

State of Colorado Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303)894-2100 Fax:(303)894-2109



FOR OGCC USE ONLY

RECEIVED 10/15/2014

REM 8692

DOC 2142208

SITE INVESTIGATION AND REMEDIATION WORKPLAN

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

☒ Spill or Release ☐ Plug & Abandon ☐ Central Facility Closure ☐ Site/Facility Closure ☐ Other (describe): _____

OGCC Employee:

☐ Spill ☐ Complaint☐ Inspection ☐ NOAV

Tracking No:

OGCC Operator Number: 10112

Name of Operator: Foundation Energy Management, LLC

Address: 16000 Dallas Parkway #875

City: Dallas State: TX Zip: 75248

Contact Name and Telephone:

Rachel Grant

No: 918-526-5592

Fax: 918-585-1660

API Number: 05-057-61240

County: Jackson

Facility Name: Allard 30-8-5

Facility Number: 115269

Well Name: Allard 30-8-5

Well Number: 30-8-5

Location: (QtrQtr, Sec, Twp, Rng, Meridian): SENE Sec 30 T10N R79W Latitude: 40.812241 Longitude: -106.301789

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc): Crude Oil

Site Conditions: Is location within a sensitive area (according to Rule 901e)? ☐ Y ☒ N If yes, attach evaluation.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): Grazing Land

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: Dobrow Loam

Potential receptors (water wells within 1/4 mi, surface waters, etc.): Irrigation channel approximately 100' northwest of tank battery;
intermittent surface water ponding northeast of pit depending on season and precipitation

Description of Impact (if previously provided, refer to that form or document):

Impacted Media (check):

☒ Soils☐ Vegetation☐ Groundwater☐ Surface Water

Extent of Impact:

East side of pit, base of pit

How Determined:

Soil samples collected May 2013

REMEDIAL WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document):

DOC dug out pit in late 2012, but some impacted soils remain. Pit was to be excavated in late summer/early fall of 2013, but heavy precipitation prevented the water level in the pit from dropping before winter set in. 1100 activated carbon in the excavation

Describe how source is to be removed:

Pit will be dewatered and the water containerized. A pump will remove water that infiltrates the pit periodically as needed.

Describe how remediation of existing impacts is to be accomplished, including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.:

Water that is pumped from the pit will be containerized and disposed of by Foundation Energy. Site work is planned to begin the week of October 20th, 2014, with Tasman Geosciences performing soil mixing to remediate impacted soils. The preferred remedial approach is to treat up to 500 cubic yards (yd3) of impacted soil using a dilute solution of hydrogen peroxide and physical soil mixing using an appropriately-sized excavator/backhoe. Further workplan specifics are provided in the attached document.

FORM
27
Rev 6/99

State of Colorado
Oil and Gas Conservation Commission
1120 Lincoln Street, Suite 801, Denver, Colorado 80203
(303)894-2100 Fax: (303)894-2109



Page 2

REMEDIAL WORKPLAN (Cont.)

Tracking Number: _____
Name of Operator: Foundation Energy Management
OGCC Operator No: 10112
Received Date: _____
Well Name & No: Atland 30-8-5
Facility Name & No: _____

OGCC Employee: _____

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):

Treat groundwater within the excavation extent with oxidant and granular activated carbon. Surface water samples collected from the irrigation canal northwest of the pit, and a standing pond northeast of the pit in May 2013 did not contain BTEX.

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.

Once the excavated area is in compliance with COGCC Table 910-1 standards, the excavated area will be backfilled to grade with clean soil, compacted, and recontoured. A seed bed will be prepared and the area reseeded with a weed free mix conforming with surrounding area.

Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.

Is further site investigation required? ☒ Y ☐ N If yes, describe:

Delineation of site is necessary during excavation to establish horizontal and vertical extent of the impacted soil. This will determine the volume of material to be excavated and treated.

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):

The preferred remedial method is for soil to be chemically treated to conform to Table 910-1 standards, thus eliminating the need to haul impacted soil. Weather conditions during the project may necessitate a dig and haul procedure or a combination of the two methods, however (snow, and/or extended below-freezing temperatures).

Water pumped from the pit during de-watering activities will be disposed of by Foundation Energy. Any soil removed from the pit that is not treated in-situ will be placed into rolloffs and disposed of at the Twin Enviro Services facility in Milner, CO.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: <u>May 2013</u>	Date Site Investigation Completed: _____	Date Remediation Plan Submitted: <u>9/24/14</u>
Remediation Start Date: <u>October 15, 2014</u>	Anticipated Completion Date: <u>October 31, 2014</u>	Actual Completion Date: _____

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

Print Name: Rachel Grant

Signed: [Signature]

Title: Sr. HSE/Regulatory Tech

Date: 10/15/2014

OGCC Approved: [Signature]

Title: Env. Supv

Date: 10/21/14

See Attached COAs

STATE OF
COLORADO

EnviroScan - DNR, OGCC <dnr_ogcc.enviroscan@state.co.us>

Fwd: Allard- Amended Form 27, Sampling Data

1 message

Neidel - DNR, Kris <kris.neidel@state.co.us>

Mon, Oct 20, 2014 at 11:49 AM

To: OGCC EnviroScan - DNR <dnr_ogcc.enviroscan@state.co.us>

Cc: Alex Fischer - DNR <alex.fischer@state.co.us>

Haley,

please upload the attached Form 27 to Facility ID number, 115269 and 324639 with the following COA's;

- In discussion with operator and their consultant on 10/20/2014 they have decided to remove any use of "absorbent polymer" in this Remediation, therefore no use of such a product is to be used on this location.
- The "activated carbon" discussed in the Form 27 will not be incorporated in the back-fill of pit or left on location either in the pit or in final reclamation.
- At least one water sample should be taken from the bottom of pit, if, in the instance ground water infiltration is recharging the pit. If pit is practicable dry after de-watering, only soil samples will be required, an accompanying description of field activities should accompany final request for project closure.
- One sample should be taken from corner of pit and underneath partially buried tank as a confirmation that installation of the tank did not conceal impacts.
- Operator provided pit soil sample results dated 6/10/2013 as basis for an amended soil sample constituent list however, no amended list was provided, operator should request amended sample constituent for approval. This can be done via email.
- At least 5 discrete soil samples should be taken, with one from true pit bottom. Guidance for sample locations should be taken from rule 910.b(2)B.
- Operator should provide notice to Environmental staff Kris Neidel (kris.neidel@state.co.us) or [970-819-9609](tel:970-819-9609) 48hrs prior to mobilization at begin of work (notice for mobilization has been provided) and at time of sample collection.
- Work plan is approved; however additional information and remediation may be required during the course of investigation and remediation.

