

CONFIDENTIAL

Titan Directional Drilling, LLC
Survey Report

Company:	Alta Mesa	Local Co-ordinate Reference:	Well #2-3
Project:	Payette County, ID W'27	TVD Reference:	est.GL+KB @ 2647.00usft (Paul Graham #4)
Site:	ML Investments 2-3	MD Reference:	est.GL+KB @ 2647.00usft (Paul Graham #4)
Well:	#2-3	North Reference:	Grid
Wellbore:	#2-3 OH	Survey Calculation Method:	Minimum Curvature
Design:	#2-3 OH	Database:	EDM 5000.1 Single User Db

Project	Payette County, ID W'27		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	Idaho West 1103		Using geodetic scale factor

Site	ML Investments 2-3, Centered on pre grade stake				
Site Position:		Northing:	874,260.00 usft	Latitude:	44° 3' 38.726 N
From:	Map	Easting:	222,404.00 usft	Longitude:	116° 48' 21.744 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.73 °

Well	#2-3					
Well Position	+N/-S	0.00 usft	Northing:	874,308.67 usft	Latitude:	44° 3' 39.012 N
	+E/-W	0.00 usft	Easting:	222,420.44 usft	Longitude:	116° 48' 21.524 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	2,635.00 usft	Ground Level:	2,635.00 usft

Wellbore	#2-3 OH				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	IGRF2015	12/23/15	(°)	(°)	(nT)
			13.85	67.54	52,853

Design	#2-3 OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.00	0.00	0.00	186.74	

Survey Program	Date 01/08/16				
From	To	Survey (Wellbore)	Tool Name	Description	
(usft)	(usft)				
100.00	1,053.00	Survey #1 (#2-3 OH)	GYRO-NS	Gyrocompass Gyro	
1,144.00	4,979.00	Survey #2 (#2-3 OH)	MWD	MWD - Standard	
5,034.00	5,034.00	Projection (#2-3 OH)	ZERO-ERROR	Zero Error	

Survey										
Measured Depth	Inclination	Azimuth	Vertical Depth	+N/-S	+E/-W	Vertical Section	Dogleg Rate	Build Rate	Turn Rate	
(usft)	(°)	(°)	(usft)	(usft)	(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	0.00
100.00	0.15	225.88	100.00	-0.09	-0.09	0.10	0.15	0.15	0.00	
200.00	0.30	357.72	200.00	0.08	-0.19	-0.06	0.41	0.15	131.84	
300.00	0.31	345.58	300.00	0.60	-0.27	-0.56	0.06	0.01	-12.15	
400.00	0.45	299.85	400.00	1.05	-0.68	-0.97	0.32	0.14	-45.72	
500.00	0.24	136.58	500.00	1.09	-0.87	-0.98	0.69	-0.21	-163.27	
600.00	0.29	297.36	599.99	1.06	-0.95	-0.94	0.52	0.05	160.78	
700.00	0.27	195.18	699.99	0.95	-1.24	-0.79	0.43	-0.02	-102.18	
800.00	0.12	52.14	799.99	0.79	-1.21	-0.64	0.37	-0.15	-143.04	

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Site:	ML Investments 2-3	MD Reference:	est.GL+KB @ 2647.00usft (Paul Graham #4)
Well:	#2-3	North Reference:	Grid
Wellbore:	#2-3 OH	Survey Calculation Method:	Minimum Curvature
Design:	#2-3 OH	Database:	EDM 5000.1 Single User Db

