

VERDAD RESOURCES

WATTENBERG FIELD

ARNOLD 02N-64W-24

HELEN 24-15H

Wellbore #1

Plan: Design #1

Standard Planning Report

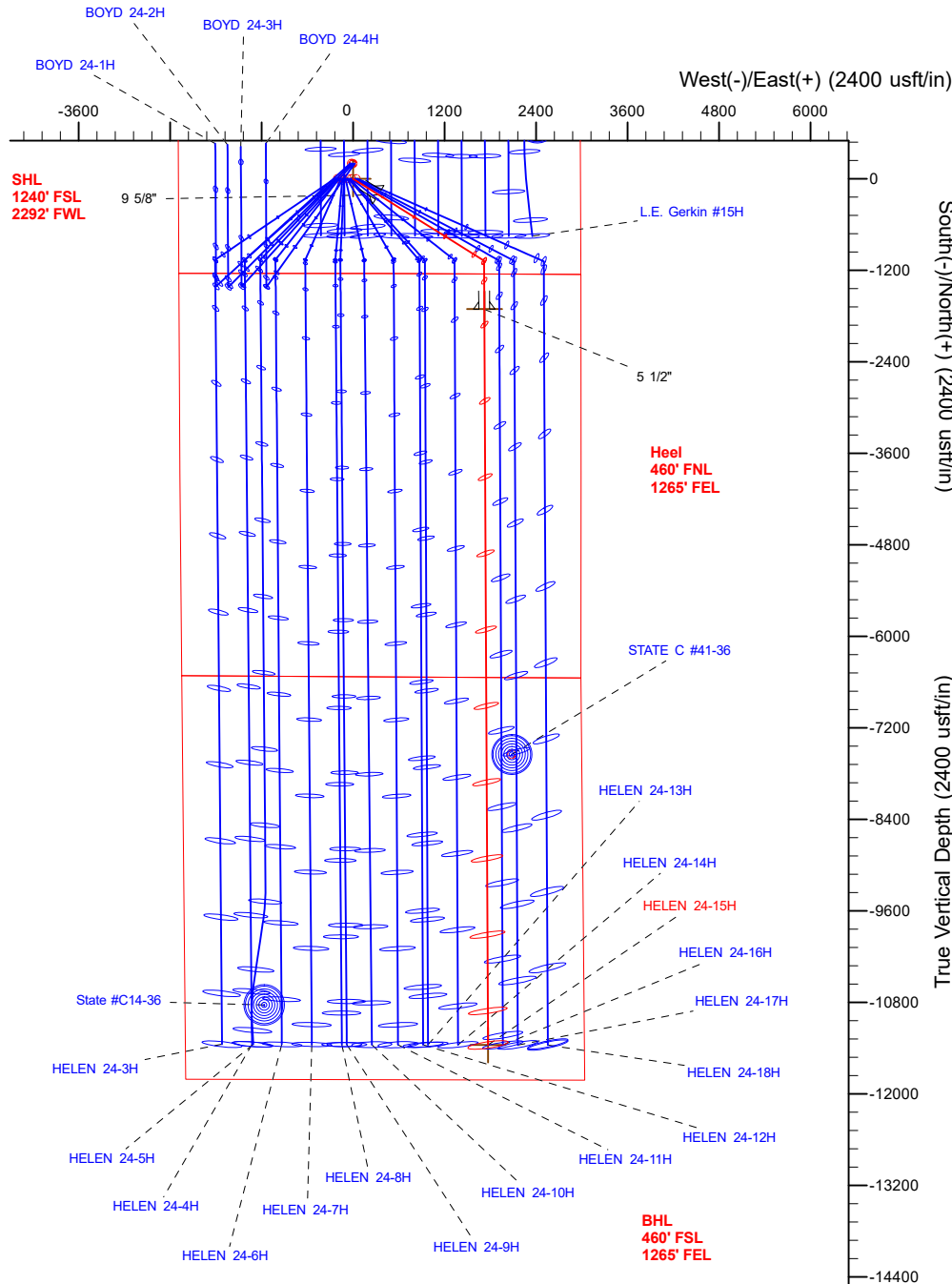
02 November, 2017

Project: WATTENBERG FIELD
Site: ARNOLD 02N-64W-24
Well: HELEN 24-15H
Wellbore: Wellbore #1
Design: Design #1

