

# **VERDAD RESOURCES**

**WATTENBERG FIELD**

**ARNOLD 02N-64W-24**

**HELEN 24-5H**

**Wellbore #1**

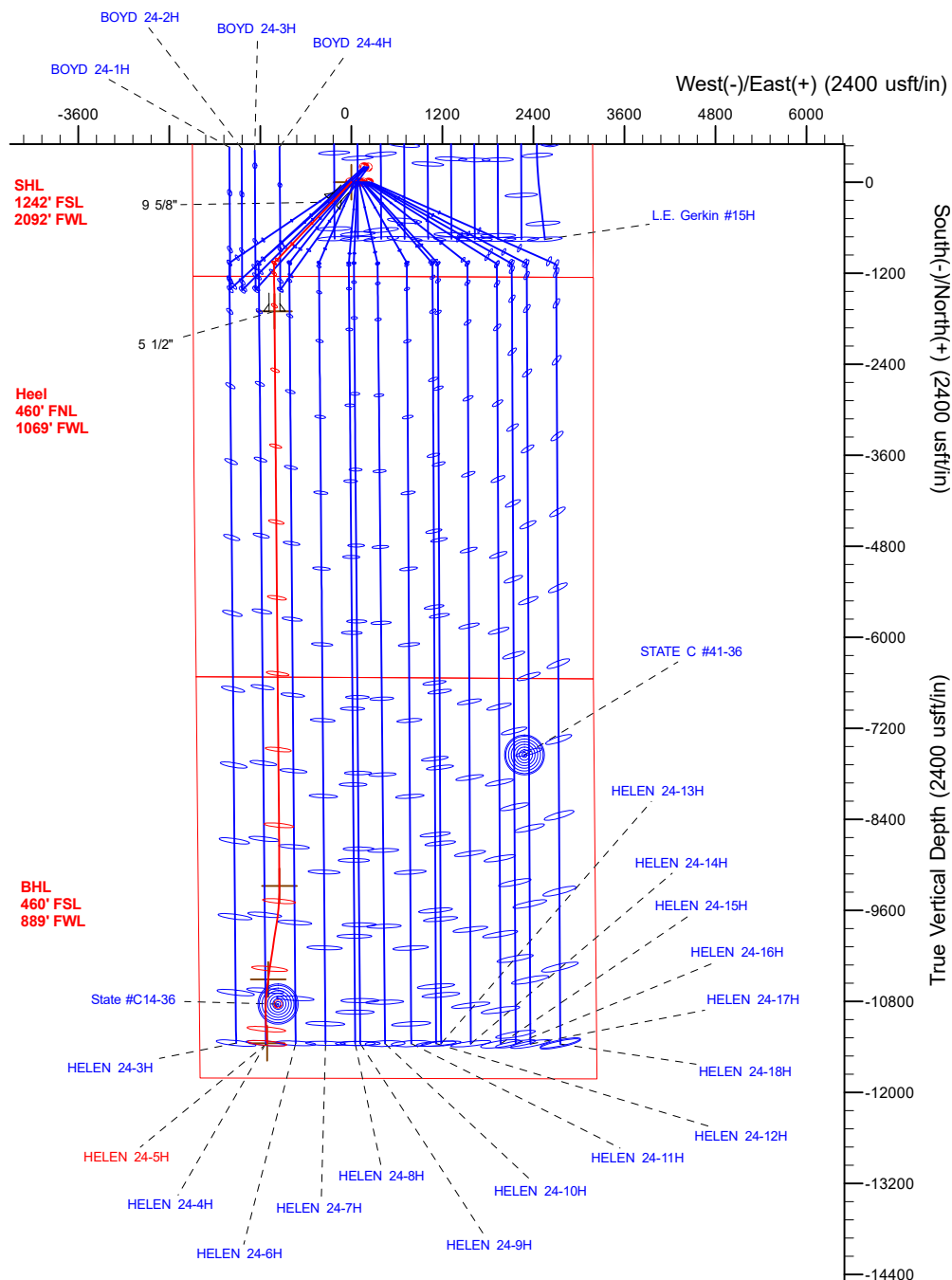
**Plan: Design #1**

## **Standard Planning Report**

**03 November, 2017**

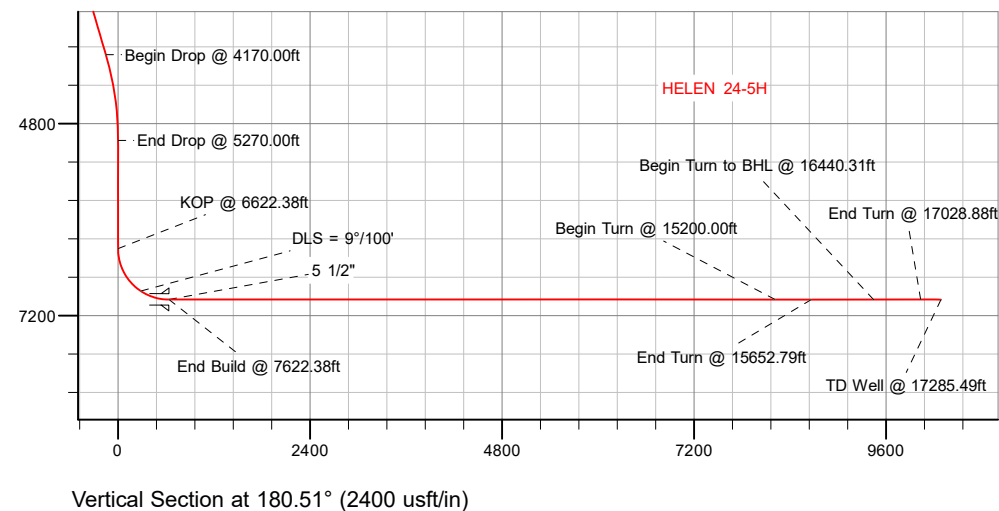
# VERDAD RESOURCES


CASING DETAILS			
TVD	MD	Name	Size
1700.00	1756.43	9 5/8"	9-5/8
7000.00	7622.38	5 1/2"	5-1/2



SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1074.36	
2	250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	-1074.36	
3	1350.00	22.00	223.70	1323.17	-150.81	-144.12	2.00	223.70	-922.27	
4	4170.00	22.00	223.70	3937.83	-914.55	-873.96	0.00	0.00	-152.09	
5	5270.00	0.00	0.00	5011.00	-1065.36	-1018.08	2.00	180.00	0.00	
6	6622.38	0.00	0.00	6363.38	-1065.36	-1018.08	0.00	0.00	0.00	
7	7622.38	90.00	179.51	7000.00	-1701.96	-1012.60	9.00	179.51	636.52	
8	15200.00	90.00	179.51	7000.00	-9279.30	-947.32	0.00	0.00	8212.99	HELEN 24-5H_tgt
9	15652.79	90.00	188.56	7000.00	-9730.49	-979.14	2.00	90.00	8664.45	
10	16440.31	90.00	188.56	7000.00	-10509.24	-1096.39	0.00	0.00	9444.20	HELEN 24-5H_tgt2
11	17028.88	90.00	176.79	7000.00	-11096.13	-1123.83	2.00	-90.00	10031.32	
12	17285.49	90.00	176.79	7000.00	-11352.34	-1109.46	0.00	0.00	10287.39	HELEN 24-5H_BHL

