RECR - 12

WORK PLAN AND PURCHASING ORDER

YEAR(S): 2010

RESPEC
WATER & NATURAL RESOURCES

RSI(ALO)-1912/3-10/07

March 18, 2010

Mr. Jim Griswold
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505

Dear Mr. Griswold:

Re: Work Plan for Remedial Action at the Ramapo #1 Site in Southeastern New Mexico

RESPEC is pleased to submit the following work plan and cost estimate for the Ramapo #1 site of a formerly operating oil well. The site, located at Latitude 32.788400 Longitude -104.232973, in ULSTR K-36-17S-27E in Eddy County, New Mexico, east of Artesia, west of Loco Hills, and south of U.S. Highway 82, was used for a production facility for approximately 60 years. It can be reached by driving 9.7 miles east from the main intersection in Artesia (15 miles west of Loco Hills) on U.S. Highway 82 toward Lovington, then south on Hilltop Road just east of the power station (on the north side) for 1.5 miles, turning west on Evans Road and after driving 0.3 miles, turning left on an unmarked road that is across from the storage tank.

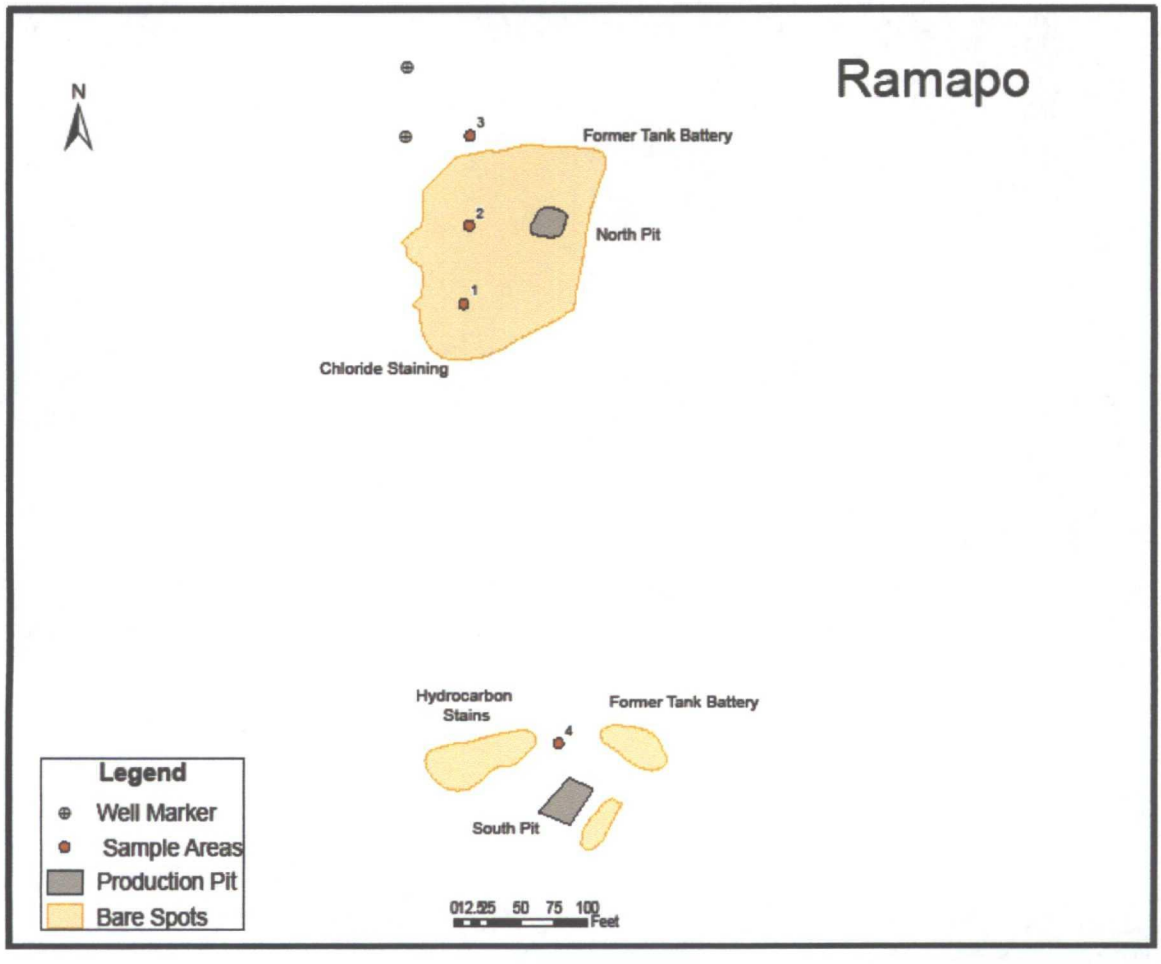
At the Ramapo #1 site, with two pits filled with oilfield waste and several areas of oil- and chloride-stained soil because of illegal dumping of oilfield waste, RESPEC will oversee the execution of Tasks 1-10, detailed on pages 4-8 of this work plan. All work will be conducted in accordance with all pertinent state and federal regulations, and a professional geologist will have direct supervisory control over the project. RESPEC will give a minimum of 96 hours' advance notice to the Oil Conservation Division (OCD) project manager before starting work.