VERDAD RESOURCES

CASING DETAILS

TVD	MD	Name	Size
1700.00	1769.88	9 5/8"	9-5/8
6775.00	7599.15	5 1/2"	5-1/2

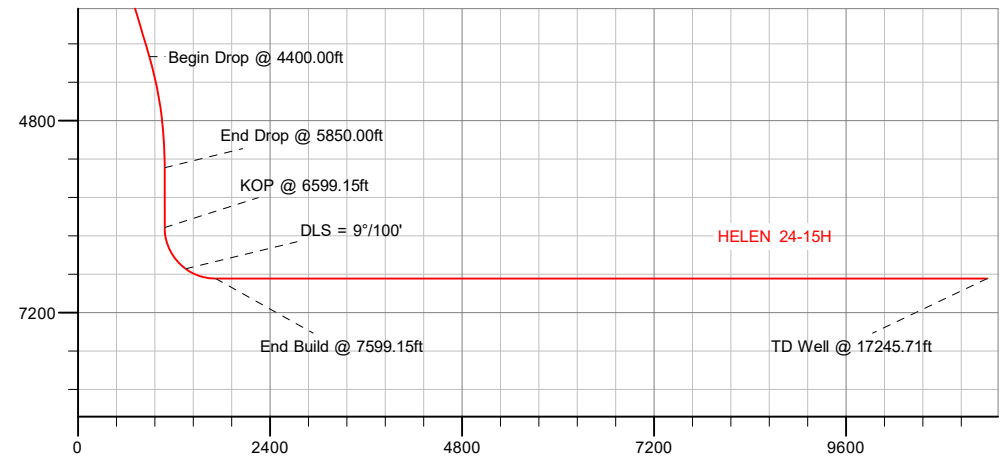


SECTION DETAILS

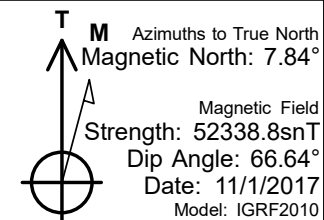
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00	
3	1700.00	29.00	122.00	1638.88	-190.34	304.61	2.00	122.00	191.83	
4	4400.00	29.00	122.00	4000.35	-884.00	1414.69	0.00	0.00	890.90	
5	5850.00	0.00	0.00	5389.23	-1074.34	1719.30	2.00	180.00	1082.73	
6	6599.15	0.00	0.00	6138.38	-1074.34	1719.30	0.00	0.00	1082.73	
7	7599.15	90.00	179.72	6775.00	-1710.95	1722.40	9.00	179.72	1719.35	
8	17245.71	90.00	179.72	6775.00	-11357.39	1769.38	0.00	0.00	11365.90	HELEN 24-15H_BHL

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
HELEN 24-15H_SHL	0.00	0.00	0.00	40.120051	-104.500936
HELEN 24-15H_BHL	6775.00	-11357.39	1769.38	40.088873	-104.494612



Vertical Section at 179.72° (2400 usft/in)



WELL DETAILS: HELEN 24-15H

GL = 4923'

RKB = 20' @ 4943.00usft (Drilling Rig)

Plan: Design #1 (HELEN 24-15H/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 24-15H					
Well Position	+N/-S	-200.73 usft	Northing:	1,288,152.47 usft	Latitude:	40.120051
	+E/-W	37.75 usft	Easting:	3,279,392.75 usft	Longitude:	-104.500936
Position Uncertainty		3.28 usft	Wellhead Elevation:		Ground Level:	4,923.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/1/2017	7.84	66.64	52,338.78265124

