



# **MALLARD EXPLORATION**

**WELD COUNTY, COLORADO (NAD 83)**

**NE NW SEC. 29 T8N R60W 6th P.M.**

**SHOVELER GOLDENEYE FED 21-16-1HN**

**ORIGINAL WELLBORE**

**05 March, 2020**

**Survey: FINAL SURVEYS**





Project: WELD COUNTY, COLORADO (NAD 83)  
Site: NE NW SEC. 29 T8N R60W 6th P.M.  
Well: SHOVELER GOLDENEYE FED 21-16-1HN  
Wellbore: ORIGINAL WELLBORE  
Design: FINAL SURVEYS

ANNOTATIONS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Dep	Annotation	
1700.00	27.85	80.77	1636.83	55.53	363.36	215.44	369.40	9 5/8" SURFACE CASING	
6741.00	35.07	74.34	5901.46	486.62	3011.70	1809.21	3055.95	KOP	
7612.35	75.21	14.25	6382.78	1072.19	3370.53	2494.04	3769.88	~300ft SETBACK X-OVER (7613.35ft md, 308.84ft FSL & 300ft FWL of Sec 21)	
7829.00	85.48	4.00	6417.47	1282.99	3403.04	2696.40	3983.18	HZ LANDING POINT	
13271.00	89.13	358.44	6406.95	6721.24	3530.09	7591.57	9424.22	LAST SURVEY	
13341.00	89.13	358.44	6408.01	6791.21	3528.18	7652.93	9494.21	5.5" CASING (736.04ft FSL & 336.63ft FWL of Sec 16)	
13353.00	89.13	358.44	6408.19	6803.20	3527.85	7663.45	9506.21	EXTRAPOLATION TO TD (748.03ft FSL & 336.3ft FWL of Sec 16)	

AS DRILLED LOCAL COORDINATES:

