM	28847
Surr: BFB	228	68.3-144	S	%Rec	100	11/28/2016 2:13:36 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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

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							Analyst: **TOM**
Diesel Range Organics (DRO)	820	96		mg/Kg	10	11/29/2016 4:12:42 PM	28850
Surr: DNOP	0	70-130	S	%Rec	10	11/29/2016 4:12:42 PM	28850
EPA METHOD 8015D: GASOLINE RANGE							Analyst: **NSB**
Gasoline Range Organics (GRO)	95	4.9		mg/Kg	1	11/28/2016 2:37:16 PM	28847
Surr: BFB	644	68.3-144	S	%Rec	1	11/28/2016 2:37:16 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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

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	Qual	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 RANGE ORGANICS						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 RANGE						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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

CLIENT: Souder, Miller and Associates
Client Sample ID: SB9-25
Project: BIYA 185 Line Leak
Collection Date: 11/19/2016 1:27:00 PM
Lab ID: 1611C33-008
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 8:20:23 PM	28989
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	9.2		mg/Kg	1	11/29/2016 4:58:59 PM	28850
Surr: DNOP	93.0	70-130		%Rec	1	11/29/2016 4:58:59 PM	28850
EPA METHOD 8015D: GASOLINE RANGE						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 SHORT 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

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

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	Qual	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 RANGE ORGANICS						Analyst: **TOM**	
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 RANGE						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:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

CLIENT: Souder, Miller and Associates
Project: BIYA 185 Line Leak
Lab ID: 1611C33-010 **Matrix:** SOIL

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	46	30		mg/Kg	20	12/2/2016 8:45:11 PM	28989
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	15	9.8		mg/Kg	1	11/29/2016 5:45:12 PM	28850
Surr: DNOP	97.9	70-130		%Rec	1	11/29/2016 5:45:12 PM	28850
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	7.5	4.7		mg/Kg	1	11/28/2016 6:08:23 PM	28847
Surr: BFB	96.6	68.3-144		%Rec	1	11/28/2016 6:08:23 PM	28847
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **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

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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

Analytical Report
Lab Order **1611C33**

Hall Environmental Analysis Laboratory, Inc.

Date Reported: **12/8/2016**

CLIENT: Souder, Miller and Associates
Client Sample ID: SB1-15
Project: BIYA 185 Line Leak
Collection Date: 11/18/2016 11:40:00 AM
Lab ID: 1611C33-011 **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 8:57:36 PM	28989
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	9.8		mg/Kg	1	11/29/2016 6:08:25 PM	28850
Surr: DNOP	91.7	70-130		%Rec	1	11/29/2016 6:08:25 PM	28850
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	15	4.8		mg/Kg	1	11/28/2016 6:31:47 PM	28847
Surr: BFB	93.9	68.3-144		%Rec	1	11/28/2016 6:31:47 PM	28847
EPA METHOD 8260B: VOLATILES SHORT 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
Ethylbenzene	0.089	0.048		mg/Kg	1	12/1/2016 3:41:18 PM	28847
Xylenes, Total	0.41	0.097		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	28847
Surr: 4-Bromofluorobenzene	93.9	70-130		%Rec	1	12/1/2016 3:41:18 PM	28847
Surr: Dibromofluoromethane	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	28847

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

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- B Analyte detected in the associated Method Blank
- D Sample Diluted Due to Matrix
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- P 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.

CLIENT: Souder, Miller and Associates
Client Sample ID: SB2-7
Project: BIYA 185 Line Leak
Collection Date: 11/18/2016 12:23:00 PM
Lab ID: 1611C33-012
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	120	30		mg/Kg	20	12/2/2016 9:10:01 PM	28989
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						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 RANGE						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