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	179.72

Plan Survey Tool Program	Date	11/2/2017			
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	17,245.71	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	
1,700.00	29.00	122.00	1,638.88	-190.34	304.61	2.00	2.00	0.00	122.00	
4,400.00	29.00	122.00	4,000.35	-884.00	1,414.69	0.00	0.00	0.00	0.00	
5,850.00	0.00	0.00	5,389.23	-1,074.34	1,719.30	2.00	-2.00	0.00	180.00	
6,599.15	0.00	0.00	6,138.38	-1,074.34	1,719.30	0.00	0.00	0.00	0.00	
7,599.15	90.00	179.72	6,775.00	-1,710.95	1,722.40	9.00	9.00	17.97	179.72	
17,245.71	90.00	179.72	6,775.00	-11,357.39	1,769.38	0.00	0.00	0.00	0.00	HELEN 24-15H_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	122.00	300.00	-0.23	0.37	0.23	2.00	2.00	0.00
400.00	3.00	122.00	399.93	-2.08	3.33	2.10	2.00	2.00	0.00
500.00	5.00	122.00	499.68	-5.78	9.24	5.82	2.00	2.00	0.00
600.00	7.00	122.00	599.13	-11.32	18.11	11.40	2.00	2.00	0.00
700.00	9.00	122.00	698.15	-18.69	29.91	18.84	2.00	2.00	0.00
800.00	11.00	122.00	796.63	-27.89	44.64	28.11	2.00	2.00	0.00
900.00	13.00	122.00	894.44	-38.91	62.27	39.21	2.00	2.00	0.00
1,000.00	15.00	122.00	991.46	-51.73	82.78	52.13	2.00	2.00	0.00
1,100.00	17.00	122.00	1,087.58	-66.33	106.16	66.85	2.00	2.00	0.00
1,200.00	19.00	122.00	1,182.68	-82.71	132.36	83.35	2.00	2.00	0.00
1,300.00	21.00	122.00	1,276.65	-100.83	161.36	101.62	2.00	2.00	0.00
1,400.00	23.00	122.00	1,369.36	-120.68	193.13	121.62	2.00	2.00	0.00
1,500.00	25.00	122.00	1,460.71	-142.23	227.62	143.35	2.00	2.00	0.00
1,600.00	27.00	122.00	1,550.59	-165.46	264.80	166.76	2.00	2.00	0.00
1,700.00	29.00	122.00	1,638.88	-190.34	304.61	191.83	2.00	2.00	0.00
End Nudge @ 1700.00ft									
1,769.88	29.00	122.00	1,700.00	-208.29	333.34	209.92	0.00	0.00	0.00
9 5/8"									
1,800.00	29.00	122.00	1,726.34	-216.03	345.72	217.72	0.00	0.00	0.00
1,900.00	29.00	122.00	1,813.80	-241.72	386.84	243.61	0.00	0.00	0.00
2,000.00	29.00	122.00	1,901.26	-267.41	427.95	269.50	0.00	0.00	0.00
2,100.00	29.00	122.00	1,988.73	-293.10	469.07	295.39	0.00	0.00	0.00
2,200.00	29.00	122.00	2,076.19	-318.80	510.18	321.29	0.00	0.00	0.00
2,300.00	29.00	122.00	2,163.65	-344.49	551.29	347.18	0.00	0.00	0.00
2,400.00	29.00	122.00	2,251.11	-370.18	592.41	373.07	0.00	0.00	0.00
2,500.00	29.00	122.00	2,338.57	-395.87	633.52	398.96	0.00	0.00	0.00
2,600.00	29.00	122.00	2,426.04	-421.56	674.64	424.85	0.00	0.00	0.00
2,700.00	29.00	122.00	2,513.50	-447.25	715.75	450.74	0.00	0.00	0.00
2,800.00	29.00	122.00	2,600.96	-472.94	756.86	476.63	0.00	0.00	0.00
2,900.00	29.00	122.00	2,688.42	-498.63	797.98	502.53	0.00	0.00	0.00
3,000.00	29.00	122.00	2,775.88	-524.32	839.09	528.42	0.00	0.00	0.00
3,100.00	29.00	122.00	2,863.34	-550.01	880.21	554.31	0.00	0.00	0.00
3,200.00	29.00	122.00	2,950.81	-575.71	921.32	580.20	0.00	0.00	0.00
3,300.00	29.00	122.00	3,038.27	-601.40	962.44	606.09	0.00	0.00	0.00
3,400.00	29.00	122.00	3,125.73	-627.09	1,003.55	631.98	0.00	0.00	0.00
3,500.00	29.00	122.00	3,213.19	-652.78	1,044.66	657.88	0.00	0.00	0.00
3,600.00	29.00	122.00	3,300.65	-678.47	1,085.78	683.77	0.00	0.00	0.00
3,700.00	29.00	122.00	3,388.12	-704.16	1,126.89	709.66	0.00	0.00	0.00
3,800.00	29.00	122.00	3,475.58	-729.85	1,168.01	735.55	0.00	0.00	0.00
3,900.00	29.00	122.00	3,563.04	-755.54	1,209.12	761.44	0.00	0.00	0.00
4,000.00	29.00	122.00	3,650.50	-781.23	1,250.24	787.33	0.00	0.00	0.00
4,100.00	29.00	122.00	3,737.96	-806.92	1,291.35	813.23	0.00	0.00	0.00
4,200.00	29.00	122.00	3,825.43	-832.62	1,332.46	839.12	0.00	0.00	0.00
4,300.00	29.00	122.00	3,912.89	-858.31	1,373.58	865.01	0.00	0.00	0.00
4,400.00	29.00	122.00	4,000.35	-884.00	1,414.69	890.90	0.00	0.00	0.00
Begin Drop @ 4400.00ft									
4,500.00	27.00	122.00	4,088.64	-908.87	1,454.50	915.97	2.00	-2.00	0.00
4,600.00	25.00	122.00	4,178.52	-932.10	1,491.68	939.38	2.00	-2.00	0.00
4,700.00	23.00	122.00	4,269.87	-953.66	1,526.17	961.10	2.00	-2.00	0.00
4,800.00	21.00	122.00	4,362.58	-973.51	1,557.94	981.11	2.00	-2.00	0.00
4,900.00	19.00	122.00	4,456.54	-991.63	1,586.94	999.37	2.00	-2.00	0.00
5,000.00	17.00	122.00	4,551.64	-1,008.00	1,613.14	1,015.88	2.00	-2.00	0.00
5,100.00	15.00	122.00	4,647.77	-1,022.61	1,636.52	1,030.60	2.00	-2.00	0.00
5,200.00	13.00	122.00	4,744.79	-1,035.43	1,657.03	1,043.51	2.00	-2.00	0.00
5,300.00	11.00	122.00	4,842.60	-1,046.45	1,674.66	1,054.62	2.00	-2.00	0.00
5,400.00	9.00	122.00	4,941.08	-1,055.65	1,689.39	1,063.89	2.00	-2.00	0.00
5,500.00	7.00	122.00	5,040.10	-1,063.02	1,701.19	1,071.32	2.00	-2.00	0.00
5,600.00	5.00	122.00	5,139.55	-1,068.56	1,710.06	1,076.91	2.00	-2.00	0.00
5,700.00	3.00	122.00	5,239.30	-1,072.26	1,715.97	1,080.63	2.00	-2.00	0.00
5,800.00	1.00	122.00	5,339.23	-1,074.11	1,718.93	1,082.49	2.00	-2.00	0.00
5,850.00	0.00	0.00	5,389.23	-1,074.34	1,719.30	1,082.73	2.00	-2.00	-244.00