WELLBORE TARGET DETAILS (LAT/LONG)					
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
HELEN 24-5H_SHL	0.00	0.00	0.00	40.120058	-104.501651
HELEN 24-5H_BHL	7000.00	-11352.34	-1109.46	40.088894	-104.505616



	WELL DETAILS: HELEN 24-5H	
	GL = 4925'	
	RKB = 20' @ 4945.00usft (Drilling Rig)	
	Plan: Design #1 (HELEN 24-5H/Wellbore #1)	
	Created By:	Date: 11/03/2017
	Reviewed: _____	Date: _____

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

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

<b>Well</b>	HELEN 24-5H		
<b>Well Position</b>	<b>+N/-S</b>	-198.18 usft	<b>Northing:</b>
	<b>+E/-W</b>	-162.20 usft	<b>Easting:</b>
<b>Position Uncertainty</b>	3.28 usft		<b>Wellhead Elevation:</b>
			<b>Latitude:</b>
			<b>Longitude:</b>
			<b>Ground Level:</b>
			4,925.00 usft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination</b>	<b>Dip Angle</b>	<b>Field Strength</b>
			(°)	(°)	(nT)
	IGRF2010	11/1/2017	7.84	66.64	52,338.69895210

<b>Design</b>	Design #1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>
	(usft)	(usft)	(usft)	(°)
	0.00	-1,065.36	-1,018.08	180.51

<b>Plan Survey Tool Program</b>	<b>Date</b>	11/3/2017		
<b>Depth From</b>	<b>Depth To</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>
(usft)	(usft)			
1	0.00	1,700.00	Design #1 (Wellbore #1)	ISCWSA REV 2 MWD
				Fixed:v2:standard declination
2	1,700.00	17,285.49	Design #1 (Wellbore #1)	ISCWSA REV 2 MWD
				Fixed:v2:standard declination

