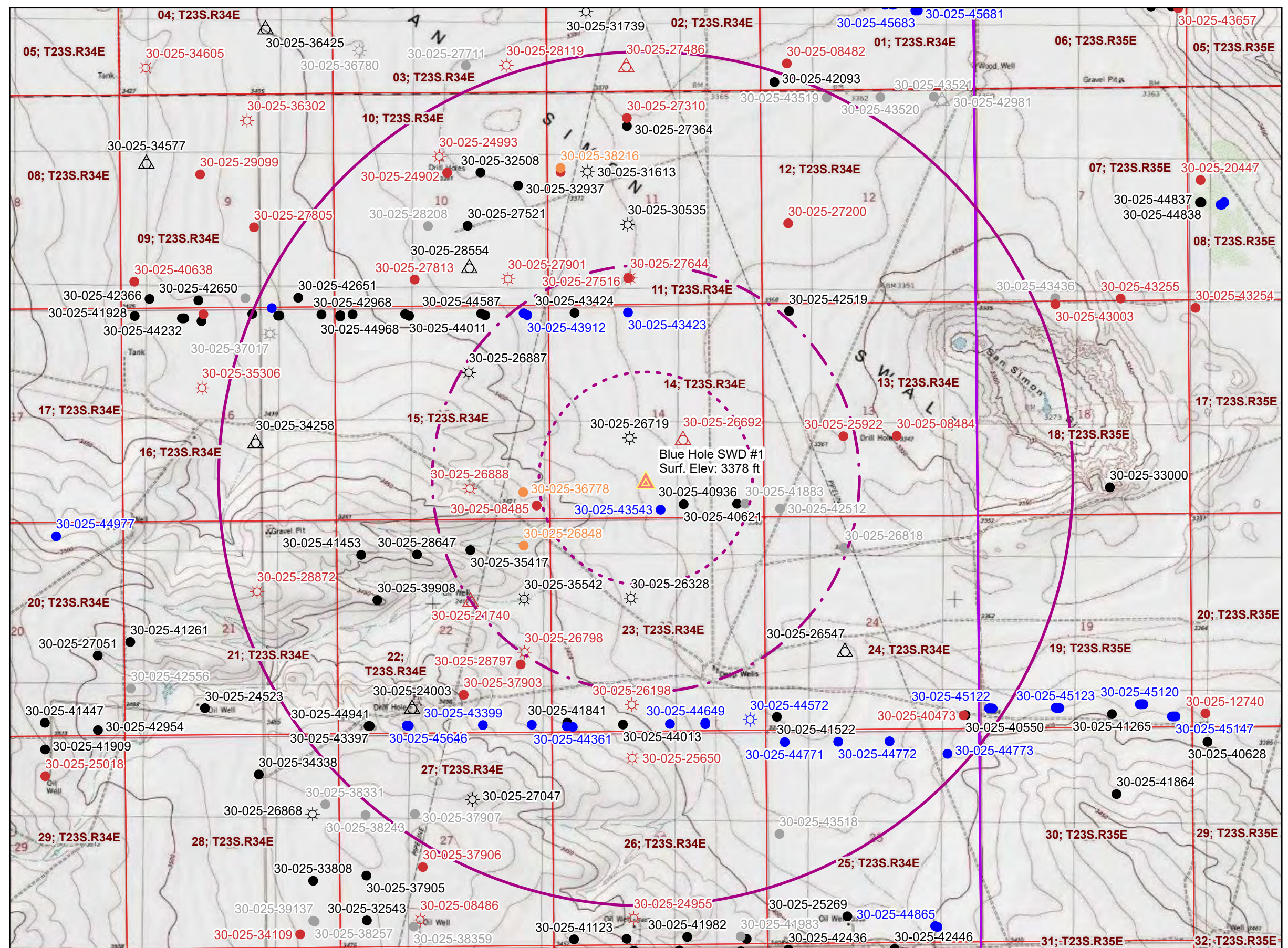
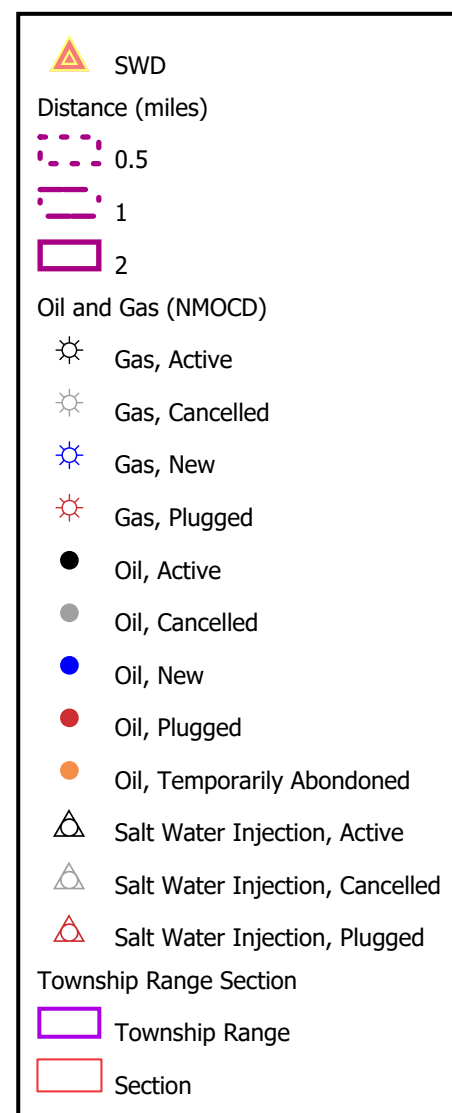


Application

Part *II*

Plates

Plate 1	OCD wells within the area of review
Plate 2	Mineral leases within the area of review
Plate 3	Water supply wells within the area of review
Plate 4	Surface water within the area of review



0 0.25 0.5 Miles

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

Oil and Gas Wells Within 2-Miles

AWR Disposal, LLC
Blue Hole SWD #1

Plate 1a

August 2019

SWD

Distance (miles)

0.5

1

2

Oil and Gas (NMOCD)

Gas, Active

Gas, New

Oil, Active

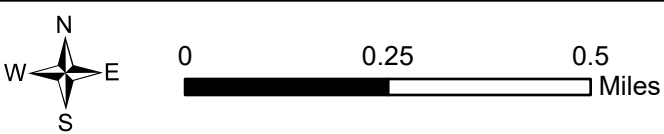
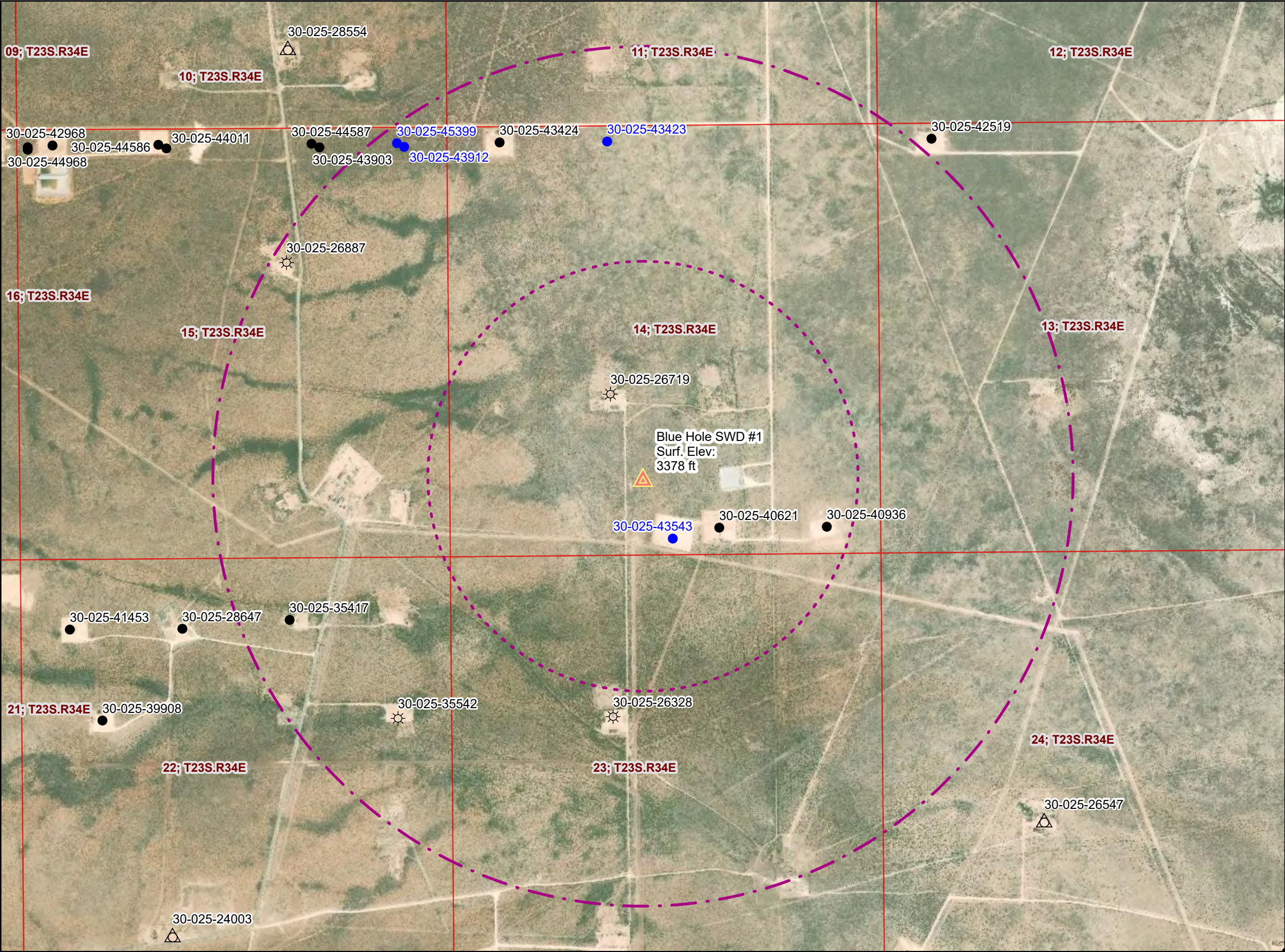
Oil, New

Salt Water Injection, Active

Township Range Section

Township Range

Section



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

Oil and Gas Wells within 1-Mile (Active Only)
AWR Disposal, LLC Blue Hole SWD #1

Plate 1b
August 2019

 SWD

Distance (miles)

 0.5

 1

 2

Oil and Gas Leases

 SLO Leases

 BLM Leases

Mineral Ownership (BLM Dataset)