SHL: 757ft FNL & 2222ft FWL Sec 29

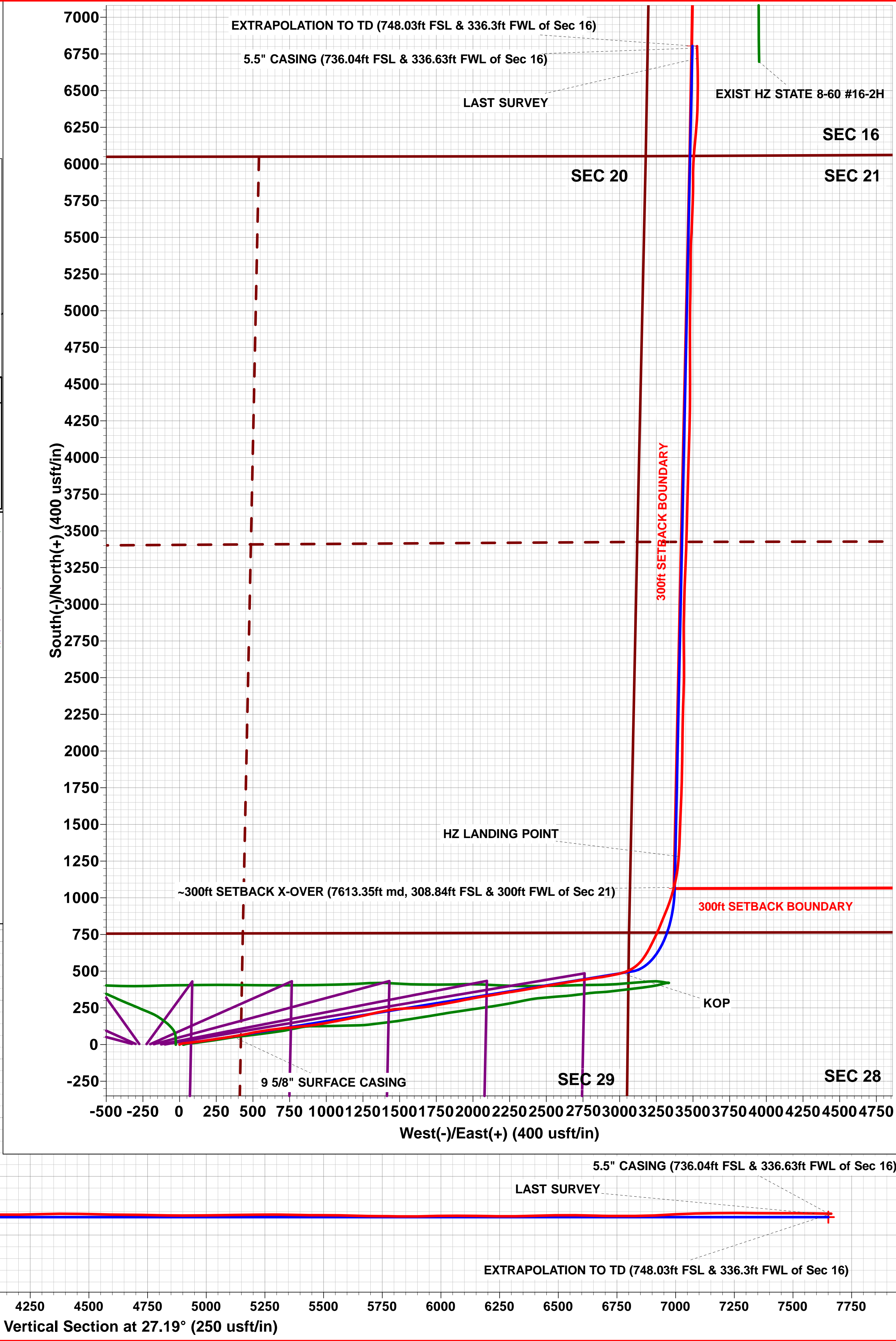
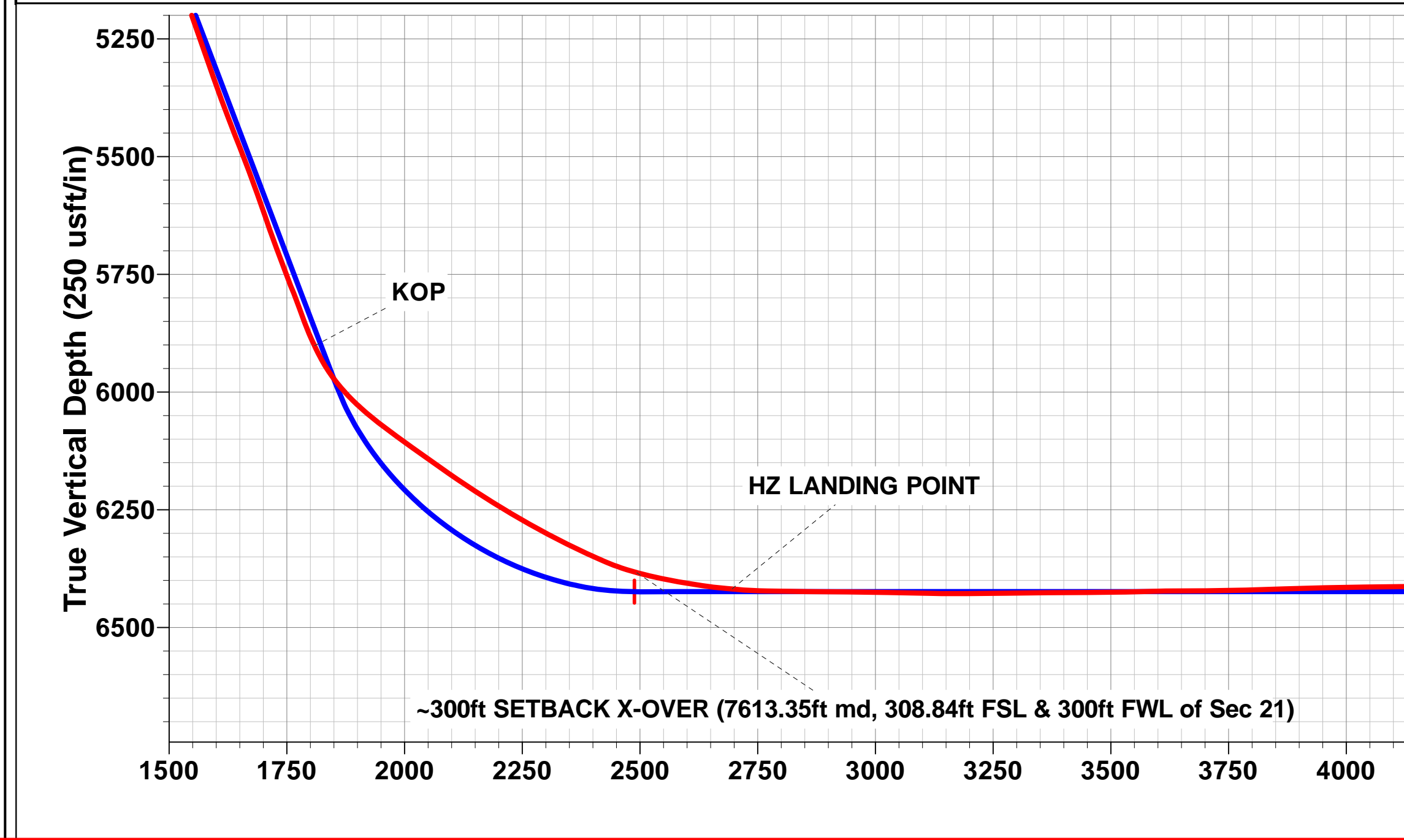
