

VERDAD RESOURCES

WATTENBERG FIELD

ARNOLD 02N-64W-24

HELEN 24-9H

Wellbore #1

Plan: Design #1

Standard Planning Report

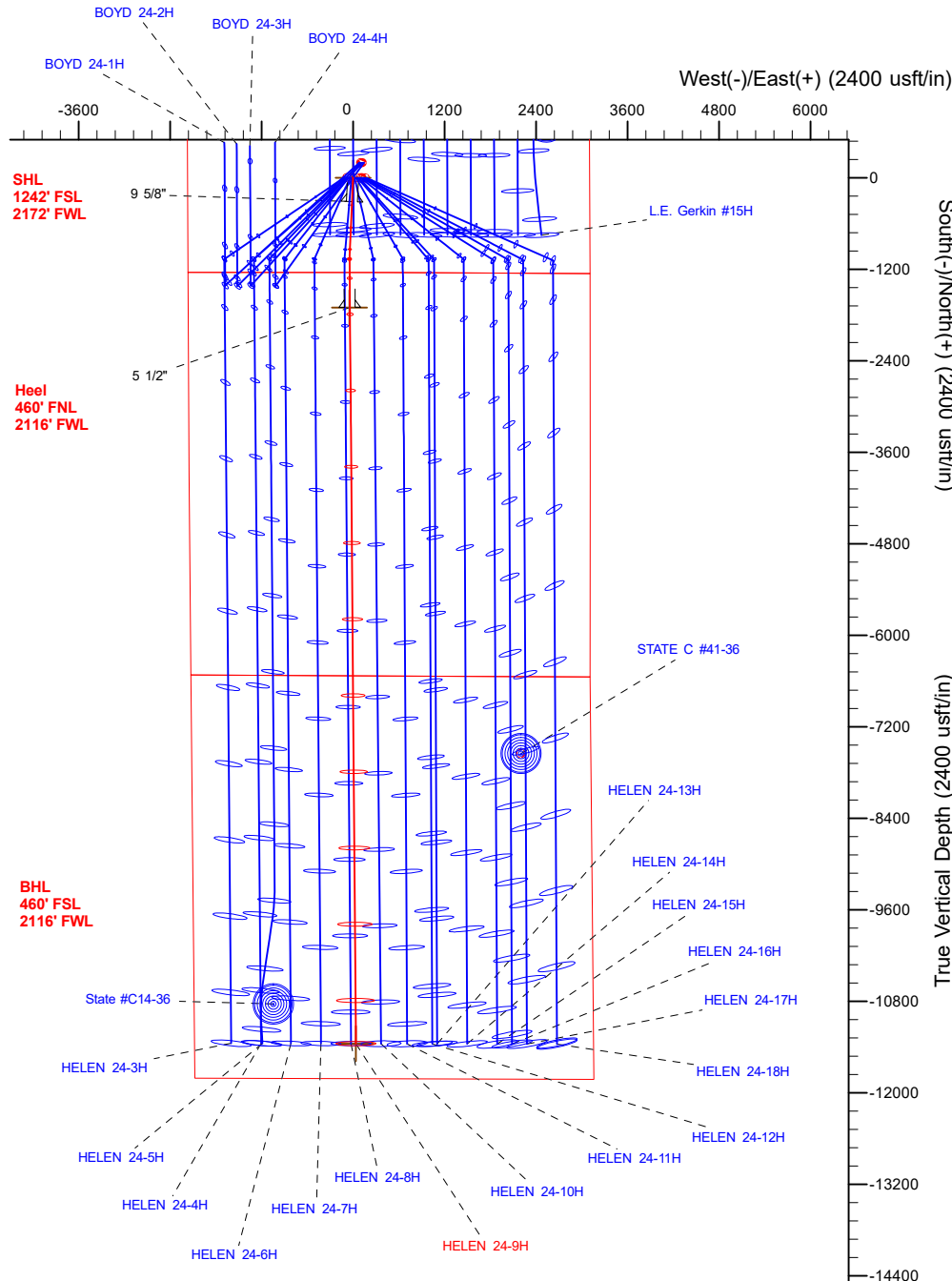
02 November, 2017

Project: WATTENBERG FIELD
Site: ARNOLD 02N-64W-24
Well: HELEN 24-9H
Wellbore: Wellbore #1
Design: Design #1