SITE CHARACTERIZATION

In October, 2009 RESPEC performed a site characterization at the Ramapo #1 location to delineate areas of known and suspected contamination caused by the operation of a single production well. It is suspected that there has also been illegal dumping of oilfield waste at the site. Results of the site characterization are outlined on pages 2 and 3, and field sample results and laboratory results are included in the attachments to this work plan. A site diagram is included on page 2.

The assessment involved the mapping of soil staining, pits, and well markers with a Trimble GPS unit and potholing the site with a rubber-tired backhoe to delineate yardage for remediating the site. Four test pits, marked in red and numbered in the site diagram below, were dug to a depth of 2 feet, and several areas of hydrocarbon staining were excavated to a depth of 3 feet to reveal the extent of contamination.

As shown in the site diagram, an approximately 15,000-square-foot area surrounding the north production pit is denuded of vegetation. During the site investigation, RESPEC observed evidence of recent 18 wheeler activity in this area. The southern part of this area had a white crystalline crust on the surface soil. West of the north production pit, in the strongest concentration of visible chloride contamination, three potholes in a north-south line were excavated so that RESPEC personnel could collect soil samples and perform a field chloride test in accordance with the suggested method outlined in the David G. Boyer report provided by OCD.



The test results indicated very high chloride contamination at the surface in Test Pit #1 and Test Pit # 2 (18,576 parts per million (ppm) and more than 26,000 ppm, respectively). However, surface contamination in Test Pit # 3 was much lower—2,212 ppm. Samples from 2 feet below the surface in the same three pits showed a dramatic lowering of chloride levels (from approximately 7,320 ppm at the surface to 1,008 ppm at -2 ft). Overall, these results indicate that the approximately 15,000-square-foot area of bare soil surrounding the north production pit has high levels of chloride contamination at a shallow depth. The highest levels were recorded to the south and southwest of the north production pit.

A small area of surface chloride contamination was observed and potholed near Test Pit #4. Field test results indicated that soil at the surface had a chloride concentration of 8,680 ppm and at 2 feet of depth had chloride contamination of 5,697 ppm.

Other areas of interest were the locations of the former tank batteries to the north of both production pits. These approximately 900-square-foot areas contained surface hydrocarbon contamination mixed with pea gravel and were excavated with the rubber-tired backhoe. Indications of hydrocarbon contamination were observed at depths in excess of three feet.

Two minor hydrocarbon stains were observed near the south production pit. Field investigation revealed that the broad areas (1,834 square feet and 479 square feet) were relatively shallow and should be easily excavated for remediation.

Based on this site characterization, RESPEC recommends that the following amounts of contaminated soil be excavated and removed from the site for proper disposal:

- South production pit: 585 square feet to a depth of 10 feet = 5,850 cubic feet = 217 cubic yards
- North production pit: 372 square feet to a depth of 10 feet = 3,720 cubic feet = 138 cubic yards
- Two former tank batteries: 900 square feet **each** to a depth of 5 feet = 1,800 x 5 = 9,000 cubic feet = 333 cubic yards
- Larger hydrocarbon-stained area around south production pit: 1,834 square feet to a depth of 3 feet = 5,502 cubic feet = 204 cubic yards
- Smaller hydrocarbon-stained area around north production pit: 479 square feet to a depth of 3 feet = 1,437 cubic feet = 53 cubic yards

- Chloride-stained soil surrounding north production pit: 14,840 square feet to a depth of 1 foot = 14,840 cubic feet = 550 cubic yards

Total: 1,495 cubic yards (in place) + 55 cubic yards for chasing contamination and for landscaping = **Grand Total: 1,550 cubic yards (in place).**

TASK 1 — PREPARE A WORK PLAN

This task involves the preparation of the work plan and cost estimates and interaction with all subcontractors and the OCD project manager.