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)
End Drop @ 5850.00ft									
5,900.00	0.00	0.00	5,439.23	-1,074.34	1,719.30	1,082.73	0.00	0.00	0.00
6,000.00	0.00	0.00	5,539.23	-1,074.34	1,719.30	1,082.73	0.00	0.00	0.00
6,100.00	0.00	0.00	5,639.23	-1,074.34	1,719.30	1,082.73	0.00	0.00	0.00
6,200.00	0.00	0.00	5,739.23	-1,074.34	1,719.30	1,082.73	0.00	0.00	0.00
6,300.00	0.00	0.00	5,839.23	-1,074.34	1,719.30	1,082.73	0.00	0.00	0.00
6,400.00	0.00	0.00	5,939.23	-1,074.34	1,719.30	1,082.73	0.00	0.00	0.00
6,500.00	0.00	0.00	6,039.23	-1,074.34	1,719.30	1,082.73	0.00	0.00	0.00
6,599.15	0.00	0.00	6,138.38	-1,074.34	1,719.30	1,082.73	0.00	0.00	0.00
KOP @ 6599.15ft									
6,650.00	4.58	179.72	6,189.17	-1,076.37	1,719.31	1,084.76	9.00	9.00	0.00
6,700.00	9.08	179.72	6,238.81	-1,082.31	1,719.34	1,090.70	9.00	9.00	0.00
6,750.00	13.58	179.72	6,287.82	-1,092.13	1,719.39	1,100.52	9.00	9.00	0.00
6,800.00	18.08	179.72	6,335.91	-1,105.76	1,719.45	1,114.15	9.00	9.00	0.00
6,850.00	22.58	179.72	6,382.79	-1,123.12	1,719.54	1,131.51	9.00	9.00	0.00
6,900.00	27.08	179.72	6,428.15	-1,144.11	1,719.64	1,152.50	9.00	9.00	0.00
6,950.00	31.58	179.72	6,471.74	-1,168.59	1,719.76	1,176.98	9.00	9.00	0.00
7,000.00	36.08	179.72	6,513.26	-1,196.42	1,719.90	1,204.81	9.00	9.00	0.00
7,050.00	40.58	179.72	6,552.48	-1,227.42	1,720.05	1,235.81	9.00	9.00	0.00
7,100.00	45.08	179.72	6,589.14	-1,261.40	1,720.21	1,269.79	9.00	9.00	0.00
7,150.00	49.58	179.72	6,623.02	-1,298.15	1,720.39	1,306.54	9.00	9.00	0.00
7,200.00	54.08	179.72	6,653.91	-1,337.45	1,720.58	1,345.84	9.00	9.00	0.00
DLS = 9°/100'									
7,250.00	58.58	179.72	6,681.63	-1,379.05	1,720.78	1,387.44	9.00	9.00	0.00
7,300.00	63.08	179.72	6,706.00	-1,422.69	1,721.00	1,431.09	9.00	9.00	0.00
7,350.00	67.58	179.72	6,726.86	-1,468.12	1,721.22	1,476.51	9.00	9.00	0.00
7,400.00	72.08	179.72	6,744.10	-1,515.04	1,721.45	1,523.43	9.00	9.00	0.00
7,450.00	76.58	179.72	6,757.61	-1,563.16	1,721.68	1,571.56	9.00	9.00	0.00
7,500.00	81.08	179.72	6,767.29	-1,612.20	1,721.92	1,620.60	9.00	9.00	0.00
7,550.00	85.58	179.72	6,773.10	-1,661.85	1,722.16	1,670.25	9.00	9.00	0.00
7,599.15	90.00	179.72	6,775.00	-1,710.95	1,722.40	1,719.35	9.00	9.00	0.00
End Build @ 7599.15ft - 5 1/2"									
7,700.00	90.00	179.72	6,775.00	-1,811.80	1,722.89	1,820.20	0.00	0.00	0.00
7,800.00	90.00	179.72	6,775.00	-1,911.80	1,723.38	1,920.20	0.00	0.00	0.00
7,900.00	90.00	179.72	6,775.00	-2,011.80	1,723.87	2,020.20	0.00	0.00	0.00
8,000.00	90.00	179.72	6,775.00	-2,111.80	1,724.35	2,120.20	0.00	0.00	0.00
8,100.00	90.00	179.72	6,775.00	-2,211.79	1,724.84	2,220.20	0.00	0.00	0.00
8,200.00	90.00	179.72	6,775.00	-2,311.79	1,725.33	2,320.20	0.00	0.00	0.00
8,300.00	90.00	179.72	6,775.00	-2,411.79	1,725.81	2,420.20	0.00	0.00	0.00
8,400.00	90.00	179.72	6,775.00	-2,511.79	1,726.30	2,520.20	0.00	0.00	0.00
8,500.00	90.00	179.72	6,775.00	-2,611.79	1,726.79	2,620.20	0.00	0.00	0.00
8,600.00	90.00	179.72	6,775.00	-2,711.79	1,727.28	2,720.20	0.00	0.00	0.00
8,700.00	90.00	179.72	6,775.00	-2,811.79	1,727.76	2,820.20	0.00	0.00	0.00
8,800.00	90.00	179.72	6,775.00	-2,911.79	1,728.25	2,920.20	0.00	0.00	0.00
8,900.00	90.00	179.72	6,775.00	-3,011.79	1,728.74	3,020.20	0.00	0.00	0.00
9,000.00	90.00	179.72	6,775.00	-3,111.78	1,729.22	3,120.20	0.00	0.00	0.00
9,100.00	90.00	179.72	6,775.00	-3,211.78	1,729.71	3,220.20	0.00	0.00	0.00
9,200.00	90.00	179.72	6,775.00	-3,311.78	1,730.20	3,320.20	0.00	0.00	0.00
9,300.00	90.00	179.72	6,775.00	-3,411.78	1,730.68	3,420.20	0.00	0.00	0.00
9,400.00	90.00	179.72	6,775.00	-3,511.78	1,731.17	3,520.20	0.00	0.00	0.00
9,500.00	90.00	179.72	6,775.00	-3,611.78	1,731.66	3,620.20	0.00	0.00	0.00
9,600.00	90.00	179.72	6,775.00	-3,711.78	1,732.15	3,720.20	0.00	0.00	0.00
9,700.00	90.00	179.72	6,775.00	-3,811.78	1,732.63	3,820.20	0.00	0.00	0.00
9,800.00	90.00	179.72	6,775.00	-3,911.77	1,733.12	3,920.20	0.00	0.00	0.00
9,900.00	90.00	179.72	6,775.00	-4,011.77	1,733.61	4,020.20	0.00	0.00	0.00
10,000.00	90.00	179.72	6,775.00	-4,111.77	1,734.09	4,120.20	0.00	0.00	0.00
10,100.00	90.00	179.72	6,775.00	-4,211.77	1,734.58	4,220.20	0.00	0.00	0.00
10,200.00	90.00	179.72	6,775.00	-4,311.77	1,735.07	4,320.20	0.00	0.00	0.00
10,300.00	90.00	179.72	6,775.00	-4,411.77	1,735.56	4,420.20	0.00	0.00	0.00
10,400.00	90.00	179.72	6,775.00	-4,511.77	1,736.04	4,520.20	0.00	0.00	0.00
10,500.00	90.00	179.72	6,775.00	-4,611.77	1,736.53	4,620.20	0.00	0.00	0.00
10,600.00	90.00	179.72	6,775.00	-4,711.76	1,737.02	4,720.20	0.00	0.00	0.00
10,700.00	90.00	179.72	6,775.00	-4,811.76	1,737.50	4,820.20	0.00	0.00	0.00
10,800.00	90.00	179.72	6,775.00	-4,911.76	1,737.99	4,920.20	0.00	0.00	0.00
10,900.00	90.00	179.72	6,775.00	-5,011.76	1,738.48	5,020.20	0.00	0.00	0.00
11,000.00	90.00	179.72	6,775.00	-5,111.76	1,738.96	5,120.20	0.00	0.00	0.00