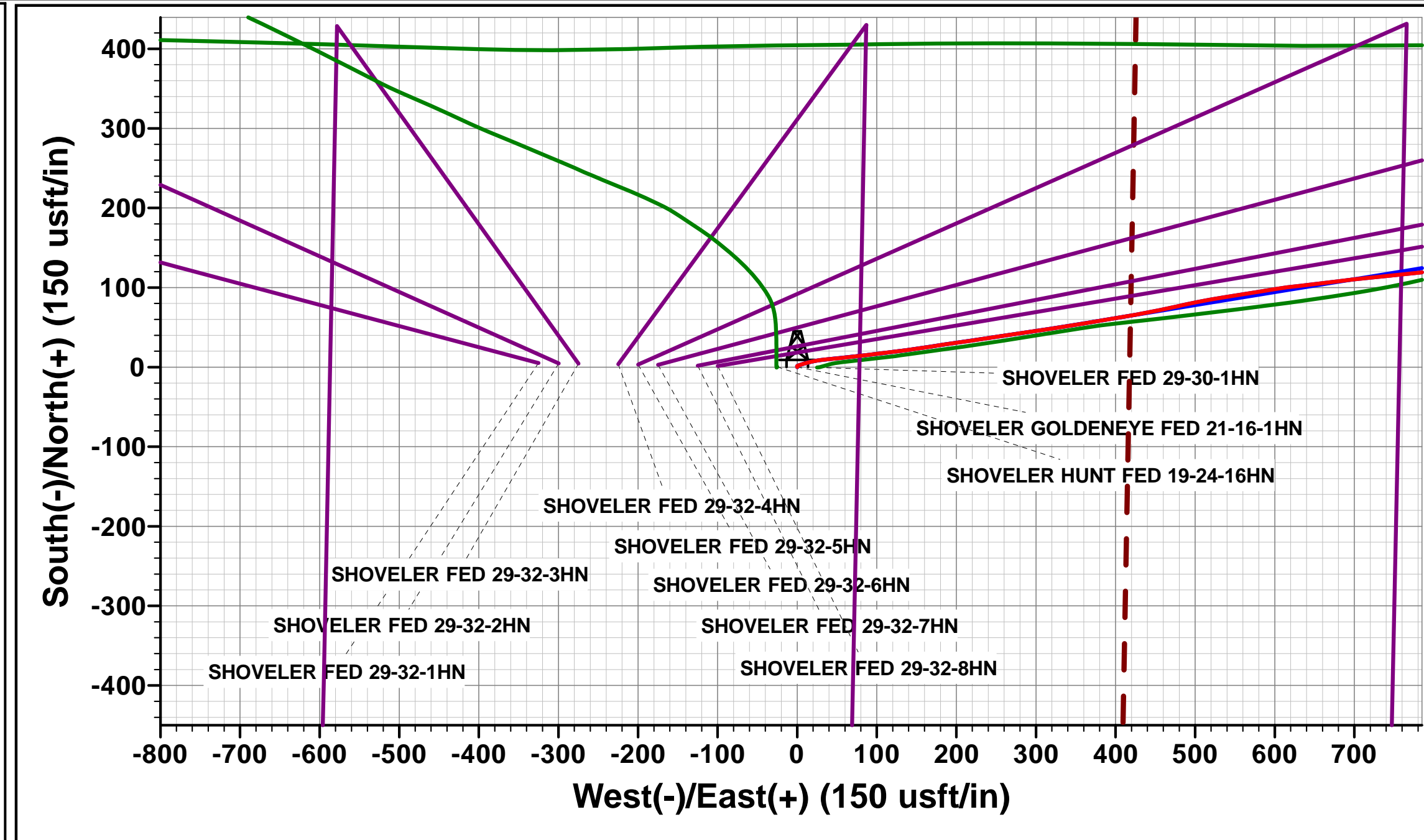
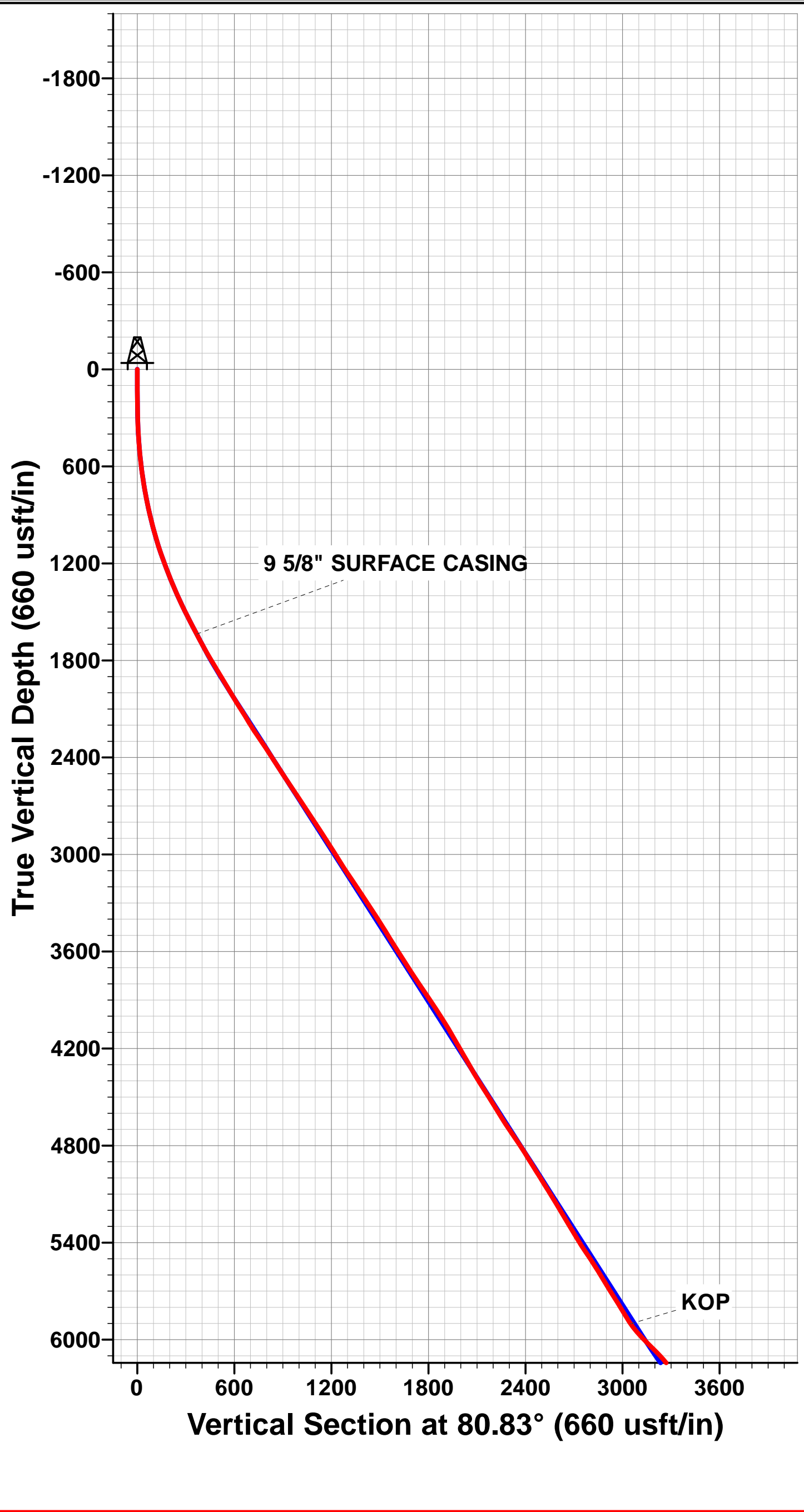
HZ LP: 519.64ft FSL & 332.51ft FWL Sec 21