 All minerals are owned by the U.S. (BLM)

 No minerals are owned by the U.S. (BLM)

 Other minerals are owned by the U.S. (BLM)

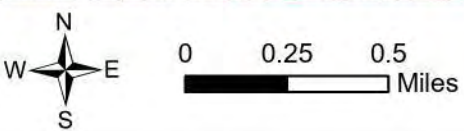
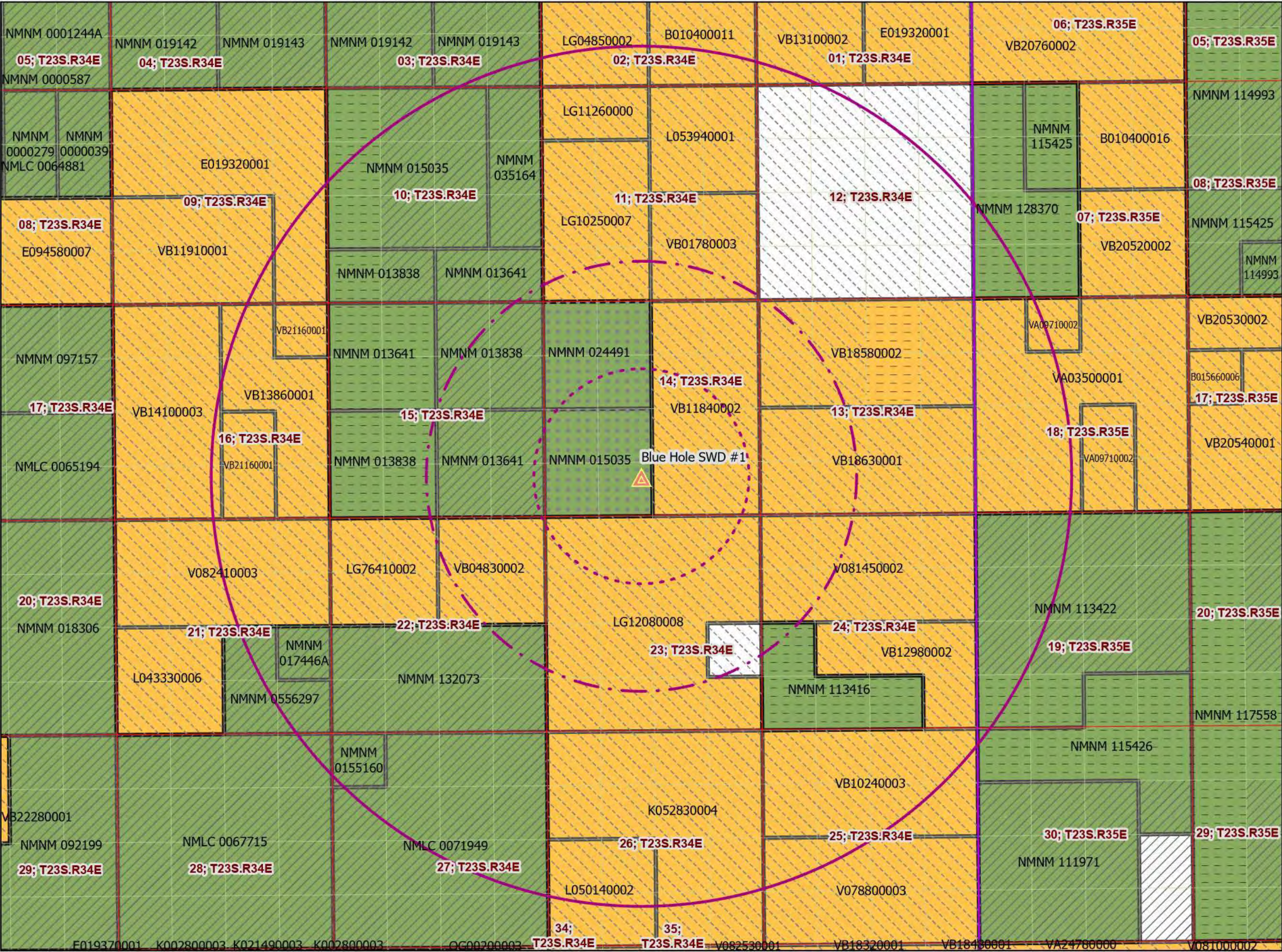
 Only oil and gas are owned by the U.S. (BLM)

Township Range Section

 Township Range

 Section

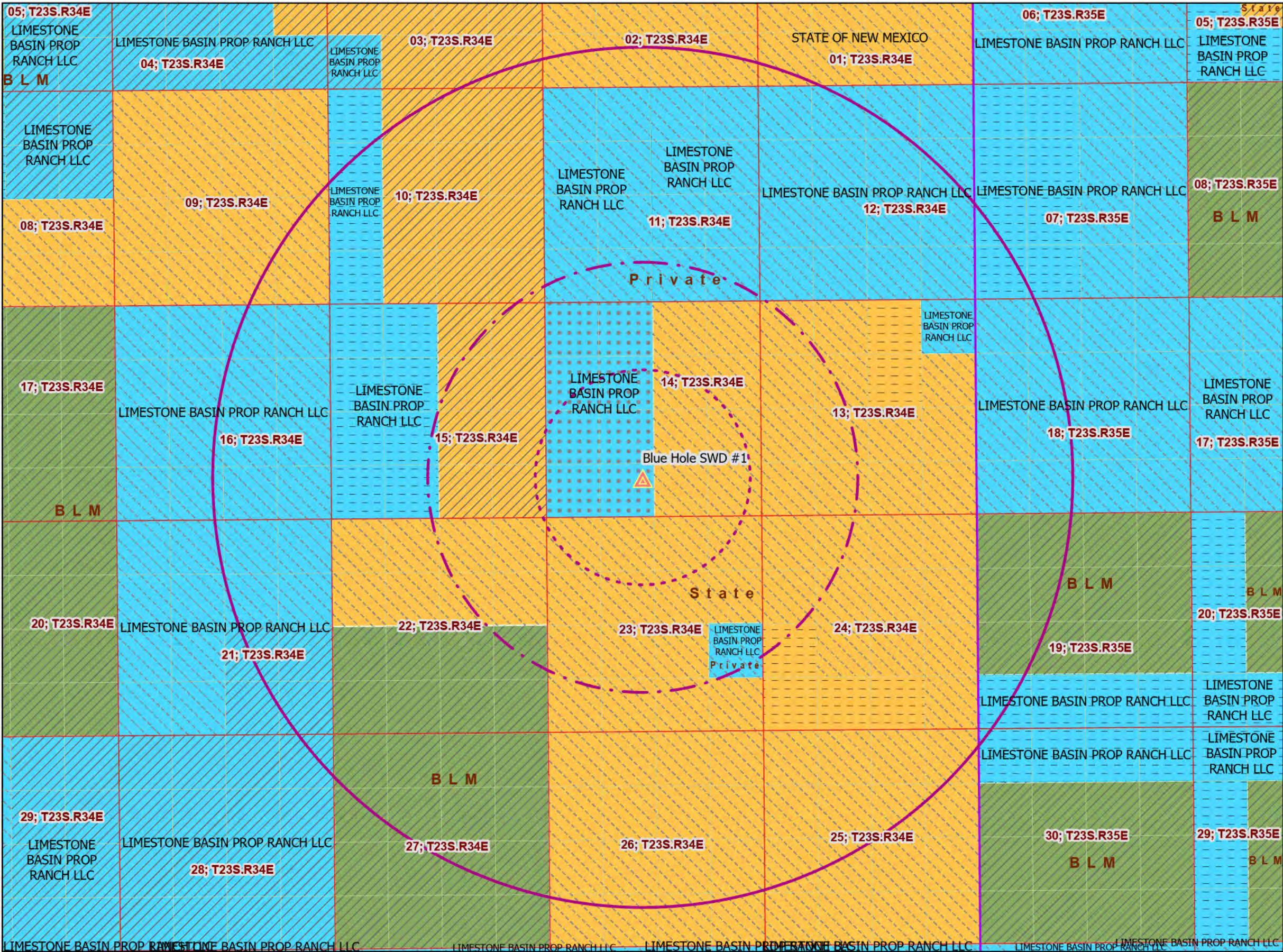
 UL (qq)



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

Oil and Gas Leases with Mineral Ownership
Within 2-Miles
AWR Disposal, LLC
Blue Hole SWD #1

Plate 2a
August 2019



 SWD

Distance (miles)

 0.5

 1

 2

NM Land Ownership

 BLM

 State

 Private

Mineral Ownership (BLM Dataset)

 All minerals are owned by the U.S. (BLM)

 No minerals are owned by the U.S. (BLM)

 Other minerals are owned by the U.S. (BLM)

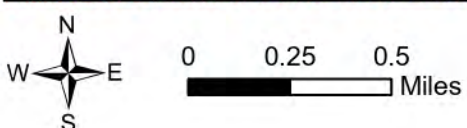
 Only oil and gas are owned by the U.S. (BLM)

Township Range Section

 Township Range

 Section

 UL (qq)



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

Surface Ownership and Mineral Ownership within 2-Miles
AWR Disposal, LLC Blue Hole SWD #1

Plate 2b
August 2019



SWD

Potentiometric Surface (ft msl)



Isocontour

USGS Gauging Station (DTW, Date)

Aquifer Code, Well Status



Alluvium/Bolsom



Chinle



Santa Rosa

Misc. Water Wells (Well ID, DTW)

Well Depth (ft)



No Data



351 - 500

OSE Water Wells (DTW/Date)

Well Depth (ft)