<b>Plan Sections</b>										
<b>Measured</b>	<b>Inclination</b>	<b>Azimuth</b>	<b>Vertical</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Dogleg</b>	<b>Build</b>	<b>Turn</b>	<b>TFO</b>	<b>Target</b>
<b>Depth</b>	(°)	(°)	<b>Depth</b>	(usft)	(usft)	<b>Rate</b>	<b>Rate</b>	<b>Rate</b>	(°)	
(usft)			(usft)			(°/100usft)	(°/100usft)	(°/100usft)		
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	
1,350.00	22.00	223.70	1,323.17	-150.81	-144.12	2.00	2.00	0.00	223.70	
4,170.00	22.00	223.70	3,937.83	-914.55	-873.96	0.00	0.00	0.00	0.00	
5,270.00	0.00	0.00	5,011.00	-1,065.36	-1,018.08	2.00	-2.00	0.00	180.00	
6,622.38	0.00	0.00	6,363.38	-1,065.36	-1,018.08	0.00	0.00	0.00	0.00	
7,622.38	90.00	179.51	7,000.00	-1,701.96	-1,012.60	9.00	9.00	17.95	179.51	
15,200.00	90.00	179.51	7,000.00	-9,279.30	-947.32	0.00	0.00	0.00	0.00	HELEN 24-5H_tgt
15,652.79	90.00	188.56	7,000.00	-9,730.50	-979.14	2.00	0.00	2.00	90.00	
16,440.31	90.00	188.56	7,000.00	-10,509.24	-1,096.39	0.00	0.00	0.00	0.00	HELEN 24-5H_tgt2
17,028.88	90.00	176.79	7,000.00	-11,096.13	-1,123.83	2.00	0.00	-2.00	-90.00	
17,285.49	90.00	176.79	7,000.00	-11,352.34	-1,109.46	0.00	0.00	0.00	0.00	HELEN 24-5H_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	-1,074.36	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	-1,074.36	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	-1,074.36	0.00	0.00	0.00
250.00	0.00	0.00	250.00	0.00	0.00	-1,074.36	0.00	0.00	0.00
Begin Nudge @ 250.00ft									
300.00	1.00	223.70	300.00	-0.32	-0.30	-1,074.04	2.00	2.00	0.00
400.00	3.00	223.70	399.93	-2.84	-2.71	-1,071.50	2.00	2.00	0.00
500.00	5.00	223.70	499.68	-7.88	-7.53	-1,066.41	2.00	2.00	0.00
600.00	7.00	223.70	599.13	-15.44	-14.75	-1,058.79	2.00	2.00	0.00
700.00	9.00	223.70	698.15	-25.50	-24.37	-1,048.65	2.00	2.00	0.00
800.00	11.00	223.70	796.63	-38.05	-36.36	-1,035.99	2.00	2.00	0.00
900.00	13.00	223.70	894.44	-53.08	-50.73	-1,020.83	2.00	2.00	0.00
1,000.00	15.00	223.70	991.46	-70.57	-67.44	-1,003.19	2.00	2.00	0.00
1,100.00	17.00	223.70	1,087.58	-90.50	-86.48	-983.10	2.00	2.00	0.00
1,200.00	19.00	223.70	1,182.68	-112.84	-107.83	-960.57	2.00	2.00	0.00
1,300.00	21.00	223.70	1,276.65	-137.56	-131.46	-935.63	2.00	2.00	0.00
1,350.00	22.00	223.70	1,323.17	-150.81	-144.12	-922.27	2.00	2.00	0.00
End Nudge @ 1350.00ft									
1,400.00	22.00	223.70	1,369.53	-164.35	-157.06	-908.62	0.00	0.00	0.00
1,500.00	22.00	223.70	1,462.25	-191.44	-182.94	-881.31	0.00	0.00	0.00
1,600.00	22.00	223.70	1,554.96	-218.52	-208.82	-853.99	0.00	0.00	0.00
1,700.00	22.00	223.70	1,647.68	-245.60	-234.70	-826.68	0.00	0.00	0.00
1,756.43	22.00	223.70	1,700.00	-260.88	-249.31	-811.27	0.00	0.00	0.00
9 5/8"									
1,800.00	22.00	223.70	1,740.40	-272.69	-260.58	-799.37	0.00	0.00	0.00
1,900.00	22.00	223.70	1,833.12	-299.77	-286.47	-772.06	0.00	0.00	0.00
2,000.00	22.00	223.70	1,925.84	-326.85	-312.35	-744.75	0.00	0.00	0.00
2,100.00	22.00	223.70	2,018.56	-353.93	-338.23	-717.44	0.00	0.00	0.00
2,200.00	22.00	223.70	2,111.28	-381.02	-364.11	-690.13	0.00	0.00	0.00
2,300.00	22.00	223.70	2,203.99	-408.10	-389.99	-662.81	0.00	0.00	0.00
2,400.00	22.00	223.70	2,296.71	-435.18	-415.87	-635.50	0.00	0.00	0.00
2,500.00	22.00	223.70	2,389.43	-462.27	-441.75	-608.19	0.00	0.00	0.00
2,600.00	22.00	223.70	2,482.15	-489.35	-467.63	-580.88	0.00	0.00	0.00
2,700.00	22.00	223.70	2,574.87	-516.43	-493.51	-553.57	0.00	0.00	0.00
2,800.00	22.00	223.70	2,667.59	-543.51	-519.39	-526.26	0.00	0.00	0.00
2,900.00	22.00	223.70	2,760.30	-570.60	-545.27	-498.94	0.00	0.00	0.00
3,000.00	22.00	223.70	2,853.02	-597.68	-571.16	-471.63	0.00	0.00	0.00
3,100.00	22.00	223.70	2,945.74	-624.76	-597.04	-444.32	0.00	0.00	0.00
3,200.00	22.00	223.70	3,038.46	-651.85	-622.92	-417.01	0.00	0.00	0.00
3,300.00	22.00	223.70	3,131.18	-678.93	-648.80	-389.70	0.00	0.00	0.00
3,400.00	22.00	223.70	3,223.90	-706.01	-674.68	-362.39	0.00	0.00	0.00
3,500.00	22.00	223.70	3,316.61	-733.09	-700.56	-335.07	0.00	0.00	0.00
3,600.00	22.00	223.70	3,409.33	-760.18	-726.44	-307.76	0.00	0.00	0.00
3,700.00	22.00	223.70	3,502.05	-787.26	-752.32	-280.45	0.00	0.00	0.00
3,800.00	22.00	223.70	3,594.77	-814.34	-778.20	-253.14	0.00	0.00	0.00
3,900.00	22.00	223.70	3,687.49	-841.43	-804.08	-225.83	0.00	0.00	0.00
4,000.00	22.00	223.70	3,780.21	-868.51	-829.96	-198.52	0.00	0.00	0.00
4,100.00	22.00	223.70	3,872.92	-895.59	-855.85	-171.20	0.00	0.00	0.00
4,170.00	22.00	223.70	3,937.83	-914.55	-873.96	-152.09	0.00	0.00	0.00
Begin Drop @ 4170.00ft									
4,200.00	21.40	223.70	3,965.70	-922.57	-881.63	-144.00	2.00	-2.00	0.00
4,300.00	19.40	223.70	4,059.42	-947.77	-905.71	-118.59	2.00	-2.00	0.00
4,400.00	17.40	223.70	4,154.31	-970.59	-927.51	-95.57	2.00	-2.00	0.00
4,500.00	15.40	223.70	4,250.23	-991.00	-947.02	-74.99	2.00	-2.00	0.00
4,600.00	13.40	223.70	4,347.09	-1,008.98	-964.20	-56.86	2.00	-2.00	0.00
4,700.00	11.40	223.70	4,444.75	-1,024.50	-979.03	-41.20	2.00	-2.00	0.00
4,800.00	9.40	223.70	4,543.10	-1,037.55	-991.51	-28.04	2.00	-2.00	0.00
4,900.00	7.40	223.70	4,642.02	-1,048.11	-1,001.60	-17.39	2.00	-2.00	0.00
5,000.00	5.40	223.70	4,741.40	-1,056.17	-1,009.30	-9.27	2.00	-2.00	0.00
5,100.00	3.40	223.70	4,841.10	-1,061.72	-1,014.60	-3.67	2.00	-2.00	0.00
5,200.00	1.40	223.70	4,941.00	-1,064.74	-1,017.49	-0.62	2.00	-2.00	0.00
5,270.00	0.00	0.00	5,011.00	-1,065.36	-1,018.08	0.00	2.00	-2.00	0.00
End Drop @ 5270.00ft									
5,300.00	0.00	0.00	5,041.00	-1,065.36	-1,018.08	0.00	0.00	0.00	0.00
5,400.00	0.00	0.00	5,141.00	-1,065.36	-1,018.08	0.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,241.00	-1,065.36	-1,018.08	0.00	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)
5,600.00	0.00	0.00	5,341.00	-1,065.36	-1,018.08	0.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,441.00	-1,065.36	-1,018.08	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,541.00	-1,065.36	-1,018.08	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,641.00	-1,065.36	-1,018.08	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	5,741.00	-1,065.36	-1,018.08	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	5,841.00	-1,065.36	-1,018.08	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	5,941.00	-1,065.36	-1,018.08	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,041.00	-1,065.36	-1,018.08	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,141.00	-1,065.36	-1,018.08	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,241.00	-1,065.36	-1,018.08	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,341.00	-1,065.36	-1,018.08	0.00	0.00	0.00	0.00
6,622.38	0.00	0.00	6,363.38	-1,065.36	-1,018.08	0.00	0.00	0.00	0.00
KOP @ 6622.38ft									
6,650.00	2.49	179.51	6,390.99	-1,065.96	-1,018.08	0.60	9.00	9.00	0.00
6,700.00	6.99	179.51	6,440.80	-1,070.09	-1,018.04	4.73	9.00	9.00	0.00
6,750.00	11.49	179.51	6,490.14	-1,078.11	-1,017.97	12.75	9.00	9.00	0.00
6,800.00	15.99	179.51	6,538.70	-1,089.98	-1,017.87	24.62	9.00	9.00	0.00
6,850.00	20.49	179.51	6,586.18	-1,105.62	-1,017.74	40.26	9.00	9.00	0.00
6,900.00	24.99	179.51	6,632.28	-1,124.94	-1,017.57	59.57	9.00	9.00	0.00
6,950.00	29.49	179.51	6,676.73	-1,147.82	-1,017.37	82.45	9.00	9.00	0.00
7,000.00	33.99	179.51	6,719.24	-1,174.11	-1,017.15	108.73	9.00	9.00	0.00
7,050.00	38.49	179.51	6,759.56	-1,203.65	-1,016.89	138.28	9.00	9.00	0.00
7,100.00	42.99	179.51	6,797.43	-1,236.27	-1,016.61	170.89	9.00	9.00	0.00
7,150.00	47.49	179.51	6,832.64	-1,271.76	-1,016.30	206.38	9.00	9.00	0.00
7,200.00	51.99	179.51	6,864.94	-1,309.91	-1,015.98	244.52	9.00	9.00	0.00
7,250.00	56.49	179.51	6,894.16	-1,350.47	-1,015.63	285.07	9.00	9.00	0.00
DLS = 9°/100'									
7,300.00	60.99	179.51	6,920.10	-1,393.19	-1,015.26	327.79	9.00	9.00	0.00