VERDAD RESOURCES

CASING DETAILS

TVD	MD	Name	Size
1700.00	1740.40	9 5/8"	9-5/8
7000.00	7509.69	5 1/2"	5-1/2

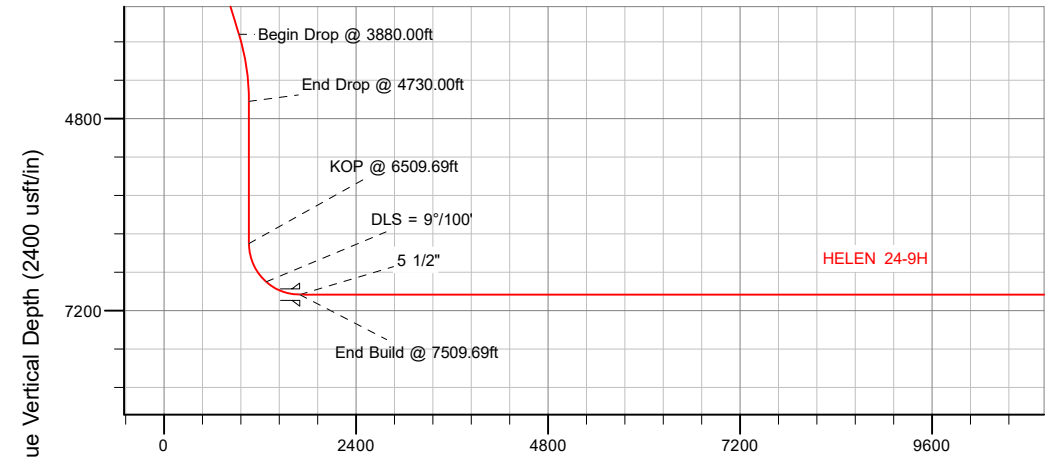


SECTION DETAILS

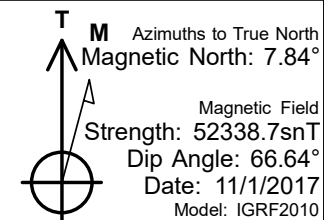
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00	
3	1100.00	17.00	182.50	1087.58	-125.06	-5.46	2.00	182.50	125.01	
4	3880.00	17.00	182.50	3746.11	-937.08	-40.91	0.00	0.00	936.71	
5	4730.00	0.00	0.00	4583.69	-1062.14	-46.37	2.00	180.00	1061.72	
6	6509.69	0.00	0.00	6363.38	-1062.14	-46.37	0.00	0.00	1061.72	
7	7509.69	90.00	179.53	7000.00	-1698.74	-41.19	9.00	179.53	1698.34	
8	17165.45	90.00	179.53	7000.00	-11354.18	37.49	0.00	0.00	11354.10	HELEN 24-9H_BHL

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
HELEN 24-9H_SHL	0.00	0.00	0.00	40.120055	-104.501365
HELEN 24-9H_BHL	7000.00	-11354.18	37.49	40.088886	-104.501231



Vertical Section at 179.53° (2400 usft/in)



WELL DETAILS: HELEN 24-9H

GL = 4924'

RKB = 20' @ 4944.00usft (Drilling Rig)

Plan: Design #1 (HELEN 24-9H/Wellbore #1)

Created By: _____ Date: 11/03/2017
Reviewed: _____ Date: _____

Project	WATTENBERG FIELD		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site	ARNOLD 02N-64W-24				
Site Position:		Northing:	1,288,352.76 usft	Latitude:	40.120602
From:	Lat/Long	Easting:	3,279,352.74 usft	Longitude:	-104.501071
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.65 °

Well	HELEN 24-9H					
Well Position	+N/-S	-199.27 usft	Northing:	1,288,152.58 usft	Latitude:	40.120055
	+E/-W	-82.22 usft	Easting:	3,279,272.77 usft	Longitude:	-104.501365
Position Uncertainty		3.28 usft	Wellhead Elevation:		Ground Level:	4,924.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/1/2017	7.84	66.64	52,338.73394319

Design	Design #1				
Audit Notes:					
Version:		Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:		Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
		0.00	0.00	0.00	179.53

Plan Survey Tool Program	Date	11/1/2017			
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.00	1,700.00	Design #1 (Wellbore #1)	ISCWSA REV 2 MWD Fixed:v2:standard declination	
2	1,700.00	17,165.45	Design #1 (Wellbore #1)	ISCWSA REV 2 MWD Fixed:v2:standard declination	

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,100.00	17.00	182.50	1,087.58	-125.06	-5.46	2.00	2.00	0.00	182.50	
3,880.00	17.00	182.50	3,746.11	-937.08	-40.91	0.00	0.00	0.00	0.00	
4,730.00	0.00	0.00	4,583.69	-1,062.14	-46.37	2.00	-2.00	0.00	180.00	
6,509.69	0.00	0.00	6,363.38	-1,062.14	-46.37	0.00	0.00	0.00	0.00	
7,509.69	90.00	179.53	7,000.00	-1,698.74	-41.19	9.00	9.00	17.95	179.53	
17,165.45	90.00	179.53	7,000.00	-11,354.18	37.49	0.00	0.00	0.00	0.00	HELEN 24-9H_BHL