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

CLIENT: Souder, Miller and Associates
Client Sample 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	PQL	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 RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.2		mg/Kg	1	11/29/2016 6:54:12 PM	28850
Surr: DNOP	96.5	70-130		%Rec	1	11/29/2016 6:54:12 PM	28850
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	17	4.6		mg/Kg	1	11/28/2016 7:18:31 PM	28847
Surr: 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	70-130		%Rec	1	12/1/2016 4:39:09 PM	28847
Surr: 4-Bromofluorobenzene	90.9	70-130		%Rec	1	12/1/2016 4:39:09 PM	28847
Surr: Dibromofluoromethane	105	70-130		%Rec	1	12/1/2016 4:39:09 PM	28847
Surr: Toluene-d8	97.2	70-130		%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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

CLIENT: Souder, Miller and Associates
Client Sample ID: SB3-5
Project: BIYA 185 Line Leak
Collection Date: 11/18/2016 1:25:00 PM
Lab ID: 1611C33-014 **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 9:34:50 PM	28989
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
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 RANGE						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

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

CLIENT: Souder, Miller and Associates
Client Sample ID: SB3-10
Project: BIYA 185 Line Leak
Collection Date: 11/18/2016 2:04:00 PM
Lab ID: 1611C33-015
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 9:47:15 PM	28989
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	11/29/2016 8:02:27 PM	28850
Surr: DNOP	90.3	70-130		%Rec	1	11/29/2016 8:02:27 PM	28850
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	11/28/2016 8:05:05 PM	28847
Surr: BFB	92.8	68.3-144		%Rec	1	11/28/2016 8:05:05 PM	28847
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **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	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.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

CLIENT: Souder, Miller and Associates
Project: BIYA 185 Line Leak
Lab ID: 1611C33-016 **Matrix:** SOIL

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	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst: **LGT**	
Chloride	470	30		mg/Kg	20	12/2/2016 9:59:40 PM	28989
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	11/29/2016 8:25:15 PM	28850
Surr: DNOP	98.0	70-130		%Rec	1	11/29/2016 8:25:15 PM	28850
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **NSB**	
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	11/28/2016 8:28:23 PM	28847
Surr: BFB	92.8	68.3-144		%Rec	1	11/28/2016 8:28:23 PM	28847
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **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

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

CLIENT: Souder, Miller and Associates
Client Sample ID: SB4-10
Project: BIYA 185 Line Leak
Collection Date: 11/18/2016 3:09:00 PM
Lab ID: 1611C33-017
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	190	30		mg/Kg	20	12/2/2016 10:12:04 PM	28989
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: TOM	
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	11/29/2016 8:47:52 PM	28850
Surr: DNOP	98.5	70-130		%Rec	1	11/29/2016 8:47:52 PM	28850
EPA METHOD 8015D: GASOLINE RANGE						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 SHORT LIST						Analyst: AG	
Benzene	0.59	0.025		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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

CLIENT: Souder, Miller and Associates
Client Sample ID: SB5-4
Project: BIYA 185 Line Leak
Collection Date: 11/18/2016 3:34:00 PM
Lab ID: 1611C33-018
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 10:49:18 PM	28989
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						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 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

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

CLIENT: Souder, Miller and Associates
Client Sample ID: SB5-7
Project: BIYA 185 Line Leak
Collection Date: 11/18/2016 3:51:00 PM
Lab ID: 1611C33-019
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	38	30		mg/Kg	20	12/2/2016 11:01:43 PM	28989
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst: **TOM**	
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	11/29/2016 9:33:23 PM	28850
Surr: DNOP	95.2	70-130		%Rec	1	11/29/2016 9:33:23 PM	28850
EPA METHOD 8015D: GASOLINE RANGE						Analyst: **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	28847
EPA METHOD 8260B: VOLATILES SHORT LIST						Analyst: **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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

CLIENT: Souder, Miller and Associates
Client Sample ID: SB6-5
Project: BIYA 185 Line Leak
Collection Date: 11/18/2016 4:17:00 PM
Lab ID: 1611C33-020
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: **MRA**	
Chloride	ND	30		mg/Kg	20	12/5/2016 2:15:29 PM	28994
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						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 RANGE						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 SHORT LIST						Analyst: **AG**	
Benzene	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.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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.