BHL: 748.03ft FSL & 336.3ft FWL of Sec 16

~300ft SETBACK X-OVER PNT: 308.84ft FSL & 300ft FWL of Sec 2

5.5" CASING: 736.04ft FSL & 336.63ft FWL of Sec 16

WELLBORE TARGET DETAILS (LAT/LONG)					
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
BHL - SHOVELER GOLDENEYE FED 21-16-1HN (P6)	6424.00	6805.17	3496.55	40.657115	-104.104770
LP - SHOVELER GOLDENEYE FED 21-16-1HN (P6)	6424.00	1063.35	3375.53	40.641355	-104.105209



# Survey Report

<b>Company:</b>	MALLARD EXPLORATION	<b>Local Co-ordinate Reference:</b>	Well SHOVELER GOLDENEYE FED 21-16-1HN
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>TVD Reference:</b>	KB 27' @ 4974.00usft (CYCLONE 37)
<b>Site:</b>	NE NW SEC. 29 T8N R60W 6th P.M.	<b>MD Reference:</b>	KB 27' @ 4974.00usft (CYCLONE 37)
<b>Well:</b>	SHOVELER GOLDENEYE FED 21-16-1HN	<b>North Reference:</b>	True
<b>Wellbore:</b>	ORIGINAL WELLBORE	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL SURVEYS	<b>Database:</b>	Database 1

<b>Project</b>	WELD COUNTY, COLORADO (NAD 83)		
<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		Using geodetic scale factor

Site	NE NW SEC. 29 T8N R60W 6th P.M.				
Site Position:		Northing:	1,478,416.23 usft	Latitude:	40.638452
From:	Lat/Long	Easting:	3,383,356.26 usft	Longitude:	-104.118633
Position Uncertainty:	0.00 usft	Slot Radius:	1.10ft	Grid Convergence:	0.89 °

Well	SHOVELER GOLDENEYE FED 21-16-1HN					
Well Position	+N/-S	0.00 usft	Northing:	1,478,416.21 usft	Latitude:	40.638437
	+E/-W	0.00 usft	Easting:	3,383,706.27 usft	Longitude:	-104.117372
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	4,948.00 usft

<b>Wellbore</b>	ORIGINAL WELLBORE				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2020	2020-02-17	7.66	66.99	52,282.49973914

<b>Design</b>	FINAL SURVEYS				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	27.19	

<b>Survey Program</b>	<b>Date</b>	2020-03-05			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
19.00	13,354.00	FINAL SURVEYS (ORIGINAL WELLBORE	MWD	MWD - Standard	