7,350.00	65.49	179.51	6,942.61	-1,437.82	-1,014.87	372.42	9.00	9.00	0.00
7,400.00	69.99	179.51	6,961.55	-1,484.08	-1,014.47	418.67	9.00	9.00	0.00
7,450.00	74.49	179.51	6,976.80	-1,531.68	-1,014.06	466.27	9.00	9.00	0.00
7,500.00	78.99	179.51	6,988.27	-1,580.33	-1,013.65	514.92	9.00	9.00	0.00
7,550.00	83.49	179.51	6,995.89	-1,629.74	-1,013.22	564.31	9.00	9.00	0.00
7,600.00	87.99	179.51	6,999.60	-1,679.58	-1,012.79	614.15	9.00	9.00	0.00
7,622.38	90.00	179.51	7,000.00	-1,701.96	-1,012.60	636.52	9.00	9.00	0.00
End Build @ 7622.38ft - 5 1/2"									
7,700.00	90.00	179.51	7,000.00	-1,779.58	-1,011.93	714.13	0.00	0.00	0.00
7,800.00	90.00	179.51	7,000.00	-1,879.57	-1,011.07	814.12	0.00	0.00	0.00
7,900.00	90.00	179.51	7,000.00	-1,979.57	-1,010.21	914.10	0.00	0.00	0.00
8,000.00	90.00	179.51	7,000.00	-2,079.56	-1,009.34	1,014.09	0.00	0.00	0.00
8,100.00	90.00	179.51	7,000.00	-2,179.56	-1,008.48	1,114.07	0.00	0.00	0.00
8,200.00	90.00	179.51	7,000.00	-2,279.56	-1,007.62	1,214.06	0.00	0.00	0.00
8,300.00	90.00	179.51	7,000.00	-2,379.55	-1,006.76	1,314.04	0.00	0.00	0.00
8,400.00	90.00	179.51	7,000.00	-2,479.55	-1,005.90	1,414.03	0.00	0.00	0.00
8,500.00	90.00	179.51	7,000.00	-2,579.55	-1,005.04	1,514.01	0.00	0.00	0.00
8,600.00	90.00	179.51	7,000.00	-2,679.54	-1,004.18	1,613.99	0.00	0.00	0.00
8,700.00	90.00	179.51	7,000.00	-2,779.54	-1,003.31	1,713.98	0.00	0.00	0.00
8,800.00	90.00	179.51	7,000.00	-2,879.53	-1,002.45	1,813.96	0.00	0.00	0.00
8,900.00	90.00	179.51	7,000.00	-2,979.53	-1,001.59	1,913.95	0.00	0.00	0.00
9,000.00	90.00	179.51	7,000.00	-3,079.53	-1,000.73	2,013.93	0.00	0.00	0.00
9,100.00	90.00	179.51	7,000.00	-3,179.52	-999.87	2,113.92	0.00	0.00	0.00
9,200.00	90.00	179.51	7,000.00	-3,279.52	-999.01	2,213.90	0.00	0.00	0.00
9,300.00	90.00	179.51	7,000.00	-3,379.52	-998.15	2,313.89	0.00	0.00	0.00
9,400.00	90.00	179.51	7,000.00	-3,479.51	-997.28	2,413.87	0.00	0.00	0.00
9,500.00	90.00	179.51	7,000.00	-3,579.51	-996.42	2,513.86	0.00	0.00	0.00
9,600.00	90.00	179.51	7,000.00	-3,679.50	-995.56	2,613.84	0.00	0.00	0.00
9,700.00	90.00	179.51	7,000.00	-3,779.50	-994.70	2,713.83	0.00	0.00	0.00
9,800.00	90.00	179.51	7,000.00	-3,879.50	-993.84	2,813.81	0.00	0.00	0.00
9,900.00	90.00	179.51	7,000.00	-3,979.49	-992.98	2,913.80	0.00	0.00	0.00
10,000.00	90.00	179.51	7,000.00	-4,079.49	-992.12	3,013.78	0.00	0.00	0.00
10,100.00	90.00	179.51	7,000.00	-4,179.49	-991.25	3,113.76	0.00	0.00	0.00
10,200.00	90.00	179.51	7,000.00	-4,279.48	-990.39	3,213.75	0.00	0.00	0.00
10,300.00	90.00	179.51	7,000.00	-4,379.48	-989.53	3,313.73	0.00	0.00	0.00
10,400.00	90.00	179.51	7,000.00	-4,479.47	-988.67	3,413.72	0.00	0.00	0.00
10,500.00	90.00	179.51	7,000.00	-4,579.47	-987.81	3,513.70	0.00	0.00	0.00
10,600.00	90.00	179.51	7,000.00	-4,679.47	-986.95	3,613.69	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)
10,700.00	90.00	179.51	7,000.00	-4,779.46	-986.09	3,713.67	0.00	0.00	0.00
10,800.00	90.00	179.51	7,000.00	-4,879.46	-985.22	3,813.66	0.00	0.00	0.00
10,900.00	90.00	179.51	7,000.00	-4,979.46	-984.36	3,913.64	0.00	0.00	0.00
11,000.00	90.00	179.51	7,000.00	-5,079.45	-983.50	4,013.63	0.00	0.00	0.00
11,100.00	90.00	179.51	7,000.00	-5,179.45	-982.64	4,113.61	0.00	0.00	0.00
11,200.00	90.00	179.51	7,000.00	-5,279.45	-981.78	4,213.60	0.00	0.00	0.00
11,300.00	90.00	179.51	7,000.00	-5,379.44	-980.92	4,313.58	0.00	0.00	0.00
11,400.00	90.00	179.51	7,000.00	-5,479.44	-980.06	4,413.57	0.00	0.00	0.00
11,500.00	90.00	179.51	7,000.00	-5,579.43	-979.19	4,513.55	0.00	0.00	0.00
11,600.00	90.00	179.51	7,000.00	-5,679.43	-978.33	4,613.54	0.00	0.00	0.00
11,700.00	90.00	179.51	7,000.00	-5,779.43	-977.47	4,713.52	0.00	0.00	0.00
11,800.00	90.00	179.51	7,000.00	-5,879.42	-976.61	4,813.50	0.00	0.00	0.00
11,900.00	90.00	179.51	7,000.00	-5,979.42	-975.75	4,913.49	0.00	0.00	0.00
12,000.00	90.00	179.51	7,000.00	-6,079.42	-974.89	5,013.47	0.00	0.00	0.00
12,100.00	90.00	179.51	7,000.00	-6,179.41	-974.03	5,113.46	0.00	0.00	0.00
12,200.00	90.00	179.51	7,000.00	-6,279.41	-973.16	5,213.44	0.00	0.00	0.00
12,300.00	90.00	179.51	7,000.00	-6,379.40	-972.30	5,313.43	0.00	0.00	0.00
12,400.00	90.00	179.51	7,000.00	-6,479.40	-971.44	5,413.41	0.00	0.00	0.00
12,500.00	90.00	179.51	7,000.00	-6,579.40	-970.58	5,513.40	0.00	0.00	0.00
12,600.00	90.00	179.51	7,000.00	-6,679.39	-969.72	5,613.38	0.00	0.00	0.00
12,700.00	90.00	179.51	7,000.00	-6,779.39	-968.86	5,713.37	0.00	0.00	0.00
12,800.00	90.00	179.51	7,000.00	-6,879.39	-967.99	5,813.35	0.00	0.00	0.00
12,900.00	90.00	179.51	7,000.00	-6,979.38	-967.13	5,913.34	0.00	0.00	0.00
13,000.00	90.00	179.51	7,000.00	-7,079.38	-966.27	6,013.32	0.00	0.00	0.00
13,100.00	90.00	179.51	7,000.00	-7,179.37	-965.41	6,113.31	0.00	0.00	0.00
13,200.00	90.00	179.51	7,000.00	-7,279.37	-964.55	6,213.29	0.00	0.00	0.00
13,300.00	90.00	179.51	7,000.00	-7,379.37	-963.69	6,313.28	0.00	0.00	0.00
13,400.00	90.00	179.51	7,000.00	-7,479.36	-962.83	6,413.26	0.00	0.00	0.00
13,500.00	90.00	179.51	7,000.00	-7,579.36	-961.96	6,513.24	0.00	0.00	0.00
13,600.00	90.00	179.51	7,000.00	-7,679.36	-961.10	6,613.23	0.00	0.00	0.00
13,700.00	90.00	179.51	7,000.00	-7,779.35	-960.24	6,713.21	0.00	0.00	0.00
13,800.00	90.00	179.51	7,000.00	-7,879.35	-959.38	6,813.20	0.00	0.00	0.00
13,900.00	90.00	179.51	7,000.00	-7,979.35	-958.52	6,913.18	0.00	0.00	0.00
14,000.00	90.00	179.51	7,000.00	-8,079.34	-957.66	7,013.17	0.00	0.00	0.00
14,100.00	90.00	179.51	7,000.00	-8,179.34	-956.80	7,113.15	0.00	0.00	0.00
14,200.00	90.00	179.51	7,000.00	-8,279.33	-955.93	7,213.14	0.00	0.00	0.00
14,300.00	90.00	179.51	7,000.00	-8,379.33	-955.07	7,313.12	0.00	0.00	0.00
14,400.00	90.00	179.51	7,000.00	-8,479.33	-954.21	7,413.11	0.00	0.00	0.00
14,500.00	90.00	179.51	7,000.00	-8,579.32	-953.35	7,513.09	0.00	0.00	0.00
14,600.00	90.00	179.51	7,000.00	-8,679.32	-952.49	7,613.08	0.00	0.00	0.00
14,700.00	90.00	179.51	7,000.00	-8,779.32	-951.63	7,713.06	0.00	0.00	0.00
14,800.00	90.00	179.51	7,000.00	-8,879.31	-950.77	7,813.05	0.00	0.00	0.00
14,900.00	90.00	179.51	7,000.00	-8,979.31	-949.90	7,913.03	0.00	0.00	0.00
15,000.00	90.00	179.51	7,000.00	-9,079.30	-949.04	8,013.01	0.00	0.00	0.00
15,100.00	90.00	179.51	7,000.00	-9,179.30	-948.18	8,113.00	0.00	0.00	0.00
15,200.00	90.00	179.51	7,000.00	-9,279.30	-947.32	8,212.98	0.00	0.00	0.00
Begin Turn @ 15200.00ft									
15,300.00	90.00	181.51	7,000.00	-9,379.29	-948.20	8,312.98	2.00	0.00	2.00
15,400.00	90.00	183.51	7,000.00	-9,479.19	-952.58	8,412.91	2.00	0.00	2.00
15,500.00	90.00	185.51	7,000.00	-9,578.87	-960.43	8,512.67	2.00	0.00	2.00
15,600.00	90.00	187.51	7,000.00	-9,678.22	-971.76	8,612.11	2.00	0.00	2.00
15,652.79	90.00	188.56	7,000.00	-9,730.49	-979.14	8,664.45	2.00	0.00	2.00
End Turn @ 15652.79ft									
15,700.00	90.00	188.56	7,000.00	-9,777.18	-986.17	8,711.19	0.00	0.00	0.00
15,800.00	90.00	188.56	7,000.00	-9,876.06	-1,001.06	8,810.21	0.00	0.00	0.00
15,900.00	90.00	188.56	7,000.00	-9,974.95	-1,015.95	8,909.22	0.00	0.00	0.00
16,000.00	90.00	188.56	7,000.00	-10,073.84	-1,030.84	9,008.23	0.00	0.00	0.00
16,100.00	90.00	188.56	7,000.00	-10,172.72	-1,045.72	9,107.25	0.00	0.00	0.00
16,200.00	90.00	188.56	7,000.00	-10,271.61	-1,060.61	9,206.26	0.00	0.00	0.00
16,300.00	90.00	188.56	7,000.00	-10,370.49	-1,075.50	9,305.27	0.00	0.00	0.00
16,400.00	90.00	188.56	7,000.00	-10,469.38	-1,090.39	9,404.29	0.00	0.00	0.00
16,440.31	90.00	188.56	7,000.00	-10,509.24	-1,096.39	9,444.20	0.00	0.00	0.00
Begin Turn to BHL @ 16440.31ft									
16,500.00	90.00	187.37	7,000.00	-10,568.35	-1,104.66	9,503.39	2.00	0.00	-2.00
16,600.00	90.00	185.37	7,000.00	-10,667.73	-1,115.75	9,602.86	2.00	0.00	-2.00
16,700.00	90.00	183.37	7,000.00	-10,767.43	-1,123.37	9,702.63	2.00	0.00	-2.00