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

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

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1611C33**

08-Dec-16

Client: Souder, Miller and Associates

Project: BIYA 185 Line Leak

Sample ID	**MB-28989**	SampType:	**MBLK**		TestCode:	**EPA Method 300.0: Anions**				
Client ID:	**PBS**	Batch ID:	**28989**		RunNo:	**39134**				
Prep Date:	**12/2/2016**	Analysis Date:	**12/2/2016**		SeqNo:	**1224235**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	**LCS-28989**	SampType:	**LCS**		TestCode:	**EPA Method 300.0: Anions**				
Client ID:	**LCSS**	Batch ID:	**28989**		RunNo:	**39134**				
Prep Date:	**12/2/2016**	Analysis Date:	**12/2/2016**		SeqNo:	**1224236**	Units:	**mg/Kg**		
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:	**mblk**		TestCode:	**EPA Method 300.0: Anions**				
Client ID:	**PBS**	Batch ID:	**28994**		RunNo:	**39175**				
Prep Date:	**12/5/2016**	Analysis Date:	**12/5/2016**		SeqNo:	**1225529**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	**LCS-28994**	SampType:	**lcs**		TestCode:	**EPA Method 300.0: Anions**				
Client ID:	**LCSS**	Batch ID:	**28994**		RunNo:	**39175**				
Prep Date:	**12/5/2016**	Analysis Date:	**12/5/2016**		SeqNo:	**1225530**	Units:	**mg/Kg**		
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	95.9	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1611C33**

08-Dec-16

Client: Souder, Miller and Associates

Project: BIYA 185 Line Leak

Sample ID **LCS-28850**	SampType: **LCS**			TestCode: **EPA Method 8015M/D: Diesel Range Organics**					
Client ID: **LCSS**	Batch ID: **28850**			RunNo: **39005**					
Prep Date: **11/23/2016**	Analysis Date: **11/29/2016**			SeqNo: **1220400**		Units: **mg/Kg**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	51	10	50.00	0	102	62.6	124			
Surr: DNOP	4.6		5.000		92.6	70	130			

Sample ID **MB-28850**	SampType: **MBLK**			TestCode: **EPA Method 8015M/D: Diesel Range Organics**					
Client ID: **PBS**	Batch ID: **28850**			RunNo: **39005**					
Prep Date: **11/23/2016**	Analysis Date: **11/29/2016**			SeqNo: **1220401**		Units: **mg/Kg**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Surr: DNOP	9.3		10.00		92.7	70	130			

Sample ID **1611C33-001AMS**	SampType: **MS**			TestCode: **EPA Method 8015M/D: Diesel Range Organics**					
Client ID: **SB7-7**	Batch ID: **28850**			RunNo: **39005**					
Prep Date: **11/23/2016**	Analysis Date: **11/29/2016**			SeqNo: **1220530**		Units: **mg/Kg**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	48	9.9	49.31	5.162	87.5	51.6	130			
Surr: DNOP	4.4		4.931		89.9	70	130			

Sample ID **1611C33-001AMSD**	SampType: **MSD**			TestCode: **EPA Method 8015M/D: Diesel Range Organics**					
Client ID: **SB7-7**	Batch ID: **28850**			RunNo: **39005**					
Prep Date: **11/23/2016**	Analysis Date: **11/29/2016**			SeqNo: **1220531**		Units: **mg/Kg**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	50	9.5	47.26	5.162	94.4	51.6	130	3.01	20	
Surr: DNOP	4.5		4.726		95.5	70	130	0	0	

Sample ID **1611C33-021AMS**	SampType: **MS**			TestCode: **EPA Method 8015M/D: Diesel Range Organics**					
Client ID: **SB6-10**	Batch ID: **28851**			RunNo: **39005**					
Prep Date: **11/23/2016**	Analysis Date: **11/29/2016**			SeqNo: **1220905**		Units: **mg/Kg**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	59	9.8	49.02	31.95	54.9	51.6	130			
Surr: DNOP	4.7		4.902		96.3	70	130			

