

REN # 5277

DOCUMENT
#2221975

Page 1

FORM
4
Rev 1205

State of Colorado

Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 Phone: (303)861-2100 Fax: (303)861-2109



SUNDRY NOTICE

Submit original plus one copy. This form is to be used for general, technical and environmental sundry information. For proposed or completed operations, describe in full on Technical Information Page (Page 2 of this form). Identify well or other facility by API Number or by OGCC Facility ID. Operator shall send an informational copy of all sundry notices for wells located in High Density Areas to the Local Government Designee (Rule 603b).

RECEIVED
12/12/2011

1. OGCC Operator Number: 10255	4. Contact Name: Todd Hutson - Environmental Manager	Complete the Attachment Checklist OP OGCC
2. Name of Operator: Quicksilver Resources Inc.	Phone: 817-422-2883	
3. Address: 801 Cherry Street, Suite 3700, Unit 19 City: Fort Worth State: TX Zip: 76102	Fax: 817-665-4191	
5. API Number: 05-081-07455-00	OGCC Facility ID Number: 313413 (LOCATION)	Survey Plat
6. Well/Facility Name: Moffat County	7. Well/Facility Number: 01-08	Directional Survey
8. Location (Qtr/Sec, Twp, Rng, Meridian): SW/4 SE/4 Section 8, T9N, R94W, 6th Meridian		Surface Equip Diagram
9. County: Moffat	10. Field Name: Wildcat	Technical Info Page
11. Federal, Indian or State Lease Number: NA		Other Lab Results

General Notice

NO PIT ID NUMBER

☐ CHANGE OF LOCATION: Attach New Survey Plat (a change of surface qtr/qr is substantive and requires a new permit)

Change of Surface Footage from Exterior Section Lines: ☐ FNL/FSL ☐ FEL/FWL

Change of Surface Footage to Exterior Section Lines: ☐ ☐ ☐ ☐

Change of Bottomhole Footage from Exterior Section Lines: ☐ ☐ ☐ ☐

Change of Bottomhole Footage to Exterior Section Lines: ☐ ☐ ☐ ☐ attach directional survey

Bottomhole location Qtr/Sec, Twp, Rng, Mer: _____

Latitude: _____ Distance to nearest property line: _____ Distance to nearest bldg, public rd, utility or RR: _____

Longitude: _____ Distance to nearest lease line: _____ Is location in a High Density Area (rule 603b)? Yes/No: _____

Ground Elevation: _____ Distance to nearest well same formation: _____ Surface owner consultation date: _____

GPS DATA:
Date of Measurement: _____ PDOP Reading: _____ Instrument Operator's Name: _____

☐ CHANGE SPACING UNIT
Formation: _____ Formation Code: _____ Spacing order number: _____ Unit Acreage: _____ Unit configuration: _____

☐ Remove from surface bond
Signed surface use agreement attached: _____

☐ CHANGE OF OPERATOR (prior to drilling):
Effective Date: _____
Plugging Bond: ☐ Blanket ☐ Individual

☐ CHANGE WELL NAME
From: _____ NUMBER: _____
To: _____
Effective Date: _____

☐ ABANDONED LOCATION:
Was location ever built? ☐ Yes ☐ No
Is site ready for inspection? ☐ Yes ☐ No
Date Ready for inspection: _____

☐ NOTICE OF CONTINUED SHUT IN STATUS
Date well shut in or temporarily abandoned: _____
Has Production Equipment been removed from site? ☐ Yes ☐ No
MIT required if shut in longer than two years. Date of last MIT: _____

☐ SPUD DATE: _____ ☐ REQUEST FOR CONFIDENTIAL STATUS (6 mos from date casing set)

☐ SUBSEQUENT REPORT OF STAGE, SQUEEZE OR REMEDIAL CEMENT WORK
Method used: _____ Cementing tool setting/depth: _____ Cement volume: _____ Cement top: _____ Cement bottom: _____ Date: _____
*submit cbl and cement job summaries

☐ RECLAMATION: Attach technical page describing final reclamation procedures per Rule 1004.
Final reclamation will commence on approximately: _____ ☐ Final reclamation is completed and site is ready for inspection.

(Reserve Pit) ✓

Technical Engineering/Environmental Notice

☐ Notice of Intent
Approximate Start Date: _____

☐ Report of Work Done
Date Work Completed: _____

Details of work must be described in full on Technical Information Page (Page 2 must be submitted.)

<input type="checkbox"/> Intent to Recombine (submit form 2)	<input type="checkbox"/> Request to Vent or Flare	<input checked="" type="checkbox"/> E&P Waste Disposal
<input type="checkbox"/> Change Drilling Plans	<input type="checkbox"/> Repair Well	<input type="checkbox"/> Beneficial Reuse of E&P Waste
<input type="checkbox"/> Gross Interval Changed?	<input type="checkbox"/> Rule 502 variance requested	<input type="checkbox"/> Status Update/Change of Remediation Plans
<input type="checkbox"/> Casing/Cementing Program Change	<input checked="" type="checkbox"/> Other: Background	for Spills and Releases

I hereby certify that the statements made in this form are to the best of my knowledge, true, correct and complete.

Signed: Todd Hutson Date: 12/12/11 Email: thutson@qrrc.com
Print Name: Todd Hutson Title: Environmental Manager

COGCC Approved: Chris Canfield
CONDITIONS OF APPROVAL, IF ANY:

Title: FOR Date: 02/01/2012
Chris Canfield
EPS NW Region



TECHNICAL INFORMATION PAGE



FOR OGCC USE ONLY

- | | |
|--|-----------------------------|
| 1. OGCC Operator Number: 10255 | API Number: 05-081-07455-00 |
| 2. Name of Operator: Quicksilver Resources Inc. | OGCC Facility ID # 313413 |
| 3. Well/Facility Name: Moffat County | Well/Facility Number: 01-08 |
| 4. Location (QtrQtr, Sec, Twp, Rng, Meridian): SW/4 SE/4, Section 8, T9N, R94W, 6th Meridian | |

This form is to be completed whenever a Sundry Notice is submitted requiring detailed report of work to be performed or completed. This form shall be transmitted within 30 days of work completed as a "subsequent" report and must accompany Form 4, page 1.

5. **DESCRIBE PROPOSED OR COMPLETED OPERATIONS**

This COGCC Form 4 is being submitted as a request to meet the background concentration levels for arsenic at the Moffat 1-8 pad in accordance with footnote 1 to the COGCC table 910-1.

The request is based on the analytical results presented below (see attached laboratory report).

The reserve pit only supported drilling activities and, as such, the drilling mud was a bentonitic, water-based drilling mud. The pit was excavated based on COGCC REM # 5277 and the waste taken to an approved landfill. Thirteen samples were collected from separate locations within the pit to determine the arsenic concentration within the pit. Nine of these samples were reported to be below detection limits for arsenic. Four samples collected were shown to have arsenic concentrations of 2.2 ppm, 2.1 ppm, 2.4 ppm, and 1.9 ppm.

Five grab samples were collected from nearby non-impacted, native soil to establish a background arsenic concentration. These five samples showed arsenic concentrations of 1.14 ppm, 2.2 ppm, 2.4 ppm, 1.8 ppm, 3.1 ppm, and 1.3 ppm.

Quicksilver would also like request to use a shortened list of target analytes based on site specific conditions. Quicksilver requests to close the pit based on TPH values pursuant to Table 910-1 levels (i.e. 500 ppm), based on the above points. All TPH values presented are well below Table 910-1 criteria.

Quicksilver is requesting this approval in order to proceed with closure and reclamation of the cuttings pit located at the Moffat 1-8 pad.

Table 1
Quicksilver Resources Inc. Moffat 1-8 Pit
Soil Sample Summary

SAMPLE SUMMARY	
Location Description	Moffat 1-8
Sample Type	Soil

LABORATORY DATA SUMMARY																							
Sample ID	M-1	M-2	M-3	M-4	M-5	M-6	M-7	M-8	M-9	M-10	M-11	M-12	M-13	BO-1	BO-1	BO-2	BO-3	BO-4	BO-5				
Sample Date	11/21/2011	11/21/2011	11/21/2011	11/21/2011	11/21/2011	11/21/2011	11/21/2011	11/21/2011	11/21/2011	11/21/2011	11/21/2011	11/21/2011	11/21/2011	3/4/2010	6/10/2011	6/10/2011	6/10/2011	6/10/2011	6/10/2011	6/10/2011			
Depth	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	0-6"	9-12"	6-9"	6-9"	12-15"	6-9"			
Analytical Parameters																							
TPH																							
TPH Low Fraction	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NA	mg/kg	
TPH High Fraction	170	140	4.1	BDL	6.6	170	110	BDL	4.2	7.4	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NA	mg/kg	
Total TPH	170	140	4.1	BDL	6.6	170	110	BDL	4.2	7.4	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	0.50	mg/kg	
BTEX																							
Benzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	0.17	mg/kg
Toluene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	85	mg/kg
Ethylbenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	100	mg/kg
Total Xylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	175	mg/kg
Metals																							
Chloride	190	600	220	600	390	300	720	340	170	670	140	210	930	NT	NT	NT	NT	NT	NT	NT	NA	mg/kg	
Sulfate	240	300	110	140	190	250	270	62	92	190	63	160	63	NT	NT	NT	NT	NT	NT	NT	NT	NA	mg/kg
Chromium, Hexavalent	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	23	mg/kg
Chromium, Trivalent	19	16	21	22	19	24	18	21	20	23	20	22	20	NT	NT	NT	NT	NT	NT	NT	NT	120,000	mg/kg
Mercury	0.037	BDL	BDL	BDL	BDL	BDL	BDL	0.047	0.033	0.064	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	NT	23	mg/kg
Arsenic	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	0.17	mg/kg
Barium	6000	5000	690	190	830	5100	5000	620	920	1900	160	190	190	2.4	1.9	2.4	2.2	2.4	1.8	3.1	1.3	0.39	mg/kg
Cadmium	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	15,000	mg/kg
Chromium	19	16	21	22	19	24	18	21	20	23	20	22	20	NT	NT	NT	NT	NT	NT	NT	NT	NA	mg/kg
Copper	24	17	23	20	16	26	16	15	16	25	14	16	27	NT	NT	NT	NT	NT	NT	NT	NT	3,100	mg/kg
Lead	9.5	8.8	6.7	9.5	7.2	7.5	7.4	12	11	18	11	15	11	NT	NT	NT	NT	NT	NT	NT	NT	400	mg/kg
Nickel	10	7.3	17	12	13	13	8.8	14	14	17	13	13	9.6	NT	NT	NT	NT	NT	NT	NT	NT	1,600	mg/kg
Selenium	2.4	2.2	4.3	4.1	4.9	2.2	4.0	2.9	3.4	2.2	2.5	3.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	390	mg/kg
Silver	0.60	0.67	0.59	0.63	0.68	0.88	0.53	0.68	0.56	BDL	BDL	BDL	0.51	NT	NT	NT	NT	NT	NT	NT	NT	390	mg/kg
Zinc	64	54	99	53	52	68	49	60	49	82	58	52	47	NT	NT	NT	NT	NT	NT	NT	NT	23,000	mg/kg
Polynuclear Aromatic Hydrocarbons																							
Anthracene	0.067	0.034	BDL	BDL	BDL	BDL	0.020	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	1,000	mg/kg
Acenaphthene	0.036	0.017	BDL	BDL	BDL	BDL	0.024	0.010	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	1,000	mg/kg
Acenaphthylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	NA	mg/kg
Benzo(a)anthracene	0.38	0.25	BDL	BDL	0.018	0.58	0.10	BDL	0.0074	0.022	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	0.22	mg/kg
Benzo(a)pyrene	0.20	0.13	BDL	BDL	0.010	0.33	0.054	BDL	0.0091	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	0.022	mg/kg
Benzo(b)fluoranthene	0.71	0.57	BDL	BDL	0.035	1.4	0.20	BDL	0.0098	0.031	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	0.22	mg/kg
Benzo(k)fluoranthene	BDL	0.039	BDL	BDL	0.0060	BDL	0.031	BDL	0.0079	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	NA	mg/kg
Benzo(b)fluoranthene	0.14	0.12	BDL	BDL	0.0066	0.25	0.031	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	2.2	mg/kg
Chrysene	0.42	0.25	BDL	BDL	0.020	0.62	0.12	BDL	0.0072	0.018	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	2.2	mg/kg
Dibenz(a,h)anthracene	BDL	0.008	BDL	BDL	BDL	BDL	0.005	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	0.022	mg/kg
Fluoranthene	0.60	0.40	BDL	BDL	0.024	0.80	0.18	0.0066	0.011	0.037	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	1,000	mg/kg
Fluorene	0.061	0.026	BDL	BDL	BDL	0.033	0.015	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	1,000	mg/kg
Indeno(1,2,3-cd)pyrene	BDL	0.040	BDL	BDL	0.0069	BDL	0.029	BDL	BDL	0.0070	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	0.22	mg/kg
Naphthalene	0.24	0.043	BDL	BDL	BDL	0.098	0.031	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	23	mg/kg
Phenanthrene	0.46	0.24	BDL	BDL	0.012	0.39	0.13	BDL	0.0066	0.030	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	NA	mg/kg
Pyrene	0.31	0.18	BDL	BDL	0.011	0.39	0.074	BDL	BDL	0.015	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	1,000	mg/kg
1-Methylnaphthalene	0.36	0.075	BDL	BDL	BDL	0.089	0.054	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	NA	mg/kg
2-Methylnaphthalene	0.60	0.094	BDL	BDL	BDL	0.16	0.084	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	NA	mg/kg
2-Chloronaphthalene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NT	NT	NT	NT	NT	NT	NT	NA	mg/kg
General Chemistry																							
pH	8.0	8.0	8.2	7.2	8.4	7.9	8.7	7.9	9.5	8.0	8.0	7.7	8.6	NT	NT	NT	NT	NT	NT	NT	NT	6-9	su
Sodium Adsorption Ratio	4.0	6.4	6.7	4.8	10	4.0	6.9	1.8	11	6.4	2.0	2.9	18	1.68	NT	NT	NT	NT	NT	NT	NT	<12	mmhos/cm
Specific Conductance	0.800	1.800	0.980	1.700	1.100	0.870	1.500	0.970	0.520	1.900	0.310	0.540	2.900	NT	NT	NT	NT	NT	NT	NT	NT	<4	mmhos/cm

mg/kg = milligrams per kilogram
BDL = parameter was below the detection limit
mmhos/cm = milliequivalents per centimeter
su = standard units



