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

INFORMATION ONLY

March 12, 2018

Mr. David Harwell
ADVANCE ENERGY PARTNERS HAT MESA, LLC
11490 Westheimer Rd. STE 950
Houston, TX 77077
Via Email

RE: Advance Energy – Merchant Containment/Merchant State 503H Release(s)
Delineation Plan and Potential Corrective Actions - **1RP-4953**

Dear Mr. Harwell:

Hicks Consultants has elected to use the proposed language in NMOCD's application to repeal and replace Rule 19.15.29 NMAC (R&R Part 29) as guidance for delineation of each release location and identification of potential corrective actions. The proposed R&R Part 29 can be found at the OCD website:
http://ocdimage.emnrd.state.nm.us/Imaging/FileStore/santafeadmin/cf/312025/15959_1_cf.pdf .

The OCD is the applicant for the Rule Making and, as we understand the process, OCD worked with operators and other stakeholders to develop the text and concepts presented in the proposal. With respect to the releases of produced water caused by leakage of water transfer pipes during the hydraulic stimulation of Merchant State 503H well, the most salient points of the proposed language are presented near-verbatim below as we deleted certain text that did not apply to these releases.

Requirements Outlined in Proposed Rule

19.15.29.7 DEFINITIONS

1. "Responsible Party" means the operator, as defined in 19.15.2 NMAC. Notwithstanding the foregoing, the division, in its sole discretion, may also consider a person causing the release, or controlling the location of the release as the responsible party.

19.15.29.11 SITE ASSESSMENT/CHARACTERIZATION

2. The responsible party must submit information characterizing the release to the appropriate division district office within 90 days of discovery of the release…
3. The responsible party must determine the depth to ground water where the release occurred.
4. The responsible party must determine the horizontal distance from all known water sources within a half mile of the release including private and domestic water sources.
5. The responsible party must determine the horizontal distance to the nearest significant watercourse as defined in Subsection P of 19.15.17.7 NMAC [Pit Rule].

6. The responsible party must delineate the release horizontally and vertically using Table I constituents or other constituents as appropriate for the type of the release.
7. If the release occurred outside of a lined containment area and is in an area where depth to ground water is greater than 50 feet and less than or equal to 100 feet, the responsible party must delineate the vertical extent of the release to the greater of 600 mg/kg chloride or background chloride level, if:
    a. the release contains produced water that exceeds 10,000 mg/1 of chloride and
    b. the release is of an unknown quantity or results in greater than 200 barrels of unrecovered produced water.

NOTE: As indicated in the following section of this transmittal, the depth to groundwater at all three locations is greater than 100 feet and item 7, above, does not apply.

19.15.29.12 REMEDIATION AND CLOSURE

8. The responsible party must remediate all releases regardless of volume
9. The responsible party must complete division-approved remediation for releases that endanger public health or the environment within 90 days of division approval of a remediation plan or with an abatement plan the responsible party submitted to the division in accordance with 19.15.30 NMAC.

NOTE: If a release does not endanger public health or the environment, the 90-day completion time constraint does not apply

10.) The responsible party shall remediate the impacted surface area of a release not occurring on a lined, bermed or otherwise contained exploration, development, production or storage site to meet the standards of Table I of 19.15.29.12 NMAC and contain a minimum of four feet of non-waste material containing, uncontaminated, earthen material with chloride concentrations less than 600 mg/kg as analyzed by EPA Method 300.0. The soil cover must include a top layer which is either the background thickness of topsoil or one foot of suitable material to establish vegetation at the site, whichever is greater.

Table I is Attachment A to this submittal.

Site Assessment/Characterization Plan

Background Environmental Data

Figures 1-9 demonstrate that the release sites are not within

A. 300 feet of any continuously flowing watercourse or any other significant watercourse or 200 feet of any lakebed, sinkhole or playa lake (measured from the ordinary high-water mark);
B. 300 feet from an occupied permanent residence, school, hospital, institution or church;
C. 500 feet of a spring or a private, domestic fresh water well used by less than five households for domestic or stock watering purposes. However, as Figure 1 shows, two sites are witnin 1000 feet of any fresh water well (CP 1355) ; Because the well is hydraulically up-gradient from the release sites and, more importantly,

a. The top of the groundwater zone for this well is at a depth of 925 feet (see well log in Attachment B)
b. The well has cement grout circulated to the surface from ground level to a depth of 757 feet
c. The screened interval is 874-1192 feet below grade and
d. The static water level after drilling is reported as 582 feet, or 343 feet above the groundwater zone and 175 feet above the base of the annular seal.

the location of this will within the arbitrary 1000-foot radius of the spill is of no environmental consequence.

D. within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to Section 3-27-3 NMSA 1978 as amended,
E. within 100 feet of a wetland;
F. within the area overlying a subsurface mine;
G. within an unstable area; or
H. within a 100-year floodplain.

Thus, the closure standard (and the delineation limits) for chloride for these releases are

Closure Criteria Depth (below ground surface)	Chloride Limit
0-4 feet	600 mg/kg
>4 feet	20,000 mg/kg

Initial Sampling Results and Observations

Table A (below) and the laboratory reports in Attachment C provides the results of the initial characterization of these releases and Plate 10 provides the location of each release on a January 30, 2016 aerial photo. The data demonstrate that produced water has saturated the uppermost 2-feet of the sandy soil horizon. Based upon work at the nearby Tomahawk release site, the excavation of the Merchant produced water recycling containment and observations along the roadway, we anticipate encountering hard caliche at depths as shallow as 5 feet or up to 15 feet below grade. Stabilized dunes cover most of the area and this sandy soil will rest upon the caliche.

Sample 32 26 50 BH2 is on the top of a sand dune on the south side of the lease road. We expect penetration of chloride to exceed 2500 mg/kg in the upper 4-feet of the dune beneath the footprint of the release. BH1 from this same location is within the lease road. The data suggest that high chloride concentrations from non-Advance/Amtex sources may be responsible for the 2900 mg/kg value at 12 inches. The depth to hard caliche at this location is difficult to predict.

Table A: Laboratory Results

Site	Location	Depth	Cl
32 26 50	BH2	6	5200
33 26 50	BH2	12	5400
34 26 50	BH2	24	5500
35 26 50	BH1	6	840
36 26 50	BH1	12	2900
Battle 34	BH1	6	3100
Battle 34	BH1	12	95
Battle 34	BH1	24	220
Battle 34	BH2	6	6800
Battle 34	BH2	12	2100
Battle 34	BH2	16	1900
Battle 34	BH3	6	4100
Battle 34	BH3	12	1300
Battle 34	BH3	24	1100
West of MP Jnct	BH-1	6	3300
West of MP Jnct	BH-1	12	3600
West of MP Jnct	BH-1	24	5100

Concentrations in mg/kg, Depth in inches

The Battle 34 location is the site of three separate release incidents that occurred during the hydraulic stimulation of Merchant State 503H. Less sandy soil exists at this location and we expect chloride concentrations to be less than the 600 mg/kg limit at 4 feet. Hard caliche should be present at a depth of less than 10 feet.

At the West of MP Jnct (Merchant Recycling Containment Pit) location, sandy soil is present to a depth of at least 2 feet. We expect hard caliche to exist at a depth of about 5-10 feet. Here, chloride will probably exceed the 600 mg/kg closure criteria to the top of the hard caliche horizon.

The data clearly demonstrate that impact above the 20,000 mg/kg closure criteria established by the proposed R&R Rule 29 will not be exceeded at depths greater than 4 feet.

Proposed Additional Characterization

The footprint of each of the releases has been mapped by Bradley Blevins of Merchant Livestock (Attachment D). Hicks Consultants inspected the sites with Mr. Blevins and we believe the sketches of Merchant Livestock are accurate and of better quality that we could produce 1-2 weeks after the events.

For each of the three locations that are the subject of this submission, the plan described below was implemented on March 6-7, 2018, with a few minor modifications in the field.

1. Drill or excavate near the source of the release to a depth of 5-15 feet, penetrating a minimum of 2 feet into the underlying hard caliche (if encountered).
2. Collect samples from the boring or deep trench for chloride analysis at
    a. 1 foot
    b. 2-3 feet
    c. 4 feet
    d. 6 feet, and if possible,
    e. 9 feet.
3. Advance and Merchant Livestock representatives will select 2-3 additional locations within the footprint of the release, to collect samples for analysis of chloride at
    a. 1 foot
    b. 2-3 feet
    c. 4 feet

This plan does not contemplate sampling along the busy lease road due to safety concerns as well as the inability to determine if chloride concentration in the road is due to the release caused by the water transport company or past releases along the road.

The purpose of the characterization program is to select the appropriate remedy for each release location that is, in order of importance:

i. protective of fresh water and the environment,
ii. creates the greatest net environmental benefit,
iii. complies with existing and proposed OCD Rules, and

iv. is cost-effective.

