



June 15, 2012

Mr. Scott Rose
Samson Resources Company
Two West Second Street
Tulsa, Oklahoma 74103-3103

**RE: Soil Sampling Results
Pipeline Release
La Plata County, Colorado**

Dear Mr. Rose:

LT Environmental, Inc. (LTE) is pleased to provide Samson Resources Company (Samson) with this letter summarizing the results of confirmation soil sampling activities conducted at a pipeline release in the southwest quarter of the southwest quarter of Section 11, Township 33 North, Range 8 West in La Plata County, Colorado (Site; Figure 1).

BACKGROUND

LTE conducted an initial site investigation on November 29, 2011 following a release of approximately 2 to 5 barrels (bbls) of produced water. The release originated at a valve can and flowed through a culvert under a county road and down a natural drainage approximately 200 feet before entering the Morrison Consolidated Ditch. Soil sample analytical results were reported in a letter submitted to the Colorado Oil and Gas Conservation Commission (COGCC) on January 18, 2012 and indicated sodium adsorption ratio (SAR) values exceeded COGCC Table 910 standards within the upper portion of the drainage. In response, LTE recommended application of gypsum at the Site. LTE visited the Site on February 27, 2012 to apply gypsum in the drainage; however, the drainage was full of running water produced by snow melt and the gypsum was not added. LTE suggested waiting until the early summer dry period to re-sample the drainage area and determine if the fresh water reduced the SAR values naturally.

METHODS

On May 21, 2012, LTE collected soil from three locations at the Site. The soil samples were collected within the flow path of the release labeled "Drainage 1 Soil," "Drainage 2 Soil," and "Drainage 3 Soil". Sample locations are depicted on Figure 2 along with the locations of the initial soil samples.

The soil samples were placed in clean Teflon-lined glass jars and Ziploc bags and stored in a cooler with ice in the field. All samples were shipped on ice to Hall Environmental Analysis Laboratory (HEAL) in Albuquerque, New Mexico under strict chain-of-custody protocol. The soil samples were analyzed for calcium, magnesium, sodium and a SAR value was calculated.

LTE also observed and noted vegetation growth within the drainage as compared to the surrounding area.

RESULTS

Table 1 presents the soil analytical results. The complete laboratory reports are included as Appendix A. Soil analytical results indicate SAR levels in all three sample locations are below COGCC Table 910-1 standards.

Vegetation observed within the drainage was comparable to the surrounding landscape. No dead vegetation or lack of vegetation was noted and normal, healthy growth was apparent.

CONCLUSIONS

Soil analytical results indicate produced water impact to the soil has been eliminated by naturally flowing fresh water sourced by snow melt. Vegetation within the drainage is healthy and soil within drainage does not appear to be limiting natural growth.

RECOMMENDATIONS

Based on the soil sample analytical results, LTE recommends Samson request a determination of no further action at the Site.

LTE appreciates the opportunity to provide environmental services to Samson. If you have any questions regarding this report, please contact us at (970) 385-1096.

Sincerely,

LT ENVIRONMENTAL, INC.

A handwritten signature in black ink, appearing to read "Ashley L. Ager".

Ashley L. Ager, M.S.

Senior Geologist/Office Manager

Attachments (4)