12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

Report Summary

Tuesday November 29, 2011

Report Number: L548284

Samples Received: 11/23/11

Client Project: 011-2510

Description: MoFrat 1-8 Pit Sampling

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Daphne Richards , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT - PH-0197, FL - E87487
GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704, ND - R-140
NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032008A,
TX - T104704245, OK-9915, PA - 68-02979

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

This report may not be reproduced, except in full, without written approval from ESC Lab Sciences. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-1

Collected By : J. Sutrina
Collection Date : 11/21/11 11:00

ESC Sample # : L548284-01

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chloride	190	10.	mg/kg	9056	11/25/11	1
Sulfate	240	50.	mg/kg	9056	11/25/11	1
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	11/28/11	1
Chromium, Trivalent	19.	2.0	mg/kg	Calc.	11/25/11	1
pH	8.0		su	9045D	11/26/11	1
Sodium Adsorption Ratio	4.0			Calc.	11/26/11	1
Specific Conductance	800		umhos/cm	9050AMod	11/23/11	1
Mercury	BDL	0.020	mg/kg	7471	11/23/11	1
Arsenic	BDL	1.0	mg/kg	6010B	11/25/11	1
Barium	6000	1.2	mg/kg	6010B	11/25/11	5
Cadmium	BDL	0.25	mg/kg	6010B	11/25/11	1
Chromium	19.	0.50	mg/kg	6010B	11/25/11	1
Copper	24.	1.0	mg/kg	6010B	11/25/11	1
Lead	9.5	0.25	mg/kg	6010B	11/25/11	1
Nickel	10.	1.0	mg/kg	6010B	11/25/11	1
Selenium	2.4	1.0	mg/kg	6010B	11/25/11	1
Silver	0.60	0.50	mg/kg	6010B	11/25/11	1
Zinc	64.	1.5	mg/kg	6010B	11/25/11	1
Benzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Toluene	BDL	0.025	mg/kg	8021/8015	11/24/11	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Total Xylene	BDL	0.0075	mg/kg	8021/8015	11/24/11	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	11/24/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	94.8		% Rec.	8021/8015	11/24/11	5
a,a,a-Trifluorotoluene(PID)	95.0		% Rec.	8021/8015	11/24/11	5
TPH (GC/FID) High Fraction	170	4.0	mg/kg	3546/DRO	11/24/11	1
Surrogate recovery(%)						
o-Terphenyl	70.9		% Rec.	3546/DRO	11/24/11	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	0.067	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthene	0.036	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(a)anthracene	0.38	0.12	mg/kg	8270C-SIM	11/25/11	20

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L548284-01 (PH) - 8.03@18.5c

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-1

Collected By : J. Sutrina
Collection Date : 11/21/11 11:00

ESC Sample # : L548284-01

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	0.20	0.12	mg/kg	8270C-SIM	11/25/11	20
Benzo(b)fluoranthene	0.71	0.12	mg/kg	8270C-SIM	11/25/11	20
Benzo(g,h,i)perylene	BDL	0.12	mg/kg	8270C-SIM	11/25/11	20
Benzo(k)fluoranthene	0.14	0.12	mg/kg	8270C-SIM	11/25/11	20
Chrysene	0.42	0.12	mg/kg	8270C-SIM	11/25/11	20
Dibenz(a,h)anthracene	BDL	0.12	mg/kg	8270C-SIM	11/25/11	20
Fluoranthene	0.60	0.12	mg/kg	8270C-SIM	11/25/11	20
Fluorene	0.061	0.0060	mg/kg	8270C-SIM	11/24/11	1
Indeno(1,2,3-cd)pyrene	BDL	0.12	mg/kg	8270C-SIM	11/25/11	20
Naphthalene	0.24	0.12	mg/kg	8270C-SIM	11/25/11	20
Phenanthrene	0.48	0.12	mg/kg	8270C-SIM	11/25/11	20
Pyrene	0.31	0.0060	mg/kg	8270C-SIM	11/24/11	1
1-Methylnaphthalene	0.36	0.12	mg/kg	8270C-SIM	11/25/11	20
2-Methylnaphthalene	0.60	0.12	mg/kg	8270C-SIM	11/25/11	20
2-Chloronaphthalene	BDL	0.12	mg/kg	8270C-SIM	11/25/11	20
Surrogate Recovery						
Nitrobenzene-d5	0.00		% Rec.	8270C-SIM	11/25/11	20
2-Fluorobiphenyl	106.		% Rec.	8270C-SIM	11/24/11	1
p-Terphenyl-d14	96.6		% Rec.	8270C-SIM	11/24/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

This report shall not be reproduced, except in full, without the written approval from ESC.

Reported: 11/29/11 14:37 Printed: 11/29/11 14:38
L548284-01 (PH) - 8.03@18.5c

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-2

Collected By : J. Sutrina
Collection Date : 11/21/11 11:05

ESC Sample # : L548284-02

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chloride	600	10.	mg/kg	9056	11/25/11	1
Sulfate	300	50.	mg/kg	9056	11/25/11	1
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	11/28/11	1
Chromium, Trivalent	16.	2.0	mg/kg	Calc.	11/25/11	1
pH	8.0		su	9045D	11/26/11	1
Sodium Adsorption Ratio	6.4			Calc.	11/26/11	1
Specific Conductance	1800		umhos/cm	9050AMod	11/23/11	1
Mercury	0.037	0.020	mg/kg	7471	11/23/11	1
Arsenic	BDL	1.0	mg/kg	6010B	11/25/11	1
Barium	5900	1.2	mg/kg	6010B	11/25/11	5
Cadmium	BDL	0.25	mg/kg	6010B	11/25/11	1
Chromium	16.	0.50	mg/kg	6010B	11/25/11	1
Copper	17.	1.0	mg/kg	6010B	11/25/11	1
Lead	8.8	0.25	mg/kg	6010B	11/25/11	1
Nickel	7.3	1.0	mg/kg	6010B	11/25/11	1
Selenium	2.2	1.0	mg/kg	6010B	11/25/11	1
Silver	0.87	0.50	mg/kg	6010B	11/25/11	1
Zinc	54.	1.5	mg/kg	6010B	11/25/11	1
Benzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Toluene	BDL	0.025	mg/kg	8021/8015	11/24/11	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Total Xylene	BDL	0.0075	mg/kg	8021/8015	11/24/11	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	11/24/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	95.0		% Rec.	8021/8015	11/24/11	5
a,a,a-Trifluorotoluene(PID)	94.5		% Rec.	8021/8015	11/24/11	5
TPH (GC/FID) High Fraction	140	4.0	mg/kg	3546/DRO	11/24/11	1
Surrogate recovery(%)						
o-Terphenyl	72.1		% Rec.	3546/DRO	11/24/11	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	0.034	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthene	0.017	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(a)anthracene	0.25	0.0060	mg/kg	8270C-SIM	11/24/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

L548284-02 (PH) - 7.97@17.8c

L548284-02 (CR6) - Sample is a reducer. pH of 8s.u. and ORP value of 83.



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Est. 1970

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-2

Collected By : J. Sutrina
Collection Date : 11/21/11 11:05

ESC Sample # : L548284-02

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	0.13	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(b)fluoranthene	0.57	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(g,h,i)perylene	0.039	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(k)fluoranthene	0.12	0.0060	mg/kg	8270C-SIM	11/24/11	1
Chrysene	0.25	0.0060	mg/kg	8270C-SIM	11/24/11	1
Dibenz(a,h)anthracene	0.028	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluoranthene	0.40	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluorene	0.026	0.0060	mg/kg	8270C-SIM	11/24/11	1
Indeno(1,2,3-cd)pyrene	0.040	0.0060	mg/kg	8270C-SIM	11/24/11	1
Naphthalene	0.043	0.0060	mg/kg	8270C-SIM	11/24/11	1
Phenanthrene	0.24	0.0060	mg/kg	8270C-SIM	11/24/11	1
Pyrene	0.18	0.0060	mg/kg	8270C-SIM	11/24/11	1
1-Methylnaphthalene	0.075	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Methylnaphthalene	0.094	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Chloronaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Surrogate Recovery						
Nitrobenzene-d5	167.		% Rec.	8270C-SIM	11/24/11	1
2-Fluorobiphenyl	86.6		% Rec.	8270C-SIM	11/24/11	1
p-Terphenyl-d14	87.0		% Rec.	8270C-SIM	11/24/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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L548284-02 (PH) - 7.97@17.8c

L548284-02 (CR6) - Sample is a reducer. pH of 8s.u. and ORP value of 83.

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-3

Collected By : J. Sutrina
Collection Date : 11/21/11 11:10

ESC Sample # : L548284-03

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chloride	220	10.	mg/kg	9056	11/25/11	1
Sulfate	110	50.	mg/kg	9056	11/25/11	1
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	11/28/11	1
Chromium, Trivalent	21.	2.0	mg/kg	Calc.	11/25/11	1
pH	8.2		su	9045D	11/26/11	1
Sodium Adsorption Ratio	6.7			Calc.	11/26/11	1
Specific Conductance	590		umhos/cm	9050AMod	11/23/11	1
Mercury	BDL	0.020	mg/kg	7471	11/23/11	1
Arsenic	BDL	1.0	mg/kg	6010B	11/25/11	1
Barium	690	0.25	mg/kg	6010B	11/25/11	1
Cadmium	BDL	1.2	mg/kg	6010B	11/25/11	5
Chromium	21.	0.50	mg/kg	6010B	11/25/11	1
Copper	23.	1.0	mg/kg	6010B	11/25/11	1
Lead	6.7	0.25	mg/kg	6010B	11/25/11	1
Nickel	17.	1.0	mg/kg	6010B	11/25/11	1
Selenium	4.3	1.0	mg/kg	6010B	11/25/11	1
Silver	0.59	0.50	mg/kg	6010B	11/25/11	1
Zinc	59.	1.5	mg/kg	6010B	11/25/11	1
Benzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Toluene	BDL	0.025	mg/kg	8021/8015	11/24/11	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Total Xylene	BDL	0.0075	mg/kg	8021/8015	11/24/11	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	11/24/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	95.3		% Rec.	8021/8015	11/24/11	5
a,a,a-Trifluorotoluene(PID)	96.0		% Rec.	8021/8015	11/24/11	5
TPH (GC/FID) High Fraction	4.1	4.0	mg/kg	3546/DRO	11/24/11	1
Surrogate recovery(%)						
o-Terphenyl	69.6		% Rec.	3546/DRO	11/24/11	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(a)anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L548284-03 (PH) - 8.23@18.1c

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-3

Collected By : J. Sutrina
Collection Date : 11/21/11 11:10

ESC Sample # : L548284-03

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(b)fluoranthene	0.0092	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(g,h,i)perylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Chrysene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluorene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Indeno(1,2,3-cd)pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Naphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Phenanthrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
1-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Chloronaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Surrogate Recovery						
Nitrobenzene-d5	82.0		% Rec.	8270C-SIM	11/24/11	1
2-Fluorobiphenyl	85.2		% Rec.	8270C-SIM	11/24/11	1
p-Terphenyl-d14	83.5		% Rec.	8270C-SIM	11/24/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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L548284-03 (PH) - 8.23@18.1c