There are three possible remedies that may be applied to these site:

- excavation and removal
- natural flushing by precipitation
- artificial flushing using fresh groundwater

After we obtain the data from the characterization, we will evaluate these three options to determine the corrective action that best suits each site. Please contact me if you have any questions concerning this submission.

Sincerely,
R.T. Hicks Consultants, Ltd.

Randall Hicks
Principal

Copy: Merchant Livestock
Clabe Pearson (clabe@merchantlivestock.com)
Brad Blevins (bblevins5252@gmail.com)

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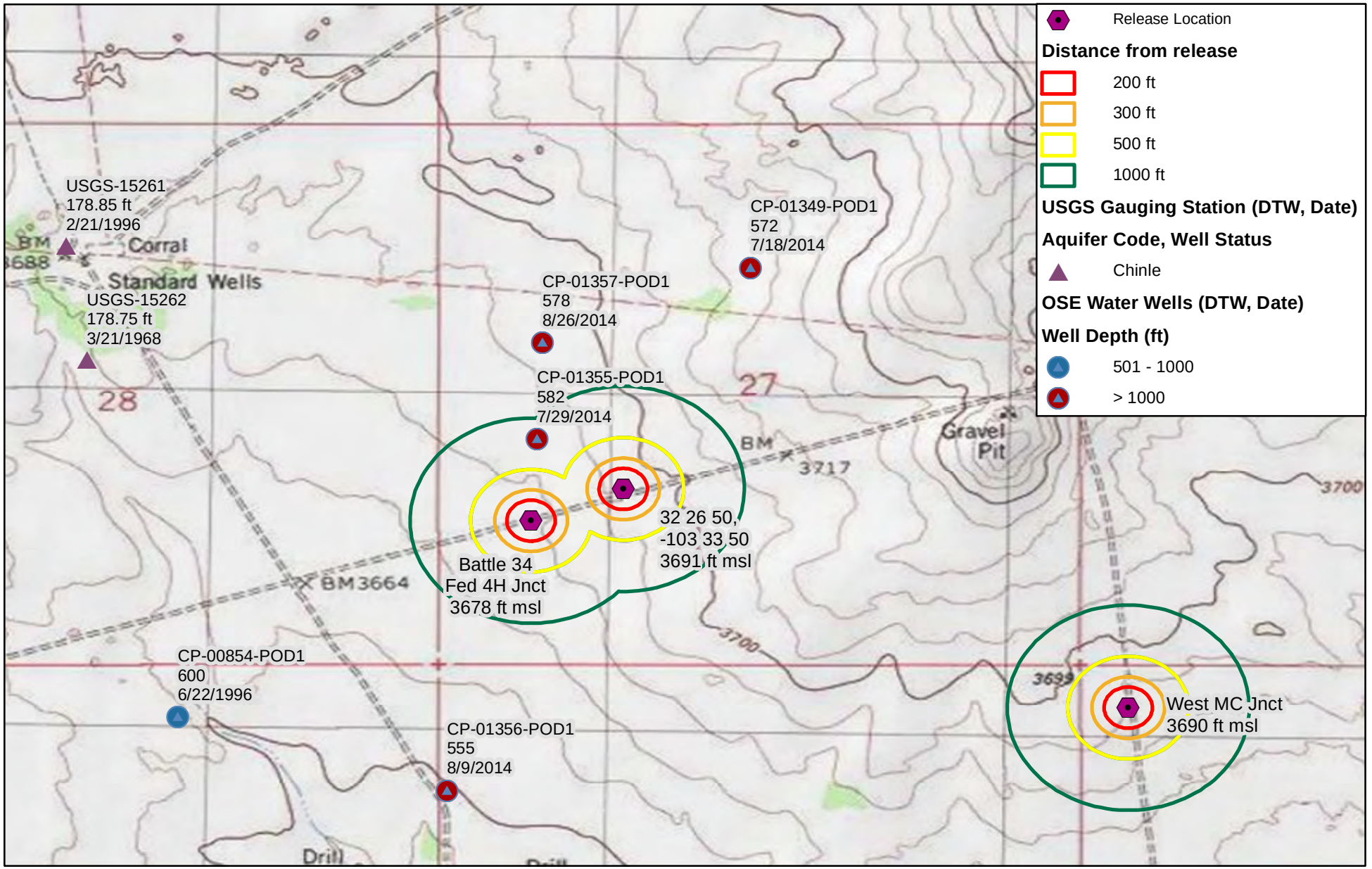

0 0.125 0.25 Miles

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Depth To Water and Geology	Figure 1
	Advanced Energy Partners Hat Mesa, LLC Merchant Containment/Merchant State 503H Release(s)	February 2018

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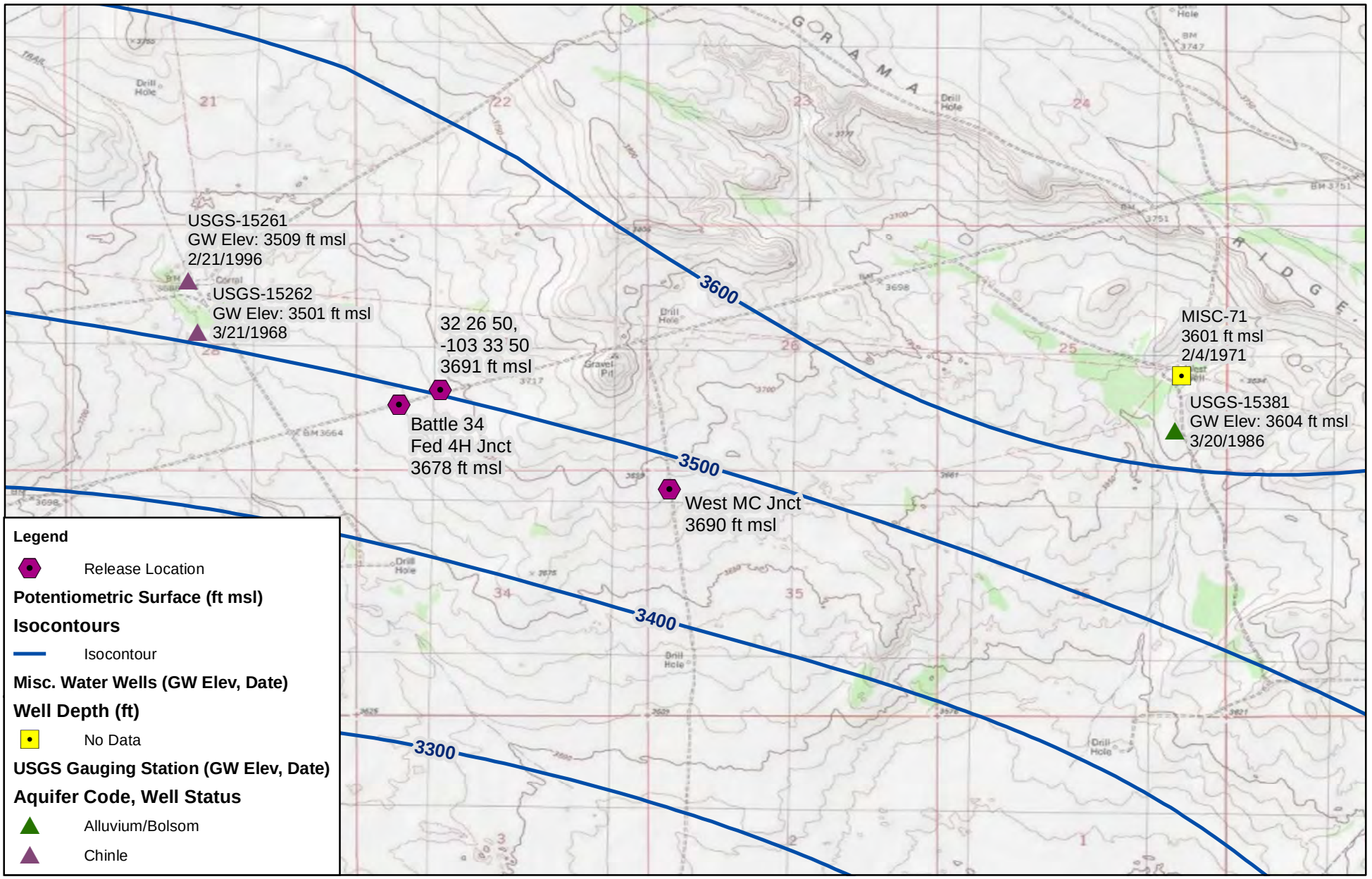

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Albuquerque, NM 87104
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Potentiometric Surface and Groundwater Elevation

Plate 2

Advanced Energy Partners Hat Mesa, LLC
Merchant Containment/Merchant State 503H Release(s)