Figure 1 – Site Location Map

Figure 2 – Site Map

Table 1 – Soil Analytical Results

Appendix A – Laboratory Analytical Reports

FIGURES



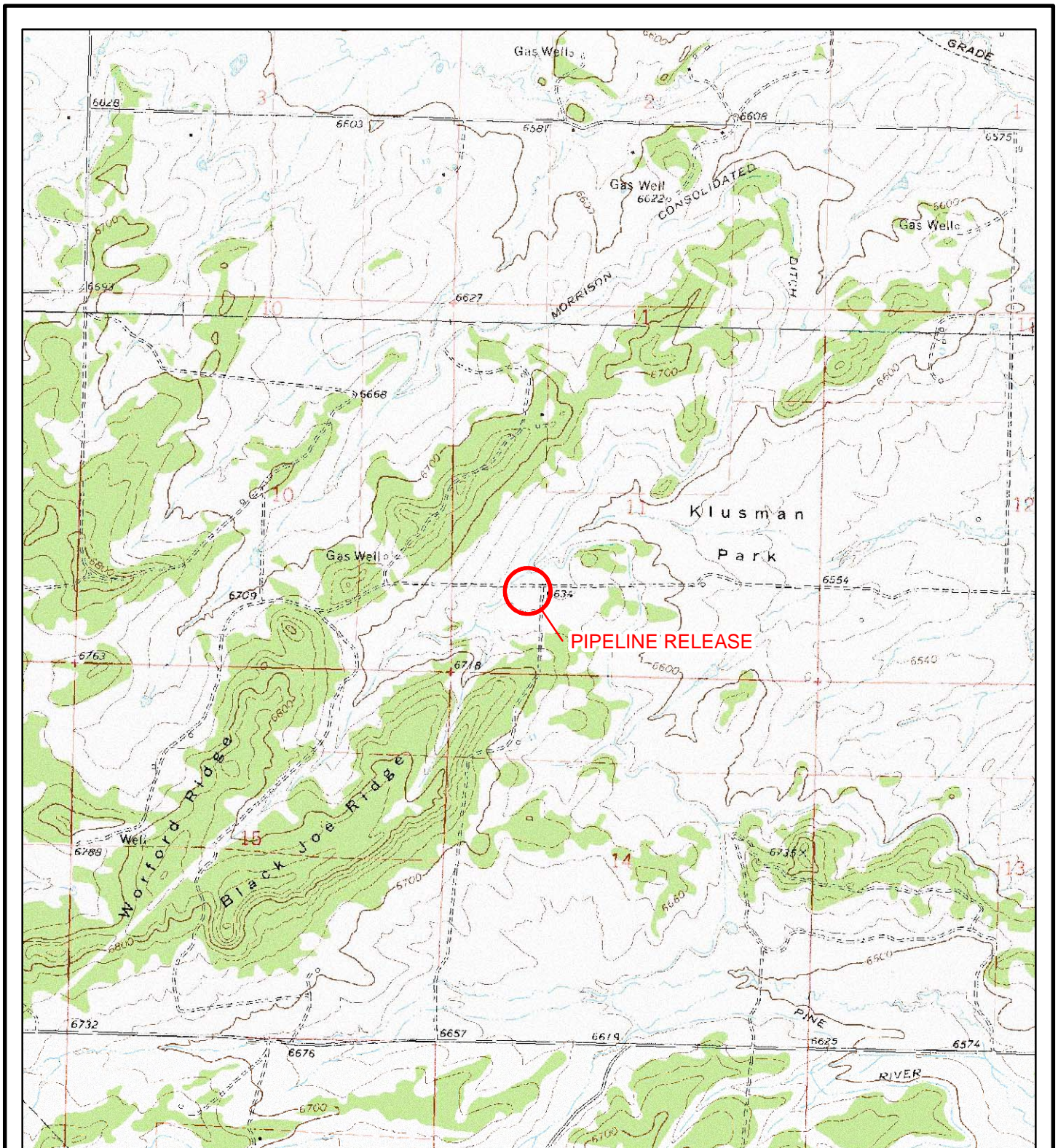


IMAGE COURTESY OF USDA/NRCS, VARIOUS DATES

LEGEND

○ SITE LOCATION

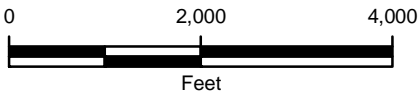


FIGURE 1
SITE LOCATION MAP
PIPELINE RELEASE
SWSW SEC 11 T33N R8W
LA PLATA COUNTY, COLORADO
SAMSON RESOURCES



UP GRADIENT WATER SAMPLE

MORRISON
CONSOLIDATED
DITCH

DOWN GRADIENT WATER SAMPLE

DRAINAGE 3 SOIL

DRAINAGE 3 SOIL

DRAINAGE 2 SOIL

DRAINAGE 2 SOIL

DRAINAGE 1 SOIL

DRAINAGE 1 SOIL

ACCESS ROAD

LEGEND

- ⊗ DRAINAGE SOIL SAMPLE (05/21/2012)
- ⊗ DRAINAGE SOIL SAMPLE (11/29/2012)
- WATER SAMPLE (05/21/2012)
- BACKGROUND SAMPLE
- ⬠ VALVE CAN
- ▭ CULVERT
- ▨ ABOVEGROUND PIPING
- FLOW PATH
- DITCH BANK
- ROAD