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-4

Collected By : J. Sutrina
Collection Date : 11/21/11 11:15

ESC Sample # : L548284-04

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chloride	600	10.	mg/kg	9056	11/25/11	1
Sulfate	140	50.	mg/kg	9056	11/25/11	1
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	11/28/11	1
Chromium, Trivalent	22.	2.0	mg/kg	Calc.	11/25/11	1
pH	7.2		su	9045D	11/26/11	1
Sodium Adsorption Ratio	4.8			Calc.	11/26/11	1
Specific Conductance	1700		umhos/cm	9050AMod	11/23/11	1
Mercury	BDL	0.020	mg/kg	7471	11/23/11	1
Arsenic	BDL	5.0	mg/kg	6010B	11/25/11	5
Barium	190	0.25	mg/kg	6010B	11/25/11	1
Cadmium	BDL	1.2	mg/kg	6010B	11/25/11	5
Chromium	22.	0.50	mg/kg	6010B	11/25/11	1
Copper	20.	1.0	mg/kg	6010B	11/25/11	1
Lead	9.5	0.25	mg/kg	6010B	11/25/11	1
Nickel	12.	1.0	mg/kg	6010B	11/25/11	1
Selenium	4.3	1.0	mg/kg	6010B	11/25/11	1
Silver	0.83	0.50	mg/kg	6010B	11/25/11	1
Zinc	53.	1.5	mg/kg	6010B	11/25/11	1
Benzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Toluene	BDL	0.025	mg/kg	8021/8015	11/24/11	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Total Xylene	BDL	0.0075	mg/kg	8021/8015	11/24/11	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	11/24/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	94.6		% Rec.	8021/8015	11/24/11	5
a,a,a-Trifluorotoluene(PID)	95.1		% Rec.	8021/8015	11/24/11	5
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	3546/DRO	11/24/11	1
Surrogate recovery(%)						
o-Terphenyl	67.1		% Rec.	3546/DRO	11/24/11	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(a)anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L548284-04 (PH) - 7.24@18.6c



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REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
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Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-4

Collected By : J. Sutrina
Collection Date : 11/21/11 11:15

ESC Sample # : L548284-04

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(b)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(g,h,i)perylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Chrysene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluorene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Indeno(1,2,3-cd)pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Naphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Phenanthrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
1-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Chloronaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Surrogate Recovery						
Nitrobenzene-d5	74.6		% Rec.	8270C-SIM	11/24/11	1
2-Fluorobiphenyl	71.9		% Rec.	8270C-SIM	11/24/11	1
p-Terphenyl-d14	84.4		% Rec.	8270C-SIM	11/24/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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L548284-04 (PH) - 7.24@18.6c

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-5

Collected By : J. Sutrina
Collection Date : 11/21/11 11:20

ESC Sample # : L548284-05

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chloride	390	10.	mg/kg	9056	11/25/11	1
Sulfate	180	50.	mg/kg	9056	11/25/11	1
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	11/28/11	1
Chromium, Trivalent	19.	2.0	mg/kg	Calc.	11/25/11	1
pH	8.4		su	9045D	11/26/11	1
Sodium Adsorption Ratio	10.			Calc.	11/26/11	1
Specific Conductance	1100		umhos/cm	9050AMod	11/23/11	1
Mercury	BDL	0.020	mg/kg	7471	11/23/11	1
Arsenic	BDL	5.0	mg/kg	6010B	11/28/11	5
Barium	830	0.25	mg/kg	6010B	11/25/11	1
Cadmium	BDL	1.2	mg/kg	6010B	11/28/11	5
Chromium	19.	0.50	mg/kg	6010B	11/25/11	1
Copper	16.	1.0	mg/kg	6010B	11/25/11	1
Lead	7.2	0.25	mg/kg	6010B	11/25/11	1
Nickel	13.	1.0	mg/kg	6010B	11/25/11	1
Selenium	4.1	1.0	mg/kg	6010B	11/25/11	1
Silver	0.68	0.50	mg/kg	6010B	11/25/11	1
Zinc	52.	1.5	mg/kg	6010B	11/25/11	1
Benzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Toluene	BDL	0.025	mg/kg	8021/8015	11/24/11	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Total Xylene	BDL	0.0075	mg/kg	8021/8015	11/24/11	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	11/24/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	95.1		% Rec.	8021/8015	11/24/11	5
a,a,a-Trifluorotoluene(PID)	95.5		% Rec.	8021/8015	11/24/11	5
TPH (GC/FID) High Fraction	6.6	4.0	mg/kg	3546/DRO	11/24/11	1
Surrogate recovery(%)						
o-Terphenyl	67.7		% Rec.	3546/DRO	11/24/11	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(a)anthracene	0.018	0.0060	mg/kg	8270C-SIM	11/24/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L548284-05 (PH) - 8.45@18.6c



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REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-5

Collected By : J. Sutrina
Collection Date : 11/21/11 11:20

ESC Sample # : L548284-05

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	0.010	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(b)fluoranthene	0.035	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(g,h,i)perylene	0.0080	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(k)fluoranthene	0.0066	0.0060	mg/kg	8270C-SIM	11/24/11	1
Chrysene	0.020	0.0060	mg/kg	8270C-SIM	11/24/11	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluoranthene	0.024	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluorene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Indeno(1,2,3-cd)pyrene	0.0069	0.0060	mg/kg	8270C-SIM	11/24/11	1
Naphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Phenanthrene	0.012	0.0060	mg/kg	8270C-SIM	11/24/11	1
Pyrene	0.011	0.0060	mg/kg	8270C-SIM	11/24/11	1
1-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Chloronaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Surrogate Recovery						
Nitrobenzene-d5	81.2		% Rec.	8270C-SIM	11/24/11	1
2-Fluorobiphenyl	79.2		% Rec.	8270C-SIM	11/24/11	1
p-Terphenyl-d14	82.7		% Rec.	8270C-SIM	11/24/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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Reported: 11/29/11 14:37 Printed: 11/29/11 14:38
L548284-05 (PH) - 8.45@18.6c

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-6

Collected By : J. Sutrina
Collection Date : 11/21/11 11:25

ESC Sample # : L548284-06

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chloride	300	10.	mg/kg	9056	11/25/11	1
Sulfate	250	50.	mg/kg	9056	11/25/11	1
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	11/28/11	1
Chromium, Trivalent	24.	2.0	mg/kg	Calc.	11/25/11	1
pH	7.9		su	9045D	11/26/11	1
Sodium Adsorption Ratio	4.0			Calc.	11/26/11	1
Specific Conductance	870		umhos/cm	9050AMod	11/23/11	1
Mercury	BDL	0.020	mg/kg	7471	11/23/11	1
Arsenic	BDL	5.0	mg/kg	6010B	11/25/11	5
Barium	5100	1.2	mg/kg	6010B	11/25/11	5
Cadmium	BDL	1.2	mg/kg	6010B	11/25/11	5
Chromium	24.	0.50	mg/kg	6010B	11/25/11	1
Copper	26.	1.0	mg/kg	6010B	11/25/11	1
Lead	7.5	0.25	mg/kg	6010B	11/25/11	1
Nickel	13.	1.0	mg/kg	6010B	11/25/11	1
Selenium	4.9	1.0	mg/kg	6010B	11/25/11	1
Silver	0.88	0.50	mg/kg	6010B	11/25/11	1
Zinc	68.	1.5	mg/kg	6010B	11/25/11	1
Benzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Toluene	BDL	0.025	mg/kg	8021/8015	11/24/11	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Total Xylene	BDL	0.0075	mg/kg	8021/8015	11/24/11	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	11/24/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	95.0		% Rec.	8021/8015	11/24/11	5
a,a,a-Trifluorotoluene(PID)	94.4		% Rec.	8021/8015	11/24/11	5
TPH (GC/FID) High Fraction	170	4.0	mg/kg	3546/DRO	11/24/11	1
Surrogate recovery(%)						
o-Terphenyl	76.4		% Rec.	3546/DRO	11/24/11	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.12	mg/kg	8270C-SIM	11/25/11	20
Acenaphthene	0.024	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(a)anthracene	0.58	0.12	mg/kg	8270C-SIM	11/25/11	20

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L548284-06 (PH) - 7.89@18.4c



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REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-6

Collected By : J. Sutrina
Collection Date : 11/21/11 11:25

ESC Sample # : L548284-06

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	0.33	0.12	mg/kg	8270C-SIM	11/25/11	20
Benzo(b)fluoranthene	1.4	0.12	mg/kg	8270C-SIM	11/25/11	20
Benzo(g,h,i)perylene	BDL	0.12	mg/kg	8270C-SIM	11/25/11	20
Benzo(k)fluoranthene	0.25	0.12	mg/kg	8270C-SIM	11/25/11	20
Chrysene	0.62	0.12	mg/kg	8270C-SIM	11/25/11	20
Dibenz(a,h)anthracene	BDL	0.12	mg/kg	8270C-SIM	11/25/11	20
Fluoranthene	0.80	0.12	mg/kg	8270C-SIM	11/25/11	20
Fluorene	0.033	0.0060	mg/kg	8270C-SIM	11/24/11	1
Indeno(1,2,3-cd)pyrene	BDL	0.12	mg/kg	8270C-SIM	11/25/11	20
Naphthalene	0.068	0.0060	mg/kg	8270C-SIM	11/24/11	1
Phenanthrene	0.38	0.12	mg/kg	8270C-SIM	11/25/11	20
Pyrene	0.39	0.12	mg/kg	8270C-SIM	11/25/11	20
1-Methylnaphthalene	0.089	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Methylnaphthalene	0.16	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Chloronaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Surrogate Recovery						
Nitrobenzene-d5	151.		% Rec.	8270C-SIM	11/24/11	1
2-Fluorobiphenyl	88.5		% Rec.	8270C-SIM	11/24/11	1
p-Terphenyl-d14	0.00		% Rec.	8270C-SIM	11/25/11	20

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Reported: 11/29/11 14:37 Printed: 11/29/11 14:38
L548284-06 (PH) - 7.89@18.4c

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-7

Collected By : J. Sutrina
Collection Date : 11/21/11 11:30

ESC Sample # : L548284-07

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chloride	720	10.	mg/kg	9056	11/25/11	1
Sulfate	270	50.	mg/kg	9056	11/25/11	1
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	11/28/11	1
Chromium, Trivalent	18.	2.0	mg/kg	Calc.	11/25/11	1
pH	8.7		su	9045D	11/26/11	1
Sodium Adsorption Ratio	6.9			Calc.	11/26/11	1
Specific Conductance	1500		umhos/cm	9050AMod	11/23/11	1
Mercury	BDL	0.020	mg/kg	7471	11/23/11	1
Arsenic	BDL	1.0	mg/kg	6010B	11/25/11	1
Barium	5000	1.2	mg/kg	6010B	11/25/11	5
Cadmium	BDL	0.25	mg/kg	6010B	11/25/11	1
Chromium	18.	0.50	mg/kg	6010B	11/25/11	1
Copper	16.	1.0	mg/kg	6010B	11/25/11	1
Lead	7.4	0.25	mg/kg	6010B	11/25/11	1
Nickel	8.8	1.0	mg/kg	6010B	11/25/11	1
Selenium	2.2	1.0	mg/kg	6010B	11/25/11	1
Silver	0.53	0.50	mg/kg	6010B	11/25/11	1
Zinc	49.	1.5	mg/kg	6010B	11/25/11	1
Benzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Toluene	BDL	0.025	mg/kg	8021/8015	11/24/11	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Total Xylene	BDL	0.0075	mg/kg	8021/8015	11/24/11	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	11/24/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	95.1		% Rec.	8021/8015	11/24/11	5
a,a,a-Trifluorotoluene(PID)	95.0		% Rec.	8021/8015	11/24/11	5
TPH (GC/FID) High Fraction	110	4.0	mg/kg	3546/DRO	11/24/11	1
Surrogate recovery(%)						
o-Terphenyl	69.1		% Rec.	3546/DRO	11/24/11	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	0.020	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthene	0.010	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(a)anthracene	0.10	0.0060	mg/kg	8270C-SIM	11/24/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L548284-07 (PH) - 8.71@18.5c



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REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-7

Collected By : J. Sutrina
Collection Date : 11/21/11 11:30

ESC Sample # : L548284-07

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	0.054	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(b)fluoranthene	0.20	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(g,h,i)perylene	0.031	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(k)fluoranthene	0.031	0.0060	mg/kg	8270C-SIM	11/24/11	1
Chrysene	0.12	0.0060	mg/kg	8270C-SIM	11/24/11	1
Dibenz(a,h)anthracene	0.020	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluoranthene	0.18	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluorene	0.015	0.0060	mg/kg	8270C-SIM	11/24/11	1
Indeno(1,2,3-cd)pyrene	0.029	0.0060	mg/kg	8270C-SIM	11/24/11	1
Naphthalene	0.031	0.0060	mg/kg	8270C-SIM	11/24/11	1
Phenanthrene	0.13	0.0060	mg/kg	8270C-SIM	11/24/11	1
Pyrene	0.074	0.0060	mg/kg	8270C-SIM	11/24/11	1
1-Methylnaphthalene	0.054	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Methylnaphthalene	0.084	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Chloronaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Surrogate Recovery						
Nitrobenzene-d5	122.		% Rec.	8270C-SIM	11/24/11	1
2-Fluorobiphenyl	83.2		% Rec.	8270C-SIM	11/24/11	1
p-Terphenyl-d14	78.3		% Rec.	8270C-SIM	11/24/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Reported: 11/29/11 14:37 Printed: 11/29/11 14:38
L548284-07 (PH) - 8.71@18.5c