Please reply to me with REM number and I will provide to operator.

Thank you,

Kris Neidel
Environmental Protection Specialist Northwest Area
Colorado Oil and Gas Conservation Commission
Office [970-871-1963](tel:970-871-1963)
Cell [970-846-5097](tel:970-846-5097)



COLORADO
Oil & Gas Conservation
Commission
Department of Natural Resources

----- Forwarded message -----

From: **Rachel Grant** <rgrant@foundationenergy.com>

Allard 1 Pit Closure

Form 27 Supplemental Information

Pit closure and reclamation is planned to begin the week of October 20th, 2014, with Tasman Geosciences performing soil mixing to remediate impacted soils. The preferred remedial approach is to treat up to 500 cubic yards (yd³) of impacted soil using a dilute solution of hydrogen peroxide and physical soil mixing using an appropriately-sized excavator. The chemical storage, mixing, and dilution operation will occur within poly containers staged inside a 12'x50' portable secondary containment berm, located on gravel at the tank battery. A benefit of this treatment method is minimizing truck traffic to the location. The work is expected to run through the week of the 20th.

The pit will be pumped down and water removed from the pit will be containerized and treated with granulated activated carbon. Water that is pumped from the pit will be disposed of by Foundation Energy.

Two roll-off containers from the Twin Enviro Services Landfill in Milner, CO will be delivered to the site so that any sludgy materials can be placed there and solidified using additional dry soil or absorbent polymer as necessary. Soil placed in the rollofs and not treated will be disposed of at the Twin Enviro Services Landfill. Straw wattles will be staged around the edge of the pit as BMPs to protect the nearby surface water during remediation activities.

In order to insure complete contact and full reaction with the hydrocarbon constituents, a backhoe will be used to mix the impacted soil and sprayed reagent within the open excavation. Mixing will not take place at the surface. A multi-point composite confirmation sample will be collected from each 100 yd³ treatment cell and submitted to Summit Scientific Laboratory for overnight turn on analysis of BTEX, GRO, and DRO. Laboratory analysis will confirm if the previous day's treatment was successful, prior to engaging in the next 100 yd³ treatment cell. This approach allows for real-time measurement of remedial success and spot treatment of potential hot spots.

A true base and discrete sidewall samples will be collected from the final extent of the open excavation to demonstrate full delineation and removal of impacts, analyzed for BTEX and TPH, and compared to the Table 910-1 standard. Remediation will continue until BTEX and TPH sample results are below the Table 910-1 standard. The pit will then be backfilled to grade with clean fill and a seedbed prepared.

The surface landowner will be notified and consulted prior to the start of pit remediation activities for the appropriate reclamation seed mix and any further considerations.

In the event of adverse weather conditions during the work time period, a dig and haul approach (or a combination of soil mixing/dig and haul) may be implemented if the temperature at the Allard site drops too low at night and will potentially freeze the water/chemical in totes.

Foundation Energy would like to request an amended Table 910, based on the attached results from sampling on 5/13/2013.

Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

June 10, 2013

RECEIVED 10/15/2014

REM 8692

DOC 2142209

Alyssa Beard
Tasman Geosciences
6899 Pecos Street
Denver, CO 80221
RE: FEM Allard 30-8-5

Enclosed are the results of analyses for samples received by Summit Scientific on 05/31/13 17:40. If you have any questions concerning this report, please feel free to contact me.

