Skim Pit Conversion Report
for the
Lipplemann "P" Lease
Washington County, Colorado
COGCC Remediation # 9058

Prepared for:

Mr. Terry Pape
HRM Resources, LLC
410 17th Street, Suite 1100
Denver, CO 80202

Nicholson GeoSolutions, LLC
3433 East Lake Drive
Centennial, CO 80121

May 2016

1.0 INTRODUCTION

Nicholson GeoSolutions LLC was retained by HRM Resources, LLC to conduct sampling during skim pit conversion activities at the Lipplemann "P" Lease, an active oil well site located in the NW¼ NW¼ Section 31, T3S, R51W, Washington County, Colorado. Remediation activities were conducted in accordance with the Colorado Oil and Gas Conservation Commission (COGCC) Series 900 Rules.

A Form 27 Remediation Work Plan and Form 15 Earthen Pit Report were submitted to the COGCC prior to the start of work. The Forms are included in Appendix A of this report.

The site consists of three wellheads, two evaporation pits, a heater-treater, and a tank battery with three 400-bbl storage tanks. The skim pit was previously excavated in 2015 and associated impacted soil placed in a series of landfarm cells on site for treatment or sent to the Denver Arapahoe Disposal (DADS) landfill in Aurora, Colorado. During the winter of 2015/2016, the shared wall between the existing evaporation pit No. 1 and the former skim pit collapsed into the skim pit excavation. This material was excavated and placed in a new section of the existing landfarm on site. Excavation was performed by Jayhawk Grading, Inc.

This report provides the results of documentation and sampling activities conducted by Nicholson GeoSolutions on April 8th, 2016.

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2.0 DOCUMENTATION AND SAMPLING ACTIVITIES

The following sections discuss the documentation and sampling activities conducted by Nicholson GeoSolutions. Photographs that document the excavation of impacted materials and rebuilding of the former skim pit are included in Appendix B.

2.1 Sampling Activities

Excavation of the impacted material that collapsed into the former skim pit was conducted by Jayhawk. The most impacted soil (about 34 yards) was sent to the DADS landfill. Appendix C contains a summary of the landfill gatehouse ticket for this material. In addition, approximately 150 yards of impacted soil was placed in a new portion of the existing north landfarm cell on the site, as shown on Figure 1.

Confirmation samples were collected to assess whether compliance with the COGCC Table 910-1 standards had been achieved. Figure 1 provides the approximate limits of the excavation and the locations of the confirmation samples. The laboratory report is included in Appendix D.

Five confirmation samples were collected from the sidewalls and base of the former skim pit excavation in areas affected by the collapse on April 8th, 2016 and analyzed for sodium adsorption ratio (SAR), pH, conductivity, Total Volatile Petroleum Hydrocarbons (TVPH – gasoline range), Total Extractable Petroleum Hydrocarbons (TEPH – diesel and motor oil ranges), and BTEX compounds (benzene, toluene, ethylbenzene, and xylenes). Table 1 provides the confirmation sample results.

Table 1 Skim Pit Excavation Confirmation Sample Results

Sample ID, Location, and depth	pH	SAR	SC	BTEX	TVPH – Gasoline (mg/kg)	TEPH – Diesel (mg/kg)	TEPH – Motor Oil (mg/kg)
Lipplemann-C-6 (bottom – 20')	**9.31 J**	1.24	0.91	All ND	<0.5	42.3	19.8
Lipplemann-C-7 (south – 14')	**9.79 J**	1.46	0.758	All ND	<0.5	10.8	5.99
Lipplemann-C-8 (west – 14')	**9.61 J**	1.31	0.617	All ND	<0.5	<4.0	<4.0
Lipplemann-C-9 (bottom – 20')	8.86 J	3.10	1.15	All ND	<0.5	131	48.1
Lipplemann-C-10 (north – 14')	**9.54 J**	1.41	0.525	All ND	<0.5	20.8	6.04
Table 910-1 Standard	6-9	<12	<4.0	Various	500[1]	500[1]	500[1]