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)
16,800.00	90.00	181.37	7,000.00	-10,867.34	-1,127.50	9,802.57	2.00	0.00	-2.00
16,900.00	90.00	179.37	7,000.00	-10,967.34	-1,128.14	9,902.56	2.00	0.00	-2.00
17,000.00	90.00	177.37	7,000.00	-11,067.29	-1,125.30	10,002.49	2.00	0.00	-2.00
17,028.88	90.00	176.79	7,000.00	-11,096.13	-1,123.83	10,031.32	2.00	0.00	-2.00
End Turn @ 17028.88ft									
17,100.00	90.00	176.79	7,000.00	-11,167.14	-1,119.84	10,102.29	0.00	0.00	0.00
17,200.00	90.00	176.79	7,000.00	-11,266.98	-1,114.25	10,202.08	0.00	0.00	0.00
17,285.49	90.00	176.79	7,000.00	-11,352.34	-1,109.46	10,287.39	0.00	0.00	0.00
TD Well @ 17285.49ft									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name		Casing Diameter (")	Hole Diameter (")
1,756.43	1,700.00	9 5/8"		9-5/8	13-1/2
7,622.38	7,000.00	5 1/2"		5-1/2	8-1/2

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
250.00	250.00	0.00	0.00	Begin Nudge @ 250.00ft
1,350.00	1,323.17	-150.81	-144.12	End Nudge @ 1350.00ft
4,170.00	3,937.83	-914.55	-873.96	Begin Drop @ 4170.00ft
5,270.00	5,011.00	-1,065.36	-1,018.08	End Drop @ 5270.00ft
6,622.38	6,363.38	-1,065.36	-1,018.08	KOP @ 6622.38ft
7,250.00	6,894.16	-1,350.47	-1,015.63	DLS = 9°/100'
7,622.38	7,000.00	-1,701.96	-1,012.60	End Build @ 7622.38ft
15,200.00	7,000.00	-9,279.30	-947.32	Begin Turn @ 15200.00ft
15,652.79	7,000.00	-9,730.49	-979.14	End Turn @ 15652.79ft
16,440.31	7,000.00	-10,509.24	-1,096.39	Begin Turn to BHL @ 16440.31ft
17,028.88	7,000.00	-11,096.13	-1,123.83	End Turn @ 17028.88ft
17,285.49	7,000.00	-11,352.34	-1,109.46	TD Well @ 17285.49ft

# **VERDAD RESOURCES**

**WATTENBERG FIELD**

**ARNOLD 02N-64W-24**

**HELEN 24-5H**

**Wellbore #1**

**Design #1**

## **Anticollision Summary Report**

**03 November, 2017**



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

<b>Survey Tool Program</b>		<b>Date</b>	11/3/2017		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
0.00	1,700.00	Design #1 (Wellbore #1)	ISCWSA REV 2 MWD	Fixed:v2:standard declination	
1,700.00	17,285.49	Design #1 (Wellbore #1)	ISCWSA REV 2 MWD	Fixed:v2:standard declination	

