



December 10, 2017

Mr. Ben Huggins
Great Western Operating Company, LLC
1801 Broadway, Suite 500
Denver, Colorado 80202

**RE: Closure Request: Confirmation Soil Sampling Report
Dittmer KE 29-032HN Production Facility Surface Release
Weld County, Colorado - Olsson Project #017-2902**

Dear Mr. Huggins,

Great Western Operating Company, LLC (GWOC) retained Olsson Associates (Olsson) to perform confirmation soil sampling at the Dittmer KE 29-032HN Production Facility (Site) following initial cleanup of an October 12, 2017 surface release that occurred beneath the separator units and within secondary containment. Olsson collected confirmation soil samples following removal of petroleum hydrocarbon impacted soils and submitted the samples for laboratory analysis. Olsson compared the laboratory results to the Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 concentrations levels.

This letter summarizes the project activities, presents the analytical results, and serves as the Closure Request for the October 12, 2017 release. An initial Form 19 Spill/Release Report (document number 401429897) was submitted to the COGCC on October 16, 2017. A copy of the initial Form 19 is included in Attachment A.

Site Location and Description

The Site is an active well pad and production facility located on the south side of Weld County Road 4, 0.9 miles east of U.S. Highway 85, in Weld County, Colorado. The Site is located in an agricultural area in the northeast quarter of the northwest quarter of Section 32, Township 1 North, Range 66 West of the 6th Principle Meridian. The ground surface in the vicinity of the Site slopes to the west. Two irrigation ponds are located approximately 860 feet to the west / southwest (topographically down-gradient). According to records at the Colorado Division of Water Resources, the nearest groundwater well is used for irrigation purposes and is located 590 feet to the northwest (topographically cross-gradient). Based on a review of permitted water wells in the area, depth to groundwater is approximately 20 feet below ground surface (bgs). The nearest residential structure is located approximately 950 feet to the north (topographically up-gradient). Figure 1 illustrates the general location of the Site.

Incident Description and Initial Response

A fire occurred at the separators on October 12, 2017. Approximately 30 barrels (bbls) of produced water and 10 bbls of oil were released within secondary containment as a result of the fire. Between 3 inches and 6 inches of soil was excavated and removed from the release area, and approximately 12 cubic yards (yd³) of impacted soil was transported to Waste Management's Buffalo Ridge Landfill in Kennesburg, Colorado.

A supplemental Form 19 Spill/Release Report was submitted to the COGCC on October 30, 2017 (document number 401443897), requesting that confirmation/closure soil sampling be postponed until construction and roustabout crews had departed the site. A copy of the supplemental Form 19 is included in Attachment A.

Olsson conducted soil sampling activities and the required release reporting in accordance with the COGCC 900 Series Rules. During this project, Olsson followed sampling procedures, equipment decontamination methods, and chain-of-custody procedures in accordance with U.S. Environmental Protection Agency (EPA) guidelines and COGCC 900 Series Rules.

Confirmation/Closure Soil Sampling Activities – November 1, 2017

Olsson visited the Site on November 1, 2017 and observed the release area within secondary containment, beneath the separators. Prior to Olsson personnel arriving onsite, GWOC had removed the damaged separators from the release area, excavated impacted soil beneath the separators, and installed new separators after the area beneath the new separators had been backfilled with 6 inches to 8 inches of clean base material. The dimensions of the impacted area measured approximately 52.5 feet by 32.5 feet.

Olsson collected four confirmation soil samples (DKEHN-5 through DKEHN-8) from beneath the backfill in the release area for field screening and laboratory analysis. The sample locations were recorded on a Trimble GeoExplorer 6000 series handheld global positioning system (Trimble) and are depicted on Figure 2. All soil samples were collected from 8 inches to 12 inches bgs in native brown, sandy, moist clay and placed into laboratory supplied glass jars, sealed, labeled, and placed into a cooler with ice. Olsson personnel observed a slight hydrocarbon odor in soil sample, DKEHN-7, that was collected from the release area, between the separator housings for separators 6 and 7.

The field soil screening consisted of placing a representative portion of each soil sample into a new re-sealable plastic bag, allowing the bag contents to equilibrate to the ambient air temperature, and volatile organic compounds to desorb from the soil. The air intake nozzle of a Mini Rae 3000 photo-ionization detector (PID) was introduced into the individual sample bags to measure the volatile organic vapors in the bags in parts per million (ppm). The soil sample PID field screening readings ranged from 3.8 ppm to 101.1 ppm and are included on Table 1.

Soil Analytical Methods and Results – November 1, 2017

On the day of collection, Olsson delivered the four soil samples to Origins Laboratory, Inc. (Origins) in Denver, Colorado for analysis. Origins analyzed each soil sample for benzene, toluene, ethylbenzene, total xylene (BTEX) and gasoline-range organics (GRO) by EPA Method 8260C and diesel-range organics (DRO) by EPA Method 8015C. The soil analytical results are illustrated on Figure 2 and included on Table 1. A copy of the laboratory report is included in Attachment B.

The laboratory reported that concentrations of BTEX were not detected at or above laboratory reporting limits in the four confirmation soil samples. In addition, concentrations of GRO and DRO were not detected at or above laboratory reporting limits in soil samples DKEHN-5 and DKEHN-6. The laboratory reported concentrations of GRO in soil samples DKEHN-7 (112 milligrams per kilogram (mg/kg)) and DKEHN-8 (29.5 mg/kg), but these concentrations were

below the COGCC Table 910-1 concentration level of 500 mg/kg. Concentrations of DRO were reported below the COGCC Table 910-1 concentration level of 500 mg/kg in soil sample DKEHN-8 (179 mg/kg). Concentrations of DRO were reported above the COGCC Table 910-1 concentration level in soil sample DKEHN-7 (1,180 mg/kg).

In accordance with COGCC requirements, GRO and DRO values were added together to obtain the total petroleum hydrocarbon (TPH) concentration. TPH concentrations were not detected at or above laboratory reporting limits in samples DKEHN-5 and DKEHN-6 and were reported below the COGCC Table 910-1 concentration level of 500 mg/kg in soil sample DKEHN-8 (208.5 mg/kg). Concentrations of TPH were reported above the COGCC Table 910-1 concentration level in soil sample DKEHN-7 (1,292 mg/kg).

Additional Soil Removal Confirmation/Closure Soil Sampling – November 21, 2017

The vertical extent of impact following the October 12, 2017 surface release was not determined during initial confirmation soil sampling activities and limited hydrocarbon impacted soil remained at the Site. Consequently, Olsson returned to the Site on November 21, 2017 to re-sample the soil in the release area in the containment. Prior to arrival, a hydro-vac truck was used to excavate an area measuring 5 feet wide by 4 feet long by 20 inches deep (1.25 yd³) between the separator housings for separators 6 and 7. The impacted soil was transported to Waste Management's Buffalo Ridge Landfill.