February 2018

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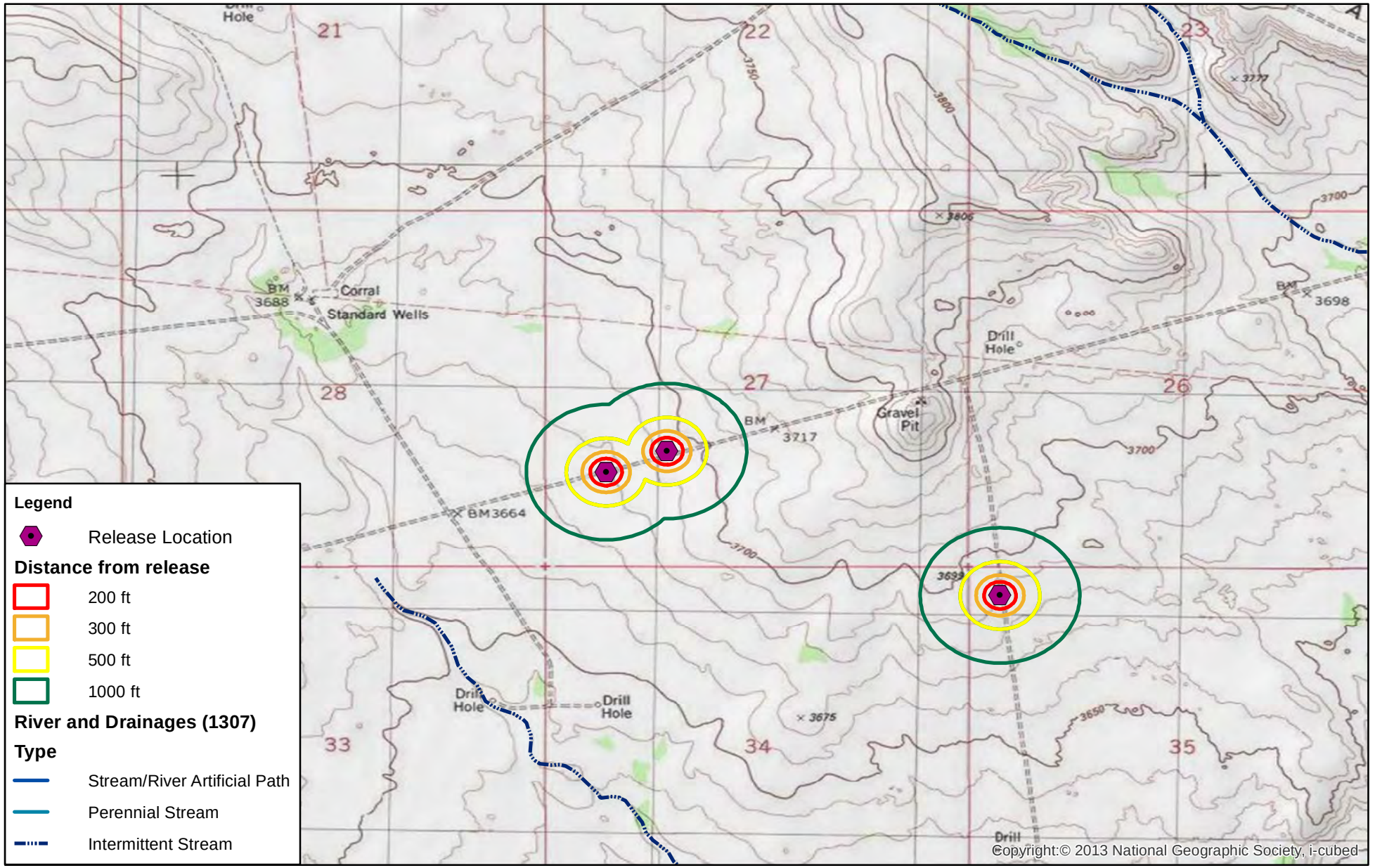

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0 1,000 2,000 Feet

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Surface Water and Topography	Plate 3
	Advanced Energy Partners Hat Mesa, LLC Merchant Containment/Merchant State 503H Release(s)	February 2018

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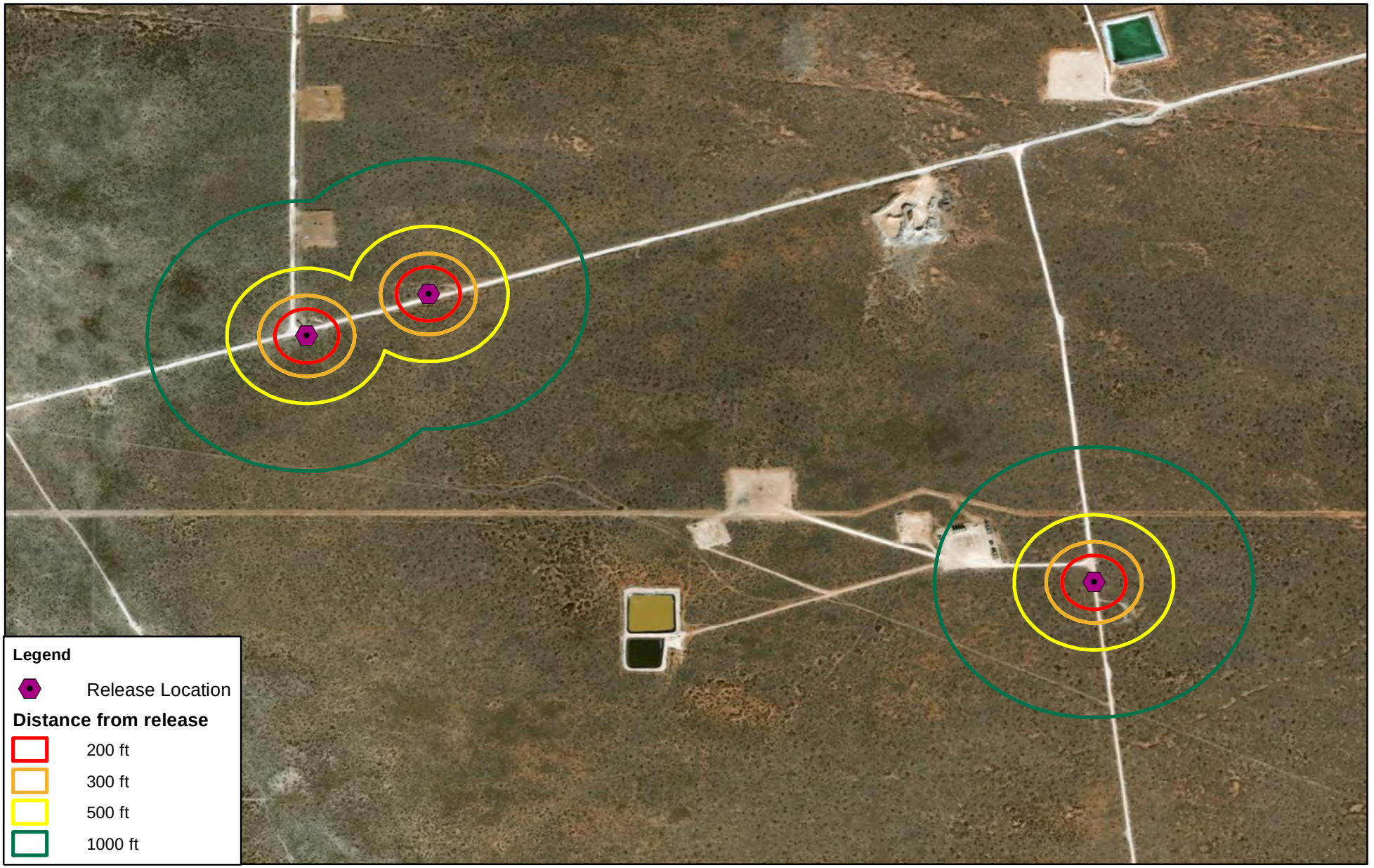

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Nearby Structures

Plate 4

Advanced Energy Partners Hat Mesa, LLC
Merchant Containment/Merchant State 503H Release(s)