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	
250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00	0.00	
Begin Nudge @ 250.00ft										
300.00	1.00	182.50	300.00	-0.44	-0.02	0.44	2.00	2.00	0.00	
400.00	3.00	182.50	399.93	-3.92	-0.17	3.92	2.00	2.00	0.00	
500.00	5.00	182.50	499.68	-10.89	-0.48	10.89	2.00	2.00	0.00	
600.00	7.00	182.50	599.13	-21.33	-0.93	21.33	2.00	2.00	0.00	
700.00	9.00	182.50	698.15	-35.24	-1.54	35.22	2.00	2.00	0.00	
800.00	11.00	182.50	796.63	-52.58	-2.30	52.56	2.00	2.00	0.00	
900.00	13.00	182.50	894.44	-73.35	-3.20	73.33	2.00	2.00	0.00	
1,000.00	15.00	182.50	991.46	-97.52	-4.26	97.48	2.00	2.00	0.00	
1,100.00	17.00	182.50	1,087.58	-125.06	-5.46	125.01	2.00	2.00	0.00	
End Nudge @ 1100.00ft										
1,200.00	17.00	182.50	1,183.21	-154.27	-6.74	154.21	0.00	0.00	0.00	
1,300.00	17.00	182.50	1,278.84	-183.48	-8.01	183.41	0.00	0.00	0.00	
1,400.00	17.00	182.50	1,374.47	-212.69	-9.29	212.60	0.00	0.00	0.00	
1,500.00	17.00	182.50	1,470.11	-241.90	-10.56	241.80	0.00	0.00	0.00	
1,600.00	17.00	182.50	1,565.74	-271.11	-11.84	271.00	0.00	0.00	0.00	
1,700.00	17.00	182.50	1,661.37	-300.31	-13.11	300.20	0.00	0.00	0.00	
1,740.40	17.00	182.50	1,700.00	-312.11	-13.63	311.99	0.00	0.00	0.00	
9 5/8"										
1,800.00	17.00	182.50	1,757.00	-329.52	-14.39	329.39	0.00	0.00	0.00	
1,900.00	17.00	182.50	1,852.63	-358.73	-15.66	358.59	0.00	0.00	0.00	
2,000.00	17.00	182.50	1,948.26	-387.94	-16.94	387.79	0.00	0.00	0.00	
2,100.00	17.00	182.50	2,043.89	-417.15	-18.21	416.99	0.00	0.00	0.00	
2,200.00	17.00	182.50	2,139.52	-446.36	-19.49	446.19	0.00	0.00	0.00	
2,300.00	17.00	182.50	2,235.15	-475.57	-20.76	475.38	0.00	0.00	0.00	
2,400.00	17.00	182.50	2,330.78	-504.78	-22.04	504.58	0.00	0.00	0.00	
2,500.00	17.00	182.50	2,426.41	-533.99	-23.31	533.78	0.00	0.00	0.00	
2,600.00	17.00	182.50	2,522.04	-563.20	-24.59	562.98	0.00	0.00	0.00	
2,700.00	17.00	182.50	2,617.67	-592.41	-25.87	592.18	0.00	0.00	0.00	
2,800.00	17.00	182.50	2,713.30	-621.62	-27.14	621.37	0.00	0.00	0.00	
2,900.00	17.00	182.50	2,808.93	-650.83	-28.42	650.57	0.00	0.00	0.00	
3,000.00	17.00	182.50	2,904.56	-680.04	-29.69	679.77	0.00	0.00	0.00	
3,100.00	17.00	182.50	3,000.19	-709.25	-30.97	708.97	0.00	0.00	0.00	
3,200.00	17.00	182.50	3,095.82	-738.45	-32.24	738.17	0.00	0.00	0.00	
3,300.00	17.00	182.50	3,191.45	-767.66	-33.52	767.36	0.00	0.00	0.00	
3,400.00	17.00	182.50	3,287.08	-796.87	-34.79	796.56	0.00	0.00	0.00	
3,500.00	17.00	182.50	3,382.71	-826.08	-36.07	825.76	0.00	0.00	0.00	
3,600.00	17.00	182.50	3,478.35	-855.29	-37.34	854.96	0.00	0.00	0.00	
3,700.00	17.00	182.50	3,573.98	-884.50	-38.62	884.15	0.00	0.00	0.00	
3,800.00	17.00	182.50	3,669.61	-913.71	-39.89	913.35	0.00	0.00	0.00	
3,880.00	17.00	182.50	3,746.11	-937.08	-40.91	936.71	0.00	0.00	0.00	
Begin Drop @ 3880.00ft										
3,900.00	16.60	182.50	3,765.26	-942.85	-41.17	942.48	2.00	-2.00	0.00	
4,000.00	14.60	182.50	3,861.57	-969.72	-42.34	969.34	2.00	-2.00	0.00	
4,100.00	12.60	182.50	3,958.76	-993.21	-43.36	992.82	2.00	-2.00	0.00	
4,200.00	10.60	182.50	4,056.71	-1,013.30	-44.24	1,012.90	2.00	-2.00	0.00	
4,300.00	8.60	182.50	4,155.31	-1,029.96	-44.97	1,029.55	2.00	-2.00	0.00	
4,400.00	6.60	182.50	4,254.42	-1,043.17	-45.55	1,042.76	2.00	-2.00	0.00	
4,500.00	4.60	182.50	4,353.94	-1,052.92	-45.97	1,052.51	2.00	-2.00	0.00	
4,600.00	2.60	182.50	4,453.74	-1,059.19	-46.25	1,058.78	2.00	-2.00	0.00	
4,700.00	0.60	182.50	4,553.69	-1,061.98	-46.37	1,061.56	2.00	-2.00	0.00	
4,730.00	0.00	0.00	4,583.69	-1,062.14	-46.37	1,061.72	2.00	-2.00	591.67	
End Drop @ 4730.00ft										
4,800.00	0.00	0.00	4,653.69	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00	
4,900.00	0.00	0.00	4,753.69	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00	
5,000.00	0.00	0.00	4,853.69	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00	
5,100.00	0.00	0.00	4,953.69	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00	
5,200.00	0.00	0.00	5,053.69	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00	
5,300.00	0.00	0.00	5,153.69	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00	
5,400.00	0.00	0.00	5,253.69	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00	
5,500.00	0.00	0.00	5,353.69	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00	
5,600.00	0.00	0.00	5,453.69	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00	