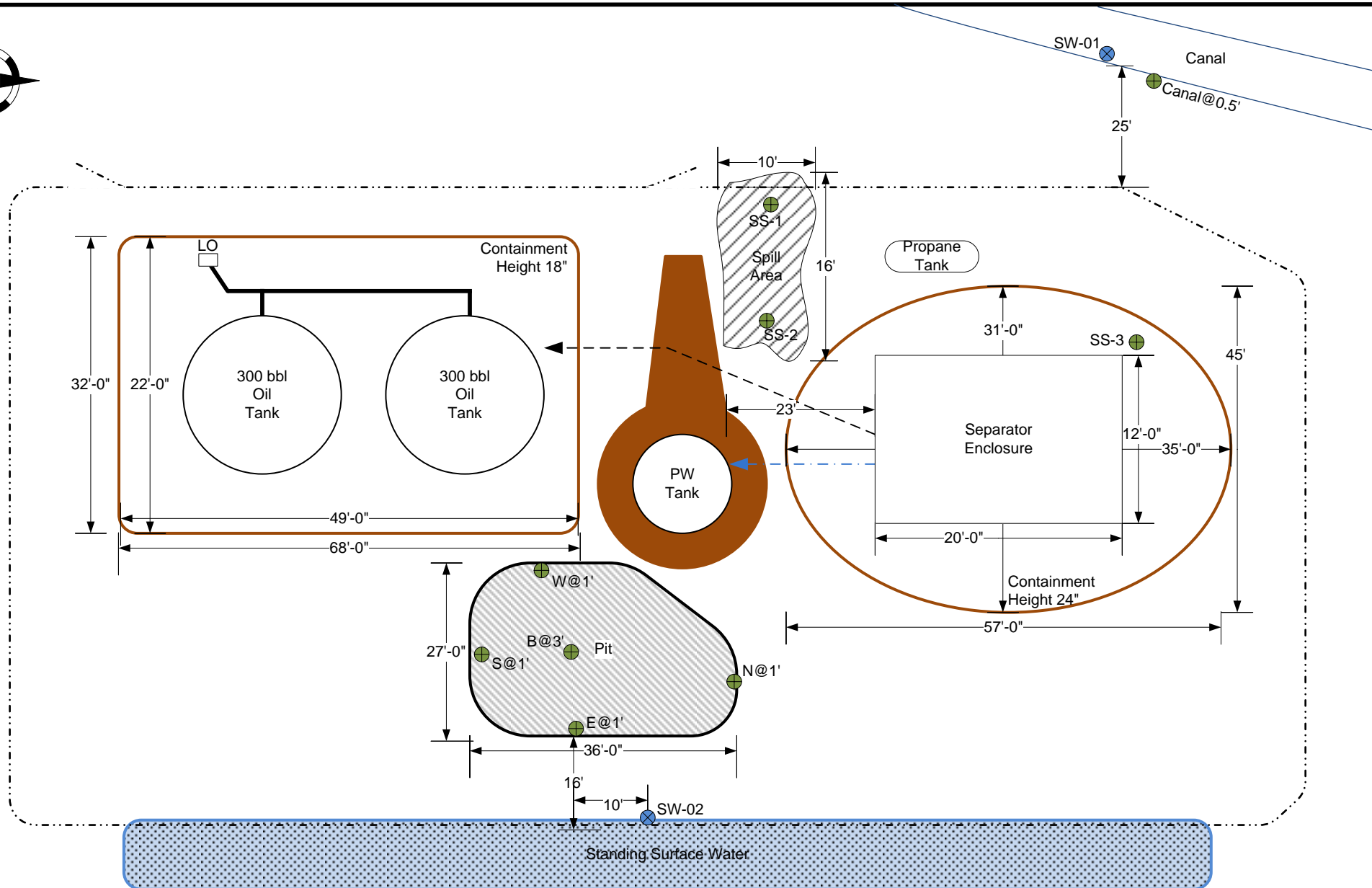
Sincerely,



Joseph J Egry IV
Laboratory Director

This report shall not be reproduced, except in its entirety, without the written approval of Summit Scientific. Test results relate only to samples analyzed.

Summit Scientific is the sole authority for authorizing edits or modifications to this document. Unauthorized modification of this report is strictly prohibited.



PROJECT NO:	Facility Diagram Foundation Energy Allard 30-8-5 T10N R79W S30 QSENE Jackson County, CO	 6899 Pecos Street, Unit C Denver, CO 80221 Office: 303 487 1228	LEGEND  Oil Dump  Water Dump  Earthen Berm  Fence  LO Load Out  Soil Sample  Water Sample	FIGURE 2 Not to Scale
DRAWN BY: DB				
DATE: 5/14/2013				



Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS1 1'	R306003-01	Soil	05/31/13 09:35	05/31/13 17:40
SS2 1'	R306003-02	Soil	05/31/13 09:40	05/31/13 17:40
SS3 1.5'	R306003-03	Soil	05/31/13 09:50	05/31/13 17:40

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

R306003

Summit Scientific

741 Corporate Circle Suite I ♦ Golden, Colorado 80401
303-277-9310 ♦ 303-374-5933 Fax

Client:	PENNY SERVICES		
Address:			
City/State/Zip:			
Phone:	720 257 2902	Fax:	
Sample Name:	ALPHA BERRY		
Project Manager:	ALPHA BERRY		
E-Mail:	ALPHA.BERRY@ALPHA.BERRY		
Project Name:	PENNY SERVICES		
Project Number:	PENNY SERVICES		

Page 1 of 1

Page | of

[illegible]

www.s2scientific.com

Summit Scientific

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Regel IV



Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

SS1 1'
R306003-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **05/31/13 09:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3060308	06/03/13	06/03/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: **05/31/13 09:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		95.8 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/31/13 09:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0050	mg/kg	1	3060307	06/03/13	06/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	0.010	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	3.7	0.50	"	"	"	"	"	"	

Date Sampled: **05/31/13 09:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		109 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		111 %	21-167		"	"	"	"	

Semivolatile Organic Compounds by EPA Method 8270D SIM

Date Sampled: **05/31/13 09:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	ND	5.00	ug/kg	1	3060512	06/07/13	06/09/13	EPA 8270D SIM	

Summit Scientific

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

SS1 1'
R306003-01 (Soil)

Summit Scientific

Semivolatile Organic Compounds by EPA Method 8270D SIM

Analyte	Result	Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthylene	ND	5.00	ug/kg	1	3060512	06/07/13	06/09/13	EPA 8270D SIM	
Anthracene	ND	5.00	"	"	"	"	"	"	
Benzo (a) anthracene	ND	5.00	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	5.00	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	5.00	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	5.00	"	"	"	"	"	"	
Benzo (a) pyrene	ND	5.00	"	"	"	"	"	"	
Chrysene	6.62	5.00	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	10.0	"	"	"	"	"	"	
Fluoranthene	ND	5.00	"	"	"	"	"	"	
Fluorene	19.2	5.00	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	10.0	"	"	"	"	"	"	
Naphthalene	ND	5.00	"	"	"	"	"	"	
Phenanthrene	33.8	5.00	"	"	"	"	"	"	
Pyrene	ND	5.00	"	"	"	"	"	"	

Date Sampled: 05/31/13 09:35

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10		102 %	50-150		"	"	"	"	
Surrogate: Fluoranthene-d10		116 %	50-150		"	"	"	"	

Total Metals by EPA Method 6020 - Dry Weight Basis

Date Sampled: 05/31/13 09:35

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	3.19	0.105	mg/kg dry	1	3060401	06/04/13	06/04/13	EPA 6020A	
Barium	94.3	0.105	"	"	"	"	"	"	
Cadmium	0.174	0.105	"	"	"	"	"	"	
Chromium	12.4	0.105	"	"	"	"	"	"	
Copper	11.1	0.523	"	"	"	"	"	"	
Lead	7.54	0.105	"	"	"	"	"	"	
Nickel	9.83	0.105	"	"	"	"	"	"	
Selenium	0.206	0.105	"	"	"	"	"	"	
Silver	ND	0.105	"	"	"	"	"	"	
Zinc	40.7	10.5	"	"	"	"	"	"	

Summit Scientific

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

SS1 1'
R306003-01 (Soil)

Summit Scientific

Total Metals by EPA Method 6020 - Dry Weight Basis

Total Mercury by EPA Method 7471/7470/245.1

Date Sampled: **05/31/13 09:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Mercury	ND	0.0544	mg/kg dry	1	3060501	06/05/13	06/06/13	EPA 7471	

Hexavalent Chromium by EPA 7199

Date Sampled: **05/31/13 09:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	1.24	mg/kg dry	1	3060506	06/05/13	06/06/13	EPA 7199	