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-8

Collected By : J. Sutrina
Collection Date : 11/21/11 11:35

ESC Sample # : L548284-08

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chloride	340	10.	mg/kg	9056	11/25/11	1
Sulfate	62.	50.	mg/kg	9056	11/25/11	1
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	11/28/11	1
Chromium, Trivalent	21.	2.0	mg/kg	Calc.	11/25/11	1
pH	7.9		su	9045D	11/26/11	1
Sodium Adsorption Ratio	1.8			Calc.	11/26/11	1
Specific Conductance	570		umhos/cm	9050AMod	11/23/11	1
Mercury	0.047	0.020	mg/kg	7471	11/23/11	1
Arsenic	BDL	1.0	mg/kg	6010B	11/25/11	1
Barium	820	0.25	mg/kg	6010B	11/25/11	1
Cadmium	BDL	1.2	mg/kg	6010B	11/25/11	5
Chromium	21.	0.50	mg/kg	6010B	11/25/11	1
Copper	15.	1.0	mg/kg	6010B	11/25/11	1
Lead	12.	0.25	mg/kg	6010B	11/25/11	1
Nickel	14.	1.0	mg/kg	6010B	11/25/11	1
Selenium	4.0	1.0	mg/kg	6010B	11/25/11	1
Silver	0.68	0.50	mg/kg	6010B	11/25/11	1
Zinc	60.	1.5	mg/kg	6010B	11/25/11	1
Benzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Toluene	BDL	0.025	mg/kg	8021/8015	11/24/11	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Total Xylene	BDL	0.0075	mg/kg	8021/8015	11/24/11	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	11/24/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	95.2		% Rec.	8021/8015	11/24/11	5
a,a,a-Trifluorotoluene(PID)	95.0		% Rec.	8021/8015	11/24/11	5
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	3546/DRO	11/25/11	1
Surrogate recovery(%)						
o-Terphenyl	66.4		% Rec.	3546/DRO	11/25/11	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(a)anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L548284-08 (PH) - 7.91@20.3c



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REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-8

Collected By : J. Sutrina
Collection Date : 11/21/11 11:35

ESC Sample # : L548284-08

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(b)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(g,h,i)perylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Chrysene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluoranthene	0.0066	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluorene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Indeno(1,2,3-cd)pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Naphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Phenanthrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
1-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Chloronaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Surrogate Recovery						
Nitrobenzene-d5	86.3		% Rec.	8270C-SIM	11/24/11	1
2-Fluorobiphenyl	76.0		% Rec.	8270C-SIM	11/24/11	1
p-Terphenyl-d14	81.7		% Rec.	8270C-SIM	11/24/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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L548284-08 (PH) - 7.91@20.3c

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-9

Collected By : J. Sutrina
Collection Date : 11/21/11 11:40

ESC Sample # : L548284-09

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chloride	170	10.	mg/kg	9056	11/25/11	1
Sulfate	92.	50.	mg/kg	9056	11/25/11	1
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	11/28/11	1
Chromium, Trivalent	20.	2.0	mg/kg	Calc.	11/25/11	1
pH	9.5		su	9045D	11/26/11	1
Sodium Adsorption Ratio	11.			Calc.	11/26/11	1
Specific Conductance	520		umhos/cm	9050AMod	11/23/11	1
Mercury	BDL	0.020	mg/kg	7471	11/23/11	1
Arsenic	BDL	1.0	mg/kg	6010B	11/25/11	1
Barium	920	0.25	mg/kg	6010B	11/25/11	1
Cadmium	BDL	1.2	mg/kg	6010B	11/25/11	5
Chromium	20.	0.50	mg/kg	6010B	11/25/11	1
Copper	16.	1.0	mg/kg	6010B	11/25/11	1
Lead	11.	0.25	mg/kg	6010B	11/25/11	1
Nickel	14.	1.0	mg/kg	6010B	11/25/11	1
Selenium	2.9	1.0	mg/kg	6010B	11/25/11	1
Silver	0.56	0.50	mg/kg	6010B	11/25/11	1
Zinc	49.	1.5	mg/kg	6010B	11/25/11	1
Benzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Toluene	BDL	0.025	mg/kg	8021/8015	11/24/11	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Total Xylene	BDL	0.0075	mg/kg	8021/8015	11/24/11	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	11/24/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	95.2		% Rec.	8021/8015	11/24/11	5
a,a,a-Trifluorotoluene(PID)	95.7		% Rec.	8021/8015	11/24/11	5
TPH (GC/FID) High Fraction	4.2	4.0	mg/kg	3546/DRO	11/24/11	1
Surrogate recovery(%)						
o-Terphenyl	61.6		% Rec.	3546/DRO	11/24/11	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(a)anthracene	0.0074	0.0060	mg/kg	8270C-SIM	11/24/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L548284-09 (PH) - 9.50@21.1c



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Est. 1970

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-9

Collected By : J. Sutrina
Collection Date : 11/21/11 11:40

ESC Sample # : L548284-09

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(b)fluoranthene	0.0098	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(g,h,i)perylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Chrysene	0.0072	0.0060	mg/kg	8270C-SIM	11/24/11	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluoranthene	0.011	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluorene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Indeno(1,2,3-cd)pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Naphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Phenanthrene	0.0086	0.0060	mg/kg	8270C-SIM	11/24/11	1
Pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
1-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Chloronaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Surrogate Recovery						
Nitrobenzene-d5	85.8		% Rec.	8270C-SIM	11/24/11	1
2-Fluorobiphenyl	81.5		% Rec.	8270C-SIM	11/24/11	1
p-Terphenyl-d14	81.6		% Rec.	8270C-SIM	11/24/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Reported: 11/29/11 14:37 Printed: 11/29/11 14:38
L548284-09 (PH) - 9.50@21.1c

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-10

Collected By : J. Sutrina
Collection Date : 11/21/11 11:45

ESC Sample # : L548284-10

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chloride	870	10.	mg/kg	9056	11/25/11	1
Sulfate	160	50.	mg/kg	9056	11/25/11	1
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	11/28/11	1
Chromium, Trivalent	23.	2.0	mg/kg	Calc.	11/26/11	1
pH	8.0		su	9045D	11/26/11	1
Sodium Adsorption Ratio	6.4			Calc.	11/26/11	1
Specific Conductance	1900		umhos/cm	9050AMod	11/23/11	1
Mercury	0.033	0.020	mg/kg	7471	11/23/11	1
Arsenic	2.2	1.0	mg/kg	6010B	11/26/11	1
Barium	1800	0.25	mg/kg	6010B	11/26/11	1
Cadmium	0.38	0.25	mg/kg	6010B	11/26/11	1
Chromium	23.	0.50	mg/kg	6010B	11/26/11	1
Copper	25.	1.0	mg/kg	6010B	11/26/11	1
Lead	18.	0.25	mg/kg	6010B	11/26/11	1
Nickel	17.	1.0	mg/kg	6010B	11/26/11	1
Selenium	3.4	1.0	mg/kg	6010B	11/29/11	1
Silver	BDL	0.50	mg/kg	6010B	11/26/11	1
Zinc	82.	1.5	mg/kg	6010B	11/26/11	1
Benzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Toluene	BDL	0.025	mg/kg	8021/8015	11/24/11	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Total Xylene	BDL	0.0075	mg/kg	8021/8015	11/24/11	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	11/24/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	95.5		% Rec.	8021/8015	11/24/11	5
a,a,a-Trifluorotoluene(PID)	95.8		% Rec.	8021/8015	11/24/11	5
TPH (GC/FID) High Fraction	7.4	4.0	mg/kg	3546/DRO	11/24/11	1
Surrogate recovery(%)						
o-Terphenyl	56.4		% Rec.	3546/DRO	11/24/11	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(a)anthracene	0.022	0.0060	mg/kg	8270C-SIM	11/24/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L548284-10 (PH) - 7.98@21.1c



12065 Lebanon Rd.
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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-10

Collected By : J. Sutrina
Collection Date : 11/21/11 11:45

ESC Sample # : L548284-10

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	0.0091	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(b)fluoranthene	0.031	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(g,h,i)perylene	0.0079	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Chrysene	0.019	0.0060	mg/kg	8270C-SIM	11/24/11	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluoranthene	0.037	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluorene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Indeno(1,2,3-cd)pyrene	0.0070	0.0060	mg/kg	8270C-SIM	11/24/11	1
Naphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Phenanthrene	0.030	0.0060	mg/kg	8270C-SIM	11/24/11	1
Pyrene	0.015	0.0060	mg/kg	8270C-SIM	11/24/11	1
1-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Chloronaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Surrogate Recovery						
Nitrobenzene-d5	79.8		% Rec.	8270C-SIM	11/24/11	1
2-Fluorobiphenyl	78.8		% Rec.	8270C-SIM	11/24/11	1
p-Terphenyl-d14	80.3		% Rec.	8270C-SIM	11/24/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Reported: 11/29/11 14:37 Printed: 11/29/11 14:38
L548284-10 (PH) - 7.98@21.1c

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-11

Collected By : J. Sutrina
Collection Date : 11/21/11 11:50

ESC Sample # : L548284-11

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chloride	140	10.	mg/kg	9056	11/25/11	1
Sulfate	BDL	50.	mg/kg	9056	11/25/11	1
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	11/28/11	1
Chromium, Trivalent	20.	2.0	mg/kg	Calc.	11/26/11	1
pH	8.0		su	9045D	11/26/11	1
Sodium Adsorption Ratio	2.0			Calc.	11/26/11	1
Specific Conductance	310		umhos/cm	9050AMod	11/23/11	1
Mercury	0.054	0.020	mg/kg	7471	11/23/11	1
Arsenic	2.1	1.0	mg/kg	6010B	11/26/11	1
Barium	160	0.25	mg/kg	6010B	11/26/11	1
Cadmium	0.29	0.25	mg/kg	6010B	11/26/11	1
Chromium	20.	0.50	mg/kg	6010B	11/26/11	1
Copper	14.	1.0	mg/kg	6010B	11/26/11	1
Lead	11.	0.25	mg/kg	6010B	11/26/11	1
Nickel	13.	1.0	mg/kg	6010B	11/26/11	1
Selenium	2.2	1.0	mg/kg	6010B	11/29/11	1
Silver	BDL	0.50	mg/kg	6010B	11/26/11	1
Zinc	58.	1.5	mg/kg	6010B	11/26/11	1
Benzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Toluene	BDL	0.025	mg/kg	8021/8015	11/24/11	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Total Xylene	BDL	0.0075	mg/kg	8021/8015	11/24/11	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	11/24/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	95.1		% Rec.	8021/8015	11/24/11	5
a,a,a-Trifluorotoluene(PID)	95.2		% Rec.	8021/8015	11/24/11	5
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	3546/DRO	11/24/11	1
Surrogate recovery(%)						
o-Terphenyl	51.8		% Rec.	3546/DRO	11/24/11	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(a)anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L548284-11 (PH) - 7.95@21.7c

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-11

Collected By : J. Sutrina
Collection Date : 11/21/11 11:50

ESC Sample # : L548284-11

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(b)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(g,h,i)perylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Chrysene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluorene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Indeno(1,2,3-cd)pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Naphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Phenanthrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
1-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Chloronaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Surrogate Recovery						
Nitrobenzene-d5	72.9		% Rec.	8270C-SIM	11/24/11	1
2-Fluorobiphenyl	74.4		% Rec.	8270C-SIM	11/24/11	1
p-Terphenyl-d14	91.9		% Rec.	8270C-SIM	11/24/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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L548284-11 (PH) - 7.95@21.7c

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling
Sample ID : M-12
Collected By : J. Sutrina
Collection Date : 11/21/11 11:55

ESC Sample # : L548284-12

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chloride	210	10.	mg/kg	9056	11/25/11	1
Sulfate	63.	50.	mg/kg	9056	11/25/11	1
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	11/28/11	1
Chromium, Trivalent	22.	2.0	mg/kg	Calc.	11/26/11	1
pH	7.7		su	9045D	11/26/11	1
Sodium Adsorption Ratio	2.9			Calc.	11/26/11	1
Specific Conductance	540		umhos/cm	9050AMod	11/23/11	1
Mercury	BDL	0.020	mg/kg	7471	11/23/11	1
Arsenic	2.4	1.0	mg/kg	6010B	11/26/11	1
Barium	190	0.25	mg/kg	6010B	11/26/11	1
Cadmium	0.36	0.25	mg/kg	6010B	11/26/11	1
Chromium	22.	0.50	mg/kg	6010B	11/26/11	1
Copper	16.	1.0	mg/kg	6010B	11/26/11	1
Lead	15.	0.25	mg/kg	6010B	11/26/11	1
Nickel	13.	1.0	mg/kg	6010B	11/26/11	1
Selenium	2.5	1.0	mg/kg	6010B	11/29/11	1
Silver	BDL	0.50	mg/kg	6010B	11/26/11	1
Zinc	52.	1.5	mg/kg	6010B	11/26/11	1
Benzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Toluene	BDL	0.025	mg/kg	8021/8015	11/24/11	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Total Xylene	BDL	0.0075	mg/kg	8021/8015	11/24/11	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	11/24/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	95.6		% Rec.	8021/8015	11/24/11	5
a,a,a-Trifluorotoluene(PID)	95.1		% Rec.	8021/8015	11/24/11	5
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	3546/DRO	11/24/11	1
Surrogate recovery(%)						
o-Terphenyl	55.5		% Rec.	3546/DRO	11/24/11	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(a)anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L548284-12 (PH) - 7.71@20.6c