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,700.00	0.00	0.00	5,553.69	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00
5,800.00	0.00	0.00	5,653.69	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00
5,900.00	0.00	0.00	5,753.69	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00
6,000.00	0.00	0.00	5,853.69	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00
6,100.00	0.00	0.00	5,953.69	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00
6,200.00	0.00	0.00	6,053.69	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00
6,300.00	0.00	0.00	6,153.69	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00
6,400.00	0.00	0.00	6,253.69	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00
6,509.69	0.00	0.00	6,363.38	-1,062.14	-46.37	1,061.72	0.00	0.00	0.00
KOP @ 6509.69ft									
6,550.00	3.63	179.53	6,403.67	-1,063.41	-46.36	1,063.00	9.00	9.00	0.00
6,600.00	8.13	179.53	6,453.39	-1,068.53	-46.32	1,068.12	9.00	9.00	0.00
6,650.00	12.63	179.53	6,502.56	-1,077.54	-46.25	1,077.12	9.00	9.00	0.00
6,700.00	17.13	179.53	6,550.87	-1,090.37	-46.14	1,089.95	9.00	9.00	0.00
6,750.00	21.63	179.53	6,598.03	-1,106.96	-46.01	1,106.54	9.00	9.00	0.00
6,800.00	26.13	179.53	6,643.74	-1,127.19	-45.84	1,126.77	9.00	9.00	0.00
6,850.00	30.63	179.53	6,687.72	-1,150.95	-45.65	1,150.53	9.00	9.00	0.00
6,900.00	35.13	179.53	6,729.70	-1,178.08	-45.43	1,177.67	9.00	9.00	0.00
6,950.00	39.63	179.53	6,769.42	-1,208.43	-45.18	1,208.01	9.00	9.00	0.00
7,000.00	44.13	179.53	6,806.64	-1,241.79	-44.91	1,241.38	9.00	9.00	0.00
7,050.00	48.63	179.53	6,841.12	-1,277.98	-44.62	1,277.57	9.00	9.00	0.00
DLS = 9°/100'									
7,100.00	53.13	179.53	6,872.67	-1,316.76	-44.30	1,316.35	9.00	9.00	0.00
7,150.00	57.63	179.53	6,901.07	-1,357.89	-43.96	1,357.48	9.00	9.00	0.00
7,200.00	62.13	179.53	6,926.15	-1,401.13	-43.61	1,400.72	9.00	9.00	0.00
7,250.00	66.63	179.53	6,947.77	-1,446.20	-43.24	1,445.79	9.00	9.00	0.00
7,300.00	71.13	179.53	6,965.78	-1,492.82	-42.86	1,492.42	9.00	9.00	0.00
7,350.00	75.63	179.53	6,980.08	-1,540.72	-42.47	1,540.32	9.00	9.00	0.00
7,400.00	80.13	179.53	6,990.58	-1,589.59	-42.08	1,589.19	9.00	9.00	0.00
7,450.00	84.63	179.53	6,997.21	-1,639.13	-41.67	1,638.74	9.00	9.00	0.00
7,500.00	89.13	179.53	6,999.93	-1,689.05	-41.27	1,688.65	9.00	9.00	0.00
7,509.69	90.00	179.53	7,000.00	-1,698.74	-41.19	1,698.34	9.00	9.00	0.00
End Build @ 7509.69ft - 5 1/2"									
7,600.00	90.00	179.53	7,000.00	-1,789.04	-40.45	1,788.65	0.00	0.00	0.00
7,700.00	90.00	179.53	7,000.00	-1,889.04	-39.64	1,888.65	0.00	0.00	0.00
7,800.00	90.00	179.53	7,000.00	-1,989.04	-38.82	1,988.65	0.00	0.00	0.00
7,900.00	90.00	179.53	7,000.00	-2,089.03	-38.01	2,088.65	0.00	0.00	0.00
8,000.00	90.00	179.53	7,000.00	-2,189.03	-37.19	2,188.65	0.00	0.00	0.00
8,100.00	90.00	179.53	7,000.00	-2,289.03	-36.38	2,288.65	0.00	0.00	0.00
8,200.00	90.00	179.53	7,000.00	-2,389.02	-35.56	2,388.65	0.00	0.00	0.00
8,300.00	90.00	179.53	7,000.00	-2,489.02	-34.75	2,488.65	0.00	0.00	0.00
8,400.00	90.00	179.53	7,000.00	-2,589.02	-33.93	2,588.65	0.00	0.00	0.00
8,500.00	90.00	179.53	7,000.00	-2,689.01	-33.12	2,688.65	0.00	0.00	0.00
8,600.00	90.00	179.53	7,000.00	-2,789.01	-32.30	2,788.65	0.00	0.00	0.00
8,700.00	90.00	179.53	7,000.00	-2,889.01	-31.49	2,888.65	0.00	0.00	0.00
8,800.00	90.00	179.53	7,000.00	-2,989.00	-30.67	2,988.65	0.00	0.00	0.00
8,900.00	90.00	179.53	7,000.00	-3,089.00	-29.86	3,088.65	0.00	0.00	0.00
9,000.00	90.00	179.53	7,000.00	-3,189.00	-29.04	3,188.65	0.00	0.00	0.00
9,100.00	90.00	179.53	7,000.00	-3,288.99	-28.23	3,288.65	0.00	0.00	0.00
9,200.00	90.00	179.53	7,000.00	-3,388.99	-27.41	3,388.65	0.00	0.00	0.00
9,300.00	90.00	179.53	7,000.00	-3,488.99	-26.60	3,488.65	0.00	0.00	0.00
9,400.00	90.00	179.53	7,000.00	-3,588.98	-25.78	3,588.65	0.00	0.00	0.00
9,500.00	90.00	179.53	7,000.00	-3,688.98	-24.97	3,688.65	0.00	0.00	0.00
9,600.00	90.00	179.53	7,000.00	-3,788.98	-24.15	3,788.65	0.00	0.00	0.00
9,700.00	90.00	179.53	7,000.00	-3,888.97	-23.34	3,888.65	0.00	0.00	0.00
9,800.00	90.00	179.53	7,000.00	-3,988.97	-22.52	3,988.65	0.00	0.00	0.00
9,900.00	90.00	179.53	7,000.00	-4,088.97	-21.71	4,088.65	0.00	0.00	0.00
10,000.00	90.00	179.53	7,000.00	-4,188.96	-20.89	4,188.65	0.00	0.00	0.00
10,100.00	90.00	179.53	7,000.00	-4,288.96	-20.08	4,288.65	0.00	0.00	0.00
10,200.00	90.00	179.53	7,000.00	-4,388.96	-19.27	4,388.65	0.00	0.00	0.00
10,300.00	90.00	179.53	7,000.00	-4,488.95	-18.45	4,488.65	0.00	0.00	0.00
10,400.00	90.00	179.53	7,000.00	-4,588.95	-17.64	4,588.65	0.00	0.00	0.00
10,500.00	90.00	179.53	7,000.00	-4,688.95	-16.82	4,688.65	0.00	0.00	0.00
10,600.00	90.00	179.53	7,000.00	-4,788.94	-16.01	4,788.65	0.00	0.00	0.00
10,700.00	90.00	179.53	7,000.00	-4,888.94	-15.19	4,888.65	0.00	0.00	0.00
10,800.00	90.00	179.53	7,000.00	-4,988.94	-14.38	4,988.65	0.00	0.00	0.00