Calculated Analytes

Date Sampled: **05/31/13 09:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium+3 Calculated	11.2	1.00	mg/kg	1	3060719	06/07/13	06/07/13	Calculation	

Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis

Date Sampled: **05/31/13 09:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	4080	3.34	mg/kg dry	1	3060402	06/04/13	06/04/13	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	711	1.24	"	"	"	"	"	"	
Sodium	2810	6.19	"	"	"	"	"	"	

Date Sampled: **05/31/13 09:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	10.7		units	"	3060714	06/07/13	06/07/13	"	

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Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

SS1 1'
R306003-01 (Soil)

Summit Scientific

Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **05/31/13 09:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	4.87	0.00100	mmhos/cm	1	3060406	06/04/13	06/04/13	SM 2510B	

Date Sampled: **05/31/13 09:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	9.42	0.100	pH Units	"	3060405	06/04/13	06/04/13	EPA 9045	

Date Sampled: **05/31/13 09:35**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	80.8		%	"	3060410	06/04/13	06/05/13	% calculation	

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6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

SS2 1'
R306003-02 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **05/31/13 09:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	ND	50	mg/kg	1	3060308	06/03/13	06/04/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: **05/31/13 09:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		104 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/31/13 09:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0050	mg/kg	1	3060307	06/03/13	06/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **05/31/13 09:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		112 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.7 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.0 %	21-167		"	"	"	"	

Semivolatile Organic Compounds by EPA Method 8270D SIM

Date Sampled: **05/31/13 09:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	ND	5.00	ug/kg	1	3060512	06/07/13	06/09/13	EPA 8270D SIM	

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6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

SS2 1'
R306003-02 (Soil)

Summit Scientific

Semivolatile Organic Compounds by EPA Method 8270D SIM

Analyte	Result	Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthylene	ND	5.00	ug/kg	1	3060512	06/07/13	06/09/13	EPA 8270D SIM	
Anthracene	ND	5.00	"	"	"	"	"	"	
Benzo (a) anthracene	ND	5.00	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	5.00	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	5.00	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	5.00	"	"	"	"	"	"	
Benzo (a) pyrene	ND	5.00	"	"	"	"	"	"	
Chrysene	ND	5.00	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	10.0	"	"	"	"	"	"	
Fluoranthene	ND	5.00	"	"	"	"	"	"	
Fluorene	ND	5.00	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	10.0	"	"	"	"	"	"	
Naphthalene	ND	5.00	"	"	"	"	"	"	
Phenanthrene	ND	5.00	"	"	"	"	"	"	
Pyrene	ND	5.00	"	"	"	"	"	"	

Date Sampled: 05/31/13 09:40

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10		98.8 %	50-150		"	"	"	"	
Surrogate: Fluoranthene-d10		114 %	50-150		"	"	"	"	

Total Metals by EPA Method 6020 - Dry Weight Basis

Date Sampled: 05/31/13 09:40

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	0.439	0.0915	mg/kg dry	1	3060401	06/04/13	06/04/13	EPA 6020A	
Barium	43.2	0.0915	"	"	"	"	"	"	
Cadmium	ND	0.0915	"	"	"	"	"	"	
Chromium	19.7	0.0915	"	"	"	"	"	"	
Copper	8.04	0.458	"	"	"	"	"	"	
Lead	2.89	0.0915	"	"	"	"	"	"	
Nickel	11.2	0.0915	"	"	"	"	"	"	
Selenium	0.138	0.0915	"	"	"	"	"	"	
Silver	ND	0.0915	"	"	"	"	"	"	
Zinc	30.6	9.15	"	"	"	"	"	"	

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6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

SS2 1'
R306003-02 (Soil)

Summit Scientific

Total Metals by EPA Method 6020 - Dry Weight Basis

Total Mercury by EPA Method 7471/7470/245.1

Date Sampled: **05/31/13 09:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Mercury	ND	0.0475	mg/kg dry	1	3060501	06/05/13	06/06/13	EPA 7471	

Hexavalent Chromium by EPA 7199

Date Sampled: **05/31/13 09:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	1.09	mg/kg dry	1	3060506	06/05/13	06/06/13	EPA 7199	

Calculated Analytes

Date Sampled: **05/31/13 09:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium+3 Calculated	18.6	1.00	mg/kg	1	3060719	06/07/13	06/07/13	Calculation	

Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis

Date Sampled: **05/31/13 09:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	442	2.95	mg/kg dry	1	3060402	06/04/13	06/04/13	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	109	1.09	"	"	"	"	"	"	
Sodium	107	5.47	"	"	"	"	"	"	

Date Sampled: **05/31/13 09:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	1.18		units	"	3060714	06/07/13	06/07/13	"	

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

SS2 1'
R306003-02 (Soil)

Summit Scientific

Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **05/31/13 09:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.590	0.00100	mmhos/cm	1	3060406	06/04/13	06/04/13	SM 2510B	

Date Sampled: **05/31/13 09:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	9.61	0.100	pH Units	"	3060405	06/04/13	06/04/13	EPA 9045	

Date Sampled: **05/31/13 09:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	91.4		%	"	3060410	06/04/13	06/05/13	% calculation	

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6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

SS3 1.5'
R306003-03 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **05/31/13 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (TEPH-DRO)	58	50	mg/kg	1	3060308	06/03/13	06/04/13	8015M	
C28-C36 (TEPH-ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: **05/31/13 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: <i>o</i> -Terphenyl		112 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **05/31/13 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0050	mg/kg	1	3060307	06/03/13	06/04/13	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.0050	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **05/31/13 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		110 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		91.6 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.0 %	21-167		"	"	"	"	

Semivolatile Organic Compounds by EPA Method 8270D SIM

Date Sampled: **05/31/13 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	ND	5.00	ug/kg	1	3060512	06/07/13	06/10/13	EPA 8270D SIM	

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

SS3 1.5'
R306003-03 (Soil)