One confirmation/closure soil re-sample (DKEHN-7R) was collected from the excavation for field screening and laboratory analysis of GRO and DRO. The sample was collected directly below the initial sample location in native brown, moist clay from 20 inches to 24 inches bgs and placed into laboratory supplied glass jar, sealed, labeled, and placed into a cooler with ice. No soil staining or hydrocarbon odors were observed in the sample.

Field soil screening was performed by the same methods described above. The soil sample PID field screening reading was 1.0 ppm and is included on Table 1.

Confirmation/Closure Soil Analytical Results – November 21, 2017

On the day of collection, Olsson personnel hand delivered the sample to Origins. The confirmation/closure soil sample was submitted to Origins for analysis of GRO and DRO by the same methods described above. The soil analytical results are illustrated on Figure 2 and included on Table 1. A copy of the laboratory report is included in Attachment B.

Origins reported that GRO and DRO concentrations were not detected at or above laboratory reporting limits in the confirmation/closure soil sample DKEHN-7R.

Conclusions

Olsson conducted soil sampling activities at the Dittmer KE 29-032HN Production Facility on November 1, 2017 and November 21, 2017. The intent of the project was to collect confirmation/closure soil samples to assess the presence of petroleum hydrocarbon impacts, following excavation and removal of impacted soil as a result of a separator fire and subsequent surface release, above the COGCC Table 910-1 concentrations levels, and confirm that impacted soil had been excavated and disposed of properly.

Olsson recommends that GWOC request closure from COGCC for the separator fire release at this Site based on the following:

- No sensitive receptors were identified within 500 feet of the Site.
- Approximately 12 yd³ of soil inside secondary containment was excavated and disposed of at Waste Management's Buffalo Ridge Landfill.
- A hydro-vac truck was utilized to excavate an additional 1.25 yd³ of soil from the release area inside secondary containment. This soil was also disposed offsite.
- BTEX concentrations were not detected at or above laboratory reporting limits in the four confirmation/closure soil samples collected on November 1, 2017.
- TPH concentrations were not detected at or above laboratory reporting limits in soil samples DKEHN-5, and DKEHN-6 and were reported below the COGCC Table 910-1 concentration level in soil sample DKEHN-8 (208.5 mg/kg). Results for soil sample DKEHN-7 showed that DRO concentrations were above the Table 910-1 concentration level of 500 mg/kg.
- An additional confirmation soil sample, DKEHN-7R, was collected on November 21, 2017 following additional excavation. Analytical results showed that concentrations of GRO and DRO were not detected at or above the laboratory reporting limits.
- Groundwater was not encountered during this project and is expected to lie at a depth of 20 feet bgs.

Olsson Associates appreciates the opportunity to assist GWOC on this project. If you have any questions or require further information, please call us at 303-237-2072.

Sincerely,

Olsson Associates, Inc.



Jason E. Davidson, PG
Senior Geologist



James W. Hix, PG
Senior Geologist

TABLE

Table 1
Dittmer KE 29-032HN Production Facility Surface Release
Soil Analytical Summary
November 2017
Weld County, Colorado

Sample Number	Sample Date	Sample Depth (in-bgs)	PID (ppm)	BTEX (mg/kg)				TPH (mg/kg)			Sample Location
				Benzene	Toluene	Ethylbenzene	Total Xylenes	GRO (C6-C10 Range)	DRO (C10-C28 Range)	TPH=GRO+DRO	
*COGCC Table 910-1 Concentration Levels				0.17	85	100	175	500	500	500	
DKEHN-5	11/1/2017	8-12	4.4	<0.002	<0.002	<0.002	<0.002	<0.200	<50	<50	Between separators 8 and 9, center, west end
DKEHN-6	11/1/2017	8-12	3.8	<0.002	<0.002	<0.002	<0.002	<0.200	<50	<50	Between separators 7 and 8, center
DKEHN-7	11/1/2017	8-12	101.1	<0.050	<0.050	<0.050	<0.050	112	1,180	1,292	Between separators 6 and 7, center, east end
DKEHN-8	11/1/2017	8-12	50.8	<0.050	<0.050	<0.050	<0.050	29.5	179	208.5	Between separators 5 and 6, center
DKEHN-7R	11/21/2017	20-24	1.0	NA	NA	NA	NA	<0.100	<50	<50	Between separators 6 and 7, center, east end

*Colorado Oil and Gas Conservation Commission (COGCC), 900 Series, Exploration and Production Waste Management, Table 910-1, Concentration Levels, January 30, 2015