Casing Points					
	Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
	1,740.40	1,700.00	9 5/8"	9-5/8	13-1/2
	7,509.69	7,000.00	5 1/2"	5-1/2	8-1/2

Plan Annotations					
	Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		
			+N/-S (usft)	+E/-W (usft)	Comment
	250.00	250.00	0.00	0.00	Begin Nudge @ 250.00ft
	1,100.00	1,087.58	-125.06	-5.46	End Nudge @ 1100.00ft
	3,880.00	3,746.11	-937.08	-40.91	Begin Drop @ 3880.00ft
	4,730.00	4,583.69	-1,062.14	-46.37	End Drop @ 4730.00ft
	6,509.69	6,363.38	-1,062.14	-46.37	KOP @ 6509.69ft
	7,050.00	6,841.12	-1,277.98	-44.62	DLS = 9°/100'
	7,509.69	7,000.00	-1,698.74	-41.19	End Build @ 7509.69ft
	17,165.45	7,000.00	-11,354.18	37.49	TD Well @ 17165.45ft

VERDAD RESOURCES

WATTENBERG FIELD

ARNOLD 02N-64W-24

HELEN 24-9H

Wellbore #1

Design #1

Anticollision Summary Report

02 November, 2017

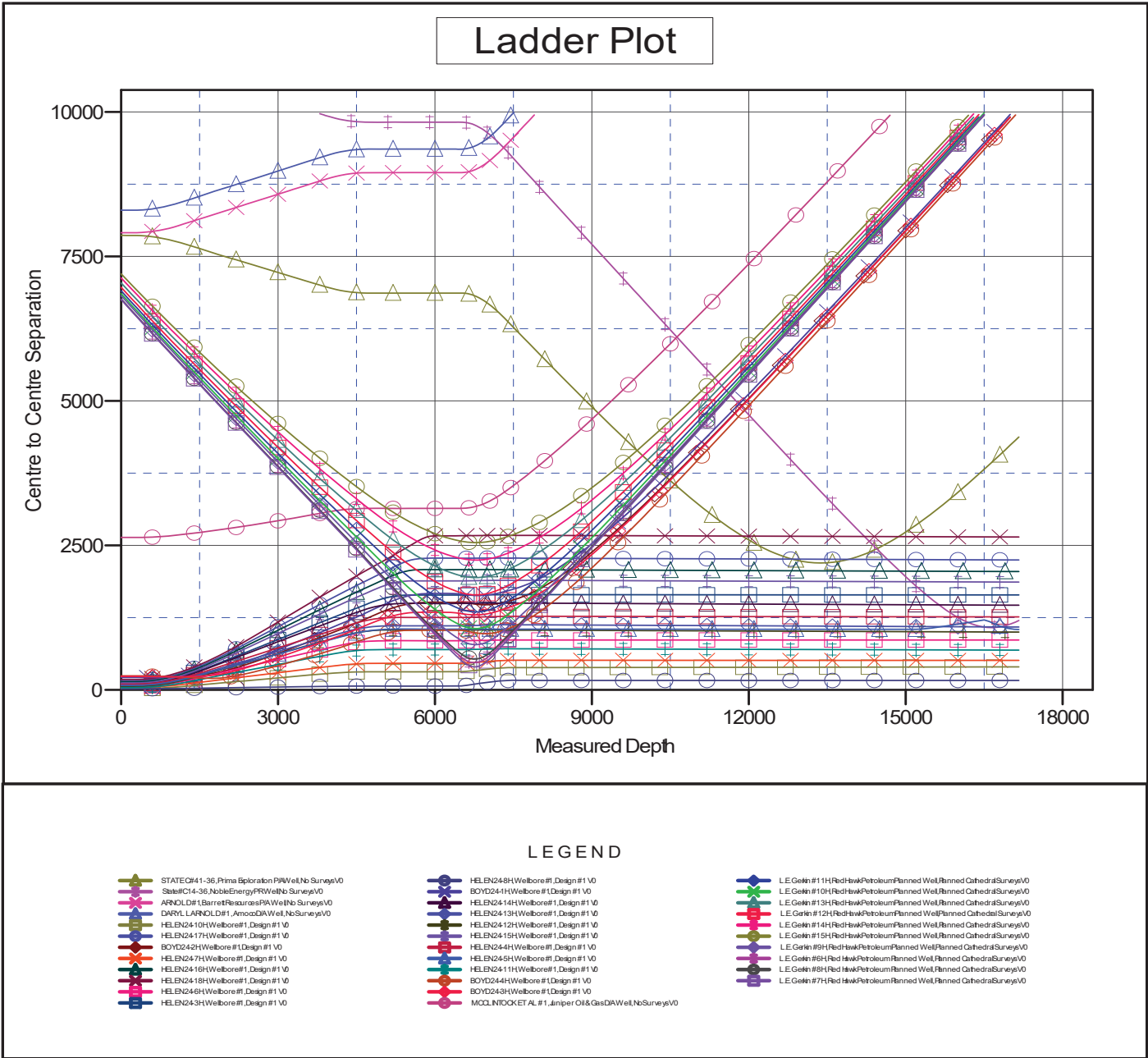
Reference	Design #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 9,999.98 usft	Error Surface:	Pedal Curve
Warning Levels Evaluated at:	2.45 Sigma	Casing Method:	Added to Error Values

