March 25, 2019

1RP-5350 Characterization Report and Remediation Plan

AO 6 #501H Tank Release

Staked point for Trench-01. Photo viewing east-northeast. Release point is located photo upper-right.

Prepared for
Advance Energy Partners Hat Mesa LLC
Houston, Texas

Prepared by
R.T. Hicks Consultants, Ltd.
Albuquerque, New Mexico

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	NCH1903862333
District RP	1RP-5350
Facility ID	
Application ID	pCH1903862671

Release Notification

Responsible Party

Responsible Party: Advance Energy Partners Hat Mesa, LLC	OGRID: 372417
Contact Name: David Harwell	Contact Telephone: 832-672-4604
Contact email: DHarwell@advanceenergypartners.com	Incident # NCH1903862333 AO 6 501H @ 30-025-45026
Contact mailing address: 11490 Westheimer Rd. STE 950, Houston, TX 77077	

Location of Release Source

Latitude N 32.41557 Longitude W 103.60359

(NAD 83 in decimal degrees to 5 decimal places)

Site Name: AO 6 501H	Site Type: Well Site
Date Release Discovered: Feb. 6, 2019 (9:00)	API# *30-025-45026*

Unit Letter	Section	Township	Range	County
P	6	22 S.	33 E.	Lea County

Surface Owner: [X] State [ ] Federal [ ] Tribal [ ] Private (*Name:* _____)

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)
[X] Produced Water	Volume Released (bbls): 220	Volume Recovered (bbls) 200
Treated PW	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	[X] 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
During flowback operations a valve on frac was left open by a vacuum truck driver. Water was later transferred into the tank and leaked from open valve. Water was found on location. Valve was closed on frac tank and water on location was immediately withdrawn by vac truck. 200 bbls were recovered.

State of New Mexico
Oil Conservation Division

Incident ID	
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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? Release was greater than 25 bbls of produced water.

If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)?
Email at 8:30 2/7/2019
Email to NMOCD christna.hernandez@state.nm.us , Bradford.Billings@state.nm.us
SLO rmann@slo.state.nm.us

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 release was in silty sand surface soils. Free standing liquid quickly soaked into the sand. Within 15 hours, removal of surface soils within the upper 2-feet of soil column along the east-west extent of the release was excavated and temporarily stockpiled. Near surface soils along north-south release extent, which is along a buried pipeline, was excavated to a depth of a few inches. A one-call is in progress and excavation of impacted soil will resume within the next few days.
[SEE ATTACHED MAP]
Release characterization and remediation will occur under NMAC 19.15.29.

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: David Harwell Title: Vice President

Signature: David Harwell Date: Feb. 7, 2019

email: DHarwell@advanceenergypartners.com Telephone: 832-672-4604

OCD Only

RECEIVED
By CHernandez at 5:27 pm, Feb 07, 2019

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? Plates 2 and 3	380 (ft bgs)
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? Plate 5	☐ 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)? Plate 5	☐ 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? Plate 4	☐ Yes ☑ No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring? Plate 4	☐ Yes ☑ No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field? Plate 4	☐ Yes ☑ No
Are the lateral extents of the release within 300 feet of a wetland? Plate 7	☐ Yes ☑ No
Are the lateral extents of the release overlying a subsurface mine? Plate 8	☐ Yes ☑ No
Are the lateral extents of the release overlying an unstable area such as karst geology? Plate 9	☐ Yes ☑ No
Are the lateral extents of the release within a 100-year floodplain? Plate 10	☐ Yes ☑ No
Did the release impact areas **not** on an exploration, development, production, or storage site? Plate 1	☐ 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.

Form C-141
Page 4

State of New Mexico
Oil Conservation Division

Incident ID	
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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: David Harwell Title: VP Eng. + Ops.

Signature: David Harwell Date: 3-25-19

email: dharwell@advanceenergypartners.com Telephone: 832-672-4604

OCD Only

Received by: _____ Date: _____

Form C-141
Page 5

State of New Mexico
Oil Conservation Division

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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: David Harwell Title: VP Eng. & Ops

Signature: David Harwell Date: 3-25-19

email: dharwell@advanceenergypartners.com Telephone: 832-672-4604

OCD Only

Received by: _____ Date: _____

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

Signature: _____ Date: _____

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: _____ Title: _____

Signature: _____ Date: _____

email: _____ Telephone: _____

OCD Only

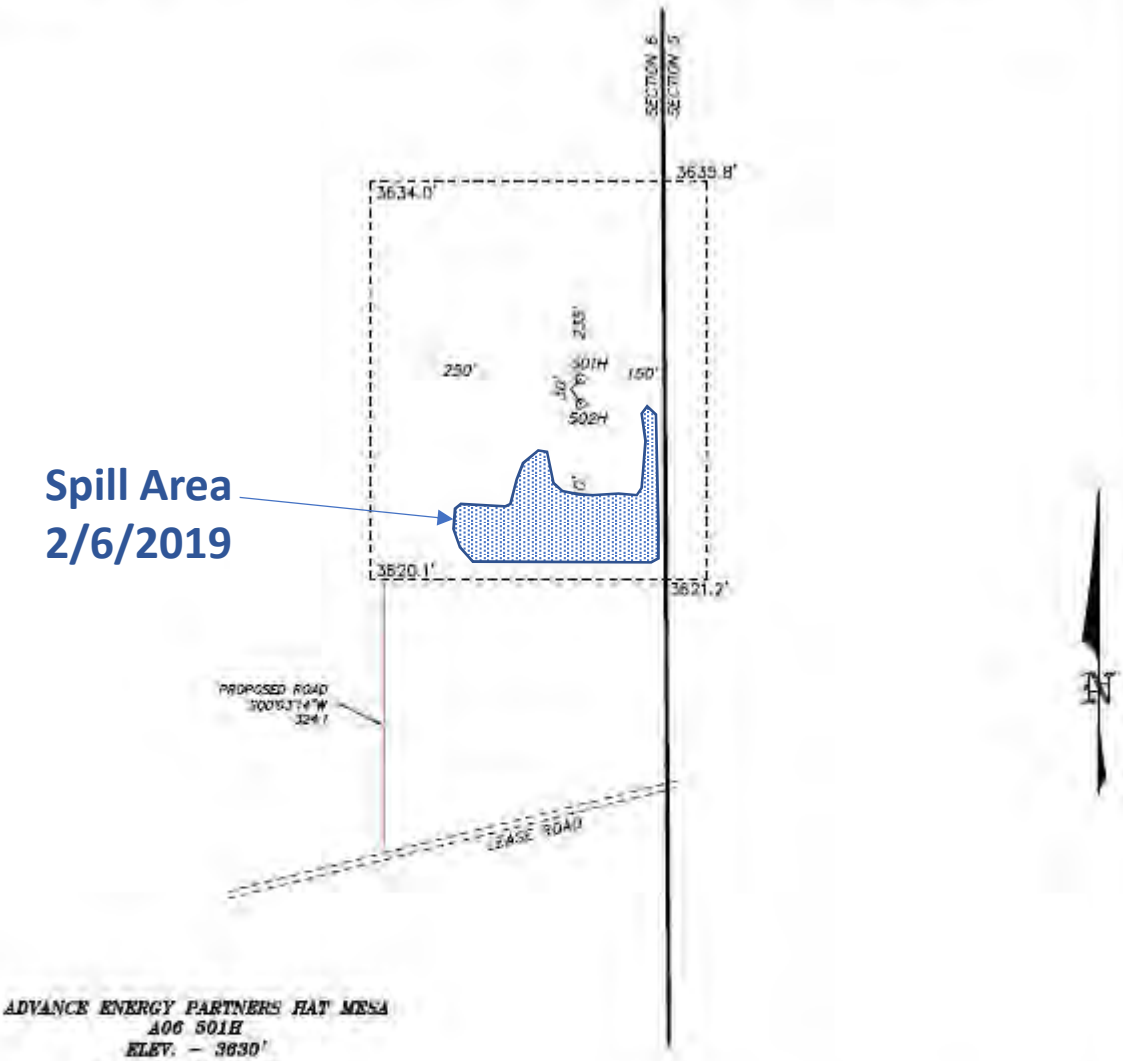
Received by: _____ Date: _____

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: _____ Date: _____

Printed Name: _____ Title: _____

SECTION 6, TOWNSHIP 22 SOUTH, RANGE 33 EAST. N.M.P.M., LEA COUNTY, NEW MEXICO.



ADVANCE ENERGY PARTNERS HAT MESA
A06 501H
ELEV. - 3630'
Lat - N 32.415798°
Long - W 103.603428°
NMSPCE- N 515767.8
E 766575.0
(NAD-83)

EUNICE, NM IS ±26 MILES TO THE EAST OF LOCATION.

200 0 200 400 FEET
SCALE: 1" = 200'

ADVANCE ENERGY PARTNERS HAT MESA

REF: A06 501H / WELL PAD TOPO

THE A06 501H LOCATED 795' FROM THE SOUTH LINE AND 100' FROM THE EAST LINE OF SECTION 6, TOWNSHIP 22 SOUTH, RANGE 33 EAST, N.M.P.M., LEA COUNTY, NEW MEXICO.

Basin Surveys
focused on excellence in the oilfield
P.O. Box 1786
1120 N. West County Rd.
Hobbs, New Mexico 88241
(575) 393-7316 - Office
(575) 392-2206 - Fax
basinsurvey@aol.com

W.O. Number: 33698	Drawn By: J GOAD	Date: 4-19-2018	Survey Date: 4-17-2018	Sheet 1 of 1 Sheets

Characterization Report And Remediation Plan

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

R. T. HICKS CONSULTANTS, LTD.
901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Since 1996
Artesia ▲ Carlsbad ▲ Durango ▲ Midland

March 25, 2019

NMOCD District 1 (vacant)
District 1 - HOBBS
1625 N. French Drive
Hobbs, New Mexico 88240
(575) 370-3180 Ext. 111
Via Email:
emnrd-ocd-district1spills@state.nm.us

Bradford Billings
Environmental Bureau
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
Via Email:
bradford.billings@state.nm.us

RE: 1RP-5330 – AO 6 #501H Release
Advance Energy Partners Hat Mesa, LLC
Characterization Report and Remediation Plan

NMOCD:

R.T. Hicks Consultants submits this characterization report and remediation plan on the behalf of Advance Energy Partners Hat Mesa, LLC (Advance Energy).

The C-141 including the Characterization and Remediation Forms are attached. Hick Consultants relied on 19.15.29 NMAC for characterization and remediation reporting for the A0 6 #501H produced water release.

The remediation plan includes a request for deferral for final reclamation. Characterization sampling shows the release is within Table 1 NMAC 19.15.29 concentration limits for restoration of areas “in-use” where groundwater is greater than 100-feet.

The report is divided into three sections:

I. Initial Response
II. Characterization
III. Final Remediation Deferral Request

Plates

- Plate 1 – Site Map
- Plates 2 through 10 – As labeled on the C-141 Characterization Checklist
- Plate 11 – Initial Characterization EM Survey Results
- Plate 12 – Characterization Sample Results for Chloride

Tables

- Table 1 – Nearby OSE Well Summary
- Table 2 – EM Survey and Characterization Sample Results
- Table 3 – Coordinates of EM and sample points

Appendices

- Appendix A – OSE Well Logs
- Appendix B – EM Survey Calibration Data
- Appendix C - Laboratory Certificate of Analyses

I. Initial Response

The release occurred on February 06, 2019 from an open valve on a frac tank. During flowback operations the valve on the frac tank was left open by a vacuum truck driver. Flowback water that was later transferred into the frac tank leaked from the open valve. Flowback water was observed on location. The valve on frac tank was closed and the released water on location was immediately removed by a vac truck. Two-hundred barrels (200 bbls) were recovered. Initial volume of release was estimated at 220 barrels.

The release did not impact surface or groundwater and was contained on the active production pad.

Following the removal of free-standing liquid, the upper 10 to 12 inches of the production pad within the release extent was removed and replaced with clean caliche. The graded area as shown in Figure 1, below, shows the eastern portion of the release extent that was removed and replaced with clean caliche.

Figure 1: Graded area shows the eastern half of the release extent that was removed and replaced with clean caliche. Frac tanks are visible photo left. Photo is viewing south-southeast. GPS: 32.4158530 N, -103.6036710 W. Date/Time: 2019-02-08 09:28:16

Plate 1 shows the release extent relative to the well pad and the AO 6 #501H wellhead (API 30-025-45026). The source of the release is located at Lat: 32.415185, Long: -103.603427.

II. Characterization

The following sections address items as described in 19.15.29.11.A, paragraphs 1- 4. Please refer to the C-141 characterization checklist for additional setback criteria and verification (Plates 2-10).

1. Site Map

Horizontal extent was determined by wet soil from the release and an electromagnetic survey (EM Survey) with a read field reading of 18 mS/m (26 mS/m temperature corrected to 25° C.)[1]. Plate 1 shows the release extent relative to the source, wellhead, surveyed production pad, and location of frac tanks during flowback operations. Access to the production pad is from the southwest corner.

Figure 2, below, shows a photo of the source point.

Figure 2: Photo viewing west near the source (frac tank). Vehicle in photo center background is the western extent of the release. The graded surface is where the removal of impacted surface soils and replacement with clean caliche occurred during initial response. GPS: 32.4151778 N, -103.6033083 W. Date/Time: 2019-02-24 13:19:36

[1] See Appendix B for a discussion on EM Survey and calibration curves.

2. Depth to Ground Water

Most recent depth to water data was queried from the USGS and New Mexico Office of the State Engineer (OSE) online databases (Plate 2). Spatial analysis shows:

- The nearest water well is located 2.38-miles northeast of the release (OSE CP-00854) with a depth to water of 600-feet.
- The next two nearest water wells are located
  - 2.59-miles northeast (OSE CP-01356) with a depth to water of 555-feet.
  - 3.05-miles southwest (OSE CP-02821) with a depth to water of 340-feet.

Review of well logs available from the New Mexico Office of the State Engineer (OSE) online database (see Table 1, below) shows that the depth to the top of the water-bearing zone exceeds 400 feet below land surface, as shown in the "top of water bearing strata" column. Appendix A contains well logs available online from the OSE.