in-bgs - Inches below ground surface

mg/kg - Milligrams per kilogram

PID - Photo-ionization detector

ppm - Parts per million

BTEX - Benzene, toluene, ethylbenzene, total xylenes

TPH - Total petroleum hydrocarbons

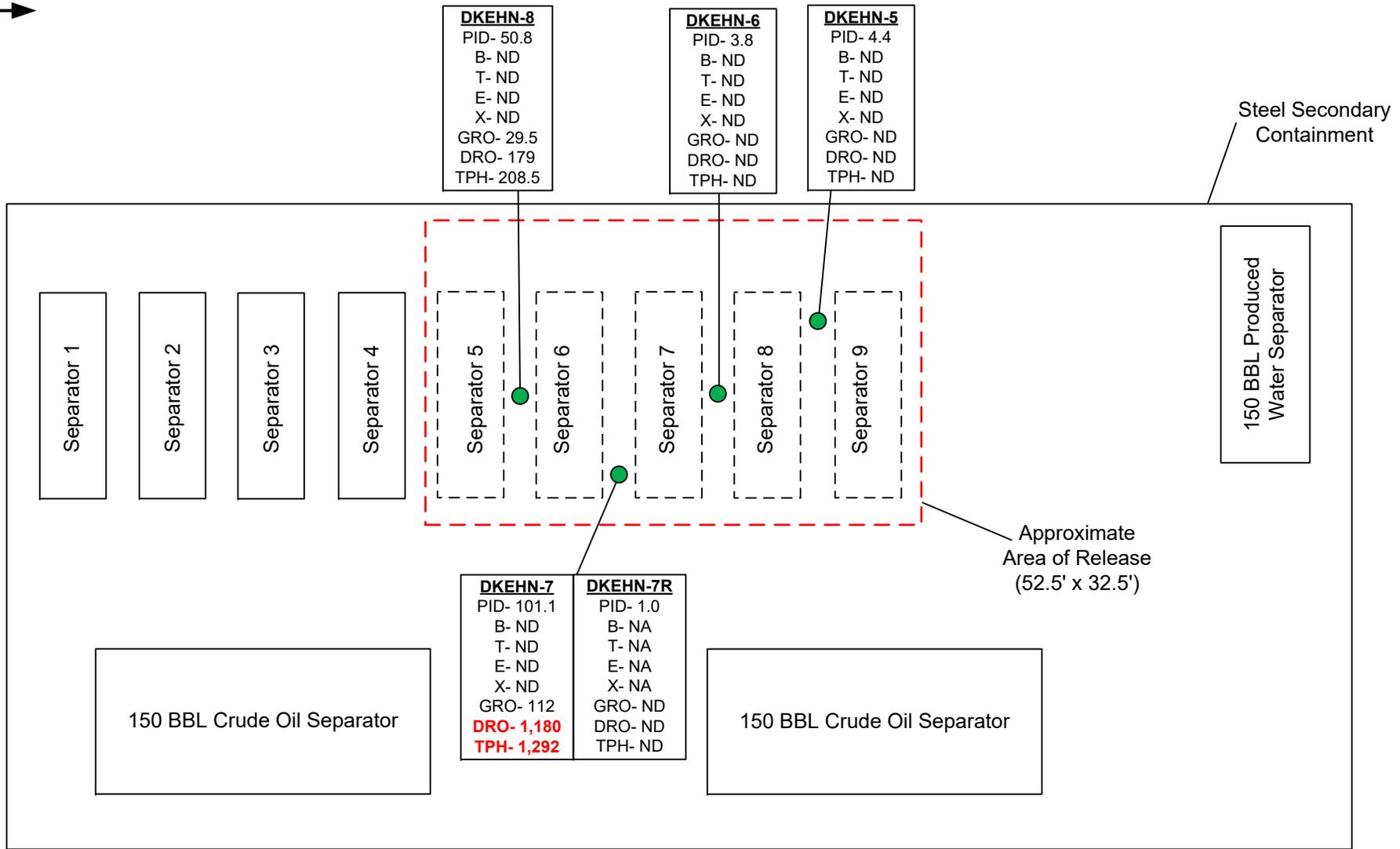
GRO - Gasoline range organics

DRO - Diesel range organics

NA - Not analyzed

Bold - Above COGCC Table 910-1 concentration level

FIGURES



DKEHN-8
 PID- 50.8
 B- ND
 T- ND
 E- ND
 X- ND
 GRO- 29.5
 DRO- 179
 TPH- 208.5

DKEHN-6
 PID- 3.8
 B- ND
 T- ND
 E- ND
 X- ND
 GRO- ND
 DRO- ND
 TPH- ND

DKEHN-5
 PID- 4.4
 B- ND
 T- ND
 E- ND
 X- ND
 GRO- ND
 DRO- ND
 TPH- ND

DKEHN-7
 PID- 101.1
 B- ND
 T- ND
 E- ND
 X- ND
 GRO- 112
DRO- 1,180
TPH- 1,292

DKEHN-7R
 PID- 1.0
 B- NA
 T- NA
 E- NA
 X- NA
 GRO- ND
 DRO- ND
 TPH- ND

● Soil Sample Location
 PID - Photoionization Detector reported in parts per million (ppm)
 ND - Not detected above laboratory detection limits
 NA - Not analyzed
 BTEX - Benzene, toluene, ethylbenzene, total xylenes
 GRO - Gasoline Range Organics
 DRO - Diesel Range Organics
 TPH - Total Petroleum Hydrocarbons
 BTEX/GRO/DRO/TPH reported in milligrams per kilogram (mg/kg)
Bold - Above COGCC Table 910-1 concentration level

PROJECT NO: 017-2902
 DRAWN BY: JED
 DATE: 11/22/2017

Sample Location and Analytical Results Map
 Dittmer KE 29-032HN Production Facility
 NENW S32 T1N R66W
 Weld County, Colorado

OLSSON
 ASSOCIATES

4690 Table Mountain Drive
 Suite 200
 Golden, CO 80403
 TEL 303-237-2072
 FAX 303-237-2659

FIGURE
 2

**ATTACHMENT A
COGCC INITIAL AND
SUPPLEMENTAL FORM 19**

State of Colorado
Oil and Gas Conservation Commission

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



Document Number:

401429897

Date Received:

10/16/2017

SPILL/RELEASE REPORT (INITIAL)

This form is to be submitted by the party responsible for the oil and gas spill or release. Refer to COGCC Rule 906.b. for reporting requirements of spills or releases of E&P Waste or produced fluids. Submit a Site Investigation and Remediation Workplan (Form 27) when requested by the Director.

Spill report taken by:

CANFIELD, CHRIS

Spill/Release Point ID:

453130

OPERATOR INFORMATION

Name of Operator: GREAT WESTERN OPERATING COMPANY LLC Operator No: 10110
Address: 1801 BROADWAY #500
City: DENVER State: CO Zip: 80202
Contact Person: Ben Huggins
Phone Numbers: Phone: (303) 398-0478 Mobile: () Email: bhuggins@gwogco.com

INITIAL SPILL/RELEASE REPORT

Initial Spill/Release Report Doc# 401429897

Initial Report Date: 10/16/2017 Date of Discovery: 10/12/2017 Spill Type: Recent Spill

Spill/Release Point Location:

Location of Spill/Release: QTRQTR NENW SEC 32 TWP 1N RNG 66W MERIDIAN 6

Latitude: 40.012016 Longitude: -104.801556

Municipality (if within municipal boundaries): County: WELD

Reference Location:

Facility Type: TANK BATTERY Facility/Location ID No 447013
No Existing Facility or Location ID No.
Well API No. (Only if the reference facility is well) 05-

Fluid(s) Spilled/Released (please answer Yes/No):

Was one (1) barrel or more spilled outside of berms or secondary containment? No

Secondary containment, including walls & floor regardless of construction material, must be sufficiently impervious to contain any discharge from primary containment until cleanup occurs.

Were Five (5) barrels or more spilled? Yes

Estimated Total Spill Volume: use same ranges as others for values

Estimated Oil Spill Volume(bbl): >=5 and <100 Estimated Condensate Spill Volume(bbl): 0

Estimated Flow Back Fluid Spill Volume(bbl): 0 Estimated Produced Water Spill Volume(bbl): >=5 and <100

Estimated Other E&P Waste Spill Volume(bbl): 0 Estimated Drilling Fluid Spill Volume(bbl): 0

Specify: 40 bbls total: 30 bbls produced water and 10 bbls oil released w/in containment

Land Use:

Current Land Use: CROP LAND Other(Specify):

Weather Condition: Clear, 75 degrees F

Surface Owner: FEE Other(Specify): Tim Dittmer

Check if impacted or threatened by spill/Release (please answer Yes/No to all that apply):

Waters of the State Residence/Occupied Structure Livestock Public Byway Surface Water Supply Area
As defined in COGCC 100-Series Rules

Describe what is known about the spill/release event (what happened -- including how it was stopped, contained, and recovered):

A fire occurred at the separators. Subsequently, thirty (30) bbls of produced water and ten (10) bbls of oil were released within containment.