351-500



501-1000

NM Geology

Map Unit,Description



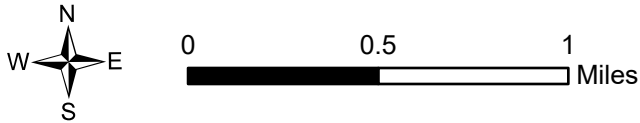
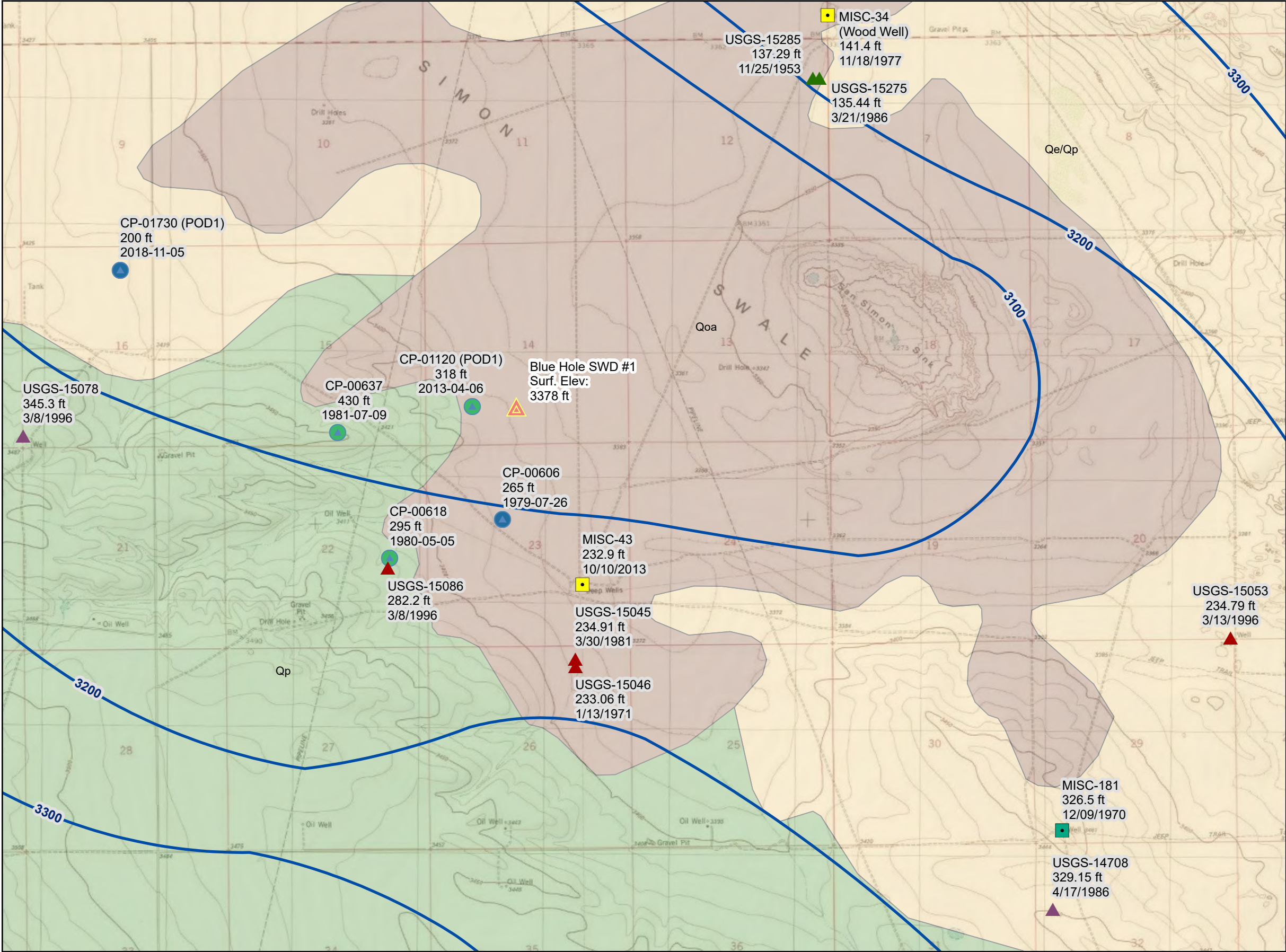
Qe/Qp, Quaternary-Eolian Piedmont Deposits



Qoa, Quaternary-Older Alluvial Deposits,Qoa, Quaternary-Older Alluvial Deposits



Qp, Quaternary-Piedmont Alluvial Deposits,Qp, Quaternary-Piedmont Alluvial Deposits





 SWD

OSE Water Wells (DTW/Date)

Well Depth (ft)

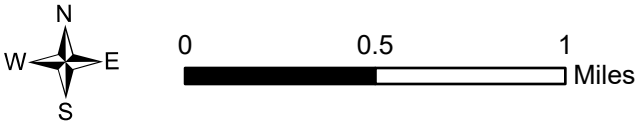
 <=150

 151-350

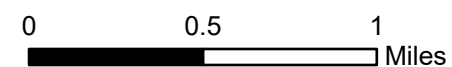
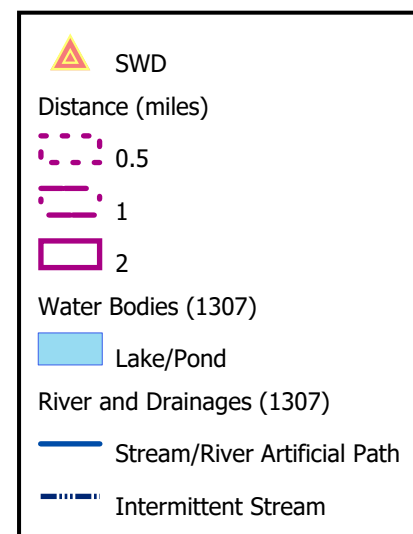
 351-500

 501-1000

 Other



R.T. Hicks Consultants, Ltd 901 Rio Grande Blvd NW Suite F-142 Albuquerque, NM 87104 Ph: 505.266.5004	Nearby OSE Water Wells	Plate 3b
	AWR Disposal, LLC Blue Hole SWD #1	August 2019



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

Nearby Surface Water

AWR Disposal, LLC
Blue Hole SWD #1

Plate 4

August 2019

Tables

Table 1	OCD wells within the area of review
Table 2	Mineral Interests and Affected Persons within area of review
Table 3	Produced Water Chemistry of Nearby Wells
Table 4	Formational water quality data

API	Ogrid	Ogrid Name	Well Type	Status	Well Name	UL-S-T-R	Total Depth	Pool ID
30-025-08485	7586	ESTORIL PRODUCING CORP	O	P	BELCO FEDERAL #003	P-15-23S-34E	5493	
30-025-21740	233545	BOLD ENERGY, L.P.	S	P	ANTELOPE RIDGE UNIT #001	G-22-23S-34E	14761	[96100] SWD, DELAWARE
30-025-25922	214263	PRE-ONGARD WELL OPERATOR	O	P	PRE-ONGARD WELL #001	K-13-23S-34E	13914	
30-025-26328	228937	MATADOR PRODUCTION COMPANY	G	A	STATE 23 #002	F-23-23S-34E	13600	[2209] ANTELOPE RIDGE, BONE SPRING, WEST; [70360] ANTELOPE RIDGE, ATOKA (GAS); [70440] ANTELOPE RIDGE, MORROW (GAS)
30-025-26692	249099	CAZA OPERATING, LLC	S	P	CAZA RIDGE 14 STATE #001	J-14-23S-34E	13543	[2205] ANTELOPE RIDGE, BONE SPRING, NORTH; [70360] ANTELOPE RIDGE, ATOKA (GAS); [97869] SWD, DEVONIAN-SILURIAN
30-025-26719	370351	WYNN-CROSBY OPERATING, LP	G	A	SUPRON 14 FEDERAL COM #001	K-14-23S-34E	13600	[70360] ANTELOPE RIDGE, ATOKA (GAS); [70440] ANTELOPE RIDGE, MORROW
30-025-26798	11158	J C WILLIAMSON	G	P	CURRY FEDERAL #001	I-22-23S-34E	13409	[70450] ANTELOPE RIDGE, STRAWN (GAS)
30-025-26818	214263	PRE-ONGARD WELL OPERATOR	O	C	PRE-ONGARD WELL #002	C-24-23S-34E	0	
30-025-26848	168687	SIANA OPERATING LLC	O	E	CURRY STATE #001	A-22-23S-34E	13205	[2209] ANTELOPE RIDGE, BONE SPRING, WEST
30-025-26887	372098	MARATHON OIL PERMIAN LLC	G	A	ADOBE FEDERAL COM #001	G-15-23S-34E	13274	[70440] ANTELOPE RIDGE, MORROW (GAS); [70450] ANTELOPE RIDGE, STRAWN (GAS)
30-025-26888	372098	MARATHON OIL PERMIAN LLC	G	P	BELCO FEDERAL COM #001	O-15-23S-34E	13239	[70450] ANTELOPE RIDGE, STRAWN (GAS)
30-025-27516	214263	PRE-ONGARD WELL OPERATOR	O	P	PRE-ONGARD WELL #001	N-11-23S-34E	703	
30-025-27644	214263	PRE-ONGARD WELL OPERATOR	G	P	PRE-ONGARD WELL #001Y	N-11-23S-34E	13600	[70360] ANTELOPE RIDGE, ATOKA (GAS)
30-025-35417	190595	ENDEAVOR ENERGY RESOURCES, LP	O	A	CURRY STATE #003	B-22-23S-34E	7500	[2215] ANTELOPE RIDGE, CHERRY CANYON, SOUTH
30-025-35542	7377	EOG RESOURCES INC	G	A	CURRY STATE #004	H-22-23S-34E	13375	[70440] ANTELOPE RIDGE, MORROW (GAS)
30-025-36778	6137	DEVON ENERGY PRODUCTION COMPANY, LP	O	E	MAD DOG 15 FEDERAL COM #001	P-15-23S-34E	14832	[97436] ANTELOPE RIDGE, DEVONIAN, NORTH (GAS)
30-025-40621	249099	CAZA OPERATING, LLC	O	A	CAZA RIDGE 14 STATE #003H	O-14-23S-34E	11260	[2209] ANTELOPE RIDGE, BONE SPRING, WEST
30-025-40936	249099	CAZA OPERATING, LLC	O	A	CAZA RIDGE 14 STATE #004H	P-14-23S-34E	9	[2209] ANTELOPE RIDGE, BONE SPRING, WEST
30-025-41883	249099	CAZA OPERATING, LLC	O	C	CAZA RIDGE 14 STATE #005C	P-14-23S-34E	0	[2209] ANTELOPE RIDGE, BONE SPRING, WEST
30-025-42512	25575	EOG Y RESOURCES, INC.	O	C	WANDERER BWP STATE #001H	M-13-23S-34E	0	[2205] ANTELOPE RIDGE, BONE SPRING, NORTH
30-025-43423	14744	MEWBOURNE OIL CO	O	N	ORYX 14 B3CN FEDERAL COM #001H	C-14-23S-34E	0	[2209] ANTELOPE RIDGE, BONE SPRING, WEST
30-025-43424	14744	MEWBOURNE OIL CO	O	A	ORYX 14 B3DM FEDERAL COM #001H	D-14-23S-34E	11299	[2209] ANTELOPE RIDGE, BONE SPRING, WEST
30-025-43543	249099	CAZA OPERATING, LLC	O	N	CAZA RIDGE 14 STATE #006H	O-14-23S-34E	0	[2209] ANTELOPE RIDGE, BONE SPRING, WEST
30-025-43912	14744	MEWBOURNE OIL CO	O	N	PRONGHORN 15 B3AP FEDERAL COM #001H	A-15-23S-34E	0	[2209] ANTELOPE RIDGE, BONE SPRING, WEST
30-025-45399	14744	MEWBOURNE OIL CO	O	N	IBEX 10 B3PA FEDERAL COM #001H	A-15-23S-34E	0	[2207] ANTELOPE RIDGE, BONE SPRING, NW

Township	Range	Section	Unit Letter	Lease Number	Leasee (O & G Minerals)	Leassor (O & G Minerals)	Surface Owner	UPC
23S	34E	10	P	NMNM 013641	MEWBOURNE OIL CO	BLM	New Mexico State Land Office	4201134332265
23S	34E	11	M	LG10250007	CENTENNIAL RESOURCE PRODUCTION, LLC	State	LIMESTONE BASIN PROP RANCH LLC	4202134134266
23S	34E	11	N	LG10250007	CENTENNIAL RESOURCE PRODUCTION, LLC	State	LIMESTONE BASIN PROP RANCH LLC	4202134134266
23S	34E	11	O	VB01780003	COG OPERATING LLC	State	LIMESTONE BASIN PROP RANCH LLC	4202134398264
23S	34E	11	P	VB01780003	COG OPERATING LLC	State	LIMESTONE BASIN PROP RANCH LLC	4202134398264
23S	34E	12	M			Unknown (a)	LIMESTONE BASIN PROP RANCH LLC	4203134266265
23S	34E	13	C	VB18580002	EOG Y RESOURCES, INC.	State	New Mexico State Land Office	4203135253279
23S	34E	13	D	VB18580002	EOG Y RESOURCES, INC.	State	New Mexico State Land Office	4203135253279
23S	34E	13	E	VB18580002	EOG Y RESOURCES, INC.	State	New Mexico State Land Office	4203135253279
23S	34E	13	F	VB18580002	EOG Y RESOURCES, INC.	State	New Mexico State Land Office	4203135253279
23S	34E	13	K	VB18630001	EOG Y RESOURCES, INC.	State	New Mexico State Land Office	4203135253279
23S	34E	13	L	VB18630001	EOG Y RESOURCES, INC.	State	New Mexico State Land Office	4203135253279
23S	34E	13	M	VB18630001	EOG Y RESOURCES, INC.	State	New Mexico State Land Office	4203135253279
23S	34E	13	N	VB18630001	EOG Y RESOURCES, INC.	State	New Mexico State Land Office	4203135253279
23S	34E	14	A	VB11840002	CAZA PETROLEUM, LLC.	State	New Mexico State Land Office	4202135398264
23S	34E	14	B	VB11840002	CAZA PETROLEUM, LLC.	State	New Mexico State Land Office	4202135398264
23S	34E	14	C	NMNM 024491	DEVON ENERGY PROD CO LP	BLM	LIMESTONE BASIN PROP RANCH LLC	4202135134267
23S	34E	14	D	NMNM 024491	DEVON ENERGY PROD CO LP	BLM	LIMESTONE BASIN PROP RANCH LLC	4202135134267
23S	34E	14	E	NMNM 024491	DEVON ENERGY PROD CO LP	BLM	LIMESTONE BASIN PROP RANCH LLC	4202135134267
23S	34E	14	F	NMNM 024491	DEVON ENERGY PROD CO LP	BLM	LIMESTONE BASIN PROP RANCH LLC	4202135134267
23S	34E	14	G	VB11840002	CAZA PETROLEUM, LLC.	State	New Mexico State Land Office	4202135398264
23S	34E	14	H	VB11840002	CAZA PETROLEUM, LLC.	State	New Mexico State Land Office	4202135398264
23S	34E	14	I	VB11840002	CAZA PETROLEUM, LLC.	State	New Mexico State Land Office	4202135398264
23S	34E	14	J	VB11840002	CAZA PETROLEUM, LLC.	State	New Mexico State Land Office	4202135398264
23S	34E	14	K	NMNM 015035	NORTEX CORP	BLM	LIMESTONE BASIN PROP RANCH LLC	4202135134267
23S	34E	14	L	NMNM 015035	NORTEX CORP	BLM	LIMESTONE BASIN PROP RANCH LLC	4202135134267
23S	34E	14	M	NMNM 015035	NORTEX CORP	BLM	LIMESTONE BASIN PROP RANCH LLC	4202135134267
23S	34E	14	N	NMNM 015035	NORTEX CORP	BLM	LIMESTONE BASIN PROP RANCH LLC	4202135134267
23S	34E	14	O	VB11840002	CAZA PETROLEUM, LLC.	State	New Mexico State Land Office	4202135398264
23S	34E	14	P	VB11840002	CAZA PETROLEUM, LLC.	State	New Mexico State Land Office	4202135398264
23S	34E	15	A	NMNM 013838	DEVON ENERGY PROD CO LP	BLM	New Mexico State Land Office	4201135398264
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23S	34E	15	I	NMNM 013641	MEWBOURNE OIL CO	BLM	New Mexico State Land Office	4201135398264
23S	34E	15	J	NMNM 013641	MEWBOURNE OIL CO	BLM	New Mexico State Land Office	4201135398264
23S	34E	15	K	NMNM 013838	DEVON ENERGY PROD CO LP	BLM	LIMESTONE BASIN PROP RANCH LLC	4201135134266
23S	34E	15	N	NMNM 013838	DEVON ENERGY PROD CO LP	BLM	LIMESTONE BASIN PROP RANCH LLC	4201135134266
23S	34E	15	O	NMNM 013641	MEWBOURNE OIL CO	BLM	New Mexico State Land Office	4201135398264
23S	34E	15	P	NMNM 013641	MEWBOURNE OIL CO	BLM	New Mexico State Land Office	4201135398264
23S	34E	22	A	VB04830002	ENDEAVOR ENERGY RESOURCES, LP	State	New Mexico State Land Office	4201136265133
23S	34E	22	B	VB04830002	ENDEAVOR ENERGY RESOURCES, LP	State	New Mexico State Land Office	4201136265133
23S	34E	22	C	LG76410002	SIANA OIL & GAS CO.	State	New Mexico State Land Office	4201136265133
23S	34E	22	G	VB04830002	ENDEAVOR ENERGY RESOURCES, LP	State	New Mexico State Land Office	4201136265133
23S	34E	22	H	VB04830002	ENDEAVOR ENERGY RESOURCES, LP	State	New Mexico State Land Office	4201136265133
23S	34E	22	I	NMNM 132073	Not Listed	BLM	Bureau of Land Management	4201136267397
23S	34E	22	J	NMNM 132073	Not Listed	BLM	Bureau of Land Management	4201136267397

Township	Range	Section	Unit Letter	Lease Number	Leasee (O & G Minerals)	Leassor (O & G Minerals)	Surface Owner	UPC
23S	34E	23	A	LG12080008	MRC PERMIAN COMPANY	State	New Mexico State Land Office	4202136253261
23S	34E	23	B	LG12080008	MRC PERMIAN COMPANY	State	New Mexico State Land Office	4202136253261
23S	34E	23	C	LG12080008	MRC PERMIAN COMPANY	State	New Mexico State Land Office	4202136253261
23S	34E	23	D	LG12080008	MRC PERMIAN COMPANY	State	New Mexico State Land Office	4202136253261
23S	34E	23	E	LG12080008	MRC PERMIAN COMPANY	State	New Mexico State Land Office	4202136253261
23S	34E	23	F	LG12080008	MRC PERMIAN COMPANY	State	New Mexico State Land Office	4202136253261
23S	34E	23	G	LG12080008	MRC PERMIAN COMPANY	State	New Mexico State Land Office	4202136253261
23S	34E	23	H	LG12080008	MRC PERMIAN COMPANY	State	New Mexico State Land Office	4202136253261
23S	34E	23	I			Unknown (a)	LIMESTONE BASIN PROP RANCH LLC	4202136465330
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23S	34E	23	K	LG12080008	MRC PERMIAN COMPANY	State	New Mexico State Land Office	4202136253261
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23S	34E	23	P	LG12080008	MRC PERMIAN COMPANY	State	New Mexico State Land Office	4202136253261
23S	34E	24	C	V081450002	ADVANCE ENERGY PARTNERS, LLC	State	New Mexico State Land Office	4203136266265
23S	34E	24	D	V081450002	ADVANCE ENERGY PARTNERS, LLC	State	New Mexico State Land Office	4203136266265
23S	34E	24	E	V081450002	ADVANCE ENERGY PARTNERS, LLC	State	New Mexico State Land Office	4203136266265
23S	34E	24	F	V081450002	ADVANCE ENERGY PARTNERS, LLC	State	New Mexico State Land Office	4203136266265
23S	34E	24	L	NMNM 113416	ADVANCE ENERGY PARTNERS LLC	BLM	New Mexico State Land Office	4203136266265
Notes								
	(a)	See section V in C 108 for details						

Table 3
Produced Water

wellname	api	latitude	longitude	section	township	range	unit	ftgns	ftgew	county	state	ph	tds_mgl	resistivity_ohm_cm	sodium_mgl	calcium_mgl	iron_mgl	magnesium_mgl	manganese_mgl	chloride_mgl	bicarbonate_mgl	sulfate_mgl	co2_mgl
RED BULL 31 STATE #002	3002537069	32.2565651	-103.4023438	31	23S	35E	P	983S	1298E	Lea	NM	6.9	258268.6	0.025	73826.2	19030	31.6	4042	3.31	159864	73.2	490	300
SWEETNESS 30 STATE FED COM #001H	3002541864	32.278347	-103.4042511	30	23S	35E	G	1650N	1887E	Lea	NM	8.5	67516.1	0.095	23558.7	2923.2	0.1	401	0.03	39091.2	732	740	200
NORTH CUSTER MOUNTAI #001	3002521601	32.2810211	-103.3746414	28	23S	35E	C	660N	1980W	LEA	NM		39074							23980	488	465	
SWEETNESS 30 STATE FED COM #001H	3002541864	32.278347	-103.4042511	30	23S	35E	G	1650N	1887E	Lea	NM	5.5			57782	18114	29	2755	3.3	130601	122	920	300
RED BULL 31 STATE #001	3002536798	32.2574463	-103.4067612	31	23S	35E	N	1300S	2610W	Lea	NM	5.69	280094		78620	21967	62	4035		173149	87	385	
RED BULL 31 STATE #002	3002537069	32.2565651	-103.4023438	31	23S	35E	P	983S	1298E	Lea	NM	5.52	271366.2		85907.7	14750	39	2346	4	166106	24	778	280
KELLER 4 STATE #001	3002536643	32.3318176	-103.3762283	4	23S	35E	K	1980S	1475W	Lea	NM	6.9	182379.5		68450.6	846	54	104	1	100659	292.8	10609	
SWEETNESS 30 STATE FED COM #001H	3002541864	32.278347	-103.4042511	30	23S	35E	G	1650N	1887E	Lea	NM	5.5			53792	19065	78	2983	4.34	126850	122	690	220
RED BULL 29 FEDERAL #001H	3002540628	32.2818451	-103.3969345	29	23S	35E	D	375N	375W	Lea	NM	6.3			71207	35626	28	5417	6.2	190774	61	90	120
SWEETNESS 30 STATE FED COM #001H	3002541864	32.278347	-103.4042511	30	23S	35E	G	1650N	1887E	Lea	NM	6			75025	29081	22	4416	4.9	178278	37	380	520
SWEETNESS 30 STATE FED COM #001H	3002541864	32.278347	-103.4042511	30	23S	35E	G	1650N	1887E	Lea	NM	5.8			65779	26380	23	5455	5.6	164000	49	269	880
RIO BLANCO 4 FEDERAL COM #003	3002536425	32.3309593	-103.4718094	4	23S	34E	J	1650S	1650E	Lea	NM	6.1	179000.8		53519.9	12080.6	38.7	1748.7	2.4	109000	122	0	200
BELL LAKE UNIT #006	3002508483	32.3282585	-103.507103	6	23S	34E	O	660S	1980E	LEA	NM	7	71078							42200	500	1000	
BELL LAKE UNIT #002	3002508489	32.2701836	-103.5112457	30	23S	34E	N	660S	3300E	LEA	NM		52115							32200	451	529	
RIO BLANCO 4 FEDERAL COM #003	3002536425	32.3309593	-103.4718094	4	23S	34E	J	1650S	1650E	Lea	NM	7	254017.1	0.025	62818	24835.8	47	4233.5	5.48	160463.8	244	425	1000
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM	6.07	185742	0.034	60151.2	9297	80.6	1501	1.68	113474.4	341.6	560	800
CABALLO 9 STATE #001	3002534577	32.321888	-103.4814224	9	23S	34E	E	1650N	660W	Lea	NM	7.81	71862.4		24399.6	2685.9	462.1	367.8	2.86	42700	576	0	0
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM	6.9	71718.6		23830.8	2540	0	346.3	0	42400	610	170	100
RIO BLANCA 4 FEDERAL COM #001	3002534515	32.3354988	-103.4771652	4	23S	34E	F	1980N	1980W	Lea	NM	6.1	43388.1		13982.1	1697	363	243		25721	207	574	
RIO BLANCA 4 FEDERAL COM #001	3002534515	32.3354988	-103.4771652	4	23S	34E	F	1980N	1980W	Lea	NM	6.1	70316.5		25492.9	1361	7	162		41669	228.1	1011	100
RIO BLANCO 9 STATE #001	3002536302	32.3246078	-103.4733582	9	23S	34E	B	660N	2129E	Lea	NM	5.6	65810.3		15070.8	6754	28	2137		41261	165.9	277	
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM	6.2	71521.1		25245.7	1754	5	255		42308	207.4	1176	75
RIO BLANCA 4 FEDERAL COM #001	3002534515	32.3354988	-103.4771652	4	23S	34E	F	1980N	1980W	Lea	NM	5.7	84267.8		28936.1	2670	64	383		50154	153.7	1230	
RIO BLANCO 9 STATE #001	3002536302	32.3246078	-103.4733582	9	23S	34E	B	660N	2129E	Lea	NM	5.9	83217.6		28207.2	2817	1	493		49511	290.4	1188	
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM	5.8	81393.3		27656.1	2657	9.5	497		48230	331.8	1340	
RIO BLANCA 4 FEDERAL COM #001	3002534515	32.3354988	-103.4771652	4	23S	34E	F	1980N	1980W	Lea	NM	5.9	76404.4		25237.5	2495	1087	329		45259	290.4	1093	
RIO BLANCO 9 STATE #001	3002536302	32.3246078	-103.4733582	9	23S	34E	B	660N	2129E	Lea	NM	5.9	74771.3		25099.8	2724	5	454		44417	311.1	1123	
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM	5.8	72187.8		24914.3	2151	7.5	345		42673	331.8	1198	
RIO BLANCA 4 FEDERAL COM #001	3002534515	32.3354988	-103.4771652	4	23S	34E	F	1980N	1980W	Lea	NM	6.1	74296		25272.2	2538	47	343		44022	456.3	1031	60
RIO BLANCO 9 STATE #001	3002536302	32.3246078	-103.4733582	9	23S	34E	B	660N	2129E	Lea	NM	6	74579		25426.9	2472	33	363		44159	414.8	1112	50
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM	6.1	73515.4		25199.7	2394	22	320		43444	456.3	1134	25
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM	6.6	73741.5		24583.3	2814	5	363	0.2	42853	732	1724	
ANTELOPE RIDGE UNIT #003	3002521082	32.2593155	-103.4610748	34	23S	34E	K	1980S	1650W	LEA	NM	6.9	80187							47900	476	900	
CABALLO 9 STATE #001	3002534577	32.321888	-103.4814224	9	23S	34E	E	1650N	660W	Lea	NM	6.9	70554		22500.6	2476.8	0	337.7	0	42521	732	1299	200
RIO BLANCO 9 STATE #001	3002536302	32.3246078	-103.4733582	9	23S	34E	B	660N	2129E	Lea	NM	6.2	192154		54068.3	13499.7	59.3	1983	2.7	119614	122	943	200
BELL LAKE UNIT #009	3002520261	32.3028488	-103.5110779	18	23S	34E	K	1980S	1980W	LEA	NM		204652							130000	512	260	
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM	7	77292.8		25964.7	2876	1	378	0.08	45890	244	1186	100
MAD DOG 15 FEDERAL COM #001	3002536778	32.299202	-103.4514999	15	23S	34E	P	660S	660E	Lea	NM	8.4	69356		24262.3	1833	4.5	298	0.2	40711	366	1404	20
CABALLO 9 STATE #001	3002534577	32.321888	-103.4814224	9	23S	34E	E	1650N	660W	Lea	NM	7	122402.2		38021	6823	11	1120	1	73600	622.2	1213	300

Table 4 - Chemistry of Produced Water from Formations

wellname	api	section	township	range	unit	county	state	field	formation	depth	samplesource	sampledate	ph	specificgravity	specificgravity_temp_F	tds_mgL	resistivity_ohm_cm	resistivity_ohm_cm_temp_F	conductivity	conductivity_temp_F	sodium_mgL	calcium_mgL	magnesium_mgL	chloride_mgL	bicarbonate_mgL	sulfate_mgL
MCKITTRICK FED #1	3001500135	25	22S	25E	G	EDDY	NM		DEVONIAN		DST					16200							8762	290	1175	
MCKITTRICK FED #1	3001500135	25	22S	25E	G	EDDY	NM		DEVONIAN		DST					17510							9389	664	982	
CARNERO PEAK UT #001	3001510053	31	22S	25E	A	EDDY	NM		DEVONIAN		DST					14601							7236	515	1487	
CARNERO PEAK UT #001	3001510053	31	22S	25E	A	EDDY	NM		DEVONIAN		DST					15780							8126	336	1467	
CARNERO PEAK UT #001	3001510053	31	22S	25E	A	EDDY	NM		DEVONIAN		DST					15580							7853	487	1488	
BANDANA POINT UT #001	3001500044	13	23S	23E	O	EDDY	NM	BANDANA POINT	DEVONIAN		DST					15500							8020	500	1190	
TORTOISE ASB COM #001	3001510490	29	23S	24E	G	EDDY	NM		DEVONIAN		DST					17861							7760	490	3100	
TORTOISE ASB COM #001	3001510490	29	23S	24E	G	EDDY	NM		DEVONIAN		DST					15601							7780	476	1600	
REMUDA BASIN UNIT #001	3001503691	24	23S	29E	J	EDDY	NM	REMUDA	DEVONIAN		SWAB					64582							37500	610	1700	
REMUDA BASIN UNIT #001	3001503691	24	23S	29E	J	EDDY	NM	REMUDA	DEVONIAN		SWAB					56922							29000	1740	4980	
BELL LAKE UNIT #006	3002508483	6	23S	34E	O	LEA	NM	BELL LAKE NORTH	DEVONIAN		HEATER TREATER		7			71078							42200	500	1000	
ANTELOPE RIDGE UNIT #003	3002521082	34	23S	34E	K	LEA	NM	ANTELOPE RIDGE	DEVONIAN		UNKNOWN	14/11/1967 0:00	6,9			80187							47900	476	900	
ANTELOPE RIDGE UNIT #003	3002521082	34	23S	34E	K	LEA	NM	ANTELOPE RIDGE	DEVONIAN		UNKNOWN	14/11/1967 0:00	6,9			80187							47900	476	900	
CLINE FEDERAL #001	3002510717	14	23S	37E	K	LEA	NM	CLINE	DEVONIAN		PRODUCTION TEST					118979							71280	462	2593	
E C HILL B FEDERAL #001	3002510945	34	23S	37E	A	LEA	NM	TEAGUE	DEVONIAN		UNKNOWN					112959							67390	288	2765	
E C HILL D FEDERAL #001	3002510947	34	23S	37E	H	LEA	NM	TEAGUE	DEVONIAN		UNKNOWN					35639										
E C HILL D FEDERAL #004	3002510950	34	23S	37E	A	LEA	NM	TEAGUE	DEVONIAN		UNKNOWN					236252							147000	129	781	
HUAPACHE #003	3001500020	22	24S	22E	F	EDDY	NM		DEVONIAN		DST					3110							48	246	2020	
JURNEGAN POINT #001	3001510280	5	24S	25E	M	EDDY	NM	WILDCAT	DEVONIAN		DST	14/12/1964 0:00	7			229706							136964	198	2511	
JURNEGAN POINT #001	3001510280	5	24S	25E	M	EDDY	NM	WILDCAT	DEVONIAN		DST	14/12/1964 0:00	7			203100							121100	175	2220	
WHITE CITY PENN GAS COM UNIT 1 #001	3001500408	29	24S	26E	A	EDDY	NM		DEVONIAN		DST	01/03/1960 0:00	7	1,012	60		0,36	75	25596	64	6072	1002	132	10120	653	1336
STATE B COM #001	3002509716	36	24S	36E	C	LEA	NM	CUSTER	DEVONIAN		UNKNOWN					176234							107400	128	1004	
ELLIOTT H FEDERAL #001	3002512272	31	24S	38E	H	LEA	NM	DOLLARHIDE	DEVONIAN		WELLHEAD					58687										
ELLIOTT H FEDERAL #001	3002512272	31	24S	38E	H	LEA	NM	DOLLARHIDE	DEVONIAN		WELLHEAD					57018										
WEST DOLLARHIDE DEVONIAN UNIT #104	3002512297	32	24S	38E	I	LEA	NM	DOLLARHIDE	DEVONIAN		WELLHEAD					50858							30200	183	980	
WESTATES FEDERAL #004	3002511389	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		DST	17/06/1961 0:00	6			80880							46200	340	3050	
WESTATES FEDERAL #004	3002511389	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		DST					84900							48600	840	2650	
WESTATES FEDERAL #004	3002511389	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		DST					72200							41000	370	2960	
WESTATES FEDERAL #004	3002511389	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		DST					80900							46200	340	3050	
WESTATES FEDERAL #004	3002511389	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		DST					77600							44000	550	3240	
WESTATES FEDERAL #004	3002511389	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		DST					135000							77000	650	5810	
WESTATES FEDERAL #004	3002511389	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		DST					114000							65000	280	5110	
WESTATES FEDERAL #004	3002511389	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		DST					135000							77000	500	5320	
WESTATES FEDERAL #008	3002511393	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		UNKNOWN					91058							51020	376	4783	
WESTATES FEDERAL #008	3002511393	1	25S	37E	E	LEA	NM	JUSTIS NORTH	FUSSELMAN		UNKNOWN					86847							50450	363	2544	
STATE NJ A #001	3002511398	2	25S	37E	A	LEA	NM	JUSTIS NORTH	DEVONIAN		DST					105350							59300	660	4950	
NEW MEXICO BM STATE #002	3002511407	2	25S	37E	I	LEA	NM	JUSTIS NORTH	MONTOYA		UNKNOWN					77770							45500	1800	2400	
HALE STATE #003	3002512581	2	25S	37E	H	LEA	NM	JUSTIS NORTH	MONTOYA		WELLHEAD					64916							37000	813	2500	
SOUTH JUSTIS UNIT #016F	3002511556	13	25S	37E	F	LEA	NM	JUSTIS	FUSSELMAN		UNKNOWN					57675							34030	595	1211	
LEARCY MCBUFFINGTON #008	3002511569	13	25S	37E	N	LEA	NM	203MNTY, 259FSLM	FUSSELMAN	7052		02/01/1900 0:00	7,6	1,037	78	67909			81429	67		2603	684	38887	742	2489
LEARCY MCBUFFINGTON #008	3002511569	13	25S	37E	N	LEA	NM	JUSTIS	MONTOYA		UNKNOWN					67898							38880	742	2489	
A B COATES C FEDERAL #014	3002511736	24	25S	37E	G	LEA	NM	JUSTIS	MONTOYA		UNKNOWN					39261							22840	871	1030	
SOUTH JUSTIS UNIT #023C	3002511760	25	25S	37E	C	LEA	NM	JUSTIS	FUSSELMAN		SEPARATOR					63817							35870	360	3442	
CARLSON A #002	3002511764	25	25S	37E	I	LEA	NM	JUSTIS	FUSSELMAN		DST					208280							124000	510	3400	
STATE Y #009	3002511777	25	25S	37E	A	LEA	NM	JUSTIS	FUSSELMAN		DST	17/03/1961 0:00	7,3			219570							129000	960	4630	
STATE Y #009	3002511777	25	25S	37E	A	LEA	NM	JUSTIS	FUSSELMAN		DST	18/03/1961 0:00	6,8			163430							96000	290	3780	
CARLSON B 25 #004	3002511784	25	25S	37E	P	LEA	NM	JUSTIS	FUSSELMAN		SEPARATOR					184030							112900	68	1806	
COPPER #001	3002511818	28	25S	37E	J	LEA	NM	CROSBY	DEVONIAN		UNKNOWN					27506							15270	1089	1079	
ARNOTT RAMSAY NCT-B #003	3002511863	32	25S	37E	A	LEA	NM	CROSBY	DEVONIAN	8797		02/01/1900 0:00		1,142	70							17244	5345	100382	476	
ARNOTT RAMSAY NCT-B #003	3002511863	32	25S	37E	A	LEA	NM	CROSBY	DEVONIAN		UNKNOWN					158761										
WEST DOLLARHIDE DEVONIAN UNIT #110	3002512386	5	25S	38E	B	LEA	NM	DOLLARHIDE	DEVONIAN		UNKNOWN					56776										
FARNSWORTH FEDERAL #006	3002511950	4	26S	37E	A	LEA	NM	CROSBY	DEVONIAN		UNKNOWN					31931							20450	302	591	

OSE Well Logs – NO WATER SUPPLY WELLS

XIII. Applicants must complete the "Proof of Notice" section on the reverse side of this form.

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

August 6, 2019

Hobbs News Sun
201 N. Thorp
P.O. Box 850
Hobbs, N.M. 88240

LEGAL NOTICE

AWR Disposal LLC, 3300 N. A Street, Ste. 220, Midland, TX 79705 filed Form C-108 (Application for Authorization to Inject) with the New Mexico Oil Conservation Division seeking administrative approval for a salt water disposal well. The proposed well, the Blue Hole SWD #1 will be located 978 feet from the South line and 2,383 feet from the West line, Section 14, Township 23 South, Range 34 East, Lea County, New Mexico. Produced water from area production will be commercially disposed into the Devonian, Fusselman and Montoya Formations at a depth of 14,462 feet to 16,489 feet at a maximum surface pressure of 3,000 psi and an average injection rate of 30,000 barrels per day. The proposed SWD well is located approximately 24.1 miles southwest of Eunice, New Mexico.

Interested parties wishing to object to the proposed application must file with the New Mexico Oil Conservation Division, 1220 S. St. Francis Dr., Santa Fe, NM 87505 (505) 476-3460 within 15 days of the date of this notice.

Additional information can be obtained by contacting Mr. Randall Hicks, agent for Accelerated Water Resources, LP, at 505-238-9515.

Sincerely,
R.T. Hicks Consultants



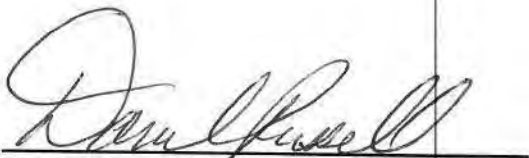
Randall Hicks
Principal

Affidavit of Publication

STATE OF NEW MEXICO
COUNTY OF LEA

I, Daniel Russell, Publisher of the Hobbs News-Sun, a newspaper published at Hobbs, New Mexico, solemnly swear that the clipping attached hereto was published in the regular and entire issue of said newspaper, and not a supplement thereof for a period of 1 issue(s).

Beginning with the issue dated
August 06, 2019
and ending with the issue dated
August 06, 2019.



Publisher

Sworn and subscribed to before me this
6th day of August 2019.

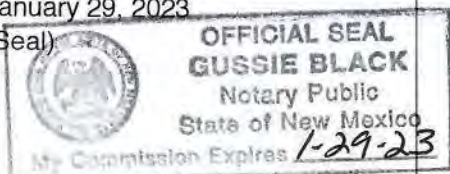


Business Manager

My commission expires

January 29, 2023

(Seal)



This newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Laws of 1937 and payment of fees for said

LEGAL NOTICE AUGUST 6, 2019

AWR Disposal LLC, 3300 N. A Street, Ste. 220, Midland, TX 79705 filed Form C-108 (Application for Authorization to Inject) with the New Mexico Oil Conservation Division seeking administrative approval for a salt water disposal well. The proposed well, the Blue Hole SWD #1 will be located 978 feet from the South line and 2,383 feet from the West line, Section 14, Township 23 South, Range 34 East, Lea County, New Mexico. Produced water from area production will be commercially disposed into the Devonian, Fusselman and Montoya Formations at a depth of 14,462 feet to 16,489 feet at a maximum surface pressure of 3,000 psi and an average injection rate of 30,000 barrels per day. The proposed SWD well is located approximately 24.1 miles southwest of Eunice, New Mexico.

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Additional information can be obtained by contacting Mr. Randall Hicks, agent for Accelerated Water Resources, LP, at 505-238-9515.

Sincerely,
R.T. Hicks Consultants

Randall Hicks
Principal
#34530

67115764

00231754

RANDALL HICKS
R.T. HICKS CONSULTANTS, LTD
901 RIO GRANDE BLVD NM
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
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August 10, 2019

NOTIFICATION TO INTERESTED PARTIES

Via U.S. Certified Mail – Return Receipt Requested

To Whom It May Concern:

AWR Disposal, LLC, Midland, Texas, has made application to the New Mexico Oil Conservation Division to drill and complete, for salt water disposal, the Blue Hole SWD #1. The proposed commercial operation will be for produced water disposal from area operators. As indicated in the notice below, the well is in Section 14, Township 23 South, Range 34 East in Lea County, New Mexico.

The published notice states that the interval will be from 14,462 feet to 16,489 feet into the Devonian, Fusselman and Montoya Formations.

LEGAL NOTICE

AWR Disposal LLC, 3300 N. A Street, Ste. 220, Midland, TX 79705 filed Form C-108 (Application for Authorization to Inject) with the New Mexico Oil Conservation Division seeking administrative approval for a salt water disposal well. The proposed well, the Blue Hole SWD #1 will be located 978 feet from the South line and 2,383 feet from the West line, Section 14, Township 23 South, Range 34 East, Lea County, New Mexico. Produced water from area production will be commercially disposed into the Devonian, Fusselman and Montoya Formations at a depth of 14,462 feet to 16,489 feet at a maximum surface pressure of 3,000 psi and an average injection rate of 30,000 barrels per day. The proposed SWD well is located approximately 24.1 miles southwest of Eunice, New Mexico.

Interested parties wishing to object to the proposed application must file with the New Mexico Oil Conservation Division, 1220 S. St. Francis Dr., Santa Fe, NM 87505 (505) 476-3460 within 15 days of the date of this notice.

You have been identified as a party who may be interested as an offset lessee or operator. **IF YOU WOULD LIKE AN ELECTRONIC COPY OF THE ENTIRE PERMIT PACKAGE, PLEASE SEND YOUR REQUEST TO** david@rthicksconsult.com (request a read receipt to avoid your email becoming stuck in spam).

Thank you for your attention in this matter.

Sincerely,
R.T. Hicks Consultants



Randall Hicks
Principal

OPERATORS, LEASEHOLDERS AND SURFACE OWNERS WITHIN 1 MILE -RADIUS

ADVANCE ENERGY PARTNERS, LLC Blue Hole SWD #1 11490 WESTHEIMER RD STE 950 HOUSTON, TX 77077	BOLD ENERGY, L.P. Blue Hole SWD #1 600 N. MARIENFELD SUITE 1000 MIDLAND, TX 79701	Bureau of Land Management Blue Hole SWD #1 620 E. Greene Street Carlsbad, NM 88220-6292
CAZA OPERATING, LLC Blue Hole SWD #1 200 N LORAIN STE 1550 MIDLAND, TX 79701	CAZA PETROLEUM, LLC. Blue Hole SWD #1 16945 NORTHCHASE DR SUITE 1430 HOUSTON, TX 77060	CENTENNIAL RESOURCE PROD., LLC Blue Hole SWD #1 1001 17th Street, Suite 1800 Denver, CO 80202
COG OPERATING LLC Blue Hole SWD #1 600 W Illinois Ave Midland, TX 79701	DEVON ENERGY PRODUCTION CO Blue Hole SWD #1 333 W. SHERIDAN AVENUE OKLAHOMA CITY, OK 73102	ENDEAVOR ENERGY RESOURCES, LP Blue Hole SWD #1 110 NORTH MARIENFELD SUITE 200 MIDLAND, TX 79701
EOG RESOURCES INC Blue Hole SWD #1 P.O. Box 2267 Midland, TX 79702	EOG Y RESOURCES, INC. Blue Hole SWD #1 104 S 4TH ST ARTESIA, NM 88210	ESTORIL PRODUCING CORP Blue Hole SWD #1 400 W ILLINOIS STE 1600 MIDLAND, TX 79701
J C WILLIAMSON Blue Hole SWD #1 PO BOX 16 MIDLAND, TX 79702	LIMESTONE BASIN PROP RANCH LLC Blue Hole SWD #1 18 DESTA DRIVE MIDLAND, TX 79705	MARATHON OIL PERMIAN LLC Blue Hole SWD #1 5555 SAN FELIPE STREET HOUSTON, TX 77056
MATADOR PRODUCTION COMPANY Blue Hole SWD #1 One Lincoln Centre 5400 LBJ Freeway, Ste 1500 Dallas, TX 75240	MEWBOURNE OIL CO Blue Hole SWD #1 P.O. BOX 7698 TYLER, TX 75711	MRC PERMIAN COMPANY Blue Hole SWD #1 5400 LBJ FREEWAY SUITE 1500 DALLAS, TX 75240
New Mexico State Land Office Blue Hole SWD #1 310 Old Santa Fe Trail Santa Fe, NM 87501	NORTEX CORP Blue Hole SWD #1 100 THROCKMORTON ST STE 400 FORT WORTH, TX 76102	SIANA OIL & GAS CO. Blue Hole SWD #1 12012 WICKCHESTER LANE SUITE 410 HOUSTON, TX 77079
SIANA OPERATING LLC Blue Hole SWD #1 P.O. BOX 10303 MIDLAND, TX 79702	WYNN-CROSBY OPERATING, LP Blue Hole SWD #1 15660 DALLAS PARKWAY SUITE 1175 DALLAS, TX 75248	

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Blue Hole SWD #1

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STE 950

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Blue Hole SWD #1

200 N LORAIN

STE 1550

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J C WILLIAMSON

Blue Hole SWD #1

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MATADOR PRODUCTION COMPANY

Blue Hole SWD #1

One Lincoln Centre

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Dallas, TX 75240

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Blue Hole SWD #1

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Blue Hole SWD #1

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Blue Hole SWD #1

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Blue Hole SWD #1

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Blue Hole SWD #1

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 Blue Hole SWD #1
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 Blue Hole SWD #1
 12012 WICKCHESTER LANE
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 HOUSTON, TX 77079

City, State, ZIP+4® HOUSTON, TX 77079

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August 13, 2019

Mr. Phillip Goetze, P.G.
New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, NM 87505

RE: AWR Disposal LLC Blue Hole SWD #1
UL N, Section 14 T23S R34E, Lea County

Dear Mr. Goetze:

On behalf of AWR Disposal LLC, R.T. Hicks Consultants is providing data and an opinion regarding the probability that injection of wastewater in the above referenced well at the proposed rates will cause seismic events of sufficient magnitude to create damage. It is our understanding that OCD is interested in such an opinion as part of the SWD approval process. We elected to provide this opinion as a separate submission as the C-108 does not specifically require such an opinion.

We relied upon the following data to develop our opinion

- State of stress in the Permian Basin, Texas and New Mexico: Implications for induced seismicity, Jens-Erik Lund Snee and Mark D. Zoback, The Leading Edge, February 2018¹
- Plate 5, which is reproduced from the Snee and Zoback publication, which uses the following references
 - Crone, A. J., and R. L. Wheeler, 2000, Data for Quaternary faults, liquefaction features, and possible tectonic features in the Central and Eastern United States, east of the Rocky Mountain front; U.S. Geological Survey Open-File Report.
 - Ewing, T. E., R. T. Budnik, J. T. Ames, and D. M. Ridner, 1990, Tectonic map of Texas: Bureau of Economic Geology, University of Texas at Austin.
 - Green, G. N., and G. E. Jones, 1997, a digital geologic map of New Mexico in ARC/INFO format: U.S. Geological Survey Open-File Report.
 - Ruppel, S. C., R. H. Jones, C. L. Breton, and J. A. Kane, 2005, Preparation of maps depicting geothermal gradient and Precambrian structure in the Permian Basin: USGS Order no. 04CRSA0834 and Requisition no. 04CRPR01474.
 - NMOCD database of oil and gas wells
- Plate 5, which shows the distribution of active and new SWD wells in the area of the proposed AWR Disposal SWD well
- Stratigraphic and lithologic information from two deep wells in the Delaware Basin
- Data on the thickness and lithology of the Simpson Group from the Texas Bureau of Economic Geology²

¹ https://scits.stanford.edu/sites/default/files/3702_tss_lundsnee_v2.pdf

² http://www.beg.utexas.edu/resprog/permianbasin/PBGSP_members/writ_synth/Simpson.pdf

Plate 5 reproduces Figure 3 of the 2018 publication of Snee and Zoback and shows

1. Fault traces based upon the references provided above for which Dr. Snee and Dr. Zoback provide a value of the fault slip potential (FSP)
2. Areas of documented seismic activity, and a magnitude 2.0-2.9 earthquake that occurred between 1970-2004 about 12 miles southwest of the proposed Blue Hole SWD #1. A slightly larger magnitude and more recent seismic event is reported about 26 miles west of the Blue Hole SWD #1 well location.
3. Although Plate 5 does not show faults that may be identified in confidential seismic data owned by oil and gas operators, the closest mapped basement fault that was re-activated during Woodford time is about 5 miles to the west, exhibits a low FSP (less than 5%) based upon the modeling and analysis of Snee and Zoback referenced above
4. Other mapped faults in southern Lea County shown on Plate 5 also show a low FSP.

Plate 6 reproduces the major elements of Plate 5 in the inset map and also shows that within an 6-mile radius around the proposed Blue Hole SWD #1, the OCD database shows about 3 active and 2 new Devonian SWDs, which translates into an average density of about one SWD for every 22 square miles.

Figure 4 from the referenced Bureau of Economic Geology (The Middle-Upper Ordovician Simpson Group of the Permian Basin: Deposition, Diagenesis, And Reservoir Development) is attached to this letter and the portion of that figure for the Delaware Basin is shown to the right. In southern Lea County the mapped thickness appears to be 500-1500 feet thick (note one contour line appears to be missing on the map). This unit, which is clay-rich carbonate interbedded with shale and sandstone, provides an excellent permeability/pressure barrier between the injection zone and the basement faults that were re-activated during Woodford time.

Data from the Amoco Federal CW Com 1 (3002528119) show that the thickness of the Simpson in the Antelope Ridge area of Lea County (Section 3 24S 34E) is about 450 feet thick with. This is consistent with Figure 4 of the BEG paper (probably because this well was used to produce the isopach map).

We contend that the data permit conclusion that unmapped faults (which may be located by confidential seismic data that AWR Disposal does not possess) near the Blue Hole SWD #1 would be dominantly north-south normal faults, as is common in Lea County. The data on Plate 6 permit a conclusion that faults near the Blue Hole SWD #1 are also most likely to exhibit a low FSP, like the mapped faults shown on Plate 5.



Given the density of Devonian SWDs (planned/new and active) near the proposed Blue Hole SWD #1 well and the high likelihood that any unmapped faults in the area would exhibit a low FSP, the probability that injection into the Blue Hole SWD #1 would cause an increase in pore pressure to trigger a seismic event of sufficient magnitude to cause damage is very low.