POD Number	Date	Top of Water Bearing Strata	Bottom of Water Bearing Strata	Depth to Water	Height Above Confining Layer
		Feet	Feet	Feet	Feet
CP-00854	6/22/1996	755	890	600	155
CP-01356	8/9/2014	765	1092	555.2	209.8
C-02821	6/23/2001	410	540	340	70

Table 1: Summary of OSE Well Logs

OSE well logs show that the nearby wells have a minimum of 70 feet of pressure head above the confining layer. It is important to recognize that at CP-00854, the nearest water well to the release, ground water is at a confined depth of 755 feet and confining pressure causes the water column to rise 155 feet for a perceived depth to water of 600 feet bgs.

Ground water flow is to the southeast as demonstrated on the potentiometric map (Plate 3). We relied on the USGS water wells to generate the potentiometric surface. Regionally, USGS water wells show that ground water is within the Santa Rosa and Chinle Formation.

The potentiometric surface indicates that the depth to water, which is under artesian flow, is approximately 380 feet below ground surface, where

380 feet = 3630 ft surface elevation – 3250 ft potentiometric surface.

3. Wellhead Protection Area

Plate 4 shows that the release extent is not:

- Within incorporated municipal boundaries or within a defined municipal fresh water well field.
- Within ½-mile private and domestic water sources (wells and springs).
- 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
- Within 1000 feet of any other fresh water well or spring

4. Distance to Nearest Significant Water Course

Plate 5 shows that the release extent is not:

- Within ½ mile of any significant water course.
- Within 300 feet of a continuously flowing watercourse or any other significant watercourse.
- Within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark).

5. Soil/Waste Characteristics

The release was contained on an active production pad and is within an area needed for production operations. Surface soils within areas that are "in-use" were restored (19.15.29.12.C(2) NMAC) and meet the Closure Criteria limits listed in Table 1 of 19.15.29 NMAC.

The release occurred in an area where depth to water is greater than 100 ft below ground surface (bgs).

According to Table 1 19.15.29 NMAC, closure criteria limits are as follows:

Table 1 19.15.29 NMAC		Chloride	GRO+DRO	TPH+Ext	BTEX	Benzene
DTW > 100ft		(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Closure Criteria	0-4 ft (not in-use)	600	1,000	2,500	50	10
Closure Criteria	>4 ft or "in-use"	20,000	1,000	2,500	50	10

An electromagnetic survey (EM Survey) was employed to delineate the release extent. As discussed in Appendix B, electrical conductivity (EC) readings from EM Surveys show that an EC reading of >30 mS/m (temperature corrected to 25 deg. C.) correlates with a chloride concentration > 600 mg/kg. The greater the EC

reading the greater the chloride concentration. Furthermore, a higher EC reading in the vertical position relative to the horizontal position indicates that chloride concentrations are increasing from 0 to 4 feet below ground surface.

An EM38 meter was used to measure EC in the upper 4-feet and we elected to delineate the release extent to a more conservative EC value of 26 mS/m.

Plate 11 shows the results of the EM Survey. The EM Survey 26 mS/m delineation extent aligned with the observed surface grading from the removal of impacted material during the initial response.

The background reading near the northwest corner on Plate 11 shows an EC reading of 11 mS/m and 17 mS/m, in the horizontal and vertical positions, respectively. The highest EC reading was near the southwest corner of the release extent showing an EC reading of 273/211 (horizontal/vertical) mS/m; indicating that chloride concentrations are decreasing with depth. All EM survey locations within the release extent show that EC readings decreased with depth; therefore, chloride concentrations are decreasing with depth.

We obtained two samples for laboratory confirmation based upon the EM Survey results.

1. Trench-01 is located where EC readings were the highest in both the horizontal and vertical positions, discussed above, and is representative of a "worst case scenario" where chloride concentration from 0 to 4 feet below ground surface are likely to be the highest.
2. Trench-02 is located just outside the 26 mS/m EC delineation and near a corner where laboratory detections of chloride will be at or below laboratory detection levels. Trench-02 is representative of areas outside and adjacent to the release extent.

Plate 12 shows the location of the two trench samples and characterization sample results from 0 to 4 feet and 4.5 feet below ground surface. Table 2 summarizes the EM Survey and chloride sample results. TPH, TPH Extended, BTEX, and Benzene are below laboratory detection levels and not discussed further. Table 3 shows the latitude and longitude of EM and sample points. The Laboratory Certificate of Analysis is in Appendix C.

One composite soil sample was obtained from each trench. The composite sample was obtained by scraping the trench sidewall from 0 to 4 feet and obtaining equal amounts of soil throughout the column. The 4.5-foot discrete samples were obtained from the bottom sidewall of the trench.

Analtical results show that chloride concentrations in Trench 1 from 0 to 4 feet below ground surface is 2,300 mg/kg; below the 20,000 mg/kg limit for areas "in-use" such as the active production pad. At 4.5-feet below ground surface, chlroide was below laboratory detection levels.

Trench 2 exhibited chloride concentrations from 0 to 4 feet and 4.5 feet below ground surface below laboratory detections levels; confirming the release extent is confined to the EM Survey's EC reading of 26 mS/m.

Trench sampling showed the lithology as:

0 - 1 ft : Caliche Pad.
1 – 4.5 : Silty Sand, medium brown, loose.
Trench 1 the soil was moist. Trench 2 the soil was dry.

Figure 3: Trench-01 sampling viewing east-northeast.
GPS: 32.4151611 N, -103.6039111 W. Date/Time: 2019-02-24 13:25:09

Figure 4: Trench -02 sampling viewing west-northwest.
GPS: 32.4152972 N, -103.6037056 W. Date/Time: 2019-02-24 13:40:33

III. Remediation and Deferral Request

- The removal of the upper 10 to 12 -inches of chloride impacted caliche on the active production pad,
- The EM Survey, and
- The soil sampling during characterization

shows that the upper 4-feet has been restored to meet chloride concentration limits as listed in Table 1 of 19.15.29 NMAC.

Therefore, we ask the NMOCD to defer reclamation until final well plugging and abandonment and tank battery decommissioning. At which time the production pad surface will be reclaimed according to 19.15.29.13 NMAC.

Final reclamation/remediation plan is as follows:

1. Conduct an EM Survey to identify any changes in the release extent that may cause chloride to exceed 600 mg/kg in the upper 4-feet. Below 4-feet must not exceed 20,000 mg/kg chloride.
2. Using a backhoe or excavator, remove soil within the upper 4-feet to a depth where chloride is less than 600 mg/kg.
3. Submit confirmation 5-point composite soil samples for Chloride, TPH, TPH Ext, BTEX, and Benzene from the excavation sidewalls (0 to 4 ft). Obtain a 5-point composite soil sample below 4 feet. Soil samples shall not exceed 200 sq, ft. surface area unless prior approval from NMOCD.
4. If soil samples do not exceed closure limits listed in Table 1 of 19.15.29, backfill the excavation with clean fill, contour, and seed. Otherwise, continue excavation until soil samples are below closure limits.

Estimated volume of material to remediate is 1,169 cu. yrds (=879 sq. yrds * 1.33 yrds depth).

Please contact me with any questions at andrew@rthicksconsult.com or 970-570-9535.

Sincerely,
R.T. Hicks Consultants, Ltd.

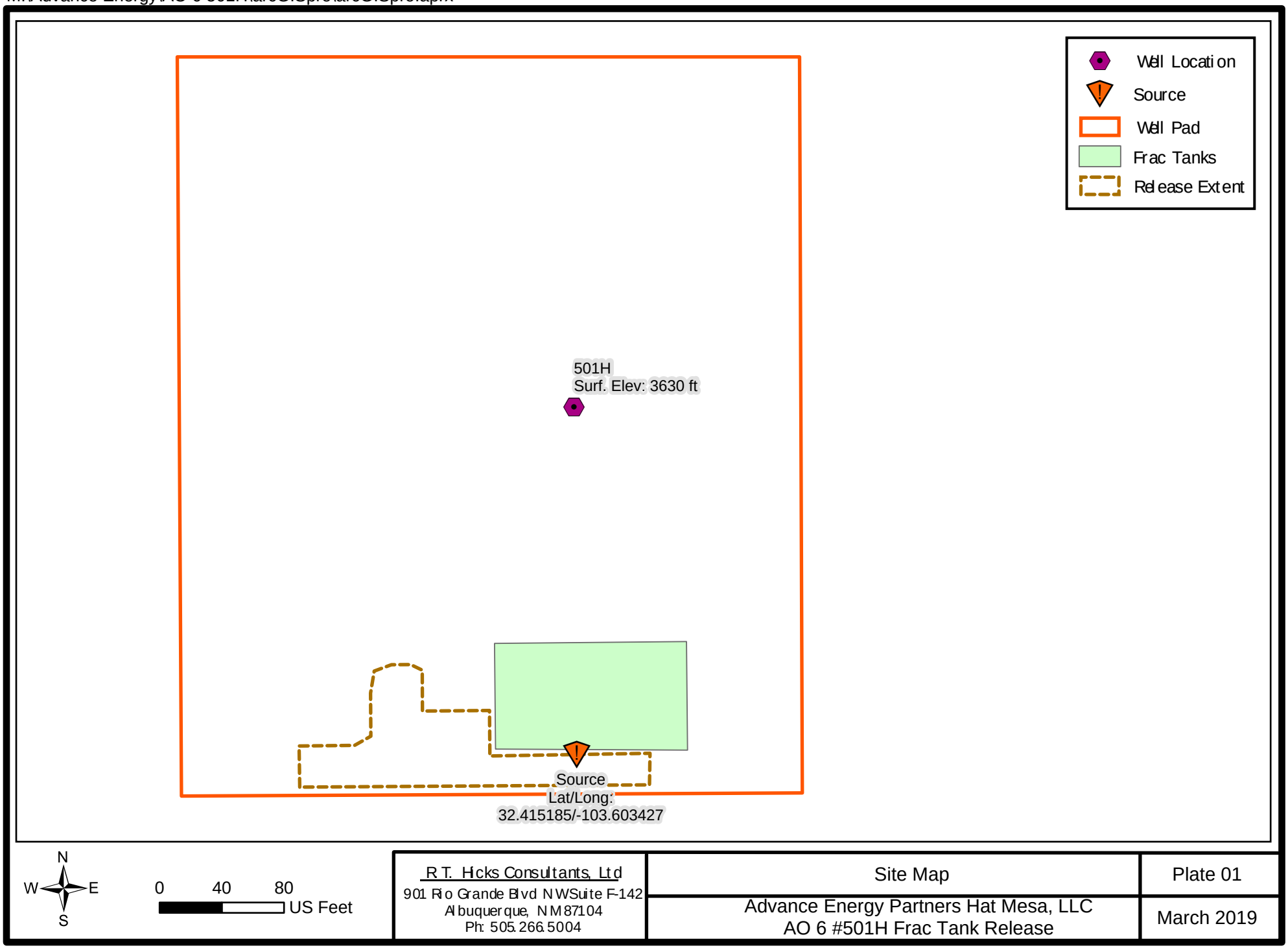
Andrew Parker
Sr. Env. Specialist

Copy: David Harwell (DHarwell@advanceenergypartners.com)
Advance Energy Partners Hat Mesa, LLC
Ryan Mann (rmann@slo.state.nm.us); State Land Office

Plates

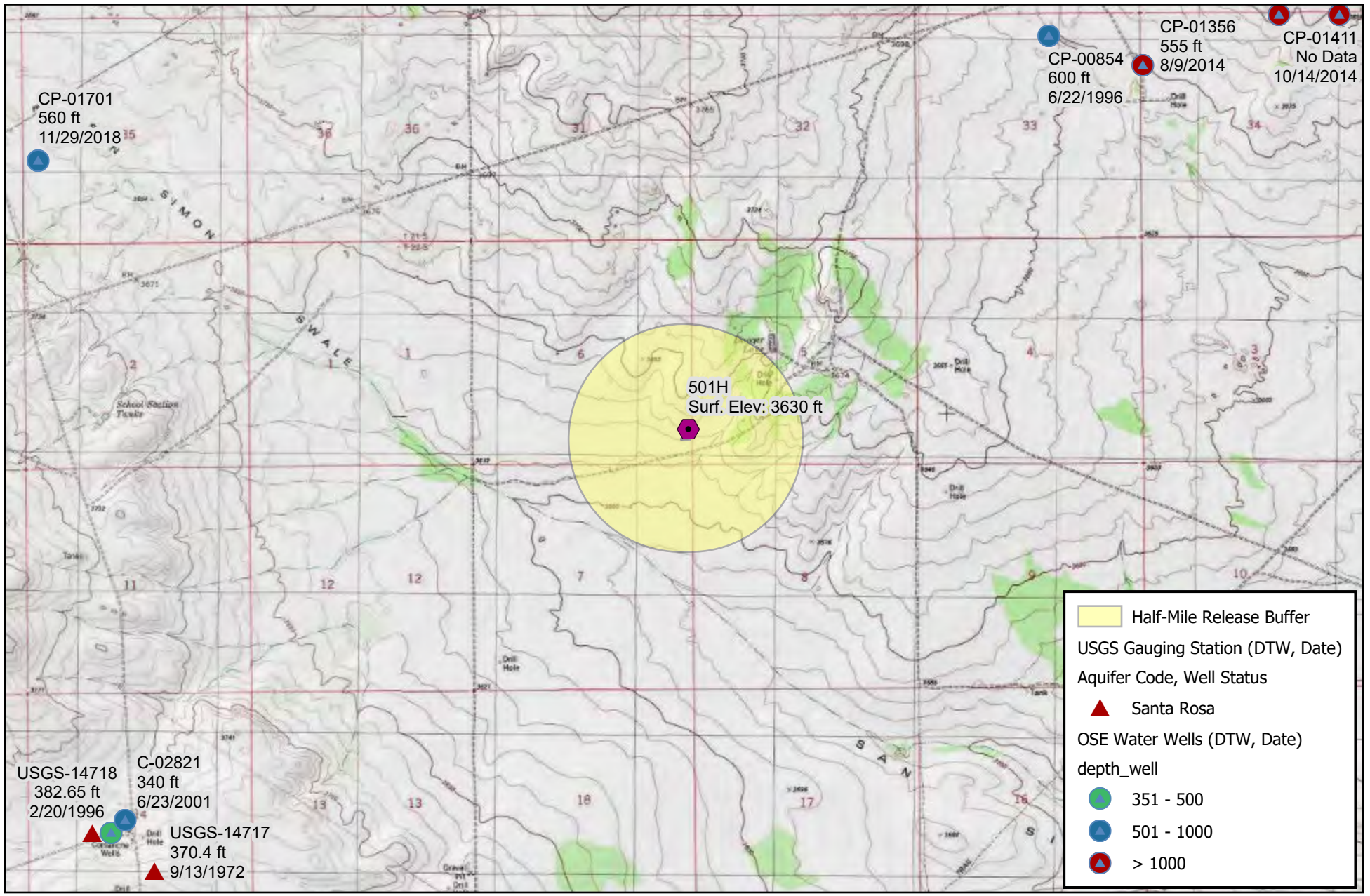
R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