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)	
900.00	0.22	14.27	899.99	1.04	-1.08	-0.91	0.15	0.10	-37.87	
1,000.00	0.36	299.35	999.99	1.38	-1.30	-1.22	0.37	0.13	-74.92	
1,053.00	0.26	252.74	1,052.99	1.43	-1.56	-1.23	0.49	-0.18	-87.95	
1,105.00	0.28	239.68	1,104.99	1.33	-1.78	-1.11	0.12	0.04	-25.12	
9 5/8"										
1,144.00	0.30	231.30	1,143.99	1.22	-1.94	-0.98	0.12	0.06	-21.49	
1,333.00	0.50	252.70	1,332.99	0.66	-3.12	-0.29	0.13	0.11	11.32	
1,523.00	0.50	217.30	1,522.98	-0.24	-4.41	0.76	0.16	0.00	-18.63	
1,649.00	0.70	234.10	1,648.97	-1.13	-5.37	1.75	0.21	0.16	13.33	
1,713.00	1.90	220.00	1,712.95	-2.17	-6.37	2.91	1.93	1.88	-22.03	
1,776.00	3.30	197.80	1,775.89	-4.70	-7.59	5.56	2.70	2.22	-35.24	
1,839.00	4.00	187.70	1,838.76	-8.61	-8.44	9.54	1.50	1.11	-16.03	
1,902.00	4.40	182.90	1,901.59	-13.20	-8.86	14.14	0.84	0.63	-7.62	
1,965.00	4.80	181.30	1,964.39	-18.24	-9.04	19.18	0.67	0.63	-2.54	
2,028.00	4.70	183.70	2,027.17	-23.46	-9.27	24.38	0.35	-0.16	3.81	
2,091.00	4.70	183.30	2,089.96	-28.61	-9.58	29.53	0.05	0.00	-0.63	
2,154.00	4.70	183.40	2,152.75	-33.76	-9.88	34.69	0.01	0.00	0.16	
2,217.00	5.10	186.40	2,215.52	-39.12	-10.35	40.06	0.75	0.63	4.76	
2,280.00	6.70	185.20	2,278.18	-45.56	-10.99	46.54	2.55	2.54	-1.90	
2,343.00	8.50	182.50	2,340.63	-53.88	-11.53	54.86	2.91	2.86	-4.29	
2,406.00	9.80	180.30	2,402.83	-63.89	-11.76	64.83	2.14	2.06	-3.49	
2,469.00	11.20	181.60	2,464.77	-75.37	-11.96	76.25	2.25	2.22	2.06	
2,532.00	11.10	181.80	2,526.58	-87.55	-12.32	88.39	0.17	-0.16	0.32	
2,595.00	11.10	180.00	2,588.40	-99.67	-12.51	100.45	0.55	0.00	-2.86	
2,658.00	10.80	181.40	2,650.25	-111.64	-12.66	112.35	0.64	-0.48	2.22	
2,722.00	10.80	181.10	2,713.12	-123.63	-12.92	124.29	0.09	0.00	-0.47	
2,785.00	10.50	181.50	2,775.04	-135.27	-13.18	135.88	0.49	-0.48	0.63	
2,849.00	10.50	182.00	2,837.96	-146.92	-13.54	147.50	0.14	0.00	0.78	
2,912.00	10.60	180.90	2,899.90	-158.45	-13.83	158.98	0.36	0.16	-1.75	
2,975.00	10.70	181.00	2,961.81	-170.10	-14.02	170.57	0.16	0.16	0.16	
3,038.00	10.80	181.80	3,023.71	-181.84	-14.31	182.27	0.29	0.16	1.27	
3,101.00	10.60	181.00	3,085.61	-193.54	-14.60	193.91	0.40	-0.32	-1.27	
3,164.00	10.70	181.60	3,147.53	-205.18	-14.86	205.50	0.24	0.16	0.95	
3,227.00	10.80	180.50	3,209.42	-216.92	-15.07	217.19	0.36	0.16	-1.75	
3,290.00	10.90	179.00	3,271.30	-228.78	-15.02	228.96	0.48	0.16	-2.38	
3,352.00	10.90	182.50	3,332.18	-240.50	-15.18	240.62	1.07	0.00	5.65	
3,415.00	10.90	189.60	3,394.04	-252.32	-16.43	252.51	2.13	0.00	11.27	
3,478.00	10.00	191.90	3,456.00	-263.55	-18.55	263.91	1.57	-1.43	3.65	
3,541.00	9.20	185.30	3,518.12	-273.92	-20.14	274.39	2.16	-1.27	-10.48	
3,604.00	7.80	187.80	3,580.43	-283.17	-21.19	283.70	2.30	-2.22	3.97	
3,667.00	7.90	188.30	3,642.83	-291.69	-22.39	292.30	0.19	0.16	0.79	
3,730.00	8.00	187.70	3,705.23	-300.32	-23.61	301.01	0.21	0.16	-0.95	
3,793.00	7.90	188.40	3,767.62	-308.94	-24.83	309.72	0.22	-0.16	1.11	

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Site:	ML Investments 2-3	MD Reference:	est.GL+KB @ 2647.00usft (Paul Graham #4)
Well:	#2-3	North Reference:	Grid
Wellbore:	#2-3 OH	Survey Calculation Method:	Minimum Curvature
Design:	#2-3 OH	Database:	EDM 5000.1 Single User Db