Sample ID **1611C33-021AMSD**	SampType: **MSD**			TestCode: **EPA Method 8015M/D: Diesel Range Organics**					
Client ID: **SB6-10**	Batch ID: **28851**			RunNo: **39005**					
Prep Date: **11/23/2016**	Analysis Date: **11/29/2016**			SeqNo: **1220906**		Units: **mg/Kg**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- B Analyte detected in the associated Method Blank
- D Sample Diluted Due to Matrix
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- P 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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1611C33**

08-Dec-16

Client: Souder, Miller and Associates

Project: BIYA 185 Line Leak

Sample ID **1611C33-021AMSD**	SampType: **MSD**			TestCode: **EPA Method 8015M/D: Diesel Range Organics**					
Client ID: **SB6-10**	Batch ID: **28851**			RunNo: **39005**					
Prep Date: **11/23/2016**	Analysis Date: **11/29/2016**			SeqNo: **1220906**		Units: **mg/Kg**			
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 ID: **28851**			RunNo: **39005**					
Prep Date: **11/23/2016**	Analysis Date: **11/29/2016**			SeqNo: **1220914**		Units: **mg/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**	SampType: **MBLK**			TestCode: **EPA Method 8015M/D: Diesel Range Organics**					
Client ID: **PBS**	Batch ID: **28851**			RunNo: **39005**					
Prep Date: **11/23/2016**	Analysis Date: **11/29/2016**			SeqNo: **1220915**		Units: **mg/Kg**			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Surr: DNOP	9.8		10.00		97.6	70	130			

Qualifiers:

- * Value exceeds Maximum Contaminant Level.
- B Analyte detected in the associated Method Blank
- D Sample Diluted Due to Matrix
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- P 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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1611C33

08-Dec-16

Client: Souder, Miller and Associates

Project: BIYA 185 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	SPK Ref Val	%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	RunNo: 38984							
Prep Date: 11/23/2016	Analysis Date: 11/28/2016	SeqNo: 1219304	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	25	5.0	25.00	0	99.8	74.6	123			
Surr: BFB	990		1000		99.0	68.3	144			

Sample ID 1611C33-021AMS	SampType: MS	TestCode: EPA Method 8015D: Gasoline Range							
Client ID: SB6-10	Batch ID: 28848	RunNo: 38984							
Prep Date: 11/23/2016	Analysis Date: 11/28/2016	SeqNo: 1219314	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	24.93	14.08	48.1	61.3	150			S
Surr: BFB	1000		997.0		100	68.3	144			

Sample ID 1611C33-021AMSD	SampType: MSD	TestCode: EPA Method 8015D: Gasoline Range							
Client ID: SB6-10	Batch ID: 28848	RunNo: 38984							
Prep Date: 11/23/2016	Analysis Date: 11/28/2016	SeqNo: 1219315	Units: mg/Kg						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	36	4.8	24.13	14.08	91.8	61.3	150	32.6	20	R
Surr: BFB	980		965.3		102	68.3	144	0	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	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	890		1000		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	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1611C33**

08-Dec-16

Client: Souder, Miller and Associates

Project: BIYA 185 Line Leak

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	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	25	5.0	25.00	0	99.1	74.6	123			
Surr: BFB	960		1000		96.3	68.3	144			

Sample ID **1611C33-001AMS**	SampType: **MS**			TestCode: **EPA Method 8015D: Gasoline Range**						
Client ID: **SB7-7**	Batch ID: **28847**			RunNo: **38983**						
Prep Date: **11/23/2016**	Analysis Date: **11/28/2016**			SeqNo: **1219362**		Units: **mg/Kg**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range 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 **1611C33-001AMSD**	SampType: **MSD**			TestCode: **EPA Method 8015D: Gasoline Range**						
Client ID: **SB7-7**	Batch ID: **28847**			RunNo: **38983**						
Prep Date: **11/23/2016**	Analysis Date: **11/28/2016**			SeqNo: **1219363**		Units: **mg/Kg**				
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28	4.9	24.39	1.244	111	61.3	150	20.0	20	
Surr: BFB	970		975.6		99.2	68.3	144	0	0	