February 2018

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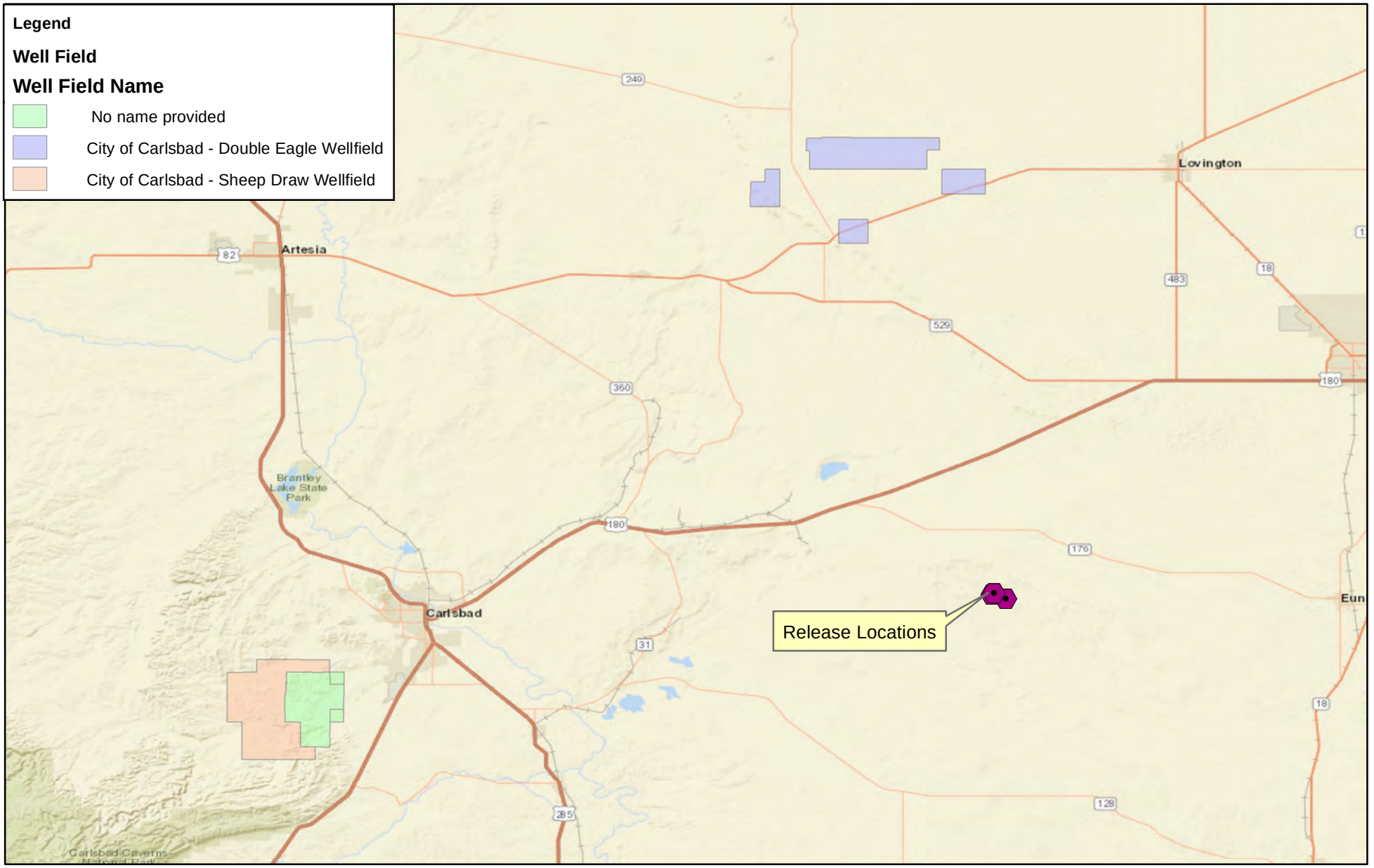

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Nearby Municipalities and Well Fields

Plate 5

Advanced Energy Partners Hat Mesa, LLC
Merchant Containment/Merchant State 503H Release(s)

February 2018

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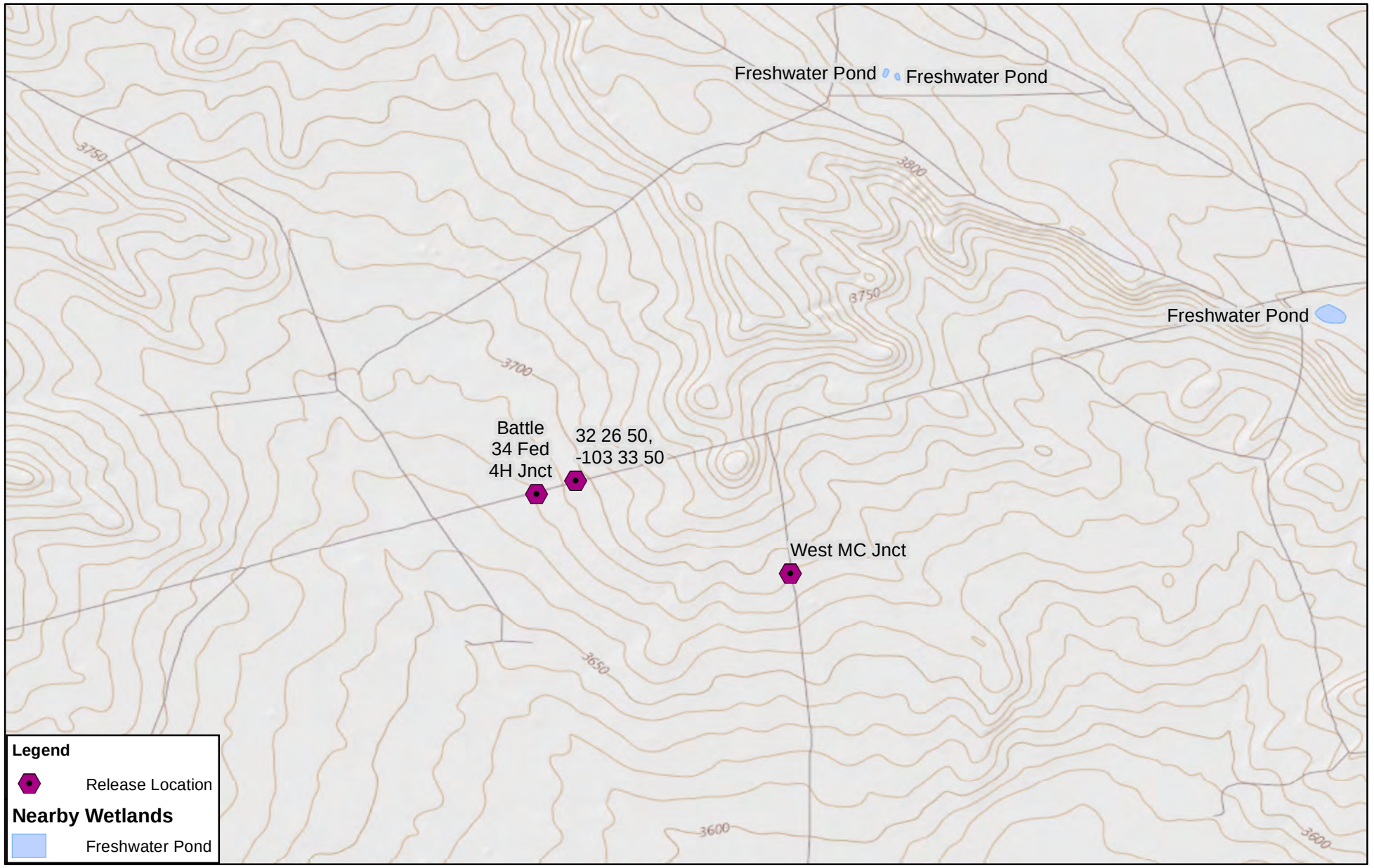

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Wetlands	Plate 6
	Advanced Energy Partners Hat Mesa, LLC Merchant Containment/Merchant State 503H Release(s)	February 2018