M:\Advance Energy\AO 6 501H\arcGISpro\arcGISpro.aprx



R.T. Hicks Consultants, Ltd. 901 Rio Grande Blvd. NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Site Map	Plate 01
	Advance Energy Partners Hat Mesa, LLC AO 6 #501H Frac Tank Release	March 2019

M:\Advance Energy\AO 6 501H\arcGISpro\arcGISpro.aprx



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Depth to Water	Plate 02
	Advance Energy Partners Hat Mesa, LLC AO 6 #501H Frac Tank Release	March 2019

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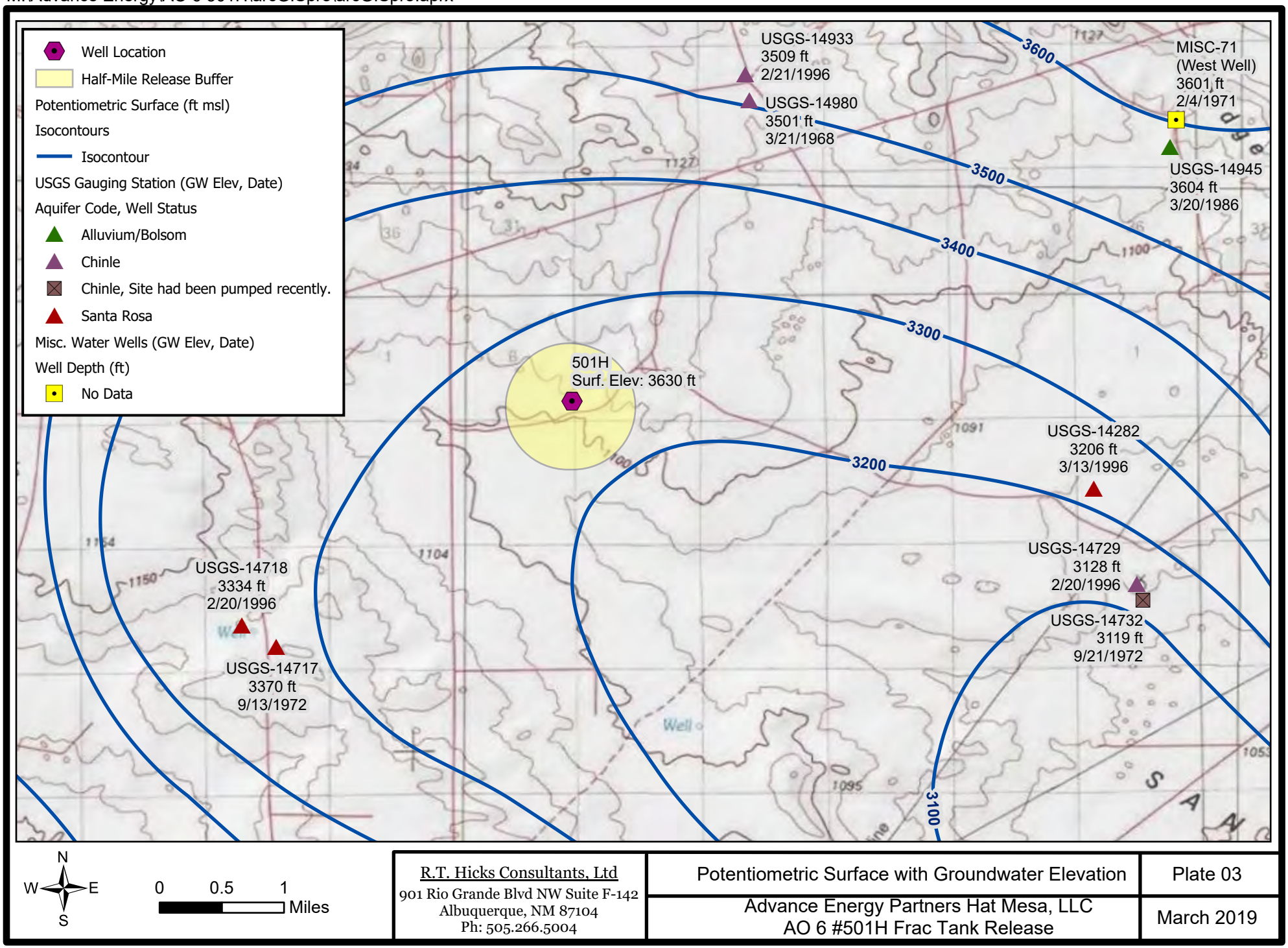

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Potentiometric Surface with Groundwater Elevation	Plate 03
	Advance Energy Partners Hat Mesa, LLC AO 6 #501H Frac Tank Release	March 2019

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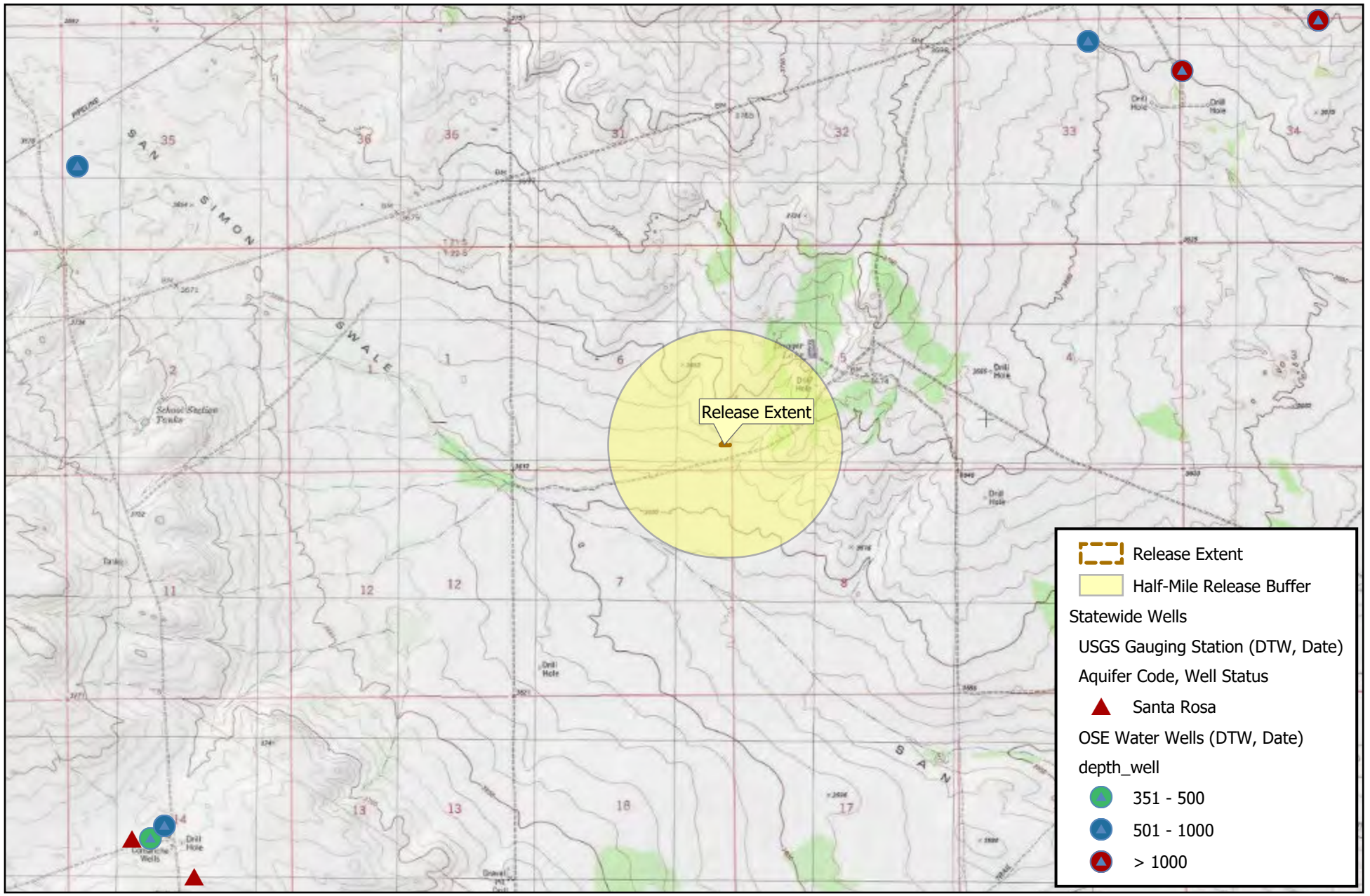

R.T. Hicks Consultants, Ltd
901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

Wellhead Protection

Plate 04

Advance Energy Partners Hat Mesa, LLC
AO 6 #501H Frac Tank Release

March 2019

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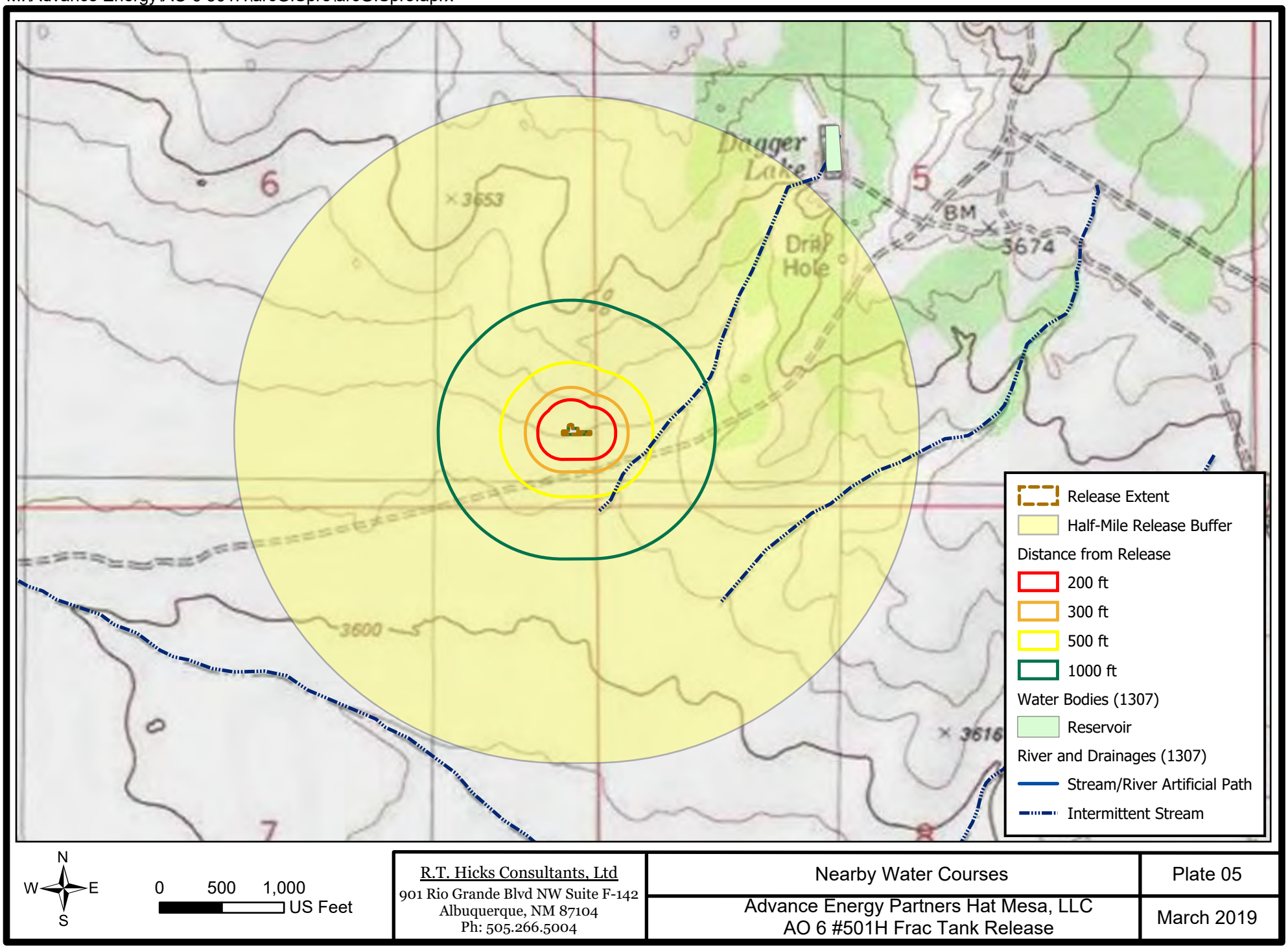

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Water Courses	Plate 05
	Advance Energy Partners Hat Mesa, LLC AO 6 #501H Frac Tank Release	March 2019

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R.T. Hicks Consultants, Ltd
901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