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1611C33

08-Dec-16

Client: Souder, Miller and Associates

Project: BIYA 185 Line Leak

Sample ID MB-28848	SampType: MBLK	TestCode: EPA Method 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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.97		1.000		97.0	80	120			

Sample ID LCS-28848	SampType: LCS	TestCode: EPA Method 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	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.97	0.025	1.000	0	96.9	75.2	115			
Toluene	0.94	0.050	1.000	0	94.3	80.7	112			
Ethylbenzene	0.88	0.050	1.000	0	87.9	78.9	117			
Xylenes, Total	2.6	0.10	3.000	0	88.3	79.2	115			
Surr: 4-Bromofluorobenzene	1.0		1.000		101	80	120			

Sample ID MB-28847	SampType: MBLK	TestCode: EPA Method 8021B: Volatiles							
Client ID: PBS	Batch ID: 28847	RunNo: 38983							
Prep Date: 11/23/2016	Analysis Date: 11/28/2016	SeqNo: 1219387	Units: %Rec						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.1		1.000		109	80	120			

Sample ID LCS-28847	SampType: LCS	TestCode: EPA Method 8021B: Volatiles							
Client ID: LCSS	Batch ID: 28847	RunNo: 38983							
Prep Date: 11/23/2016	Analysis Date: 11/28/2016	SeqNo: 1219388	Units: %Rec						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Surr: 4-Bromofluorobenzene	1.1		1.000		114	80	120			

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

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: **1611C33**

08-Dec-16

Client: Souder, Miller and Associates

Project: BIYA 185 Line Leak

Sample ID **lcs-28847**	SampType: **LCS**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **LCSS**	Batch ID: **28847**	RunNo: **39098**
Prep Date: **11/23/2016**	Analysis Date: **12/1/2016**	SeqNo: **1222991** 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	0.51		0.5000		102	70	130			
Surr: 4-Bromofluorobenzene	0.45		0.5000		89.3	70	130			
Surr: Dibromofluoromethane	0.57		0.5000		114	70	130			
Surr: Toluene-d8	0.47		0.5000		93.8	70	130			

Sample ID **mb-28847**	SampType: **MBLK**	TestCode: **EPA Method 8260B: Volatiles Short List**
Client ID: **PBS**	Batch ID: **28847**	RunNo: **39098**
Prep Date: **11/23/2016**	Analysis Date: **12/1/2016**	SeqNo: **1222992** Units: **mg/Kg**

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-Bromofluorobenzene	0.47		0.5000		93.8	70	130			
Surr: Dibromofluoromethane	0.60		0.5000		120	70	130			
Surr: Toluene-d8	0.49		0.5000		97.4	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	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

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

Sample Log-In Check List

Client Name: SMA-FARM | Work Order Number: 1611C33 | RcptNo: 1

Received by/date: 11/23/16

Logged By: Lindsay Mangin 11/23/2016 7:40:00 AM

Completed By: Lindsay Mangin 11/23/2016 8:02:59 AM

Reviewed By: 11/23/16

Chain of Custody

1. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
2. Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
3. How was the sample delivered?	Courier		

Log In

4. Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5. Were all samples received at a temperature of >0° C to 6.0°C	Yes ☑	No ☐	NA ☐
6. Sample(s) in proper container(s)?	Yes ☑	No ☐	
7. Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8. Are samples (except VOA and ONG) properly preserved?	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 broken?	Yes ☐	No ☑	
12. Does paperwork match bottle labels? (Note discrepancies on chain of custody)	Yes ☑	No ☐	# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)
13. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted? _____
14. Is it clear what analyses were requested?	Yes ☑	No ☐	
15. Were all holding times able to be met? (If no, notify customer for authorization.)	Yes ☑	No ☐	Checked by: _____