Summit Scientific

Semivolatile Organic Compounds by EPA Method 8270D SIM

Analyte	Result	Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthylene	ND	5.00	ug/kg	1	3060512	06/07/13	06/10/13	EPA 8270D SIM	
Anthracene	ND	5.00	"	"	"	"	"	"	
Benzo (a) anthracene	ND	5.00	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	5.00	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	5.00	"	"	"	"	"	"	
Benzo (g,h,i) perylene	ND	5.00	"	"	"	"	"	"	
Benzo (a) pyrene	ND	5.00	"	"	"	"	"	"	
Chrysene	ND	5.00	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	10.0	"	"	"	"	"	"	
Fluoranthene	ND	5.00	"	"	"	"	"	"	
Fluorene	ND	5.00	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	10.0	"	"	"	"	"	"	
Naphthalene	ND	5.00	"	"	"	"	"	"	
Phenanthrene	ND	5.00	"	"	"	"	"	"	
Pyrene	ND	5.00	"	"	"	"	"	"	

Date Sampled: 05/31/13 09:50

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10		96.8 %	50-150		"	"	"	"	
Surrogate: Fluoranthene-d10		97.6 %	50-150		"	"	"	"	

Total Metals by EPA Method 6020 - Dry Weight Basis

Date Sampled: 05/31/13 09:50

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Arsenic	2.36	0.106	mg/kg dry	1	3060401	06/04/13	06/04/13	EPA 6020A	
Barium	120	0.106	"	"	"	"	"	"	
Cadmium	0.232	0.106	"	"	"	"	"	"	
Chromium	18.1	0.106	"	"	"	"	"	"	
Copper	15.0	0.532	"	"	"	"	"	"	
Lead	10.1	0.106	"	"	"	"	"	"	
Nickel	11.8	0.106	"	"	"	"	"	"	
Selenium	0.209	0.106	"	"	"	"	"	"	
Silver	ND	0.106	"	"	"	"	"	"	
Zinc	51.4	10.6	"	"	"	"	"	"	

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6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

SS3 1.5'
R306003-03 (Soil)

Summit Scientific

Total Metals by EPA Method 6020 - Dry Weight Basis

Total Mercury by EPA Method 7471/7470/245.1

Date Sampled: **05/31/13 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Mercury	ND	0.0626	mg/kg dry	1	3060501	06/05/13	06/06/13	EPA 7471	

Hexavalent Chromium by EPA 7199

Date Sampled: **05/31/13 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	1.25	mg/kg dry	1	3060506	06/05/13	06/06/13	EPA 7199	

Calculated Analytes

Date Sampled: **05/31/13 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium+3 Calculated	16.8	1.00	mg/kg	1	3060719	06/07/13	06/07/13	Calculation	

Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis

Date Sampled: **05/31/13 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	2180	3.38	mg/kg dry	1	3060402	06/04/13	06/04/13	EPA 6020/Mod. USDA60 6(2, 3A)	
Magnesium	627	1.25	"	"	"	"	"	"	
Sodium	711	6.26	"	"	"	"	"	"	

Date Sampled: **05/31/13 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Sodium Adsorption Ratio	3.45		units	"	3060714	06/07/13	06/07/13	"	

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6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

SS3 1.5'
R306003-03 (Soil)

Summit Scientific

Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **05/31/13 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Specific Conductance (EC)	0.936	0.00100	mmhos/cm	1	3060406	06/04/13	06/04/13	SM 2510B	

Date Sampled: **05/31/13 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
pH	9.39	0.100	pH Units	"	3060405	06/04/13	06/04/13	EPA 9045	

Date Sampled: **05/31/13 09:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
% Solids	79.9		%	"	3060410	06/04/13	06/05/13	% calculation	

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6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

Extractable Petroleum Hydrocarbons by 8015 - Quality Control
Summit Scientific

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 3060308 - EPA 3550A

Blank (3060308-BLK1)

Prepared & Analyzed: 06/03/13

C10-C28 (TEPH-DRO)	ND	50	mg/kg
C28-C36 (TEPH-ORO)	ND	50	"

LCS (3060308-BS1)

Prepared & Analyzed: 06/03/13

C10-C28 (TEPH-DRO)	480	50	mg/kg	501	95.9	73-134
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LCS Dup (3060308-BSD1)

Prepared & Analyzed: 06/03/13

C10-C28 (TEPH-DRO)	484	50	mg/kg	501	96.7	73-134	0.808	11
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Matrix Spike (3060308-MS1)

Source: R305297-05

Prepared & Analyzed: 06/03/13

C10-C28 (TEPH-DRO)	495	50	mg/kg	501	ND	98.7	50-148
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Matrix Spike Dup (3060308-MSD1)

Source: R305297-05

Prepared & Analyzed: 06/03/13

C10-C28 (TEPH-DRO)	490	50	mg/kg	501	ND	97.8	50-148	0.898	13
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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

Volatile Organic Compounds by EPA Method 8260B - Quality Control
Summit Scientific

Analyte	Reporting			Spike	Source	%REC			RPD	Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

Batch 3060307 - EPA 5030 Soil MS

Blank (3060307-BLK1)

Prepared & Analyzed: 06/03/13

Benzene	ND	0.0050	mg/kg							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.0050	"							
Gasoline Range Hydrocarbons	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	0.0368		"	0.0397		92.6	23-173			
Surrogate: Toluene-d8	0.0400		"	0.0400		100	20-170			
Surrogate: 4-Bromofluorobenzene	0.0427		"	0.0400		107	21-167			

LCS (3060307-BS1)

Prepared & Analyzed: 06/03/13

Benzene	0.0928	0.0050	mg/kg	0.100		92.8	58-130			
Toluene	0.111	0.0050	"	0.100		111	61-134			
Ethylbenzene	0.115	0.0050	"	0.100		115	74-139			
m,p-Xylene	0.225	0.010	"	0.200		112	73-137			
o-Xylene	0.111	0.0050	"	0.100		111	73-141			
Surrogate: 1,2-Dichloroethane-d4	0.0358		"	0.0397		90.2	23-173			
Surrogate: Toluene-d8	0.0414		"	0.0400		104	20-170			
Surrogate: 4-Bromofluorobenzene	0.0403		"	0.0400		101	21-167			

LCS Dup (3060307-BSD1)