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Est. 1970

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-12

Collected By : J. Sutrina
Collection Date : 11/21/11 11:55

ESC Sample # : L548284-12

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(b)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(g,h,i)perylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Chrysene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluorene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Indeno(1,2,3-cd)pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Naphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Phenanthrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
1-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Chloronaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Surrogate Recovery						
Nitrobenzene-d5	87.6		% Rec.	8270C-SIM	11/24/11	1
2-Fluorobiphenyl	79.6		% Rec.	8270C-SIM	11/24/11	1
p-Terphenyl-d14	84.0		% Rec.	8270C-SIM	11/24/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Reported: 11/29/11 14:37 Printed: 11/29/11 14:38
L548284-12 (PH) - 7.71@20.6c

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-13

Collected By : J. Sutrina
Collection Date : 11/21/11 12:00

ESC Sample # : L548284-13

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chloride	930	10.	mg/kg	9056	11/25/11	1
Sulfate	180	50.	mg/kg	9056	11/25/11	1
Chromium, Hexavalent	BDL	2.0	mg/kg	3060A/7196A	11/28/11	1
Chromium, Trivalent	20.	2.0	mg/kg	Calc.	11/26/11	1
pH	8.6		su	9045D	11/26/11	1
Sodium Adsorption Ratio	18.			Calc.	11/26/11	1
Specific Conductance	2500		umhos/cm	9050AMod	11/23/11	1
Mercury	BDL	0.020	mg/kg	7471	11/23/11	1
Arsenic	1.9	1.0	mg/kg	6010B	11/26/11	1
Barium	180	0.25	mg/kg	6010B	11/26/11	1
Cadmium	BDL	0.25	mg/kg	6010B	11/26/11	1
Chromium	20.	0.50	mg/kg	6010B	11/26/11	1
Copper	27.	1.0	mg/kg	6010B	11/26/11	1
Lead	11.	0.25	mg/kg	6010B	11/26/11	1
Nickel	9.6	1.0	mg/kg	6010B	11/26/11	1
Selenium	3.0	1.0	mg/kg	6010B	11/29/11	1
Silver	0.51	0.50	mg/kg	6010B	11/26/11	1
Zinc	47.	1.5	mg/kg	6010B	11/26/11	1
Benzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Toluene	BDL	0.025	mg/kg	8021/8015	11/24/11	5
Ethylbenzene	BDL	0.0025	mg/kg	8021/8015	11/24/11	5
Total Xylene	BDL	0.0075	mg/kg	8021/8015	11/24/11	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	GRO	11/24/11	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	95.2		% Rec.	8021/8015	11/24/11	5
a,a,a-Trifluorotoluene(PID)	95.0		% Rec.	8021/8015	11/24/11	5
TPH (GC/FID) High Fraction	BDL	4.0	mg/kg	3546/DRO	11/24/11	1
Surrogate recovery(%)						
o-Terphenyl	51.8		% Rec.	3546/DRO	11/24/11	1
Polynuclear Aromatic Hydrocarbons						
Anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Acenaphthylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(a)anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
L548284-13 (PH) - 8.64@21.0c



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Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

November 29, 2011

Date Received : November 23, 2011
Description : MoFrat 1-8 Pit Sampling

Sample ID : M-13

Collected By : J. Sutrina
Collection Date : 11/21/11 12:00

ESC Sample # : L548284-13

Site ID :

Project # : 011-2510

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzo(a)pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(b)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(g,h,i)perylene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Benzo(k)fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Chrysene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Dibenz(a,h)anthracene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluoranthene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Fluorene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Indeno(1,2,3-cd)pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Naphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Phenanthrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Pyrene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
1-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Methylnaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
2-Chloronaphthalene	BDL	0.0060	mg/kg	8270C-SIM	11/24/11	1
Surrogate Recovery						
Nitrobenzene-d5	86.6		% Rec.	8270C-SIM	11/24/11	1
2-Fluorobiphenyl	83.0		% Rec.	8270C-SIM	11/24/11	1
p-Terphenyl-d14	74.9		% Rec.	8270C-SIM	11/24/11	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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Reported: 11/29/11 14:37 Printed: 11/29/11 14:38
L548284-13 (PH) - 8.64@21.0c

Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L548284-01	WG567249	SAMP	TPH (GC/FID) Low Fraction	R1944232	J3
	WG567064	SAMP	Nitrobenzene-d5	R1944592	J7
	WG567168	SAMP	pH	R1946632	T8
L548284-02	WG567064	SAMP	Benzo(b)fluoranthene	R1944592	E
	WG567064	SAMP	Fluoranthene	R1944592	E
	WG567064	SAMP	Nitrobenzene-d5	R1944592	J1
	WG567168	SAMP	pH	R1946632	T8
	WG567165	SAMP	Chromium, Hexavalent	R1946876	J6
L548284-03	WG567189	SAMP	Cadmium	R1945213	O
	WG567168	SAMP	pH	R1946632	T8
L548284-04	WG567189	SAMP	Arsenic	R1945213	O
	WG567189	SAMP	Cadmium	R1945213	O
	WG567168	SAMP	pH	R1946632	T8
L548284-05	WG567189	SAMP	Arsenic	R1945213	O
	WG567189	SAMP	Cadmium	R1945213	O
	WG567168	SAMP	pH	R1946632	T8
L548284-06	WG567189	SAMP	Arsenic	R1945213	O
	WG567189	SAMP	Cadmium	R1945213	O
	WG567064	SAMP	Nitrobenzene-d5	R1944592	J1
	WG567064	SAMP	p-Terphenyl-d14	R1944592	J7
	WG567168	SAMP	pH	R1946632	T8
L548284-07	WG567168	SAMP	pH	R1946632	T8
L548284-08	WG567189	SAMP	Cadmium	R1945213	O
	WG567332	SAMP	pH	R1946593	T8
L548284-09	WG567189	SAMP	Barium	R1945213	J3V
	WG567189	SAMP	Cadmium	R1945213	O
	WG567189	SAMP	Silver	R1945213	P1
	WG567332	SAMP	pH	R1946593	T8
L548284-10	WG567332	SAMP	pH	R1946593	T8
L548284-11	WG567332	SAMP	pH	R1946593	T8
L548284-12	WG567332	SAMP	pH	R1946593	T8
L548284-13	WG567332	SAMP	pH	R1946593	T8

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
E	GTL (EPA) - Greater than upper calibration limit: Actual value is known to be greater than the upper calibration range.
J1	Surrogate recovery limits have been exceeded; values are outside upper control limits
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low
J7	Surrogate recovery limits cannot be evaluated; surrogates were diluted out
O	(ESC) Sample diluted due to matrix interferences that impaired the ability to make an accurate analytical determination. The detection limit is elevated in order to reflect the necessary dilution.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
T8	(ESC) - Additional method/sample information: Sample(s) received past/too close to holding time expiration.
V	(ESC) - Additional QC Info: The sample concentration is too high to evaluate accurate spike recoveries.

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods, it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable "unless qualified as 'R' (Rejected)."

Definitions

- Accuracy** - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.
- Precision** - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Difference.
- Surrogate** - Organic compounds that are similar in chemical composition, extraction, and chromatography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.
- TIC** - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

Summary of Remarks For Samples Printed
11/29/11 at 14:38:40

TSR Signing Reports: 288
R4 - Rush: Three Day

Sample: L548284-01 Account: CORCOMGCO Received: 11/23/11 09:00 Due Date: 11/29/11 00:00 RPT Date: 11/29/11 14:37
Sample: L548284-02 Account: CORCOMGCO Received: 11/23/11 09:00 Due Date: 11/29/11 00:00 RPT Date: 11/29/11 14:37
Sample: L548284-03 Account: CORCOMGCO Received: 11/23/11 09:00 Due Date: 11/29/11 00:00 RPT Date: 11/29/11 14:37
Sample: L548284-04 Account: CORCOMGCO Received: 11/23/11 09:00 Due Date: 11/29/11 00:00 RPT Date: 11/29/11 14:37
Sample: L548284-05 Account: CORCOMGCO Received: 11/23/11 09:00 Due Date: 11/29/11 00:00 RPT Date: 11/29/11 14:37
Sample: L548284-06 Account: CORCOMGCO Received: 11/23/11 09:00 Due Date: 11/29/11 00:00 RPT Date: 11/29/11 14:37
Sample: L548284-07 Account: CORCOMGCO Received: 11/23/11 09:00 Due Date: 11/29/11 00:00 RPT Date: 11/29/11 14:37
Sample: L548284-08 Account: CORCOMGCO Received: 11/23/11 09:00 Due Date: 11/29/11 00:00 RPT Date: 11/29/11 14:37
Sample: L548284-09 Account: CORCOMGCO Received: 11/23/11 09:00 Due Date: 11/29/11 00:00 RPT Date: 11/29/11 14:37
Sample: L548284-10 Account: CORCOMGCO Received: 11/23/11 09:00 Due Date: 11/29/11 00:00 RPT Date: 11/29/11 14:37
Sample: L548284-11 Account: CORCOMGCO Received: 11/23/11 09:00 Due Date: 11/29/11 00:00 RPT Date: 11/29/11 14:37
Sample: L548284-12 Account: CORCOMGCO Received: 11/23/11 09:00 Due Date: 11/29/11 00:00 RPT Date: 11/29/11 14:37
Sample: L548284-13 Account: CORCOMGCO Received: 11/23/11 09:00 Due Date: 11/29/11 00:00 RPT Date: 11/29/11 14:37



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Tax I.D. 62-0814289

Est. 1970

November 29, 2011

Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
TPH (GC/FID) High Fraction	< 4	ppm			WG567171	11/24/11 02:17
o-Terphenyl		% Rec.	76.41	50-150	WG567171	11/24/11 02:17
Specific Conductance	2.70	umhos/cm			WG567147	11/23/11 20:23
Benzene	< .0005	mg/kg			WG567249	11/24/11 05:11
Ethylbenzene	< .0005	mg/kg			WG567249	11/24/11 05:11
Toluene	< .005	mg/kg			WG567249	11/24/11 05:11
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG567249	11/24/11 05:11
Total Xylene	< .0015	mg/kg			WG567249	11/24/11 05:11
a,a,a-Trifluorotoluene(FID)		% Rec.	95.87	59-128	WG567249	11/24/11 05:11
a,a,a-Trifluorotoluene(PID)		% Rec.	95.29	54-144	WG567249	11/24/11 05:11
Mercury	< .02	mg/kg			WG567127	11/23/11 18:45
1-Methylnaphthalene	< .006	mg/kg			WG567064	11/24/11 03:09
2-Chloronaphthalene	< .006	mg/kg			WG567064	11/24/11 03:09
2-Methylnaphthalene	< .006	mg/kg			WG567064	11/24/11 03:09
Acenaphthene	< .006	mg/kg			WG567064	11/24/11 03:09
Acenaphthylene	< .006	mg/kg			WG567064	11/24/11 03:09
Anthracene	< .006	mg/kg			WG567064	11/24/11 03:09
Benzo(a)anthracene	< .006	mg/kg			WG567064	11/24/11 03:09
Benzo(a)pyrene	< .006	mg/kg			WG567064	11/24/11 03:09
Benzo(b)fluoranthene	< .006	mg/kg			WG567064	11/24/11 03:09
Benzo(g,h,i)perylene	< .006	mg/kg			WG567064	11/24/11 03:09
Benzo(k)fluoranthene	< .006	mg/kg			WG567064	11/24/11 03:09
Chrysene	< .006	mg/kg			WG567064	11/24/11 03:09
Dibenz(a,h)anthracene	< .006	mg/kg			WG567064	11/24/11 03:09
Fluoranthene	< .006	mg/kg			WG567064	11/24/11 03:09
Fluorene	< .006	mg/kg			WG567064	11/24/11 03:09
Indeno(1,2,3-cd)pyrene	< .006	mg/kg			WG567064	11/24/11 03:09
Naphthalene	< .006	mg/kg			WG567064	11/24/11 03:09
Phenanthrene	< .006	mg/kg			WG567064	11/24/11 03:09
Pyrene	< .006	mg/kg			WG567064	11/24/11 03:09
2-Fluorobiphenyl		% Rec.	83.27	34-129	WG567064	11/24/11 03:09
Nitrobenzene-d5		% Rec.	92.71	14-141	WG567064	11/24/11 03:09
p-Terphenyl-d14		% Rec.	88.19	25-139	WG567064	11/24/11 03:09
Arsenic	< 1	mg/kg			WG567189	11/25/11 11:03
Barium	< .25	mg/kg			WG567189	11/25/11 11:03
Cadmium	< .25	mg/kg			WG567189	11/25/11 11:03
Chromium	< .5	mg/kg			WG567189	11/25/11 11:03
Copper	< 1	mg/kg			WG567189	11/25/11 11:03
Lead	< .25	mg/kg			WG567189	11/25/11 11:03
Nickel	< 1	mg/kg			WG567189	11/25/11 11:03
Selenium	< 1	mg/kg			WG567189	11/25/11 11:03
Silver	< .5	mg/kg			WG567189	11/25/11 11:03
Zinc	< 1.5	mg/kg			WG567189	11/25/11 11:03
Chloride	< 10	mg/kg			WG567160	11/25/11 10:36
Sulfate	< 50	mg/kg			WG567160	11/25/11 10:36

* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



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November 29, 2011

Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
pH	6.10	su			WG567332	11/26/11 15:54
pH	3.50	su			WG567168	11/26/11 09:26
Chromium, Hexavalent	< 2	mg/kg			WG567165	11/28/11 10:52
Arsenic	< 1	mg/kg			WG567192	11/27/11 19:44
Barium	< .25	mg/kg			WG567192	11/27/11 19:44
Cadmium	< .25	mg/kg			WG567192	11/27/11 19:44
Chromium	< .5	mg/kg			WG567192	11/27/11 19:44
Copper	< 1	mg/kg			WG567192	11/27/11 19:44
Nickel	< 1	mg/kg			WG567192	11/27/11 19:44
Silver	< .5	mg/kg			WG567192	11/27/11 19:44
Zinc	< 1.5	mg/kg			WG567192	11/27/11 19:44
Lead	< .25	mg/kg			WG567192	11/26/11 20:53
Selenium	< 1	mg/kg			WG567192	11/29/11 12:01

Analyte	Units	Result	Duplicate		RPD	Limit	Ref Samp	Batch
			Duplicate					
Specific Conductance	umhos/cm	4100	4300		4.76	20	L547545-01	WG567147
Specific Conductance	umhos/cm	2700	2500		7.69	20	L548284-13	WG567147
Mercury	mg/kg	0.160	0.217		33.3*	20	L548297-01	WG567127
Arsenic	mg/kg	0	0		0	20	L548284-09	WG567189
Barium	mg/kg	1200	920.		30.4*	20	L548284-09	WG567189
Chromium	mg/kg	21.0	20.0		2.96	20	L548284-09	WG567189
Copper	mg/kg	16.0	16.0		1.86	20	L548284-09	WG567189
Lead	mg/kg	11.0	11.0		3.70	20	L548284-09	WG567189
Nickel	mg/kg	13.0	14.0		4.38	20	L548284-09	WG567189
Selenium	mg/kg	3.00	2.90		2.72	20	L548284-09	WG567189
Silver	mg/kg	0.760	0.560		29.9*	20	L548284-09	WG567189
Zinc	mg/kg	51.0	49.0		4.39	20	L548284-09	WG567189
Cadmium	mg/kg	0	0		0	20	L548284-09	WG567189
Chloride	mg/kg	570.	600.		5.13	20	L548284-04	WG567160
Sulfate	mg/kg	140.	140.		3.64	20	L548284-04	WG567160
Chloride	mg/kg	51.0	46.0		10.9	20	L548353-03	WG567160
Sulfate	mg/kg	0	0		0	20	L548353-03	WG567160
pH	su	7.90	7.90		0.253	1	L548284-08	WG567332
pH	su	6.80	6.80		0	1	L548469-03	WG567332
pH	su	12.0	12.0		2.47*	1	L548006-01	WG567168
pH	su	8.70	8.70		0.115	1	L548284-07	WG567168
Chromium, Hexavalent	mg/kg	0	0		0	20	L548284-13	WG567165
Chromium, Hexavalent	mg/kg	0	0		0	20	L547684-01	WG567165

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Analyte	Units	Result	Duplicate		RPD	Limit	Ref Samp	Batch
			Duplicate					
Arsenic	mg/kg	9.60	12.0	22.0*	20		L548399-01	WG567192
Barium	mg/kg	260.	290.	10.9	20		L548399-01	WG567192
Cadmium	mg/kg	0.450	0.340	28.5*	20		L548399-01	WG567192
Chromium	mg/kg	20.0	15.0	26.6*	20		L548399-01	WG567192
Copper	mg/kg	16.0	18.0	9.91	20		L548399-01	WG567192
Lead	mg/kg	13.0	14.0	7.41	20		L548399-01	WG567192
Nickel	mg/kg	12.0	12.0	4.08	20		L548399-01	WG567192
Silver	mg/kg	0	0	0	20		L548399-01	WG567192
Zinc	mg/kg	55.0	53.0	3.70	20		L548399-01	WG567192
Selenium	mg/kg	1.60	1.80	11.1	20		L548399-01	WG567192

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
TPH (GC/FID) High Fraction	ppm	60	47.1	78.5	50-150	WG567171
o-Terphenyl				82.47	50-150	WG567171
Specific Conductance	umhos/cm	427	430.	101.	85-115	WG567147
Benzene	mg/kg	.05	0.0471	94.1	76-113	WG567249
Ethylbenzene	mg/kg	.05	0.0458	91.6	78-115	WG567249
Toluene	mg/kg	.05	0.0502	100.	76-114	WG567249
Total Xylene	mg/kg	.15	0.136	90.5	81-118	WG567249
a,a,a-Trifluorotoluene(PID)				95.71	54-144	WG567249
TPH (GC/FID) Low Fraction	mg/kg	5.5	5.55	101.	67-135	WG567249
a,a,a-Trifluorotoluene(FID)				104.0	59-128	WG567249
Mercury	mg/kg	3.77	4.05	107.	71.6-128	WG567127
1-Methylnaphthalene	mg/kg	.033	0.0271	82.2	48-113	WG567064
2-Chloronaphthalene	mg/kg	.033	0.0277	84.0	51-114	WG567064
2-Methylnaphthalene	mg/kg	.033	0.0262	79.2	44-109	WG567064
Acenaphthene	mg/kg	.033	0.0254	76.8	52-108	WG567064
Acenaphthylene	mg/kg	.033	0.0275	83.3	51-110	WG567064
Anthracene	mg/kg	.033	0.0270	81.8	58-120	WG567064
Benzo(a)anthracene	mg/kg	.033	0.0268	81.3	54-110	WG567064
Benzo(a)pyrene	mg/kg	.033	0.0285	86.2	56-118	WG567064
Benzo(b)fluoranthene	mg/kg	.033	0.0278	84.4	55-114	WG567064
Benzo(g,h,i)perylene	mg/kg	.033	0.0225	68.1	48-130	WG567064
Benzo(k)fluoranthene	mg/kg	.033	0.0296	89.7	55-122	WG567064
Chrysene	mg/kg	.033	0.0274	83.0	57-118	WG567064
Dibenz(a,h)anthracene	mg/kg	.033	0.0231	70.0	53-122	WG567064
Fluoranthene	mg/kg	.033	0.0288	87.3	58-118	WG567064
Fluorene	mg/kg	.033	0.0275	83.2	54-109	WG567064
Indeno(1,2,3-cd)pyrene	mg/kg	.033	0.0235	71.3	51-125	WG567064
Naphthalene	mg/kg	.033	0.0249	75.5	45-105	WG567064
Phenanthrene	mg/kg	.033	0.0278	84.2	53-114	WG567064
Pyrene	mg/kg	.033	0.0285	86.4	53-121	WG567064
2-Fluorobiphenyl				80.50	34-129	WG567064
Nitrobenzene-d5				84.85	14-141	WG567064
p-Terphenyl-d14				83.90	25-139	WG567064

Arsenic	mg/kg	92.6	82.6	89.2	82.9-117	WG567189
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Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Barium	mg/kg	169	154.	91.1	82.8-117	WG567189
Cadmium	mg/kg	61.8	58.2	94.2	83.3-117	WG567189
Chromium	mg/kg	71.3	66.0	92.6	81.8-118	WG567189
Copper	mg/kg	81.2	77.3	95.2	83.9-116	WG567189
Lead	mg/kg	92.4	84.7	91.7	83.3-117	WG567189
Nickel	mg/kg	59.1	57.0	96.4	83.8-116	WG567189
Selenium	mg/kg	89.5	83.6	93.4	79-121	WG567189
Silver	mg/kg	34.4	31.5	91.6	66.3-134	WG567189
Zinc	mg/kg	141	131.	92.9	80.9-119	WG567189
Chloride	mg/kg	200	208.	104.	85-115	WG567160
Sulfate	mg/kg	200	205.	103.	85-115	WG567160
pH	su	7.98	8.00	100.	98-101	WG567332
pH	su	7.98	8.00	100.	98-101	WG567168
Chromium, Hexavalent	mg/kg	203	147.	72.4	50-150	WG567165
Arsenic	mg/kg	92.6	86.2	93.1	82.9-117	WG567192
Barium	mg/kg	169	162.	95.9	82.8-117	WG567192
Cadmium	mg/kg	61.8	56.4	91.3	83.3-117	WG567192
Chromium	mg/kg	71.3	67.4	94.5	81.8-118	WG567192
Copper	mg/kg	81.2	79.7	98.2	83.9-116	WG567192
Lead	mg/kg	92.4	88.5	95.8	83.3-117	WG567192
Nickel	mg/kg	59.1	54.8	92.7	83.8-116	WG567192
Silver	mg/kg	34.4	33.0	95.9	66.3-134	WG567192
Zinc	mg/kg	141	131.	92.9	80.9-119	WG567192
Selenium	mg/kg	89.5	84.3	94.2	79-121	WG567192

Analyte	Units	Laboratory Control Sample Duplicate		%Rec	Limit	RPD	Limit	Batch
		Result	Ref					
TPH (GC/FID) High Fraction	ppm	46.6	47.1	78.0	50-150	1.01	25	WG567171
o-Terphenyl				82.53	50-150			WG567171
Specific Conductance	umhos/	420.	430.	98.0	85-115	2.35	20	WG567147
Benzene	mg/kg	0.0469	0.0471	94.0	76-113	0.330	20	WG567249
Ethylbenzene	mg/kg	0.0455	0.0458	91.0	78-115	0.720	20	WG567249
Toluene	mg/kg	0.0489	0.0502	98.0	76-114	2.60	20	WG567249
Total Xylene	mg/kg	0.133	0.136	89.0	81-118	1.97	20	WG567249
a,a,a-Trifluorotoluene(PID)				95.57	54-144			WG567249
TPH (GC/FID) Low Fraction	mg/kg	5.70	5.55	104.	67-135	2.68	20	WG567249
a,a,a-Trifluorotoluene(FID)				104.5	59-128			WG567249
1-Methylnaphthalene	mg/kg	0.0256	0.0271	78.0	48-113	5.84	24	WG567064
2-Chloronaphthalene	mg/kg	0.0259	0.0277	78.0	51-114	6.80	24	WG567064
2-Methylnaphthalene	mg/kg	0.0254	0.0262	77.0	44-109	2.81	24	WG567064
Acenaphthene	mg/kg	0.0251	0.0254	76.0	52-108	0.869	22	WG567064
Acenaphthylene	mg/kg	0.0249	0.0275	75.0	51-110	9.86	21	WG567064

* Performance of this Analyte is outside of established criteria.

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Quality Assurance Report
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Est. 1970

November 29, 2011

Analyte	Units	Laboratory Control			Sample Duplicate		Limit	RPD	Limit	Batch
		Result	Ref	%Rec	Limit	RPD				
Anthracene	mg/kg	0.0265	0.0270	80.0	58-120	1.67	20			WG567064
Benzo(a)anthracene	mg/kg	0.0253	0.0268	77.0	54-110	5.75	22			WG567064
Benzo(a)pyrene	mg/kg	0.0262	0.0285	79.0	56-118	8.27	21			WG567064
Benzo(b)fluoranthene	mg/kg	0.0271	0.0278	82.0	55-114	2.86	20			WG567064
Benzo(g,h,i)perylene	mg/kg	0.0252	0.0225	76.0	48-130	11.5	20			WG567064
Benzo(k)fluoranthene	mg/kg	0.0246	0.0296	75.0	55-122	18.3	25			WG567064
Chrysene	mg/kg	0.0258	0.0274	78.0	57-118	5.98	20			WG567064
Dibenz(a,h)anthracene	mg/kg	0.0255	0.0231	77.0	53-122	9.65	20			WG567064
Fluoranthene	mg/kg	0.0266	0.0288	80.0	58-118	8.13	20			WG567064
Fluorene	mg/kg	0.0260	0.0275	79.0	54-109	5.38	20			WG567064
Indeno(1,2,3-cd)pyrene	mg/kg	0.0251	0.0235	76.0	51-125	6.42	21			WG567064
Naphthalene	mg/kg	0.0245	0.0249	74.0	45-105	1.74	24			WG567064
Phenanthrene	mg/kg	0.0257	0.0278	78.0	53-114	7.70	20			WG567064
Pyrene	mg/kg	0.0287	0.0285	87.0	53-121	0.459	20			WG567064
2-Fluorobiphenyl				76.37	34-129					WG567064
Nitrobenzene-d5				80.92	14-141					WG567064
p-Terphenyl-d14				78.58	25-139					WG567064
Chloride	mg/kg	204.	208.	102.	85-115	1.94	20			WG567160
Sulfate	mg/kg	202.	205.	101.	85-115	1.47	20			WG567160
pH	su	8.00	8.00	100.	98-101	0	20			WG567332
pH	su	8.00	8.00	100.	98-101	0	20			WG567168
Chromium, Hexavalent	mg/kg	157.	147.	77.0	50-150	6.58	20			WG567165