Nearby Structures

Plate 06

Advance Energy Partners Hat Mesa, LLC
AO 6 #501H Frac Tank Release

March 2019

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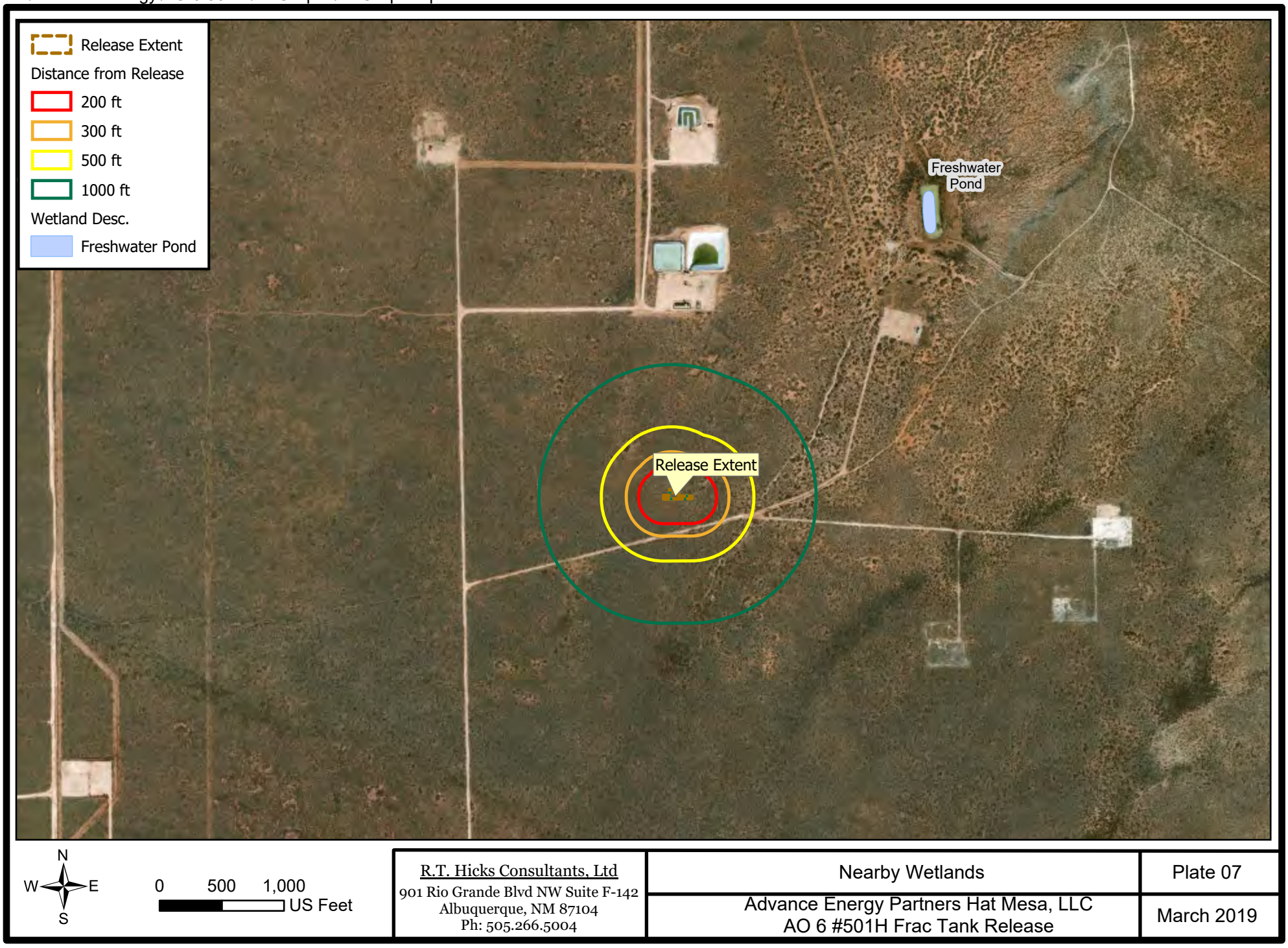

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Wetlands	Plate 07
	Advance Energy Partners Hat Mesa, LLC AO 6 #501H Frac Tank Release	March 2019

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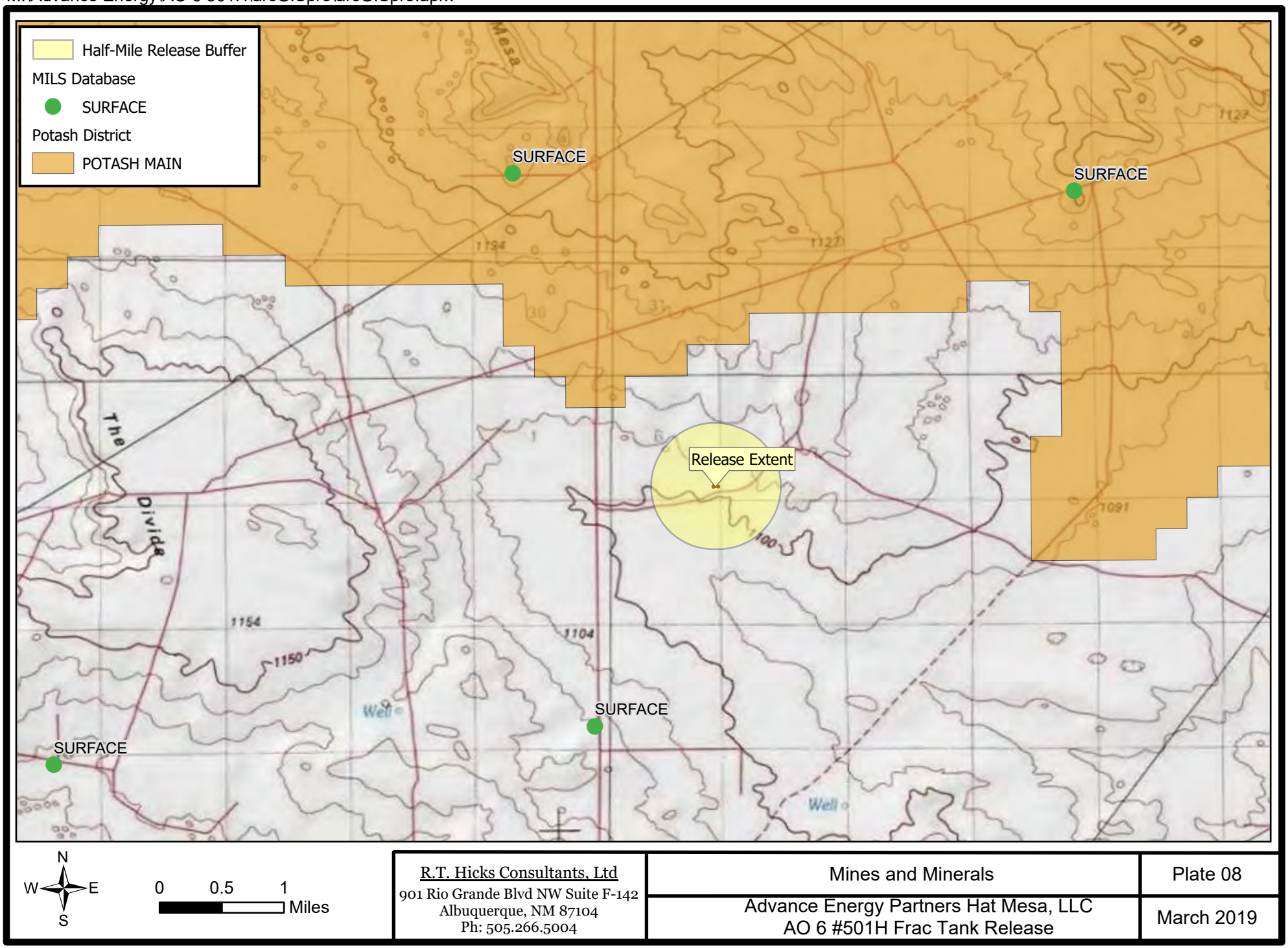

R.T. Hicks Consultants, Ltd
901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

Mines and Minerals

Plate 08

Advance Energy Partners Hat Mesa, LLC
AO 6 #501H Frac Tank Release

March 2019

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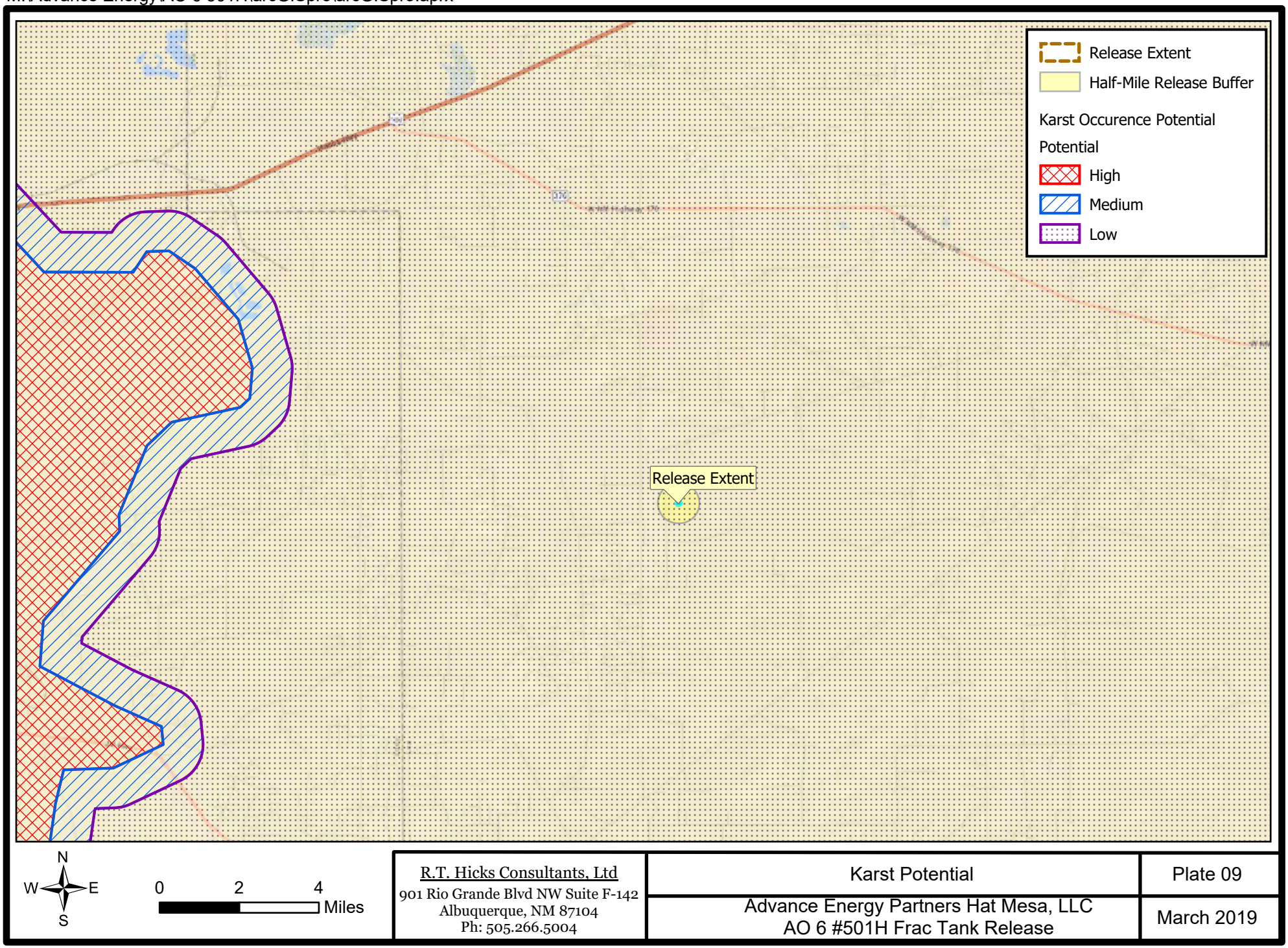

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Karst Potential	Plate 09
	Advance Energy Partners Hat Mesa, LLC AO 6 #501H Frac Tank Release	March 2019

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R.T. Hicks Consultants, Ltd
901 Rio Grande Blvd NW Suite F-142
Albuquerque, NM 87104
Ph: 505.266.5004

FEMA Flood Zones

Plate 10

Advance Energy Partners Hat Mesa, LLC
AO 6 #501H Frac Tank Release

March 2019

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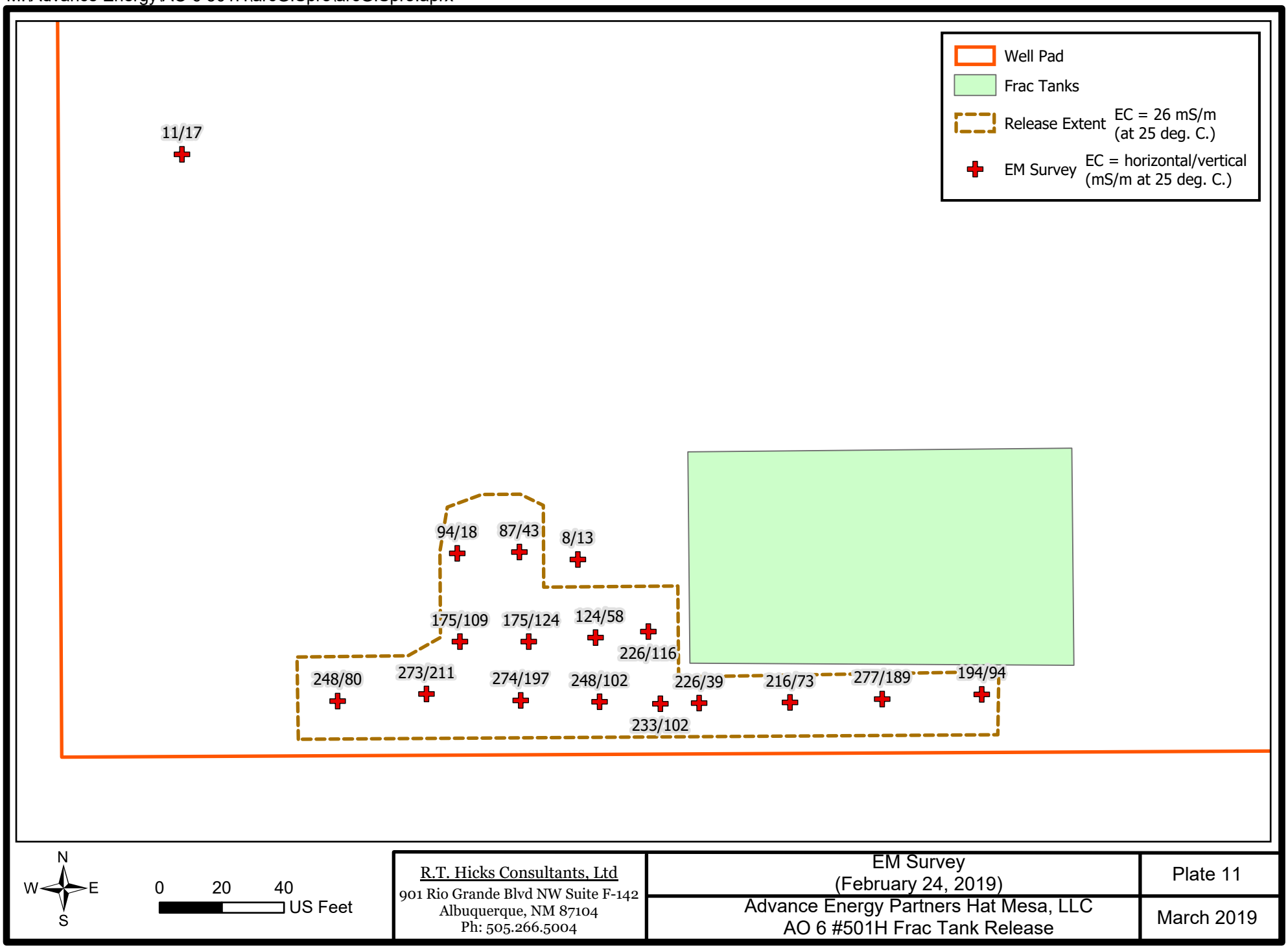