Casing Points					
	Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
	1,769.88	1,700.00	9 5/8"	9-5/8	13-1/2
	7,599.15	6,775.00	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
	1,700.00	1,638.88	-190.34	304.61	End Nudge @ 1700.00ft
	4,400.00	4,000.35	-884.00	1,414.69	Begin Drop @ 4400.00ft
	5,850.00	5,389.23	-1,074.34	1,719.30	End Drop @ 5850.00ft
	6,599.15	6,138.38	-1,074.34	1,719.30	KOP @ 6599.15ft
	7,200.00	6,653.91	-1,337.45	1,720.58	DLS = 9°/100'
	7,599.15	6,775.00	-1,710.95	1,722.40	End Build @ 7599.15ft
	17,245.71	6,775.00	-11,357.39	1,769.38	TD Well @ 17245.71ft

VERDAD RESOURCES

WATTENBERG FIELD

ARNOLD 02N-64W-24

HELEN 24-15H

Wellbore #1

Design #1

Anticollision Summary Report

02 November, 2017

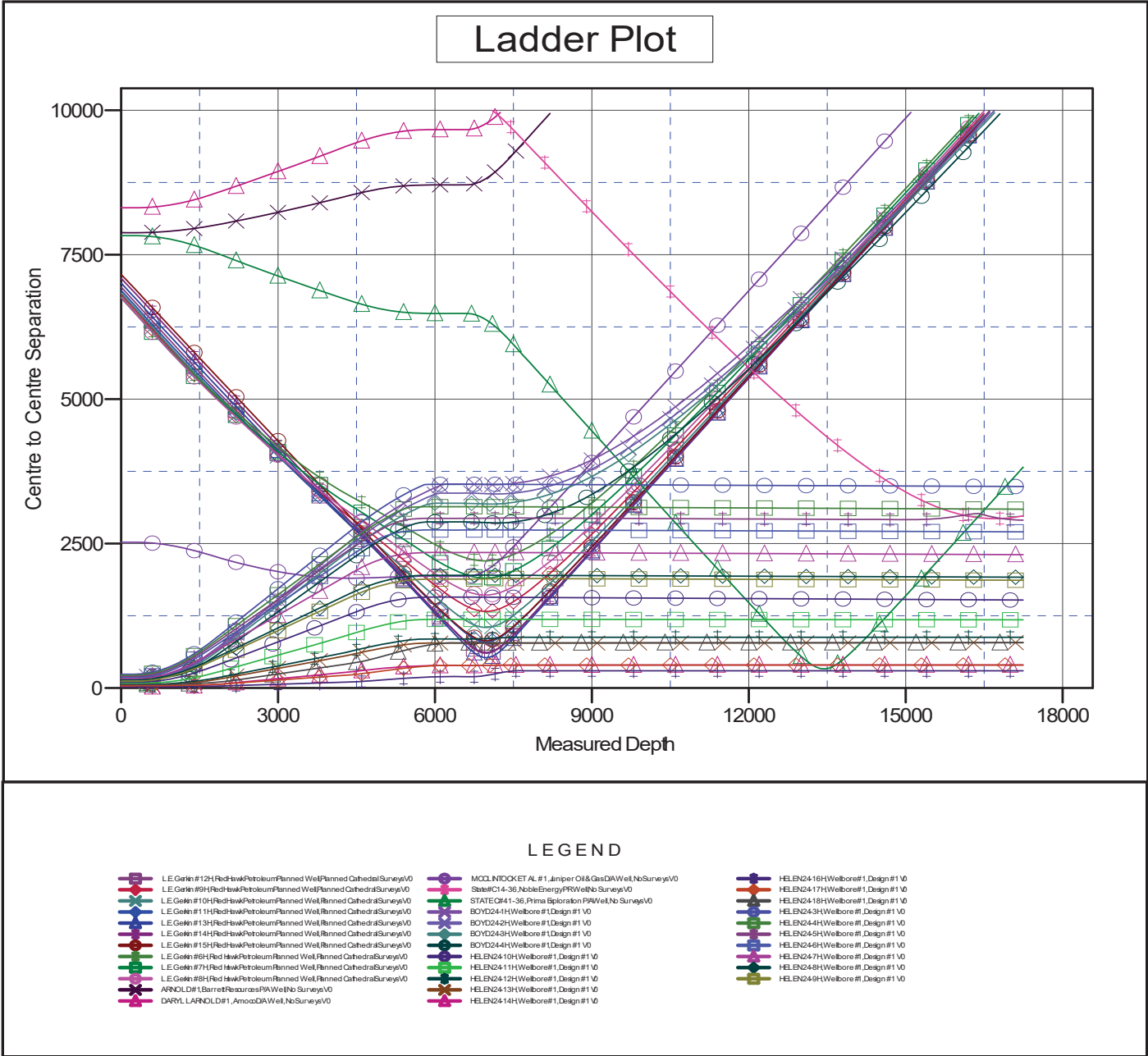
Reference	Design #1				
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria				
Interpolation Method:	Stations	Error Model:	ISCWSA		
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D		
Results Limited by:	Maximum center-center distance of 9,999.98 usft	Error Surface: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