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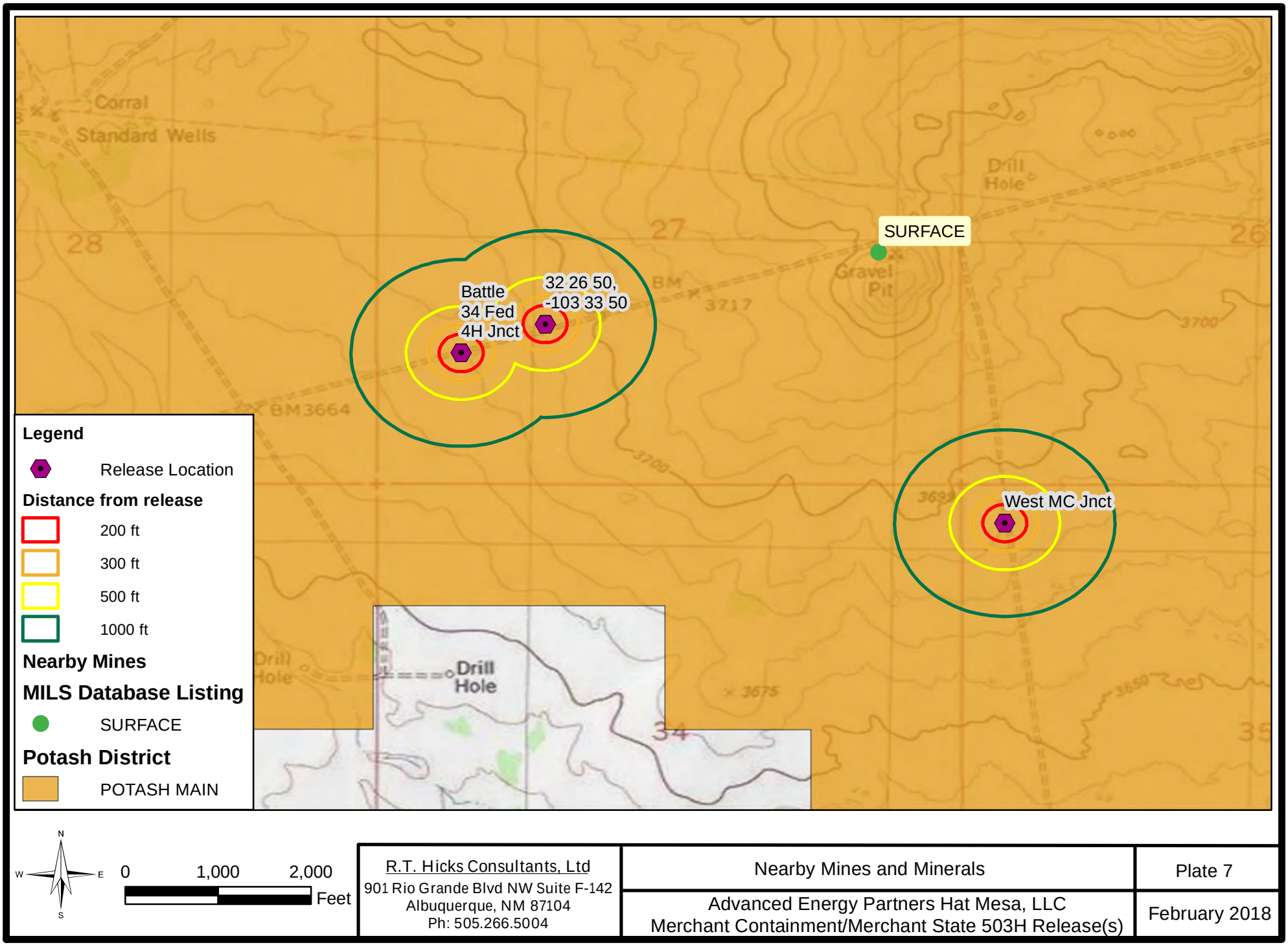

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby Mines and Minerals	Plate 7
	Advanced Energy Partners Hat Mesa, LLC Merchant Containment/Merchant State 503H Release(s)	February 2018

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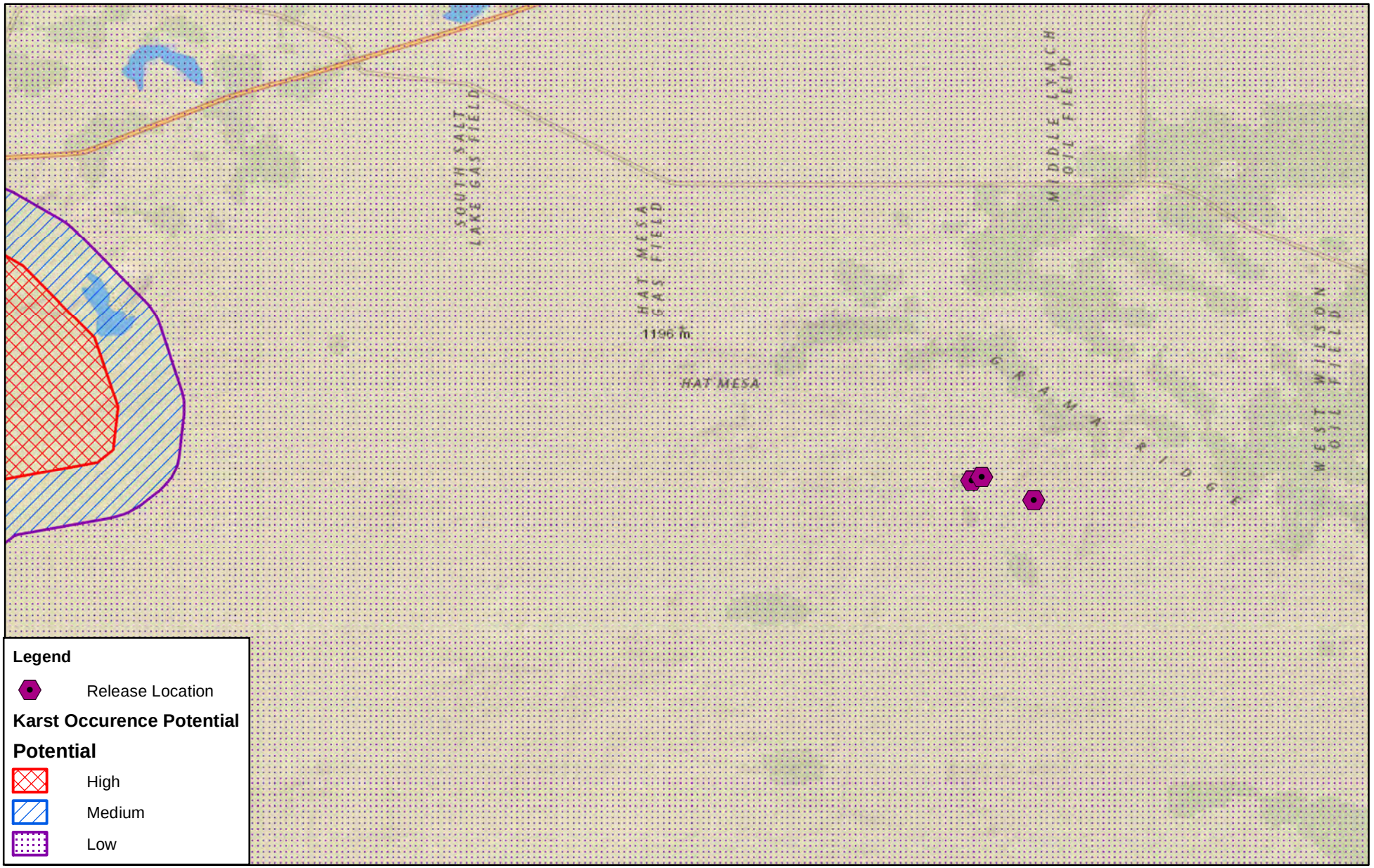

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Karst Potential	Plate 8
	Advanced Energy Partners Hat Mesa, LLC Merchant Containment/Merchant State 503H Release(s)	February 2018

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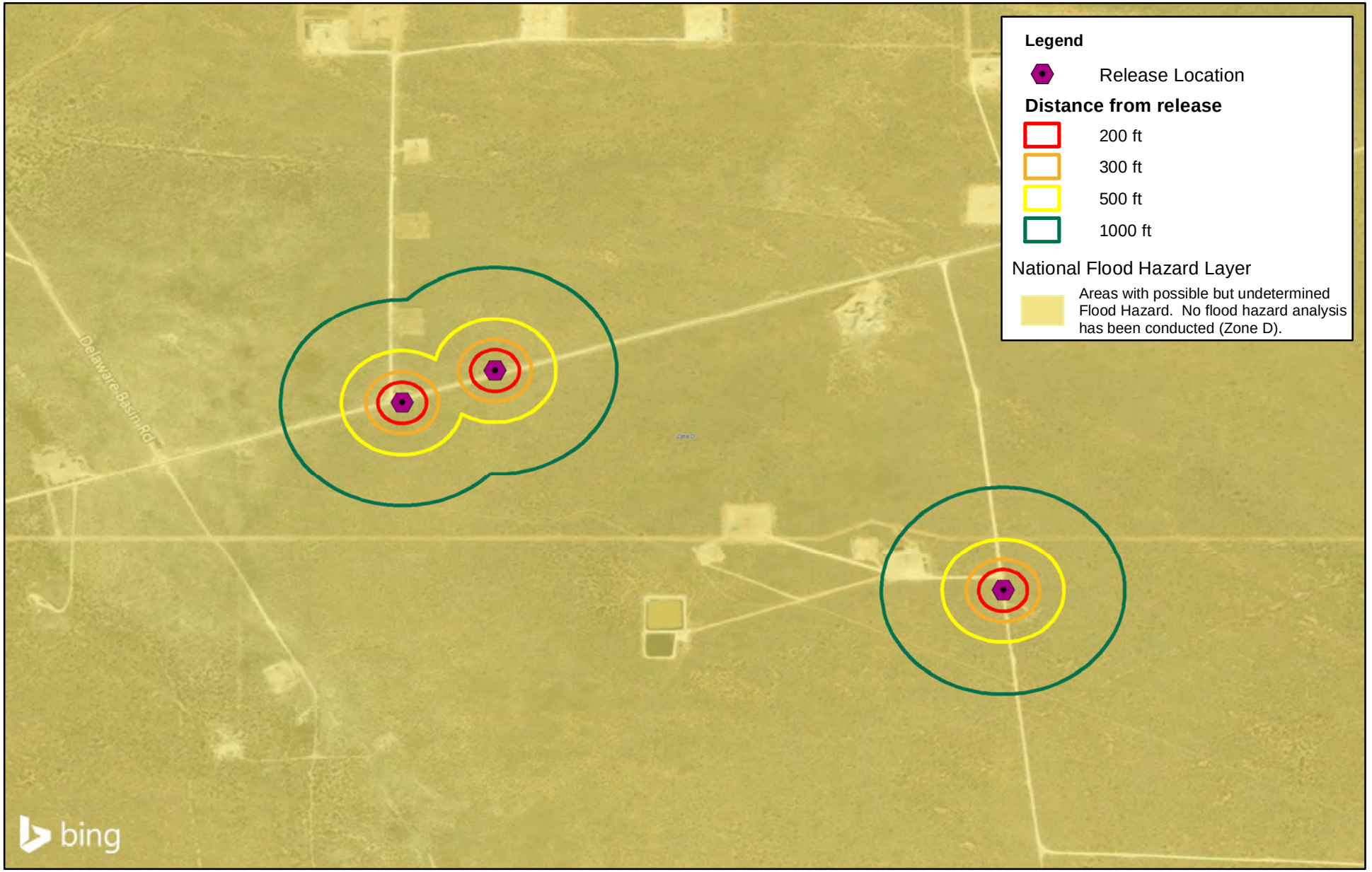