List Agencies and Other Parties Notified:

OTHER NOTIFICATIONS

<u>Date</u>	<u>Agency/Party</u>	<u>Contact</u>	<u>Phone</u>	<u>Response</u>
10/13/2017	Weld County	Tom Parko	--	Email- tparko@co.weld.co.us
10/13/2017	Weld County	Roy Rudisill	--	Email- rrudisill@weldgov.com
10/13/2017	Weld County	Troy Swain	--	Email- tswain@weldgov.com
10/13/2017	Weld County	Gracie Marquez	--	Email- gmarquez@weldgov.com
10/13/2017	Weld County	Jay McDonald	--	Email- jmcdonald@weldgov.com
10/13/2017	COGCC	Chris Canfield	303-894-2100	Verbal- Left voicemail 10/13/17 at 2:45 pm
10/13/2017	Landowner	Tim Dittmer	303-548-4974	Verbal by Great Western 10/13/17 at 1:50 pm

OPERATOR COMMENTS:

--

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

Signed: _____ Print Name: Jason Davidson
 Title: Senior Geologist Date: 10/16/2017 Email: jdavidson@olssonassociates.com

COA Type

Description

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Attachment Check List

<u>Att Doc Num</u>	<u>Name</u>
401429897	SPILL/RELEASE REPORT(INITIAL)
401430494	TOPOGRAPHIC MAP
401430497	AERIAL PHOTOGRAPH
401468524	FORM 19 SUBMITTED

Total Attach: 4 Files

General Comments

<u>User Group</u>	<u>Comment</u>	<u>Comment Date</u>
		Stamp Upon Approval

Total: 0 comment(s)

State of Colorado
Oil and Gas Conservation Commission

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



Document Number:

401443897

Date Received:

10/30/2017

Spill report taken by:

Spill/Release Point ID:

SPILL/RELEASE REPORT (SUPPLEMENTAL)

This form is to be submitted by the party responsible for the oil and gas spill or release. Refer to COGCC Rule 906.b. for reporting requirements of spills or releases of E&P Waste or produced fluids. Submit a Site Investigation and Remediation Workplan (Form 27) when requested by the Director.

OPERATOR INFORMATION

Name of Operator: <u>GREAT WESTERN OPERATING COMPANY LLC</u>	Operator No: <u>10110</u>	Phone Numbers
Address: <u>1801 BROADWAY #500</u>		Phone: <u>(303) 398-0537</u>
City: <u>DENVER</u>	State: <u>CO</u>	Zip: <u>80202</u>
Contact Person: <u>Ben Huggins</u>		Mobile: <u>()</u>
		Email: <u>bhuggins@gwogco.com</u>

INITIAL SPILL/RELEASE REPORT

Initial Spill/Release Report Doc# 401429897

Initial Report Date: 10/16/2017 Date of Discovery: 10/12/2017 Spill Type: Recent Spill

Spill/Release Point Location:

Location of Spill/Release: QTRQTR NENW SEC 32 TWP 1N RNG 66W MERIDIAN 6

Latitude: 40.012016 Longitude: -104.801556

Municipality (if within municipal boundaries): _____ County: WELD

Reference Location:

Facility Type: TANK BATTERY Facility/Location ID No 447013
 No Existing Facility or Location ID No.
 Well API No. (Only if the reference facility is well) 05- -

Fluid(s) Spilled/Released (please answer Yes/No):

Was one (1) barrel or more spilled outside of berms or secondary containment? No

Secondary containment, including walls & floor regardless of construction material, must be sufficiently impervious to contain any discharge from primary containment until cleanup occurs.

Were Five (5) barrels or more spilled? Yes

Estimated Total Spill Volume: use same ranges as others for values

Estimated Oil Spill Volume(bbl): >=5 and <100 Estimated Condensate Spill Volume(bbl): 0

Estimated Flow Back Fluid Spill Volume(bbl): 0 Estimated Produced Water Spill Volume(bbl): >=5 and <100

Estimated Other E&P Waste Spill Volume(bbl): 0 Estimated Drilling Fluid Spill Volume(bbl): 0

Specify: 40 bbls total: 30 bbls produced water and 10 bbls oil released w/in containment

Land Use:

Current Land Use: CROP LAND Other(Specify): _____

Weather Condition: Clear, 75 degrees F

Surface Owner: FEE Other(Specify): Tim Dittmer

Check if impacted or threatened by spill/Release (please answer Yes/No to all that apply):

Waters of the State Residence/Occupied Structure Livestock Public Byway Surface Water Supply Area
As defined in COGCC 100-Series Rules

Describe what is known about the spill/release event (what happened -- including how it was stopped, contained, and recovered):

A fire occurred at the separators. Subsequently, thirty (30) bbls of produced water and ten (10) bbls of oil were released within containment.

List Agencies and Other Parties Notified:

OTHER NOTIFICATIONS

<u>Date</u>	<u>Agency/Party</u>	<u>Contact</u>	<u>Phone</u>	<u>Response</u>
10/13/2017	Weld County	Tom Parko	--	Email- tparko@co.weld.co.us
10/13/2017	Weld County	Roy Rudisill	--	Email- rrudisill@weldgov.com
10/13/2017	Weld County	Troy Swain	--	Email- tswain@weldgov.com
10/13/2017	Weld County	Gracie Marquez	--	Email- gmarquez@weldgov.com
10/13/2017	Weld County	Jay McDonald	--	Email- jmcdonald@weldgov.com
10/13/2017	COGCC	Chris Canfield	303-894-2100	Verbal- Left voicemail 10/13/17 at 2:45 pm
10/13/2017	Landowner	Tim Dittmer	303-548-4974	Verbal by Great Western 10/13/17 at 1:50 pm

REQUEST FOR CLOSURE

Spill/Release Reports should be closed when impacts have been remediated or when further investigation and corrective actions will take place under an approved Form 27.

Basis for Closure: Corrective Actions Completed (documentation attached)

Work proceeding under an approved Form 27

Form 27 Remediation Project No: _____

OPERATOR COMMENTS:

Additional assessment and confirmation sampling of the soil in the vicinity of the separators cannot occur until the construction/roustabout crew has departed the site. It is anticipated that confirmation soil sampling activities will ensue, as is necessary to meet COGCC standards, before the end of November 2017. The additional soil sampling activities will be documented on a follow-up Form 19 Supplemental.

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

Signed: _____ Print Name: Jason Davidson

Title: Senior Geologist Date: 10/30/2017 Email: j davidson@olssonassociates.com

COA Type

Description

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Attachment Check List

Att Doc Num

Name

401443897	FORM 19 SUBMITTED
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Total Attach: 1 Files

General Comments

User Group

Comment

Comment Date

<u>User Group</u>	<u>Comment</u>	<u>Comment Date</u>
		Stamp Upon Approval

Total: 0 comment(s)

**ATTACHMENT B
SOIL CONFIRMATION SAMPLES
LABORATORY REPORTS**

November 07, 2017

Olsson Associates

Jason Davidson

4690 Table Mountain Drive

Golden CO 80403

Project Name - Dittmer KE 29-032HN Release

Project Number - 017-2902

Attached are your analytical results for Dittmer KE 29-032HN Release received by Origins Laboratory, Inc. November 01, 2017. This project is associated with Origins project number Y711020-01.

The analytical results in the following report were analyzed under the guidelines of EPA Methods. These methods are identified as follows; "SW" are defined in SW-846, "EPA" are defined in 40CFR part 136 and "SM" are defined in the most current revision of Standard Methods For the Examination of Water and Wastewater.

The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. As such, this report shall not be reproduced except in full, without the written approval of Origin's laboratory.