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	EM Survey (February 24, 2019) Advance Energy Partners Hat Mesa, LLC AO 6 #501H Frac Tank Release	Plate 11 March 2019

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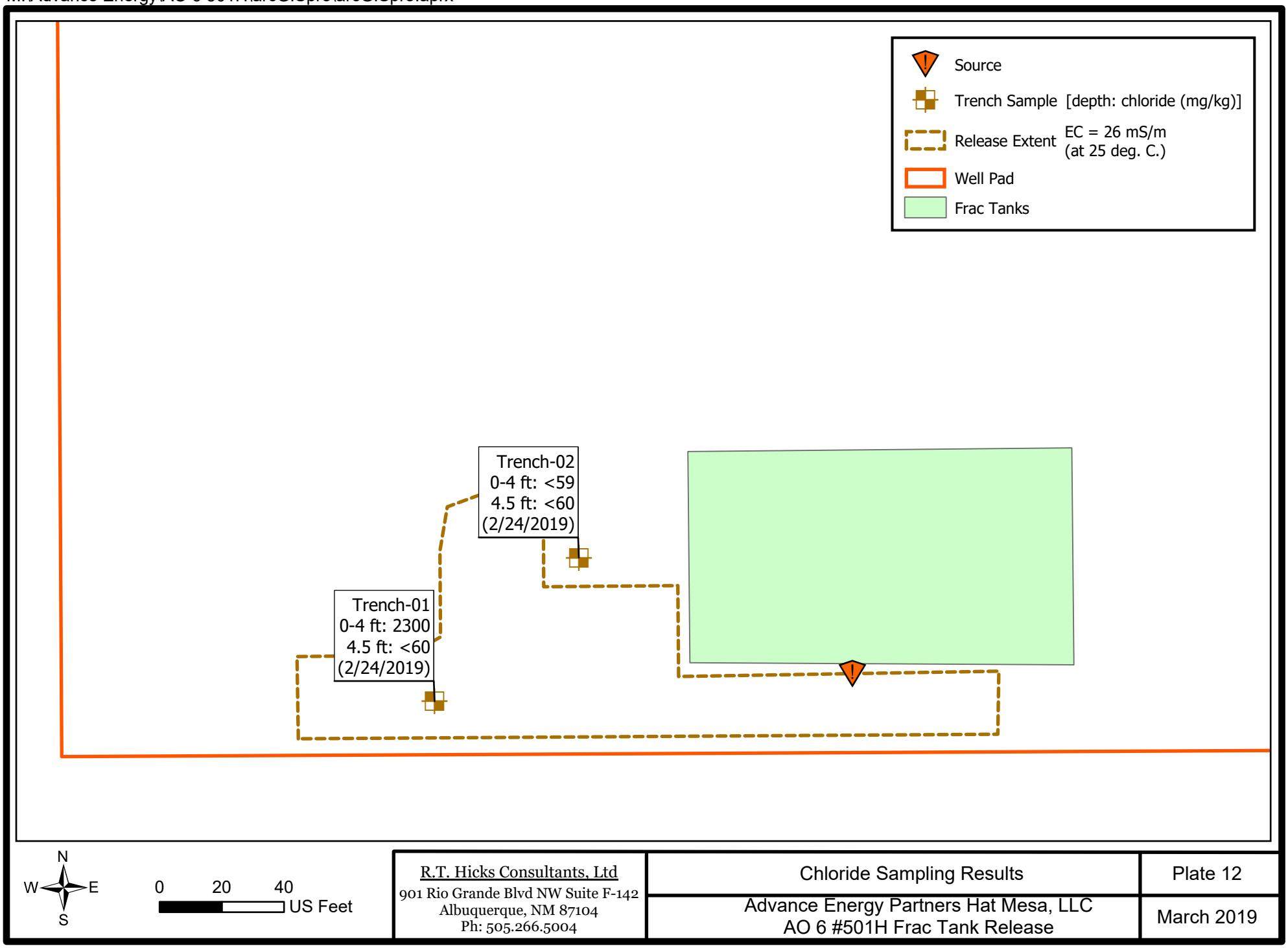


R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Chloride Sampling Results	Plate 12
	Advance Energy Partners Hat Mesa, LLC AO 6 #501H Frac Tank Release	March 2019

Tables

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

Sample ID	Date	Matrix (Soil/Water)	Discrete Depth (Feet)	Top Depth (Feet)	Bottom Depth (Feet)	In Use (Yes/No)	EM - Horizontal (100mS/m)	EM Vertical (100mS/m)	EM - Horizontal TC (100mS/m)	EM Vertical TC (100mS/m)
NMOCD Limits										
0 - 4 feet & "not in-use"										
> 4 ft or "in-use"										
EM-01	2/24/2019		0			Yes	170	55	248	80
EM-02	2/24/2019		0			Yes	188	135	274	197
EM-03	2/24/2019		0			Yes	170	70	248	102
EM-04	2/24/2019		0			Yes	160	70	234	102
EM-05	2/24/2019		0			Yes	155	27	226	39
EM-06	2/24/2019		0			Yes	148	50	216	73
EM-07	2/24/2019		0			Yes	190	130	277	190
EM-08	2/24/2019		0			Yes	133	65	194	95
EM-09	2/24/2019		0			Yes	120	75	175	110
EM-10	2/24/2019		0			Yes	120	85	175	124
EM-11	2/24/2019		0			Yes	85	40	124	58
EM-12	2/24/2019		0			Yes	155	80	226	117
EM-13	2/24/2019		0			Yes	65	13	95	19
EM-14	2/24/2019		0			Yes	60	30	88	44
EM-15	2/24/2019		0			Yes	8	12	12	18
EM-Trench-01	2/24/2019		0			Yes	187	145	273	212
EM-Trench-02	2/24/2019		0			Yes	6	9	9	13

Sample ID	Date	Matrix (Soil/Water)	Discrete Depth (Feet)	Top Depth (Feet)	Bottom Depth (Feet)	In Use (Yes/No)	Chloride (PPM)	GRO+DRO (PPM)	TPH Ext. (PPM)	Benzene (PPM)	BTEX (PPM)
NMOCD Limits											
0 - 4 feet & "not in-use"							600	--	2,500	10	50
> 4 ft or "in-use"							20,000	1,000	2,500	10	50
Trench-01	2/24/2019	soil		0	4	Yes	2,300	<14.2	<62.2	<0.023	<0.208
Trench-01	2/24/2019	soil	4.5			Yes	<60	<14.3	<61.3	<0.024	<0.217
Trench-02	2/24/2019	soil		0	4	Yes	<59	<14.7	<64.7	<0.023	<0.21
Trench-02	2/24/2019	soil	4.5			Yes	<60	<14.3	<62.3	<0.024	<0.215

Notes:
TC - Temp. Corrected to 25 deg. C.

Sample ID	Sample Type	Date	Latitude	Longitude	Datum
EM-01	EM Survey	02/24/19	32.41516405	-103.6039634	NAD 83
EM-02	EM Survey	02/24/19	32.41516353	-103.6037728	NAD 83
EM-03	EM Survey	02/24/19	32.41516188	-103.6036907	NAD 83
EM-04	EM Survey	02/24/19	32.41515974	-103.6036274	NAD 83
EM-05	EM Survey	02/24/19	32.4151601	-103.603587	NAD 83
EM-06	EM Survey	02/24/19	32.41516014	-103.6034924	NAD 83
EM-07	EM Survey	02/24/19	32.41516253	-103.6033963	NAD 83
EM-08	EM Survey	02/24/19	32.41516606	-103.6032926	NAD 83
EM-09	EM Survey	02/24/19	32.41521584	-103.6038357	NAD 83
EM-10	EM Survey	02/24/19	32.41521543	-103.603764	NAD 83
EM-11	EM Survey	02/24/19	32.41521857	-103.6036944	NAD 83
EM-12	EM Survey	02/24/19	32.41522356	-103.6036394	NAD 83
EM-13	EM Survey	02/24/19	32.41529377	-103.6038378	NAD 83
EM-14	EM Survey	02/24/19	32.41529458	-103.6037731	NAD 83
EM-15	EM Survey	02/24/19	32.41564782	-103.6041217	NAD 83
EM-Trench-01	EM Survey	02/24/19	32.4151698	-103.6038709	NAD 83
EM-Trench-02	EM Survey	02/24/19	32.41528763	-103.6037122	NAD 83
Source	Source	02/06/19	32.41518479	-103.603427	NAD 83
Trench-01	Trench Sample	02/24/19	32.41516287	-103.6038625	NAD 83
Trench-02	Trench Sample	02/24/19	32.41528891	-103.6037112	NAD 83

Appendix A

OSE Well Logs

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

STATE ENGINEER OFFICE

WELL RECORD

Revised June 1972

476275

Section 1. GENERAL INFORMATION

(A) Owner of well Glenn's Water Well Service Owner's Well No. _____

Street or Post Office Address P.O. Box 692

City and State Tatum, New Mexico 88267

Well was drilled under Permit No. CP-854 and is located in the:

a. _____ ¼ _____ ¼ NW ¼ NE ¼ of Section 33 Township 21-S. Range 33-E. 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= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor Glenn's Water Well Service License No. WD -421

Address P.O. Box 692 Tatum, New Mexico 88267

Drilling Began 6-22-96 Completed 6-22-96 Type tools rotary Size of hole 7 7/8 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 950 ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 600 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)
755	805	50	brown sand (coarse)	100 gpm
860	890	30	brown sand (coarse)	

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
8 5/8	.188		1	16	16			
6 5/8	.188		1	950	950	none	760	950

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 21.33.53.211413 #130944

Date Received 07-11-96

Quad _____ FWL _____ FSL _____

File No. CP-854 Use OWD Location No. 21.33.33.211413

540255

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	6	6	sand
6	20	14	caleche
20	30	10	white clay
30	45	15	red clay
45	68	23	green sandrock
68	72	4	hard rock
72	105	33	red clay
105	128	23	brown shale
128	195	67	red clay
195	300	105	brown shale
300	520	220	brown and red clay
520	555	35	blue sandy shale
555	560	5	red and brown shale
560	630	70	brown shale
630	735	105	red clay
735	745	10	brown sandy shale
745	755	10	brown sand rock
755	805	50	brown sand (coarse-some gravel-water)
805	860	55	brown sandrock (with stringers of brown shale)
860	890	30	brown sand (coarse-water)
890	910	20	brown sandrock
910	930	20	brown shale
930	950	20	red clay

Section 7. REMARKS AND ADDITIONAL INFORMATION

well drilled with air and foam to 300'

well drilled (dusted) with air only to 735'

no water to 735'

went back to foam after getting water at 755'

STATE ENGINEER OFFICE
ROSWELL, NEW MEXICO
'96 JUL 11 AM 10 25

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.

Corkey Glenn
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.

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

1. GENERAL AND WELL LOCATION

OSE POD NUMBER (WELL NUMBER): CP-1356 (JD-33 East)	OSE FILE NUMBER(S):
WELL OWNER NAME(S): Merchants/Glenn's Water Well Service, Inc.	PHONE (OPTIONAL): 575-398-2424
WELL OWNER MAILING ADDRESS: P. O. Box 692	CITY: Tatum STATE: NM ZIP: 88267

WELL LOCATION (FROM GPS)	DEGREES	MINUTES	SECONDS	
LATITUDE	32	26	20.9	N
LONGITUDE	103	34	7	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

SE1/4NE1/4NE1/4 Section 33, Township 21 South, Range 33 East on Merchants Livestock Land

2. DRILLING & CASING INFORMATION

LICENSE NUMBER	NAME OF LICENSED DRILLER	NAME OF WELL DRILLING COMPANY
WD 421	Corky Glenn	Glenn's Water Well Service, Inc.

DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
08/01/14	08/09/14	1,098'	1,098'	765'

COMPLETED WELL IS: (•) ARTESIAN ( ) DRY HOLE ( ) SHALLOW (UNCONFINED)

STATIC WATER LEVEL IN COMPLETED WELL (FT): 555.2'

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'	40'	20"	16"	None	15 1/2"	.250	
0'	760'	14 3/4"	9 5/8"	Thread & Collar	8.921"	36 lbs.	none
735'	1,098'	8 3/4"	7"	Thread & Collar	6.366"	23 lbs.	1/8"

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'	40'	20"	Cemented	2 yds.	Top Pour
0'	760'	14 3/4"	Float and shoe cemented to surface	655 cu ft	Circulated

FOR OSE INTERNAL USE

WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER	CP-1356	POD NUMBER	1	TRN NUMBER	549453
LOCATION	Exp1	21S.33E.33.224			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	3	3	Soil	○ Y ◉ N	
3	34	31	Caleche	○ Y ◉ N	
34	275	241	Red Clay	○ Y ◉ N	
275	760	485	Red & Brown Shale	○ Y ◉ N	
760	765	5	Red Shale & Sandrock	○ Y ◉ N	
765	795	30	Water Sand	◉ Y ○ N	
795	825	30	Red Shale & Sandrock	◉ Y ○ N	
825	920	95	Water Sand	◉ Y ○ N	
920	935	15	Red Shale & Sandrock	◉ Y ○ N	
935	968	33	Water Sand & Sandrock	◉ Y ○ N	
968	976	8	Red Shale & Sandrock	◉ Y ○ N	
976	1005	29	Water sand & strips of red shale	◉ Y ○ N	
1005	1092	87	Water sand fine	◉ Y ○ N	
1092	1098	6	Red Shale	○ Y ◉ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA: ◉ PUMP ○ AIR LIFT ○ BAILER ○ 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:

0' to 760' drilled with mud.
760' to 1,098' drilled with air and foam.