Prepared & Analyzed: 06/03/13

Benzene	0.0878	0.0050	mg/kg	0.100		87.8	58-130	5.55	13	
Toluene	0.105	0.0050	"	0.100		105	61-134	5.25	16	
Ethylbenzene	0.117	0.0050	"	0.100		117	74-139	2.09	12	
m,p-Xylene	0.231	0.010	"	0.200		115	73-137	2.58	14	
o-Xylene	0.115	0.0050	"	0.100		115	73-141	3.18	12	
Surrogate: 1,2-Dichloroethane-d4	0.0359		"	0.0397		90.5	23-173			
Surrogate: Toluene-d8	0.0391		"	0.0400		97.8	20-170			
Surrogate: 4-Bromofluorobenzene	0.0410		"	0.0400		103	21-167			

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6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

Volatile Organic Compounds by EPA Method 8260B - Quality Control
Summit Scientific

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 3060307 - EPA 5030 Soil MS

Matrix Spike (3060307-MS1)		Source: R305297-05			Prepared & Analyzed: 06/03/13					
Benzene	0.0920	0.0050	mg/kg	0.100	ND	92.0	30-131			
Toluene	0.110	0.0050	"	0.100	ND	110	30-134			
Ethylbenzene	0.114	0.0050	"	0.100	ND	114	22-153			
m,p-Xylene	0.224	0.010	"	0.200	ND	112	10-159			
o-Xylene	0.110	0.0050	"	0.100	ND	110	31-151			
Surrogate: 1,2-Dichloroethane-d4	0.0377		"	0.0397		95.1	23-173			
Surrogate: Toluene-d8	0.0413		"	0.0400		103	20-170			
Surrogate: 4-Bromofluorobenzene	0.0406		"	0.0400		101	21-167			
Matrix Spike Dup (3060307-MSD1)		Source: R305297-05			Prepared & Analyzed: 06/03/13					
Benzene	0.0929	0.0050	mg/kg	0.100	ND	92.9	30-131	1.01	34	
Toluene	0.113	0.0050	"	0.100	ND	113	30-134	1.91	30	
Ethylbenzene	0.115	0.0050	"	0.100	ND	115	22-153	0.992	24	
m,p-Xylene	0.225	0.010	"	0.200	ND	113	10-159	0.789	68	
o-Xylene	0.113	0.0050	"	0.100	ND	113	31-151	2.58	38	
Surrogate: 1,2-Dichloroethane-d4	0.0391		"	0.0397		98.5	23-173			
Surrogate: Toluene-d8	0.0415		"	0.0400		104	20-170			
Surrogate: 4-Bromofluorobenzene	0.0413		"	0.0400		103	21-167			

Summit Scientific

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5
Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

Semivolatile Organic Compounds by EPA Method 8270D SIM - Quality Control
Summit Scientific

Analyte	Reporting			Spike	Source	%REC			RPD	Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

Batch 3060512 - EPA 5030 Soil MS

Blank (3060512-BLK1)

Prepared: 06/07/13 Analyzed: 06/09/13

Acenaphthene	ND	5.00	ug/kg							
Acenaphthylene	ND	5.00	"							
Anthracene	ND	5.00	"							
Benzo (a) anthracene	ND	5.00	"							
Benzo (b) fluoranthene	ND	5.00	"							
Benzo (k) fluoranthene	ND	5.00	"							
Benzo (g,h,i) perylene	ND	5.00	"							
Benzo (a) pyrene	ND	5.00	"							
Chrysene	ND	5.00	"							
Dibenz (a,h) anthracene	ND	10.0	"							
Fluoranthene	ND	5.00	"							
Fluorene	ND	5.00	"							
Indeno (1,2,3-cd) pyrene	ND	10.0	"							
Naphthalene	ND	5.00	"							
Phenanthrene	ND	5.00	"							
Pyrene	ND	5.00	"							
Surrogate: 2-Methylnaphthalene-d10	32.5		"	33.1		98.4	50-150			
Surrogate: Fluoranthene-d10	35.5		"	32.7		108	50-150			

LCS (3060512-BS1)

Prepared: 06/07/13 Analyzed: 06/09/13

Acenaphthene	34.0	5.00	ug/kg	33.3		102	48-131			
Acenaphthylene	35.0	5.00	"	33.3		105	49-130			
Anthracene	34.9	5.00	"	33.3		105	48-135			
Benzo (a) anthracene	32.3	5.00	"	33.3		97.0	37-142			
Benzo (b) fluoranthene	36.9	5.00	"	33.3		111	35-139			
Benzo (k) fluoranthene	36.9	5.00	"	33.3		111	30-139			
Benzo (g,h,i) perylene	35.6	5.00	"	33.3		107	30-132			
Benzo (a) pyrene	36.4	5.00	"	33.3		109	41-132			
Chrysene	35.0	5.00	"	33.3		105	30-136			
Dibenz (a,h) anthracene	36.3	10.0	"	33.3		109	24-127			
Fluoranthene	35.0	5.00	"	33.3		105	50-139			
Fluorene	35.1	5.00	"	33.3		105	50-130			
Indeno (1,2,3-cd) pyrene	35.1	10.0	"	33.3		105	26-139			
Naphthalene	31.5	5.00	"	33.3		94.5	40-135			
Phenanthrene	34.7	5.00	"	33.3		104	53-130			
Pyrene	32.0	5.00	"	33.3		96.0	39-141			
Surrogate: 2-Methylnaphthalene-d10	29.1		"	33.1		87.9	50-150			
Surrogate: Fluoranthene-d10	37.2		"	32.7		114	50-150			

Summit Scientific

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5
Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

Semivolatile Organic Compounds by EPA Method 8270D SIM - Quality Control
Summit Scientific

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 3060512 - EPA 5030 Soil MS

LCS Dup (3060512-BSD1)