Survey Tool Program		Date	11/2/2017		
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	17,245.71	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 - P	6,979.59	16,446.50	601.30	452.34	4.037	CC, ES, SF
L.E. Gerkin #9H - Red Hawk Petroleum Planned Well - P	6,977.19	16,541.50	1,326.61	1,083.94	5.467	CC, ES, SF
L.E. Gerkin #10H - Red Hawk Petroleum Planned Well - P	6,977.66	16,489.70	1,049.56	820.91	4.590	CC, ES, SF
L.E. Gerkin #11H - Red Hawk Petroleum Planned Well - P	6,978.07	16,457.40	799.13	597.18	3.957	CC, ES, SF
L.E. Gerkin #13H - Red Hawk Petroleum Planned Well - P	6,900.00	16,448.80	536.94	438.37	5.447	SF
L.E. Gerkin #13H - Red Hawk Petroleum Planned Well - P	6,950.00	16,448.80	527.52	432.08	5.527	ES
L.E. Gerkin #13H - Red Hawk Petroleum Planned Well - P	6,980.01	16,448.80	525.96	432.70	5.640	CC
L.E. Gerkin #14H - Red Hawk Petroleum Planned Well - P	6,980.51	16,481.10	617.32	439.29	3.467	CC, ES
L.E. Gerkin #14H - Red Hawk Petroleum Planned Well - P	7,000.00	16,481.10	617.88	439.65	3.467	SF
L.E. Gerkin #15H - Red Hawk Petroleum Planned Well - P	6,981.00	16,511.10	821.26	590.29	3.556	CC
L.E. Gerkin #15H - Red Hawk Petroleum Planned Well - P	7,000.00	16,511.10	821.66	590.15	3.549	ES, SF
2N-64W-13 L.E. GERKIN WEST PAD						
L.E. Gerkin #6H - Red Hawk Petroleum Planned Well - P	6,950.00	16,431.70	2,200.69	1,949.44	8.759	SF
L.E. Gerkin #6H - Red Hawk Petroleum Planned Well - P	6,957.78	16,431.70	2,200.66	1,949.42	8.759	CC, ES
L.E. Gerkin #7H - Red Hawk Petroleum Planned Well - P	6,950.00	16,464.00	1,902.15	1,655.07	7.699	ES, SF
L.E. Gerkin #7H - Red Hawk Petroleum Planned Well - P	6,958.35	16,464.00	1,902.12	1,655.08	7.700	CC
L.E. Gerkin #8H - Red Hawk Petroleum Planned Well - P	6,950.00	16,517.20	1,608.39	1,367.14	6.667	ES, SF
L.E. Gerkin #8H - Red Hawk Petroleum Planned Well - P	6,959.81	16,517.20	1,608.34	1,367.18	6.669	CC
2N-64W-13 Offsets						
ARNOLD #1 - Barrett Resources P/A Well - No Surveys	250.00	179.00	7,882.49	7,872.75	809.380	CC
ARNOLD #1 - Barrett Resources P/A Well - No Surveys	600.00	528.13	7,888.94	7,867.28	364.322	ES
ARNOLD #1 - Barrett Resources P/A Well - No Surveys	7,150.00	6,552.02	8,932.79	8,657.67	32.468	SF
DARYL L ARNOLD #1 - Amoco D/A Well - No Surveys	250.00	210.00	8,312.55	8,301.89	779.590	CC
DARYL L ARNOLD #1 - Amoco D/A Well - No Surveys	400.00	359.93	8,314.90	8,299.25	531.189	ES
DARYL L ARNOLD #1 - Amoco D/A Well - No Surveys	7,200.00	6,613.91	9,920.37	9,650.86	36.809	SF
2N-64W-24 Offsets						
MCCLINTOCK ET AL #1 - Juniper Oil & Gas D/A Well - N	4,383.51	3,936.93	1,900.07	1,721.15	10.619	CC
MCCLINTOCK ET AL #1 - Juniper Oil & Gas D/A Well - N	6,599.15	6,089.38	1,935.23	1,672.26	7.359	ES
MCCLINTOCK ET AL #1 - Juniper Oil & Gas D/A Well - N	6,800.00	6,286.91	1,964.53	1,694.26	7.269	SF
2N-64W-36 Offsets						
State #C14-36 - Noble Energy PR Well - No Surveys	16,706.90	6,746.00	2,932.65	2,442.72	5.986	CC, ES
State #C14-36 - Noble Energy PR Well - No Surveys	16,800.00	6,746.00	2,934.12	2,443.28	5.978	SF
STATE C #41-36 - Prima Exploration P/A Well - No Surveys	13,438.38	6,704.00	332.15	-80.01	0.806	Level 1, CC, ES, SF

