



Directional Survey Data

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MAY 07 2019

DISTRICT 11 ARTESIA O.C.D.

Well Name HH CE 35 2 FED 006 1H	Lease HH CE 35 2 Fed 006	Field Name Purple Sage	Business Unit Mid-Continent	Latitude (°) 32° 5' 8.61" N	Longitude (°) 104° 9' 11.754" W	Surface UWI 3001544347	Surface ChevNo PM0784
Wellbore Name Original Hole	Wellbore UWI 300154434700	Wellbore ChevNo PM0784-00	Directional Type Vertical	Min Kick Off Depth (ftOTH)	Min Kick Off Depth (TVD) (ftOTH)	Total Depth of Wellbore (ftOTH) 10,629.00	Date TD Reached (wellbore)

Bottom Hole Location							
Northing (Y) (ft)	Easting (X) (ft)		UTM Grid Zone	Latitude (°)	Longitude (°)		Closure Direction (°) 185.85

Directional Surveys			
Description MWD	Planned? N	Definitive? N	Note Correction

Survey Company	Date	MD (ftOTH)	TVD (ftOTH)	Incl (°)	Azm (°)	VS (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Build (°/100ft)	Turn (°/100ft)
Phoenix Directional	3/15/2018	138	138.00	0.40	124.34	0.23	-0.27	0.40	0.29	0.29	90.10
Phoenix Directional	3/15/2018	324	323.98	1.18	118.16	1.27	-1.54	2.62	0.42	0.42	-3.32
Phoenix Directional	3/15/2018	452	451.94	1.74	100.81	1.93	-2.53	5.69	0.55	0.44	-13.55
Phoenix Directional	3/15/2018	594	593.87	1.93	92.07	1.96	-3.02	10.20	0.24	0.13	-6.15
Phoenix Directional	3/15/2018	688	687.85	0.33	317.53	1.68	-2.88	11.60	2.31	-1.70	-143.13
Phoenix Directional	3/15/2018	783	782.84	1.07	282.41	1.40	-2.48	10.55	0.87	0.78	-36.97
Phoenix Directional	3/15/2018	878	877.83	0.74	282.84	1.22	-2.16	9.08	0.35	-0.35	0.45
Phoenix Directional	3/15/2018	973	972.83	0.43	296.71	1.02	-1.86	8.17	0.36	-0.33	14.60
Phoenix Directional	3/15/2018	1,058	1,057.82	0.16	316.92	0.83	-1.63	7.80	0.34	-0.32	23.78
Phoenix Directional	3/15/2018	1,152	1,151.82	1.13	284.49	0.60	-1.30	6.81	1.06	1.03	-34.50
Phoenix Directional	3/15/2018	1,247	1,246.79	1.50	288.41	0.19	-0.68	4.73	0.40	0.39	4.13
Phoenix Directional	3/15/2018	1,342	1,341.76	1.42	290.46	-0.38	0.13	2.45	0.10	-0.08	2.16
Phoenix Directional	3/15/2018	1,437	1,436.74	0.95	292.87	-0.90	0.85	0.62	0.50	-0.49	2.54
Phoenix Directional	3/15/2018	1,532	1,531.73	0.70	299.12	-1.36	1.43	-0.62	0.28	-0.26	6.58
Phoenix Directional	3/15/2018	1,627	1,626.73	0.32	15.24	-1.86	1.97	-1.05	0.73	-0.40	80.13
Phoenix Directional	3/15/2018	1,722	1,721.72	1.06	72.90	-2.46	2.49	-0.14	0.98	0.78	60.69
Phoenix Directional	3/15/2018	1,816	1,815.70	1.15	51.01	-3.46	3.34	1.42	0.46	0.10	-23.29
Phoenix Directional	3/15/2018	1,910	1,909.69	1.24	328.92	-4.94	4.80	1.63	1.67	0.10	-87.33
Phoenix Directional	3/15/2018	2,004	2,003.67	1.15	340.42	-6.61	6.56	0.79	0.27	-0.10	12.23
Phoenix Directional	3/15/2018	2,099	2,098.64	1.60	313.37	-8.28	8.37	-0.50	0.82	0.47	-28.47
Phoenix Directional	3/15/2018	2,194	2,193.53	3.75	302.55	-10.48	10.95	-4.08	2.31	2.26	-11.39
Phoenix Directional	3/15/2018	2,288	2,287.18	6.17	281.96	-12.40	13.65	-11.61	3.16	2.57	-21.90
Phoenix Directional	3/15/2018	2,382	2,380.41	8.45	277.95	-13.19	15.66	-23.40	2.48	2.43	-4.27
Phoenix Directional	3/15/2018	2,477	2,474.04	10.98	277.48	-13.70	17.80	-39.28	2.66	2.66	-0.49
Phoenix Directional	3/15/2018	2,571	2,566.01	12.88	281.96	-15.07	21.14	-58.41	2.25	2.02	4.77
Phoenix Directional	3/15/2018	2,666	2,658.64	12.77	283.34	-17.57	25.75	-78.98	0.34	-0.12	1.45
Phoenix Directional	3/15/2018	2,760	2,750.32	12.76	283.16	-20.24	30.51	-99.20	0.04	-0.01	-0.19
Phoenix Directional	3/15/2018	2,854	2,842.01	12.67	284.16	-23.05	35.40	-119.30	0.25	-0.10	1.06
Phoenix Directional	3/15/2018	2,948	2,933.79	12.30	284.18	-25.99	40.37	-139.01	0.39	-0.39	0.02
Phoenix Directional	3/15/2018	3,043	3,026.63	12.15	284.27	-28.92	45.32	-158.51	0.16	-0.16	0.09
Phoenix Directional	3/15/2018	3,137	3,118.67	11.36	276.42	-30.47	48.79	-177.30	1.90	-0.84	-8.35
Phoenix Directional	3/15/2018	3,231	3,210.92	10.80	273.34	-30.17	50.34	-195.29	0.87	-0.60	-3.28
Phoenix Directional	3/15/2018	3,325	3,303.27	10.65	273.32	-29.40	51.35	-212.75	0.16	-0.16	-0.02
Phoenix Directional	3/15/2018	3,420	3,396.61	10.86	277.00	-29.19	52.95	-230.40	0.76	0.22	3.87
Phoenix Directional	3/15/2018	3,515	3,489.86	11.12	278.89	-29.86	55.46	-248.33	0.47	0.27	1.99