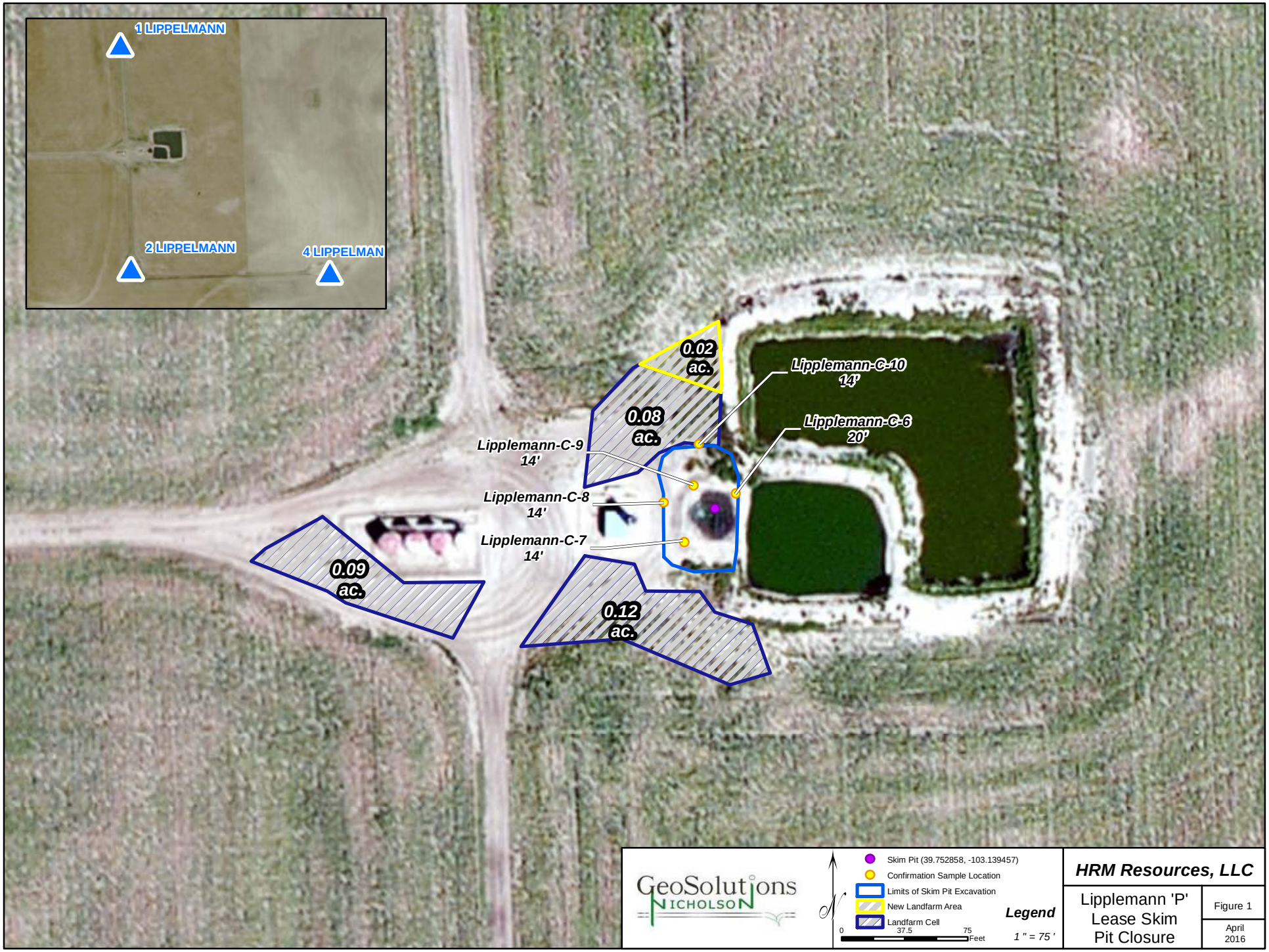
[1]The standard is 500 mg/kg for the combined TEPH/TVPH results
Bold values exceed standards ND = Not detected

All confirmation sample results were below the COGCC standards except for pH for four samples.

2.2 Data Quality Review

A data quality review was conducted using the quality assurance report supplied by the laboratory and standard EPA data validation guidance. All analyses were conducted within the recommended holding times. All method blank results were reported as not detected. All laboratory control sample (LCS), surrogate, laboratory duplicate, and matrix spike/matrix spike duplicate (MS/MSD) recoveries were within the laboratory control limits, except for pH (duplicate = 98%) and the TPH low fraction (MS = 26.4%; MSD = 26.4%). All pH results were qualified as estimated "J". All TPH low fraction (gasoline range) results were reported as not detected and qualified as estimate "UJ".

All results are usable for the intended purposes of this remediation.