Unless otherwise noted, the analytical results for all soil samples are reported on a wet weight basis. All analytical analyses were performed under NELAP guidelines unless noted by a data qualifier.

Any holding time exceedances, deviations from the method specifications or deviations from Origins Laboratory's Standard Operating Procedures are outlined in the case narrative.

Thank you for selecting Origins for your analytical needs. Please contact us with any questions concerning this report, or if we can help with anything at all.

Origins Laboratory, Inc.
303.433.1322
o-squad@oelabinc.com



Olsson Associates
4690 Table Mountain Drive
Golden CO 80403

Jason Davidson
Project Number: 017-2902
Project: Dittmer KE 29-032HN Release

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
DKEHN-5	Y711020-01	Soil	November 1, 2017 15:00	11/01/2017 17:50
DKEHN-6	Y711020-02	Soil	November 1, 2017 15:10	11/01/2017 17:50
DKEHN-7	Y711020-03	Soil	November 1, 2017 15:15	11/01/2017 17:50
DKEHN-8	Y711020-04	Soil	November 1, 2017 15:20	11/01/2017 17:50

Origins Laboratory, Inc.



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.

Olsson Associates
 4690 Table Mountain Drive
 Golden CO 80403

Jason Davidson
 Project Number: 017-2902
 Project: Dittmer KE 29-032HN Release

Origins Laboratory

F-012207-01-R1
 Effective Date: 01/09/12

Sample Receipt Checklist

Origins Work Order: 4711020

Client: OLSSON ASSC.

Client Project ID: Dittmer KE 29

Checklist Completed by: JD

Shipped Via: HD
 (UPS, FedEx, Hand Delivered, Pick-up, etc.)

Date/time completed: 11-2-17 1131

Airbill #: NA

Matrix(s) Received: (Check all that apply): Soil/Solid Water Other: _____

Cooler Number/Temperature: 1 / 8.1 °C _____ / _____ °C _____ / _____ °C (Describe)

Thermometer ID: TC03

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C ⁽¹⁾ ?		<input checked="" type="checkbox"/>		<u>sampled same day</u>
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.			<input checked="" type="checkbox"/>	
Are samples preserved that require preservation and was it checked ⁽¹⁾ ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)/(pH <2 for samples preserved with HNO3, HCL, H2SO4) / (pH >10 for samples preserved with NaAsO2+NaOH, ZnAc+NaOH)		<input checked="" type="checkbox"/>		
Additional Comments (if any):				

⁽¹⁾If NO, then contact the client before proceeding with analysis and note date/time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.

Reviewed by (Project Manager) [Signature]

11-2-17 1131
 Date/Time Reviewed

Origins Laboratory, Inc.

Jefe Pellegrini

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.

Olsson Associates
 4690 Table Mountain Drive
 Golden CO 80403

Jason Davidson
 Project Number: 017-2902
 Project: Dittmer KE 29-032HN Release

DKEHN-5
11/1/2017 3:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y711020-01 (Soil)

Diesel Range Organics (DRO/TEPH) by EPA 8015C

Diesel (C10-C28)	ND	50.0	mg/kg	1	B7K0204	11/02/2017	11/04/2017	U
<i>Surrogate: o-Terphenyl</i>	69.6 %	59-131			"	"	"	

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B7K0203	11/02/2017	11/03/2017	U
Benzene	ND	0.002	"	"	"	"	"	U
Toluene	ND	0.002	"	"	"	"	"	U
Ethylbenzene	ND	0.002	"	"	"	"	"	U
Xylenes, total	ND	0.002	"	"	"	"	"	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>	123 %	70-130			"	"	"	
<i>Surrogate: Toluene-d8</i>	81.3 %	70-130			"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>	96.6 %	70-130			"	"	"	

Origins Laboratory, Inc.



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Jason Davidson
 Project Number: 017-2902
 Project: Dittmer KE 29-032HN Release

DKEHN-6
11/1/2017 3:10:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y711020-02 (Soil)

Diesel Range Organics (DRO/TEPH) by EPA 8015C

Diesel (C10-C28)	ND	50.0	mg/kg	1	B7K0204	11/02/2017	11/04/2017	U
Surrogate: <i>o</i> -Terphenyl	71.4 %	59-131			"	"	"	

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B7K0203	11/02/2017	11/03/2017	U
Benzene	ND	0.002	"	"	"	"	"	U
Toluene	ND	0.002	"	"	"	"	"	U
Ethylbenzene	ND	0.002	"	"	"	"	"	U
Xylenes, total	ND	0.002	"	"	"	"	"	U
Surrogate: 1,2-Dichloroethane-d4	127 %	70-130			"	"	"	
Surrogate: Toluene-d8	79.3 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	99.2 %	70-130			"	"	"	

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Jason Davidson
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 Project: Dittmer KE 29-032HN Release

DKEHN-7
11/1/2017 3:15:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y711020-03 (Soil)

Diesel Range Organics (DRO/TEPH) by EPA 8015C

Diesel (C10-C28)	1180	50.0	mg/kg	1	B7K0204	11/02/2017	11/04/2017	
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Surrogate: <i>o</i> -Terphenyl	120 %	59-131			"	"	"	
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GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	112	5.00	mg/kg	25	B7K0203	11/02/2017	11/04/2017	
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Benzene	ND	0.050	"	"	"	"	"	U
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Toluene	ND	0.050	"	"	"	"	"	U
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Ethylbenzene	ND	0.050	"	"	"	"	"	U
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Xylenes, total	ND	0.050	"	"	"	"	"	U
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Surrogate: 1,2-Dichloroethane-d4	101 %	70-130			"	"	"	
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Surrogate: Toluene-d8	101 %	70-130			"	"	"	
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Surrogate: 4-Bromofluorobenzene	100 %	70-130			"	"	"	
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Jason Davidson
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DKEHN-8
11/1/2017 3:20:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y711020-04 (Soil)

Diesel Range Organics (DRO/TEPH) by EPA 8015C

Diesel (C10-C28)	179	50.0	mg/kg	1	B7K0204	11/02/2017	11/04/2017	
Surrogate: <i>o</i> -Terphenyl	83.4 %	59-131			"	"	"	

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	29.5	5.00	mg/kg	25	B7K0203	11/02/2017	11/04/2017	
Benzene	ND	0.050	"	"	"	"	"	U
Toluene	ND	0.050	"	"	"	"	"	U
Ethylbenzene	ND	0.050	"	"	"	"	"	U
Xylenes, total	ND	0.050	"	"	"	"	"	U
Surrogate: 1,2-Dichloroethane-d4	101 %	70-130			"	"	"	
Surrogate: Toluene-d8	101 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	98.8 %	70-130			"	"	"	

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7K0203 - EPA 5030 (soil)

Blank (B7K0203-BLK1)

Prepared: 11/02/2017 Analyzed: 11/02/2017

Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	80		ug/kg	62.5		127	70-130			
Surrogate: Toluene-d8	63		"	62.5		100	70-130			
Surrogate: 4-Bromofluorobenzene	70		"	62.5		112	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7K0203 - EPA 5030 (soil)