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R.T. Hicks Consultants, Ltd
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Albuquerque, NM 87104
Ph: 505.266.5004

FEMA Flood Map

Plate 9

Advanced Energy Partners Hat Mesa, LLC
Merchant Containment/Merchant State 503H Release(s)

February 2018

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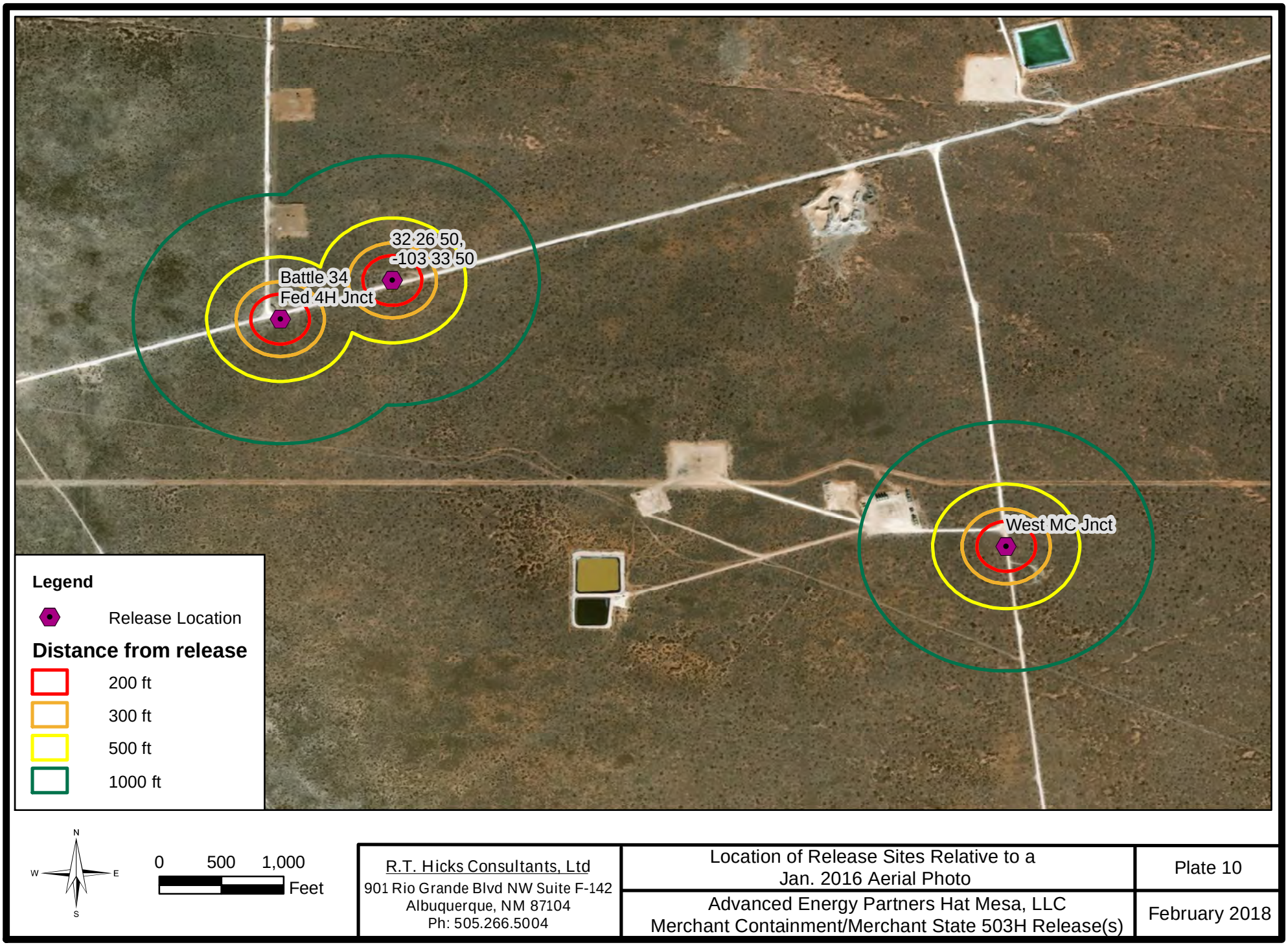

R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Location of Release Sites Relative to a Jan. 2016 Aerial Photo	Plate 10
	Advanced Energy Partners Hat Mesa, LLC Merchant Containment/Merchant State 503H Release(s)	February 2018

Attachment A

Table I Closure Criteria for Soils Impacted by a Release			
Depth below bottom of release to ground water less than 10,000 mg/l TDS	Constituent	Method*	Limit**
≤ 50 feet	Chloride***	EPA 300.0	600 mg/kg
	TPH	EPA SW-846 Method 8015M	100 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg
51 feet-100 feet	Chloride***	EPA 300.0	10,000 mg/kg
	TPH	EPA SW-846 Method 8015M	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8260B	10 mg/kg
➢ 100 feet	Chloride***	EPA 300.0	20,000 mg/kg
	TPH	EPA SW-846 Method 8015M	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8015M	10 mg/kg

Attachment B – Well Log

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

STATE ENGINEER OFFICE
ROSWELL, NEW MEXICO
2014 SEP 10 PM 2:15

1. GENERAL AND WELL LOCATION

OSE POD NUMBER (WELL NUMBER): CP-1355 (East Standard South) *** Revised 09/09/14 ***	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	54.8	N
LONGITUDE	103	33	58.3	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

NE1/4NW1/4SW1/4 Section 27, 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)
07/22/14	07/29/14	1,192'	1,192'	925'

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

STATIC WATER LEVEL IN COMPLETED WELL (FT): 582'

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'	757'	14 3/4"	9 5/8"	Thread & Collar	8.921"	36 lbs.	none
690'	1,192'	8 3/4"	7" (502.14' Total)	Thread & Collar	6.366"	23 lbs.	1/8"
			317.96 perforated				
			on bottom of liner				

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	757'	14 3/4"	Float and shoe cemented to surface	962	Circulated

FOR OSE INTERNAL USE

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

FILE NUMBER	CP-1355	POD NUMBER	1	TRN NUMBER	549450
LOCATION	Expl	21S.33E.27.312			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	4'	4'	Sand	○ Y ◉ N	
4'	28'	24'	Caliche	○ Y ◉ N	
28'	120'	92'	Sand & Clay	○ Y ◉ N	
120'	260'	140'	Red Clay	○ Y ◉ N	
260'	757'	497'	Red & Brown Shale, and Clay (some blue)	○ Y ◉ N	
757'	815'	58'	Red & Brown Shale	○ Y ◉ N	
815'	840'	25'	Blue Clay & Shale	○ Y ◉ N	
840'	925'	85'	Red and Brown Shale (some sandrock)	○ Y ◉ N	
925'	975'	50'	Watersand and Gravel	◉ Y ○ N	
975'	1,185'	210'	Watersand (brown sandrock)	◉ Y ○ N	
1,185'	1,192'	7'	Red Shale	○ Y ◉ N	
				○ Y ◉ N	
				○ Y ◉ N	
				○ 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 757' drilled with mud.
757' to 1192' drilled with air and foam.