1 LIPPELMANN
2 LIPPELMANN
4 LIPPELMAN
0.02 ac.
0.08 ac.
Lipplemann-C-10 14'
Lipplemann-C-6 20'
Lipplemann-C-9 14'
Lipplemann-C-8 14'
Lipplemann-C-7 14'
0.09 ac.
0.12 ac.
GeoSolutions NICHOLSON
Skim Pit (39.752858, -103.139457)
Confirmation Sample Location
Limits of Skim Pit Excavation
New Landfarm Area
Landfarm Cell
Legend
0 37.5 75 Feet
1 " = 75 '
HRM Resources, LLC
Lipplemann 'P' Lease Skim Pit Closure
Figure 1
April 2016

APPENDIX A
COGCC Form 27 and Form 15

Click here to reset form

FORM 15
Rev 10/11

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80205 Phone: (303) 894-2100 Fax: (303) 894-2109

OGCC RECEPTION

Document Number:

EARTHEN PIT REPORT / PERMIT

This form is to be used for both reporting and permitting pits. Rule 903 describes when a Permit with prior approval, or a Report within 30 days is required for pits. Submit required attachments and forms.

Form Type: ☐ PERMIT ☑ REPORT OGCC PIT NUMBER: 107549

NOTE: Operator to provide OGCC Pit Number only if available on an existing pit for pit report

ATTACHMENTS

Detailed Site Plan	
Design/Cross Sec	
Topo Map	
Calculations	
Sensitive Area Info	
Mud Program	
Form 2A	
Form 26	
Water Analysis	

OGCC Operator Number: 10,548 Contact Name: Terry Pape

Name of Operator: HRM Resources II LLC

Address: 410 17th Street, Suite 1100 Phone: (970) 768-5700

City: Denver State: CO Zip: 80202 Email: tpape@hrmres.com

Pit Location Information

Operator's Pit/Facility Name: Lipplemann "P" Operator's Pit/Facility Number: 107549

API Number (associated well): 05- 1210 5323 ____

OGCC Location ID (associated location): 316935 Or Form 2A # ____

Pit Location (QtrQtr, Sec, Twp, Rng, Meridian): ____ - ____ - ____ - ____

Latitude: 39.750860 Longitude: -103.139965 County: Washington

Operation Information

Pit Use/Type (Check all that apply): Pit Type: ☐ Lined ☑ Unlined

☐ Drilling: (Ancillary, Completion, Flowback, Reserve Pits) ☐ Oil-based Mud; ☐ Salt Sections or High Chloride Mud

☑ Production: ☐ Skimming/Settling; ☑ Produced Water Storage; ☑ Percolation; ☑ Evaporation

☐ Special Purpose: ☐ Flare; ☐ Emergency; ☐ Blowdown; ☐ Workover; ☐ Plugging; ☐ BS&W/Tank Bottoms

☐ Multi-Well Pit: Construction Date: 09/23/1999 Actual or Planned: ____

Method of treatment prior to discharge into pit: oil/water separator

Offsite disposal of pit contents: ☐ Injection; ☐ Commercial; ☐ Reuse/Recycle; ☐ NPDES; Permit Number: ____

Other Information: see attached plan for details

Site Conditions

Distance (in feet) to the nearest surface water: 3,000 Ground Water (depth): 50 Water Well: ____

Is this location in a Sensitive Area? Yes Existing Location? Yes

Pit Design and Construction

Size of Pit (in feet): Length: 75 Width: 53 Depth: 38 Calc. Volume (barrels): ____

Flow Rates (in bbl/day): Inflow: 2 Outflow: ____ Evaporation: ____ Percolation: ____

Primary Liner. Type: none Thickness (mil): ____

Seconday Liner (if present): Type: none Thickness (mil): ____

Is Pit Fenced? no Is Pit Netted? no Leak Detection? no

Other Information: ____

Operator Comments: ____

Certification

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

Signed: ____ Print Name: David K Nicholson

Title: Consultant to HRM Resources Email: dknicholson@q.com Date: 01/11/2016

Approval

Signed: ____ Title: ____ Date: ____

BMP

Type	Comment

Total: 0 comment(s)

CONDITIONS OF APPROVAL:

FORM
27
Rev 6/99

Click here to reset form

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

OGCC Employee:
☐ Spill ☐ Complaint
☐ Inspection ☐ NOAV
Tracking No:

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): Skim Pit Conversion

OGCC Operator Number: 10548
Name of Operator: HRM Resources II, LLC
Address: 410 17th Street, Suite 1100
City: Denver State: CO Zip: 80202

Contact Name and Telephone:
Terry Pape
No: (970) 768-5700
Fax: (303) 893-6892

API Number: 05-121-05323
County: Washington
Facility Name: Lipplemann
Facility Number: 107549
Well Name: Lipplemann #1
Well Number: 1
Location: (QtrQtr, Sec, Twp, Rng, Meridian): NWNW Sec. 31, T3S, R51W, 6PM Latitude: Longitude:

TECHNICAL CONDITIONS

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

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.): agricultural - grazing and cultivated

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: upland soils derived from glacial till

Potential receptors (water wells within 1/4 mi, surface waters, etc.): none

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

Impacted Media (check):	Extent of Impact:	How Determined:
☑ Soils	200 yards	visual estimate
☐ Vegetation		
☐ Groundwater		
☐ Surface Water		

REMEDIATION WORKPLAN

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

Impacted soil beneath the former skim pit was excavated during September 2015 and is currently being landfarmed on site. The shared wall with the adjacent evaporation pit no. 1 contained some impacted soil that was left in place at that time. This wall collapsed into the open skim pit excavation in December 2015.

Describe how source is to be removed:

The three Lipplemann wells will be shut-in to allow the skim pit excavation and adjacent breached evaporation pit No. 1 to be drained of water and dried. Impacted soil will then be excavated from the base and sidewalls of the skim pit excavation and the bottom of evaporation pit no. 1 as necessary. Impacted soil removed from the pit will be sent to the Denver Arapahoe Disposal landfill for disposal or added to the existing landfarm cells on site.

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.:

Impacted soil will be sent to the landfill or landfarmed on site. Following excavation, confirmation samples will be collected from the base and sidewalls of the skim pit excavation to confirm that soils that exceed the Table 910-1 standards for TPH have been removed. Confirmation samples will also be collected from the base of the evaporation pit if necessary. Materials placed in the landfarm will be periodically tilled and sampled to evaluate when the Table 910-1 standards have been achieved in accordance with the previous conditions of approval for this site. The evaporation pit berms will be extended to surround the skim pit excavation and the skim pit excavation will be merged with the adjacent evaporation pit no.1 and allowed to fill with produced water.

Submit Page 2 with Page 1

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

Tracking Number: _____
Name of Operator: _____
OGCC Operator No: _____
Received Date: _____
Well Name & No: _____
Facility Name & No: _____

Page 2

REMEDIATION WORKPLAN (Cont.)

OGCC Employee:

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

Impacts to groundwater have not been identified at the site.

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.

It is anticipated that no reclamation will be required. The existing landfarm cells were constructed on areas currently used for production activities. After Table 910-1 standards have been achieved, the landfarmed soil will be used to backfill the former skim pit excavation or used to construct berms as needed. Weeds will be controlled by spraying and mechanical removal as necessary.

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:

Confirmation samples will be collected from the base and sidewalls of the skim pit excavation and adjacent evaporation pit bottom as needed. The landfarm materials will be periodically sampled to evaluate progress in achieving the Table 910-1 standards in accordance with the previous conditions of approval for Remediation # 9058.

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

Oily soils will be disposed of at Denver Arapahoe Disposal (DADS) landfill. Other impacted soils and clean fill will be landfarmed on site and backfilled into the skim pit excavation or used to construct berms on site once the Table 910-1 standards have been achieved with approval from COGCC.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: _____	Date Site Investigation Completed: _____	Date Remediation Plan Submitted: Feb 17, 2016
Remediation Start Date: Feb 17, 2016	Anticipated Completion Date: May 31, 2016	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: David K Nicholson Signed: DK Nicholson

Title: Consultant to HRM Resources II LLC Date: February 17, 2016

OGCC Approved: _____ Title: _____ Date: _____

APPENDIX B
Photographs

Collapsed wall between evaporation pit and skim pit

Dewatering of skim pit excavation

Collapsed wall from evaporation pit side

Excavation of collapsed debris

Rebuilding of wall between pits after excavation

Final partial wall

Rebuilding of partial wall

Final pit configuration

APPENDIX C
Landfill Gatehouse Tickets

Ticket Date	Ticket ID	Cust Code	MAS Unique ID	Customer	Generator	Manifest	Profile	Truck	Material	Material Description	Origin	Rate Unit	Rate Qty	Yards	Tons
4/14/2016	946701	0000529	165222433001	HRM RESOURCES II, LLC	125-HRMRESOURCESIILLC	228427	122960CO	653108 SIDE DUMP	Cont Soil Pet-Tons	Cont. Soil - Petroleum	LIPPLEMANN	TON	24.99	17	24.99
4/14/2016	946710	0000529	165222433001	HRM RESOURCES II, LLC	125-HRMRESOURCESIILLC	228426	122960CO	653162 SIDE DUMP	Cont Soil Pet-Tons	Cont. Soil - Petroleum	LIPPLEMANN	TON	19.95	17	19.95
Material Total	13												265.64	208	265.64
3/8/2016	944852	0000529	165222433001	HRM RESOURCES II, LLC	125-HRMRESOURCESIILLC		122960CO	NONE	PRFEE	PROFILE PROCESSING FEE		EA	0	0	0
Material Total	1												0	0	0
Customer Total	14												265.64	208	265.64
Ticket Totals	14												265.64	208	265.64

External Customer	Loads	Yards	Tons
HRM RESOURCES II, LLC	13	208	265.64

APPENDIX D
Laboratory Report

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

Tax I.D. 62-0814289

Est. 1970

Dave Nicholson
HRM Resources, LLC - Denver, CO
410 17th Street, Suite 1100
Denver, CO 80202

Report Summary

Saturday April 16, 2016

Report Number: L828793
Samples Received: 04/09/16
Client Project:

Description: Lipplemann

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

Entire Report Reviewed By:

Mark W. Beasley , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01,1461-02, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197, FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704/BIO041, ND - R-140. NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1, TX - T104704245-11-3, OK - 9915, PA - 68-02979, IA Lab #364, EPA - TN002

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

Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

ESC LAB SCIENCES
YOUR LAB OF CHOICE

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(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Dave Nicholson
HRM Resources, LLC - Denver, CO
410 17th Street, Suite 1100
Denver, CO 80202

April 16, 2016

ESC Sample # : L828793-01

Date Received : April 09, 2016
Description : Lipplemann

Site ID :

Sample ID : LIPPLEMANN-C-6

Project # :

Collected By : Dave Nicholson
Collection Date : 04/08/16 10:40

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
pH	9.31	0.100	su	9045D	04/11/16	1
Sodium Adsorption Ratio	1.24			Calc	04/13/16	1
Specific Conductance	910.	0.0100	umhos/cm	9050AMod	04/14/16	1
Benzene	BDL	0.00250	mg/kg	8021	04/14/16	5
Toluene	BDL	0.0250	mg/kg	8021	04/14/16	5
Ethylbenzene	BDL	0.00250	mg/kg	8021	04/14/16	5
Total Xylene	BDL	0.00750	mg/kg	8021	04/14/16	5
TPH (GC/FID) Low Fraction	BDL	0.500	mg/kg	8015	04/14/16	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	101.		% Rec.	8015	04/14/16	1
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021	04/14/16	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	42.3	4.00	mg/kg	8015	04/15/16	1
C28-C40 Oil Range	19.8	4.00	mg/kg	8015	04/15/16	1
Surrogate Recovery						
o-Terphenyl	87.1		% Rec.	8015	04/15/16	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
The reported analytical results relate only to the sample submitted.

.
Reported: 04/16/16 17:22 Printed: 04/16/16 17:23
L828793-01 (PH) - 9.31 at 24.4c

ESC LAB SCIENCES
YOUR LAB OF CHOICE

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Tax I.D. 62-0814289

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REPORT OF ANALYSIS

Dave Nicholson
HRM Resources, LLC - Denver, CO
410 17th Street, Suite 1100
Denver, CO 80202

April 16, 2016

ESC Sample # : L828793-02

Date Received : April 09, 2016
Description : Lipplemann

Site ID :

Sample ID : LIPPLEMANN-C-7

Project # :

Collected By : Dave Nicholson
Collection Date : 04/08/16 11:00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
pH	9.79	0.100	su	9045D	04/11/16	1
Sodium Adsorption Ratio	1.46			Calc	04/13/16	1
Specific Conductance	758.	0.0100	umhos/cm	9050AMod	04/14/16	1
Benzene	BDL	0.00250	mg/kg	8021	04/14/16	5
Toluene	BDL	0.0250	mg/kg	8021	04/14/16	5
Ethylbenzene	BDL	0.00250	mg/kg	8021	04/14/16	5
Total Xylene	BDL	0.00750	mg/kg	8021	04/14/16	5
TPH (GC/FID) Low Fraction	BDL	0.500	mg/kg	8015	04/14/16	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	101.		% Rec.	8015	04/14/16	1
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021	04/14/16	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	10.8	4.00	mg/kg	8015	04/15/16	1
C28-C40 Oil Range	5.99	4.00	mg/kg	8015	04/15/16	1
Surrogate Recovery						
o-Terphenyl	92.7		% Rec.	8015	04/15/16	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
The reported analytical results relate only to the sample submitted.

.
Reported: 04/16/16 17:22 Printed: 04/16/16 17:23
L828793-02 (PH) - 9.76 at 24.6c

ESC LAB SCIENCES
YOUR LAB OF CHOICE

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REPORT OF ANALYSIS

Dave Nicholson
HRM Resources, LLC - Denver, CO
410 17th Street, Suite 1100
Denver, CO 80202

April 16, 2016

ESC Sample # : L828793-03

Date Received : April 09, 2016
Description : Lipplemann

Site ID :

Sample ID : LIPPLEMANN-C-8

Project # :

Collected By : Dave Nicholson
Collection Date : 04/08/16 11:05

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
pH	9.61	0.100	su	9045D	04/11/16	1
Sodium Adsorption Ratio	1.31			Calc	04/13/16	1
Specific Conductance	617.	0.0100	umhos/cm	9050AMod	04/14/16	1
Benzene	BDL	0.00250	mg/kg	8021	04/14/16	5
Toluene	BDL	0.0250	mg/kg	8021	04/14/16	5
Ethylbenzene	BDL	0.00250	mg/kg	8021	04/14/16	5
Total Xylene	BDL	0.00750	mg/kg	8021	04/14/16	5
TPH (GC/FID) Low Fraction	BDL	0.500	mg/kg	8015	04/14/16	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	101.		% Rec.	8015	04/14/16	1
a,a,a-Trifluorotoluene(PID)	104.		% Rec.	8021	04/14/16	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	BDL	4.00	mg/kg	8015	04/15/16	1
C28-C40 Oil Range	BDL	4.00	mg/kg	8015	04/15/16	1
Surrogate Recovery						
o-Terphenyl	92.8		% Rec.	8015	04/15/16	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
The reported analytical results relate only to the sample submitted.

.
Reported: 04/16/16 17:22 Printed: 04/16/16 17:23
L828793-03 (PH) - 9.61 at 24.5c

ESC LAB SCIENCES
YOUR LAB OF CHOICE

12065 Lebanon Rd.
Mt. Juliet, TN 37122
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REPORT OF ANALYSIS

Dave Nicholson
HRM Resources, LLC - Denver, CO
410 17th Street, Suite 1100
Denver, CO 80202

April 16, 2016

ESC Sample # : L828793-04

Date Received : April 09, 2016
Description : Lipplemann

Site ID :

Sample ID : LIPPLEMANN-C-9

Project # :

Collected By : Dave Nicholson
Collection Date : 04/08/16 11:10

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
pH	8.86	0.100	su	9045D	04/11/16	1
Sodium Adsorption Ratio	3.10			Calc	04/13/16	1
Specific Conductance	1150	0.0100	umhos/cm	9050AMod	04/14/16	1
Benzene	BDL	0.00250	mg/kg	8021	04/14/16	5
Toluene	BDL	0.0250	mg/kg	8021	04/14/16	5
Ethylbenzene	BDL	0.00250	mg/kg	8021	04/14/16	5
Total Xylene	BDL	0.00750	mg/kg	8021	04/14/16	5
TPH (GC/FID) Low Fraction	BDL	0.500	mg/kg	8015	04/14/16	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	101.		% Rec.	8015	04/14/16	1
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021	04/14/16	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	131.	4.00	mg/kg	8015	04/15/16	1
C28-C40 Oil Range	48.1	4.00	mg/kg	8015	04/15/16	1
Surrogate Recovery						
o-Terphenyl	80.2		% Rec.	8015	04/15/16	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
The reported analytical results relate only to the sample submitted.

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Reported: 04/16/16 17:22 Printed: 04/16/16 17:23
L828793-04 (PH) - 8.86 at 24.8c

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REPORT OF ANALYSIS

Dave Nicholson
HRM Resources, LLC - Denver, CO
410 17th Street, Suite 1100
Denver, CO 80202

April 16, 2016

ESC Sample # : L828793-05

Date Received : April 09, 2016
Description : Lipplemann

Site ID :

Sample ID : LIPPLEMANN-C-10

Project # :

Collected By : Dave Nicholson
Collection Date : 04/08/16 11:20

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
pH	9.54	0.100	su	9045D	04/11/16	1
Sodium Adsorption Ratio	1.41			Calc	04/13/16	1
Specific Conductance	525.	0.0100	umhos/cm	9050AMod	04/14/16	1
Benzene	BDL	0.00250	mg/kg	8021	04/14/16	5
Toluene	BDL	0.0250	mg/kg	8021	04/14/16	5
Ethylbenzene	BDL	0.00250	mg/kg	8021	04/14/16	5
Total Xylene	BDL	0.00750	mg/kg	8021	04/14/16	5
TPH (GC/FID) Low Fraction	BDL	0.500	mg/kg	8015	04/14/16	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	101.		% Rec.	8015	04/14/16	1
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021	04/14/16	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	20.8	4.00	mg/kg	8015	04/15/16	1
C28-C40 Oil Range	6.04	4.00	mg/kg	8015	04/15/16	1
Surrogate Recovery						
o-Terphenyl	87.8		% Rec.	8015	04/15/16	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
The reported analytical results relate only to the sample submitted.

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Reported: 04/16/16 17:22 Printed: 04/16/16 17:23
L828793-05 (PH) - 9.5 at 24.6c

Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L828793-01	WG863831	SAMP	TPH (GC/FID) Low Fraction	R3128946	J6
	WG863419	SAMP	pH	R3127985	T8
L828793-02	WG863419	SAMP	pH	R3127985	T8
L828793-03	WG863419	SAMP	pH	R3127985	T8
L828793-04	WG863419	SAMP	pH	R3127985	T8
L828793-05	WG863419	SAMP	pH	R3127985	T8

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low
T8	(ESC) - Additional method/sample information: Sample(s) received past/too close to holding time expiration.

Qualifier Report Information

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

Definitions

Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.

Precision - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Differrence.

Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromotography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.

TIC - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

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Quality Assurance Report
Level II

L828793

April 16, 2016

Laboratory Blank

Analyte	Result	Units	% Rec	Limit	Batch	Date Analyzed
Benzene	< .0005	mg/kg			WG863831	04/13/16 14:08
Ethylbenzene	< .0005	mg/kg			WG863831	04/13/16 14:08
Toluene	< .005	mg/kg			WG863831	04/13/16 14:08
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG863831	04/13/16 14:08
Total Xylene	< .0015	mg/kg			WG863831	04/13/16 14:08
a,a,a-Trifluorotoluene(FID)		% Rec.	101.0	59-128	WG863831	04/13/16 14:08
a,a,a-Trifluorotoluene(PID)		% Rec.	103.0	54-144	WG863831	04/13/16 14:08
Specific Conductance	1.95	umhos/cm			WG864404	04/14/16 16:52
C10-C28 Diesel Range	< 4	mg/kg			WG865018	04/15/16 09:24
C28-C40 Oil Range	< 4	mg/kg			WG865018	04/15/16 09:24
o-Terphenyl		% Rec.	88.60	50-150	WG865018	04/15/16 09:24

Duplicate

Analyte	Units	Result	Duplicate	RPD	Limit	Ref Samp	Batch
pH	su	9.34	9.31	0.322	1	L828793-01	WG863419
Specific Conductance	umhos/cm	2970	2970	0.0673	20	L828711-01	WG864404

Laboratory Control Sample

Analyte	Units	Known Val	Result	% Rec	Limit	Batch
pH	su	6.43	6.30	98.0*	98.5-101.5	WG863419
Benzene	mg/kg	.05	0.0473	94.6	70-130	WG863831
Ethylbenzene	mg/kg	.05	0.0528	106.	70-130	WG863831
Toluene	mg/kg	.05	0.0508	102.	70-130	WG863831
Total Xylene	mg/kg	.15	0.162	108.	70-130	WG863831
a,a,a-Trifluorotoluene(FID)				101.0	59-128	WG863831
a,a,a-Trifluorotoluene(PID)				105.0	54-144	WG863831
TPH (GC/FID) Low Fraction	mg/kg	5.5	5.12	93.0	63.5-137	WG863831
a,a,a-Trifluorotoluene(FID)				101.0	59-128	WG863831
a,a,a-Trifluorotoluene(PID)				106.0	54-144	WG863831
Specific Conductance	umhos/cm	653	657.	101.	90-110	WG864404
C10-C28 Diesel Range	mg/kg	60	42.3	70.5	50-100	WG865018
o-Terphenyl				85.90	50-150	WG865018