<b>Survey</b>											
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>Subsea Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
0.00	0.00	0.00	0.00	4,974.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19.00	0.00	0.00	19.00	4,955.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
129.00	0.75	345.51	129.00	4,845.00	0.70	-0.18	0.54	0.68	0.68	0.00	0.00
224.00	1.05	64.53	223.99	4,750.01	1.67	0.45	1.69	1.23	0.32	83.18	83.18
319.00	1.85	73.49	318.96	4,655.04	2.48	2.71	3.45	0.87	0.84	9.43	9.43
414.00	2.90	69.80	413.87	4,560.13	3.75	6.43	6.27	1.12	1.11	-3.88	-3.88
509.00	5.98	75.25	508.58	4,465.42	5.84	13.47	11.35	3.27	3.24	5.74	5.74
604.00	7.38	80.35	602.93	4,371.07	8.12	24.28	18.32	1.60	1.47	5.37	5.37
699.00	8.44	84.65	697.03	4,276.97	9.80	37.23	25.73	1.28	1.12	4.53	4.53
794.00	10.90	84.12	790.67	4,183.33	11.37	53.11	34.38	2.59	2.59	-0.56	-0.56
889.00	12.70	83.16	883.66	4,090.34	13.53	72.42	45.13	1.91	1.89	-1.01	-1.01
985.00	15.21	83.69	976.82	3,997.18	16.17	95.41	57.99	2.62	2.61	0.55	0.55
1,080.00	16.70	82.89	1,068.16	3,905.84	19.23	121.35	72.56	1.59	1.57	-0.84	-0.84

# Survey Report

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<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>TVD Reference:</b>	KB 27' @ 4974.00usft (CYCLONE 37)
<b>Site:</b>	NE NW SEC. 29 T8N R60W 6th P.M.	<b>MD Reference:</b>	KB 27' @ 4974.00usft (CYCLONE 37)
<b>Well:</b>	SHOVELER GOLDENEYE FED 21-16-1HN	<b>North Reference:</b>	True
<b>Wellbore:</b>	ORIGINAL WELLBORE	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL SURVEYS	<b>Database:</b>	Database 1

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,175.00	19.78	81.49	1,158.37	3,815.63	23.30	150.80	89.64	3.27	3.24	-1.47
1,270.00	21.18	81.49	1,247.37	3,726.63	28.22	183.67	109.04	1.47	1.47	0.00
1,365.00	22.76	81.75	1,335.46	3,638.54	33.39	218.83	129.71	1.67	1.66	0.27
1,460.00	24.48	81.14	1,422.50	3,551.50	39.06	256.47	151.95	1.83	1.81	-0.64
1,555.00	26.54	81.93	1,508.24	3,465.76	45.08	296.93	175.79	2.20	2.17	0.83
1,651.00	27.86	80.61	1,593.62	3,380.38	51.75	340.30	201.55	1.51	1.37	-1.37
<b>9 5/8" SURFACE CASING</b>										
<b>1,700.00</b>	<b>27.85</b>	<b>80.77</b>	<b>1,636.94</b>	<b>3,337.06</b>	<b>55.45</b>	<b>362.89</b>	<b>215.17</b>	<b>0.15</b>	<b>-0.02</b>	<b>0.32</b>
1,768.00	27.84	80.99	1,697.07	3,276.93	60.49	394.25	233.98	0.15	-0.02	0.32
1,862.00	31.24	78.92	1,778.84	3,195.16	68.61	439.87	262.05	3.78	3.62	-2.20
1,956.00	30.45	77.33	1,859.54	3,114.46	78.52	487.03	292.42	1.21	-0.84	-1.69
2,051.00	31.42	81.47	1,941.04	3,032.96	87.47	535.01	322.31	2.46	1.02	4.36
2,145.00	30.76	80.11	2,021.54	2,952.46	95.24	582.92	351.11	1.03	-0.70	-1.45
2,240.00	32.30	83.59	2,102.52	2,871.48	102.24	632.09	379.81	2.51	1.62	3.66
2,334.00	31.20	82.93	2,182.45	2,791.55	108.04	681.21	407.42	1.23	-1.17	-0.70
2,428.00	34.07	84.29	2,261.60	2,712.40	113.66	731.58	435.44	3.15	3.05	1.45
2,523.00	33.89	84.07	2,340.38	2,633.62	119.05	784.40	464.37	0.23	-0.19	-0.23
2,617.00	33.05	84.25	2,418.79	2,555.21	124.32	835.97	492.63	0.90	-0.89	0.19
2,711.00	32.35	83.72	2,497.89	2,476.11	129.64	886.48	520.44	0.80	-0.74	-0.56
2,805.00	34.38	80.59	2,576.40	2,397.60	136.73	937.67	550.14	2.83	2.16	-3.33
2,899.00	33.94	79.89	2,654.18	2,319.82	145.68	989.68	581.87	0.63	-0.47	-0.74
2,993.00	33.32	79.62	2,732.45	2,241.55	154.94	1,040.91	613.52	0.68	-0.66	-0.29
3,087.00	33.14	79.09	2,811.08	2,162.92	164.45	1,091.54	645.12	0.36	-0.19	-0.56
3,182.00	32.74	78.83	2,890.81	2,083.19	174.34	1,142.24	677.09	0.45	-0.42	-0.27
3,276.00	32.39	78.48	2,970.03	2,003.97	184.29	1,191.85	708.61	0.42	-0.37	-0.37
3,369.00	31.95	78.04	3,048.75	1,925.25	194.37	1,240.33	739.73	0.54	-0.47	-0.47
3,463.00	34.38	77.07	3,127.43	1,846.57	205.46	1,290.53	772.54	2.65	2.59	-1.03
3,557.00	33.10	76.80	3,205.60	1,768.40	217.26	1,341.39	806.28	1.37	-1.36	-0.29
3,651.00	34.25	79.84	3,283.83	1,690.17	227.79	1,392.42	838.96	2.17	1.22	3.23
3,746.00	32.30	79.89	3,363.25	1,610.75	236.96	1,443.73	870.57	2.05	-2.05	0.05
3,840.00	32.39	86.45	3,442.69	1,531.31	242.93	1,493.60	898.67	3.73	0.10	6.98
3,935.00	32.30	86.41	3,522.95	1,451.05	246.10	1,544.32	924.67	0.10	-0.09	-0.04
4,029.00	32.48	85.97	3,602.32	1,371.68	249.44	1,594.57	950.61	0.32	0.19	-0.47
4,123.00	32.30	85.66	3,681.70	1,292.30	253.12	1,644.79	976.82	0.26	-0.19	-0.33
4,217.00	34.03	80.28	3,760.40	1,213.60	259.46	1,695.77	1,005.77	3.63	1.84	-5.72
4,312.00	33.89	80.28	3,839.20	1,134.80	268.42	1,748.08	1,037.64	0.15	-0.15	0.00
4,406.00	33.67	80.06	3,917.33	1,056.67	277.34	1,799.57	1,069.11	0.27	-0.23	-0.23
4,501.00	32.48	79.84	3,996.93	977.07	286.39	1,850.62	1,100.49	1.26	-1.25	-0.23
4,594.00	31.33	78.70	4,075.88	898.12	295.53	1,898.91	1,130.69	1.40	-1.24	-1.23
4,688.00	29.43	77.90	4,156.97	817.03	305.16	1,945.46	1,160.53	2.07	-2.02	-0.85
4,782.00	30.67	80.46	4,238.34	735.66	313.98	1,991.69	1,189.50	1.90	1.32	2.72
4,875.00	29.03	78.87	4,319.00	655.00	322.26	2,037.23	1,217.68	1.96	-1.76	-1.71
4,970.00	31.60	81.91	4,401.01	572.99	330.22	2,084.49	1,246.35	3.15	2.71	3.20
5,064.00	32.92	80.59	4,480.50	493.50	337.86	2,134.08	1,275.81	1.59	1.40	-1.40
5,158.00	31.02	79.75	4,560.23	413.77	346.35	2,183.12	1,305.77	2.08	-2.02	-0.89
5,252.00	32.21	81.38	4,640.28	333.72	354.41	2,231.72	1,335.16	1.56	1.27	1.73
5,346.00	34.87	81.25	4,718.63	255.37	362.26	2,283.06	1,365.60	2.83	2.83	-0.14
5,440.00	33.41	80.68	4,796.43	177.57	370.54	2,335.16	1,396.77	1.59	-1.55	-0.61
5,534.00	31.07	79.31	4,875.93	98.07	379.23	2,384.54	1,427.07	2.61	-2.49	-1.46
5,629.00	32.79	80.46	4,956.55	17.45	388.04	2,434.00	1,457.51	1.92	1.81	1.21
5,723.00	30.89	80.19	5,036.40	-62.40	396.37	2,482.88	1,487.26	2.03	-2.02	-0.29
5,817.00	32.70	79.84	5,116.29	-142.29	404.96	2,531.66	1,517.19	1.94	1.93	-0.37
5,912.00	30.00	79.36	5,197.42	-223.42	413.87	2,580.27	1,547.34	2.85	-2.84	-0.51