TASK 2 – LOCATE BURIED UTILITIES VIA NEW MEXICO ONE CALL

RESPEC's subcontractor will contact the New Mexico One Call system to locate, mark, and map all buried pipelines and utilities at the sites. The subcontractor will maintain and update a One Call log as required throughout the duration of the project.

TASK 3 – HOLD A PREJOB CONFERENCE

A prejob conference will be scheduled to detail site remediation procedures, including the timeline for construction activities; required signage for public information and traffic control; local and countywide notification as required; project budgeting and cost control; and required safety procedures for the project.

TASK 4 – PREPARE A HEALTH AND SAFETY PLAN

A project-specific health and safety plan (HASP) will be completed before fieldwork commences. The HASP will include, but not be limited to, an information summary for the site; a list of key personnel on-site and their responsibilities; tailgate meeting schedules and mandatory attendance logs; a list of site hazards; emergency information; a job hazard assessment; requirements for personal protective equipment (PPE), air quality monitoring, decontamination and disposal; and information on employee training and emergency procedures.

TASK 5 – MUCK OUT AND BACKFILL SOUTH PRODUCTION PIT

The south production pit (see Photograph 1 on the next page) measures approximately 30 feet by 20 feet at the surface and has an unknown depth. RESPEC's subcontractor will muck out this pit to a depth of 10 feet and backfill it with soil free from contamination. All contaminated soil will be removed from the site and taken to a waste facility approved by the OCD.

Photograph 1. South Production Pit at Ramapo #1 Site.

TASK 6 – MUCK OUT AND BACKFILL NORTH PRODUCTION PIT

The north production pit (see Photograph 2 below) measures approximately 20 feet by 20 feet at the surface and has an unknown depth. RESPEC's subcontractor will muck out this pit to a depth of 10 feet and backfill it with soil free from contamination. All contaminated soil will be removed from the site and taken to a waste facility approved by the OCD.

Photograph 2. North Production Pit at Ramapo #1 Site.

TASK 7 – REMOVE CONTAMINATED SOIL FROM THE AREA AROUND SOUTH PRODUCTION PIT AND REGRADE THE SITE

The soil in the area around the south production pit (see Photograph 3 on the next page) is contaminated with chloride and hydrocarbon parches. RESPEC will oversee the removal of these patches of contaminated soil to a depth of 3 to 5 feet. The contaminated soil will be removed from the site and taken to a waste facility approved by the OCD and will be replaced with soil free from contamination. The area will then

be regraded so as to divert water runoff, thereby preventing erosion of the downgradient road.

Photograph 3. Area Around South Production Pit.

TASK 8 – REMOVE CONTAMINATED SOIL FROM THE AREA AROUND NORTH PRODUCTION PIT, REGRADE THE SITE, AND RESEED

The soil in the area around the north production pit (see Photograph 4 below) is contaminated with chloride and hydrocarbons. RESPEC will oversee the removal of this contaminated soil to a depth of 1 to 5 feet. The contaminated soil will be removed from the site and taken to a waste facility approved by the OCD and will be replaced with soil free from contamination. The area will then be regraded so as to divert water runoff, thereby preventing erosion of the road and pad. In the process of soil removal and regrading, RESPEC will make sure that the two buried pipelines in this area (one possibly for fresh water) are not damaged or disturbed. Photograph 5 below shows an exposed pipeline. The area around the north production pit will be seeded with grass and watered.

Photograph 4. Area of North Production Pit.

Photograph 5. One of Two Buried Pipelines.

TASK 9 – REPAIR/REGRADE ROADS AS NEEDED

Erosion has damaged several parts of the roads at the Ramapo #1 site. RESPEC will oversee the installation of water bars and the backfilling of roads as needed. After repairs, the roads will be able to accommodate the hauling of equipment by heavy vehicles.