Directional Survey Data

Survey Data												
Survey Company	Date	MD (ft)	TVD (ft)	Incl (°)	Azm (°)	VS (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Build (°/100ft)	Turn (°/100ft)	
Phoenix Directional	3/15/2018	3,609	3,582.12	11.02	278.90	-30.82	58.25	-266.16	0.11	-0.11	0.01	
Phoenix Directional	3/15/2018	3,704	3,675.43	10.59	276.71	-31.43	60.68	-283.80	0.63	-0.45	-2.31	
Phoenix Directional	3/15/2018	3,799	3,768.73	11.14	283.43	-32.77	63.83	-301.40	1.45	0.58	7.07	
Phoenix Directional	3/15/2018	3,894	3,862.00	10.78	284.76	-35.36	68.22	-318.92	0.46	-0.38	1.40	
Phoenix Directional	3/15/2018	3,989	3,955.28	11.06	281.50	-37.63	72.30	-336.44	0.71	0.29	-3.43	
Phoenix Directional	3/15/2018	4,085	4,049.46	11.26	281.35	-39.44	75.98	-354.65	0.21	0.21	-0.16	
Phoenix Directional	3/15/2018	4,180	4,142.68	10.97	280.57	-41.07	79.47	-372.63	0.34	-0.31	-0.82	
Phoenix Directional	3/15/2018	4,275	4,235.96	10.86	281.10	-42.63	82.85	-390.30	0.16	-0.12	0.56	
Phoenix Directional	3/15/2018	4,369	4,328.21	11.33	280.22	-44.15	86.19	-408.08	0.53	0.50	-0.94	
Phoenix Directional	3/15/2018	4,464	4,421.42	10.92	280.09	-45.53	89.42	-426.12	0.43	-0.43	-0.14	
Phoenix Directional	3/15/2018	4,559	4,514.80	10.27	279.50	-46.73	92.40	-443.33	0.69	-0.68	-0.62	
Phoenix Directional	3/15/2018	4,654	4,608.15	11.11	279.89	-47.91	95.37	-460.70	0.89	0.88	0.41	
Phoenix Directional	3/15/2018	4,748	4,700.43	10.83	279.98	-49.19	98.45	-478.32	0.30	-0.30	0.10	
Phoenix Directional	3/15/2018	4,843	4,793.79	10.50	280.06	-50.47	101.51	-495.63	0.35	-0.35	0.08	
Phoenix Directional	3/15/2018	4,938	4,887.20	10.49	278.28	-51.47	104.27	-512.71	0.34	-0.01	-1.87	
Phoenix Directional	3/15/2018	5,033	4,980.40	11.84	277.94	-52.19	106.86	-530.92	1.42	1.42	-0.36	
Phoenix Directional	3/15/2018	5,128	5,073.41	11.66	278.55	-53.00	109.63	-550.07	0.23	-0.19	0.64	
Phoenix Directional	3/15/2018	5,223	5,166.50	11.39	279.01	-53.97	112.53	-568.83	0.30	-0.28	0.48	
Phoenix Directional	3/15/2018	5,318	5,259.67	11.12	277.85	-54.80	115.25	-587.17	0.37	-0.28	-1.22	
Phoenix Directional	3/15/2018	5,412	5,351.96	10.74	277.30	-55.34	117.60	-604.84	0.42	-0.40	-0.59	