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

STATE ENGINEER OFFICE
2014 AUG 25 P 1:

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:

Corky Glenn — SIGNATURE OF DRILLER / PRINT SIGNEE NAME

8/21/14 — DATE

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

FILE NUMBER	CP-1356	POD NUMBER	1	TRN NUMBER	549453
LOCATION	Exp1	21S.33E.33.224			PAGE 2 OF 2

Trans. H-[illegible]

466507

Revised June 1972

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well JC Mills Ranch Owner's Well No. _____

Street or Post Office Address Box 1358

City and State Loving, NM 88256

Well was drilled under Permit No. C-2821 and is located in the:

a. NE ¼ NE ¼ SW ¼ ¼ of Section 14 Township 22S Range 32E 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= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor Taylor Water Well Service License No. WD-1348

Address 7317 Etcheverry Rd., Carlsbad, NM 88220

Drilling Began 6/12/01 Completed 6/23/01 Type tools Air Rotary Size of hole 7 7/8 in.

Elevation of land surface or _____ at well is UK ft. Total depth of well 540 ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 340 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)
410	540	130	Very thin silt stone+sand stone layers	1.5

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	SCH 40	PVC	+2	540	542	Cap	410	430
							440	540

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

OCD-ARTESIA, NEW MEXICO
2020 JUL 10 A 9:56
RECEIVED

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 10-04-2001

Quad _____ FWL _____ FSL _____

File No. C-2821 Use Domestic/Stock Location No. 22S.32E.14.322

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	4	4	Sandy Soil
4	14	10	Caliche+Pnk Shdy Congl
14	26	12	Clay:pnk,rd,sndy
26	30	4	Limestone:yel brn,dns
30	36	6	Conglomerate:wht,pnk,sndy,lmy
36	68	32	Clay:rd,sndy
68	72	4	Conglomerate:rd,sndy,vfn-fn grn,wl consl
72	166	94	Clay:rd,smth,stky
166	170	4	Siltstone:gry,fria,calc
170	184	14	Clay:rd,smth,stky
184	188	4	Siltstone:gry,fria,calc
188	194	6	Clay:rd,sft
194	238	44	Shale:rd,blky,sme rd sandstone
238	266	28	Sandstone:rd,gry,frstd,fn-med grn,shly in prt
266	290	24	Conglomerate:rd,gry,vfn grn ss+sh gravel,calc
290	302	12	Sh:rd,blky,slty,sndy
302	310	8	Conglomerate:yel brn,vry sndy,lmy
310	386	76	Shale:rd,sme lt gn+bent,blky-tblr,slty
386	390	4	Clay:rd,vry stky
390	476	86	Shale:rd,blky,slty,thin layers of sandstone
476	482	6	Sandstone:gry,vfn grn,slty,fria
482	518	36	Shale:rd,blky,slty,sme gry ss
518	522	4	Sandstone:gry,vfn grn,slty,fria,calc
522	532	10	Sh:rd,blky,slty
532	538	6	Sandstone:gry,vfn grn,slty,fria,calc
538	540	2	SH:rd,blky,slty

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.

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 [redacted] and Section 5 need be completed.

Appendix B

EM Survey Calibration

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

R. T. HICKS CONSULTANTS, LTD.
901 Rio Grande Blvd NW ▲ Suite F-142 ▲ Albuquerque, NM 87104 ▲ 505.266.5004 ▲ Fax: 505.266-0745
✖ Durango, CO ✖ Carlsbad, NM ✖ Midland, TX

ELECTROMAGNETIC SURVEY CALIBRATION TO CHLORIDE

Revised: March 7, 2019 (DRAFT)

Electromagnetic surveys (EM Survey) are commonly used to measure electrical conductivity (EC, "soil salinity") in soils. Employing a Geonics EM38 (Exhibit 1), field personnel can effectively delineate the horizontal extent of a produced water release by measuring EC and monitoring for EC changes between background and higher EC readings. Increasing EC measurements suggest that the edge of the release extent is approaching.

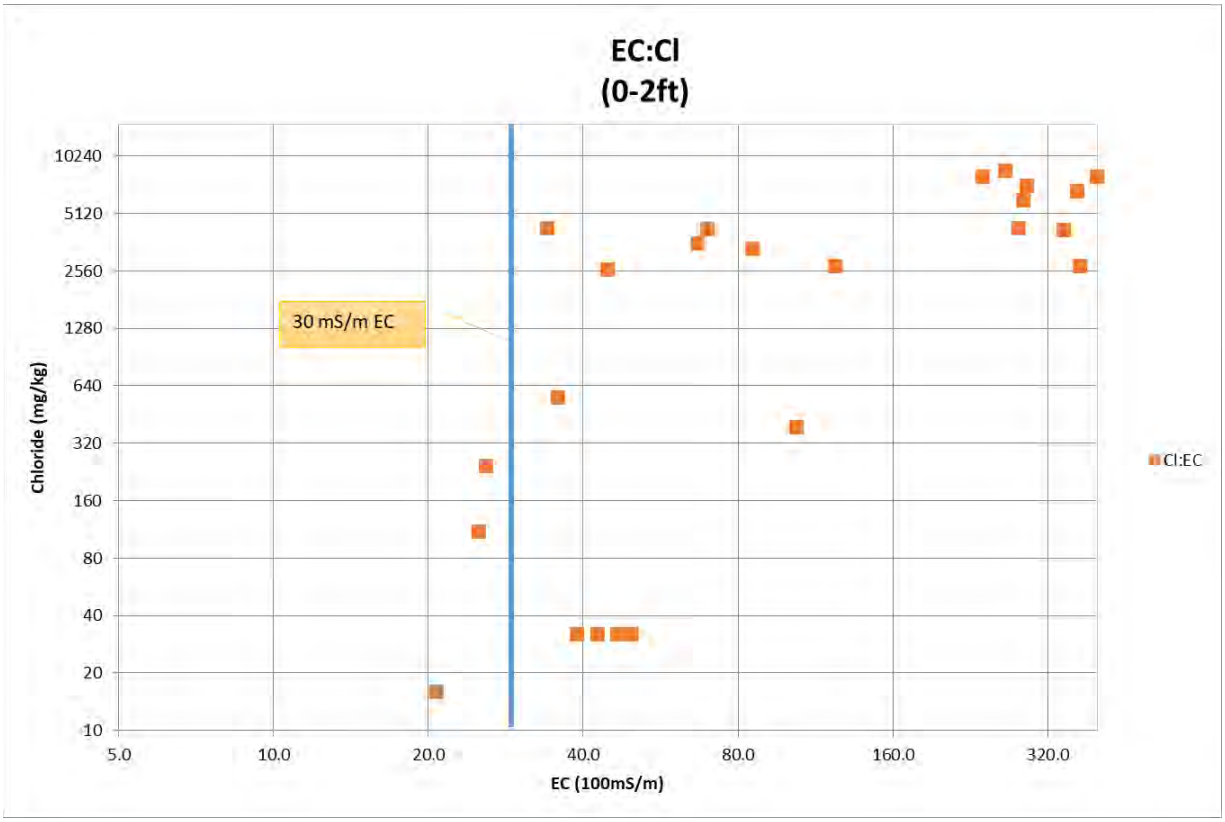
Exhibit 1: Measuring EC with the EM38 in the vertical position.

The EM38 detects EC from the surface to a depth of appoximtely 4-feet. EC measurements can be obtained in the vertical or horizontal positions. In the vertical position, EC readings are weighted toward the lower depths of 3 to 4 feet. In the horizontal position, EC readings are weighted toward the upper 0 to 2 feet. If a higher EC reading is obtained in the horizontal position than the vertical position, produced water has likely impacted the upper surface more than at lower depths. If a higher EC reading is obtained in the vertical position than the horizontal position, produced water has likely impacted lower soils than the upper surface soils.

The below charts show the correlation between EC and Chloride (Cl) measurements. The EC measurements collected in the field were temperature corrected (TC) to 25^{o} Celsius. Table 1 shows

the data, collected by R.T. Hicks Consultants, which was used for the EC:Cl correlation. Table 2 shows the temperature correction factor.

Analysis of data shows that an EC_{tc} value greater than 30 mS/m is the delineation curve where chloride in soil will be greater than 600 mg/kg. Furthermore, field personnel can survey a release and identify "hot spots" with the highest EC readings. These hot spots are likely areas where impacted to near surface soils (0 to 4 feet) from released produced water will be the greatest.


EC:Cl
(0-2ft)
10240
5120
2560
1280
640
320
160
80
40
20
10
Chloride (mg/kg)
30 mS/m EC
5.0
10.0
20.0
40.0
80.0
160.0
320.0
EC (100mS/m)
Cl:EC

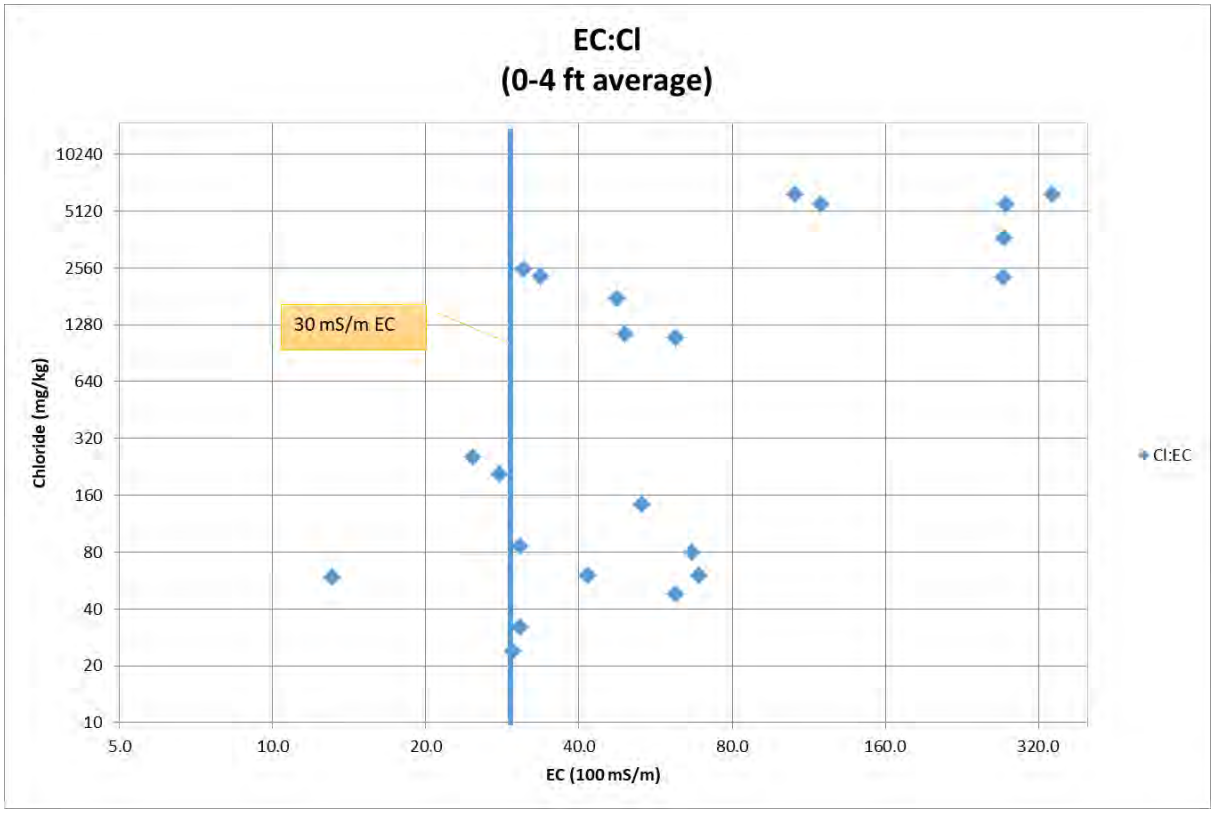

EC:Cl
(0-4 ft average)
10240
5120
2560
1280
640
320
160
80
40
20
10
Chloride (mg/kg)
30 mS/m EC
5.0
10.0
20.0
40.0
80.0
160.0
320.0
EC (100 mS/m)
Cl:EC

Table 1
EM 38 Survey
EC:Cl

Sample Name	Date	Depth	In-Use	EM38 (Horizontal	EM38 (vertical)	EM38 TC (Horizontal	EM38 TC (vertical)	Cl	Cl
		(ft)	(Yes/No)	100mS/m	100mS/m	100mS/m	100mS/m	(titration)	mg/kg
Background	12/12/2018	0	No	4.2	6.8	6.2	10.1		
Background	12/17/2018	0 - 2	No						16
Background	12/17/2018	2 - 4	No						32
Background	12/17/2018	5 - 6	No						32
S1 Base	12/10/2018	2	No	206	253.0	296.6	364.3	4,992	6,720
S1 Base	12/17/2018	4.5	No	396	230.0	586.1	340.4	4,588	6,400
S2 Base	12/10/2018	2	No	256	181.0	368.6	260.6	1,355	2,720
S3 Base	12/10/2018	2	No	277	250.0	398.9	360.0	5,575	8,000
S3 Trench	12/17/2018	1	No	343	341.0	343	341.0		
S3 Trench	12/17/2018	1 - 2	No						4,200
S3 Trench	12/17/2018	2 - 4	No						8,400
S4 Base	12/10/2018	2	Yes	333	252.0	479.5	362.9		10,500
S5 Base	12/10/2018	2	Yes	202	211.0	290.9	303.8		7,200
S6 Trench	12/17/2018	0	No	14	20.0	20.7	29.6		
S6 Trench	12/17/2018	0 - 2	No						16
S6 Trench	12/17/2018	2 - 4	No						32
S6 Trench	12/17/2018	5 - 6	No						32
S7 Trench	12/17/2018	0	No	23	21.0	34.0	31.1		
S7 Trench	12/17/2018	0 - 2	No						4,320
S7 Trench	12/17/2018	2 - 4	No						736
S7 Trench	12/17/2018	5 - 6	No						224
EC-1	12/11/2018	0	No	336	302.0	497.3	447.0		
EC-1	12/11/2018	0 - 2	No					4,711	
EC-2	12/11/2018	0	No	47	47.0	69.6	69.6	4,253	
EC-2	12/11/2018	0 - 2	No					4,253	
EC-3	12/11/2018	0	No	45		66.6			
EC-3	12/11/2018	0 - 2	No					3,575	
EC-4	12/01/2018	2.5	No	17.9	21.0	25.8	30.2		
EC-4	12/01/2018	2.5	No					244	
EC-5	12/19/2018	3.5	Yes	70	40.0	103.6	59.2		
EC-5	12/19/2018	3.5	Yes					388	