Blank (B7K0203-BLK2)

Prepared: 11/02/2017 Analyzed: 11/02/2017

Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	0.002	0.002	"							
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	70		ug/kg	62.5		113	70-130			
Surrogate: Toluene-d8	64		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	66		"	62.5		106	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7K0203 - EPA 5030 (soil)

Blank (B7K0203-BLK3)

Prepared: 11/02/2017 Analyzed: 11/03/2017

Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	72		ug/kg	62.5		115	70-130			
Surrogate: Toluene-d8	64		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	69		"	62.5		110	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7K0203 - EPA 5030 (soil)

LCS (B7K0203-BS1)

Prepared: 11/02/2017 Analyzed: 11/02/2017

Benzene	0.093	0.002	mg/kg	0.100		93.4	77.1-124			
Toluene	0.097	0.002	"	0.100		96.8	74.5-128			
Ethylbenzene	0.115	0.002	"	0.100		115	66.4-127			
m,p-Xylene	0.236	0.004	"	0.200		118	76.6-124			
o-Xylene	0.117	0.002	"	0.100		117	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	73		ug/kg	62.5		117	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7K0203 - EPA 5030 (soil)

LCS (B7K0203-BS2)

Prepared: 11/02/2017 Analyzed: 11/02/2017

Benzene	0.092	0.002	mg/kg	0.100		91.9	77.1-124			
Toluene	0.097	0.002	"	0.100		97.2	74.5-128			
Ethylbenzene	0.110	0.002	"	0.100		110	66.4-127			
m,p-Xylene	0.223	0.004	"	0.200		112	76.6-124			
o-Xylene	0.110	0.002	"	0.100		110	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	65		ug/kg	62.5		104	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		98.5	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7K0203 - EPA 5030 (soil)

LCS (B7K0203-BS3)

Prepared: 11/02/2017 Analyzed: 11/02/2017

Benzene	0.089	0.002	mg/kg	0.100		89.0	77.1-124			
Toluene	0.095	0.002	"	0.100		94.9	74.5-128			
Ethylbenzene	0.094	0.002	"	0.100		94.2	66.4-127			
m,p-Xylene	0.191	0.004	"	0.200		95.4	76.6-124			
o-Xylene	0.094	0.002	"	0.100		94.0	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	65		ug/kg	62.5		105	70-130			
Surrogate: Toluene-d8	64		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	54		"	62.5		87.0	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7K0203 - EPA 5030 (soil)

Matrix Spike (B7K0203-MS1)	Source: Y711037-03			Prepared: 11/02/2017 Analyzed: 11/02/2017						
Benzene	0.095	0.002	mg/kg	0.100	ND	94.6	71.8-126			
Toluene	0.098	0.002	"	0.100	ND	97.8	65.1-130			
Ethylbenzene	0.111	0.002	"	0.100	ND	111	62.2-130			
m,p-Xylene	0.223	0.004	"	0.200	ND	112	46.5-137			
o-Xylene	0.112	0.002	"	0.100	ND	112	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	69		ug/kg	62.5		110	70-130			
Surrogate: Toluene-d8	63		"	62.5		102	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7K0203 - EPA 5030 (soil)

Matrix Spike (B7K0203-MS2)	Source: Y711037-05			Prepared: 11/02/2017 Analyzed: 11/02/2017						
Benzene	0.079	0.002	mg/kg	0.100	ND	78.5	71.8-126			
Toluene	0.080	0.002	"	0.100	ND	80.5	65.1-130			
Ethylbenzene	0.090	0.002	"	0.100	ND	89.9	62.2-130			
m,p-Xylene	0.181	0.004	"	0.200	ND	90.6	46.5-137			
o-Xylene	0.091	0.002	"	0.100	ND	90.7	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	65		ug/kg	62.5		105	70-130			
Surrogate: Toluene-d8	65		"	62.5		104	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

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Jason Davidson
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 Project: Dittmer KE 29-032HN Release

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7K0203 - EPA 5030 (soil)

Matrix Spike (B7K0203-MS3)	Source: Y711037-01			Prepared: 11/02/2017 Analyzed: 11/02/2017						
Benzene	0.093	0.002	mg/kg	0.100	ND	92.6	71.8-126			
Toluene	0.099	0.002	"	0.100	ND	98.8	65.1-130			
Ethylbenzene	0.108	0.002	"	0.100	ND	108	62.2-130			
m,p-Xylene	0.218	0.004	"	0.200	ND	109	46.5-137			
o-Xylene	0.108	0.002	"	0.100	ND	108	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	67		ug/kg	62.5		107	70-130			
Surrogate: Toluene-d8	64		"	62.5		103	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	70-130			

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Jason Davidson
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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7K0203 - EPA 5030 (soil)

Matrix Spike Dup (B7K0203-MSD1)	Source: Y711037-03			Prepared: 11/02/2017 Analyzed: 11/02/2017						
Benzene	0.090	0.002	mg/kg	0.100	ND	90.3	71.8-126	4.65	11.3	
Toluene	0.092	0.002	"	0.100	ND	91.6	65.1-130	6.55	15.4	
Ethylbenzene	0.106	0.002	"	0.100	ND	106	62.2-130	4.78	19.6	
m,p-Xylene	0.217	0.004	"	0.200	ND	108	46.5-137	3.06	19.2	
o-Xylene	0.108	0.002	"	0.100	ND	108	54.2-134	3.57	17.9	
Surrogate: 1,2-Dichloroethane-d4	67		ug/kg	62.5		108	70-130			
Surrogate: Toluene-d8	65		"	62.5		104	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		98.9	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7K0203 - EPA 5030 (soil)

Matrix Spike Dup (B7K0203-MSD2)	Source: Y711037-05			Prepared: 11/02/2017 Analyzed: 11/02/2017						
Benzene	0.089	0.002	mg/kg	0.100	ND	88.6	71.8-126	12.1	11.3	QR-02
Toluene	0.090	0.002	"	0.100	ND	90.0	65.1-130	11.1	15.4	
Ethylbenzene	0.101	0.002	"	0.100	ND	101	62.2-130	11.7	19.6	
m,p-Xylene	0.206	0.004	"	0.200	ND	103	46.5-137	12.7	19.2	
o-Xylene	0.104	0.002	"	0.100	ND	104	54.2-134	13.6	17.9	
Surrogate: 1,2-Dichloroethane-d4	63		ug/kg	62.5		101	70-130			
Surrogate: Toluene-d8	62		"	62.5		99.5	70-130			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	70-130			

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Jason Davidson
 Project Number: 017-2902
 Project: Dittmer KE 29-032HN Release

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7K0203 - EPA 5030 (soil)