<b>Summary</b>						
<b>Site Name</b>	<b>Reference Measured Depth (usft)</b>	<b>Offset Measured Depth (usft)</b>	<b>Distance Between Centres (usft)</b>	<b>Distance Between Ellipses (usft)</b>	<b>Separation Factor</b>	<b>Warning</b>
<b>Offset Well - Wellbore - Design</b>						
2N-64W-13 L.E. GERKIN EAST PAD						
L.E. Gerkin #12H - Red Hawk Petroleum Planned Well -	6,900.04	16,446.50	2,676.43	2,420.53	10.459	CC, ES
L.E. Gerkin #12H - Red Hawk Petroleum Planned Well -	6,950.00	16,446.50	2,677.18	2,421.13	10.456	SF
L.E. Gerkin #9H - Red Hawk Petroleum Planned Well - P	6,897.11	16,541.50	1,768.57	1,520.58	7.132	CC, ES, SF
L.E. Gerkin #10H - Red Hawk Petroleum Planned Well - P	6,897.81	16,489.70	2,071.39	1,819.94	8.238	CC, ES, SF
L.E. Gerkin #11H - Red Hawk Petroleum Planned Well - P	6,898.44	16,457.40	2,373.58	2,119.70	9.349	CC
L.E. Gerkin #11H - Red Hawk Petroleum Planned Well - P	6,900.00	16,457.40	2,373.58	2,119.70	9.349	ES, SF
L.E. Gerkin #13H - Red Hawk Petroleum Planned Well - P	6,900.69	16,448.80	2,981.29	2,723.91	11.583	CC, ES
L.E. Gerkin #13H - Red Hawk Petroleum Planned Well - P	7,000.00	16,448.80	2,983.94	2,726.12	11.574	SF
L.E. Gerkin #14H - Red Hawk Petroleum Planned Well - P	6,901.43	16,481.10	3,286.21	3,033.15	12.986	CC, ES
L.E. Gerkin #14H - Red Hawk Petroleum Planned Well - P	7,050.00	16,481.10	3,291.55	3,037.61	12.962	SF
L.E. Gerkin #15H - Red Hawk Petroleum Planned Well - P	6,894.46	16,481.40	3,591.36	3,336.10	14.069	CC
L.E. Gerkin #15H - Red Hawk Petroleum Planned Well - P	6,950.00	16,506.46	3,591.98	3,335.49	14.004	ES
L.E. Gerkin #15H - Red Hawk Petroleum Planned Well - P	7,100.00	16,511.10	3,600.08	3,342.37	13.969	SF
2N-64W-13 L.E. GERKIN WEST PAD						
L.E. Gerkin #6H - Red Hawk Petroleum Planned Well - P	6,873.25	16,431.70	890.64	658.66	3.839	CC, ES, SF
L.E. Gerkin #7H - Red Hawk Petroleum Planned Well - P	6,873.98	16,464.00	1,174.31	929.17	4.790	CC, ES, SF
L.E. Gerkin #8H - Red Hawk Petroleum Planned Well - P	6,875.46	16,517.20	1,465.43	1,213.50	5.817	CC, ES
L.E. Gerkin #8H - Red Hawk Petroleum Planned Well - P	6,900.00	16,517.20	1,465.76	1,213.71	5.815	SF
2N-64W-13 Offsets						
ARNOLD #1 - Barrett Resources P/A Well - No Surveys	250.00	177.00	7,932.51	7,922.82	819.346	CC
ARNOLD #1 - Barrett Resources P/A Well - No Surveys	400.00	326.93	7,935.98	7,921.44	545.907	ES
ARNOLD #1 - Barrett Resources P/A Well - No Surveys	7,200.00	6,808.06	9,490.92	9,229.71	36.334	SF
DARYL L ARNOLD #1 - Amoco D/A Well - No Surveys	250.00	208.00	8,295.55	8,284.95	782.490	CC
DARYL L ARNOLD #1 - Amoco D/A Well - No Surveys	400.00	357.93	8,298.22	8,282.64	532.484	ES
DARYL L ARNOLD #1 - Amoco D/A Well - No Surveys	7,150.00	6,809.37	9,566.13	9,299.43	35.869	SF
2N-64W-24 Offsets						
MCCLINTOCK ET AL #1 - Juniper Oil & Gas D/A Well - N	250.00	201.00	2,714.49	2,704.10	261.292	CC
MCCLINTOCK ET AL #1 - Juniper Oil & Gas D/A Well - N	400.00	348.93	2,717.86	2,702.58	177.883	ES
MCCLINTOCK ET AL #1 - Juniper Oil & Gas D/A Well - N	7,350.00	6,908.39	4,227.24	3,959.81	15.807	SF
2N-64W-36 Offsets						
State #C14-36 - Noble Energy PR Well - No Surveys	16,762.11	6,969.00	160.65	-333.25	0.325	Level 1, CC, ES, SF
STATE C #41-36 - Prima Exploration P/A Well - No Surve	13,499.62	6,927.00	3,245.09	2,826.80	7.758	CC
STATE C #41-36 - Prima Exploration P/A Well - No Surve	13,600.00	6,927.00	3,246.64	2,826.70	7.731	ES
STATE C #41-36 - Prima Exploration P/A Well - No Surve	13,800.00	6,927.00	3,258.96	2,836.23	7.709	SF