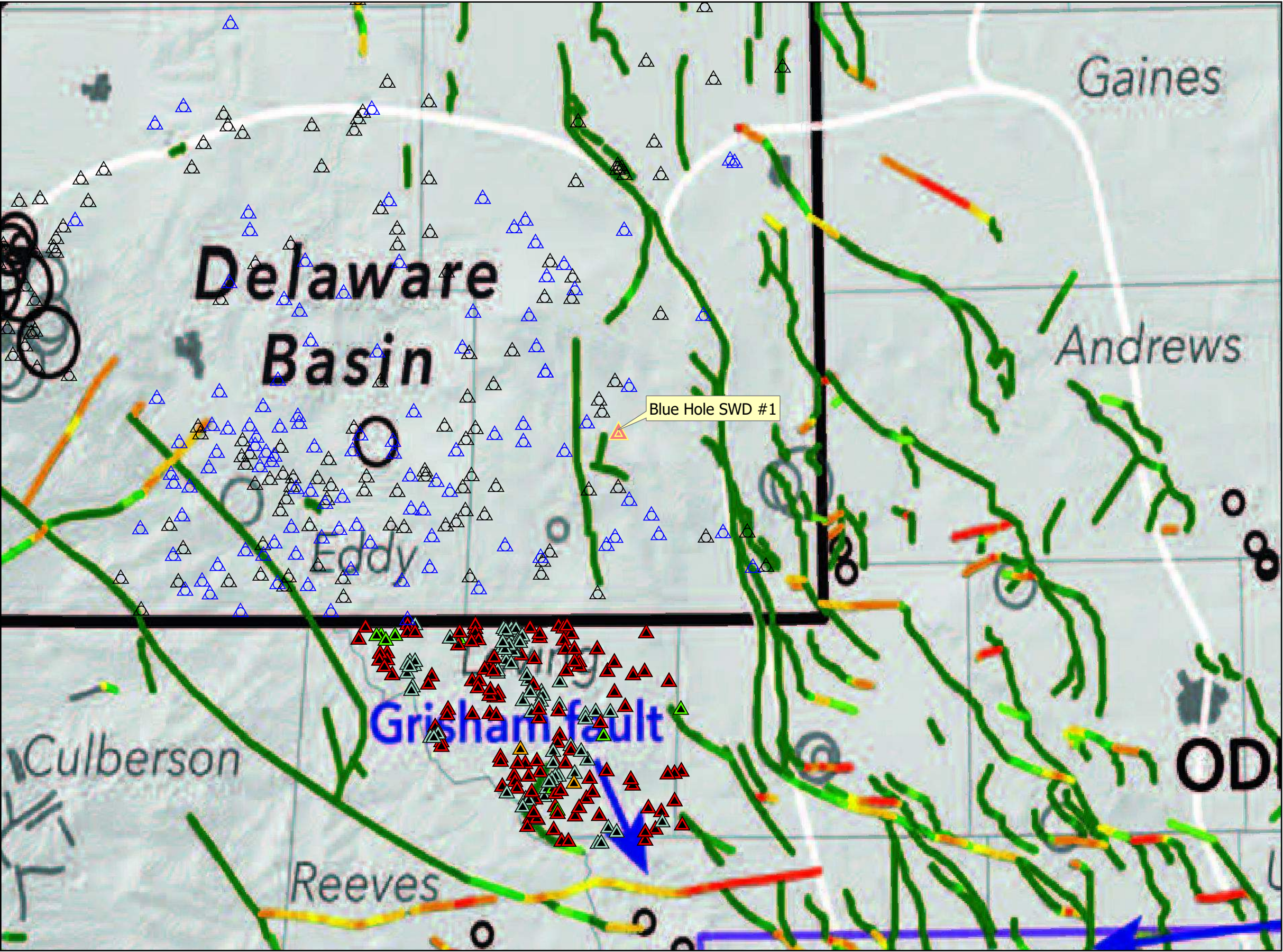
The users of this letter should recognize the uncertainties of using seismic maps of the Permian Basin to determine probability that injection of wastewater into a single SWD well could cause seismic events of sufficient magnitude to cause damage. However, on a regional basis injection by numerous wells into the Devonian/Fusselman/Montoya interval will raise the hydrostatic pressure. If pressure increases sufficiently, fluid could migrate from the injection zone along fault planes, up and down. Downward fluid migration will be intercepted first by the sandstone units of the Simpson Group. After fluid pressure increases in these sandstones, fluid would migrate downward into the Ellenberger Formation, which lies beneath the Simpson Group. This downward migration will next enter the permeable units of the Ellenberger and, over time, increase the fluid pressure. After fluid pressure in the Ellenberger is sufficiently large to cause downward migration along fault planes or other conduits, the migrating fluid will, in some areas, enter a thinner horizon of granite wash. Downward migrating fluids from the injection zone could then enter basement fault planes if the pressure in the granite wash horizon is sufficient, and reduce the frictional resistance (lubricate the faults). Reduction in the frictional force in faults due to fluid invasion can and has caused seismic events. In my opinion, the probability that injection into the Blue Hole SWD will measurably contribute to the events described above and will cause a seismic event resulting in damage is so low as to be nil.

Sincerely,
R.T. Hicks Consultants

A handwritten signature in dark ink, appearing to read "Randall T. Hicks", with a stylized flourish at the end.

Randall T. Hicks
Principal

Copy: AWR Disposal LLC



Seismic and Fault Slip Potential-
Ewing et al. (1990), Green and Jones (1997), Ruppel
et al. (2005), and the USGS Quaternary Faults and
Folds Database (Crone and Wheeler, 2000).



0 5 10
Miles

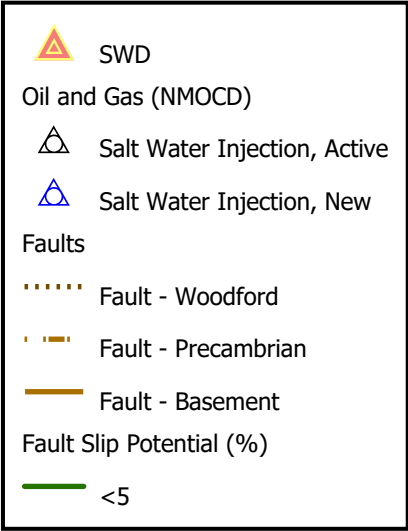
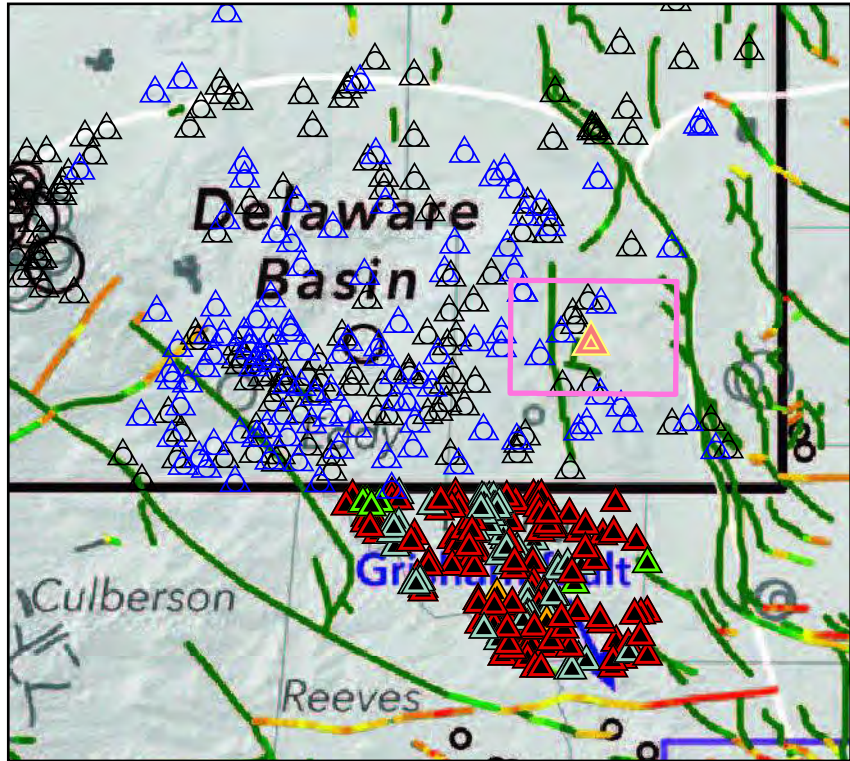
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Ph: 505.266.5004

Seismicity and Fault Slip Potential

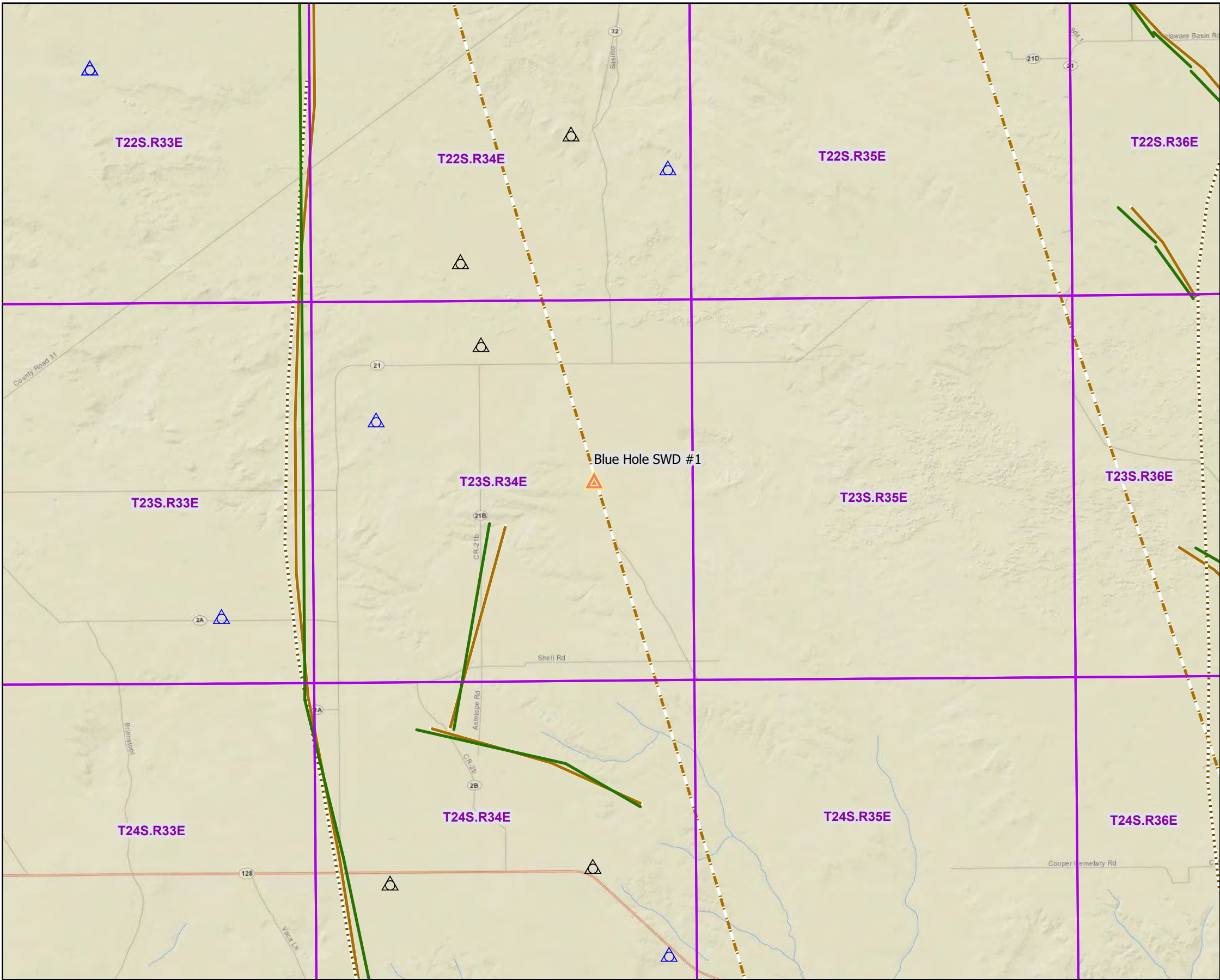
AWR Disposal, LLC
Blue Hole SWD #1

Plate 5

August 2019



Seismic and Fault Slip Potential-
Ewing et al. (1990), Green and Jones (1997), Ruppel
et al. (2005), and the USGS Quaternary Faults and
Folds Database (Crone and Wheeler, 2000).



0 2 4 Miles

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

Fault Slip Potential

AWR Disposal, LLC
Blue Hole SWD #1

Plate 6

August 2019