Phoenix Directional	3/15/2018	5,507	5,445.34	10.50	277.70	-55.85	119.89	-622.19	0.26	-0.25	0.42	
Phoenix Directional	3/15/2018	5,601	5,537.86	9.81	276.37	-56.19	121.92	-638.64	0.78	-0.73	-1.41	
Phoenix Directional	3/15/2018	5,696	5,631.52	9.49	279.66	-56.79	124.13	-654.40	0.67	-0.34	3.46	
Phoenix Directional	3/15/2018	5,791	5,725.28	9.06	281.44	-58.04	126.93	-669.46	0.54	-0.45	1.87	
Phoenix Directional	3/15/2018	5,886	5,819.23	8.01	281.50	-59.42	129.74	-683.27	1.11	-1.11	0.06	
Phoenix Directional	3/15/2018	5,981	5,913.50	6.11	289.04	-61.22	132.70	-694.54	2.22	-2.00	7.94	
Phoenix Directional	3/15/2018	6,076	6,008.08	4.63	288.42	-63.21	135.57	-702.96	1.56	-1.56	-0.65	
Phoenix Directional	3/15/2018	6,171	6,102.82	3.88	278.88	-64.22	137.27	-709.77	1.08	-0.79	-10.04	
Phoenix Directional	3/15/2018	6,266	6,197.68	2.37	281.47	-64.58	138.16	-714.87	1.60	-1.59	2.73	
Phoenix Directional	3/15/2018	6,361	6,292.64	0.96	322.90	-65.35	139.19	-717.28	1.86	-1.48	43.61	
Phoenix Directional	3/15/2018	6,456	6,387.62	1.38	319.10	-66.72	140.69	-718.51	0.45	0.44	-4.00	
Phoenix Directional	3/15/2018	6,550	6,481.59	1.33	302.56	-67.99	142.13	-720.17	0.42	-0.05	-17.60	
Phoenix Directional	3/15/2018	6,645	6,576.58	0.93	16.69	-69.24	143.46	-720.88	1.47	-0.42	78.03	
Phoenix Directional	3/15/2018	6,740	6,671.56	1.19	6.37	-70.98	145.18	-720.54	0.34	0.27	-10.86	
Phoenix Directional	3/15/2018	6,834	6,765.54	1.20	24.27	-72.89	147.05	-720.03	0.40	0.01	19.04	
Phoenix Directional	3/15/2018	6,929	6,860.50	2.30	50.73	-75.19	149.16	-718.15	1.41	1.16	27.85	
Phoenix Directional	3/15/2018	7,023	6,954.42	2.28	45.64	-77.96	151.66	-715.35	0.22	-0.02	-5.41	
Phoenix Directional	3/15/2018	7,118	7,049.36	1.77	26.54	-80.78	154.29	-713.34	0.88	-0.54	-20.11	
Phoenix Directional	3/15/2018	7,213	7,144.33	1.02	15.52	-82.99	156.42	-712.46	0.83	-0.79	-11.60	
Phoenix Directional	3/15/2018	7,308	7,239.32	0.83	28.65	-84.46	157.84	-711.91	0.30	-0.20	13.82	
Phoenix Directional	3/15/2018	7,403	7,334.32	0.59	59.04	-85.39	158.70	-711.16	0.46	-0.25	31.99	
Phoenix Directional	3/15/2018	7,497	7,428.31	0.70	77.89	-85.85	159.07	-710.18	0.25	0.12	20.05	
Phoenix Directional	3/15/2018	7,592	7,523.30	0.89	113.11	-85.81	158.90	-708.93	0.54	0.20	37.07	