Survey Tool Program		Date	11/1/2017	
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	1,700.00	Design #1 (Wellbore #1)	ISCWSA REV 2 MWD	Fixed:v2:standard declination
1,700.00	17,165.45	Design #1 (Wellbore #1)	ISCWSA REV 2 MWD	Fixed:v2:standard declination

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
2N-64W-13 L.E. GERKIN EAST PAD						
L.E. Gerkin #12H - Red Hawk Petroleum Planned Well -	6,784.78	16,446.50	1,644.10	1,392.48	6.534	CC, ES
L.E. Gerkin #12H - Red Hawk Petroleum Planned Well -	6,800.00	16,446.50	1,644.21	1,392.53	6.533	SF
L.E. Gerkin #9H - Red Hawk Petroleum Planned Well - P	6,782.01	16,541.50	782.86	565.96	3.609	CC, ES, SF
L.E. Gerkin #10H - Red Hawk Petroleum Planned Well - P	6,782.66	16,489.70	1,060.04	823.16	4.475	CC, ES, SF
L.E. Gerkin #11H - Red Hawk Petroleum Planned Well - P	6,783.24	16,457.40	1,349.16	1,102.96	5.480	CC, ES, SF
L.E. Gerkin #13H - Red Hawk Petroleum Planned Well - P	6,785.38	16,448.80	1,944.21	1,689.38	7.629	CC
L.E. Gerkin #13H - Red Hawk Petroleum Planned Well - P	6,800.00	16,448.80	1,944.30	1,689.36	7.626	ES
L.E. Gerkin #13H - Red Hawk Petroleum Planned Well - P	6,850.00	16,448.80	1,945.94	1,690.72	7.625	SF
L.E. Gerkin #14H - Red Hawk Petroleum Planned Well - P	6,786.07	16,481.10	2,245.93	1,994.37	8.928	CC
L.E. Gerkin #14H - Red Hawk Petroleum Planned Well - P	6,800.00	16,481.10	2,246.00	1,994.31	8.924	ES
L.E. Gerkin #14H - Red Hawk Petroleum Planned Well - P	6,850.00	16,481.10	2,247.39	1,995.28	8.914	SF
L.E. Gerkin #15H - Red Hawk Petroleum Planned Well - P	6,786.74	16,511.10	2,548.94	2,293.63	9.984	CC
L.E. Gerkin #15H - Red Hawk Petroleum Planned Well - P	6,800.00	16,511.10	2,548.99	2,293.55	9.979	ES
L.E. Gerkin #15H - Red Hawk Petroleum Planned Well - P	6,900.00	16,511.10	2,552.96	2,296.54	9.956	SF
2N-64W-13 L.E. GERKIN WEST PAD						
L.E. Gerkin #6H - Red Hawk Petroleum Planned Well - P	6,750.00	16,431.70	470.35	324.59	3.227	ES, SF
L.E. Gerkin #6H - Red Hawk Petroleum Planned Well - P	6,758.38	16,431.70	470.23	324.73	3.232	CC
L.E. Gerkin #7H - Red Hawk Petroleum Planned Well - P	6,650.00	16,464.00	421.76	337.06	4.980	SF
L.E. Gerkin #7H - Red Hawk Petroleum Planned Well - P	6,750.00	16,464.00	398.49	322.47	5.242	ES
L.E. Gerkin #7H - Red Hawk Petroleum Planned Well - P	6,759.06	16,464.00	398.33	323.12	5.297	CC
L.E. Gerkin #8H - Red Hawk Petroleum Planned Well - P	6,760.49	16,517.20	531.91	339.27	2.761	CC, ES, SF
2N-64W-13 Offsets						
ARNOLD #1 - Barrett Resources P/A Well - No Surveys	250.00	178.00	7,912.00	7,902.29	814.815	CC
ARNOLD #1 - Barrett Resources P/A Well - No Surveys	300.00	228.00	7,912.43	7,901.18	703.750	ES
ARNOLD #1 - Barrett Resources P/A Well - No Surveys	7,150.00	6,829.07	9,238.51	8,979.83	35.714	SF
DARYL L ARNOLD #1 - Amoco D/A Well - No Surveys	250.00	209.00	8,301.85	8,291.22	780.831	CC
DARYL L ARNOLD #1 - Amoco D/A Well - No Surveys	300.00	259.00	8,302.28	8,290.05	678.646	ES
DARYL L ARNOLD #1 - Amoco D/A Well - No Surveys	7,150.00	6,860.07	9,654.34	9,395.25	37.263	SF
2N-64W-24 Offsets						
MCCLINTOCK ET AL #1 - Juniper Oil & Gas D/A Well - N	250.00	200.00	2,637.83	2,627.47	254.653	CC
MCCLINTOCK ET AL #1 - Juniper Oil & Gas D/A Well - N	600.00	549.13	2,644.71	2,622.34	118.207	ES
MCCLINTOCK ET AL #1 - Juniper Oil & Gas D/A Well - N	7,050.00	6,808.88	3,268.91	3,003.04	12.295	SF
2N-64W-36 Offsets						
State #C14-36 - Noble Energy PR Well - No Surveys	16,636.80	6,970.00	1,079.05	582.61	2.174	CC, ES
State #C14-36 - Noble Energy PR Well - No Surveys	16,700.00	6,970.00	1,080.90	583.34	2.172	SF
STATE C #41-36 - Prima Exploration P/A Well - No Surve	13,378.98	6,928.00	2,196.43	1,777.72	5.246	CC
STATE C #41-36 - Prima Exploration P/A Well - No Surve	13,400.00	6,928.00	2,196.53	1,777.35	5.240	ES
STATE C #41-36 - Prima Exploration P/A Well - No Surve	13,600.00	6,928.00	2,207.52	1,784.65	5.220	SF