Prepared: 06/07/13 Analyzed: 06/09/13

Acenaphthene	35.0	5.00	ug/kg	33.3	105	48-131	2.80	23	
Acenaphthylene	35.1	5.00	"	33.3	105	49-130	0.306	23	
Anthracene	33.7	5.00	"	33.3	101	48-135	3.36	28	
Benzo (a) anthracene	31.4	5.00	"	33.3	94.2	37-142	2.90	32	
Benzo (b) fluoranthene	36.8	5.00	"	33.3	110	35-139	0.314	30	
Benzo (k) fluoranthene	35.6	5.00	"	33.3	107	30-139	3.78	27	
Benzo (g,h,i) perylene	32.8	5.00	"	33.3	98.3	30-132	8.16	28	
Benzo (a) pyrene	36.8	5.00	"	33.3	110	41-132	1.00	25	
Chrysene	34.9	5.00	"	33.3	105	30-136	0.205	27	
Dibenz (a,h) anthracene	34.9	10.0	"	33.3	105	24-127	3.89	29	
Fluoranthene	38.1	5.00	"	33.3	114	50-139	8.66	26	
Fluorene	35.8	5.00	"	33.3	107	50-130	1.91	24	
Indeno (1,2,3-cd) pyrene	37.0	10.0	"	33.3	111	26-139	5.10	30	
Naphthalene	31.0	5.00	"	33.3	93.0	40-135	1.55	21	
Phenanthrene	32.6	5.00	"	33.3	97.8	53-130	6.22	25	
Pyrene	36.8	5.00	"	33.3	110	39-141	14.0	26	
Surrogate: 2-Methylnaphthalene-d10	34.4		"	66.1	52.0	50-150			
Surrogate: Fluoranthene-d10	39.8		"	65.5	60.7	50-150			

Matrix Spike (3060512-MS1)

Source: R306002-01

Prepared: 06/07/13 Analyzed: 06/10/13

Acenaphthene	26.4	5.00	ug/kg	33.3	ND	79.2	27-140	
Acenaphthylene	31.2	5.00	"	33.3	ND	93.6	24-136	
Anthracene	29.5	5.00	"	33.3	ND	88.6	23-144	
Benzo (a) anthracene	31.6	5.00	"	33.3	ND	94.8	12-168	
Benzo (b) fluoranthene	40.6	5.00	"	33.3	ND	122	10-170	
Benzo (k) fluoranthene	37.4	5.00	"	33.3	ND	112	11-150	
Benzo (g,h,i) perylene	22.4	5.00	"	33.3	ND	67.3	10-161	
Benzo (a) pyrene	32.2	5.00	"	33.3	ND	96.6	11-162	
Chrysene	29.5	5.00	"	33.3	ND	88.6	10-167	
Dibenz (a,h) anthracene	22.7	10.0	"	33.3	ND	68.2	10-128	
Fluoranthene	31.9	5.00	"	33.3	ND	95.8	18-157	
Fluorene	26.8	5.00	"	33.3	ND	80.4	37-133	
Indeno (1,2,3-cd) pyrene	20.9	10.0	"	33.3	ND	62.7	10-161	
Naphthalene	29.2	5.00	"	33.3	ND	87.7	10-157	
Phenanthrene	31.2	5.00	"	33.3	ND	93.5	10-156	
Pyrene	33.4	5.00	"	33.3	ND	100	10-166	
Surrogate: 2-Methylnaphthalene-d10	28.4		"	33.1	86.0	50-150		
Surrogate: Fluoranthene-d10	31.8		"	32.7	97.2	50-150		

Summit Scientific

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

Total Metals by EPA Method 6020 - Dry Weight Basis - Quality Control
Summit Scientific

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 3060401 - EPA 3050B

Blank (3060401-BLK1)

Prepared & Analyzed: 06/04/13

Arsenic	ND	0.100	mg/kg wet
Barium	ND	0.100	"
Cadmium	ND	0.100	"
Chromium	ND	0.100	"
Copper	ND	0.500	"
Lead	ND	0.100	"
Nickel	ND	0.100	"
Selenium	ND	0.100	"
Silver	ND	0.100	"
Zinc	ND	10.0	"

LCS (3060401-BS1)

Prepared & Analyzed: 06/04/13

Arsenic	2.39	0.100	mg/kg wet	2.40	99.7	80-120
Barium	221	0.100	"	216	102	80-120
Cadmium	0.940	0.100	"	0.960	97.9	80-120
Chromium	10.5	0.100	"	9.60	109	80-120
Copper	21.2	0.500	"	19.2	111	80-120
Lead	7.85	0.100	"	7.20	109	80-120
Nickel	15.5	0.100	"	14.4	108	80-120
Selenium	1.31	0.100	"	1.20	109	80-120
Silver	0.258	0.100	"	0.240	108	80-120
Zinc	7.50	10.0	"	7.20	104	80-120

LCS Dup (3060401-BSD1)

Prepared & Analyzed: 06/04/13

Arsenic	2.37	0.100	mg/kg wet	2.40	98.9	80-120	0.849	20
Barium	204	0.100	"	216	94.8	80-120	7.65	20
Cadmium	0.871	0.100	"	0.960	90.8	80-120	7.57	20
Chromium	10.0	0.100	"	9.60	104	80-120	4.33	20
Copper	20.4	0.500	"	19.2	107	80-120	3.56	20
Lead	7.37	0.100	"	7.20	102	80-120	6.25	20
Nickel	15.0	0.100	"	14.4	104	80-120	3.39	20
Selenium	1.22	0.100	"	1.20	102	80-120	7.00	20
Silver	0.248	0.100	"	0.240	104	80-120	3.76	20
Zinc	7.16	10.0	"	7.20	99.5	80-120	4.63	20

Summit Scientific

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

Total Metals by EPA Method 6020 - Dry Weight Basis - Quality Control
Summit Scientific

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 3060401 - EPA 3050B

Matrix Spike (3060401-MS1)		Source: R306003-01			Prepared & Analyzed: 06/04/13					
Arsenic	5.72	0.104	mg/kg dry	2.50	3.19	101	75-125			
Barium	297	0.104	"	225	94.3	90.0	75-125			
Cadmium	1.15	0.104	"	1.00	0.174	97.8	75-125			
Chromium	22.2	0.104	"	10.0	12.4	97.9	75-125			
Copper	30.1	0.522	"	20.0	11.1	94.9	75-125			
Lead	14.7	0.104	"	7.52	7.54	95.4	75-125			
Nickel	23.6	0.104	"	15.0	9.83	91.6	75-125			
Selenium	1.37	0.104	"	1.25	0.206	92.7	75-125			
Silver	0.309	0.104	"	0.250	0.0573	101	75-125			
Zinc	48.4	10.4	"	7.52	40.7	102	75-125			