# Survey Report

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<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>TVD Reference:</b>	KB 27' @ 4974.00usft (CYCLONE 37)
<b>Site:</b>	NE NW SEC. 29 T8N R60W 6th P.M.	<b>MD Reference:</b>	KB 27' @ 4974.00usft (CYCLONE 37)
<b>Well:</b>	SHOVELER GOLDENEYE FED 21-16-1HN	<b>North Reference:</b>	True
<b>Wellbore:</b>	ORIGINAL WELLBORE	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL SURVEYS	<b>Database:</b>	Database 1

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,006.00	30.27	81.03	5,278.71	-304.71	421.91	2,626.76	1,575.73	0.94	0.29	1.78
6,122.00	32.08	81.47	5,377.96	-403.96	431.04	2,686.11	1,610.97	1.57	1.56	0.38
6,215.00	33.27	80.68	5,456.24	-482.24	438.83	2,735.71	1,640.57	1.36	1.28	-0.85
6,308.00	33.63	81.91	5,533.84	-559.84	446.59	2,786.38	1,670.63	0.83	0.39	1.32
6,403.00	30.53	82.09	5,614.32	-640.32	453.61	2,836.34	1,699.71	3.26	-3.26	0.19
6,496.00	31.60	80.42	5,693.98	-719.98	460.92	2,883.76	1,727.88	1.48	1.15	-1.80
6,591.00	32.35	79.05	5,774.57	-800.57	469.89	2,933.26	1,758.48	1.10	0.79	-1.44
6,685.00	30.84	78.78	5,854.64	-880.64	479.35	2,981.59	1,788.98	1.61	-1.61	-0.29
<b>KOP</b>										
6,741.00	34.99	74.41	5,901.64	-927.64	486.47	3,011.15	1,808.82	8.54	7.41	-7.81
6,780.00	37.96	71.87	5,933.00	-959.00	493.21	3,033.32	1,824.95	8.54	7.61	-6.51
6,874.00	47.46	58.78	6,002.13	-1,028.13	520.27	3,090.66	1,875.22	13.79	10.11	-13.93
6,969.00	53.07	40.58	6,063.14	-1,089.14	567.52	3,145.61	1,942.36	15.83	5.91	-19.16
7,063.00	54.75	28.81	6,118.63	-1,144.63	629.83	3,188.64	2,017.46	10.27	1.79	-12.52
7,157.00	54.66	27.05	6,172.95	-1,198.95	697.61	3,224.58	2,094.17	1.53	-0.10	-1.87
7,252.00	58.24	24.45	6,225.45	-1,251.45	768.92	3,258.93	2,173.29	4.40	3.77	-2.74
7,346.00	60.01	21.36	6,273.69	-1,299.69	843.23	3,290.31	2,253.72	3.39	1.88	-3.29
7,440.00	63.37	22.60	6,318.27	-1,344.27	919.95	3,321.29	2,336.13	3.76	3.57	1.32
7,535.00	66.81	17.18	6,358.30	-1,384.30	1,000.94	3,350.53	2,421.52	6.31	3.62	-5.71
<b>-300ft SETBACK X-OVER (7613.35ft md, 308.84ft FSL &amp; 300ft FWL of Sec 21)</b>										
7,612.35	75.10	14.29	6,383.52	-1,409.52	1,071.26	3,370.29	2,493.10	11.28	10.72	-3.74
7,629.00	76.89	13.70	6,387.55	-1,413.55	1,086.93	3,374.20	2,508.83	11.28	10.75	-3.54
7,723.00	80.82	8.41	6,405.73	-1,431.73	1,177.40	3,391.84	2,597.36	6.92	4.18	-5.63
7,818.00	84.98	4.21	6,417.47	-1,443.47	1,271.06	3,402.19	2,685.40	6.20	4.38	-4.42
<b>HZ LANDING POINT</b>										
7,829.00	85.43	4.02	6,418.39	-1,444.39	1,281.99	3,402.97	2,695.48	4.48	4.13	-1.74
7,912.00	88.86	2.58	6,422.52	-1,448.52	1,364.74	3,407.74	2,771.26	4.48	4.13	-1.73
8,005.00	89.62	2.05	6,423.76	-1,449.76	1,457.65	3,411.50	2,855.62	1.00	0.82	-0.57
8,099.00	89.48	2.18	6,424.49	-1,450.49	1,551.59	3,414.97	2,940.75	0.20	-0.15	0.14
8,193.00	89.22	2.36	6,425.56	-1,451.56	1,645.51	3,418.69	3,025.99	0.34	-0.28	0.19
8,288.00	88.69	2.05	6,427.29	-1,453.29	1,740.42	3,422.34	3,112.09	0.65	-0.56	-0.33
8,382.00	90.46	0.90	6,427.99	-1,453.99	1,834.38	3,424.76	3,196.77	2.25	1.88	-1.22
8,476.00	90.46	1.17	6,427.24	-1,453.24	1,928.36	3,426.46	3,281.13	0.29	0.00	0.29
8,571.00	90.85	0.51	6,426.15	-1,452.15	2,023.35	3,427.85	3,366.25	0.81	0.41	-0.69
8,662.00	89.70	0.82	6,425.71	-1,451.71	2,114.34	3,428.91	3,447.67	1.31	-1.26	0.34
8,756.00	91.52	1.21	6,424.71	-1,450.71	2,208.31	3,430.57	3,532.02	1.98	1.94	0.41
8,850.00	90.90	1.79	6,422.73	-1,448.73	2,302.26	3,433.03	3,616.70	0.90	-0.66	0.62
8,945.00	89.84	1.96	6,422.11	-1,448.11	2,397.20	3,436.14	3,702.58	1.13	-1.12	0.18
9,039.00	91.83	0.42	6,420.74	-1,446.74	2,491.17	3,438.09	3,787.04	2.68	2.12	-1.64
9,134.00	91.65	0.07	6,417.86	-1,443.86	2,586.12	3,438.50	3,871.69	0.41	-0.19	-0.37
9,227.00	91.21	359.63	6,415.54	-1,441.54	2,679.09	3,438.26	3,954.27	0.67	-0.47	-0.47
9,320.00	90.68	358.92	6,414.00	-1,440.00	2,772.07	3,437.08	4,036.43	0.95	-0.57	-0.76
9,415.00	90.32	1.43	6,413.18	-1,439.18	2,867.06	3,437.37	4,121.05	2.67	-0.38	2.64
9,509.00	89.66	1.04	6,413.19	-1,439.19	2,961.04	3,439.40	4,205.57	0.82	-0.70	-0.41
9,603.00	92.53	1.57	6,411.40	-1,437.40	3,054.98	3,441.54	4,290.11	3.10	3.05	0.56
9,697.00	89.93	2.40	6,409.38	-1,435.38	3,148.90	3,444.79	4,375.13	2.90	-2.77	0.88
9,792.00	89.22	2.23	6,410.08	-1,436.08	3,243.82	3,448.63	4,461.31	0.77	-0.75	-0.18
9,886.00	88.47	2.31	6,411.98	-1,437.98	3,337.72	3,452.35	4,546.54	0.80	-0.80	0.09
9,981.00	89.84	1.30	6,413.38	-1,439.38	3,432.66	3,455.34	4,632.35	1.79	1.44	-1.06
10,076.00	89.26	1.70	6,414.12	-1,440.12	3,527.63	3,457.83	4,717.95	0.74	-0.61	0.42
10,170.00	88.56	1.43	6,415.91	-1,441.91	3,621.57	3,460.40	4,802.69	0.80	-0.74	-0.29
10,265.00	90.59	1.39	6,416.62	-1,442.62	3,716.54	3,462.73	4,888.22	2.14	2.14	-0.04
10,359.00	89.57	1.43	6,416.49	-1,442.49	3,810.51	3,465.05	4,972.86	1.09	-1.09	0.04

# Survey Report

<b>Company:</b>	MALLARD EXPLORATION	<b>Local Co-ordinate Reference:</b>	Well SHOVELER GOLDENEYE FED 21-16-1HN
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>TVD Reference:</b>	KB 27' @ 4974.00usft (CYCLONE 37)
<b>Site:</b>	NE NW SEC. 29 T8N R60W 6th P.M.	<b>MD Reference:</b>	KB 27' @ 4974.00usft (CYCLONE 37)
<b>Well:</b>	SHOVELER GOLDENEYE FED 21-16-1HN	<b>North Reference:</b>	True
<b>Wellbore:</b>	ORIGINAL WELLBORE	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL SURVEYS	<b>Database:</b>	Database 1

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Subsea Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
10,454.00	91.25	2.01	6,415.81	-1,441.81	3,905.46	3,467.90	5,058.62	1.87	1.77	0.61
10,547.00	90.77	1.57	6,414.17	-1,440.17	3,998.40	3,470.80	5,142.62	0.70	-0.52	-0.47
10,641.00	90.41	1.65	6,413.20	-1,439.20	4,092.36	3,473.44	5,227.39	0.39	-0.38	0.09
10,735.00	89.57	1.52	6,413.22	-1,439.22	4,186.32	3,476.04	5,312.16	0.90	-0.89	-0.14
10,830.00	88.82	1.30	6,414.55	-1,440.55	4,281.28	3,478.38	5,397.69	0.82	-0.79	-0.23
10,924.00	90.10	0.20	6,415.44	-1,441.44	4,375.26	3,479.61	5,481.85	1.80	1.36	-1.17
11,019.00	89.17	0.07	6,416.04	-1,442.04	4,470.26	3,479.84	5,566.45	0.99	-0.98	-0.14
11,112.00	88.29	0.24	6,418.10	-1,444.10	4,563.24	3,480.09	5,649.26	0.96	-0.95	0.18
11,206.00	89.97	359.80	6,419.53	-1,445.53	4,657.22	3,480.12	5,732.87	1.85	1.79	-0.47
11,300.00	88.78	359.54	6,420.56	-1,446.56	4,751.21	3,479.58	5,816.23	1.30	-1.27	-0.28
11,395.00	91.21	0.24	6,420.56	-1,446.56	4,846.21	3,479.40	5,900.63	2.66	2.56	0.74
11,489.00	91.21	0.02	6,418.58	-1,444.58	4,940.18	3,479.61	5,984.32	0.23	0.00	-0.23
11,582.00	89.53	1.30	6,417.98	-1,443.98	5,033.17	3,480.68	6,067.52	2.27	-1.81	1.38
11,676.00	89.62	0.86	6,418.68	-1,444.68	5,127.15	3,482.45	6,151.92	0.48	0.10	-0.47
11,771.00	88.56	0.38	6,420.18	-1,446.18	5,222.13	3,483.48	6,236.87	1.22	-1.12	-0.51
11,863.00	91.43	0.68	6,420.19	-1,446.19	5,314.12	3,484.33	6,319.08	3.14	3.12	0.33
11,957.00	91.47	0.29	6,417.81	-1,443.81	5,408.09	3,485.13	6,403.02	0.42	0.04	-0.41
12,051.00	91.03	3.59	6,415.76	-1,441.76	5,502.00	3,488.31	6,488.01	3.54	-0.47	3.51
12,146.00	89.17	2.18	6,415.60	-1,441.60	5,596.87	3,493.09	6,574.58	2.46	-1.96	-1.48
12,240.00	88.29	2.23	6,417.68	-1,443.68	5,690.78	3,496.70	6,659.76	0.94	-0.94	0.05
12,333.00	90.32	1.70	6,418.81	-1,444.81	5,783.71	3,499.89	6,743.87	2.26	2.18	-0.57
12,427.00	89.48	359.71	6,418.97	-1,444.97	5,877.70	3,501.05	6,828.00	2.30	-0.89	-2.12
12,521.00	93.24	1.43	6,416.74	-1,442.74	5,971.64	3,501.98	6,911.99	4.40	4.00	1.83
12,616.00	92.93	4.47	6,411.63	-1,437.63	6,066.37	3,506.86	6,998.48	3.21	-0.33	3.20
12,710.00	90.90	5.00	6,408.49	-1,434.49	6,159.99	3,514.62	7,085.29	2.23	-2.16	0.56
12,805.00	91.12	5.71	6,406.81	-1,432.81	6,254.56	3,523.48	7,173.46	0.78	0.23	0.75
12,899.00	89.48	1.83	6,406.32	-1,432.32	6,348.34	3,529.66	7,259.69	4.48	-1.74	-4.13
12,993.00	89.62	0.73	6,407.06	-1,433.06	6,442.31	3,531.76	7,344.24	1.18	0.15	-1.17
13,087.00	90.06	1.04	6,407.32	-1,433.32	6,536.30	3,533.21	7,428.50	0.57	0.47	0.33
13,181.00	90.01	358.30	6,407.26	-1,433.26	6,630.29	3,532.67	7,511.85	2.92	-0.05	-2.91
LAST SURVEY										
13,271.00	89.14	358.44	6,407.93	-1,433.93	6,720.25	3,530.11	7,590.70	0.98	-0.97	0.15
13,272.00	89.13	358.44	6,407.95	-1,433.95	6,721.24	3,530.09	7,591.57	0.98	-0.97	0.15
5.5" CASING (736.04ft FSL & 336.63ft FWL of Sec 16)										
13,341.00	89.13	358.44	6,408.99	-1,434.99	6,790.21	3,528.21	7,652.06	0.00	0.00	0.00
EXTRAPOLATION TO TD (748.03ft FSL & 336.3ft FWL of Sec 16)										
13,353.00	89.13	358.44	6,409.18	-1,435.18	6,802.21	3,527.88	7,662.58	0.00	0.00	0.00
13,354.00	89.13	358.44	6,409.19	-1,435.19	6,803.20	3,527.85	7,663.45	0.00	0.00	0.00

# Survey Report

<b>Company:</b>	MALLARD EXPLORATION	<b>Local Co-ordinate Reference:</b>	Well SHOVELER GOLDENEYE FED 21-16-1HN
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>TVD Reference:</b>	KB 27' @ 4974.00usft (CYCLONE 37)
<b>Site:</b>	NE NW SEC. 29 T8N R60W 6th P.M.	<b>MD Reference:</b>	KB 27' @ 4974.00usft (CYCLONE 37)
<b>Well:</b>	SHOVELER GOLDENEYE FED 21-16-1HN	<b>North Reference:</b>	True
<b>Wellbore:</b>	ORIGINAL WELLBORE	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL SURVEYS	<b>Database:</b>	Database 1