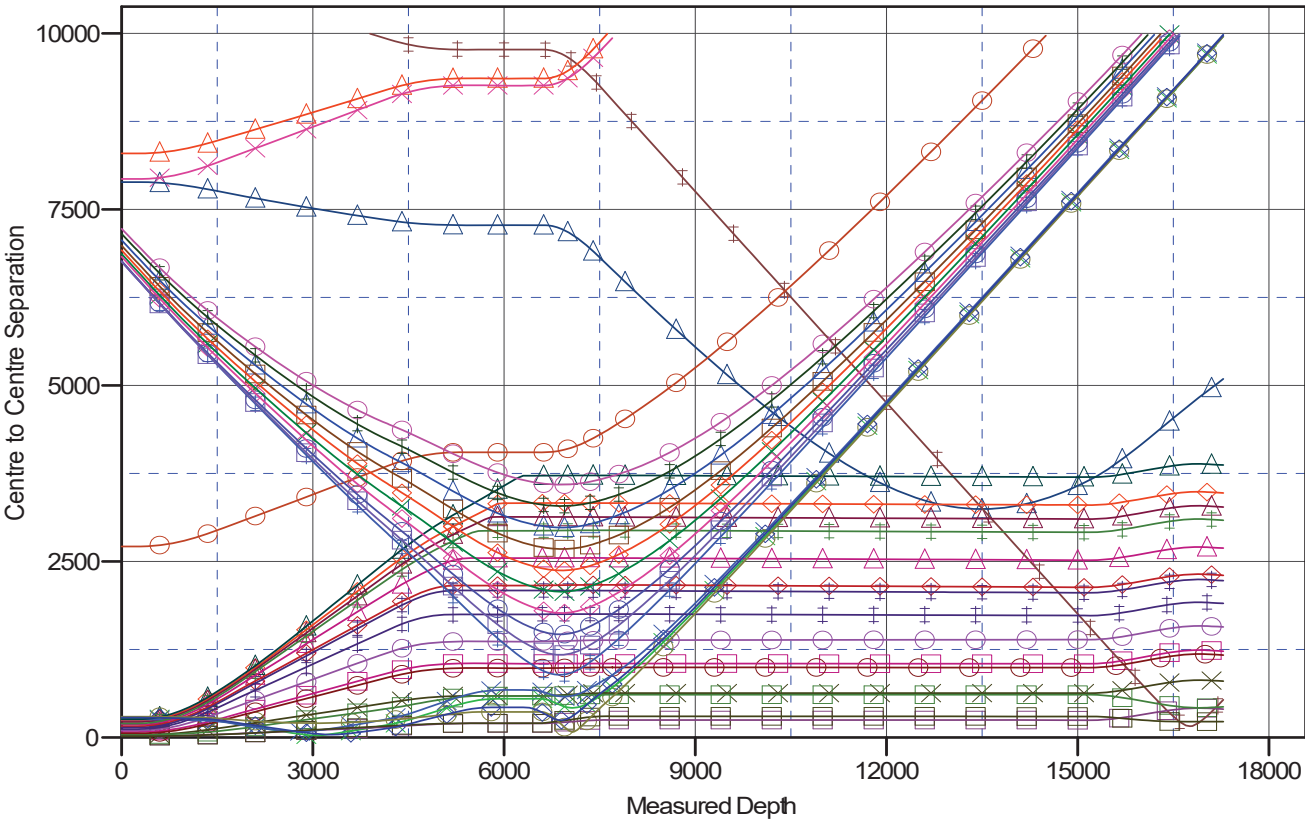
## Summary

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	2,766.57	2,879.34	86.38	46.60	2.171	CC
BOYD 24-1H - Wellbore #1 - Design #1	2,800.00	2,912.25	86.58	45.82	2.124	ES
BOYD 24-1H - Wellbore #1 - Design #1	2,900.00	3,010.69	89.51	46.71	2.091	SF
BOYD 24-2H - Wellbore #1 - Design #1	3,043.30	3,160.92	30.10	-15.29	0.663	Level 1, CC, ES, SF
BOYD 24-3H - Wellbore #1 - Design #1	3,289.73	3,411.30	41.76	-8.08	0.838	Level 1, CC
BOYD 24-3H - Wellbore #1 - Design #1	3,300.00	3,421.47	41.78	-8.35	0.833	Level 1, ES, SF
BOYD 24-4H - Wellbore #1 - Design #1	7,050.00	7,270.70	83.97	11.64	1.161	Level 2, ES, SF
BOYD 24-4H - Wellbore #1 - Design #1	7,076.01	7,272.38	79.86	13.38	1.201	Level 2, CC
HELEN 24-10H - Wellbore #1 - Design #1	250.00	249.00	100.13	92.52	13.165	CC, ES
HELEN 24-10H - Wellbore #1 - Design #1	17,285.49	16,927.58	1,571.11	1,053.83	3.037	SF
HELEN 24-11H - Wellbore #1 - Design #1	250.00	249.00	119.98	112.38	15.775	CC, ES
HELEN 24-11H - Wellbore #1 - Design #1	17,285.49	17,044.39	1,905.64	1,384.57	3.657	SF
HELEN 24-12H - Wellbore #1 - Design #1	250.00	249.00	140.12	132.52	18.423	CC, ES
HELEN 24-12H - Wellbore #1 - Design #1	17,285.49	17,241.17	2,228.00	1,705.33	4.263	SF
HELEN 24-13H - Wellbore #1 - Design #1	250.00	248.00	159.98	152.37	21.034	CC, ES
HELEN 24-13H - Wellbore #1 - Design #1	17,285.49	17,026.77	2,303.74	1,783.09	4.425	SF
HELEN 24-14H - Wellbore #1 - Design #1	250.00	248.00	180.11	172.51	23.682	CC, ES
HELEN 24-14H - Wellbore #1 - Design #1	17,285.49	17,189.67	2,690.09	2,167.58	5.148	SF
HELEN 24-15H - Wellbore #1 - Design #1	250.00	248.00	199.97	192.37	26.293	CC, ES
HELEN 24-15H - Wellbore #1 - Design #1	17,285.49	17,223.10	3,086.88	2,564.41	5.908	SF
HELEN 24-16H - Wellbore #1 - Design #1	250.00	248.00	220.11	212.50	28.941	CC, ES
HELEN 24-16H - Wellbore #1 - Design #1	17,285.49	17,501.43	3,274.95	2,751.18	6.253	SF
HELEN 24-17H - Wellbore #1 - Design #1	250.00	248.00	239.97	232.36	31.552	CC, ES
HELEN 24-17H - Wellbore #1 - Design #1	17,285.49	17,418.79	3,474.22	2,950.55	6.634	SF
HELEN 24-18H - Wellbore #1 - Design #1	250.00	247.00	260.10	252.50	34.201	CC, ES
HELEN 24-18H - Wellbore #1 - Design #1	17,285.49	17,484.49	3,870.25	3,346.38	7.388	SF
HELEN 24-3H - Wellbore #1 - Design #1	250.00	251.00	39.99	32.39	5.258	CC
HELEN 24-3H - Wellbore #1 - Design #1	17,028.88	17,015.58	424.55	-58.44	0.879	Level 1, SF
HELEN 24-3H - Wellbore #1 - Design #1	17,285.49	17,271.90	435.91	-59.82	0.879	Level 1, ES
HELEN 24-4H - Wellbore #1 - Design #1	250.00	250.00	19.86	12.25	2.610	CC
HELEN 24-4H - Wellbore #1 - Design #1	15,600.00	15,421.41	281.57	-19.81	0.934	Level 1, ES
HELEN 24-4H - Wellbore #1 - Design #1	15,652.79	15,473.62	276.92	-19.70	0.934	Level 1, SF
HELEN 24-6H - Wellbore #1 - Design #1	250.00	250.00	20.14	12.53	2.648	CC
HELEN 24-6H - Wellbore #1 - Design #1	15,400.00	15,216.47	252.88	-108.89	0.699	Level 1, SF
HELEN 24-6H - Wellbore #1 - Design #1	15,500.00	15,316.09	259.92	-109.87	0.703	Level 1, ES
HELEN 24-7H - Wellbore #1 - Design #1	250.00	250.00	40.00	32.39	5.259	CC, ES
HELEN 24-7H - Wellbore #1 - Design #1	15,400.00	15,080.07	637.27	225.52	1.548	SF
HELEN 24-8H - Wellbore #1 - Design #1	250.00	250.00	60.13	52.53	7.905	CC, ES
HELEN 24-8H - Wellbore #1 - Design #1	17,285.49	17,001.31	1,171.64	653.59	2.262	SF
HELEN 24-9H - Wellbore #1 - Design #1	250.00	249.00	79.99	72.38	10.517	CC, ES
HELEN 24-9H - Wellbore #1 - Design #1	17,285.49	17,152.52	1,226.91	704.89	2.350	SF

Reference Depths are relative to RKB = 20' @ 4945.00usft (Drilling Rig)  
Offset Depths are relative to Offset Datum  
Central Meridian is -105.500000

Coordinates are relative to: HELEN 24-5H  
Coordinate System is US State Plane 1983, Colorado Northern Zone  
Grid Convergence at Surface is: 0.65°