Table 1
EM 38 Survey
EC:Cl

Sample Name	Date	Depth	In-Use	EM38 (Horizontal	EM38 (vertical)	EM38 TC (Horizontal	EM38 TC (vertical)	Cl	Cl
		(ft)	(Yes/No)	100mS/m	100mS/m	100mS/m	100mS/m	(titration)	mg/kg
Tee (release origin)	12/15/2018	0	Yes	189.6	153.4	280.6	227.0		
Tee (release origin)	04/26/2018	0-0.5	Yes						4,800
Tee (release origin)	04/26/2018	0.5-1.0	Yes						830
Tee (release origin)	04/26/2018	1-2	Yes						1,100
Tee (release origin)	04/26/2018	2-3	Yes						1,100
Tee (release origin)	04/26/2018	3-4	Yes						1,500
Tee (release origin)	04/26/2018	4-5	Yes						1,600
83 ft East (of origin)	12/15/2018	0		193.8	185.2	286.8	274.1		
83 ft East (of origin)	01/16/2019	0-2	Yes						6,000
83 ft East (of origin)	01/16/2019	2-4	Yes						1,420
83 ft East (of origin)	01/16/2019	5	Yes						1,760
35 ft Northeast (of origin)	12/15/2018	0	No	189.8	186.3	280.9	275.7		
35 ft Northeast (of origin)	01/16/2019	0-2	No						4,320
35 ft Northeast (of origin)	01/16/2019	2-4	No						3,920
35 ft Northeast (of origin)	01/16/2019	0-4	No						5,600
35 ft Northeast (of origin)	01/16/2019	5	No						5,040
230 ft East (of origin)	12/15/2018	0		178.8	71.8	264.6	106.3		
230 ft East (of origin)	01/16/2019	0-2	Yes						8,660
230 ft East (of origin)	01/16/2019	2-4	Yes						960
230 ft East (of origin)	01/16/2019	0-4	Yes						6,320
230 ft East (of origin)	01/16/2019	5	Yes						368
390 ft East (of origin)	12/15/2018	0		161.5	80.8	239.0	119.6		
390 ft East (of origin)	01/16/2019	0-2							8,000
390 ft East (of origin)	01/16/2019	2-4							624
390 ft East (of origin)	01/16/2019	0-4							5,600
390 ft East (of origin)	01/16/2019	4.3							3,360
Background	12/15/2018	0	No	16.9	20.7	25.0	30.6		
Background	01/30/2019	0-2	No						110
Background	01/30/2019	2-4	No						61
Background	01/30/2019	5	No						120
EC-01	12/15/2018	0	No	30.1	33.3	44.5	49.3		
EC-01	01/16/2019	0-2	No						2,600
EC-01	01/16/2019	2-4	No						352
EC-01	01/16/2019	0-4	No						1,140
EC-01	01/16/2019	4.3	No						64
EC-02	12/15/2018	0	No	18.3	16.7	27.1	24.7		
EC-02	01/16/2019	0-4	No						256
EC-02	01/16/2019	4.3	No						7,200
EC-03	12/15/2018	0	No	21.8	20.7	32.3	30.6		
EC-03	01/16/2019	0-4	No						32
EC-03	01/16/2019	5.0	No						48
EC-04	12/15/2018	0	No	83.4	22.7	123.4	33.6		
EC-04	01/16/2019	0-2	No						2,720
EC-04	01/16/2019	2-4	No						688
EC-04	01/16/2019	0-4	No						2,320
EC-04	01/16/2019	5.0	No						192
EC-05	12/15/2018	0	No	57.4	32.1	85.0	47.5		
EC-05	01/16/2019	0-2	No						3,360
EC-05	01/16/2019	2-4	No						1,010
EC-05	01/16/2019	0-4	No						1,760
EC-05	01/16/2019	5.0	No						704

Table 1
EM 38 Survey
EC:Cl

Sample Name	Date	Depth	In-Use	EM38 (Horizontal	EM38 (vertical)	EM38 TC (Horizontal	EM38 TC (vertical)	Cl	Cl
		(ft)	(Yes/No)	100mS/m	100mS/m	100mS/m	100mS/m	(titration)	mg/kg
HA1	1/9/2019	0	Yes	27.5	18.0	42.6	27.9		
HA1	1/23/2019	0-2	Yes						32
HA1	1/23/2019	2-4	Yes						304
HA1	1/23/2019	0-4	Yes						208
HA2	1/9/2019	0	Yes	25.0	34.3	38.8	53.2		
HA2	1/23/2019	0-2	Yes						32
HA2	1/23/2019	2-4	Yes						160
HA2	1/23/2019	0-4	Yes						144
HA3	1/9/2019	0	Yes	23.0	40.0	35.7	62.0		
HA3	1/23/2019	0-2	Yes						560
HA3	1/23/2019	2-4	Yes						1840
HA3	1/23/2019	0-4	Yes						1100
HA1	1/9/2019	0	Yes	30.0	40.0	46.5	62.0		
HA1	1/23/2019	0-2	Yes						32
HA1	1/23/2019	2-4	Yes						64
HA1	1/23/2019	0-4	Yes						48
HA1	1/23/2019	4-4.2	Yes						64
HA2	1/23/2019	0	Yes	32.0	43.0	49.6	66.7		
HA2	1/23/2019	0-2	Yes						32
HA2	1/23/2019	2-4	Yes						112
HA2	1/23/2019	0-4	Yes						80
HA2	1/23/2019	0-4.4	Yes						96
Trench 1	2/24/2019	0	Yes	187.0	145.0	273.0	211.7		
Trench 1	2/24/2019	0-4	Yes						2300
Trench 1	2/24/2019	4.5	Yes						<60
Trench 2	2/24/2019	0	Yes	6.0	9.0	8.8	13.1		
Trench 2	2/24/2019	0-4	Yes						<59
Trench 2	2/24/2019	4.5	Yes						<60
HA-01	2/24/2019	1	No	32.7	47.2	47.7	68.9		
HA-01	2/24/2019	1-4	No						<60
HA-01	2/24/2019	4.5	No						<60
HA-02	2/24/2019	0	No	18.0	28.5	26.3	41.6		
HA-02	2/24/2019	0-4	No						<60
HA-02	2/24/2019	4.5	No						<60

Table 2
EC Temperature Correction Factor

Date	Correction Factor
01/01	1.55
01/02	1.55
01/03	1.55
01/04	1.55
01/05	1.55
01/06	1.55
01/07	1.55
01/08	1.55
01/09	1.55
01/10	1.55
01/11	1.56
01/12	1.56
01/13	1.56
01/14	1.56
01/15	1.56
01/16	1.56
01/17	1.56
01/18	1.56
01/19	1.56
01/20	1.56
01/21	1.55
01/22	1.55
01/23	1.55
01/24	1.55
01/25	1.55
01/26	1.55
01/27	1.55
01/28	1.55
01/29	1.55
01/30	1.55
01/31	1.55
02/01	1.53
02/02	1.53
02/03	1.53
02/04	1.53
02/05	1.53
02/06	1.53
02/07	1.53
02/08	1.53
02/09	1.53
02/10	1.53
02/11	1.5
02/12	1.5
02/13	1.5
02/14	1.5
02/15	1.5
02/16	1.5
02/17	1.5
02/18	1.5
02/19	1.5
02/20	1.5
02/21	1.46
02/22	1.46
02/23	1.46
02/24	1.46
02/25	1.46
02/26	1.46
02/27	1.46
02/28	1.46
02/29	1.46

Table 2
EC Temperature Correction Factor

Date	Correction Factor
03/01	1.42
03/02	1.42
03/03	1.42
03/04	1.42
03/05	1.42
03/06	1.42
03/07	1.42
03/08	1.42
03/09	1.42
03/10	1.42
03/11	1.36
03/12	1.36
03/13	1.36
03/14	1.36
03/15	1.36
03/16	1.36
03/17	1.36
03/18	1.36
03/19	1.36
03/20	1.36
03/21	1.3
03/22	1.3
03/23	1.3
03/24	1.3
03/25	1.3
03/26	1.3
03/27	1.3
03/28	1.3
03/29	1.3
03/30	1.3
03/31	1.3
04/01	1.24
04/02	1.24
04/03	1.24
04/04	1.24
04/05	1.24
04/06	1.24
04/07	1.24
04/08	1.24
04/09	1.24
04/10	1.24
04/11	1.18
04/12	1.18
04/13	1.18
04/14	1.18
04/15	1.18
04/16	1.18
04/17	1.18
04/18	1.18
04/19	1.18
04/20	1.18
04/21	1.13
04/22	1.13
04/23	1.13
04/24	1.13
04/25	1.13
04/26	1.13
04/27	1.13
04/28	1.13
04/29	1.13
04/30	1.13

Table 2
EC Temperature Correction Factor

Date	Correction Factor
05/01	1.08
05/02	1.08
05/03	1.08
05/04	1.08
05/05	1.08
05/06	1.08
05/07	1.08
05/08	1.08
05/09	1.08
05/10	1.08
05/11	1.04
05/12	1.04
05/13	1.04
05/14	1.04
05/15	1.04
05/16	1.04
05/17	1.04
05/18	1.04
05/19	1.04
05/20	1.04
05/21	1
05/22	1
05/23	1
05/24	1
05/25	1
05/26	1
05/27	1
05/28	1
05/29	1
05/30	1
05/31	1
06/01	0.97
06/02	0.97
06/03	0.97
06/04	0.97
06/05	0.97
06/06	0.97
06/07	0.97
06/08	0.97
06/09	0.97
06/10	0.97
06/11	0.94
06/12	0.94
06/13	0.94
06/14	0.94
06/15	0.94
06/16	0.94
06/17	0.94
06/18	0.94
06/19	0.94
06/20	0.94
06/21	0.92
06/22	0.92
06/23	0.92
06/24	0.92
06/25	0.92
06/26	0.92
06/27	0.92
06/28	0.92
06/29	0.92
06/30	0.92

Table 2
EC Temperature Correction Factor

Date	Correction Factor
07/01	0.91
07/02	0.91
07/03	0.91
07/04	0.91
07/05	0.91
07/06	0.91
07/07	0.91
07/08	0.91
07/09	0.91
07/10	0.91
07/11	0.91
07/12	0.91
07/13	0.91
07/14	0.91
07/15	0.91
07/16	0.91
07/17	0.91
07/18	0.91
07/19	0.91
07/20	0.91
07/21	0.91
07/22	0.91
07/23	0.91
07/24	0.91
07/25	0.91
07/26	0.91
07/27	0.91
07/28	0.91
07/29	0.91
07/30	0.91
07/31	0.91
08/01	0.92
08/02	0.92
08/03	0.92
08/04	0.92
08/05	0.92
08/06	0.92
08/07	0.92
08/08	0.92
08/09	0.92
08/10	0.92
08/11	0.93
08/12	0.93
08/13	0.93
08/14	0.93
08/15	0.93
08/16	0.93
08/17	0.93
08/18	0.93
08/19	0.93
08/20	0.93
08/21	0.91
08/22	0.91
08/23	0.91
08/24	0.91
08/25	0.91
08/26	0.91
08/27	0.91
08/28	0.91
08/29	0.91
08/30	0.91
08/31	0.91

Table 2
EC Temperature Correction Factor

Date	Correction Factor
09/01	0.98
09/02	0.98
09/03	0.98
09/04	0.98
09/05	0.98
09/06	0.98
09/07	0.98
09/08	0.98
09/09	0.98
09/10	0.98
09/11	1.01
09/12	1.01
09/13	1.01
09/14	1.01
09/15	1.01
09/16	1.01
09/17	1.01
09/18	1.01
09/19	1.01
09/20	1.01
09/21	1.05
09/22	1.05
09/23	1.05
09/24	1.05
09/25	1.05
09/26	1.05
09/27	1.05
09/28	1.05
09/29	1.05
09/30	1.05
10/01	1.09
10/02	1.09
10/03	1.09
10/04	1.09
10/05	1.09
10/06	1.09
10/07	1.09
10/08	1.09
10/09	1.09
10/10	1.09
10/11	1.14
10/12	1.14
10/13	1.14
10/14	1.14
10/15	1.14
10/16	1.14
10/17	1.14
10/18	1.14
10/19	1.14
10/20	1.14
10/21	1.2
10/22	1.2
10/23	1.2
10/24	1.2
10/25	1.2
10/26	1.2
10/27	1.2
10/28	1.2
10/29	1.2
10/30	1.2
10/31	1.2

Table 2
EC Temperature Correction Factor

Date	Correction Factor
11/01	1.26
11/02	1.26
11/03	1.26
11/04	1.26
11/05	1.26
11/06	1.26
11/07	1.26
11/08	1.26
11/09	1.26
11/10	1.26
11/11	1.32
11/12	1.32
11/13	1.32
11/14	1.32
11/15	1.32
11/16	1.32
11/17	1.32
11/18	1.32
11/19	1.32
11/20	1.32
11/21	1.38
11/22	1.38
11/23	1.38
11/24	1.38
11/25	1.38
11/26	1.38
11/27	1.38
11/28	1.38
11/29	1.38
11/30	1.38
12/01	1.44
12/02	1.44
12/03	1.44
12/04	1.44
12/05	1.44
12/06	1.44
12/07	1.44
12/08	1.44
12/09	1.44
12/10	1.44
12/11	1.48
12/12	1.48
12/13	1.48
12/14	1.48
12/15	1.48
12/16	1.48
12/17	1.48
12/18	1.48
12/19	1.48
12/20	1.48
12/21	1.52
12/22	1.52
12/23	1.52
12/24	1.52
12/25	1.52
12/26	1.52
12/27	1.52
12/28	1.52
12/29	1.52
12/30	1.52
12/31	1.52

Appendix C

Laboratory Certificates of Analyses

R.T. Hicks Consultants, Ltd.
901 Rio Grande Blvd. NW, Suite F-142
Albuquerque, NM 87104

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

March 01, 2019

Andrew Parker

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Albuquerque, NM 87104
TEL: (505) 266-5004
FAX: (505) 266-0745

RE: Advance Energy OrderNo.: 1902A41

Dear Andrew Parker:

Hall Environmental Analysis Laboratory received 4 sample(s) on 2/25/2019 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent. To access our accredited tests please go to www.hallenvironmental.com or the state specific web sites. In order to properly interpret your results, it is imperative that you review this report in its entirety. See the sample checklist and/or the Chain of Custody for information regarding the sample receipt temperature and preservation. Data qualifiers or a narrative will be provided if the sample analysis or analytical quality control parameters require a flag. When necessary, data qualifiers are provided on both the sample analysis report and the QC summary report, both sections should be reviewed. All samples are reported, as received, unless otherwise indicated. Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH and residual chlorine are qualified as being analyzed outside of the recommended holding time.