Targets									
Target Name	- hit/miss target	Dip Angle	Dip Dir.	TVD	+N-S	+E-W	Northing	Easting	
- Shape		(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)	
									Latitude Longitude
ABDN VERT FEDER/		0.00	0.00	7,023.00	2,722.03	7,764.61	1,481,258.91	3,391,427.34	40.645905 -104.089392
- survey misses target center by 4369.00usft at 9227.00usft MD (6415.54 TVD, 2679.09 N, 3438.26 E)									
- Circle (radius 30.00)									
ABDN VERT SHOWE		0.00	0.00	7,118.00	-6,769.89	-288.99	1,471,642.77	3,383,522.87	40.619855 -104.118413
- survey misses target center by 7952.35usft at 5345.87usft MD (4718.52 TVD, 362.25 N, 2282.99 E)									
- Circle (radius 30.00)									
EXIST VERT SHOWE		0.00	0.00	7,135.00	-6,494.77	-1,627.07	1,471,896.99	3,382,180.69	40.620610 -104.123233
- survey misses target center by 8235.63usft at 4911.90usft MD (4351.11 TVD, 325.58 N, 2055.10 E)									
- Circle (radius 30.00)									
LP - SHOVELER GOI		0.00	0.00	6,424.00	1,063.35	3,375.53	1,479,532.04	3,387,064.74	40.641355 -104.105209
- survey misses target center by 41.38usft at 7615.93usft MD (6384.43 TVD, 1074.62 N, 3371.14 E)									
- Point									
BHL - SHOVELER GC		0.00	0.00	6,464.00	6,805.17	3,496.55	1,485,274.93	3,387,096.22	40.657115 -104.104770
- survey misses target center by 63.15usft at 13354.00usft MD (6409.19 TVD, 6803.20 N, 3527.85 E)									
- Point									
ABDN VERT BUTLER		0.00	0.00	7,117.00	1,408.54	-1,515.82	1,479,800.91	3,382,168.71	40.642303 -104.122834
- survey misses target center by 4612.85usft at 5346.00usft MD (4718.63 TVD, 362.26 N, 2283.06 E)									
- Circle (radius 30.00)									
ABDN VERT STATE #		0.00	0.00	7,100.00	9,396.58	7,959.48	1,487,935.55	3,391,518.12	40.664225 -104.088682
- survey misses target center by 5180.94usft at 13354.00usft MD (6409.19 TVD, 6803.20 N, 3527.85 E)									
- Circle (radius 30.00)									
EXIST VERT HILL #3		0.00	0.00	7,121.00	-9,172.28	-3,977.19	1,469,183.21	3,379,872.65	40.613260 -104.131697
- survey misses target center by 11464.59usft at 3017.23usft MD (2752.70 TVD, 157.35 N, 1053.99 E)									
- Circle (radius 30.00)									
EXIST VERT HILL #3		0.00	0.00	7,138.00	-9,073.60	-5,601.64	1,469,256.56	3,378,246.89	40.613530 -104.137548
- survey misses target center by 12177.63usft at 2429.60usft MD (2262.93 TVD, 113.75 N, 732.47 E)									
- Circle (radius 30.00)									
ABDN VERT NILSEN		0.00	0.00	7,089.00	1,140.84	7,729.03	1,479,677.38	3,391,416.42	40.641565 -104.089522
- survey misses target center by 4378.11usft at 7912.00usft MD (6422.52 TVD, 1364.74 N, 3407.74 E)									
- Circle (radius 30.00)									
ABDN VERT BUCHEI		0.00	0.00	7,192.00	6,696.48	6,528.65	1,485,213.53	3,390,129.59	40.656815 -104.093842
- survey misses target center by 3097.76usft at 13181.00usft MD (6407.26 TVD, 6630.29 N, 3532.67 E)									
- Circle (radius 30.00)									
EXIST VERT HILL #3		0.00	0.00	7,118.00	-8,228.82	-3,026.71	1,470,141.36	3,380,808.28	40.615850 -104.128274
- survey misses target center by 10274.94usft at 4123.00usft MD (3681.70 TVD, 253.12 N, 1644.79 E)									
- Circle (radius 30.00)									
ABDN VERT FED RO		0.00	0.00	7,141.00	-2,288.64	1,504.11	1,476,151.34	3,385,245.85	40.632155 -104.111953
- survey misses target center by 3391.09usft at 6685.00usft MD (5854.64 TVD, 479.35 N, 2981.59 E)									
- Circle (radius 30.00)									
BHL - SHOVELER GC		0.00	0.00	6,424.00	6,805.17	3,496.55	1,485,274.93	3,387,096.22	40.657115 -104.104770
- survey misses target center by 34.69usft at 13354.00usft MD (6409.19 TVD, 6803.20 N, 3527.85 E)									
- Point									
LP - SHOVELER GOI		0.00	0.00	6,464.00	1,063.35	3,375.53	1,479,532.04	3,387,064.74	40.641355 -104.105209
- survey misses target center by 79.90usft at 7625.61usft MD (6386.77 TVD, 1083.73 N, 3373.42 E)									
- Point									
BHL - SHOVELER GC		0.00	0.00	6,371.00	6,805.17	3,496.55	1,485,274.93	3,387,096.22	40.657115 -104.104770
- survey misses target center by 49.42usft at 13354.00usft MD (6409.19 TVD, 6803.20 N, 3527.85 E)									
- Point									
ABDN VERT FEDER/		0.00	0.00	7,156.00	-3,304.98	-2,981.42	1,475,065.21	3,380,776.80	40.629365 -104.128113
- survey misses target center by 6790.54usft at 4217.00usft MD (3760.40 TVD, 259.46 N, 1695.77 E)									
- Circle (radius 30.00)									

## Survey Report

<b>Company:</b>	MALLARD EXPLORATION	<b>Local Co-ordinate Reference:</b>	Well SHOVELER GOLDENEYE FED 21-16-1HN
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>TVD Reference:</b>	KB 27' @ 4974.00usft (CYCLONE 37)
<b>Site:</b>	NE NW SEC. 29 T8N R60W 6th P.M.	<b>MD Reference:</b>	KB 27' @ 4974.00usft (CYCLONE 37)
<b>Well:</b>	SHOVELER GOLDENEYE FED 21-16-1HN	<b>North Reference:</b>	True
<b>Wellbore:</b>	ORIGINAL WELLBORE	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL SURVEYS	<b>Database:</b>	Database 1

ABDN VERT LU #1	0.00	0.00	7,111.00	-1,268.49	-2,109.66	1,477,115.01	3,381,616.68	40.634955	-104.124973
- survey misses target center by 5243.17usft at 4970.00usft MD (4401.01 TVD, 330.22 N, 2084.49 E)									
- Circle (radius 30.00)									
ABDN VERT SHOWE	0.00	0.00	7,122.00	-7,873.79	-352.86	1,470,538.03	3,383,476.22	40.616825	-104.118643
- survey misses target center by 8974.54usft at 5252.00usft MD (4640.28 TVD, 354.41 N, 2231.72 E)									
- Circle (radius 30.00)									
LP - SHOVELER GOL	0.00	0.00	6,371.00	1,063.35	3,375.53	1,479,532.04	3,387,064.74	40.641355	-104.105209
- survey misses target center by 12.56usft at 7602.40usft MD (6380.87 TVD, 1061.97 N, 3367.90 E)									
- Point									
ABDN VERT FEDER#	0.00	0.00	7,120.00	-1,332.23	2,277.31	1,477,119.67	3,386,004.03	40.634780	-104.109167
- survey misses target center by 2304.94usft at 6780.00usft MD (5933.00 TVD, 493.21 N, 3033.32 E)									
- Circle (radius 30.00)									
EXIST VERT DOC PC	0.00	0.00	7,151.00	-3,922.03	-5,683.46	1,474,406.12	3,378,084.76	40.627670	-104.137847
- survey misses target center by 9012.80usft at 2713.79usft MD (2500.24 TVD, 129.80 N, 887.96 E)									
- Circle (radius 30.00)									
EXIST VERT DOC SF	0.00	0.00	7,140.00	-7,871.91	-1,680.74	1,470,519.21	3,382,148.50	40.616830	-104.123426
- survey misses target center by 9429.11usft at 4460.30usft MD (3962.70 TVD, 282.52 N, 1828.96 E)									
- Circle (radius 30.00)									

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,700.00	1,636.83	55.53	363.36	9 5/8" SURFACE CASING
6,741.00	5,901.46	486.62	3,011.70	KOP
7,612.35	6,382.78	1,072.19	3,370.53	~300ft SETBACK X-OVER (7613.35ft md, 308.84ft FSL & 300ft FWL of
7,829.00	6,417.47	1,282.99	3,403.04	HZ LANDING POINT
13,271.00	6,406.95	6,721.24	3,530.09	LAST SURVEY
13,341.00	6,408.01	6,791.21	3,528.18	5.5" CASING (736.04ft FSL & 336.63ft FWL of Sec 16)
13,353.00	6,408.19	6,803.20	3,527.85	EXTRAPOLATION TO TD (748.03ft FSL & 336.3ft FWL of Sec 16)

Checked By: _____	Approved By: _____	Date: _____
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