Matrix Spike Dup (3060401-MSD1)		Source: R306003-01			Prepared & Analyzed: 06/04/13					
Arsenic	5.72	0.104	mg/kg dry	2.50	3.19	101	75-125	0.0271	25	
Barium	303	0.104	"	225	94.3	92.7	75-125	1.89	25	
Cadmium	1.16	0.104	"	1.00	0.174	98.5	75-125	0.430	25	
Chromium	22.7	0.104	"	10.0	12.4	103	75-125	2.12	25	
Copper	30.0	0.521	"	20.0	11.1	94.5	75-125	0.401	25	
Lead	15.5	0.104	"	7.51	7.54	107	75-125	5.50	25	
Nickel	23.8	0.104	"	15.0	9.83	93.2	75-125	0.909	25	
Selenium	1.42	0.104	"	1.25	0.206	97.0	75-125	3.78	25	
Silver	0.316	0.104	"	0.250	0.0573	104	75-125	2.25	25	
Zinc	50.3	10.4	"	7.51	40.7	127	75-125	3.86	25	QM-07

Summit Scientific

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

Total Mercury by EPA Method 7471/7470/245.1 - Quality Control
Summit Scientific

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 3060501 - EPA 7471A

Blank (3060501-BLK1)				Prepared: 06/05/13 Analyzed: 06/06/13						
Mercury	ND	0.0500	mg/kg wet							
LCS (3060501-BS1)				Prepared: 06/05/13 Analyzed: 06/06/13						
Mercury	0.391	0.0500	mg/kg wet	0.400		97.8	80-120			
LCS Dup (3060501-BSD1)				Prepared: 06/05/13 Analyzed: 06/06/13						
Mercury	0.394	0.0500	mg/kg wet	0.400		98.4	80-120	0.662	20	
Matrix Spike (3060501-MS1)				Source: R306002-01		Prepared: 06/05/13 Analyzed: 06/06/13				
Mercury	0.375	0.0466	mg/kg dry	0.373	0.00560	99.0	80-120			
Matrix Spike Dup (3060501-MSD1)				Source: R306002-01		Prepared: 06/05/13 Analyzed: 06/06/13				
Mercury	0.363	0.0464	mg/kg dry	0.371	0.00560	96.4	80-120	3.12	20	

Summit Scientific

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

Hexavalent Chromium by EPA 7199 - Quality Control
Summit Scientific

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 3060506 - General Preparation

Blank (3060506-BLK1)			Prepared: 06/05/13 Analyzed: 06/06/13							
Chromium, Hexavalent	ND	1.00	mg/kg wet							
LCS (3060506-BS1)			Prepared: 06/05/13 Analyzed: 06/06/13							
Chromium, Hexavalent	88.4	1.25	mg/kg wet	95.5		92.5	85-115			
LCS Dup (3060506-BSD1)			Prepared: 06/05/13 Analyzed: 06/06/13							
Chromium, Hexavalent	88.2	1.25	mg/kg wet	96.0		91.8	85-115	0.227	20	
Duplicate (3060506-DUP1)			Source: R306003-01		Prepared: 06/05/13 Analyzed: 06/06/13					
Chromium, Hexavalent	0.579	1.11	mg/kg dry		0.366			45.0	20	RPD-2
Matrix Spike (3060506-MS1)			Source: R306003-01		Prepared: 06/05/13 Analyzed: 06/06/13					
Chromium, Hexavalent	38.4	1.24	mg/kg dry	48.3	0.366	78.8	85-115			QM-05

Summit Scientific

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis - Quality Control
Summit Scientific

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 3060402 - General Preparation

Blank (3060402-BLK1)

Prepared & Analyzed: 06/04/13

Calcium	ND	2.70	mg/kg wet
Magnesium	ND	1.00	"
Sodium	ND	5.00	"

LCS (3060402-BS1)

Prepared & Analyzed: 06/04/13

Calcium	374	2.70	mg/kg wet	383	97.6	77-118
Magnesium	202	1.00	"	192	105	77-117
Sodium	516	5.00	"	479	108	80-119

LCS Dup (3060402-BSD1)

Prepared & Analyzed: 06/04/13

Calcium	340	2.70	mg/kg wet	383	88.7	77-118	9.56	14
Magnesium	171	1.00	"	192	89.2	77-117	16.7	12
Sodium	444	5.00	"	479	92.7	80-119	15.0	14

Matrix Spike (3060402-MS1)

Source: R306003-01

Prepared & Analyzed: 06/04/13

Calcium	4610	3.34	mg/kg dry	470	4080	111	13-170
Magnesium	925	1.24	"	236	711	90.7	34-152
Sodium	3530	6.19	"	588	2810	122	43-155

Matrix Spike Dup (3060402-MSD1)

Source: R306003-01

Prepared & Analyzed: 06/04/13

Calcium	4680	3.34	mg/kg dry	466	4080	128	13-170	1.57	37
Magnesium	938	1.24	"	234	711	96.9	34-152	1.32	33
Sodium	3490	6.19	"	583	2810	116	43-155	1.27	25

Summit Scientific

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

Physical Parameters by APHA/ASTM/EPA Methods - Quality Control
Summit Scientific

Analyte	Reporting			Spike	Source		%REC		RPD	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

Batch 3060405 - General Preparation

LCS (3060405-BS1)				Prepared & Analyzed: 06/04/13						
pH	8.05	0.100	pH Units	8.00	101	0-200				
Duplicate (3060405-DUP1)				Source: R305267-01		Prepared & Analyzed: 06/04/13				
pH	9.21	0.100	pH Units	9.21				0.00	20	

Batch 3060406 - General Preparation

Duplicate (3060406-DUP1)				Source: R305267-01		Prepared & Analyzed: 06/04/13				
Specific Conductance (EC)	85.4	0.00100	mmhos/cm	98.3				14.1	20	

Batch 3060410 - General Preparation

Duplicate (3060410-DUP1)				Source: R305267-01		Prepared: 06/04/13 Analyzed: 06/05/13				
% Solids	75.4		%	75.0				0.532	20	

Summit Scientific

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: FEM Allard 30-8-5

Project Number: [none]
Project Manager: Alyssa Beard

Reported:
06/10/13 20:05

Notes and Definitions

RPD-2 The RPD failure for the sample duplicate analysis is due analyte concentrations below 5x RL

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.

QM-05 The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The associated LCS and/or LCSD were within acceptance limits, therefore the data are considered valid.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference