District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources Department

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 24, 2018
Submit to appropriate OCD District office

Incident ID	NRM2005230899
District RP	
Facility ID	
Application ID	

Release Notification

DENIED
Please follow
Approved
Sampling plan.

Responsible Party

Responsible Party: Wapiti Operating, LLC	OGRID: 328741
Contact Name: Randy L. Madison	Contact Telephone: 575-445-6706
Contact email: rmadison@wapitienergy.com	Incident # *(assigned by OCD)* NRM2005230899
Contact mailing address: P.O. Box 190, 309 Silver St., Raton, NM 87740	

Location of Release Source

Latitude: N 36.97470 Longitude: W 104.81300
(NAD 83 in decimal degrees to 5 decimal places)

Site Name: VPR A-47	Site Type: Gas Well
Date Release Discovered: 2/11/20	API# *(if applicable)*: 30-007-20197

Unit Letter	Section	Township	Range	County
P	28	32N	20E	Colfax

Surface Owner: ☐ State ☐ Federal ☐ Tribal ☒ Private (*Name:* Vermejo Park Ranch)

Nature and Volume of Release

Material(s) Released (Select all that apply and attach calculations or specific justification for the volumes provided below)

☐ Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
☒ Produced Water	Volume Released (bbls): 356	Volume Recovered (bbls): 0
	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	☐ Yes ☒ No
☐ Condensate	Volume Released (bbls)	Volume Recovered (bbls)
☐ Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
☐ Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

Cause of Release: 2" water line froze and split along the length of the pipe. The length of the split was about 6 feet.

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State of New Mexico
Oil Conservation Division

Incident ID	
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Application ID	

Was this a major release as defined by 19.15.29.7(A) NMAC? ☒ Yes ☐ No	If YES, for what reason(s) does the responsible party consider this a major release? We calculated the amount of produced water to be about 356 Barrels.
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)? A phone call was made to Cory Smith. A follow-up email was also sent to Cory. Randy Madison made the notification	

Initial Response

The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury

☒ The source of the release has been stopped.
☐ The impacted area has been secured to protect human health and the environment.
☐ Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices.
☐ All free liquids and recoverable materials have been removed and managed appropriately.

If all the actions described above have not been undertaken, explain why:
The source was stopped by closing the valves on each end of the split pipe. The pipe was replaced. The water ran off the location and dissipated into the ground. The water presents no threat to humans or the environment. See the attached water analysis. See the attached map with GPS points showing the water did not get close to any water-ways or sources.

Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Randy L. Madison Title: HSE Specialist

Signature: Randy L Madison Date: 2/20/20

email: rmadison@wapitienergy.com Telephone: 575-445-6706

OCD Only

Received by: Date:

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Site Assessment/Characterization

This information must be provided to the appropriate district office no later than 90 days after the release discovery date.

What is the shallowest depth to groundwater beneath the area affected by the release?	Unknown ft.
Did this release impact groundwater or surface water?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	☐ Yes ☒ No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	☐ Yes ☒ No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	☐ Yes ☒ No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	☐ Yes ☒ No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	☐ Yes ☒ No
Are the lateral extents of the release within 300 feet of a wetland?	☐ Yes ☒ No
Are the lateral extents of the release overlying a subsurface mine?	☐ Yes ☒ No
Are the lateral extents of the release overlying an unstable area such as karst geology?	☐ Yes ☒ No
Are the lateral extents of the release within a 100-year floodplain?	☐ Yes ☒ No
Did the release impact areas **not** on an exploration, development, production, or storage site?	☒ Yes ☐ No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

Characterization Report Checklist: ***Each of the following items must be included in the report.***

☒ Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.
☒ Field data
☒ Data table of soil contaminant concentration data
☐ Depth to water determination
☒ Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release
☐ Boring or excavation logs
☐ Photographs including date and GIS information
☒ Topographic/Aerial maps
☒ Laboratory data including chain of custody

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

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Page 4

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Randy L. Madison Title: HSE Specialist

Signature: Randy L Madison Date: 3/30/20

email: rmadison@wapitienergy.com Telephone: 575-445-6706

OCD Only

Received by: Date:

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State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Remediation Plan

Remediation Plan Checklist: ***Each of the following items must be included in the plan.***

- ☐ Detailed description of proposed remediation technique
- ☐ Scaled sitemap with GPS coordinates showing delineation points
- ☐ Estimated volume of material to be remediated
- ☒ Closure criteria is to Table 1 specifications subject to 19.15.29.12(C)(4) NMAC
- ☐ Proposed schedule for remediation (note if remediation plan timeline is more than 90 days OCD approval is required)

Deferral Requests Only: ***Each of the following items must be confirmed as part of any request for deferral of remediation.***

- ☐ Contamination must be in areas immediately under or around production equipment where remediation could cause a major facility deconstruction.
- ☐ Extents of contamination must be fully delineated.
- ☒ Contamination does not cause an imminent risk to human health, the environment, or groundwater.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Randy L. Madison Title: HSE Specialist

Signature: Randy L Madison Date: 3/30/20

email: rmadison@wapitienergy.com Telephone: 575-445-6706

OCD Only

Received by: _____ Date: _____

☐ Approved ☐ Approved with Attached Conditions of Approval ☐ Denied ☐ Deferral Approved

Signature: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Closure

The responsible party must attach information demonstrating they have complied with all applicable closure requirements and any conditions or directives of the OCD. This demonstration should be in the form of a comprehensive report (electronic submittals in .pdf format are preferred) including a scaled site map, sampling diagrams, relevant field notes, photographs of any excavation prior to backfilling, laboratory data including chain of custody documents of final sampling, and a narrative of the remedial activities. Refer to 19.15.29.12 NMAC.

Closure Report Attachment Checklist: ***Each of the following items must be included in the closure report.***

☒ A scaled site and sampling diagram as described in 19.15.29.11 NMAC

☐ Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)

☒ Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)

☐ Description of remediation activities

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: Randy L. Madison Title: HSE Specialist

Signature: Randy L Madison Date: 3/30/20

email: rmadison@wapitienergy.com Telephone: 575-445-6706

OCD Only

Received by: _____ Date: _____

Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by: DENIED Date: _____

Printed Name: _____ Title: _____

WAPITI OPERATING, LLC

TO: Cory Smith, Environmental Specialist
NMOCD District 3 & 4
1000 Rio Brazos Rd.
Aztec, NM 87410

FR: Randy Madison, HSE Specialist

REF: Major Spill VPR A-47 API # 30-00720197, Incident # NRM2005230899

Mr. Smith,
Please find this cover letter as a request for closure of the above mentioned incident. It is Wapiti's understanding that there is no remediation required per the attached soil sample results in reference to the Table 1 requirements. Pictures have also been distributed detailing the snow cover at the time of the release.

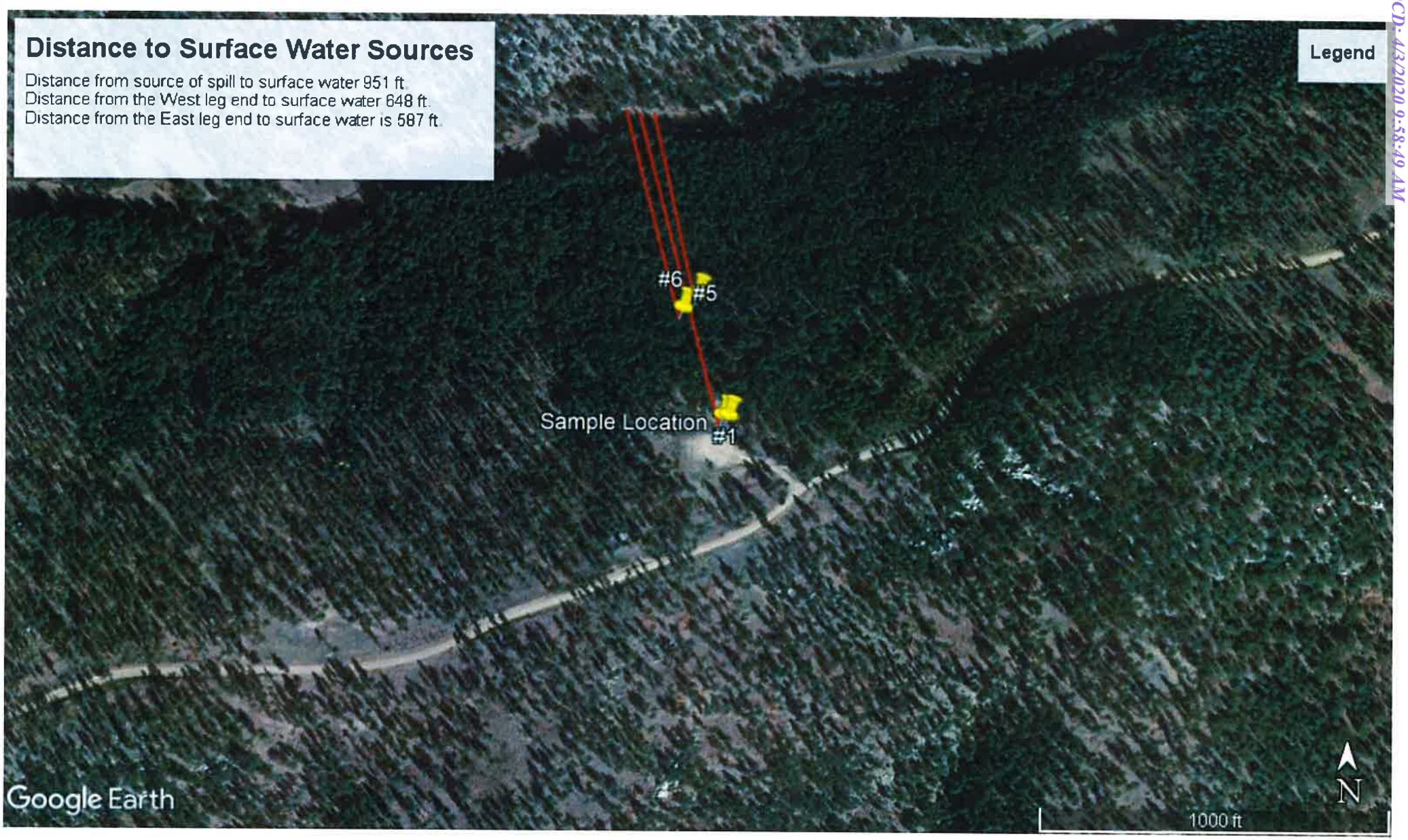
Produced water quality data from the wells associated with or representative of the spill are attached with this filing. . From the test data, it can be assumed that long term or negative effects to soil chemistry from low volume acute CBM produced water spills are generally surficial and benign, in that the water does not contain hydrocarbons; the TDS is significantly less than 10,000 mg/L, and the produced water is of suitable quality for livestock watering, wildlife and in many cases surface discharged.

Wapiti collected a soil sample at the head of the release. The results are attached and well within the limits of Table 1 at > 100 ft. It is believed that additional sampling would be of little additional benefit based on the pre-discussed benign nature of the produced fluids. Maps are included to provide an overview of distance to surface and ground water. The ground water monitoring wells are 2 arroyos (more than 1.4 miles) from the spill location.

With all the information supplied we meet all the designated requirements detailed in 19.15.29.9, 19.15.29.10 and 19.15.29.11. It is important to note that the surface owner would not allow Wapiti to clear land outside of the designated ROWs.

Kinds Regards,

Randy L. Madison, HSE Specialist



A-47 Spill of Produced Water GPS points

1. N. 36.9747
   W. 104.81300

2. N. 36.97482
   W. 104.81323

3. N. 36.97509
   W. 104.81324

4. N. 36.9750
   W. 104.81327

5. N 36.97552
   W. 104.81343

6. N. 36.97563
   W. 104.81329

7. N. 36.97547
   W. 104.81327

8. N 36.97551
   W. 104.8132

9. N. 36.97500
   W. 104.81323

BAKER HUGHES

Central Area Laboratory
12701 N. Santa Fe Ave, Suite 151
Oklahoma City, Oklahoma 73114

Upstream Chemicals

REPORT DATE: 2/18/2020

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER:	WAPITI OPERATING	**ACCOUNT REP:**	TY L. CLINESMITH
DISTRICT:	OKLAHOMA	**SAMPLE ID:**	201910011049
AREA/LEASE:	VERMEJO PARK RANCH	**SAMPLE DATE:**	7/31/2019
SAMPLE POINT NAME	VPR A 47	**ANALYSIS DATE:**	11/21/2019
SITE TYPE:	WELL SITES	**ANALYST:**	BS
SAMPLE POINT DESCRIPTION:	WELL HEAD		

WAPITI OPERATING, VERMEJO PARK RANCH, VPR A 47

FIELD DATA		ANALYSIS OF SAMPLE					
		ANIONS:	mg/L	meq/L	CATIONS:	mg/L	meq/L
Initial Temperature (°F):	250	Chloride (Cl^-):	702.2	19.8	Sodium (Na^+):	928.6	40.4
Final Temperature (°F):	68	Sulfate (SO_4^{2-}):	0.0	0.0	Potassium (K^+):	3.2	0.1
Initial Pressure (psi):	100	Borate (H_3BO_3):	0.0	0.0	Magnesium (Mg^{2+}):	2.9	0.2
Final Pressure (psi):	15	Fluoride (F^-):	ND		Calcium (Ca^{2+}):	9.9	0.5
		Bromide (Br^-):	ND		Strontium (Sr^{2+}):	2.4	0.1
pH:		Nitrite (NO_2^-):	ND		Barium (Ba^{2+}):	2.3	0.0
pH at time of sampling:	8.0	Nitrate (NO_3^-):	ND		Iron (Fe^{2+}):	0.9	0.0
		Phosphate (PO_4^{3-}):	0.9	0.0	Manganese (Mn^{2+}):	0.0	0.0
		Silica (SiO_2):	ND		Lead (Pb^{2+}):	ND	
					Zinc (Zn^{2+}):	0.0	0.0
ALKALINITY BY TITRATION:	mg/L	meq/L					
Bicarbonate (HCO_3^-):	815.0	13.4			Aluminum (Al^{3+}):	ND	
Carbonate (CO_3^{2-}):	ND				Chromium (Cr^{3+}):	ND	
Hydroxide (OH^-):	ND				Cobalt (Co^{2+}):	ND	
			ORGANIC ACIDS:	mg/L	meq/L	Copper (Cu^{2+}):	ND	
aqueous CO_2 (ppm):	44.0		Formic Acid:	ND		Molybdenum (Mo^{2+}):	ND	
aqueous H_2S (ppm):	ND		Acetic Acid:	ND		Nickel (Ni^{2+}):	ND	
aqueous O2 (ppb):	ND		Propionic Acid:	ND		Tin (Sn^{2+}):	ND	
			Butyric Acid:	ND		Titanium (Ti^{2+}):	ND	
Calculated TDS (mg/L):	2467		Valeric Acid:	ND		Vanadium (V^{2+}):	ND	
Density/Specific Gravity (g/cm³):	0.9989					Zirconium (Zr^{2+}):	ND	
Measured Specific Gravity	ND					Lithium (Li^+):	ND	
Conductivity (mmhos):	ND							
Resistivity:	ND					Total Hardness:	41	N/A
MCF/D:	No Data							
BOPD:	No Data							
BWPD:	No Data		Anion/Cation Ratio:		0.80	ND = Not Determined		

SCALE PREDICTIONS BASED ON FIELD PROVIDED DATA; FUTHER MODELING MAY BE REQUIRED FOR VALIDATION OF SCALE PREDICTION RESULTS.

Conditions		Barite ($BaSO_4$)		Calcite ($CaCO_3$)		Gypsum ($CaSO_4 \cdot 2H_2O$)		Anhydrite ($CaSO_4$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
68°F	15 psi		0.000	0.24	3.034		0.000		0.000
88°F	24 psi		0.000	0.32	3.861		0.000		0.000
108°F	34 psi		0.000	0.43	4.840		0.000		0.000
129°F	43 psi		0.000	0.55	5.737		0.000		0.000
149°F	53 psi		0.000	0.69	6.484		0.000		0.000
169°F	62 psi		0.000	0.83	7.075		0.000		0.000
189°F	72 psi		0.000	0.98	7.524		0.000		0.000
210°F	81 psi		0.000	1.14	7.871		0.000		0.000
230°F	91 psi		0.000	1.30	8.117		0.000		0.000
250°F	100 psi		0.000	1.46	8.288		0.000		0.000

Conditions		Celestite ($SrSO_4$)		Halite (NaCl)		Iron Sulfide (FeS)		Iron Carbonate ($FeCO_3$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
68°F	15 psi		0.000	-4.82	0.000	-8.04	0.000	1.00	0.597
88°F	24 psi		0.000	-4.85	0.000	-8.15	0.000	1.16	0.618
108°F	34 psi		0.000	-4.87	0.000	-8.19	0.000	1.34	0.634
129°F	43 psi		0.000	-4.88	0.000	-8.20	0.000	1.52	0.645
149°F	53 psi		0.000	-4.88	0.000	-8.17	0.000	1.70	0.652
169°F	62 psi		0.000	-4.88	0.000	-8.13	0.000	1.87	0.656
189°F	72 psi		0.000	-4.87	0.000	-8.06	0.000	2.03	0.659
210°F	81 psi		0.000	-4.85	0.000	-7.97	0.000	2.19	0.661
230°F	91 psi		0.000	-4.84	0.000	-7.86	0.000	2.35	0.662
250°F	100 psi		0.000	-4.81	0.000	-7.75	0.000	2.49	0.663

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the eight (8) scales.

Note 3: Saturation Index predictions on this sheet use pH and alkalinity; $\%CO_2$ is not included in the calculations.

ScaleSoftPitzer™ SSP2010

Comments:

BAKER HUGHES

Central Area Laboratory
12701 N. Santa Fe Ave, Suite 151
Oklahoma City, Oklahoma 73114

Upstream Chemicals

REPORT DATE: 2/18/2020

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER:	WAPITI OPERATING	**ACCOUNT REP:**	TY L. CLINESMITH
DISTRICT:	OKLAHOMA	**SAMPLE ID:**	201910011048
AREA/LEASE:	VERMEJO PARK RANCH	**SAMPLE DATE:**	7/31/2019
SAMPLE POINT NAME	VPR A 48	**ANALYSIS DATE:**	11/21/2019
SITE TYPE:	WELL SITES	**ANALYST:**	BS
SAMPLE POINT DESCRIPTION:	WELL HEAD		

WAPITI OPERATING, VERMEJO PARK RANCH, VPR A 48

FIELD DATA	
Initial Temperature (°F):	250
Final Temperature (°F):	65
Initial Pressure (psi):	100
Final Pressure (psi):	15
pH:	
pH at time of sampling:	7.7

ALKALINITY BY TITRATION:	mg/L	meq/L
Bicarbonate (HCO_3^-):	835.0	13.7
Carbonate (CO_3^{2-}):	ND	
Hydroxide (OH^-):	ND	

aqueous CO_2 (ppm):	33.0
aqueous H_2S (ppm):	ND
aqueous O2 (ppb):	ND
Calculated TDS (mg/L):	2449
Density/Specific Gravity (g/cm³):	0.9989
Measured Specific Gravity	ND
Conductivity (mmhos):	ND
Resistivity:	ND
MCF/D:	No Data
BOPD:	No Data
BWPD:	No Data

ANALYSIS OF SAMPLE

ANIONS:	mg/L	meq/L
Chloride (Cl^-):	680.3	19.2
Sulfate (SO_4^{2-}):	0.0	0.0
Borate (H_3BO_3):	1.7	0.0
Fluoride (F^-):	ND	
Bromide (Br^-):	ND	
Nitrite (NO_2^-):	ND	
Nitrate (NO_3^-):	ND	
Phosphate (PO_4^{3-}):	0.0	0.0
Silica (SiO_2):	ND	

ORGANIC ACIDS:	mg/L	meq/L
Formic Acid:	ND	
Acetic Acid:	ND	
Propionic Acid:	ND	
Butyric Acid:	ND	
Valeric Acid:	ND	

CATIONS:	mg/L	meq/L
Sodium (Na^+):	903.0	39.3
Potassium (K^+):	2.8	0.1
Magnesium (Mg^{2+}):	2.9	0.2
Calcium (Ca^{2+}):	18.5	0.9
Strontium (Sr^{2+}):	2.5	0.1
Barium (Ba^{2+}):	1.8	0.0
Iron (Fe^{2+}):	2.1	0.1
Manganese (Mn^{2+}):	0.0	0.0
Lead (Pb^{2+}):	ND	
Zinc (Zn^{2+}):	0.0	0.0
Aluminum (Al^{3+}):	ND	
Chromium (Cr^{3+}):	ND	
Cobalt (Co^{2+}):	ND	
Copper (Cu^{2+}):	ND	
Molybdenum (Mo^{2+}):	ND	
Nickel (Ni^{2+}):	ND	
Tin (Sn^{2+}):	ND	
Titanium (Ti^{2+}):	ND	
Vanadium (V^{2+}):	ND	
Zirconium (Zr^{2+}):	ND	
Lithium (Li):	ND	
Total Hardness:	62	N/A

Anion/Cation Ratio: 0.81 ND = Not Determined

SCALE PREDICTIONS BASED ON FIELD PROVIDED DATA; FUTHER MODELING MAY BE REQUIRED FOR VALIDATION OF SCALE PREDICTION RESULTS.

Conditions		Barite ($BaSO_4$)		Calcite ($CaCO_3$)		Gypsum ($CaSO_4 \cdot 2H_2O$)		Anhydrite ($CaSO_4$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
65°F	15 psi		0.000	0.23	5.292		0.000		0.000
86°F	24 psi		0.000	0.31	6.921		0.000		0.000
106°F	34 psi		0.000	0.43	8.847		0.000		0.000
127°F	43 psi		0.000	0.57	10.609		0.000		0.000
147°F	53 psi		0.000	0.71	12.076		0.000		0.000
168°F	62 psi		0.000	0.87	13.230		0.000		0.000
188°F	72 psi		0.000	1.03	14.103		0.000		0.000
209°F	81 psi		0.000	1.20	14.774		0.000		0.000
229°F	91 psi		0.000	1.37	15.242		0.000		0.000
250°F	100 psi		0.000	1.55	15.562		0.000		0.000

Conditions		Celestite ($SrSO_4$)		Halite (NaCl)		Iron Sulfide (FeS)		Iron Carbonate ($FeCO_3$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
65°F	15 psi		0.000	-4.84	0.000	-7.97	0.000	1.08	1.417
86°F	24 psi		0.000	-4.87	0.000	-8.07	0.000	1.25	1.460
106°F	34 psi		0.000	-4.89	0.000	-8.10	0.000	1.44	1.492
127°F	43 psi		0.000	-4.90	0.000	-8.09	0.000	1.63	1.513
147°F	53 psi		0.000	-4.90	0.000	-8.05	0.000	1.82	1.526
168°F	62 psi		0.000	-4.90	0.000	-7.99	0.000	2.00	1.534
188°F	72 psi		0.000	-4.89	0.000	-7.91	0.000	2.18	1.540
209°F	81 psi		0.000	-4.88	0.000	-7.80	0.000	2.35	1.543
229°F	91 psi		0.000	-4.86	0.000	-7.68	0.000	2.52	1.545
250°F	100 psi		0.000	-4.84	0.000	-7.55	0.000	2.68	1.547

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered
Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the eight (8) scales.
Note 3: Saturation Index predictions on this sheet use pH and alkalinity; $\%CO_2$ is not included in the calculations.

ScaleSoftPitzer™ SSP2010

Comments:

BAKER HUGHES

Central Area Laboratory
12701 N. Santa Fe Ave, Suite 151
Oklahoma City, Oklahoma 73114

Upstream Chemicals

REPORT DATE: 2/18/2020

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER:	WAPITI OPERATING	**ACCOUNT REP:**	TY L. CLINESMITH
DISTRICT:	OKLAHOMA	**SAMPLE ID:**	201910011621
AREA/LEASE:	VERMEJO PARK RANCH	**SAMPLE DATE:**	8/1/2019
SAMPLE POINT NAME	VPR A 49	**ANALYSIS DATE:**	11/25/2019
SITE TYPE:	WELL SITES	**ANALYST:**	BS
SAMPLE POINT DESCRIPTION:	WELL HEAD		

WAPITI OPERATING, VERMEJO PARK RANCH, VPR A 49

FIELD DATA	
Initial Temperature (°F):	250
Final Temperature (°F):	69
Initial Pressure (psi):	100
Final Pressure (psi):	15
pH:	
pH at time of sampling:	8.0

ALKALINITY BY TITRATION:	mg/L	meq/L
Bicarbonate (HCO_3^-):	1086.0	17.8
Carbonate (CO_3^{2-}):	ND	
Hydroxide (OH^-):	ND	

aqueous CO_2 (ppm):	0.0
aqueous H_2S (ppm):	0.5
aqueous O2 (ppb):	ND
Calculated TDS (mg/L):	3689
Density/Specific Gravity (g/cm³):	0.9997
Measured Specific Gravity	ND
Conductivity (mmhos):	ND
Resistivity:	ND
MCF/D:	No Data
BOPD:	No Data
BWPD:	No Data

ANALYSIS OF SAMPLE

ANIONS:	mg/L	meq/L
Chloride (Cl^-):	1423.7	40.2
Sulfate (SO_4^{2-}):	0.0	0.0
Borate (H_3BO_3):	0.0	0.0
Fluoride (F^-):	ND	
Bromide (Br^-):	ND	
Nitrite (NO_2^-):	ND	
Nitrate (NO_3^-):	ND	
Phosphate (PO_4^{3-}):	0.0	0.0
Silica (SiO_2):	ND	

ORGANIC ACIDS:	mg/L	meq/L
Formic Acid:	ND	
Acetic Acid:	ND	
Propionic Acid:	ND	
Butyric Acid:	ND	
Valeric Acid:	ND	

CATIONS:	mg/L	meq/L
Sodium (Na^+):	1135.1	49.4
Potassium (K^+):	4.0	0.1
Magnesium (Mg^{2+}):	5.4	0.4
Calcium (Ca^{2+}):	25.3	1.3
Strontium (Sr^{2+}):	4.1	0.1
Barium (Ba^{2+}):	3.9	0.1
Iron (Fe^{2+}):	1.7	0.1
Manganese (Mn^{2+}):	0.0	0.0
Lead (Pb^{2+}):	ND	
Zinc (Zn^{2+}):	0.0	0.0
Aluminum (Al^{3+}):	ND	
Chromium (Cr^{3+}):	ND	
Cobalt (Co^{2+}):	ND	
Copper (Cu^{2+}):	ND	
Molybdenum (Mo^{2+}):	ND	
Nickel (Ni^{2+}):	ND	
Tin (Sn^{2+}):	ND	
Titanium (Ti^{2+}):	ND	
Vanadium (V^{2+}):	ND	
Zirconium (Zr^{2+}):	ND	
Lithium (Li):	ND	
Total Hardness:	93	N/A

Anion/Cation Ratio: 1.13 ND = Not Determined

SCALE PREDICTIONS BASED ON FIELD PROVIDED DATA; FUTHER MODELING MAY BE REQUIRED FOR VALIDATION OF SCALE PREDICTION RESULTS

Conditions		Barite ($BaSO_4$)		Calcite ($CaCO_3$)		Gypsum ($CaSO_4 \cdot 2H_2O$)		Anhydrite ($CaSO_4$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
69°F	15 psi		0.000	0.73	15.910		0.000		0.000
89°F	24 psi		0.000	0.81	16.840		0.000		0.000
110°F	34 psi		0.000	0.92	17.941		0.000		0.000
130°F	43 psi		0.000	1.04	18.937		0.000		0.000
150°F	53 psi		0.000	1.17	19.759		0.000		0.000
170°F	62 psi		0.000	1.31	20.404		0.000		0.000
190°F	72 psi		0.000	1.45	20.892		0.000		0.000
210°F	81 psi		0.000	1.61	21.269		0.000		0.000
230°F	91 psi		0.000	1.77	21.537		0.000		0.000
250°F	100 psi		0.000	1.93	21.723		0.000		0.000

Conditions		Celestite ($SrSO_4$)		Halite (NaCl)		Iron Sulfide (FeS)		Iron Carbonate ($FeCO_3$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
69°F	15 psi		0.000	-4.45	0.000	1.90	0.492	1.38	1.171
89°F	24 psi		0.000	-4.48	0.000	1.79	0.488	1.53	1.187
110°F	34 psi		0.000	-4.50	0.000	1.74	0.486	1.71	1.199
130°F	43 psi		0.000	-4.51	0.000	1.73	0.486	1.88	1.207
150°F	53 psi		0.000	-4.51	0.000	1.75	0.487	2.05	1.212
170°F	62 psi		0.000	-4.51	0.000	1.80	0.488	2.22	1.216
190°F	72 psi		0.000	-4.50	0.000	1.87	0.491	2.38	1.218
210°F	81 psi		0.000	-4.49	0.000	1.96	0.493	2.54	1.220
230°F	91 psi		0.000	-4.47	0.000	2.06	0.496	2.69	1.221
250°F	100 psi		0.000	-4.45	0.000	2.17	0.498	2.83	1.222

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the eight (8) scales.

Note 3: Saturation Index predictions on this sheet use pH and alkalinity; $\%CO_2$ is not included in the calculations

ScaleSoftPitzer™ SSP2010

Comments:

BAKER HUGHES

Central Area Laboratory
12701 N. Santa Fe Ave, Suite 151
Oklahoma City, Oklahoma 73114

Upstream Chemicals

REPORT DATE: 2/18/2020

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER:	WAPITI OPERATING	**ACCOUNT REP:**	TY L. CLINESMITH
DISTRICT:	OKLAHOMA	**SAMPLE ID:**	201910011623
AREA/LEASE:	VERMEJO PARK RANCH	**SAMPLE DATE:**	8/1/2019
SAMPLE POINT NAME	VPR A 57	**ANALYSIS DATE:**	11/25/2019
SITE TYPE:	WELL SITES	**ANALYST:**	BS
SAMPLE POINT DESCRIPTION:	WELL HEAD		

WAPITI OPERATING, VERMEJO PARK RANCH, VPR A 57

FIELD DATA

Initial Temperature (°F):	250
Final Temperature (°F):	69
Initial Pressure (psi):	100
Final Pressure (psi):	15
pH:	
pH at time of sampling:	8.2

ALKALINITY BY TITRATION:	**mg/L**	**meq/L**
Bicarbonate (HCO_3^-):	1146.0	18.8
Carbonate (CO_3^{2-}):	ND	
Hydroxide (OH^-):	ND	

aqueous CO_2 (ppm):	0.0
aqueous H_2S (ppm):	0.5
aqueous O2 (ppb):	ND
Calculated TDS (mg/L):	2517
Density/Specific Gravity (g/cm³):	0.9989
Measured Specific Gravity	ND
Conductivity (mmhos):	ND
Resistivity:	ND
MCF/D:	No Data
BOPD:	No Data
BWPD:	No Data

ANALYSIS OF SAMPLE

ANIONS:	**mg/L**	**meq/L**
Chloride (Cl^-):	611.2	17.2
Sulfate (SO_4^{2-}):	0.0	0.0
Borate (H_3BO_3):	0.0	0.0
Fluoride (F^-):	ND	
Bromide (Br^-):	ND	
Nitrite (NO_2^-):	ND	
Nitrate (NO_3^-):	ND	
Phosphate (PO_4^{3-}):	0.0	0.0
Silica (SiO_2):	ND	

ORGANIC ACIDS:	**mg/L**	**meq/L**
Formic Acid:	ND	
Acetic Acid:	ND	
Propionic Acid:	ND	
Butyric Acid:	ND	
Valeric Acid:	ND	

CATIONS:	**mg/L**	**meq/L**
Sodium (Na^+):	737.2	32.1
Potassium (K^+):	2.3	0.1
Magnesium (Mg^{2+}):	2.3	0.2
Calcium (Ca^{2+}):	13.7	0.7
Strontium (Sr^{2+}):	1.8	0.0
Barium (Ba^{2+}):	1.7	0.0
Iron (Fe^{2+}):	1.1	0.0
Manganese (Mn^{2+}):	0.0	0.0
Lead (Pb^{2+}):	ND	
Zinc (Zn^{2+}):	0.0	0.0
Aluminum (Al^{3+}):	ND	
Chromium (Cr^{3+}):	ND	
Cobalt (Co^{2+}):	ND	
Copper (Cu^{2+}):	ND	
Molybdenum (Mo^{2+}):	ND	
Nickel (Ni^{2+}):	ND	
Tin (Sn^{2+}):	ND	
Titanium (Ti^{2+}):	ND	
Vanadium (V^{2+}):	ND	
Zirconium (Zr^{2+}):	ND	
Lithium (Li):	ND	
Total Hardness:	47	N/A

Anion/Cation Ratio: 1.09 **ND = Not Determined**

SCALE PREDICTIONS BASED ON FIELD PROVIDED DATA; FUTHER MODELING MAY BE REQUIRED FOR VALIDATION OF SCALE PREDICTION RESULTS.

Conditions		**Barite ($BaSO_4$)**		**Calcite ($CaCO_3$)**		**Gypsum ($CaSO_4 \cdot 2H_2O$)**		**Anhydrite ($CaSO_4$)**	
Temp	**Press.**	**Index**	**Amt (ptb)**	**Index**	**Amt (ptb)**	**Index**	**Amt (ptb)**	**Index**	**Amt (ptb)**
69°F	15 psi		0.000	0.70	8.815		0.000		0.000
89°F	24 psi		0.000	0.77	9.301		0.000		0.000
109°F	34 psi		0.000	0.88	9.862		0.000		0.000
129°F	43 psi		0.000	1.00	10.364		0.000		0.000
149°F	53 psi		0.000	1.13	10.775		0.000		0.000
170°F	62 psi		0.000	1.27	11.095		0.000		0.000
190°F	72 psi		0.000	1.41	11.336		0.000		0.000
210°F	81 psi		0.000	1.56	11.521		0.000		0.000
230°F	91 psi		0.000	1.72	11.653		0.000		0.000
250°F	100 psi		0.000	1.88	11.744		0.000		0.000

Conditions		**Celestite ($SrSO_4$)**		**Halite (NaCl)**		**Iron Sulfide (FeS)**		**Iron Carbonate ($FeCO_3$)**	
Temp	**Press.**	**Index**	**Amt (ptb)**	**Index**	**Amt (ptb)**	**Index**	**Amt (ptb)**	**Index**	**Amt (ptb)**
69°F	15 psi		0.000	-4.98	0.000	1.93	0.463	1.42	0.736
89°F	24 psi		0.000	-5.01	0.000	1.82	0.456	1.58	0.745
109°F	34 psi		0.000	-5.02	0.000	1.76	0.453	1.75	0.752
129°F	43 psi		0.000	-5.03	0.000	1.75	0.452	1.92	0.757
149°F	53 psi		0.000	-5.04	0.000	1.77	0.453	2.09	0.760
170°F	62 psi		0.000	-5.03	0.000	1.81	0.456	2.26	0.762
190°F	72 psi		0.000	-5.02	0.000	1.87	0.460	2.42	0.763
210°F	81 psi		0.000	-5.01	0.000	1.96	0.465	2.58	0.764
230°F	91 psi		0.000	-4.99	0.000	2.06	0.470	2.73	0.765
250°F	100 psi		0.000	-4.97	0.000	2.18	0.474	2.87	0.765

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the eight (8) scales.

Note 3: Saturation Index predictions on this sheet use pH and alkalinity; $\%CO_2$ is not included in the calculations

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Comments:

BAKER HUGHES

Central Area Laboratory
12701 N. Santa Fe Ave, Suite 151
Oklahoma City, Oklahoma 73114

Upstream Chemicals

REPORT DATE: 2/18/2020

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER:	WAPITI OPERATING	**ACCOUNT REP:**	TY L. CLINESMITH
DISTRICT:	OKLAHOMA	**SAMPLE ID:**	201910011622
AREA/LEASE:	VERMEJO PARK RANCH	**SAMPLE DATE:**	8/1/2019
SAMPLE POINT NAME	VPR A 59	**ANALYSIS DATE:**	11/25/2019
SITE TYPE:	WELL SITES	**ANALYST:**	BS
SAMPLE POINT DESCRIPTION:	WELL HEAD		

WAPITI OPERATING, VERMEJO PARK RANCH, VPR A 59

FIELD DATA		ANALYSIS OF SAMPLE					
		ANIONS:	mg/L	meq/L	CATIONS:	mg/L	meq/L
Initial Temperature (°F):	250	Chloride (Cl^-):	2767.4	78.1	Sodium (Na^+):	1630.8	71.0
Final Temperature (°F):	69	Sulfate (SO_4^{2-}):	0.0	0.0	Potassium (K^+):	4.7	0.1
Initial Pressure (psi):	100	Borate (H_3BO_3):	1.4	0.0	Magnesium (Mg^{2+}):	12.7	1.0
Final Pressure (psi):	15	Fluoride (F^-):	ND		Calcium (Ca^{2+}):	50.6	2.5
		Bromide (Br^-):	ND		Strontium (Sr^{2+}):	9.5	0.2
pH:		Nitrite (NO_2^-):	ND		Barium (Ba^{2+}):	7.4	0.1
pH at time of sampling:	7.7	Nitrate (NO_3^-):	ND		Iron (Fe^{2+}):	1.0	0.0
		Phosphate (PO_4^{3-}):	0.0	0.0	Manganese (Mn^{2+}):	0.0	0.0
		Silica (SiO_2):	ND		Lead (Pb^{2+}):	ND	
					Zinc (Zn^{2+}):	0.0	0.0

ALKALINITY BY TITRATION:	mg/L	meq/L
Bicarbonate (HCO_3^-):	848.0	13.9
Carbonate (CO_3^{2-}):	ND	
Hydroxide (OH^-):	ND	

		ORGANIC ACIDS:	mg/L	meq/L
aqueous CO_2 (ppm):	0.0	Formic Acid:	ND	
aqueous H_2S (ppm):	0.5	Acetic Acid:	ND	
aqueous O2 (ppb):	ND	Propionic Acid:	ND	
		Butyric Acid:	ND	
Calculated TDS (mg/L):	5332	Valeric Acid:	ND	
Density/Specific Gravity (g/cm³):	1.0008			
Measured Specific Gravity	ND			
Conductivity (mmhos):	ND			
Resistivity:	ND			
MCF/D:	No Data			
BOPD:	No Data			
BWPD:	No Data			

Aluminum (Al^{3+}):	ND		
Chromium (Cr^{3+}):	ND		
Cobalt (Co^{2+}):	ND		
Copper (Cu^{2+}):	ND		
Molybdenum (Mo^{2+}):	ND		
Nickel (Ni^{2+}):	ND		
Tin (Sn^{2+}):	ND		
Titanium (Ti^{2+}):	ND		
Vanadium (V^{2+}):	ND		
Zirconium (Zr^{2+}):	ND		
Lithium (Li):	ND		
Total Hardness:	195	N/A	

Anion/Cation Ratio: 1.23 ND = Not Determined

SCALE PREDICTIONS BASED ON FIELD PROVIDED DATA; FUTHER MODELING MAY BE REQUIRED FOR VALIDATION OF SCALE PREDICTION RESULTS

Conditions		Barite ($BaSO_4$)		Calcite ($CaCO_3$)		Gypsum ($CaSO_4 \cdot 2H_2O$)		Anhydrite ($CaSO_4$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
69°F	15 psi		0.000	0.58	24.115		0.000		0.000
89°F	24 psi		0.000	0.66	26.625		0.000		0.000
109°F	34 psi		0.000	0.77	29.791		0.000		0.000
130°F	43 psi		0.000	0.90	32.852		0.000		0.000
150°F	53 psi		0.000	1.04	35.540		0.000		0.000
170°F	62 psi		0.000	1.18	37.766		0.000		0.000
190°F	72 psi		0.000	1.33	39.532		0.000		0.000
210°F	81 psi		0.000	1.49	40.952		0.000		0.000
230°F	91 psi		0.000	1.66	41.989		0.000		0.000
250°F	100 psi		0.000	1.82	42.723		0.000		0.000

Conditions		Celestite ($SrSO_4$)		Halite (NaCl)		Iron Sulfide (FeS)		Iron Carbonate ($FeCO_3$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
69°F	15 psi		0.000	-4.03	0.000	1.25	0.410	0.65	0.544
89°F	24 psi		0.000	-4.06	0.000	1.16	0.395	0.81	0.592
109°F	34 psi		0.000	-4.08	0.000	1.12	0.390	0.99	0.629
130°F	43 psi		0.000	-4.09	0.000	1.12	0.390	1.16	0.654
150°F	53 psi		0.000	-4.09	0.000	1.16	0.396	1.34	0.670
170°F	62 psi		0.000	-4.09	0.000	1.21	0.404	1.51	0.681
190°F	72 psi		0.000	-4.08	0.000	1.28	0.415	1.67	0.688
210°F	81 psi		0.000	-4.07	0.000	1.38	0.428	1.83	0.692
230°F	91 psi		0.000	-4.06	0.000	1.49	0.441	1.99	0.695
250°F	100 psi		0.000	-4.04	0.000	1.60	0.454	2.13	0.698

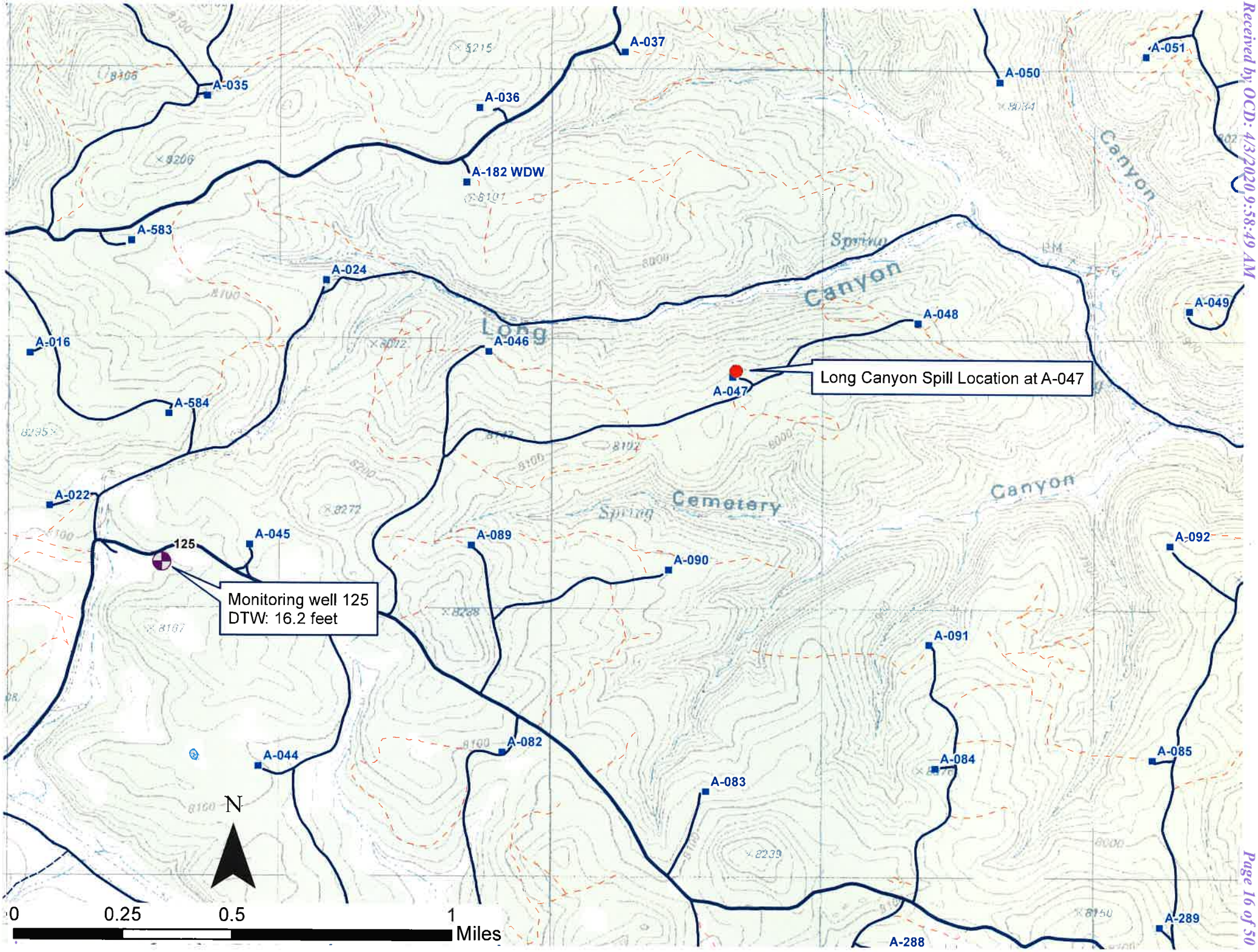
Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the eight (8) scales.

Note 3: Saturation Index predictions on this sheet use pH and alkalinity; $\%CO_2$ is not included in the calculations.

ScaleSoftPitzer™ SSP2010

Comments:



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ANALYTICAL REPORT

Eurofins TestAmerica, Denver
4955 Yarrow Street
Arvada, CO 80002
Tel: (303)736-0100

Laboratory Job ID: 280-134318-1
Client Project/Site: Produced Water Spill

For:
Wapiti Operating, LLC
PO BOX 190
309 Silver Street
Raton, New Mexico 87740

Attn: Mr. Randy Madison

Shelby Turner

Authorized for release by:
3/17/2020 10:55:47 AM

Shelby Turner, Project Manager I
(303)736-0100
shelby.turner@testamericainc.com

Table of Contents

Definitions/Glossary

Client: Wapiti Operating, LLC
Project/Site: Produced Water Spill

Job ID: 280-134318-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Wapiti Operating, LLC
Project/Site: Produced Water Spill

Job ID: 280-134318-1

Job ID: 280-134318-1

Laboratory: Eurofins TestAmerica, Denver

Narrative

CASE NARRATIVE

Client: Wapiti Operating, LLC

Project: Produced Water Spill

Report Number: 280-134318-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The samples were received on 3/5/2020 12:45 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.1° C.

VOLATILE ORGANIC COMPOUNDS (GC-MS)
Samples Gachupin (D-137/D-138) (280-134318-1) and VPR A-47 (280-134318-2) were analyzed for volatile organic compounds (GC-MS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 03/10/2020.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GASOLINE RANGE ORGANICS (GRO)
Samples Gachupin (D-137/D-138) (280-134318-1) and VPR A-47 (280-134318-2) were analyzed for Gasoline Range Organics (GRO) in accordance with EPA SW-846 Method 8015B - GRO. The samples were prepared and analyzed on 03/13/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

DIESEL RANGE ORGANICS
Samples Gachupin (D-137/D-138) (280-134318-1) and VPR A-47 (280-134318-2) were analyzed for diesel range organics in accordance with EPA SW-846 Method 8015B - DRO. The samples were prepared on 03/06/2020 and analyzed on 03/10/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ANIONS (28 DAYS)
Samples Gachupin (D-137/D-138) (280-134318-1) and VPR A-47 (280-134318-2) were analyzed for anions (28 days) in accordance with EPA SW-846 Method 9056A. The samples were leached on 03/06/2020 and analyzed on 03/06/2020.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

PERCENT SOLIDS
Samples Gachupin (D-137/D-138) (280-134318-1) and VPR A-47 (280-134318-2) were analyzed for percent solids in accordance with ASTM D2216-90. The samples were analyzed on 03/11/2020.

Case Narrative

Client: Wapiti Operating, LLC
Project/Site: Produced Water Spill

Job ID: 280-134318-1

Job ID: 280-134318-1 (Continued)

Laboratory: Eurofins TestAmerica, Denver (Continued)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Wapiti Operating, LLC
Project/Site: Produced Water Spill

Job ID: 280-134318-1

Client Sample ID: Gachupin (D-137/D-138) — Lab Sample ID: 280-134318-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Diesel Range Organics [C10-C28]	23		8.0		mg/Kg	1		8015B	Total/NA
Motor Oil (C20-C38)	38		24		mg/Kg	1		8015B	Total/NA
Chloride	110		29		mg/Kg	1		9056A	Soluble

Client Sample ID: VPR A-47 — Lab Sample ID: 280-134318-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Gasoline Range Organics (GRO) -C6-C10	1.8		1.5		mg/Kg	1		8015B	Total/NA
Diesel Range Organics [C10-C28]	66		7.7		mg/Kg	1		8015B	Total/NA
Motor Oil (C20-C38)	130		23		mg/Kg	1		8015B	Total/NA
Chloride	340		28		mg/Kg	1		9056A	Soluble

This Detection Summary does not include radiochemical test results.

Method Summary

Client: Wapiti Operating, LLC
Project/Site: Produced Water Spill

Job ID: 280-134318-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL DEN
8015B	Gasoline Range Organics - (GC)	SW846	TAL DEN
8015B	Diesel Range Organics (DRO) (GC)	SW846	TAL DEN
9056A	Anions, Ion Chromatography	SW846	TAL DEN
Moisture	Percent Moisture	EPA	TAL DEN
3546	Microwave Extraction	SW846	TAL DEN
5030B	Purge and Trap	SW846	TAL DEN
5035	Closed System Purge and Trap	SW846	TAL DEN
DI Leach	Deionized Water Leaching Procedure	ASTM	TAL DEN

Protocol References:

ASTM = ASTM International

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL DEN = Eurofins TestAmerica, Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Sample Summary

Client: Wapiti Operating, LLC
Project/Site: Produced Water Spill

Job ID: 280-134318-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
280-134318-1	Gachupin (D-137/D-138)	Solid	03/02/20 11:22	03/05/20 12:45	
280-134318-2	VPR A-47	Solid	03/02/20 13:40	03/05/20 12:45	

Client Sample Results

Client: Wapiti Operating, LLC
Project/Site: Produced Water Spill

Job ID: 280-134318-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Client Sample ID: Gachupin (D-137/D-138)
Date Collected: 03/02/20 11:22
Date Received: 03/05/20 12:45

Lab Sample ID: 280-134318-1
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.0044		mg/Kg		03/10/20 11:00	03/10/20 14:52	1
Ethylbenzene	ND		0.0044		mg/Kg		03/10/20 11:00	03/10/20 14:52	1
Toluene	ND		0.0044		mg/Kg		03/10/20 11:00	03/10/20 14:52	1
m-Xylene & p-Xylene	ND		0.0022		mg/Kg		03/10/20 11:00	03/10/20 14:52	1
o-Xylene	ND		0.0022		mg/Kg		03/10/20 11:00	03/10/20 14:52	1
Xylenes, Total	ND		0.0044		mg/Kg		03/10/20 11:00	03/10/20 14:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*58 - 140*	*03/10/20 11:00*	*03/10/20 14:52*	*1*
Toluene-d8 (Surr)	*102*		*80 - 126*	*03/10/20 11:00*	*03/10/20 14:52*	*1*
4-Bromofluorobenzene (Surr)	*112*		*76 - 127*	*03/10/20 11:00*	*03/10/20 14:52*	*1*
Dibromofluoromethane (Surr)	*100*		*75 - 121*	*03/10/20 11:00*	*03/10/20 14:52*	*1*

Client Sample ID: VPR A-47
Date Collected: 03/02/20 13:40
Date Received: 03/05/20 12:45

Lab Sample ID: 280-134318-2
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.0049		mg/Kg		03/10/20 11:00	03/10/20 15:15	1
Ethylbenzene	ND		0.0049		mg/Kg		03/10/20 11:00	03/10/20 15:15	1
Toluene	ND		0.0049		mg/Kg		03/10/20 11:00	03/10/20 15:15	1
m-Xylene & p-Xylene	ND		0.0025		mg/Kg		03/10/20 11:00	03/10/20 15:15	1
o-Xylene	ND		0.0025		mg/Kg		03/10/20 11:00	03/10/20 15:15	1
Xylenes, Total	ND		0.0049		mg/Kg		03/10/20 11:00	03/10/20 15:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*58 - 140*	*03/10/20 11:00*	*03/10/20 15:15*	*1*
Toluene-d8 (Surr)	*101*		*80 - 126*	*03/10/20 11:00*	*03/10/20 15:15*	*1*
4-Bromofluorobenzene (Surr)	*107*		*76 - 127*	*03/10/20 11:00*	*03/10/20 15:15*	*1*
Dibromofluoromethane (Surr)	*101*		*75 - 121*	*03/10/20 11:00*	*03/10/20 15:15*	*1*

Method: 8015B - Gasoline Range Organics - (GC)

Client Sample ID: Gachupin (D-137/D-138)
Date Collected: 03/02/20 11:22
Date Received: 03/05/20 12:45

Lab Sample ID: 280-134318-1
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		1.8		mg/Kg		03/13/20 10:23	03/13/20 14:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
a,a,a-Trifluorotoluene	*91*		*77 - 123*	*03/13/20 10:23*	*03/13/20 14:53*	*1*

Client Sample ID: VPR A-47
Date Collected: 03/02/20 13:40
Date Received: 03/05/20 12:45

Lab Sample ID: 280-134318-2
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	**1.8**		1.5		mg/Kg		03/13/20 10:23	03/13/20 15:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
a,a,a-Trifluorotoluene	*91*		*77 - 123*	*03/13/20 10:23*	*03/13/20 15:18*	*1*

Client Sample Results

Client: Wapiti Operating, LLC
Project/Site: Produced Water Spill

Job ID: 280-134318-1

Method: 8015B - Diesel Range Organics (DRO) (GC)

Client Sample ID: Gachupin (D-137/D-138)
Date Collected: 03/02/20 11:22
Date Received: 03/05/20 12:45

Lab Sample ID: 280-134318-1
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	23		8.0		mg/Kg		03/06/20 14:11	03/10/20 17:13	1
Motor Oil (C20-C38)	38		24		mg/Kg		03/06/20 14:11	03/10/20 17:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*71*		*49 - 115*	*03/06/20 14:11*	*03/10/20 17:13*	*1*

Client Sample ID: VPR A-47
Date Collected: 03/02/20 13:40
Date Received: 03/05/20 12:45

Lab Sample ID: 280-134318-2
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	66		7.7		mg/Kg		03/06/20 14:11	03/10/20 17:36	1
Motor Oil (C20-C38)	130		23		mg/Kg		03/06/20 14:11	03/10/20 17:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*75*		*49 - 115*	*03/06/20 14:11*	*03/10/20 17:36*	*1*

General Chemistry

Client Sample ID: Gachupin (D-137/D-138)
Date Collected: 03/02/20 11:22
Date Received: 03/05/20 12:45

Lab Sample ID: 280-134318-1
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12.4		0.1		%			03/11/20 16:05	1
Percent Solids	87.6		0.1		%			03/11/20 16:05	1

Client Sample ID: VPR A-47
Date Collected: 03/02/20 13:40
Date Received: 03/05/20 12:45

Lab Sample ID: 280-134318-2
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	9.6		0.1		%			03/11/20 16:05	1
Percent Solids	90.4		0.1		%			03/11/20 16:05	1

General Chemistry - Soluble

Client Sample ID: Gachupin (D-137/D-138)
Date Collected: 03/02/20 11:22
Date Received: 03/05/20 12:45

Lab Sample ID: 280-134318-1
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	110		29		mg/Kg			03/06/20 19:09	1

Client Sample ID: VPR A-47
Date Collected: 03/02/20 13:40
Date Received: 03/05/20 12:45

Lab Sample ID: 280-134318-2
Matrix: Solid

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	340		28		mg/Kg			03/06/20 19:26	1

Surrogate Summary

Client: Wapiti Operating, LLC
Project/Site: Produced Water Spill

Job ID: 280-134318-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	TOL	BFB	DBFM
Lab Sample ID	Client Sample ID	(58-140)	(80-126)	(76-127)	(75-121)
280-134318-1	Gachupin (D-137/D-138)	101	102	112	100
280-134318-2	VPR A-47	99	101	107	101
LCS 280-488264/1-A	Lab Control Sample	96	99	101	100
LCSD 280-488264/2-A	Lab Control Sample Dup	95	100	102	101
MB 280-488264/3-A	Method Blank	95	101	102	101

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
TOL = Toluene-d8 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8015B - Gasoline Range Organics - (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		TFT1
Lab Sample ID	Client Sample ID	(77-123)
280-134318-1	Gachupin (D-137/D-138)	91
280-134318-2	VPR A-47	91
LCS 280-488619/2-A	Lab Control Sample	92
LCSD 280-488619/3-A	Lab Control Sample Dup	90
MB 280-488619/1-A	Method Blank	91

Surrogate Legend

TFT = a,a,a-Trifluorotoluene

Method: 8015B - Diesel Range Organics (DRO) (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		OTPH1
Lab Sample ID	Client Sample ID	(49-115)
280-134318-1	Gachupin (D-137/D-138)	71
280-134318-2	VPR A-47	75
280-134318-2 MS	VPR A-47	81
280-134318-2 MS	VPR A-47	79
280-134318-2 MSD	VPR A-47	83
280-134318-2 MSD	VPR A-47	79
LCS 280-487907/2-A	Lab Control Sample	86
LCS 280-487907/3-A	Lab Control Sample	95
MB 280-487907/1-A	Method Blank	76

Surrogate Legend

OTPH = o-Terphenyl

QC Sample Results

Client: Wapiti Operating, LLC
Project/Site: Produced Water Spill

Job ID: 280-134318-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 280-488264/3-A
Matrix: Solid
Analysis Batch: 488243

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 488264

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		0.0050		mg/Kg		03/10/20 11:00	03/10/20 12:10	1
Ethylbenzene	ND		0.0050		mg/Kg		03/10/20 11:00	03/10/20 12:10	1
Toluene	ND		0.0050		mg/Kg		03/10/20 11:00	03/10/20 12:10	1
m-Xylene & p-Xylene	ND		0.0025		mg/Kg		03/10/20 11:00	03/10/20 12:10	1
o-Xylene	ND		0.0025		mg/Kg		03/10/20 11:00	03/10/20 12:10	1
Xylenes, Total	ND		0.0050		mg/Kg		03/10/20 11:00	03/10/20 12:10	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*58 - 140*	*03/10/20 11:00*	*03/10/20 12:10*	*1*
Toluene-d8 (Surr)	*101*		*80 - 126*	*03/10/20 11:00*	*03/10/20 12:10*	*1*
4-Bromofluorobenzene (Surr)	*102*		*76 - 127*	*03/10/20 11:00*	*03/10/20 12:10*	*1*
Dibromofluoromethane (Surr)	*101*		*75 - 121*	*03/10/20 11:00*	*03/10/20 12:10*	*1*

Lab Sample ID: LCS 280-488264/1-A
Matrix: Solid
Analysis Batch: 488243

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 488264

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	0.0500	0.0436		mg/Kg		87	75 - 135
Ethylbenzene	0.0500	0.0448		mg/Kg		90	73 - 125
Toluene	0.0500	0.0415		mg/Kg		83	77 - 122
m-Xylene & p-Xylene	0.0500	0.0431		mg/Kg		86	77 - 135
o-Xylene	0.0500	0.0438		mg/Kg		88	75 - 135
Xylenes, Total	0.100	0.0869		mg/Kg		87	76 - 135

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*58 - 140*
Toluene-d8 (Surr)	*99*		*80 - 126*
4-Bromofluorobenzene (Surr)	*101*		*76 - 127*
Dibromofluoromethane (Surr)	*100*		*75 - 121*

Lab Sample ID: LCSD 280-488264/2-A
Matrix: Solid
Analysis Batch: 488243

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 488264

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	0.0500	0.0481		mg/Kg		96	75 - 135	10	20
Ethylbenzene	0.0500	0.0499		mg/Kg		100	73 - 125	11	20
Toluene	0.0500	0.0453		mg/Kg		91	77 - 122	9	20
m-Xylene & p-Xylene	0.0500	0.0483		mg/Kg		97	77 - 135	11	20
o-Xylene	0.0500	0.0480		mg/Kg		96	75 - 135	9	20
Xylenes, Total	0.100	0.0963		mg/Kg		96	76 - 135	10	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*58 - 140*
Toluene-d8 (Surr)	*100*		*80 - 126*
4-Bromofluorobenzene (Surr)	*102*		*76 - 127*

QC Sample Results

Client: Wapiti Operating, LLC
Project/Site: Produced Water Spill

Job ID: 280-134318-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 280-488264/2-A
Matrix: Solid
Analysis Batch: 488243

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 488264

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Dibromofluoromethane (Surr)	101		75 - 121

Method: 8015B - Gasoline Range Organics - (GC)

Lab Sample ID: MB 280-488619/1-A
Matrix: Solid
Analysis Batch: 488643

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 488619

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		2.0		mg/Kg		03/13/20 09:31	03/13/20 11:16	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
a,a,a-Trifluorotoluene	91		77 - 123	03/13/20 09:31	03/13/20 11:16	1

Lab Sample ID: LCS 280-488619/2-A
Matrix: Solid
Analysis Batch: 488643

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 488619

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Gasoline Range Organics (GRO) -C6-C10	4.48	4.90		mg/Kg		109	75 - 135

Surrogate	LCS %Recovery	LCS Qualifier	Limits
a,a,a-Trifluorotoluene	92		77 - 123

Lab Sample ID: LCSD 280-488619/3-A
Matrix: Solid
Analysis Batch: 488643

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 488619

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Gasoline Range Organics (GRO) -C6-C10	4.48	4.89		mg/Kg		109	75 - 135	0	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
a,a,a-Trifluorotoluene	90		77 - 123

Method: 8015B - Diesel Range Organics (DRO) (GC)

Lab Sample ID: MB 280-487907/1-A
Matrix: Solid
Analysis Batch: 488279

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 487907

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	ND		8.0		mg/Kg		03/06/20 14:11	03/10/20 16:07	1
Motor Oil (C20-C38)	ND		24		mg/Kg		03/06/20 14:11	03/10/20 16:07	1

QC Sample Results

Client: Wapiti Operating, LLC
Project/Site: Produced Water Spill

Job ID: 280-134318-1

Method: 8015B - Diesel Range Organics (DRO) (GC) (Continued)

Lab Sample ID: MB 280-487907/1-A
Matrix: Solid
Analysis Batch: 488279

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 487907

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	76		49 - 115	03/06/20 14:11	03/10/20 16:07	1

Lab Sample ID: LCS 280-487907/2-A
Matrix: Solid
Analysis Batch: 488279

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 487907

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics [C10-C28]	132	110		mg/Kg		83	53 - 115

Surrogate	LCS %Recovery	LCS Qualifier	Limits
o-Terphenyl	86		49 - 115

Lab Sample ID: LCS 280-487907/3-A
Matrix: Solid
Analysis Batch: 488279

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 487907

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Motor Oil (C20-C38)	334	311		mg/Kg		93	57 - 115

Surrogate	LCS %Recovery	LCS Qualifier	Limits
o-Terphenyl	95		49 - 115

Lab Sample ID: 280-134318-2 MS
Matrix: Solid
Analysis Batch: 488279

Client Sample ID: VPR A-47
Prep Type: Total/NA
Prep Batch: 487907

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Diesel Range Organics [C10-C28]	66		117	150		mg/Kg		72	56 - 115

Surrogate	MS %Recovery	MS Qualifier	Limits
o-Terphenyl	81		49 - 115

Lab Sample ID: 280-134318-2 MS
Matrix: Solid
Analysis Batch: 488279

Client Sample ID: VPR A-47
Prep Type: Total/NA
Prep Batch: 487907

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Motor Oil (C20-C38)	130		315	422		mg/Kg		92	57 - 115

Surrogate	MS %Recovery	MS Qualifier	Limits
o-Terphenyl	79		49 - 115

QC Sample Results

Client: Wapiti Operating, LLC
Project/Site: Produced Water Spill

Job ID: 280-134318-1

Method: 8015B - Diesel Range Organics (DRO) (GC) (Continued)

Lab Sample ID: 280-134318-2 MSD
Matrix: Solid
Analysis Batch: 488279

Client Sample ID: VPR A-47
Prep Type: Total/NA
Prep Batch: 487907

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Diesel Range Organics [C10-C28]	66		128	155		mg/Kg		70	56 - 115	3	23

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
o-Terphenyl	*83*		*49 - 115*

Lab Sample ID: 280-134318-2 MSD
Matrix: Solid
Analysis Batch: 488279

Client Sample ID: VPR A-47
Prep Type: Total/NA
Prep Batch: 487907

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Motor Oil (C20-C38)	130		299	399		mg/Kg		90	57 - 115	6	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
o-Terphenyl	*79*		*49 - 115*

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MRL 280-487947/3
Matrix: Solid
Analysis Batch: 487947

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	5.00	4.56		mg/L		91	50 - 150

Lab Sample ID: MB 280-487972/3-A
Matrix: Solid
Analysis Batch: 487947

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		30		mg/Kg			03/06/20 17:41	1

Lab Sample ID: LCS 280-487972/1-A
Matrix: Solid
Analysis Batch: 487947

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	1000	987		mg/Kg		99	90 - 110

Lab Sample ID: LCSD 280-487972/2-A
Matrix: Solid
Analysis Batch: 487947

Client Sample ID: Lab Control Sample Dup
Prep Type: Soluble

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	1000	988		mg/Kg		99	90 - 110	0	10

QC Association Summary

Client: Wapiti Operating, LLC
Project/Site: Produced Water Spill

Job ID: 280-134318-1

GC/MS VOA

Analysis Batch: 488243

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-134318-1	Gachupin (D-137/D-138)	Total/NA	Solid	8260B	488264
280-134318-2	VPR A-47	Total/NA	Solid	8260B	488264
MB 280-488264/3-A	Method Blank	Total/NA	Solid	8260B	488264
LCS 280-488264/1-A	Lab Control Sample	Total/NA	Solid	8260B	488264
LCSD 280-488264/2-A	Lab Control Sample Dup	Total/NA	Solid	8260B	488264

Prep Batch: 488264

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-134318-1	Gachupin (D-137/D-138)	Total/NA	Solid	5030B	
280-134318-2	VPR A-47	Total/NA	Solid	5030B	
MB 280-488264/3-A	Method Blank	Total/NA	Solid	5030B	
LCS 280-488264/1-A	Lab Control Sample	Total/NA	Solid	5030B	
LCSD 280-488264/2-A	Lab Control Sample Dup	Total/NA	Solid	5030B	

GC VOA

Prep Batch: 488619

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 280-488619/1-A	Method Blank	Total/NA	Solid	5030B	
LCS 280-488619/2-A	Lab Control Sample	Total/NA	Solid	5030B	
LCSD 280-488619/3-A	Lab Control Sample Dup	Total/NA	Solid	5030B	

Prep Batch: 488632

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-134318-1	Gachupin (D-137/D-138)	Total/NA	Solid	5035	
280-134318-2	VPR A-47	Total/NA	Solid	5035	

Analysis Batch: 488643

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-134318-1	Gachupin (D-137/D-138)	Total/NA	Solid	8015B	488632
280-134318-2	VPR A-47	Total/NA	Solid	8015B	488632
MB 280-488619/1-A	Method Blank	Total/NA	Solid	8015B	488619
LCS 280-488619/2-A	Lab Control Sample	Total/NA	Solid	8015B	488619
LCSD 280-488619/3-A	Lab Control Sample Dup	Total/NA	Solid	8015B	488619

GC Semi VOA

Prep Batch: 487907

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-134318-1	Gachupin (D-137/D-138)	Total/NA	Solid	3546	
280-134318-2	VPR A-47	Total/NA	Solid	3546	
MB 280-487907/1-A	Method Blank	Total/NA	Solid	3546	
LCS 280-487907/2-A	Lab Control Sample	Total/NA	Solid	3546	
LCS 280-487907/3-A	Lab Control Sample	Total/NA	Solid	3546	
280-134318-2 MS	VPR A-47	Total/NA	Solid	3546	
280-134318-2 MS	VPR A-47	Total/NA	Solid	3546	
280-134318-2 MSD	VPR A-47	Total/NA	Solid	3546	
280-134318-2 MSD	VPR A-47	Total/NA	Solid	3546	

Analysis Batch: 488279

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-134318-1	Gachupin (D-137/D-138)	Total/NA	Solid	8015B	487907

QC Association Summary

Client: Wapiti Operating, LLC
Project/Site: Produced Water Spill

Job ID: 280-134318-1

GC Semi VOA (Continued)

Analysis Batch: 488279 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-134318-2	VPR A-47	Total/NA	Solid	8015B	487907
MB 280-487907/1-A	Method Blank	Total/NA	Solid	8015B	487907
LCS 280-487907/2-A	Lab Control Sample	Total/NA	Solid	8015B	487907
LCS 280-487907/3-A	Lab Control Sample	Total/NA	Solid	8015B	487907
280-134318-2 MS	VPR A-47	Total/NA	Solid	8015B	487907
280-134318-2 MS	VPR A-47	Total/NA	Solid	8015B	487907
280-134318-2 MSD	VPR A-47	Total/NA	Solid	8015B	487907
280-134318-2 MSD	VPR A-47	Total/NA	Solid	8015B	487907

General Chemistry

Analysis Batch: 487947

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-134318-1	Gachupin (D-137/D-138)	Soluble	Solid	9056A	487972
280-134318-2	VPR A-47	Soluble	Solid	9056A	487972
MB 280-487972/3-A	Method Blank	Soluble	Solid	9056A	487972
LCS 280-487972/1-A	Lab Control Sample	Soluble	Solid	9056A	487972
LCSD 280-487972/2-A	Lab Control Sample Dup	Soluble	Solid	9056A	487972
MRL 280-487947/3	Lab Control Sample	Total/NA	Solid	9056A	

Leach Batch: 487972

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-134318-1	Gachupin (D-137/D-138)	Soluble	Solid	DI Leach	
280-134318-2	VPR A-47	Soluble	Solid	DI Leach	
MB 280-487972/3-A	Method Blank	Soluble	Solid	DI Leach	
LCS 280-487972/1-A	Lab Control Sample	Soluble	Solid	DI Leach	
LCSD 280-487972/2-A	Lab Control Sample Dup	Soluble	Solid	DI Leach	

Analysis Batch: 488435

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-134318-1	Gachupin (D-137/D-138)	Total/NA	Solid	Moisture	
280-134318-2	VPR A-47	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Wapiti Operating, LLC
Project/Site: Produced Water Spill

Job ID: 280-134318-1

Client Sample ID: Gachupin (D-137/D-138)

Lab Sample ID: 280-134318-1
Matrix: Solid
Date Collected: 03/02/20 11:22
Date Received: 03/05/20 12:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			5.673 g	5 mL	488264	03/10/20 11:00	GPM	TAL DEN
Total/NA	Analysis	8260B		1	5 g	5 mL	488243	03/10/20 14:52	GPM	TAL DEN
Total/NA	Prep	5035			5.465 g	5 mL	488632	03/13/20 10:23	CAS	TAL DEN
Total/NA	Analysis	8015B		1	1 mL	50 mL	488643	03/13/20 14:53	CAS	TAL DEN
Total/NA	Prep	3546			15.0 g	1 mL	487907	03/06/20 14:11	MB	TAL DEN
Total/NA	Analysis	8015B		1			488279	03/10/20 17:13	MAM	TAL DEN
Soluble	Leach	DI Leach			10.19 g	100 mL	487972	03/06/20 13:02	JAP	TAL DEN
Soluble	Analysis	9056A		1	5 mL	5 mL	487947	03/06/20 19:09	BWH	TAL DEN
Total/NA	Analysis	Moisture		1			488435	03/11/20 16:05	BWH	TAL DEN

Client Sample ID: VPR A-47

Lab Sample ID: 280-134318-2
Matrix: Solid
Date Collected: 03/02/20 13:40
Date Received: 03/05/20 12:45

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			5.076 g	5 mL	488264	03/10/20 11:00	GPM	TAL DEN
Total/NA	Analysis	8260B		1	5 g	5 mL	488243	03/10/20 15:15	GPM	TAL DEN
Total/NA	Prep	5035			6.745 g	5 mL	488632	03/13/20 10:23	CAS	TAL DEN
Total/NA	Analysis	8015B		1	1 mL	50 mL	488643	03/13/20 15:18	CAS	TAL DEN
Total/NA	Prep	3546			15.5 g	1 mL	487907	03/06/20 14:11	MB	TAL DEN
Total/NA	Analysis	8015B		1			488279	03/10/20 17:36	MAM	TAL DEN
Soluble	Leach	DI Leach			10.59 g	100 mL	487972	03/06/20 13:02	JAP	TAL DEN
Soluble	Analysis	9056A		1	5 mL	5 mL	487947	03/06/20 19:26	BWH	TAL DEN
Total/NA	Analysis	Moisture		1			488435	03/11/20 16:05	BWH	TAL DEN

Laboratory References:

TAL DEN = Eurofins TestAmerica, Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Accreditation/Certification Summary

Client: Wapiti Operating, LLC
Project/Site: Produced Water Spill

Job ID: 280-134318-1

Laboratory: Eurofins TestAmerica, Denver

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
A2LA	Dept. of Defense ELAP	2907.01	10-31-21
A2LA	ISO/IEC 17025	2907.01	10-31-21
Alabama	State Program	40730	09-30-12 *
Alaska (UST)	State	18-001	01-08-20 *
Arizona	State	AZ0713	12-20-20
Arkansas DEQ	State	19-047-0	06-01-20
California	State	2513	01-08-21
Connecticut	State	PH-0686	09-30-20
Florida	NELAP	E87667-57	06-30-20
Illinois	NELAP	2000172019-1	04-30-20
Iowa	State	IA#370	12-01-20
Kansas	NELAP	E-10166	04-30-20
Louisiana	NELAP	30785	06-30-20
Maine	State	2019011 (231)	03-03-21
Minnesota	NELAP	1788752	12-31-20
Nevada	State	CO000262020-1	07-31-20
New Hampshire	NELAP	205319	04-28-20
New Jersey	NELAP	190002	06-30-20
New York	NELAP	59923	04-01-20
North Carolina (WW/SW)	State	358	12-31-20
North Dakota	State	R-034	01-08-21
Oklahoma	State	2018-006	08-31-20
Oregon	NELAP	4025-011	01-08-21
Pennsylvania	NELAP	013	08-01-20
South Carolina	State	72002001	01-08-20 *
Texas	NELAP	T104704183-19-17	09-30-20
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-18-00099	03-26-21
Utah	NELAP	CO000262019-11	07-31-20
Virginia	NELAP	10490	06-14-20
Washington	State	C583-19	08-05-20
West Virginia DEP	State	354	11-30-20
Wisconsin	State	999615430	08-31-20
Wyoming (UST)	A2LA	2907.01	10-31-21

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins TestAmerica, Denver
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Fax (303) 431-7171

Chain of Custody Record

Denver #280

eurofins Environment Testing TestAmerica

Client Information	Sampler: Randy L. Madison	Lab PM: Turner, Shelby R	Carrier Tracking No(s):	COC No:
Client Contact: Mr. Randy Madison	Phone: 575-420-1120	E-Mail: shelby.turner@testamericainc.com		Page:
Company: Wapiti Operating, LLC				Job #:
Address: P.O. Box 190 309 Silver Street	Due Date Requested:			
City: Raton	TAT Requested (days):			
State, Zip: NM, 87740				
Phone: 575-445-6706(Tel)	PO #: Pay by Credit Card			
Email: rmadison@wapitienergy.com	WO #:			
Project Name: Produced Water Spill	Project #: 28020400			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9056A_28D - (MOD) Local Method	8015B_DRO - (MOD) Standard 8015 list	8015B_GRO - (MOD) Standard 8015 list	8260B - (MOD) BTEX by GC/MS	% Moisture	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	F	N	N		
Gachupin (D-132 / D-138)	3/2/20	1122	G	Solid			N	N	F	N	N		
VPS (A-4)	3/2/20	1340	G	Solid			N	N	F	N	N		

280-134318 Chain of Custody

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by: Randy L Madison	3/3/20 at 1130	Wapiti		3/5/20 0910	TADEN
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 12:45	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 4C, 0.4, IR4, SG, 3/5/20

Ver: 01/16/2019

3/17/2020

Page 1 of 1

FROM (575) 420-1120
Randy Madison
309 Silver St
RATON NM 87740
US

TO Shelby Turner
TestAmerica Denver Lab.
4955 Yarrow St.

ARVADA CO 80002
(303) 736-0100

REF
PO DEPT

DENV 0806 BLDR V201 Door 7779 1069 3845 03/06/20 08:58

TRK# 7779 1069 3845

80002

9632 0019 6 (000 000 0000) 0 00 7779 1069 3845

280-134318 Waybill

Login Sample Receipt Checklist

Client: Wapiti Operating, LLC

Job Number: 280-134318-1

Login Number: 134318
List Number: 1
Creator: Lubin, Julius C

List Source: Eurofins TestAmerica, Denver

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Revised June 1972

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Vermejo Park Corporation '76 FEB 23 Owner's Well No. RM II 20

Street or Post Office Address Rt 1 Box 68

City and State Cimarron N M 87714

STATE ENGINEER OFFICE

Well was drilled under Permit No. File No CR-210 and is located in the:

a. ____ ¼ ____ ¼ ____ ¼ ____ ¼ of Section ____ Township ____ Range ____ N.M.P.M.

b. Tract No. ____ of Map No. ____ of the ____

c. Lot No. ____ of Block No. ____ of the ____
Subdivision, recorded in ____ County.

d. X= 321900 feet, Y= 2107100 feet, N.M. Coordinate System East Zone in the Maxwell Grant.

(B) Drilling Contractor Selves License No. WD 639

Address Same

Drilling Began 5-30-75 Completed 6-12-75 Type tools Cable tool Size of hole 6 in.

Elevation of land surface or GRAX at well is approx 6400 ft. Total depth of well 56.66 ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 56.66 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
56	53		Shale	8 gal

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
5"	9	Welded	0	56	56		56	18

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

Section 5. PLUGGING RECORD

Plugging Contractor ____

Address ____

Plugging Method ____

Date Well Plugged ____

Plugging approved by:

____
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received

Quad ____ FWL ____ FSL ____

File No. ____ Use ____ Location No. ____

Brunson

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	10 FT		DRT SAND CLAY
11	30		SAND - GRAVEL
30	40		11 11
40	50		11 11
50 TO	56		Shale
56 TO	64		Shale 11 FT Shale Based

Section 7. REMARKS AND ADDITIONAL INFORMATION

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Everett Kile
Driller

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the appropriate district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1(a) and Section 5 need be completed.

Revised June 1972

STATE ENGINEER OFFICE

WELL RECORD

'76 FEB 27 AM 11 20

STATE ENGINEER OFFICE

Section 1. GENERAL INFORMATION

(A) Owner of well Vermejo Park Corporation Owner's Well No.
Street or Post Office Address Rt 1 Box 68
City and State Cimarron N M 87714

Well was drilled under Permit No. File No CR 238 and is located in the:

a. ____ ¼ ____ ¼ ____ ¼ ____ ¼ of Section ____ Township ____ Range ____ N.M.P.M.

b. Tract No. ____ of Map No. ____ of the ____

c. Lot No. ____ of Block No. ____ of the ____
Subdivision, recorded in ____ County.

d. X= 326.000 feet, Y= 2,128,500 feet, N.M. Coordinate System East Zone in the Maxwell Grant, Cone Grande Grant.

(B) Drilling Contractor Silva License No. WD 639

Address Same

Drilling Began 21 JULY 75 Completed 19 Sept 75 Type tools Cable Size of hole 6 ¾ in.

Elevation of land surface or ____ at well is ____ ft. Total depth of well 209 ft.

Completed well is ☑ shallow ☐ artesian. Depth to water upon completion of well 125 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
103	104	— 1 —	GREY SANDY SHALE	1 (ONE) GPM
195	202		GREY SANDY SHALE	4 GPM
				—

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
5 9/16 OD	6	WLD			208		204	150

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
65	68	6 7/8"	½ = 50lb	—	BENTONITE & SOIL 3:1
72	74	6 7/8"	⅓ = 30lb	—	MUD & SOIL 2:1

Section 5. PLUGGING RECORD

Plugging Contractor ____
Address ____
Plugging Method ____
Date Well Plugged ____
Plugging approved by:
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received

Quad ____ FWL ____ FSL ____

File No. ____ Use ____ Location No. ____

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	3	3	PACKED CLAY, GRAVEL
3	12	9	HARD SUGAR SAND STONE, INTER. GREY SHALE
12	34	22	BROWN CLAY W/LAYERED SAND STONE
34	38	4	HARD SURFACE SEDIMENT, SOME SHALE
38	56	18	HARD SHALE, COAL LAYER
56	58	2	HEAVEY GRAVEL, SLOW LOSS OF CIRCULATION (SECT. 4)
58	65	7	DARK GREY SHALE, HARD STONE
65	68	3	LOSS of CIR., SOFT DRILLING, NO SAMPLES (SECT. 4)
68	72	4	HARD SHALE 1-2', LAYERED COAL 8-10"
72	74	2	LOSS CIRCULATION, NO SAMPLE (SECT. 4)
74	88	14	HARD SAND SEDIMENT, W/GREY SHALE & COAL
88	92	4	GREY SHALE, LARGE LAYERED COAL 16-18"
92	118	26	GREY SHALE, SAND
118	146	28	HARD WHITE LIME NO SAMPLES
146	151	5	COAL
151	207	56	SHALE, BROWN CLAY, MIXED COAL

Section 7. REMARKS AND ADDITIONAL INFORMATION

NO BENTONITE USED, HOLE PACKED W/ DRILLINGS

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Everett Kile
Driller

INSTRUCTIONS: This form should be [illegible]ted in triplicate, preferably typewritten, and [illegible]mitted to the appropriate district office of the State Engineer. All sections, exc[illegible]ection 5, shall be answered as completely [illegible]ccurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1(a) and Section 5 need be completed.

Revised June 1972

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Vermejo Park Ranch Owner's Well No. MIne Shop
Street or Post Office Address P.O. Drawer E
City and State Raton, NM 87740

Well was drilled under Permit No. CR-4363 and is located in the:

a. ____ ¼ ____ ¼ ____ ¼ ____ ¼ of Section ____ Township ____ Range ____ N.M.P.M.

b. Tract No. ____ of Map No. ____ of the ____

c. Lot No. ____ of Block No. ____ of the ____
Subdivision, recorded in Colfax County.

d. X= 328023 feet, Y= 2129326 feet, N.M. Coordinate System East Zone in
the Maxwell Grant

(B) Drilling Contractor Mack's Drilling, Inc. License No. WD-916
Address P.O. Box 1061, Raton, NM 87740

Drilling Began 05-24-05 Completed 05-25-05 Type tools Air Rotary Size of hole 7 7/8 in

Elevation of land surface or Casing at well is 2 ft. Total depth of well 80 ft

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 16 ft

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
25	33	8	Gravel	20

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
6"	.188	Weld	2	80	80		40	60

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

2005

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	13	13	Black Fill
13	15	2	Coal
15	25	10	Black Shale
25	33	8	Gravel (Water)
33	39	6	Gray Shale
39	52	13	Tan Sandstone
52	54	2	Coal
54	83	29	Tan Sandstone
83	85	2	Coal

Section 7. REMARKS AND ADDITIONAL INFORMATION

Set 25' 8 5/8" Steel at surface

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

Received

SEP 11 2015

Office of the State Engineer
District VII Cimarron Office

TWF

1. GENERAL AND WELL LOCATION

OSE POD NUMBER (WELL NUMBER): Pod 4 CR-5742	OSE FILE NUMBER(S): CR-05742 POD4
WELL OWNER NAME(S): ARP Production Company LLC	PHONE (OPTIONAL): (724) 561-8129 work (412) 489-0311 cell
WELL OWNER MAILING ADDRESS: 1000 Commerce Drive, 4th Floor	CITY: Pittsburg, STATE: PA ZIP: 15275

WELL LOCATION (FROM GPS)	DEGREES	MINUTES	SECONDS	
LATITUDE	36	55	37.6	N
LONGITUDE	104	52	31.6	W

* ACCURACY REQUIRED: ONE TENTH OF A SECOND
* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS - PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE

Near A-262 PH3R TOWNSHIP 31 NORTH
SW¼ NE¼ SW¼ NW¼, SECTION 15, RANGE 19 EAST, N.M.P.M.

2. DRILLING & CASING INFORMATION

LICENSE NUMBER	NAME OF LICENSED DRILLER	NAME OF WELL DRILLING COMPANY
WD-916	Wesley B. Mack	Mack's Drilling, Inc.

DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
09-03-15	09-03-15	9	108	None

COMPLETED WELL IS: ○ ARTESIAN ◉ DRY HOLE ○ SHALLOW (UNCONFINED) — STATIC WATER LEVEL IN COMPLETED WELL (FT): None

DRILLING FLUID: ○ AIR ○ MUD ADDITIVES – SPECIFY:

DRILLING METHOD: ◉ ROTARY ○ HAMMER ○ CABLE TOOL ○ OTHER – SPECIFY:

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
0	105	6 1/8	Steel	Weld	4	.200	

3. ANNULAR MATERIAL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL	AMOUNT (cubic feet)	METHOD OF PLACEMENT
0	108	6 1/8	12 sacks cement/ 6 gallons of water	9	Pour

FOR OSE INTERNAL USE: MONITOR WELL — WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER	CR-5742	POD NUMBER	POD4	TRN NUMBER	574435
LOCATION	31N. 19E. 15. 1323				PAGE 1 OF 2

4. HYDROGEOLOGIC LOG OF WELL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES (attach supplemental sheets to fully describe all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER-BEARING ZONES (gpm)
0	29	29	Tan Siltstone	O Y ◉ N	
29	108	79	Gray Sandstone	O Y ◉ N	
				O Y O N	
				O Y O N	
				O Y O N	
				O Y O N	
				O Y O N	
				O Y O N	
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				O Y O N	
				O Y O N	
				O Y O N	
				O Y O N	
				O Y O N	

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA: O PUMP O AIR LIFT O BAILER O OTHER – SPECIFY:

TOTAL ESTIMATED WELL YIELD (gpm):

5. TEST; RIG SUPERVISION

WELL TEST — TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING DISCHARGE METHOD, START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

MISCELLANEOUS INFORMATION:
Atlas Resources Seismic Monitoring Well

PRINT NAME(S) OF DRILL RIG SUPERVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONSTRUCTION OTHER THAN LICENSEE:
Robert E. Mack

6. SIGNATURE

THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:

Robert E. Mack — SIGNATURE OF DRILLER / PRINT SIGNEE NAME

9-4-15 — DATE

FOR OSE INTERNAL USE MONITOR WELL — WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER	CR-5742	POD NUMBER	POD4	TRN NUMBER	574435
LOCATION	31N. 19E. 15. 1323				PAGE 2 OF 2

Locator Tool Report

General Information:

Application ID: 72 Date: 09-14-2015 Time: 11:29:33

WR File Number: CR
Purpose: POINT OF DIVERSION

Applicant First Name: ARP PRODUCTION CO.
Applicant Last Name: CR-5742 POD4

GW Basin: CANADIAN RIVER
County: COLFAX

Critical Management Area Name(s): NONE
Special Condition Area Name(s): NONE
Land Grant Name: BEAUBIEN AND MIRANDA

PLSS Description (New Mexico Principal Meridian):

PLSS description is not available for this location.

Coordinate System Details:

Geographic Coordinates:

Latitude:	36 Degrees	55 Minutes	37.6 Seconds	N
Longitude:	104 Degrees	52 Minutes	31.6 Seconds	W

Universal Transverse Mercator Zone: 13N

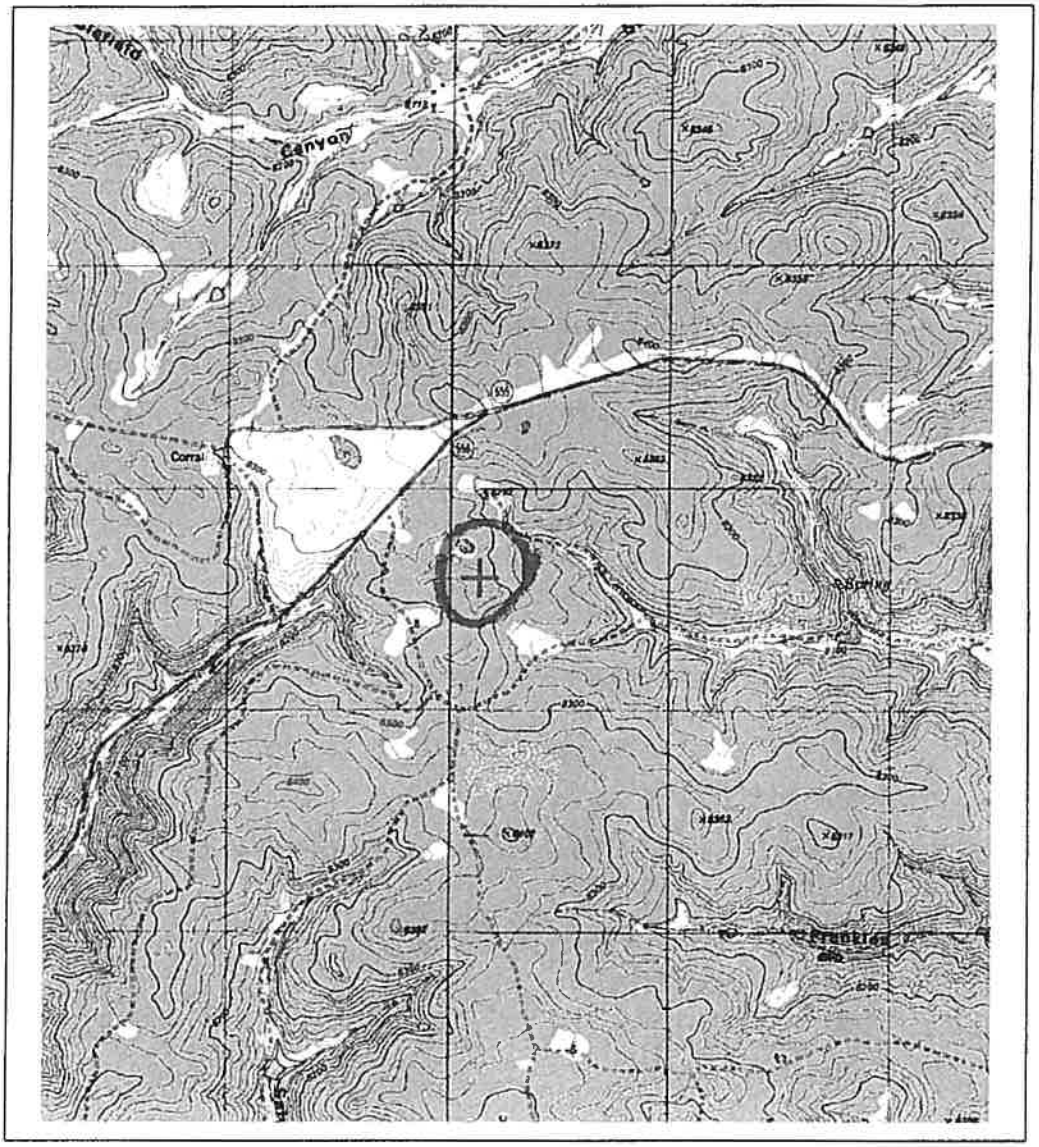
NAD 1983(92) (Meters)	N: 4,086,794	E: 511,093
NAD 1983(92) (Survey Feet)	N: 13,408,090	E: 1,676,811
NAD 1927 (Meters)	N: 4,086,588	E: 511,142
NAD 1927 (Survey Feet)	N: 13,407,414	E: 1,676,973

State Plane Coordinate System Zone: New Mexico East

NAD 1983(92) (Meters)	N: 657,525	E: 116,704
NAD 1983(92) (Survey Feet)	N: 2,157,230	E: 382,886
NAD 1927 (Meters)	N: 657,503	E: 104,152
NAD 1927 (Survey Feet)	N: 2,157,157	E: 341,706

NEW MEXICO OFFICE OF STATE ENGINEER

Locator Tool Report



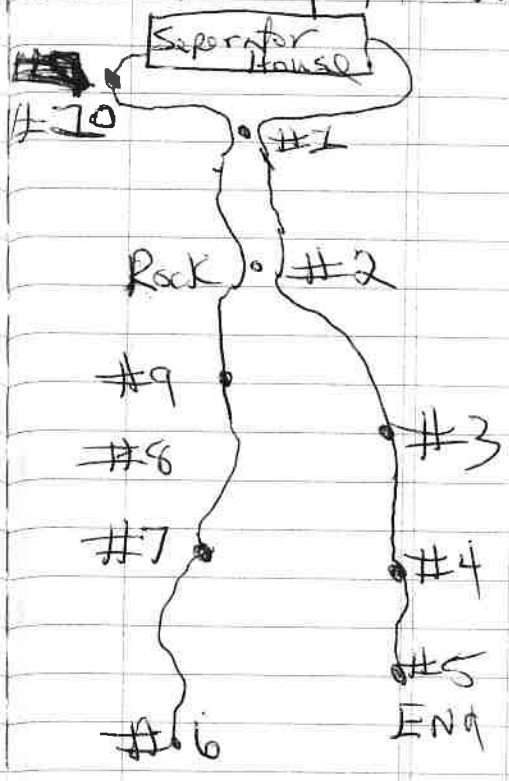
WR File Number: CR Scale: 1:32,342

Northing/Easting: UTM83(92) (Meter): N: 4,086,794 E: 511,093

Northing/Easting: SPCS83(92) (Feet): N: 2,157,230 E: 382,886

GW Basin: Canadian River

A-47 Sp. 11 2/11/20



#1 N36.9747
W104.81300

#2 N36.97482
W104.81323

#3 N36.977490
W104.81324

#4 N36.97552
W 104.81343

A-47 Spill Cont.

#5 N 36.97552
W 104.81343

#6 N 36.97563
W 104.81329

#7 N 36.97547
W 104.81327

#8 N 36.97551
W 104.81327

#9 N 36.97506
W 104.81323

A-47 Single Grab
3/2/20

N. 36.97470
W. 104.81305

2/11/20