Directional Survey Data

Survey Data												
Survey Company	Date	MD (ft)	TVD (ft)	Incl (°)	Azm (°)	VS (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Build (°/100ft)	Turn (°/100ft)	
Phoenix Directional	3/15/2018	7,687	7,618.29	1.11	122.41	-85.18	158.11	-707.48	0.29	0.23	9.79	
Phoenix Directional	3/15/2018	7,782	7,713.27	1.12	117.41	-84.43	157.19	-705.88	0.10	0.01	-5.26	
Phoenix Directional	3/15/2018	7,877	7,808.25	1.06	109.59	-83.88	156.47	-704.22	0.17	-0.06	-8.23	
Phoenix Directional	3/16/2018	7,971	7,902.23	1.16	109.20	-83.45	155.87	-702.51	0.11	0.11	-0.41	
Phoenix Directional	3/16/2018	8,066	7,997.21	1.15	115.68	-82.91	155.14	-700.74	0.14	-0.01	6.82	
Phoenix Directional	3/16/2018	8,161	8,092.20	0.61	129.39	-82.31	154.40	-699.49	0.61	-0.57	14.43	
Phoenix Directional	3/16/2018	8,256	8,187.20	0.11	161.07	-81.94	154.00	-699.07	0.55	-0.53	33.35	
Phoenix Directional	3/16/2018	8,351	8,282.20	0.26	200.99	-81.65	153.71	-699.12	0.20	0.16	42.02	
Phoenix Directional	3/16/2018	8,540	8,471.19	0.68	158.74	-80.24	152.26	-698.86	0.27	0.22	-22.35	
Phoenix Directional	3/16/2018	8,634	8,565.19	0.64	167.98	-79.24	151.23	-698.55	0.12	-0.04	9.83	
Phoenix Directional	3/16/2018	8,729	8,660.19	0.27	205.22	-78.53	150.51	-698.54	0.48	-0.39	39.20	
Phoenix Directional	3/16/2018	8,823	8,754.18	0.26	202.91	-78.11	150.11	-698.71	0.02	-0.01	-2.46	
Phoenix Directional	3/16/2018	8,918	8,849.18	0.40	189.14	-77.58	149.59	-698.85	0.17	0.15	-14.49	
Phoenix Directional	3/16/2018	9,013	8,944.18	0.61	188.14	-76.74	148.76	-698.98	0.22	0.22	-1.05	
Phoenix Directional	3/16/2018	9,107	9,038.17	0.45	216.13	-75.92	147.97	-699.26	0.32	-0.17	29.78	
Phoenix Directional	3/16/2018	9,201	9,132.17	0.39	204.21	-75.30	147.38	-699.61	0.11	-0.06	-12.68	
Phoenix Directional	3/16/2018	9,283	9,214.17	0.46	202.34	-74.72	146.82	-699.85	0.09	0.09	-2.28	
Phoenix Directional	3/22/2018	9,389	9,320.17	0.55	227.39	-73.93	146.08	-700.39	0.22	0.08	23.63	
Phoenix Directional	3/22/2018	9,483	9,414.16	0.64	192.41	-73.07	145.26	-700.83	0.39	0.10	-37.21	
Phoenix Directional	3/22/2018	9,578	9,509.16	0.64	211.43	-72.07	144.29	-701.22	0.22	0.00	20.02	
Phoenix Directional	3/22/2018	9,673	9,604.15	0.78	234.59	-71.16	143.46	-702.03	0.33	0.15	24.38	
Phoenix Directional	3/22/2018	9,768	9,699.13	1.21	244.38	-70.21	142.65	-703.46	0.49	0.45	10.31	
Phoenix Directional	3/22/2018	9,862	9,793.10	1.69	246.35	-69.01	141.67	-705.62	0.51	0.51	2.10	
Phoenix Directional	3/22/2018	9,957	9,888.07	1.38	238.38	-67.62	140.51	-707.88	0.40	-0.33	-8.39	
Phoenix Directional	3/22/2018	10,051	9,982.04	1.62	228.77	-65.96	139.04	-709.84	0.37	0.26	-10.22	
Phoenix Directional	3/23/2018	10,146	10,077.00	1.72	227.66	-63.92	137.19	-711.91	0.11	0.11	-1.17	
Phoenix Directional	3/23/2018	10,241	10,171.96	1.45	223.05	-61.90	135.35	-713.78	0.31	-0.28	-4.85	
Phoenix Directional	3/23/2018	10,335	10,265.93	1.61	225.55	-59.93	133.56	-715.54	0.18	0.17	2.66	
Phoenix Directional	3/23/2018	10,430	10,360.90	1.20	226.38	-58.15	131.94	-717.21	0.43	-0.43	0.87	
Phoenix Directional	3/23/2018	10,525	10,455.88	1.11	220.18	-56.63	130.55	-718.52	0.16	-0.09	-6.53	
Phoenix Directional	3/24/2018	10,571	10,501.87	1.35	223.48	-55.84	129.82	-719.18	0.54	0.52	7.17	
Phoenix Directional	3/24/2018	10,629	10,559.85	1.35	223.48	-54.76	128.82	-720.12	0.00	0.00	0.00	



Directional Survey Data

Well Name HH CE 35 2 FED 006 1H	Lease HH CE 35 2 Fed 006	Field Name Purple Sage	Business Unit Mid-Continent	Latitude (°) 32° 5' 8.61" N	Longitude (°) 104° 9' 11.754" W	Surface UWI 3001544347	Surface ChevNo PM0784
Wellbore Name Sidetrack	Wellbore UWI 300154434701	Wellbore ChevNo PM0784-01	Directional Type Horizontal	Min Kick Off Depth (ftOTH) 9,593.0	Min Kick Off Depth (TVD) (ftOTH) 12,195.00	Total Depth of Wellbore (ftOTH) 12,195.00	Date TD Reached (wellbore)