Summary

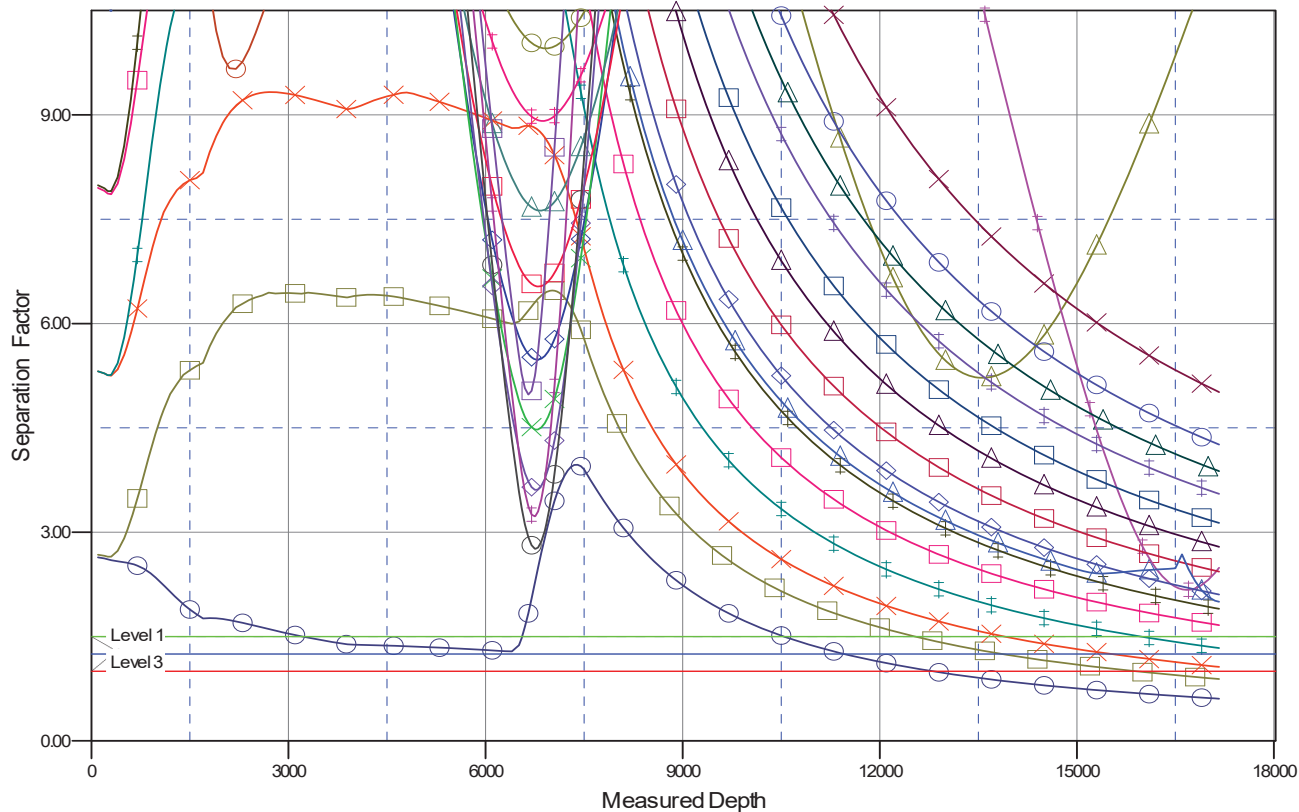
Site Name Offset Well - Wellbore - Design	Reference	Offset	Distance		Separation Factor	Warning
	Measured Depth (usft)	Measured Depth (usft)	Between Centres (usft)	Between Ellipses (usft)		
ARNOLD 02N-64W-24						
BOYD 24-1H - Wellbore #1 - Design #1	474.50	489.60	215.48	207.61	27.391	CC
BOYD 24-1H - Wellbore #1 - Design #1	500.00	516.87	215.48	207.58	27.246	ES
BOYD 24-1H - Wellbore #1 - Design #1	1,700.00	1,742.84	305.58	286.66	16.152	SF
BOYD 24-2H - Wellbore #1 - Design #1	748.40	784.85	221.21	212.72	26.054	CC
BOYD 24-2H - Wellbore #1 - Design #1	800.00	839.74	221.33	212.67	25.558	ES
BOYD 24-2H - Wellbore #1 - Design #1	1,900.00	1,943.45	310.91	289.67	14.636	SF
BOYD 24-3H - Wellbore #1 - Design #1	940.89	993.86	225.14	215.97	24.535	CC
BOYD 24-3H - Wellbore #1 - Design #1	1,000.00	1,056.45	225.40	215.94	23.823	ES
BOYD 24-3H - Wellbore #1 - Design #1	2,000.00	2,051.44	290.96	268.47	12.938	SF
BOYD 24-4H - Wellbore #1 - Design #1	1,696.28	1,779.68	198.15	181.29	11.748	CC
BOYD 24-4H - Wellbore #1 - Design #1	1,700.00	1,783.25	198.16	181.21	11.697	ES
BOYD 24-4H - Wellbore #1 - Design #1	2,200.00	2,262.93	243.87	218.63	9.662	SF
HELEN 24-10H - Wellbore #1 - Design #1	250.00	250.00	20.14	12.53	2.648	CC
HELEN 24-10H - Wellbore #1 - Design #1	17,165.45	16,942.35	397.89	-49.91	0.889	Level 1, ES, SF
HELEN 24-11H - Wellbore #1 - Design #1	250.00	250.00	39.99	32.39	5.258	CC, ES
HELEN 24-11H - Wellbore #1 - Design #1	17,165.45	17,054.30	689.39	173.03	1.335	Level 3, SF
HELEN 24-12H - Wellbore #1 - Design #1	250.00	250.00	60.13	52.53	7.905	CC, ES
HELEN 24-12H - Wellbore #1 - Design #1	17,165.45	17,249.82	1,001.06	473.95	1.899	SF
HELEN 24-13H - Wellbore #1 - Design #1	250.00	249.00	79.99	72.38	10.516	CC, ES
HELEN 24-13H - Wellbore #1 - Design #1	17,165.45	17,034.70	1,089.26	571.37	2.103	SF
HELEN 24-14H - Wellbore #1 - Design #1	250.00	249.00	100.12	92.52	13.164	CC, ES
HELEN 24-14H - Wellbore #1 - Design #1	17,165.45	17,198.16	1,466.65	941.12	2.791	SF
HELEN 24-15H - Wellbore #1 - Design #1	250.00	249.00	119.98	112.38	15.775	CC, ES
HELEN 24-15H - Wellbore #1 - Design #1	17,165.45	17,232.02	1,865.37	1,340.21	3.552	SF
HELEN 24-16H - Wellbore #1 - Design #1	250.00	249.00	140.12	132.51	18.422	CC, ES
HELEN 24-16H - Wellbore #1 - Design #1	17,165.45	17,510.34	2,048.00	1,519.79	3.877	SF
HELEN 24-17H - Wellbore #1 - Design #1	250.00	249.00	159.98	152.37	21.033	CC, ES
HELEN 24-17H - Wellbore #1 - Design #1	17,165.45	17,427.72	2,249.07	1,721.32	4.262	SF
HELEN 24-18H - Wellbore #1 - Design #1	250.00	248.00	180.11	172.51	23.682	CC, ES
HELEN 24-18H - Wellbore #1 - Design #1	17,165.45	17,493.84	2,646.35	2,118.60	5.014	SF
HELEN 24-3H - Wellbore #1 - Design #1	250.00	252.00	119.98	112.38	15.772	CC, ES
HELEN 24-3H - Wellbore #1 - Design #1	17,165.45	17,266.86	1,642.98	1,118.72	3.134	SF
HELEN 24-4H - Wellbore #1 - Design #1	250.00	251.00	99.84	92.24	13.126	CC, ES
HELEN 24-4H - Wellbore #1 - Design #1	17,165.45	17,093.67	1,263.48	744.46	2.434	SF
HELEN 24-5H - Wellbore #1 - Design #1	250.00	251.00	79.99	72.38	10.516	CC, ES
HELEN 24-5H - Wellbore #1 - Design #1	17,165.45	17,336.26	1,046.97	523.67	2.001	SF
HELEN 24-6H - Wellbore #1 - Design #1	250.00	251.00	59.85	52.25	7.868	CC, ES
HELEN 24-6H - Wellbore #1 - Design #1	17,165.45	17,101.27	864.36	344.94	1.664	SF
HELEN 24-7H - Wellbore #1 - Design #1	250.00	251.00	39.99	32.39	5.258	CC
HELEN 24-7H - Wellbore #1 - Design #1	17,165.45	16,965.12	510.71	30.82	1.064	Level 2, ES, SF
HELEN 24-8H - Wellbore #1 - Design #1	250.00	251.00	19.86	12.25	2.611	CC
HELEN 24-8H - Wellbore #1 - Design #1	17,165.45	17,014.45	164.36	-106.42	0.607	Level 1, ES, SF