Analyte	Units	Matrix Spike				Limit	Ref Samp	Batch
		MS Res	Ref Res	TV	% Rec			
TPH (GC/FID) High Fraction	ppm	37.3	0	60	62.2	50-150	L548284-13	WG567171
o-Terphenyl					63.46	50-150		WG567171
Benzene	mg/kg	0.210	0	.05	83.8	32-137	L548284-01	WG567249
Ethylbenzene	mg/kg	0.188	0	.05	75.0	10-150	L548284-01	WG567249
Toluene	mg/kg	0.214	0	.05	85.6	20-142	L548284-01	WG567249
Total Xylene	mg/kg	0.551	0	.15	73.5	16-141	L548284-01	WG567249
a,a,a-Trifluorotoluene(PID)					94.08	54-144		WG567249
TPH (GC/FID) Low Fraction	mg/kg	20.3	0	5.5	73.8	55-109	L548284-01	WG567249
a,a,a-Trifluorotoluene(FID)					101.4	59-128		WG567249
Mercury	mg/kg	0.442	0.217	.25	90.0	70-130	L548297-01	WG567127
1-Methylnaphthalene	mg/kg	0.0595	0.0180	.033	126.	25-155	L548178-05	WG567064
2-Chloronaphthalene	mg/kg	0.0282	0	.033	85.4	31-153	L548178-05	WG567064
2-Methylnaphthalene	mg/kg	0.143	0.0610	.033	249.*	22-172	L548178-05	WG567064
Acenaphthene	mg/kg	0.0280	0	.033	84.7	43-133	L548178-05	WG567064
Acenaphthylene	mg/kg	0.0269	0	.033	81.6	42-146	L548178-05	WG567064
Anthracene	mg/kg	0.0273	0	.033	82.7	38-153	L548178-05	WG567064
Benzo(a)anthracene	mg/kg	0.0279	0	.033	84.4	31-142	L548178-05	WG567064
Benzo(a)pyrene	mg/kg	0.0292	0	.033	88.6	26-152	L548178-05	WG567064
Benzo(b)fluoranthene	mg/kg	0.0303	0	.033	91.7	10-188	L548178-05	WG567064

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Analyte	Units	MS Res	Matrix Spike		% Rec	Limit	Ref Samp	Batch
			Ref Res	TV				
Benzo(g,h,i)perylene	mg/kg	0.0258	0	.033	78.1	10-176	L548178-05	WG567064
Benzo(k)fluoranthene	mg/kg	0.0277	0	.033	83.8	22-163	L548178-05	WG567064
Chrysene	mg/kg	0.0268	0	.033	81.1	26-146	L548178-05	WG567064
Dibenz(a,h)anthracene	mg/kg	0.0271	0	.033	82.2	10-160	L548178-05	WG567064
Fluoranthene	mg/kg	0.0280	0	.033	84.8	23-160	L548178-05	WG567064
Fluorene	mg/kg	0.0358	0	.033	108.	44-143	L548178-05	WG567064
Indeno(1,2,3-cd)pyrene	mg/kg	0.0269	0	.033	81.4	10-157	L548178-05	WG567064
Naphthalene	mg/kg	0.0564	0.0190	.033	113.	22-156	L548178-05	WG567064
Phenanthrene	mg/kg	0.0319	0	.033	96.8	23-164	L548178-05	WG567064
Pyrene	mg/kg	0.0289	0	.033	87.6	12-170	L548178-05	WG567064
2-Fluorobiphenyl					82.20	34-129		WG567064
Nitrobenzene-d5					99.82	14-141		WG567064
p-Terphenyl-d14					77.09	25-139		WG567064
Arsenic	mg/kg	40.1	0	50	80.2	75-125	L548284-09	WG567189
Barium	mg/kg	854.	920.	50	0*	75-125	L548284-09	WG567189
Chromium	mg/kg	63.7	20.0	50	87.4	75-125	L548284-09	WG567189
Copper	mg/kg	61.9	16.0	50	91.8	75-125	L548284-09	WG567189
Lead	mg/kg	57.0	11.0	50	92.0	75-125	L548284-09	WG567189
Nickel	mg/kg	55.0	14.0	50	82.0	75-125	L548284-09	WG567189
Selenium	mg/kg	42.0	2.90	50	78.2	75-125	L548284-09	WG567189
Silver	mg/kg	44.2	0.560	50	87.3	75-125	L548284-09	WG567189
Zinc	mg/kg	96.0	49.0	50	94.0	75-125	L548284-09	WG567189
Cadmium	mg/kg	51.2	0	50	20.5*	75-125	L548284-09	WG567189
Chloride	mg/kg	558.	52.0	500	101.	80-120	L548353-01	WG567160
Sulfate	mg/kg	511.	0	500	102.	80-120	L548353-01	WG567160
Chromium, Hexavalent	mg/kg	5.88	0	20	29.4*	50-150	L548284-02	WG567165
Arsenic	mg/kg	56.2	12.0	50	88.4	75-125	L548399-01	WG567192
Barium	mg/kg	318.	290.	50	56.0*	75-125	L548399-01	WG567192
Cadmium	mg/kg	45.9	0.340	50	91.1	75-125	L548399-01	WG567192
Chromium	mg/kg	62.4	15.0	50	94.8	75-125	L548399-01	WG567192
Copper	mg/kg	66.5	18.0	50	97.0	75-125	L548399-01	WG567192
Lead	mg/kg	59.1	14.0	50	90.2	75-125	L548399-01	WG567192
Nickel	mg/kg	56.5	12.0	50	89.0	75-125	L548399-01	WG567192
Silver	mg/kg	49.3	0	50	98.6	75-125	L548399-01	WG567192
Zinc	mg/kg	99.8	53.0	50	93.6	75-125	L548399-01	WG567192
Selenium	mg/kg	47.5	1.80	50	91.4	75-125	L548399-01	WG567192

Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
TPH (GC/FID) High Fraction	ppm	33.0	37.3	55.0	50-150	12.2	25	L548284-13	WG567171
o-Terphenyl				55.66	50-150				WG567171
Benzene	mg/kg	0.224	0.210	89.5	32-137	6.52	39	L548284-01	WG567249
Ethylbenzene	mg/kg	0.207	0.188	82.9	10-150	9.95	44	L548284-01	WG567249
Toluene	mg/kg	0.230	0.214	91.9	20-142	7.10	42	L548284-01	WG567249
Total Xylene	mg/kg	0.607	0.551	81.0	16-141	9.68	46	L548284-01	WG567249
a,a,a-Trifluorotoluene(PID)				94.50	54-144				WG567249
TPH (GC/FID) Low Fraction	mg/kg	16.5	20.3	60.0	55-109	20.7*	20	L548284-01	WG567249
a,a,a-Trifluorotoluene(FID)				99.79	59-128				WG567249

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Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
Mercury	mg/kg	0.428	0.442	84.4	70-130	3.22	20	L548297-01	WG567127
1-Methylnaphthalene	mg/kg	0.0418	0.0595	72.0	25-155	35.0*	27	L548178-05	WG567064
2-Chloronaphthalene	mg/kg	0.0267	0.0282	81.0	31-153	5.36	22	L548178-05	WG567064
2-Methylnaphthalene	mg/kg	0.0803	0.143	58.5	22-172	56.3*	29	L548178-05	WG567064
Acenaphthene	mg/kg	0.0251	0.0280	76.1	43-133	10.7	26	L548178-05	WG567064
Acenaphthylene	mg/kg	0.0251	0.0269	76.0	42-146	7.02	22	L548178-05	WG567064
Anthracene	mg/kg	0.0249	0.0273	75.5	38-153	9.14	27	L548178-05	WG567064
Benzo(a)anthracene	mg/kg	0.0220	0.0279	66.7	31-142	23.5	31	L548178-05	WG567064
Benzo(a)pyrene	mg/kg	0.0233	0.0292	70.7	26-152	22.5	32	L548178-05	WG567064
Benzo(b)fluoranthene	mg/kg	0.0244	0.0303	73.9	10-188	21.4	33	L548178-05	WG567064
Benzo(g,h,i)perylene	mg/kg	0.0215	0.0258	65.2	10-176	18.0	30	L548178-05	WG567064
Benzo(k)fluoranthene	mg/kg	0.0224	0.0277	67.8	22-163	21.2	29	L548178-05	WG567064
Chrysene	mg/kg	0.0220	0.0268	66.7	26-146	19.5	30	L548178-05	WG567064
Dibenz(a,h)anthracene	mg/kg	0.0217	0.0271	65.6	10-160	22.4	39	L548178-05	WG567064
Fluoranthene	mg/kg	0.0226	0.0280	68.5	23-160	21.2	22	L548178-05	WG567064
Fluorene	mg/kg	0.0289	0.0358	87.6	44-143	21.3	23	L548178-05	WG567064
Indeno(1,2,3-cd)pyrene	mg/kg	0.0220	0.0269	66.7	10-157	19.9	40	L548178-05	WG567064
Naphthalene	mg/kg	0.0400	0.0564	63.5	22-156	34.1*	27	L548178-05	WG567064
Phenanthrene	mg/kg	0.0253	0.0319	76.7	23-164	23.1	25	L548178-05	WG567064
Pyrene	mg/kg	0.0242	0.0289	73.4	12-170	17.7	24	L548178-05	WG567064
2-Fluorobiphenyl				74.44	34-129				WG567064
Nitrobenzene-d5				85.17	14-141				WG567064
p-Terphenyl-d14				64.82	25-139				WG567064
Arsenic	mg/kg	41.7	40.1	83.4	75-125	3.91	20	L548284-09	WG567189
Barium	mg/kg	2360	854.	2880*	75-125	93.7*	20	L548284-09	WG567189
Chromium	mg/kg	64.1	63.7	88.2	75-125	0.626	20	L548284-09	WG567189
Copper	mg/kg	62.6	61.9	93.2	75-125	1.12	20	L548284-09	WG567189
Lead	mg/kg	54.5	57.0	87.0	75-125	4.48	20	L548284-09	WG567189
Nickel	mg/kg	54.6	55.0	81.2	75-125	0.730	20	L548284-09	WG567189
Selenium	mg/kg	41.8	42.0	77.8	75-125	0.477	20	L548284-09	WG567189
Silver	mg/kg	45.4	44.2	89.7	75-125	2.68	20	L548284-09	WG567189
Zinc	mg/kg	95.1	96.0	92.2	75-125	0.942	20	L548284-09	WG567189
Cadmium	mg/kg	53.6	51.2	21.4*	75-125	4.58	20	L548284-09	WG567189
Chloride	mg/kg	570.	558.	104.	80-120	2.13	20	L548353-01	WG567160
Sulfate	mg/kg	529.	511.	106.	80-120	3.46	20	L548353-01	WG567160
Chromium,Hexavalent	mg/kg	5.48	5.88	27.4*	50-150	7.04	20	L548284-02	WG567165
Arsenic	mg/kg	54.8	56.2	85.6	75-125	2.52	20	L548399-01	WG567192
Barium	mg/kg	330.	318.	80.0	75-125	3.70	20	L548399-01	WG567192
Cadmium	mg/kg	42.3	45.9	83.9	75-125	8.16	20	L548399-01	WG567192
Chromium	mg/kg	60.8	62.4	91.6	75-125	2.60	20	L548399-01	WG567192
Copper	mg/kg	65.1	66.5	94.2	75-125	2.13	20	L548399-01	WG567192
Lead	mg/kg	58.9	59.1	89.8	75-125	0.339	20	L548399-01	WG567192
Nickel	mg/kg	54.9	56.5	85.8	75-125	2.87	20	L548399-01	WG567192
Silver	mg/kg	46.6	49.3	93.2	75-125	5.63	20	L548399-01	WG567192
Zinc	mg/kg	102.	99.8	98.0	75-125	2.18	20	L548399-01	WG567192
Selenium	mg/kg	43.7	47.5	83.8	75-125	8.33	20	L548399-01	WG567192

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November 29, 2011

Batch number /Run number / Sample number cross reference

WG567171: R1943893: L548284-01 02 03 04 05 06 07 08 09 10 11 12 13
WG567147: R1944095: L548284-01 02 03 04 05 06 07 08 09 10 11 12 13
WG567249: R1944232: L548284-01 02 03 04 05 06 07 08 09 10 11 12 13
WG567127: R1944312: L548284-01 02 03 04 05 06 07 08 09 10 11 12 13
WG567064: R1944592: L548284-01 02 03 04 05 06 07 08 09 10 11 12 13
WG567189: R1945213: L548284-01 02 03 04 05 06 07 08 09
WG567160: R1945612: L548284-01 02 03 04 05 06 07 08 09 10 11 12 13
WG567332: R1946593: L548284-08 09 10 11 12 13
WG567168: R1946632: L548284-01 02 03 04 05 06 07
WG567165: R1946876: L548284-01 02 03 04 05 06 07 08 09 10 11 12 13
WG567290: R1946992: L548284-01 02 03 04 05 06 07 08 09 10 11 12 13
WG567192: R1947092: L548284-10 11 12 13

* * Calculations are performed prior to rounding of reported values.

* Performance of this Analyte is outside of established criteria.