Bottom Hole Location							
Northing (Y) (ft)	Eastings (X) (ft)	UTM Grid Zone	Latitude (°)	Longitude (°)	Closure Direction (°) 185.85		

Directional Surveys			
Description MWD ST01	Planned? N	Definitive? N	Note Correction

Survey Data											
Survey Company	Date	MD (ftOTH)	TVD (ftOTH)	Incl (°)	Azm (°)	VS (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Build (°/100ft)	Turn (°/100ft)
Phoenix Directional	3/27/2018	9,673	9,604.14	0.78	234.59	-71.16	143.46	-702.03	0.00	0.00	0.00
Phoenix Directional	3/30/2018	9,720	9,650.94	8.93	190.01	-67.30	139.68	-702.93	17.86	17.34	-94.85
Phoenix Directional	3/30/2018	9,768	9,697.86	15.16	189.97	-57.32	129.82	-704.66	12.98	12.98	-0.08
Phoenix Directional	3/31/2018	9,815	9,742.52	21.01	188.73	-42.76	115.42	-707.01	12.47	12.45	-2.64
Phoenix Directional	3/31/2018	9,863	9,786.23	27.67	184.18	-23.00	95.78	-709.13	14.40	13.88	-9.48
Phoenix Directional	3/31/2018	9,910	9,826.67	33.54	181.00	0.87	71.89	-710.15	12.95	12.49	-6.77
Phoenix Directional	3/31/2018	9,962	9,868.96	37.59	181.62	31.01	41.66	-710.85	7.82	7.79	1.19
Phoenix Directional	3/31/2018	10,009	9,905.38	40.80	182.52	60.64	11.98	-711.93	6.94	6.83	1.91
Phoenix Directional	3/31/2018	10,056	9,940.49	42.54	183.38	91.85	-19.22	-713.54	3.90	3.70	1.83
Phoenix Directional	3/31/2018	10,104	9,975.85	42.56	183.46	124.28	-51.62	-715.48	0.12	0.04	0.17
Phoenix Directional	3/31/2018	10,151	10,009.69	45.31	180.94	156.81	-84.20	-716.71	6.93	5.85	-5.36
Phoenix Directional	3/31/2018	10,198	10,042.68	45.52	180.38	190.15	-117.67	-717.10	0.96	0.45	-1.19
Phoenix Directional	3/31/2018	10,245	10,075.56	45.70	179.80	223.57	-151.26	-717.15	0.96	0.38	-1.23
Phoenix Directional	3/31/2018	10,293	10,107.61	50.49	179.77	259.08	-186.97	-717.02	9.98	9.98	-0.06
Phoenix Directional	3/31/2018	10,341	10,136.49	55.50	180.41	297.21	-225.29	-717.08	10.49	10.44	1.33
Phoenix Directional	3/31/2018	10,388	10,161.69	59.66	180.54	336.70	-264.96	-717.41	8.85	8.85	0.28
Phoenix Directional	4/1/2018	10,437	10,184.28	65.39	180.81	379.98	-308.41	-717.93	11.70	11.69	0.55
Phoenix Directional	4/1/2018	10,484	10,202.38	69.31	181.32	423.19	-351.77	-718.74	8.40	8.34	1.09
Phoenix Directional	4/1/2018	10,532	10,217.54	73.86	181.36	468.58	-397.29	-719.80	9.48	9.48	0.08
Phoenix Directional	4/1/2018	10,579	10,228.52	79.11	181.47	514.13	-442.95	-720.93	11.17	11.17	0.23
Phoenix Directional	4/1/2018	10,627	10,234.13	87.45	183.39	561.67	-490.54	-722.96	17.82	17.38	4.00
Phoenix Directional	4/2/2018	10,743	10,238.93	87.81	181.15	677.34	-606.34	-727.55	1.95	0.31	-1.93
Phoenix Directional	4/2/2018	10,837	10,240.41	90.38	181.06	770.99	-700.30	-729.36	2.74	2.73	-0.10
Phoenix Directional	4/3/2018	11,027	10,234.16	93.39	181.55	960.27	-890.13	-733.68	1.61	1.58	0.26
Phoenix Directional	4/3/2018	11,121	10,232.85	88.21	182.69	1,054.03	-984.02	-737.16	5.64	-5.51	1.21
Phoenix Directional	4/3/2018	11,216	10,234.94	89.27	182.68	1,148.86	-1,078.89	-741.61	1.12	1.12	-0.01
Phoenix Directional	4/3/2018	11,311	10,237.85	87.22	182.19	1,243.64	-1,173.76	-745.64	2.22	-2.16	-0.52
Phoenix Directional	4/3/2018	11,406	10,239.65	90.61	182.45	1,338.43	-1,268.65	-749.49	3.58	3.57	0.27
Phoenix Directional	4/4/2018	11,500	10,238.20	91.16	181.32	1,432.19	-1,362.58	-752.58	1.34	0.59	-1.20
Phoenix Directional	4/4/2018	11,594	10,236.70	90.67	180.88	1,525.86	-1,456.55	-754.38	0.70	-0.52	-0.47
Phoenix Directional	4/4/2018	11,689	10,237.00	88.96	180.08	1,620.44	-1,551.55	-755.18	1.99	-1.80	-0.84
Phoenix Directional	4/4/2018	11,785	10,235.31	93.06	179.79	1,715.89	-1,647.51	-755.07	4.28	4.27	-0.30
Phoenix Directional	4/4/2018	11,880	10,232.00	90.94	179.44	1,810.27	-1,742.44	-754.43	2.26	-2.23	-0.37
Phoenix Directional	4/4/2018	11,975	10,230.58	90.77	178.39	1,904.56	-1,837.42	-752.63	1.12	-0.18	-1.11
Phoenix Directional	4/5/2018	12,069	10,225.81	95.05	178.48	1,997.63	-1,931.24	-750.07	4.55	4.55	0.10



Directional Survey Data

Survey Data											
Survey Company	Date	MD (ft)	TVD (ft)	Incl (°)	Azm (°)	VS (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Build (°/100ft)	Turn (°/100ft)
Phoenix Directional	4/5/2018	12,195	10,214.72	95.05	178.48	2,122.10	-2,056.70	-746.74	0.00	0.00	0.00



Directional Survey Data

Well Name HH CE 35 2 FED 006 1H	Lease HH CE 35 2 Fed 006	Field Name Purple Sage	Business Unit Mid-Continent	Latitude (") 32° 5' 8.61" N	Longitude (") 104° 9' 11.754" W	Surface UWI 3001544347	Surface ChevNo PM0784
Wellbore Name Sidetrack 2	Wellbore UWI 300154434702	Wellbore ChevNo PM0784-02	Directional Type Horizontal	Min Kick Off Depth (ftOTH) 11,735.0	Min Kick Off Depth (TVD) (ftOTH) 10,238.6	Total Depth of Wellbore (ftOTH) 17,850.00	Date TD Reached (wellbore)

Bottom Hole Location							
Northing (Y) (ft)	Easting (X) (ft)	UTM Grid Zone	Latitude (")	Longitude (")	Closure Direction (")	185.85	

Directional Surveys			
Description MWD BP01	Planned? N	Definitive? N	Note Correction

Survey Company	Date	MD (ftOTH)	TVD (ftOTH)	Incl (")	Azm (")	VS (ft)	NS (ft)	EW (ft)	DLS ("/100ft)	Build ("/100ft)	Turn ("/100ft)
Phoenix Directional	4/8/2018	11,689	10,237.00	88.96	180.08	1,620.44	-1,551.55	-755.18	0.00	0.00	0.00
Phoenix Directional	4/8/2018	11,748	10,239.35	86.47	179.62	1,679.07	-1,610.50	-755.03	4.29	-4.22	-0.78
Phoenix Directional	4/8/2018	11,780	10,242.16	83.48	181.73	1,710.81	-1,642.37	-755.40	11.42	-9.34	6.59
Phoenix Directional	4/9/2018	11,823	10,246.92	83.81	183.71	1,753.48	-1,685.05	-757.43	4.64	0.77	4.60
Phoenix Directional	4/9/2018	11,870	10,252.15	83.41	183.71	1,800.15	-1,731.66	-760.45	0.85	-0.85	0.00
Phoenix Directional	4/9/2018	11,918	10,256.94	85.13	182.83	1,847.86	-1,779.34	-763.17	4.02	3.58	-1.83
Phoenix Directional	4/9/2018	12,013	10,262.03	88.73	183.00	1,942.59	-1,874.07	-768.00	3.79	3.79	0.18
Phoenix Directional	4/9/2018	12,108	10,260.38	93.25	183.49	2,037.45	-1,968.88	-773.37	4.79	4.76	0.52
Phoenix Directional	4/9/2018	12,164	10,257.44	92.77	183.88	2,093.33	-2,024.68	-776.97	1.10	-0.86	0.70
Phoenix Directional	4/9/2018	12,259	10,253.80	91.63	181.77	2,188.12	-2,119.49	-781.64	2.52	-1.20	-2.22
Phoenix Directional	4/9/2018	12,353	10,251.27	91.45	181.24	2,281.82	-2,213.42	-784.11	0.60	-0.19	-0.56
Phoenix Directional	4/9/2018	12,448	10,248.43	91.98	181.07	2,376.46	-2,308.36	-786.03	0.59	0.56	-0.18
Phoenix Directional	4/9/2018	12,543	10,245.94	91.02	180.53	2,471.05	-2,403.32	-787.35	1.16	-1.01	-0.57
Phoenix Directional	4/9/2018	12,638	10,243.20	92.29	178.38	2,565.42	-2,498.27	-786.45	2.63	1.34	-2.26
Phoenix Directional	4/9/2018	12,733	10,239.51	92.16	178.58	2,659.56	-2,593.16	-783.93	0.25	-0.14	0.21
Phoenix Directional	4/9/2018	12,828	10,236.95	90.92	179.31	2,753.83	-2,688.11	-782.18	1.51	-1.31	0.77
Phoenix Directional	4/9/2018	12,923	10,237.11	88.89	177.60	2,848.04	-2,783.07	-779.62	2.79	-2.14	-1.80
Phoenix Directional	4/9/2018	13,018	10,237.88	90.18	178.21	2,942.12	-2,878.00	-776.15	1.50	1.36	0.64
Phoenix Directional	4/9/2018	13,113	10,235.21	93.05	180.45	3,036.45	-2,972.94	-775.04	3.83	3.02	2.36
Phoenix Directional	4/9/2018	13,208	10,230.85	92.21	179.79	3,130.87	-3,067.84	-775.24	1.12	-0.88	-0.69
Phoenix Directional	4/9/2018	13,303	10,234.82	82.99	175.75	3,224.73	-3,162.56	-771.56	10.59	-9.71	-4.25
Phoenix Directional	4/9/2018	13,398	10,243.89	86.05	174.99	3,317.71	-3,256.80	-763.93	3.32	3.22	-0.80
Phoenix Directional	4/9/2018	13,492	10,247.85	89.13	174.78	3,409.90	-3,350.34	-755.55	3.28	3.28	-0.22
Phoenix Directional	4/9/2018	13,587	10,247.84	90.88	177.95	3,503.58	-3,445.13	-749.53	3.81	1.84	3.34
Phoenix Directional	4/9/2018	13,683	10,244.32	93.32	178.83	3,598.70	-3,541.02	-746.84	2.70	2.54	0.92
Phoenix Directional	4/9/2018	13,778	10,241.06	90.61	177.67	3,692.80	-3,635.91	-743.94	3.10	-2.85	-1.22
Phoenix Directional	4/9/2018	13,872	10,238.32	92.73	179.08	3,785.95	-3,729.82	-741.27	2.71	2.26	1.50
Phoenix Directional	4/9/2018	13,967	10,234.33	92.09	177.93	3,880.09	-3,824.70	-738.79	1.38	-0.67	-1.21
Phoenix Directional	4/9/2018	14,062	10,231.23	91.65	178.07	3,974.15	-3,919.60	-735.48	0.49	-0.46	0.15
Phoenix Directional	4/9/2018	14,157	10,229.59	90.33	179.40	4,068.40	-4,014.55	-733.38	1.97	-1.39	1.40
Phoenix Directional	4/9/2018	14,251	10,228.68	90.78	179.66	4,161.82	-4,108.55	-732.61	0.55	0.48	0.28
Phoenix Directional	4/9/2018	14,346	10,230.09	87.51	179.18	4,256.20	-4,203.52	-731.65	3.48	-3.44	-0.51
Phoenix Directional	4/9/2018	14,441	10,233.59	88.27	179.53	4,350.52	-4,298.45	-730.58	0.88	0.80	0.37
Phoenix Directional	4/9/2018	14,536	10,237.07	87.53	179.01	4,444.83	-4,393.37	-729.37	0.95	-0.78	-0.55
Phoenix Directional	4/9/2018	14,631	10,240.13	88.78	179.64	4,539.17	-4,488.32	-728.26	1.47	1.32	0.66