Ladder Plot



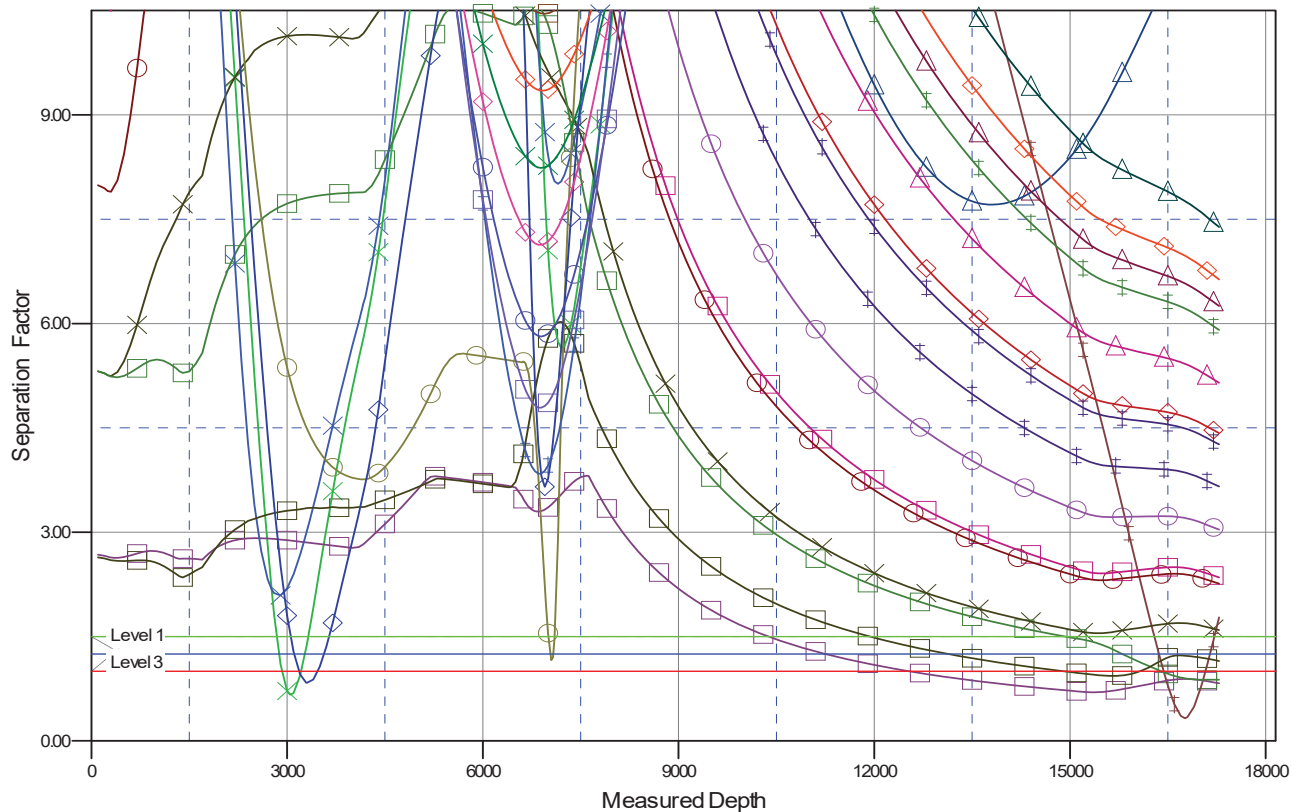
LEGEND

- |  |  |  |
|--|--|--|
| STATEC14-36, Prima Exploration PWWel, No SurveysV0 | HELEN24-8H Wellbore #1, Design #1 V0                       | L.E. Gekin #11H Red Hawk Petroleum Planned Well, Planned Cathedral SurveysV0 |
| StateC14-36, Noble Energy PWWel, No SurveysV0      | BOYD24-1H Wellbore #1, Design #1 V0                        | L.E. Gekin #10H Red Hawk Petroleum Planned Well, Planned Cathedral SurveysV0 |
| ARNDLDP1, Barron Resource PWWel, No SurveysV0      | HELEN24-14H Wellbore #1, Design #1 V0                      | L.E. Gekin #13H Red Hawk Petroleum Planned Well, Planned Cathedral SurveysV0 |
| DARYL, LARNDLDP1, Amoco DAWel, No SurveysV0        | HELEN24-13H Wellbore #1, Design #1 V0                      | L.E. Gekin #12H Red Hawk Petroleum Planned Well, Planned Cathedral SurveysV0 |
| HELEN24-9H Wellbore #1, Design #1 V0               | HELEN24-12H Wellbore #1, Design #1 V0                      | L.E. Gekin #14H Red Hawk Petroleum Planned Well, Planned Cathedral SurveysV0 |
| HELEN24-10H Wellbore #1, Design #1 V0              | HELEN24-18H Wellbore #1, Design #1 V0                      | L.E. Gekin #15H Red Hawk Petroleum Planned Well, Planned Cathedral SurveysV0 |
| BOYD24-2H Wellbore #1, Design #1 V0                | HELEN24-4H Wellbore #1, Design #1 V0                       | L.E. Gekin #9H Red Hawk Petroleum Planned Well, Planned Cathedral SurveysV0  |
| HELEN24-7H Wellbore #1, Design #1 V0               | HELEN24-11H Wellbore #1, Design #1 V0                      | L.E. Gekin #8H Red Hawk Petroleum Planned Well, Planned Cathedral SurveysV0  |
| HELEN24-16H Wellbore #1, Design #1 V0              | BOYD24-4H Wellbore #1, Design #1 V0                        | L.E. Gekin #7H Red Hawk Petroleum Planned Well, Planned Cathedral SurveysV0  |
| HELEN24-6H Wellbore #1, Design #1 V0               | BOYD24-3H Wellbore #1, Design #1 V0                        |  |
| HELEN24-3H Wellbore #1, Design #1 V0               | MOCLINTOCK ET AL #1, Juniper Oil & Gas DAWel, No SurveysV0 |  |

Reference Depths are relative to RKB = 20' @ 4945.00usft (Drilling Rig)  
Offset Depths are relative to Offset Datum  
Central Meridian is -105.500000

Coordinates are relative to: HELEN 24-5H  
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 | HELEN24-8H Wellbore #1, Design #1 V0                        | L.E. Gelin #11H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0 |
| StateFC14-36, Noble Energy P/Well, No Surveys V0     | BOYD24-1H Wellbore #1, Design #1 V0                         | L.E. Gelin #10H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0 |
| ARNDL D/F, Liberton Resources P/Well, No Surveys V0  | HELEN24-14H Wellbore #1, Design #1 V0                       | L.E. Gelin #13H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0 |
| DARYL, LARNDL D/F1, Amoco D/Well, No Surveys V0      | HELEN24-13H Wellbore #1, Design #1 V0                       | L.E. Gelin #12H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0 |
| HELEN24-9H Wellbore #1, Design #1 V0                 | HELEN24-12H Wellbore #1, Design #1 V0                       | L.E. Gelin #14H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0 |
| HELEN24-10H Wellbore #1, Design #1 V0                | HELEN24-18H Wellbore #1, Design #1 V0                       | L.E. Gelin #15H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0 |
| BOYD24-2H Wellbore #1, Design #1 V0                  | HELEN24-15H Wellbore #1, Design #1 V0                       | L.E. Gelin #9H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0  |
| HELEN24-7H Wellbore #1, Design #1 V0                 | HELEN24-4H Wellbore #1, Design #1 V0                        | L.E. Gelin #6H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0  |
| HELEN24-16H Wellbore #1, Design #1 V0                | HELEN24-11H Wellbore #1, Design #1 V0                       | L.E. Gelin #5H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0  |
| HELEN24-6H Wellbore #1, Design #1 V0                 | BOYD24-4H Wellbore #1, Design #1 V0                         | L.E. Gelin #7H Red Hawk Petroleum Planned Well, Planned Cathedral Surveys V0  |
| HELEN24-3H Wellbore #1, Design #1 V0                 | BOYD24-3H Wellbore #1, Design #1 V0                         |   |
|  | MOCLINDOCK ET AL #1, Limper Oil & Gas D/Well, No Surveys V0 |   |