- WETLANDS AREA
- STANDING WATER

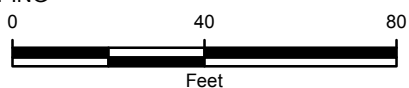


FIGURE 2
SITE MAP
PIPELINE RELEASE
SWSW SEC 11 T33N R8W
LA PLATA COUNTY, COLORADO
SAMSON RESOURCES



TABLE

TABLE 1
SOIL ANALYTICAL RESULTS
PIPELINE RELEASE
SAMSON RESOURCES COMPANY

Analyte	Sample ID							COGCC Standards*
	Background Soil Sample	Drainage 1 Soil	Drainage 2 Soil	Drainage 3 Soil	Drainage 1 Soil	Drainage 2 Soil	Drainage 3 Soil	
Sample Date	11/29/2011	11/29/2011	11/29/2011	11/29/2011	5/21/2012	5/21/2012	5/21/2012	-
pH (su)		8.2	8.2	7.0	NA	NA	NA	6-9
Specific Conductance (umhos/cm)	NA	1,200	950	400	NA	NA	NA	4,000
Sodium Adsorption Ratio	0.48	23.0	14.0	3.6	4.4	2.7	0.93	<12
Calcium (mg/Kg)	NA	NA	NA	NA	86	520	170	NE
Magnesium (mg/Kg)	NA	NA	NA	NA	13	< 200	26	NE
Potassium (mg/Kg)	NA	NA	NA	NA	NA	NA	NA	NE
Sodium (mg/Kg)	57	NA	NA	NA	170	280	49	NE
Mercury (mg/Kg)	NA	NA	NA	NA	NA	NA	NA	23,000
Arsenic (mg/Kg)**	NA	NA	NA	NA	NA	NA	NA	0.39
Barium (mg/Kg)	NA	250	240	220	NA	NA	NA	15,000
Cadmium (mg/Kg)	NA	NA	NA	NA	NA	NA	NA	70
Chromium (mg/Kg)	NA	NA	NA	NA	NA	NA	NA	120,000
Copper (mg/Kg)	NA	NA	NA	NA	NA	NA	NA	3,100
Lead (mg/Kg)	NA	NA	NA	NA	NA	NA	NA	400
Nickel (mg/Kg)	NA	NA	NA	NA	NA	NA	NA	23
Selenium (mg/Kg)	NA	<1.0	<1.0	<1.0	NA	NA	NA	1,600
Silver (mg/Kg)	NA	NA	NA	NA	NA	NA	NA	390
Zinc (mg/Kg)	NA	NA	NA	NA	NA	NA	NA	390

BOLD -indicates result greater than COGCC standard

COGCC - Colorado Oil and Gas Conservation Commission

mg/Kg - milligrams per kilogram

NA - not analyzed

NE - not established

su - standard units

umhos/cm - microohms per centimeter

* - Colorado Oil and Gas Conservation Commission Concentration Level derived from Table 910-1

< - less than stated laboratory detection limit



APPENDIX A
LABORATORY ANALYTICAL REPORTS





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

June 05, 2012

Ashley Ager

LTE

2243 Main Ave Suite 3

Durango, CO 81301

TEL: (970) 946-1093

FAX

RE: Pipeline Release

OrderNo.: 1205890

Dear Ashley Ager:

Hall Environmental Analysis Laboratory received 3 sample(s) on 5/22/2012 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. 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. All samples are reported as received unless otherwise indicated.

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

Sincerely,

A handwritten signature in black ink, appearing to read "Andy Freeman", is written over a horizontal line.

Andy Freeman

Laboratory Manager

4901 Hawkins NE

Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1205890**

Date Reported: **6/5/2012**

CLIENT: LTE

Client Sample ID: Drainage 1 Soil

Project: Pipeline Release

Collection Date: 5/21/2012 10:15:00 AM

Lab ID: 1205890-001

Matrix: SOIL

Received Date: 5/22/2012 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CATIONS						Analyst: JLF
Calcium	86	10		mg/L	10	6/1/2012 2:14:55 PM
Magnesium	13	10		mg/L	10	6/1/2012 2:14:55 PM
Sodium	170	10		mg/L	10	6/1/2012 2:14:55 PM
Sodium Adsorption Ratio	4.4	0			10	6/1/2012 2:14:55 PM

Qualifiers:

- * / X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1205890**

Date Reported: **6/5/2012**

CLIENT: LTE

Client Sample ID: Drainage 2 Soil

Project: Pipeline Release

Collection Date: 5/21/2012 10:21:00 AM

Lab ID: 1205890-002

Matrix: SOIL

Received Date: 5/22/2012 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CATIONS						Analyst: JLF
Calcium	520	200		mg/L	200	6/4/2012 2:15:57 PM
Magnesium	ND	200		mg/L	200	6/4/2012 2:15:57 PM
Sodium	280	200		mg/L	200	6/4/2012 2:15:57 PM
Sodium Adsorption Ratio	2.7	0			200	6/4/2012 2:15:57 PM