Matrix Spike Dup (B7K0203-MSD3)	Source: Y711037-01			Prepared: 11/02/2017 Analyzed: 11/02/2017						
Benzene	0.089	0.002	mg/kg	0.100	ND	89.3	71.8-126	3.65	11.3	
Toluene	0.094	0.002	"	0.100	ND	93.9	65.1-130	5.02	15.4	
Ethylbenzene	0.081	0.002	"	0.100	ND	80.9	62.2-130	28.7	19.6	QR-02
m,p-Xylene	0.164	0.004	"	0.200	ND	81.8	46.5-137	28.3	19.2	QR-02
o-Xylene	0.082	0.002	"	0.100	ND	82.2	54.2-134	26.9	17.9	QR-02
Surrogate: 1,2-Dichloroethane-d4	65		ug/kg	62.5		103	70-130			
Surrogate: Toluene-d8	63		"	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	49		"	62.5		78.8	70-130			

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Jason Davidson
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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Extractable Petroleum Hydrocarbons by 8015C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B7K0204 - EPA 3550B

Blank (B7K0204-BLK1)					Prepared: 11/02/2017 Analyzed: 11/02/2017					
Diesel (C10-C28)	ND	50.0	mg/kg							U
Surrogate: o-Terphenyl	46		"	50.0		92.7	59-131			
Blank (B7K0204-BLK2)					Prepared: 11/02/2017 Analyzed: 11/03/2017					
Diesel (C10-C28)	ND	50.0	mg/kg							U
Surrogate: o-Terphenyl	43		"	50.0		85.4	59-131			
Blank (B7K0204-BLK3)					Prepared: 11/02/2017 Analyzed: 11/02/2017					
Diesel (C10-C28)	ND	50.0	mg/kg							U
Surrogate: o-Terphenyl	40		"	50.0		80.9	59-131			
LCS (B7K0204-BS1)					Prepared: 11/02/2017 Analyzed: 11/02/2017					
Diesel (C10-C28)	892	50.0	mg/kg	1000		89.2	64-121			
Surrogate: o-Terphenyl	49		"	50.0		98.4	59-131			
LCS (B7K0204-BS2)					Prepared: 11/02/2017 Analyzed: 11/03/2017					
Diesel (C10-C28)	768	50.0	mg/kg	1000		76.8	64-121			
Surrogate: o-Terphenyl	48		"	50.0		96.5	59-131			
LCS (B7K0204-BS3)					Prepared: 11/02/2017 Analyzed: 11/02/2017					
Diesel (C10-C28)	818	50.0	mg/kg	1000		81.8	64-121			
Surrogate: o-Terphenyl	50		"	50.0		99.2	59-131			

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Olsson Associates
 4690 Table Mountain Drive
 Golden CO 80403

Jason Davidson
 Project Number: 017-2902
 Project: Dittmer KE 29-032HN Release

Extractable Petroleum Hydrocarbons by 8015C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B7K0204 - EPA 3550B										
Matrix Spike (B7K0204-MS1)		Source: Y710457-01			Prepared: 11/02/2017 Analyzed: 11/02/2017					
Diesel (C10-C28)	784	50.0	mg/kg	1000	ND	78.4	53-125			
Surrogate: o-Terphenyl	43		"	50.0		86.8	59-131			
Matrix Spike (B7K0204-MS2)		Source: Y710457-02			Prepared: 11/02/2017 Analyzed: 11/03/2017					
Diesel (C10-C28)	685	50.0	mg/kg	1000	ND	68.5	53-125			
Surrogate: o-Terphenyl	42		"	50.0		83.2	59-131			
Matrix Spike (B7K0204-MS3)		Source: Y711037-01			Prepared: 11/02/2017 Analyzed: 11/02/2017					
Diesel (C10-C28)	751	50.0	mg/kg	1000	ND	75.1	53-125			
Surrogate: o-Terphenyl	44		"	50.0		87.1	59-131			
Matrix Spike Dup (B7K0204-MSD1)		Source: Y710457-01			Prepared: 11/02/2017 Analyzed: 11/02/2017					
Diesel (C10-C28)	774	50.0	mg/kg	1000	ND	77.4	53-125	1.25	20	
Surrogate: o-Terphenyl	44		"	50.0		87.4	59-131			
Matrix Spike Dup (B7K0204-MSD2)		Source: Y710457-02			Prepared: 11/02/2017 Analyzed: 11/03/2017					
Diesel (C10-C28)	761	50.0	mg/kg	1000	ND	76.1	53-125	10.5	20	
Surrogate: o-Terphenyl	45		"	50.0		90.6	59-131			
Matrix Spike Dup (B7K0204-MSD3)		Source: Y711037-01			Prepared: 11/02/2017 Analyzed: 11/02/2017					
Diesel (C10-C28)	755	50.0	mg/kg	1000	ND	75.5	53-125	0.473	20	
Surrogate: o-Terphenyl	46		"	50.0		91.2	59-131			

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Olsson Associates
4690 Table Mountain Drive
Golden CO 80403

Jason Davidson
Project Number: 017-2902
Project: Dittmer KE 29-032HN Release

Notes and Definitions

U Sample is Non-Detect.

QR-02 The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

Origins Laboratory, Inc.



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.

Jen Pellegrini For Noelle Doyle Mathis, President

December 01, 2017

Olsson Associates

Jason Davidson

4690 Table Mountain Drive

Golden CO 80403

Project Name - Dittmer KE 29-032HN Release

Project Number - 017-2902

Attached are your analytical results for Dittmer KE 29-032HN Release received by Origins Laboratory, Inc. November 21, 2017. This project is associated with Origins project number Y711345-01.

The analytical results in the following report were analyzed under the guidelines of EPA Methods. These methods are identified as follows; "SW" are defined in SW-846, "EPA" are defined in 40CFR part 136 and "SM" are defined in the most current revision of Standard Methods For the Examination of Water and Wastewater.

The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. As such, this report shall not be reproduced except in full, without the written approval of Origin's laboratory.

Unless otherwise noted, the analytical results for all soil samples are reported on a wet weight basis. All analytical analyses were performed under NELAP guidelines unless noted by a data qualifier.

Any holding time exceedances, deviations from the method specifications or deviations from Origins Laboratory's Standard Operating Procedures are outlined in the case narrative.

Thank you for selecting Origins for your analytical needs. Please contact us with any questions concerning this report, or if we can help with anything at all.

Origins Laboratory, Inc.
303.433.1322
o-squad@oelabinc.com



Olsson Associates
4690 Table Mountain Drive
Golden CO 80403

Jason Davidson
Project Number: 017-2902
Project: Dittmer KE 29-032HN Release

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
DKEHN-7R	Y711345-01	Soil	November 21, 2017 8:45	11/21/2017 11:55

Origins Laboratory, Inc.



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.