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

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

9/9/14 — DATE

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

FILE NUMBER	CP-1355	POD NUMBER	1	TRN NUMBER	549450
LOCATION	21S.33E.27.312				PAGE 2 OF 2

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

STATE ENGINEER OFFICE RECEIVED 2014 AUG 18 AM 8:53

1. GENERAL AND WELL LOCATION

OSE POD NUMBER (WELL NUMBER)	OSE FILE NUMBER(S)
CP - 1355 East Standard (South)	
WELL OWNER NAME(S)	PHONE (OPTIONAL)
Merchants Livestock/Glenn's Water Well Service, Inc.	(575)398-2424
WELL OWNER MAILING ADDRESS	CITY / STATE / ZIP
P.O. Box 692	Tatum / NM / 88267

WELL LOCATION (FROM GPS)	DEGREES	MINUTES	SECONDS	
LATITUDE	32	26	54.8	N
LONGITUDE	103	33	58.3	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

NE/NW/SW Sec. 27, T21S, R33E 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)
7/29/14	8/2/14	1192'	1192'	925'

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

STATIC WATER LEVEL IN COMPLETED WELL (FT): 582'

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'	757'	14 3/4"	9 5/8"	Thread and Collar	.352	36 lbs.	none
757'	1192'	8 3/4'	7"	Thread and Collar	6.5"	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'	757'	14 3/4"	Float and Shoe Cemented to Surface	1034	Circulated

FOR OSE INTERNAL USE

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

FILE NUMBER	CP-1355	POD NUMBER	1	TRN NUMBER	549450
LOCATION	Exp1	21S.33E.27.312			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'	4'	4'	Soil	○ Y ◉ N	
4'	28'	24'	Caleche	○ Y ◉ N	
28'	120'	92'	Sand and Clay	○ Y ◉ N	
120'	260'	140'	Red Clay	○ Y ◉ N	
260'	757'	497'	Red and Brown Shale and Clay(some blue)	○ Y ◉ N	
757'	815'	58'	Red and Brown Shale	○ Y ◉ N	
815'	840'	25'	Blue Clay and Shale	○ Y ◉ N	
840'	925'	85'	Red and Brown Shale(some sandrock)	○ Y ◉ N	
925'	975'	50'	Watersand and Gravel	◉ Y ○ N	
975'	1185'	210'	Watersand(brown sandrock)	◉ Y ○ N	
1185'	1192'	7'	Red Shale	○ Y ◉ N	
				○ Y ○ N	
				○ Y ○ N	
				○ 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): 50

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 757' drilled with mud. 757' to 1192' drilled with air and foam.

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

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

8/7/14 — DATE

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

FILE NUMBER	CP-1355	POD NUMBER	1	TRN NUMBER	549450
LOCATION	Exp1	21S.33E.27.312			PAGE 2 OF 2

Attachment C – Laboratory Reports

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

February 19, 2018

Randall Hicks

R.T. Hicks Consultants, LTD
901 Rio Grande Blvd. NW
Suite F-142
Albuquerque, NM 87104
TEL: (505) 266-5004
FAX (505) 266-0745

RE: West of MP Jnct OrderNo.: 1802042

Dear Randall Hicks:

Hall Environmental Analysis Laboratory received 3 sample(s) on 2/1/2018 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 #NM0190

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order: **1802042**
Date Reported: **2/19/2018**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Project: West of MP Jnct
Lab Order: 1802042

Lab ID: 1802042-001 **Collection Date:** 1/30/2018 3:19:00 PM
Client Sample ID: BH1 6" **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	3300	150		mg/Kg	100	2/14/2018 4:54:58 AM	36462

Lab ID: 1802042-002 **Collection Date:** 1/30/2018 3:23:00 PM
Client Sample ID: BH1 12" **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	3600	150		mg/Kg	100	2/14/2018 5:07:23 AM	36462

Lab ID: 1802042-003 **Collection Date:** 1/30/2018 3:27:00 PM
Client Sample ID: BH1 24" **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **CJS**	
Chloride	5100	300		mg/Kg	200	2/16/2018 5:27:47 PM	36495

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#: **1802042**

19-Feb-18

Client: R.T. Hicks Consultants, LTD

Project: West of MP Jnct

Sample ID	**MB-36462**	SampType:	**mblk**		TestCode:	**EPA Method 300.0: Anions**				
Client ID:	**PBS**	Batch ID:	**36462**		RunNo:	**49047**				
Prep Date:	**2/12/2018**	Analysis Date:	**2/12/2018**		SeqNo:	**1579653**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	**LCS-36462**	SampType:	**lcs**		TestCode:	**EPA Method 300.0: Anions**				
Client ID:	**LCSS**	Batch ID:	**36462**		RunNo:	**49047**				
Prep Date:	**2/12/2018**	Analysis Date:	**2/12/2018**		SeqNo:	**1579654**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	91.9	90	110			

Sample ID	**MB-36495**	SampType:	**mblk**		TestCode:	**EPA Method 300.0: Anions**				
Client ID:	**PBS**	Batch ID:	**36495**		RunNo:	**49085**				
Prep Date:	**2/13/2018**	Analysis Date:	**2/13/2018**		SeqNo:	**1583564**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	**LCS-36495**	SampType:	**lcs**		TestCode:	**EPA Method 300.0: Anions**				
Client ID:	**LCSS**	Batch ID:	**36495**		RunNo:	**49085**				
Prep Date:	**2/13/2018**	Analysis Date:	**2/13/2018**		SeqNo:	**1583565**	Units:	**mg/Kg**		

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	92.3	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

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: 1802042 | RcptNo: 1

Received By: **Erin Melendrez** 2/1/2018 10:25:00 AM

Completed By: **Erin Melendrez** 2/1/2018 1:35:55 PM

Reviewed By: BRC 02/01/18

Labeled By: PDS

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 ☐
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 ☐	# of preserved bottles checked for pH: ____ (<2 or >12 unless noted)
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted?
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 ☐	Checked by: ____

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	0.8	Good	Not Present			

Chain-of-Custody Record

Client: ADVANCE FRAC
R THICKS Consulting

Mailing Address:

Phone #:

email or Fax#:

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

Accreditation
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☐ Standard ☐ Rush

Project Name: West of MP Jnct

Project #:

Project Manager: Randall Hicks

Sampler:

On Ice: ☑ Yes ☐ No

Sample Temperature: 1.8-1.0(cf) = 0.8

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1802042	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Chloride				Air Bubbles (Y or N)
1/30	1519	Soil	BH 1 6"	1 Glass		-001												X				
1	1523	"	BH #1 12"	"		-002												X				
1	1527	"	~~BH 2~~ 24"	"		-003												X				
			BH 1 DDS as per RH 2/1/18																			

Date	Time	Relinquished by	Received by	Date	Time
1/31	1025			2/1/18	1025
Date	Time	Relinquished by	Received by	Date	Time

Remarks:

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.

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

February 15, 2018

Randall Hicks

R.T. Hicks Consultants, LTD
901 Rio Grande Blvd. NW
Suite F-142
Albuquerque, NM 87104
TEL: (505) 266-5004
FAX (505) 266-0745

RE: 32 26 50 / 103 33 50 OrderNo.: 1802026

Dear Randall Hicks:

Hall Environmental Analysis Laboratory received 5 sample(s) on 2/1/2018 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 #NM0190

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Analytical Report
Lab Order: **1802026**
Date Reported: **2/15/2018**

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Project: 32 26 50 / 103 33 50
Lab Order: 1802026

Lab ID: 1802026-001 **Collection Date:** 1/30/2018 2:51:00 PM
Client Sample ID: BH2 6" **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	5200	300		mg/Kg	200	2/14/2018 2:26:03 AM	36462

Lab ID: 1802026-002 **Collection Date:** 1/30/2018 2:57:00 PM
Client Sample ID: BH2 12" **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	5400	300		mg/Kg	200	2/14/2018 2:38:28 AM	36462

Lab ID: 1802026-003 **Collection Date:** 1/30/2018 3:02:00 PM
Client Sample ID: BH2 24" **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	5500	300		mg/Kg	200	2/14/2018 2:50:52 AM	36462

Lab ID: 1802026-004 **Collection Date:** 1/30/2018 2:32:00 PM
Client Sample ID: BH1 6" **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	840	30		mg/Kg	20	2/12/2018 1:41:21 PM	36462

Lab ID: 1802026-005 **Collection Date:** 1/30/2018 2:37:00 PM
Client Sample ID: BH1 12" **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	2900	75		mg/Kg	50	2/14/2018 3:03:17 AM	36462

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#: **1802026**

15-Feb-18

Client: R.T. Hicks Consultants, LTD

Project: 32 26 50 / 103 33 50

Sample ID	**MB-36462**	SampType:	**mblk**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**PBS**	Batch ID:	**36462**	RunNo:	**49047**					
Prep Date:	**2/12/2018**	Analysis Date:	**2/12/2018**	SeqNo:	**1579653**	Units:	**mg/Kg**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	**LCS-36462**	SampType:	**lcs**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**LCSS**	Batch ID:	**36462**	RunNo:	**49047**					
Prep Date:	**2/12/2018**	Analysis Date:	**2/12/2018**	SeqNo:	**1579654**	Units:	**mg/Kg**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	91.9	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