Qualifiers:

- * / X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1205890**

Date Reported: **6/5/2012**

CLIENT: LTE

Client Sample ID: Drainage 3 Soil

Project: Pipeline Release

Collection Date: 5/21/2012 10:26:00 AM

Lab ID: 1205890-003

Matrix: SOIL

Received Date: 5/22/2012 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SOLUBLE CATIONS						Analyst: JLF
Calcium	170	10		mg/L	10	6/1/2012 2:28:53 PM
Magnesium	26	10		mg/L	10	6/1/2012 2:28:53 PM
Sodium	49	10		mg/L	10	6/1/2012 2:28:53 PM
Sodium Adsorption Ratio	0.93	0			10	6/1/2012 2:28:53 PM

Qualifiers:

- * / X Value exceeds Maximum Contaminant Level.
- E Value above quantitation range
- J Analyte detected below quantitation limits
- R RPD outside accepted recovery limits
- S Spike Recovery outside accepted recovery limits

- B Analyte detected in the associated Method Blank
- H Holding times for preparation or analysis exceeded
- ND Not Detected at the Reporting Limit
- RL Reporting Detection Limit

QC SUMMARY REPORT

Hall Environmental Analysis Laboratory, Inc.

WO#: 1205890

05-Jun-12

Client: LTE

Project: Pipeline Release

Sample ID	MB-2176		SampType: MBLK		TestCode: Soluble Cations					
Client ID:	PBS		Batch ID: 2176		RunNo: 3170					
Prep Date:	5/31/2012		Analysis Date: 6/1/2012		SeqNo: 87546		Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	ND	1.0								
Magnesium	ND	1.0								
Sodium	ND	1.0								
Sodium Adsorption Ratio	ND	0								

Sample ID	LCS-2176		SampType: LCS		TestCode: Soluble Cations					
Client ID:	LCSS		Batch ID: 2176		RunNo: 3170					
Prep Date:	5/31/2012		Analysis Date: 6/1/2012		SeqNo: 87547		Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	51	1.0	50.00	0	102	80	120			
Magnesium	52	1.0	50.00	0	104	80	120			
Sodium	52	1.0	50.00	0	104	80	120			

Sample ID	LCS-2176		SampType: LCSD		TestCode: Soluble Cations					
Client ID:	LCSS02		Batch ID: 2176		RunNo: 3170					
Prep Date:	5/31/2012		Analysis Date: 6/1/2012		SeqNo: 87548		Units: mg/L			
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Calcium	51	1.0	50.00	0	103	80	120	1.20	20	
Magnesium	52	1.0	50.00	0	104	80	120	0.568	20	
Sodium	51	1.0	50.00	0	103	80	120	1.10	20	

Qualifiers:

*X Value exceeds Maximum Contaminant Level.
E Value above quantitation range
J Analyte detected below quantitation limits
R RPD outside accepted recovery limits

B Analyte detected in the associated Method Blank
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
RL Reporting Detection Limit

Sample Log-In Check List

Client Name: LTE

Work Order Number: 1205890

Received by/date:

mg 05/22/12

Logged By: Ashley Gallegos

5/22/2012 8:50:00 AM

Completed By: Ashley Gallegos

5/22/2012 9:41:11 AM

Reviewed By:

IO 05/22/12

Chain of Custody

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

Log In

4. Coolers are present? (see 19. for cooler specific information) Yes ☒ No ☐ NA
5. Was an attempt made to cool the samples? Yes ☒ No ☐ NA
6. Were all samples received at a temperature of $>0^{\circ}\text{C}$ to 6.0°C ? Yes ☒ No ☐ NA
7. Sample(s) in proper container(s)? Yes ☒ No ☐
8. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
9. Are samples (except VOA and ONG) properly preserved? Yes ☒ No ☐
10. Was preservative added to bottles? Yes ☐ No ☒ NA
11. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☒
12. Were any sample containers received broken? Yes ☐ No ☒
13. Does paperwork match bottle labels?
(Note discrepancies on chain of custody) Yes ☒ No ☐ # of preserved bottles checked for pH:
(<2 or >12 unless noted)
14. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐ Adjusted?
15. Is it clear what analyses were requested? Yes ☒ No ☐
16. Were all holding times able to be met?
(If no, notify customer for authorization.) Yes ☒ No ☐ Checked by:

Special Handling (if applicable)

17. 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:

18. Additional remarks:

19. Cooler Information

Cooler No	Temp $^{\circ}\text{C}$	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	1.0	Good	Yes			