Olsson Associates
 4690 Table Mountain Drive
 Golden CO 80403

Jason Davidson
 Project Number: 017-2902
 Project: Dittmer KE 29-032HN Release

Origins Laboratory

F-012207-01-R1
 Effective Date: 01/09/12

Sample Receipt Checklist

Origins Work Order: 4711345 Client: Olsson Assoc
 Client Project ID: Dittmer KE
 Checklist Completed by: JG Shipped Via: HD
 Date/time completed: 11/22/17 (UPS, FedEx, Hand Delivered, Pick-up, etc.)
 Airbill #: NA
 Matrix(s) Received: (Check all that apply): Soil/Solid Water Other: _____
 Cooler Number/Temperature: 1 / 5.8 °C / _____ °C / _____ °C (Describe) _____ °C
 Thermometer ID: T003

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C ^{(1)?}	/			
Is there ice present (document if blue ice is used)	/			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		/		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		/		
Were all samples received intact ^{(1)?}	/			
Was adequate sample volume provided ^{(1)?}	/			
Are short holding time analytes or samples with HTs due within 48 hours present ^{(1)?}		/		
Is a chain-of-custody (COC) present and filled out completely ^{(1)?}	/			
Does the COC agree with the number and type of sample bottles received ^{(1)?}	/			
Do the sample IDs on the bottle labels match the COC ^{(1)?}	/			
Is the COC properly relinquished by the client with date and time recorded ^{(1)?}	/			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.			/	
Are samples preserved that require preservation and was it checked ^{(1)?} (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)/(pH <2 for samples preserved with HNO ₃ , HCL, H ₂ SO ₄) / (pH >10 for samples preserved with Na ₂ SO ₂ +NaOH, ZnAc+NaOH)			/	
Additional Comments (if any):				

⁽¹⁾ If NO, then contact the client before proceeding with analysis and note date/time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.

Reviewed by (Project Manager) [Signature] Date/Time Reviewed 11/22/17

Origins Laboratory, Inc.

Jefe Pellegrini

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.

Olsson Associates
 4690 Table Mountain Drive
 Golden CO 80403

Jason Davidson
 Project Number: 017-2902
 Project: Dittmer KE 29-032HN Release

DKEHN-7R
11/21/2017 8:45:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y711345-01 (Soil)

Diesel Range Organics (DRO/TEPH) by EPA 8015C

Diesel (C10-C28)	ND	50.0	mg/kg	1	B7K2803	11/28/2017	11/30/2017	U
Surrogate: <i>o</i> -Terphenyl	79.6 %	59-131			"	"	"	

GRO/TVPH by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.100	mg/kg	1	B7K2802	11/28/2017	11/29/2017	U
Surrogate: 1,2-Dichloroethane-d4	95.9 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	101 %	70-130			"	"	"	
Surrogate: Toluene-d8	97.2 %	70-130			"	"	"	

Origins Laboratory, Inc.



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Olsson Associates
 4690 Table Mountain Drive
 Golden CO 80403

Jason Davidson
 Project Number: 017-2902
 Project: Dittmer KE 29-032HN Release

Extractable Petroleum Hydrocarbons by 8015C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B7K2803 - EPA 3550B										
Blank (B7K2803-BLK1)					Prepared: 11/28/2017 Analyzed: 11/29/2017					
Diesel (C10-C28)	ND	50.0	mg/kg							U
Surrogate: o-Terphenyl	41		"	50.0		81.0	59-131			
Blank (B7K2803-BLK2)					Prepared: 11/28/2017 Analyzed: 11/30/2017					
Diesel (C10-C28)	ND	50.0	mg/kg							U
Surrogate: o-Terphenyl	46		"	50.0		91.6	59-131			
LCS (B7K2803-BS1)					Prepared: 11/28/2017 Analyzed: 11/29/2017					
Diesel (C10-C28)	1000	50.0	mg/kg	1000		100	64-121			
Surrogate: o-Terphenyl	52		"	50.0		104	59-131			
LCS (B7K2803-BS2)					Prepared: 11/28/2017 Analyzed: 11/30/2017					
Diesel (C10-C28)	958	50.0	mg/kg	1000		95.8	64-121			
Surrogate: o-Terphenyl	50		"	50.0		100	59-131			
Matrix Spike (B7K2803-MS1)		Source: Y711344-01			Prepared: 11/28/2017 Analyzed: 11/29/2017					
Diesel (C10-C28)	938	50.0	mg/kg	1000	ND	93.8	53-125			
Surrogate: o-Terphenyl	48		"	50.0		96.4	59-131			
Matrix Spike (B7K2803-MS2)		Source: Y711345-01			Prepared: 11/28/2017 Analyzed: 11/30/2017					
Diesel (C10-C28)	945	50.0	mg/kg	1000	ND	94.5	53-125			
Surrogate: o-Terphenyl	54		"	50.0		107	59-131			
Matrix Spike Dup (B7K2803-MSD1)		Source: Y711344-01			Prepared: 11/28/2017 Analyzed: 11/29/2017					
Diesel (C10-C28)	880	50.0	mg/kg	1000	ND	88.0	53-125	6.46	20	
Surrogate: o-Terphenyl	50		"	50.0		101	59-131			
Matrix Spike Dup (B7K2803-MSD2)		Source: Y711345-01			Prepared: 11/28/2017 Analyzed: 11/30/2017					

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 Golden CO 80403

Jason Davidson
 Project Number: 017-2902
 Project: Dittmer KE 29-032HN Release

Extractable Petroleum Hydrocarbons by 8015C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B7K2803 - EPA 3550B										
Matrix Spike Dup (B7K2803-MSD2)		Source: Y711345-01			Prepared: 11/28/2017 Analyzed: 11/30/2017					
Diesel (C10-C28)	969	50.0	mg/kg	1000	ND	96.9	53-125	2.50	20	
Surrogate: o-Terphenyl	50		"	50.0		99.7	59-131			

Origins Laboratory, Inc.



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 Golden CO 80403

Jason Davidson
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Volatile Organic Compounds by EPA Method 8260B - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B7K2802 - EPA 5030 (soil)										
Blank (B7K2802-BLK3)					Prepared: 11/28/2017 Analyzed: 11/28/2017					
Gasoline Range Hydrocarbons	ND	0.100	mg/kg							U
Surrogate: 1,2-Dichloroethane-d4	76		ug/kg	62.5		122	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.5	70-130			
Surrogate: Toluene-d8	60		"	62.5		96.0	70-130			
LCS (B7K2802-BS3)					Prepared: 11/28/2017 Analyzed: 11/28/2017					
Gasoline Range Hydrocarbons	4.03	0.100	mg/kg	4.00		101	70-130			
Surrogate: 1,2-Dichloroethane-d4	63		ug/kg	62.5		101	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.2	70-130			
Surrogate: Toluene-d8	61		"	62.5		97.7	70-130			
LCS Dup (B7K2802-BSD3)					Prepared: 11/28/2017 Analyzed: 11/28/2017					
Gasoline Range Hydrocarbons	4.01	0.100	mg/kg	4.00		100	70-130	0.327	20	
Surrogate: 1,2-Dichloroethane-d4	62		ug/kg	62.5		99.0	70-130			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		98.8	70-130			
Surrogate: Toluene-d8	60		"	62.5		96.2	70-130			

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Olsson Associates
4690 Table Mountain Drive
Golden CO 80403

Jason Davidson
Project Number: 017-2902
Project: Dittmer KE 29-032HN Release

Notes and Definitions

U Sample is Non-Detect.

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

Origins Laboratory, Inc.



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Jen Pellegrini For Noelle Doyle Mathis, President