Summary

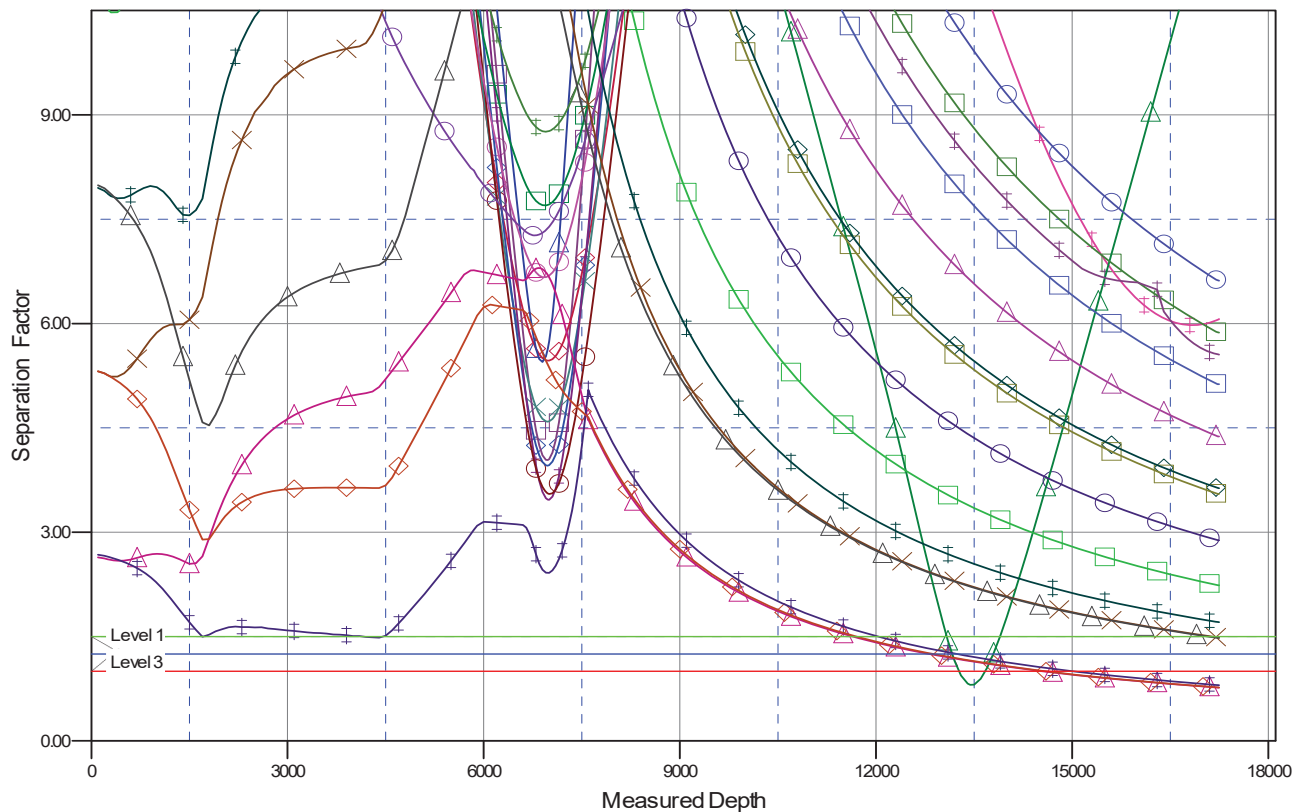
Site Name Offset Well - Wellbore - Design	Reference	Offset	Distance		Separation Factor	Warning
	Measured Depth (usft)	Measured Depth (usft)	Between Centres (usft)	Between Ellipses (usft)		
ARNOLD 02N-64W-24						
BOYD 24-1H - Wellbore #1 - Design #1	250.00	250.00	204.24	196.64	26.852	CC, ES
BOYD 24-1H - Wellbore #1 - Design #1	700.00	710.09	216.63	208.15	25.558	SF
BOYD 24-2H - Wellbore #1 - Design #1	424.31	432.11	200.94	193.14	25.760	CC, ES
BOYD 24-2H - Wellbore #1 - Design #1	800.00	812.63	215.01	206.13	24.215	SF
BOYD 24-3H - Wellbore #1 - Design #1	595.44	611.18	197.20	189.06	24.223	CC
BOYD 24-3H - Wellbore #1 - Design #1	600.00	615.86	197.20	189.05	24.188	ES
BOYD 24-3H - Wellbore #1 - Design #1	900.00	914.54	213.99	204.61	22.800	SF
BOYD 24-4H - Wellbore #1 - Design #1	744.18	767.62	190.47	181.86	22.140	CC, ES
BOYD 24-4H - Wellbore #1 - Design #1	1,000.00	1,019.07	207.59	197.61	20.805	SF
HELEN 24-10H - Wellbore #1 - Design #1	250.39	251.40	99.84	92.24	13.125	CC, ES
HELEN 24-10H - Wellbore #1 - Design #1	17,234.83	16,946.74	1,523.69	995.41	2.884	SF
HELEN 24-11H - Wellbore #1 - Design #1	251.55	252.58	79.99	72.38	10.514	CC, ES
HELEN 24-11H - Wellbore #1 - Design #1	17,240.48	17,064.26	1,181.32	653.07	2.236	SF
HELEN 24-12H - Wellbore #1 - Design #1	253.75	254.82	59.85	52.24	7.865	CC, ES
HELEN 24-12H - Wellbore #1 - Design #1	17,245.71	17,257.01	879.83	364.67	1.708	SF
HELEN 24-13H - Wellbore #1 - Design #1	250.00	250.00	40.00	32.39	5.259	CC, ES
HELEN 24-13H - Wellbore #1 - Design #1	17,245.71	17,041.57	785.93	257.38	1.487	Level 3, SF
HELEN 24-14H - Wellbore #1 - Design #1	250.00	250.00	19.86	12.25	2.611	CC
HELEN 24-14H - Wellbore #1 - Design #1	17,246.56	17,212.05	399.91	-122.94	0.765	Level 1, ES, SF
HELEN 24-16H - Wellbore #1 - Design #1	250.00	250.00	20.14	12.53	2.647	CC
HELEN 24-16H - Wellbore #1 - Design #1	17,246.56	17,524.88	298.48	-74.47	0.800	Level 1, ES, SF
HELEN 24-17H - Wellbore #1 - Design #1	250.00	250.00	39.99	32.39	5.258	CC
HELEN 24-17H - Wellbore #1 - Design #1	17,246.56	17,442.28	399.36	-121.15	0.767	Level 1, ES, SF
HELEN 24-18H - Wellbore #1 - Design #1	268.67	267.34	60.13	52.50	7.889	CC
HELEN 24-18H - Wellbore #1 - Design #1	300.00	298.08	60.13	52.48	7.862	ES
HELEN 24-18H - Wellbore #1 - Design #1	17,246.56	17,509.02	785.07	254.23	1.479	Level 3, SF
HELEN 24-3H - Wellbore #1 - Design #1	250.00	253.00	239.97	232.36	31.543	CC, ES
HELEN 24-3H - Wellbore #1 - Design #1	17,246.56	17,266.86	3,488.60	2,961.45	6.618	SF
HELEN 24-4H - Wellbore #1 - Design #1	250.00	252.00	219.83	212.22	28.897	CC, ES
HELEN 24-4H - Wellbore #1 - Design #1	17,246.56	17,093.67	3,095.04	2,567.77	5.870	SF
HELEN 24-5H - Wellbore #1 - Design #1	250.00	252.00	199.97	192.37	26.287	CC, ES
HELEN 24-5H - Wellbore #1 - Design #1	17,246.56	17,336.26	2,907.47	2,383.97	5.554	SF
HELEN 24-6H - Wellbore #1 - Design #1	250.00	252.00	179.83	172.23	23.640	CC, ES
HELEN 24-6H - Wellbore #1 - Design #1	17,245.71	17,092.09	2,704.03	2,176.68	5.128	SF
HELEN 24-7H - Wellbore #1 - Design #1	250.00	252.00	159.98	152.37	21.030	CC, ES
HELEN 24-7H - Wellbore #1 - Design #1	17,245.71	16,959.80	2,309.94	1,782.13	4.376	SF
HELEN 24-8H - Wellbore #1 - Design #1	250.00	252.00	139.84	132.23	18.383	CC, ES
HELEN 24-8H - Wellbore #1 - Design #1	17,245.71	17,013.55	1,918.23	1,390.35	3.634	SF
HELEN 24-9H - Wellbore #1 - Design #1	250.00	251.00	119.98	112.38	15.773	CC, ES
HELEN 24-9H - Wellbore #1 - Design #1	17,232.50	17,172.00	1,865.36	1,339.93	3.550	SF