TASK 10 – PREPARE AND SUBMIT APPROPRIATE REPORTS

As required by the OCD, RESPEC will submit one or more appropriate reports. At a minimum, the report(s) will include the following:

- A site map showing all buried pipelines and electrical hazards.
- The volume of material removed from excavated areas, the trip manifests, and the name of the disposal/reclamation company.
- A tabulation of all analytical data gathered during the investigation.
- One or more maps showing the location, depth, and concentrations of all waste material removed and disposed.
- Conclusions and recommendations.

INSURANCE

RESPEC maintains at its own expense the following insurance plans in dollar amounts that meet or exceed the value of services to be performed under the terms of this work plan:

- Workers' compensation insurance: statutory.
- Employer's liability insurance of $1,000,000 per occurrence, $1,000,000 aggregate.
- Comprehensive general liability insurance of $1,000,000 per occurrence, $2,000,000 aggregate.
- Vehicle liability insurance of $1,000,000 per occurrence (property damage and bodily injury combined).

Within 20 working days of the contract signing, RESPEC will provide the owner/operator with a certificate of insurance naming the owner/operator as the certificate holder.

ASSUMPTIONS

- Access to the site will be during normal working hours.
- Excavation areas will be free of underground utilities.
- All waste at the site is considered exempt oil field waste.
- Due to the shallowness of excavations, compaction of fill dirt will be achieved by wheel rolling with heavy equipment.
- Excavated areas will be finished with backfill.

COST ESTIMATE

RESPEC submits the following estimate of the fixed-price cost of work at the Ramapo #1 site:

$ 179,802.50 (Total labor, travel, equipment, materials, etc.)

+ 12,361.42 (New Mexico Gross Receipts Tax)

$ 192,163.92 (GRAND TOTAL)

Respectfully submitted,

Dave A Henard

Dave Henard
Project Geologist

DAH:pas
Attachments
cc: Project Central File 1912 — Category E

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

COVER LETTER

Monday, November 16, 2009

Dave Henard
Respec
5971 Jefferson NE Suite 101
Albuquerque, NM 87109

TEL: (505) 268-2661
FAX (505) 268-0040

RE: Pogo State/Ramapo

Order No.: 0911039

Dear Dave Henard:

Hall Environmental Analysis Laboratory, Inc. received 2 sample(s) on 11/2/2009 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. Below is a list of our accreditations. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites.

Reporting limits are determined by EPA methodology. No determination of compounds below these (denoted by the ND or < sign) has been made.

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

Sincerely,

For Andy Freeman, Laboratory Manager

NM Lab # NM9425
AZ license # AZ0682
ORELAP Lab # NM100001
Texas Lab# T104704424-08-TX

4901 Hawkins NE ■ Suite D ■ Albuquerque, NM 87109
505.345.3975 ■ Fax 505.345.4107
www.hallenvironmental.com

Hall Environmental Analysis Laboratory, Inc. **Date:** *16-Nov-09*

CLIENT: Respec
Project: Pogo State/Ramapo
Lab Order: 0911039

CASE NARRATIVE

"S" flags denote that the surrogate was not recoverable due to sample dilution or matrix interferences.

Hall Environmental Analysis Laboratory, Inc.

Date: *16-Nov-09*

CLIENT:	Respec	**Client Sample ID:**	Tank Battery 6ft
Lab Order:	0911039	**Collection Date:**	10/20/2009 9:14:00 AM
Project:	Pogo State/Ramapo	**Date Received:**	11/2/2009
Lab ID:	0911039-01	**Matrix:**	SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANGE ORGANICS						Analyst: **JB**
Diesel Range Organics (DRO)	15000	500		mg/Kg	50	11/5/2009 4:45:36 AM
Motor Oil Range Organics (MRO)	12000	2500		mg/Kg	50	11/5/2009 4:45:36 AM
Surr: DNOP	0	61.7-135	S	%REC	50	11/5/2009 4:45:36 AM
EPA METHOD 8015B: GASOLINE RANGE						Analyst: **DAM**
Gasoline Range Organics (GRO)	ND	500		mg/Kg	100	11/3/2009 8:45:02 PM
Surr: BFB	95.8	65.9-118		%REC	100	11/3/2009 8:45:02 PM
EPA METHOD 300.0: ANIONS						Analyst: **TAF**
Chloride	3700	30		mg/Kg	100	11/9/2009 11:15:45 AM

Qualifiers:	*	Value exceeds Maximum Contaminant Level	B	Analyte detected in the associated Method Blank
	E	Estimated value	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
	S	Spike recovery outside accepted recovery limits		

Hall Environmental Analysis Laboratory, Inc.