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

17. Additional remarks:

18. Cooler Information

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.3	Good	Yes			

Chain-of-Custody Record

Client: SMA	Turn-Around Time: ☒ Standard ☐ Rush
	Project Name: BIYA 185 Line Leak
Mailing Address: 401. W. Broadway Farmington, NM 87401	Project #:
Phone #: 505-325-7535	
Email or Fax#: ashley.maxwell@souder miller.com	Project Manager: Ashley Maxwell
QA/QC Package: ☒ Standard ☐ Level 4 (Full Validation)	Sampler: SAH / LD
Accreditation: ☐ NELAP ☐ Other	On Ice: ☒ Yes ☐ No
EDD (Type)	Sample Temperature: 1.3

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

See note

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1611C33	BTEX + MTBE + TMB's (8021) SAH	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO) SAH	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	300.0 chlorides (See note)				Air Bubbles (Y or N)
11/9/16	9:45	Soil	SB7 - 7	1-4oz	Cool	-001	X		X									X				
	10:10		SB7 - 15			-002	X		X									X				
	10:44		SB8 - 5			-003	X		X									X				
	11:22		SB8 - 10			-004	X		X									X				
	11:50		SB9 - 3			-005	X		X									X				
	12:49		SB9 - 16			-006	X		X									X				
			[illegible]				X		X									X				
	13:23		SB9 - 21			-007	X		X									X				
	13:27		SB9 - 25			-008	X		X									X				
11/8/16	15:54		SB5 - 10			-009	X		X									X				

Date	Time	Relinquished by:	Received by:	Date	Time
11/22/16	16:00	Kaylen Alcott			
				11/23/16	0740

Remarks:

* Only run 8021 BTEX and 300.0 chlorides if GRO/DRO < 100 ppm.
* Hold for holding time in case other analyses are needed.

Chain-of-Custody Record

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Client: SMA	Turn-Around Time: ☒ Standard ☐ Rush
Mailing Address: 401 W. Broadway Farmington, NM 87401	Project Name: BIYA 185 Line Leak
Phone #: 505-325-7535	Project #:
email or Fax#: ashley.maxwell@soudermiller.com	Project Manager: Ashley Maxwell
QA/QC Package: Standard ☐ Level 4 (Full Validation)	Sampler: SAH/LD
Accreditation: NELAP ☐ Other	On Ice: ☒ Yes ☐ No
EDD (Type)	Sample Temperature: 1.3

→ See note

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1611C33	BTEX + MTBE + TMB's (8021) SAH	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO/DRO/MRO) SAH	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	300.0 Chlorides (see note)				Air Bubbles (Y or N)
8/16	11:02	soil	SB1-7	1-4 oz	cool	-010	X		X									X				
	11:40		SB1-15			-011	X		X									X				
	12:23		SB2-7			-012	X		X									X				
	12:58		SB2-15			-013	X		X									X				
	13:25		SB3-5			-014	X		X									X				
	14:04		SB3-10			-015	X		X									X				
	14:34		SB4-5			-016	X		X									X				
	15:09		SB4-10			-017	X		X									X				
	15:34		SB5-4			-018	X		X									X				
	15:51		SB5-7			-019	X		X									X				
	16:17		SB6-5			-020	X		X									X				
↓	16:39	↓	SB6-10	↓	↓	-021	X		X									X				

Date	Time	Relinquished by:	Received by:	Date	Time
8/22/16	16:00	Stephanie Hurtado			
				11/23/16	0740

Date	Time	Relinquished by:	Received by:	Date	Time

Remarks:

* Only run 8021 BTEX and 300.0 Chlorides if GRO/DRO < 100 ppm.

* Hold for holding time in case other analyses are needed.

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.

Department Of Interior- Bureau of Land Management – Tres Rios Field Office – COAs

Well Name/Number: HSGU #185 **Operator: BIYA** **Surface/Mineral Ownership: IND/IND**

Leases: 751081035 **Location: (STR, QQ) S35,T31N, R16W**

API:3004510211 **PAD(X), ACCESS (), PIPELINE ( )**

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