Laboratory Control Sample Duplicate

Analyte	Units	Result	Ref	%Rec	Limit	RPD	Limit	Batch
pH	su	6.30	6.30	98*	98.5-101.5	0.00	1	WG863419
Benzene	mg/kg	0.0456	0.0473	91.0	70-130	3.71	20	WG863831
Ethylbenzene	mg/kg	0.0509	0.0528	102.	70-130	3.68	20	WG863831
Toluene	mg/kg	0.0493	0.0508	98.0	70-130	3.02	20	WG863831
Total Xylene	mg/kg	0.157	0.162	104.	70-130	3.63	20	WG863831
a,a,a-Trifluorotoluene(FID)				101.0	59-128			WG863831
a,a,a-Trifluorotoluene(PID)				104.0	54-144			WG863831

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

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Quality Assurance Report
Level II

L828793

April 16, 2016

Laboratory Control Sample Duplicate

Analyte	Units	Result	Ref	%Rec	Limit	RPD	Limit	Batch
TPH (GC/FID) Low Fraction	mg/kg	5.08	5.12	92.0	63.5-137	0.800	20	WG863831
a,a,a-Trifluorotoluene(FID)				102.0	59-128			WG863831
a,a,a-Trifluorotoluene(PID)				106.0	54-144			WG863831
Specific Conductance	umhos/	656.	657.	100.	90-110	0.152	20	WG864404
C10-C28 Diesel Range	mg/kg	46.4	42.3	77.0	50-100	9.11	20	WG865018
o-Terphenyl				91.30	50-150			WG865018

Matrix Spike

Analyte	Units	MS Res	Ref Res	TV	% Rec	Limit	Ref Samp	Batch
Benzene	mg/kg	0.214	0.00	.05	85.7	49.7-127	L828793-01	WG863831
Ethylbenzene	mg/kg	0.233	0.00	.05	93.1	40.8-141	L828793-01	WG863831
Toluene	mg/kg	0.231	0.00	.05	92.3	49.8-132	L828793-01	WG863831
Total Xylene	mg/kg	0.716	0.00	.15	95.4	41.2-140	L828793-01	WG863831
a,a,a-Trifluorotoluene(FID)					100.0	59-128		WG863831
a,a,a-Trifluorotoluene(PID)					105.0	54-144		WG863831
TPH (GC/FID) Low Fraction	mg/kg	7.27	0.00	5.5	26.4*	28.5-138	L828793-01	WG863831
a,a,a-Trifluorotoluene(FID)					100.0	59-128		WG863831
a,a,a-Trifluorotoluene(PID)					104.0	54-144		WG863831
C10-C28 Diesel Range	mg/kg	77.0	42.3	60	57.9	50-100	L828793-01	WG865018
o-Terphenyl					77.40	50-150		WG865018

Matrix Spike Duplicate

Analyte	Units	MSD	Ref	%Rec	Limit	RPD	Limit	Ref Samp	Batch
Benzene	mg/kg	0.219	0.214	87.7	49.7-127	2.22	23.5	L828793-01	WG863831
Ethylbenzene	mg/kg	0.223	0.233	89.1	40.8-141	4.43	23.8	L828793-01	WG863831
Toluene	mg/kg	0.229	0.231	91.8	49.8-132	0.630	23.5	L828793-01	WG863831
Total Xylene	mg/kg	0.681	0.716	90.8	41.2-140	4.96	23.7	L828793-01	WG863831
a,a,a-Trifluorotoluene(FID)				100.0	59-128				WG863831
a,a,a-Trifluorotoluene(PID)				104.0	54-144				WG863831
TPH (GC/FID) Low Fraction	mg/kg	7.26	7.27	26.4*	28.5-138	0.140	23.6	L828793-01	WG863831
a,a,a-Trifluorotoluene(FID)				101.0	59-128				WG863831
a,a,a-Trifluorotoluene(PID)				104.0	54-144				WG863831
C10-C28 Diesel Range	mg/kg	76.9	77.0	57.7	50-100	0.160	20	L828793-01	WG865018
o-Terphenyl				76.40	50-150				WG865018

Batch number /Run number / Sample number cross reference

WG863419: R3127985: L828793-01 02 03 04 05
WG863788: R3128562: L828793-01 02 03 04 05
WG863831: R3128946: L828793-01 02 03 04 05
WG864404: R3129303: L828793-01 02 03 04 05
WG865018: R3129324: L828793-01 02 03 04 05

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

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Quality Assurance Report
Level II

L828793

April 16, 2016

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

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

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

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