Date: *16-Nov-09*

CLIENT:	Respec	**Client Sample ID:**	Heater Treated 3ft
Lab Order:	0911039	**Collection Date:**	10/20/2009 4:50:00 PM
Project:	Pogo State/Ramapo	**Date Received:**	11/2/2009
Lab ID:	0911039-02	**Matrix:**	SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 8015B: DIESEL RANGE ORGANICS						Analyst: **JB**
Diesel Range Organics (DRO)	15000	500		mg/Kg	50	11/5/2009 5:56:43 AM
Motor Oil Range Organics (MRO)	11000	2500		mg/Kg	50	11/5/2009 5:56:43 AM
Surr: DNOP	0	61.7-135	S	%REC	50	11/5/2009 5:56:43 AM
EPA METHOD 8015B: GASOLINE RANGE						Analyst: **DAM**
Gasoline Range Organics (GRO)	ND	500		mg/Kg	100	11/3/2009 9:13:45 PM
Surr: BFB	92.8	66.9-118		%REC	100	11/3/2009 9:13:45 PM
EPA METHOD 300.0: ANIONS						Analyst: **TAF**
Chloride	5200	30		mg/Kg	100	11/9/2009 11:33:10 AM

Qualifiers:	*	*Value exceeds Maximum Contaminant Level*	B	*Analyte detected in the associated Method Blank*
	E	Estimated value	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	MCL	Maximum Contaminant Level
	ND	Not Detected at the Reporting Limit	RL	Reporting Limit
	S	*Spike recovery outside accepted recovery limits*		

QA/QC SUMMARY REPORT

Client: Respec
Project: Pogo State/Ramapo **Work Order:** 0911039

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 300.0: Anions											
Sample ID: MB-20560		*MBLK*				Batch ID:	**20560**	Analysis Date:		11/9/2009 9:31:18 AM	
Chloride	ND	mg/Kg	0.30								
Sample ID: LCS-20560		*LCS*				Batch ID:	**20560**	Analysis Date:		11/9/2009 9:48:43 AM	
Chloride	14.38	mg/Kg	0.30	15	0	95.9	90	110			
Method: EPA Method 8015B: Diesel Range Organics											
Sample ID: MB-20509		*MBLK*				Batch ID:	**20509**	Analysis Date:		11/5/2009 12:05:52 AM	
Diesel Range Organics (DRO)	ND	mg/Kg	10								
Motor Oil Range Organics (MRO)	ND	mg/Kg	50								
Sample ID: LCS-20509		*LCS*				Batch ID:	**20509**	Analysis Date:		11/5/2009 12:41:01 AM	
Diesel Range Organics (DRO)	51.30	mg/Kg	10	50	0	103	64.6	116			
Method: EPA Method 8015B: Gasoline Range											
Sample ID: MB-20512		*MBLK*				Batch ID:	**20512**	Analysis Date:		11/4/2009 4:53:57 AM	
Gasoline Range Organics (GRO)	ND	mg/Kg	5.0								
Sample ID: LCS-20512		*LCS*				Batch ID:	**20512**	Analysis Date:		11/4/2009 4:25:14 AM	
Gasoline Range Organics (GRO)	26.70	mg/Kg	5.0	25	0	107	64.4	133			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

QA/QC SUMMARY REPORT

Client: Respec
Project: Pogo State/Ramapo **Work Order:** 0911039

Analyte	Result	Units	PQL	SPK Va	SPK ref	%Rec	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Method: EPA Method 300.0: Anions											
Sample ID: MB-20560		*MBLK*				Batch ID:	**20560**	Analysis Date:		11/9/2009 9:31:18 AM	
Chloride	ND	mg/Kg	0.30								
Sample ID: LCS-20560		*LCS*				Batch ID:	**20560**	Analysis Date:		11/9/2009 9:48:43 AM	
Chloride	14.38	mg/Kg	0.30	15	0	95.9	90	110			
Method: EPA Method 8015B: Diesel Range Organics											
Sample ID: MB-20509		*MBLK*				Batch ID:	**20509**	Analysis Date:		11/5/2009 12:05:52 AM	
Diesel Range Organics (DRO)	ND	mg/Kg	10								
Motor Oil Range Organics (MRO)	ND	mg/Kg	50								
Sample ID: LCS-20509		*LCS*				Batch ID:	**20509**	Analysis Date:		11/5/2009 12:41:01 AM	
Diesel Range Organics (DRO)	51.30	mg/Kg	10	50	0	103	64.6	116			
Method: EPA Method 8015B: Gasoline Range											
Sample ID: MB-20512		*MBLK*				Batch ID:	**20512**	Analysis Date:		11/4/2009 4:53:57 AM	
Gasoline Range Organics (GRO)	ND	mg/Kg	5.0								
Sample ID: LCS-20512		*LCS*				Batch ID:	**20512**	Analysis Date:		11/4/2009 4:25:14 AM	
Gasoline Range Organics (GRO)	26.70	mg/Kg	5.0	25	0	107	64.4	133			