Reference Depths are relative to RKB = 20' @ 4943.00usft (Drilling Rig)
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000

Coordinates are relative to: HELEN 24-15H
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.65°

Separation Factor Plot



LEGEND

LE.Gekin #12H Red Hawk Petroleum Planned Well Planned Cathedral Surveys V0	MOCLINTOCK ET AL #1, Junior Oil & Gas DAW Well, No Surveys V0	HELEN24-16H Wellbore #1, Design #1 V0
LE.Gekin #9H Red Hawk Petroleum Planned Well Planned Cathedral Surveys V0	State/C14-36, Noble Energy PRR Well, No Surveys V0	HELEN24-17H Wellbore #1, Design #1 V0
LE.Gekin #10H Red Hawk Petroleum Planned Well Planned Cathedral Surveys V0	STATE/C41-36, Prima Exploration PRR Well, No Surveys V0	HELEN24-18H Wellbore #1, Design #1 V0
LE.Gekin #11H Red Hawk Petroleum Planned Well Planned Cathedral Surveys V0	BOYD24-1H Wellbore #1, Design #1 V0	HELEN24-3H Wellbore #1, Design #1 V0
LE.Gekin #13H Red Hawk Petroleum Planned Well Planned Cathedral Surveys V0	BOYD24-2H Wellbore #1, Design #1 V0	HELEN24-4H Wellbore #1, Design #1 V0
LE.Gekin #14H Red Hawk Petroleum Planned Well Planned Cathedral Surveys V0	BOYD24-3H Wellbore #1, Design #1 V0	HELEN24-5H Wellbore #1, Design #1 V0
LE.Gekin #15H Red Hawk Petroleum Planned Well Planned Cathedral Surveys V0	BOYD24-4H Wellbore #1, Design #1 V0	HELEN24-6H Wellbore #1, Design #1 V0
LE.Gekin #9H Red Hawk Petroleum Planned Well Planned Cathedral Surveys V0	HELEN24-10H Wellbore #1, Design #1 V0	HELEN24-7H Wellbore #1, Design #1 V0
LE.Gekin #7H Red Hawk Petroleum Planned Well Planned Cathedral Surveys V0	HELEN24-11H Wellbore #1, Design #1 V0	HELEN24-8H Wellbore #1, Design #1 V0
LE.Gekin #6H Red Hawk Petroleum Planned Well Planned Cathedral Surveys V0	HELEN24-12H Wellbore #1, Design #1 V0	HELEN24-9H Wellbore #1, Design #1 V0
ARNOLD #1 Barret Resources PRR Well, No Surveys V0	HELEN24-13H Wellbore #1, Design #1 V0	
DARYL LARNOLD #1, Amoco DAW Well, No Surveys V0	HELEN24-14H Wellbore #1, Design #1 V0	