Reference Depths are relative to RKB = 20' @ 4944.00usft (Drilling Rig)
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000

Coordinates are relative to: HELEN 24-9H
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.65°

Separation Factor Plot



LEGEND

STATEC41-36, Prima Exploration P/Well, No Surveys V0
StateC14-36, Noble Energy P/Well, No Surveys V0
ARNOLD, D/F, Barnett Resources P/Well, No Surveys V0
DARYL, LARNDOL, D/F, Amoco D/Well, No Surveys V0
HELEN24-10H Wellbore #1, Design #1 V0
HELEN24-17H Wellbore #1, Design #1 V0
BOYD24-2H Wellbore #1, Design #1 V0
HELEN24-7H Wellbore #1, Design #1 V0
HELEN24-16H Wellbore #1, Design #1 V0
HELEN24-16H Wellbore #1, Design #1 V0
HELEN24-6H Wellbore #1, Design #1 V0
HELEN24-3H Wellbore #1, Design #1 V0

HELEN24-8H Wellbore #1, Design #1 V0
BOYD24-1H Wellbore #1, Design #1 V0
HELEN24-14H Wellbore #1, Design #1 V0
HELEN24-13H Wellbore #1, Design #1 V0
HELEN24-12H Wellbore #1, Design #1 V0
HELEN24-15H Wellbore #1, Design #1 V0
HELEN24-4H Wellbore #1, Design #1 V0
HELEN24-5H Wellbore #1, Design #1 V0
HELEN24-11H Wellbore #1, Design #1 V0
BOYD24-4H Wellbore #1, Design #1 V0
BOYD24-3H Wellbore #1, Design #1 V0
MOULNDOK ET AL #1, Jumper Oil & Gas D/Well, No Surveys V0

L.E. Gelin #11H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0
L.E. Gelin #10H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0
L.E. Gelin #13H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0
L.E. Gelin #12H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0
L.E. Gelin #14H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0
L.E. Gelin #15H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0
L.E. Gelin #9H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0
L.E. Gelin #6H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0
L.E. Gelin #5H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0
L.E. Gelin #7H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0