Qualifiers:

E	Estimated value	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit
R	RPD outside accepted recovery limits	S	Spike recovery outside accepted recovery limits

Hall Environmental Analysis Laboratory, Inc.

Sample Receipt Checklist

Client Name **RESPEC** Date Received: **11/2/2009**

Work Order Number **0911039** Received by: **TLS**

Checklist completed by: _____ 11/2/09 Sample ID labels checked by: _____
Signature Date Initials

Matrix: *Carrier name:* *Client drop-off*

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☐	Not Shipped ☑
Custody seals intact on sample bottles?	Yes ☑	No ☐	N/A ☐	
Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Samples in proper container/bottle?	Yes ☑	No ☐		
Sample containers intact?	Yes ☑	No ☐		
Sufficient sample volume for indicated test?	Yes ☑	No ☐		
All samples received within holding time?	Yes ☑	No ☐		Number of preserved bottles checked for pH:
Water - VOA vials have zero headspace? No VOA vials submitted ☑		Yes ☐	No ☐	
Water - Preservation labels on bottle and cap match?	Yes ☐	No ☐	N/A ☑	
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑	*<2 >12 unless noted below.*
Container/Temp Blank temperature?	**11.3°**	*<6° C Acceptable* If given sufficient time to cool.		

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: _____

_____

_____

_____

_____

Corrective Action _____

_____

_____

Chain-of-Custody Record

Client: ~~[redacted]~~ RESPEC

Mailing Address: 5971 Jefferson NE Suite 101
Albuquerque NM 87109

Phone #: 505-268-2661

email or Fax#: charles.bark@respec.com

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)
☐ Other _____
☐ EDD (Type) _____

Turn-Around Time:
☒ Standard ☐ Rush _____

Project Name: Pogo Stem / Rampo

Project #:

Project Manager: Dave Hensl

Sampler: Charles Bark (CB)

On Ice: ☒ Yes ☐ No

Sample Temperature: 4°C

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 0910625	Analysis Request: BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH Method 8015B (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	8310 (PNA or PAH)	RCRA 8 Metals	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	80 15 NO, C_2	300 chloride			Air Bubbles (Y or N)
10-20-09	9:14am	Soil	Tank Battery 6 Ft	4 oz 1	None	1												X	X			
	4:50pm		Heat Tran 3 Ft	4 oz 1		2												X	X			

Date:	Time:	Relinquished by:	Received by:	Date	Time
11-2-09	5:32pm				
Date:	Time:	Relinquished by:	Received by:	11/2/09	1505

Remarks:

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.

Ramapo Chloride Test Results								
Trench location	Depth	Cl- ppm	High/Low (test strip)		Date collected	Time collected	Date tested	Time tested
Test Pit 1 south	surface	18,576	High= 8.0		10/20/2009	17:16	10/22/2009	11:12
Test Pit 1 south	2'	7,320	High= 6.0		10/20/2009	17:18	10/22/2009	11:14
Test Pit 2 middle	surface	>26,000	High>8.6	Over range	10/20/2009	17:19	10/26/2009	14:14
Test Pit 2 middle	2'	1,924	Low= 6.6		10/20/2009	17:20	10/26/2009	14:15
Test Pit 3 north	surface	2,212	Low= 7.0		10/20/2009	17:25	10/26/2009	14:55
Test Pit 3 north	2'	1,008	Low= 4.8		10/20/2009	17:24	10/26/2009	14:55
Test Pit 4	surface	8,680	High=6.4		8/26/2009	14:30	10/11/2009	9:20
Test Pit 4	2'	5,697	High= 5.5		10/21/2009	17:09	10/23/2009	10:00