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)
3,858.00	7.10	187.10	3,830.08	-317.09	-25.94	317.94	1.30	-1.27	-2.06
3,920.00	5.80	184.20	3,893.68	-324.24	-26.67	325.13	2.09	-2.03	-4.53
3,983.00	5.30	183.20	3,956.38	-330.32	-27.06	331.21	0.81	-0.79	-1.59
4,047.00	4.90	185.50	4,020.13	-335.99	-27.49	336.90	0.70	-0.63	3.59
4,110.00	4.70	186.10	4,082.91	-341.24	-28.02	342.17	0.33	-0.32	0.95
4,171.00	3.80	188.00	4,143.74	-345.72	-28.57	346.69	1.49	-1.48	3.11
4,234.00	3.30	189.10	4,206.62	-349.58	-29.14	350.59	0.80	-0.79	1.75
4,296.00	3.50	189.00	4,268.51	-353.21	-29.72	354.26	0.32	0.32	-0.16
4,359.00	2.60	195.80	4,331.42	-356.49	-30.41	357.59	1.54	-1.43	10.79
4,422.00	2.20	184.10	4,394.36	-359.07	-30.89	360.21	1.00	-0.63	-18.57
4,485.00	1.70	167.00	4,457.33	-361.19	-30.76	362.30	1.21	-0.79	-27.14
4,548.00	1.50	166.50	4,520.30	-362.90	-30.36	363.95	0.32	-0.32	-0.79
4,610.00	1.60	171.00	4,582.28	-364.54	-30.04	365.55	0.25	0.16	7.26
4,673.00	1.60	170.00	4,645.26	-366.28	-29.75	367.24	0.04	0.00	-1.59
4,736.00	1.10	202.90	4,708.24	-367.70	-29.83	368.66	1.43	-0.79	52.22
4,798.00	1.60	165.80	4,770.22	-369.09	-29.85	370.04	1.58	0.81	-59.84
4,861.00	1.60	159.80	4,833.20	-370.77	-29.33	371.65	0.27	0.00	-9.52
4,925.00	1.70	163.10	4,897.17	-372.51	-28.74	373.31	0.22	0.16	5.16
4,979.00	1.40	164.70	4,951.15	-373.92	-28.34	374.66	0.56	-0.56	2.96
5,001.00	1.40	164.70	4,973.15	-374.43	-28.20	375.15	0.00	0.00	0.00
5 1/2"									
5,034.00	1.40	164.70	5,006.14	-375.21	-27.98	375.90	0.00	0.00	0.00

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N-S (usft)	+E-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
#2-3 SL - hit/miss target - Shape - actual wellpath hits target center - Point	0.00	360.00	0.00	0.00	0.00	874,308.67	222,420.44	44° 3' 39.012 N	116° 48' 21.524 W
#2-3 Target - actual wellpath misses target center by 14.48usft at 4460.88usft MD (4433.22 TVD, -360.44 N, -30.88 E) - Circle (radius 50.00)	0.00	360.00	4,433.00	-387.66	-43.44	873,941.00	222,377.00	44° 3' 35.376 N	116° 48' 22.054 W
#2-3 PBHL - actual wellpath misses target center by 17.10usft at 5027.59usft MD (4999.73 TVD, -375.06 N, -28.02 E) - Point	0.00	360.00	5,000.00	-387.66	-43.44	873,941.00	222,377.00	44° 3' 35.376 N	116° 48' 22.054 W
#2-3 BHL - actual wellpath hits target center - Point	0.00	0.00	5,006.14	-375.21	-27.98	873,933.45	222,392.46	44° 3' 35.303 N	116° 48' 21.841 W

Titan Directional Drilling, LLC
Survey Report

Company:	Alta Mesa	Local Co-ordinate Reference:	Well #2-3
Project:	Payette County, ID W'27	TVD Reference:	est.GL+KB @ 2647 00usft (Paul Graham #4)
Site:	ML Investments 2-3	MD Reference:	est.GL+KB @ 2647 00usft (Paul Graham #4)
Well:	#2-3	North Reference:	Grid
Wellbore:	#2-3 OH	Survey Calculation Method:	Minimum Curvature
Design:	#2-3 OH	Database:	EDM 5000.1 Single User Db

Casing Points						
	Measured Depth (usft)	Vertical Depth (usft)		Name	Casing Diameter (")	Hole Diameter (")
	1,105.00	1,104.99	9 5/8"		9-5/8	12-1/4
	5,001.00	4,973.15	5 1/2"		5-1/2	8-3/4

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