Please don't hesitate to contact HEAL for any additional information or clarifications.

ADHS Cert #AZ0682 -- NMED-DWB Cert #NM9425 -- NMED-Micro Cert #NM0901

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order **1902A41**
Date Reported: **3/1/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Trench 1 0-4 ft
Project: Advance Energy
Collection Date: 2/24/2019 1:30:00 PM
Lab ID: 1902A41-001 **Matrix:** SOIL **Received Date:** 2/25/2019 12:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst:	**smb**
Chloride	2300	60		mg/Kg	20	2/28/2019 1:53:09 PM	43385
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst:	**lrm**
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	2/27/2019 1:10:15 PM	43351
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	2/27/2019 1:10:15 PM	43351
Surr: DNOP	110	70-130		%Rec	1	2/27/2019 1:10:15 PM	43351
EPA METHOD 8015D: GASOLINE RANGE						Analyst:	**NSB**
Gasoline Range Organics (GRO)	ND	4.6		mg/Kg	1	2/26/2019 3:12:54 PM	43319
Surr: BFB	104	73.8-119		%Rec	1	2/26/2019 3:12:54 PM	43319
EPA METHOD 8021B: VOLATILES						Analyst:	**NSB**
Benzene	ND	0.023		mg/Kg	1	2/26/2019 3:12:54 PM	43319
Toluene	ND	0.046		mg/Kg	1	2/26/2019 3:12:54 PM	43319
Ethylbenzene	ND	0.046		mg/Kg	1	2/26/2019 3:12:54 PM	43319
Xylenes, Total	ND	0.093		mg/Kg	1	2/26/2019 3:12:54 PM	43319
Surr: 4-Bromofluorobenzene	96.3	80-120		%Rec	1	2/26/2019 3:12:54 PM	43319

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Analytical Report
Lab Order **1902A41**
Date Reported: **3/1/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Trench 1 4.5 ft
Project: Advance Energy
Collection Date: 2/24/2019 1:35:00 PM
Lab ID: 1902A41-002 **Matrix:** SOIL **Received Date:** 2/25/2019 12:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst:	**smb**
Chloride	ND	60		mg/Kg	20	2/28/2019 2:30:23 PM	43385
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst:	**lrm**
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	2/27/2019 1:32:29 PM	43351
Motor Oil Range Organics (MRO)	ND	47		mg/Kg	1	2/27/2019 1:32:29 PM	43351
Surr: DNOP	91.1	70-130		%Rec	1	2/27/2019 1:32:29 PM	43351
EPA METHOD 8015D: GASOLINE RANGE						Analyst:	**NSB**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	2/26/2019 3:36:58 PM	43319
Surr: BFB	105	73.8-119		%Rec	1	2/26/2019 3:36:58 PM	43319
EPA METHOD 8021B: VOLATILES						Analyst:	**NSB**
Benzene	ND	0.024		mg/Kg	1	2/26/2019 3:36:58 PM	43319
Toluene	ND	0.048		mg/Kg	1	2/26/2019 3:36:58 PM	43319
Ethylbenzene	ND	0.048		mg/Kg	1	2/26/2019 3:36:58 PM	43319
Xylenes, Total	ND	0.097		mg/Kg	1	2/26/2019 3:36:58 PM	43319
Surr: 4-Bromofluorobenzene	98.1	80-120		%Rec	1	2/26/2019 3:36:58 PM	43319

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Analytical Report
Lab Order **1902A41**
Date Reported: **3/1/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Trench 2 0-4 ft
Project: Advance Energy
Collection Date: 2/24/2019 2:00:00 PM
Lab ID: 1902A41-003 **Matrix:** SOIL **Received Date:** 2/25/2019 12:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst:	**smb**
Chloride	ND	59		mg/Kg	20	2/28/2019 3:07:36 PM	43385
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst:	**lrm**
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	2/27/2019 2:03:39 PM	43351
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	2/27/2019 2:03:39 PM	43351
Surr: DNOP	117	70-130		%Rec	1	2/27/2019 2:03:39 PM	43351
EPA METHOD 8015D: GASOLINE RANGE						Analyst:	**NSB**
Gasoline Range Organics (GRO)	ND	4.7		mg/Kg	1	2/26/2019 4:01:01 PM	43319
Surr: BFB	104	73.8-119		%Rec	1	2/26/2019 4:01:01 PM	43319
EPA METHOD 8021B: VOLATILES						Analyst:	**NSB**
Benzene	ND	0.023		mg/Kg	1	2/26/2019 4:01:01 PM	43319
Toluene	ND	0.047		mg/Kg	1	2/26/2019 4:01:01 PM	43319
Ethylbenzene	ND	0.047		mg/Kg	1	2/26/2019 4:01:01 PM	43319
Xylenes, Total	ND	0.093		mg/Kg	1	2/26/2019 4:01:01 PM	43319
Surr: 4-Bromofluorobenzene	97.5	80-120		%Rec	1	2/26/2019 4:01:01 PM	43319

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

Analytical Report
Lab Order **1902A41**
Date Reported: **3/1/2019**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Client Sample ID: Trench 2 4.5 ft
Project: Advance Energy
Collection Date: 2/24/2019 2:15:00 PM
Lab ID: 1902A41-004 **Matrix:** SOIL **Received Date:** 2/25/2019 12:00:00 PM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS						Analyst:	**smb**
Chloride	ND	60		mg/Kg	20	2/28/2019 3:20:01 PM	43385
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS						Analyst:	**lrm**
Diesel Range Organics (DRO)	ND	9.5		mg/Kg	1	2/27/2019 2:25:55 PM	43351
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	2/27/2019 2:25:55 PM	43351
Surr: DNOP	121	70-130		%Rec	1	2/27/2019 2:25:55 PM	43351
EPA METHOD 8015D: GASOLINE RANGE						Analyst:	**NSB**
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	2/26/2019 4:25:04 PM	43319
Surr: BFB	105	73.8-119		%Rec	1	2/26/2019 4:25:04 PM	43319
EPA METHOD 8021B: VOLATILES						Analyst:	**NSB**
Benzene	ND	0.024		mg/Kg	1	2/26/2019 4:25:04 PM	43319
Toluene	ND	0.048		mg/Kg	1	2/26/2019 4:25:04 PM	43319
Ethylbenzene	ND	0.048		mg/Kg	1	2/26/2019 4:25:04 PM	43319
Xylenes, Total	ND	0.095		mg/Kg	1	2/26/2019 4:25:04 PM	43319
Surr: 4-Bromofluorobenzene	97.5	80-120		%Rec	1	2/26/2019 4:25:04 PM	43319

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A41**
01-Mar-19

Client: R.T. Hicks Consultants, LTD
Project: Advance Energy

Sample ID: **MB-43385**	SampType: **MBLK**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **PBS**	Batch ID: **43385**	RunNo: **58031**							
Prep Date: **2/27/2019**	Analysis Date: **2/28/2019**	SeqNo: **1944677**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID: **LCS-43385**	SampType: **LCS**	TestCode: **EPA Method 300.0: Anions**							
Client ID: **LCSS**	Batch ID: **43385**	RunNo: **58031**							
Prep Date: **2/27/2019**	Analysis Date: **2/28/2019**	SeqNo: **1944678**	Units: **mg/Kg**						
Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	95.9	90	110			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A41**
01-Mar-19

Client: R.T. Hicks Consultants, LTD
Project: Advance Energy

Sample ID: **LCS-43351**	SampType: **LCS**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **LCSS**	Batch ID: **43351**	RunNo: **57971**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1941438** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	60	10	50.00	0	119	63.9	124			
Surr: DNOP	5.6		5.000		112	70	130			

Sample ID: **MB-43351**	SampType: **MBLK**	TestCode: **EPA Method 8015M/D: Diesel Range Organics**
Client ID: **PBS**	Batch ID: **43351**	RunNo: **57971**
Prep Date: **2/26/2019**	Analysis Date: **2/27/2019**	SeqNo: **1941439** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10								
Motor Oil Range Organics (MRO)	ND	50								
Surr: DNOP	10		10.00		101	70	130			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A41**
01-Mar-19

Client: R.T. Hicks Consultants, LTD
Project: Advance Energy

Sample ID: **MB-43319**	SampType: **MBLK**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **PBS**	Batch ID: **43319**	RunNo: **57944**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940605** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5.0								
Surr: BFB	990		1000		99.3	73.8	119			

Sample ID: **LCS-43319**	SampType: **LCS**	TestCode: **EPA Method 8015D: Gasoline Range**
Client ID: **LCSS**	Batch ID: **43319**	RunNo: **57944**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940606** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	26	5.0	25.00	0	104	80.1	123			
Surr: BFB	1100		1000		113	73.8	119			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

QC SUMMARY REPORT
Hall Environmental Analysis Laboratory, Inc.

WO#: **1902A41**
01-Mar-19

Client: R.T. Hicks Consultants, LTD
Project: Advance Energy

Sample ID: **MB-43319**	SampType: **MBLK**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **PBS**	Batch ID: **43319**	RunNo: **57944**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940623** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	ND	0.025								
Toluene	ND	0.050								
Ethylbenzene	ND	0.050								
Xylenes, Total	ND	0.10								
Surr: 4-Bromofluorobenzene	0.96		1.000		95.8	80	120			

Sample ID: **LCS-43319**	SampType: **LCS**	TestCode: **EPA Method 8021B: Volatiles**
Client ID: **LCSS**	Batch ID: **43319**	RunNo: **57944**
Prep Date: **2/25/2019**	Analysis Date: **2/26/2019**	SeqNo: **1940624** Units: **mg/Kg**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Benzene	0.89	0.025	1.000	0	89.4	80	120			
Toluene	0.93	0.050	1.000	0	92.8	80	120			
Ethylbenzene	0.93	0.050	1.000	0	93.1	80	120			
Xylenes, Total	2.8	0.10	3.000	0	94.8	80	120			
Surr: 4-Bromofluorobenzene	1.0		1.000		99.9	80	120			

Qualifiers:

*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
D	Sample Diluted Due to Matrix	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
PQL	Practical Quanitative Limit	RL	Reporting Detection Limit
S	% Recovery outside of range due to dilution or matrix	W	Sample container temperature is out of limit as specified

HALL ENVIRONMENTAL ANALYSIS LABORATORY

Hall Environmental Analysis Laboratory
4901 Hawkins NE
Albuquerque, NM 87109
TEL: 505-345-3975 FAX: 505-345-4107
Website: www.hallenvironmental.com

Sample Log-In Check List

Client Name: **RT HICKS** Work Order Number: **1902A41** RcptNo: **1**

Received By: **Erin Melendrez** **2/25/2019 12:00:00 PM** Victoria Zellar

Completed By: **Victoria Zellar** **2/25/2019 12:54:10 PM** Victoria Zellar

Reviewed By: JO 2/25/19

labeled by TMM 2-25-19

Chain of Custody

1. Is Chain of Custody complete? Yes ☑ No ☐ Not Present ☐
2. How was the sample delivered? Client

Log In

3. Was an attempt made to cool the samples? Yes ☑ No ☐ NA ☐
4. Were all samples received at a temperature of >0° C to 6.0°C Yes ☐ No ☑ NA ☐
   Approved by client.
5. Sample(s) in proper container(s)? Yes ☑ No ☐
6. Sufficient sample volume for indicated test(s)? Yes ☑ No ☐
7. Are samples (except VOA and ONG) properly preserved? Yes ☑ No ☐
8. Was preservative added to bottles? Yes ☐ No ☑ NA ☐
9. VOA vials have zero headspace? Yes ☐ No ☐ No VOA Vials ☑
10. Were any sample containers received broken? Yes ☐ No ☑
11. Does paperwork match bottle labels? (Note discrepancies on chain of custody) Yes ☑ No ☐
12. Are matrices correctly identified on Chain of Custody? Yes ☑ No ☐
13. Is it clear what analyses were requested? Yes ☑ No ☐
14. Were all holding times able to be met? (If no, notify customer for authorization.) Yes ☑ No ☐

# of preserved bottles checked for pH: _____ (<2 or >12 unless noted)
Adjusted? _____
Checked by: _____

TMM 2-25-19

Special Handling (if applicable)

15. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified: _____ Date _____
By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding: _____
Client Instructions: _____

16. Additional remarks:

17. **Cooler Information**

Cooler No	Temp °C	Condition	Seal Intact	Seal No	Seal Date	Signed By
1	13.3	Good	Not Present			

Chain-of-Custody Record

Client: RT Hicks Consultants

Mailing Address: on file

Phone #: 970-570-9535

email or Fax#: andrew@rthicksconsult.com

QA/QC Package:
☒ Standard ☐ Level 4 (Full Validation)

Accreditation: ☐ Az Compliance
☐ NELAC ☐ Other

☐ EDD (Type)

Turn-Around Time:
☒ Standard ☐ Rush

Project Name: Advance Energy

Project #: A06 501

Project Manager: Andrew Parker

Sampler: Andrew Parker
On Ice: ☐ Yes ☒ No
# of Coolers: 1
Cooler Temp (including CF): 13.3°C

HALL ENVIRONMENTAL ANALYSIS LABORATORY
www.hallenvironmental.com
4901 Hawkins NE - Albuquerque, NM 87109
Tel. 505-345-3975 Fax 505-345-4107

Date	Time	Matrix	Sample Name	Container Type and #	Preservative Type	HEAL No. 1902A41	BTEX / MTBE / TMB's (8021)	TPH:8015D(GRO / DRO / MRO)	8081 Pesticides/8082 PCB's	EDB (Method 504.1)	PAHs by 8310 or 8270SIMS	RCRA 8 Metals	Cl, F, Br, NO_3, NO_2, PO_4, SO_4	8260 (VOA)	8270 (Semi-VOA)	Total Coliform (Present/Absent)	Benzene	GRO/DRO/MRO	Chloride			
2/24	13:30	Soil	Trench 1 0-4 ft	402 Jar		-001	X										X	X	X			
	13:35		Trench 1 4.5 ft			-002																
	14:00		Trench 2 0-4 ft			-003																
	14:15		Trench 2 4.5 ft			-004																

Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time
2/25	12pm			CDO	2/25/19	1200
Date:	Time:	Relinquished by:	Received by:	Via:	Date	Time

Remarks:
Temp ok
2.4 (19)

If necessary, samples submitted to Hall Environmental may be subcontracted to other accredited laboratories. This serves as notice of this possibility. Any sub-contracted data will be clearly notated on the analytical report.