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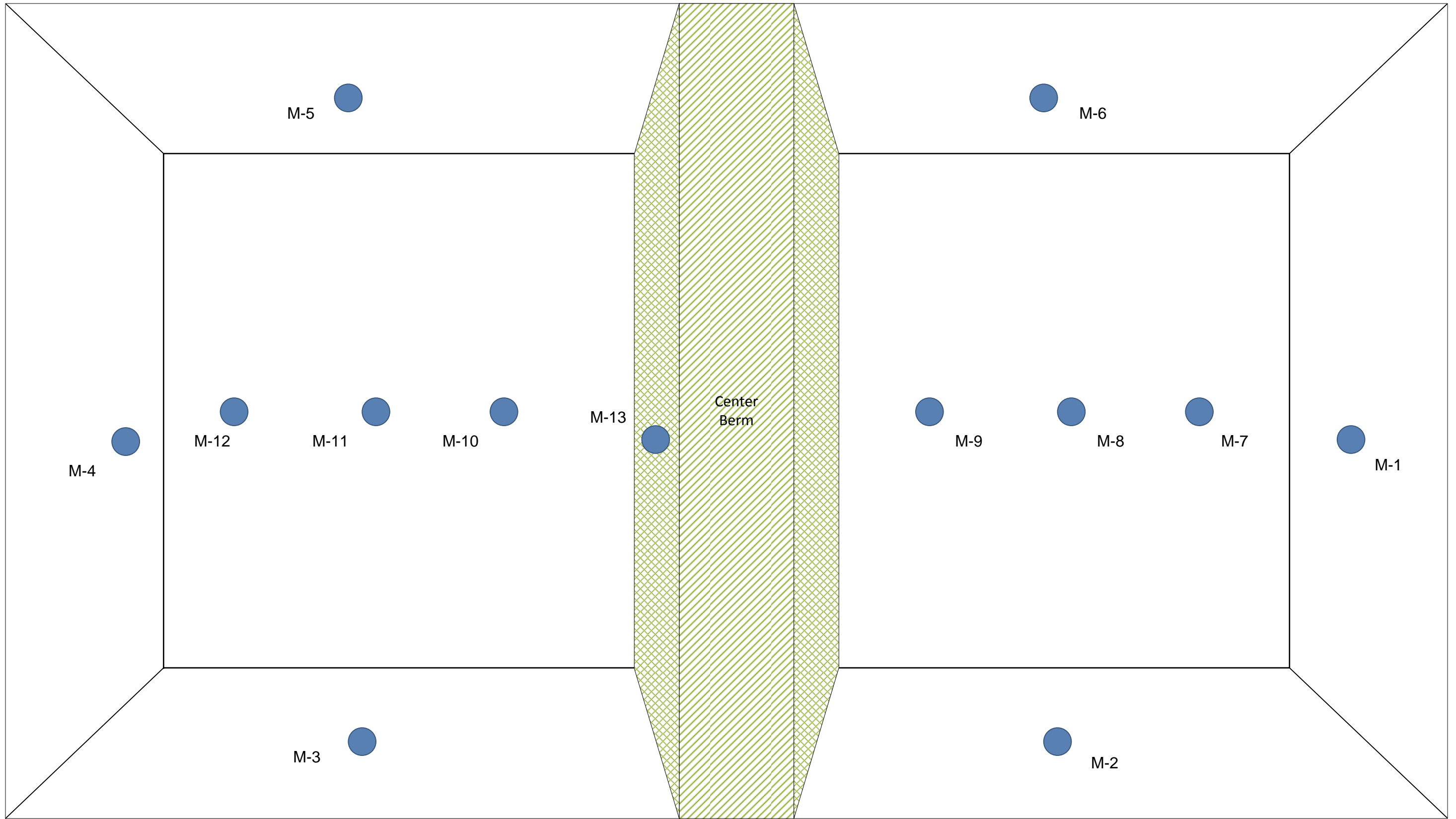
November 29, 2011

The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.



PROJECT NO:	011-2510
DRAWN BY:	J. SUTRINA
DATE:	12/1/2011

Moffat 1-8 Pit
Sample Locations
Quicksilver Resources Inc.



826 21½ Road
Grand Junction, CO 81505
TEL 970.263.7800
FAX 970.263.7456



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Ken Kreie
Olsson Associates - GJ, CO
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Grand Junction, CO 81505

Report Summary

Thursday June 17, 2010

Report Number: L464124

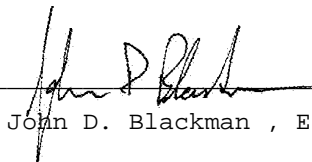
Samples Received: 06/12/10

Client Project:

Description:

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:


John D. Blackman , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT - PH-0197, FL - E87487
GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704, ND - R-140
NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032008A

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

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REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

June 17, 2010

Date Received : June 12, 2010
Description :

Sample ID : BG-1 9-12IN

Collected By : DP
Collection Date : 06/10/10 13:09

ESC Sample # : L464124-01

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	2.2	1.0	mg/kg	6010B	06/16/10	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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Reported: 06/17/10 13:15 Printed: 06/17/10 13:15



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REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

June 17, 2010

Date Received : June 12, 2010
Description :

Sample ID : BG-2 6-9IN

Collected By : DP
Collection Date : 06/10/10 13:09

ESC Sample # : L464124-02

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	2.4	1.0	mg/kg	6010B	06/16/10	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

June 17, 2010

Date Received : June 12, 2010
Description :

Sample ID : BG-3 6-9IN

Collected By : DP
Collection Date : 06/10/10 13:09

ESC Sample # : L464124-03

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	1.8	1.0	mg/kg	6010B	06/16/10	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

June 17, 2010

Date Received : June 12, 2010
Description :

Sample ID : BG-4 12-15IN

Collected By : DP
Collection Date : 06/10/10 13:09

ESC Sample # : L464124-04

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	3.1	1.0	mg/kg	6010B	06/16/10	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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Reported: 06/17/10 13:15 Printed: 06/17/10 13:15



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REPORT OF ANALYSIS

Ken Kreie
Olsson Associates - GJ, CO
826 21 1/2 Road
Grand Junction, CO 81505

June 17, 2010

Date Received : June 12, 2010
Description :

Sample ID : BG-5 6-9IN

Collected By : DP
Collection Date : 06/10/10 13:09

ESC Sample # : L464124-05

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	1.3	1.0	mg/kg	6010B	06/17/10	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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Reported: 06/17/10 13:15 Printed: 06/17/10 13:15

Summary of Remarks For Samples Printed
06/17/10 at 13:15:47

TSR Signing Reports: 151
R5 - Desired TAT

Sample: L464124-01 Account: CORCOMGCO Received: 06/12/10 09:00 Due Date: 06/18/10 00:00 RPT Date: 06/17/10 13:15
Sample: L464124-02 Account: CORCOMGCO Received: 06/12/10 09:00 Due Date: 06/18/10 00:00 RPT Date: 06/17/10 13:15
Sample: L464124-03 Account: CORCOMGCO Received: 06/12/10 09:00 Due Date: 06/18/10 00:00 RPT Date: 06/17/10 13:15
Sample: L464124-04 Account: CORCOMGCO Received: 06/12/10 09:00 Due Date: 06/18/10 00:00 RPT Date: 06/17/10 13:15
Sample: L464124-05 Account: CORCOMGCO Received: 06/12/10 09:00 Due Date: 06/18/10 00:00 RPT Date: 06/17/10 13:15



YOUR LAB OF CHOICE

Olsson Associates - GJ, CO
Ken Kreie
826 21 1/2 Road

Grand Junction, CO 81505

Quality Assurance Report
Level II

L464124

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June 17, 2010

Analyte	Result	Laboratory Blank				Limit	Batch	Date Analyzed	
		Units		% Rec					
Arsenic	< 1	mg/kg					WG483682	06/16/10	12:42
Arsenic	< 1	mg/kg					WG483716	06/17/10	00:38
Analyte	Units	Result	Duplicate		RPD	Limit	Ref Samp	Batch	
			Duplicate						
Arsenic	mg/kg	2.10	2.20		3.23	20	L464124-01	WG483682	
Arsenic	mg/kg	6.00	5.79		3.73	20	L464126-01	WG483716	
Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch			
		Known Val	Result						
Arsenic	mg/kg	192		187.	97.4		78.6-120.8	WG483682	
Arsenic	mg/kg	192		160.	83.3		78.6-120.8	WG483716	
Analyte	Units	MS Res	Matrix Spike		% Rec	Limit	Ref Samp	Batch	
			Ref Res	TV					
Arsenic	mg/kg	51.6	2.20	50	98.8	75-125	L464124-01	WG483682	
Arsenic	mg/kg	47.4	5.79	50	83.2	75-125	L464126-01	WG483716	
Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
Arsenic	mg/kg	53.5	51.6	103.	75-125	3.62	20	L464124-01	WG483682
Arsenic	mg/kg	40.1	47.4	68.6*	75-125	16.7	20	L464126-01	WG483716

Batch number /Run number / Sample number cross reference

WG483682: R1253648: L464124-01 02 03 04
WG483716: R1254789: L464124-05

* * Calculations are performed prior to rounding of reported values .
* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



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Ken Kreie
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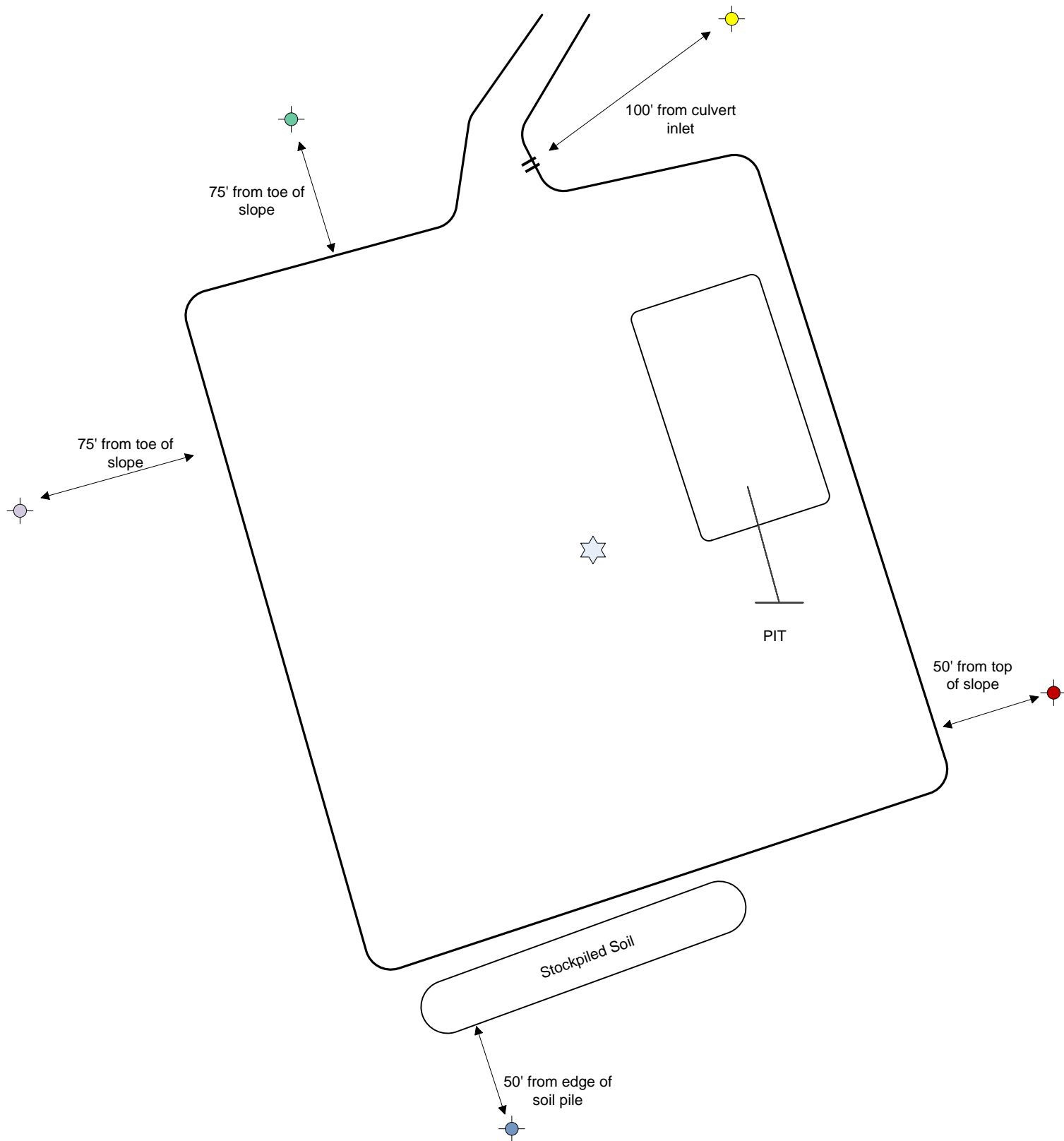
June 17, 2010

The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.







Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.



LEGEND

	Wellhead		BG-1		BG-3		BG-5
			BG-2		BG-4		



PROJECT NO: 011-2510
 DRAWN BY: JS
 DATE: 7/8/2010

Moffat 1-8
Background Arsenic Map
 Quicksilver Resources, Inc.

OLSSON
 ASSOCIATES

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FIGURE

3