Directional Survey Data

Survey Data											
Survey Company	Date	MD (ftOTH)	TVD (ftOTH)	Incl (°)	Azm (°)	VS (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Build (°/100ft)	Turn (°/100ft)
Phoenix Directional	4/9/2018	14,725	10,240.78	90.43	180.45	4,632.68	-4,582.31	-728.33	1.96	1.76	0.86
Phoenix Directional	4/9/2018	14,821	10,236.21	95.03	180.57	4,728.13	-4,678.17	-729.18	4.79	4.79	0.13
Phoenix Directional	4/9/2018	14,915	10,226.98	96.24	180.24	4,821.25	-4,771.71	-729.84	1.33	1.29	-0.35
Phoenix Directional	4/9/2018	15,010	10,215.57	97.55	180.55	4,915.13	-4,866.02	-730.49	1.42	1.38	0.33
Phoenix Directional	4/9/2018	15,104	10,206.40	93.65	181.07	5,008.31	-4,959.54	-731.82	4.19	-4.15	0.55
Phoenix Directional	4/9/2018	15,199	10,200.71	93.22	180.20	5,102.74	-5,054.37	-732.87	1.02	-0.45	-0.92
Phoenix Directional	4/9/2018	15,295	10,194.87	93.76	179.66	5,198.05	-5,150.19	-732.75	0.79	0.56	-0.56
Phoenix Directional	4/9/2018	15,390	10,187.54	95.09	181.02	5,292.33	-5,244.90	-733.31	2.00	1.40	1.43
Phoenix Directional	4/9/2018	15,485	10,181.49	92.21	182.30	5,386.87	-5,339.65	-736.06	3.32	-3.03	1.35
Phoenix Directional	4/9/2018	15,579	10,176.11	94.35	183.35	5,480.58	-5,433.38	-740.68	2.54	2.28	1.12
Phoenix Directional	4/9/2018	15,675	10,168.95	94.21	184.06	5,576.24	-5,528.91	-746.87	0.75	-0.15	0.74
Phoenix Directional	4/9/2018	15,770	10,163.12	92.82	184.06	5,671.01	-5,623.49	-753.58	1.46	-1.46	0.00
Phoenix Directional	4/9/2018	15,865	10,162.19	88.30	184.01	5,765.94	-5,718.23	-760.27	4.76	-4.76	-0.05
Phoenix Directional	4/9/2018	15,960	10,164.97	88.35	184.63	5,860.86	-5,812.92	-767.42	0.65	0.05	0.65
Phoenix Directional	4/9/2018	16,055	10,172.75	82.25	182.92	5,955.43	-5,907.34	-773.66	6.67	-6.42	-1.80
Phoenix Directional	4/9/2018	16,150	10,182.59	85.86	182.49	6,049.76	-6,001.71	-778.11	3.83	3.80	-0.45
Phoenix Directional	4/9/2018	16,245	10,188.32	87.22	181.88	6,144.39	-6,096.47	-781.73	1.57	1.43	-0.64
Phoenix Directional	4/9/2018	16,340	10,193.49	86.54	179.75	6,238.88	-6,191.31	-783.08	2.35	-0.72	-2.24
Phoenix Directional	4/9/2018	16,435	10,198.44	87.49	179.79	6,333.22	-6,286.18	-782.70	1.00	1.00	0.04
Phoenix Directional	4/9/2018	16,530	10,201.61	88.69	179.44	6,427.60	-6,381.12	-782.06	1.32	1.26	-0.37
Phoenix Directional	4/9/2018	16,625	10,203.27	89.30	178.33	6,521.88	-6,476.09	-780.21	1.33	0.64	-1.17
Phoenix Directional	4/9/2018	16,720	10,205.43	88.10	176.25	6,615.79	-6,570.95	-775.72	2.53	-1.26	-2.19
Phoenix Directional	4/9/2018	16,815	10,207.05	89.95	175.41	6,709.33	-6,665.68	-768.81	2.14	1.95	-0.88
Phoenix Directional	4/9/2018	16,910	10,205.08	92.42	175.93	6,802.80	-6,760.38	-761.64	2.66	2.60	0.55
Phoenix Directional	4/9/2018	17,005	10,200.33	93.31	177.25	6,896.45	-6,855.09	-756.00	1.67	0.94	1.39
Phoenix Directional	4/9/2018	17,099	10,195.19	92.96	178.42	6,989.39	-6,948.88	-752.45	1.30	-0.37	1.24
Phoenix Directional	4/9/2018	17,194	10,191.37	91.65	179.29	7,083.60	-7,043.78	-750.56	1.65	-1.38	0.92
Phoenix Directional	4/9/2018	17,289	10,191.34	88.39	179.25	7,177.96	-7,138.76	-749.35	3.43	-3.43	-0.04
Phoenix Directional	4/9/2018	17,384	10,194.31	88.02	179.18	7,272.28	-7,233.71	-748.05	0.40	-0.39	-0.07
Phoenix Directional	4/9/2018	17,479	10,197.43	88.22	178.21	7,366.49	-7,328.63	-745.88	1.04	0.21	-1.02
Phoenix Directional	4/9/2018	17,574	10,204.01	83.83	177.33	7,460.29	-7,423.30	-742.20	4.71	-4.62	-0.93
Phoenix Directional	4/9/2018	17,669	10,214.74	83.21	176.86	7,553.59	-7,517.58	-737.42	0.82	-0.65	-0.49
Phoenix Directional	4/9/2018	17,764	10,227.37	81.51	176.88	7,646.59	-7,611.59	-732.27	1.79	-1.79	0.02
Phoenix Directional	4/9/2018	17,850	10,240.06	81.51	176.88	7,730.60	-7,696.52	-727.64	0.00	0.00	0.00