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: 1802026 | RcptNo: 1

Received By: Erin Melendrez 2/1/2018 10:09:00 AM

Completed By: Erin Melendrez 2/1/2018 11:10:09 AM

Reviewed By: DDS 2/1/18

Labeled By: SRE 02/01/18

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 ☐
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 ☐	# of preserved bottles checked for pH (<2 or >12 unless noted)
12. Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	Adjusted?
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 ☐	Checked by:

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	0.8	Good	Not Present			

Chain-of-Custody Record

Client: ADVANCE FRAC

Mailing Address: RT Hicks Consult

Phone #: 505-238-9515

email or Fax#: R@rthicksconsult.com

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

Accreditation
☐ NELAP ☐ Other _____

☐ EDD (Type) _____

Turn-Around Time:
☐ Standard ☐ Rush _____

Project Name: 32 26 50 / 103 33 50

Project #:

Project Manager: RT Hicks

Sampler:

On Ice: ☑ Yes ☐ No

Sample Temperature: 1.8-1.0(F)=0.8

HALL ENVIRONMENTAL ANALYSIS LABORATORY

www.hallenvironmental.com

4901 Hawkins NE - Albuquerque, NM 87109

Tel. 505-345-3975 Fax 505-345-4107

Analysis Request

Date	Time	Matrix	Sample Request ID	Container Type and #	Preservative Type	HEAL No. 1802026	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions (F,Cl,NO_3,NO_2,PO_4,SO_4)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Chloride				Air Bubbles (Y or N)
1/30	1451	Soil	BH2 6"	1 Glass	/	-001												X				
"	1457	"	BH2 12"			-002												X				
	1502		BH 24"			-003												X				
	[illegible]																	X				
	1432		BH1 6"			-004												X				
↓	1437	↓	BH1 12"	↓		-005												X				

Date	Time	Relinquished by	Received by	Date	Time
2/1	1009	Randall		2/1/18	1009

Remarks:

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

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

February 15, 2018

Randall Hicks

R.T. Hicks Consultants, LTD
901 Rio Grande Blvd. NW
Suite F-142
Albuquerque, NM 87104
TEL: (505) 266-5004
FAX (505) 266-0745

RE: Battle 34 Fed 4H Jnct OrderNo.: 1802028

Dear Randall Hicks:

Hall Environmental Analysis Laboratory received 9 sample(s) on 2/1/2018 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 #NM0190

Sincerely,

Andy Freeman
Laboratory Manager
4901 Hawkins NE
Albuquerque, NM 87109

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Project: Battle 34 Fed 4H Jnct

Lab Order: 1802028

Lab ID: 1802028-001 **Collection Date:** 1/30/2018 1:09:00 PM
Client Sample ID: BH 6" **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	3100	150		mg/Kg	100	2/14/2018 3:40:31 AM	36462

Lab ID: 1802028-002 **Collection Date:** 1/30/2018 1:11:00 PM
Client Sample ID: BH 12" **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	95	30		mg/Kg	20	2/12/2018 2:18:35 PM	36462

Lab ID: 1802028-003 **Collection Date:** 1/30/2018 1:15:00 PM
Client Sample ID: BH 24" **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	220	30		mg/Kg	20	2/12/2018 2:30:59 PM	36462

Lab ID: 1802028-004 **Collection Date:** 1/30/2018 1:56:00 PM
Client Sample ID: BH3 12" **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	1300	75		mg/Kg	50	2/14/2018 3:52:55 AM	36462

Lab ID: 1802028-005 **Collection Date:** 1/30/2018 1:51:00 PM
Client Sample ID: BH3 6" **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	4100	150		mg/Kg	100	2/14/2018 4:05:20 AM	36462

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

Hall Environmental Analysis Laboratory, Inc.

CLIENT: R.T. Hicks Consultants, LTD
Project: Battle 34 Fed 4H Jnct

Lab Order: 1802028

Lab ID: 1802028-006 **Collection Date:** 1/30/2018 1:35:00 PM
Client Sample ID: BH2 12" **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	2100	75		mg/Kg	50	2/14/2018 4:17:45 AM	36462

Lab ID: 1802028-007 **Collection Date:** 1/30/2018 1:32:00 PM
Client Sample ID: BH2 6" **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	6800	300		mg/Kg	200	2/14/2018 4:30:09 AM	36462

Lab ID: 1802028-008 **Collection Date:** 1/30/2018 1:35:00 PM
Client Sample ID: BH2 16" **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	1900	75		mg/Kg	50	2/14/2018 4:42:33 AM	36462

Lab ID: 1802028-009 **Collection Date:** 1/30/2018 2:02:00 PM
Client Sample ID: BH3 24" **Matrix:** SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed	Batch ID
EPA METHOD 300.0: ANIONS						Analyst: **MRA**	
Chloride	1100	30		mg/Kg	20	2/12/2018 4:10:16 PM	36462

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#: **1802028**

15-Feb-18

Client: R.T. Hicks Consultants, LTD

Project: Battle 34 Fed 4H Jnct

Sample ID	**MB-36462**	SampType:	**mblk**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**PBS**	Batch ID:	**36462**	RunNo:	**49047**					
Prep Date:	**2/12/2018**	Analysis Date:	**2/12/2018**	SeqNo:	**1579653**	Units:	**mg/Kg**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	ND	1.5								

Sample ID	**LCS-36462**	SampType:	**lcs**	TestCode:	**EPA Method 300.0: Anions**					
Client ID:	**LCSS**	Batch ID:	**36462**	RunNo:	**49047**					
Prep Date:	**2/12/2018**	Analysis Date:	**2/12/2018**	SeqNo:	**1579654**	Units:	**mg/Kg**			

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	%RPD	RPDLimit	Qual
Chloride	14	1.5	15.00	0	91.9	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

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: 1802028 | RcptNo: 1

Received By: Erin Melendrez 2/1/2018 10:19:00 AM

Completed By: Erin Melendrez 2/1/2018 11:29:07 AM

Reviewed By: DDS 2/1/18

Labeled By: SRR 02/01/18

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 ☐
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: _____

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	0.8	Good	Not Present			

Chain-of-Custody Record

Client: ADVANCE FRAC
RT Hicks Consult

Mailing Address:

Phone #: 505-238-9515

email or Fax#: RC@rthicksconsult.com

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

Accreditation
☐ NELAP ☐ Other

☐ EDD (Type)

Turn-Around Time:
☐ Standard ☐ Rush

Project Name: BATTLE 34 FED 4H JNCT

Project #:

Project Manager: Randall Hicks

Sampler:

On Ice: ☒ Yes ☐ No

Sample Temperature: 1.8-1.0(CF)=0.8

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 Request ID	Container Type and #	Preservative Type	HEAL No. 1802028	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gas only)	TPH 8015B (GRO / DRO / MRO)	TPH (Method 418.1)	EDB (Method 504.1)	PAH's (8310 or 8270 SIMS)	RCRA 8 Metals	Anions ($F, Cl, NO_3, NO_2, PO_4, SO_4$)	8081 Pesticides / 8082 PCB's	8260B (VOA)	8270 (Semi-VOA)	Chloride				Air Bubbles (Y or N)
1/30	1309	Soil	BH 6"	1 GLASS		-001												X				
	1311		BH 12"			-002												X				
	1315		BH 24"			-003												X				
	1356		BH3 12"			-004												X				
	1351		BH 3 6"			-005												X				
	1335		BH2 12"			-006												X				
	1332		BH2 6"			-007												X				
	1335		BH2 16"			-008												X				
↓	1402	↓	BH 3 24"	↓		-009												X				

Date	Time	Relinquished by	Received by	Date	Time
2/1	10/19	Randall Hicks			
Date	Time	Relinquished by	Received by	2/1/18	1019

Remarks

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

Attachment D Field Maps from Merchant Livestock

West of Merchant Pit Produced Water Transfer Line Release

Trench 1 is at the source of the release and we expect the deepest sample at 8-10 feet or at hard caliche. Trench 2 is in a pooling area in the pasture near the terminus of the spill footprint and we expect the deepest sample at 6-8 feet. The area of the footprint is about 250 square yards.

36 22 50 and Battle Produced Water Transfer Line Releases

North is to the right.

The Battle Release consists of three separate incidents and the footprint traced is about 450 square yards. Trench 1 will test the depth of impact at a pooling site next to the road and Trench 2 is a pooling location associated with all three incidents. A third sampling trench location will be selected in the field.

The 32 26 50 Release is a single release incident with an area of flow covering about 500 yards. Trench 1 is at the location of the release at the top of a sand dune. Trench 2 is in a pooling area and Trench 3 is at the terminus of the release just off the road. A fourth sampling trench may collect samples north of Trench 2.