

COG OPERATING

Red Lake
Eddy County, NM
Moncrief State #1
VH - Job #32K10121244

30-015-25017

Survey: Gyro

SDI Standard Survey Report

This survey is correct to the best of my knowledge and is supported by actual field data.

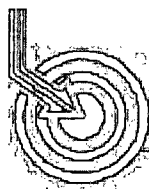
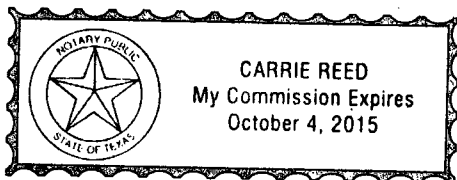
Robert

Notarized this date 5th of November, 2012.

Carrie Reed

Notary Signature
County of Midland
State of Texas

→ Provide deviation within 500' of TA



Scientific Drilling

Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Moncrief State #1
Project:	Red Lake	TVD Reference:	WELL @ 0.00usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.00usft (Original Well Elev)
Well:	Moncrief State #1	North Reference:	Grid
Wellbore:	VH - Job #32K10121244	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K10121244	Database:	EDM-Regulatory

Project	Red Lake		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site		Eddy County, NM			
Site Position:		Northing:	662,078.62 usft	Latitude:	32° 49' 12.000 N
From:	Lat/Long	Easting:	557,856.84 usft	Longitude:	104° 8' 42.000 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.10 °

Well	Moncrief State #1, Vertical					
Well Position	+N/-S	0.00 usft	Northing:	660,982.92 usft	Latitude:	32° 49' 1.200 N
	+E/-W	0.00 usft	Easting:	555,401.07 usft	Longitude:	104° 9' 10.800 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	0.00 usft

Wellbore	VH - Job #32K10121244				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/04/12	7.74	60.60	48,804

Design	VH - Job #32K10121244			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	235.00

Survey Program		Date	10/29/12		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	5,065.00	Gyro (VH - Job #32K10121244)	Keeper	Keeper Gyro	

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.65	251.43	100.00	-0.18	-0.54	251.43	0.57
200.00	1.27	253.98	199.98	-0.67	-2.14	252.69	2.24
300.00	1.32	245.96	299.96	-1.44	-4.26	251.29	4.50
400.00	1.52	237.87	399.93	-2.62	-6.43	247.86	6.94
500.00	1.21	239.35	499.90	-3.86	-8.46	245.48	9.30
600.00	1.06	235.01	599.88	-4.93	-10.13	244.05	11.27
700.00	1.03	246.50	699.86	-5.82	-11.71	243.59	13.08
800.00	0.81	237.46	799.85	-6.56	-13.13	243.47	14.68
900.00	0.76	241.23	899.84	-7.26	-14.31	243.11	16.04
1,000.00	0.71	234.17	999.83	-7.94	-15.39	242.72	17.32
1,100.00	0.42	218.55	1,099.83	-8.59	-16.12	241.96	18.27

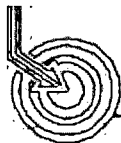
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SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Moncrief State #1
Project:	Red Lake	TVD Reference:	WELL @ 0.00usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.00usft (Original Well Elev)
Well:	Moncrief State #1	North Reference:	Grid
Wellbore:	VH - Job #32K10121244	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K10121244	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,200.00	0.45	219.22	1,199.82	-9.18	-16.60	241.06	18.97
1,300.00	0.46	208.79	1,299.82	-9.83	-17.04	240.01	19.68
1,400.00	0.50	222.14	1,399.82	-10.51	-17.53	239.05	20.44
1,500.00	0.43	221.38	1,499.81	-11.11	-18.07	238.40	21.21
1,600.00	0.51	232.48	1,599.81	-11.67	-18.67	238.00	22.02
1,700.00	0.51	234.12	1,699.81	-12.20	-19.38	237.82	22.90
1,800.00	0.69	230.96	1,799.80	-12.84	-20.21	237.58	23.95
1,900.00	0.72	229.93	1,899.79	-13.62	-21.16	237.23	25.17
2,000.00	0.68	228.07	1,999.79	-14.42	-22.08	236.85	26.38
2,100.00	0.69	225.91	2,099.78	-15.24	-22.96	236.42	27.55
2,200.00	0.76	225.69	2,199.77	-16.12	-23.86	235.96	28.80
2,300.00	0.92	227.70	2,299.76	-17.13	-24.93	235.52	30.25
2,400.00	1.03	242.11	2,399.75	-18.09	-26.32	235.51	31.94
2,500.00	0.81	246.49	2,499.73	-18.79	-27.76	235.91	33.52
2,600.00	0.92	231.95	2,599.72	-19.56	-29.04	236.03	35.02
2,700.00	0.94	230.79	2,699.71	-20.58	-30.31	235.83	36.64
2,800.00	1.11	233.93	2,799.69	-21.67	-31.73	235.67	38.42
2,900.00	1.42	239.35	2,899.67	-22.87	-33.58	235.74	40.63
3,000.00	1.33	229.71	2,999.64	-24.25	-35.53	235.68	43.02
3,100.00	1.32	238.69	3,099.61	-25.60	-37.40	235.61	45.32
3,200.00	0.99	239.14	3,199.59	-26.64	-39.12	235.75	47.33
3,300.00	0.88	227.94	3,299.58	-27.60	-40.44	235.68	48.96
3,400.00	0.92	225.66	3,399.57	-28.68	-41.58	235.41	50.51
3,500.00	0.38	197.75	3,499.56	-29.55	-42.26	235.03	51.56
3,600.00	0.35	151.50	3,599.56	-30.14	-42.21	234.48	51.87
3,700.00	0.36	124.67	3,699.56	-30.58	-41.81	233.81	51.80
3,800.00	0.25	97.57	3,799.56	-30.79	-41.33	233.32	51.54
3,900.00	0.34	143.39	3,899.55	-31.06	-40.94	232.82	51.39
4,000.00	0.28	171.97	3,999.55	-31.54	-40.73	232.25	51.51
4,100.00	0.11	194.89	4,099.55	-31.87	-40.72	231.95	51.71
4,200.00	0.26	15.09	4,199.55	-31.75	-40.68	232.04	51.60
4,300.00	0.10	327.69	4,299.55	-31.45	-40.67	232.28	51.42
4,400.00	0.14	31.18	4,399.55	-31.28	-40.66	232.43	51.29
4,500.00	0.34	14.31	4,499.55	-30.88	-40.52	232.69	50.95
4,600.00	0.47	16.80	4,599.55	-30.20	-40.33	233.17	50.38
4,700.00	0.25	1.22	4,699.55	-29.59	-40.20	233.64	49.92
4,800.00	0.41	305.09	4,799.54	-29.17	-40.49	234.23	49.90
4,900.00	0.45	257.94	4,899.54	-29.04	-41.17	234.80	50.38
5,000.00	0.31	247.47	4,999.54	-29.23	-41.80	235.04	51.01
5,065.00	0.21	197.01	5,064.54	-29.41	-42.00	235.00	51.27

TD 6127'

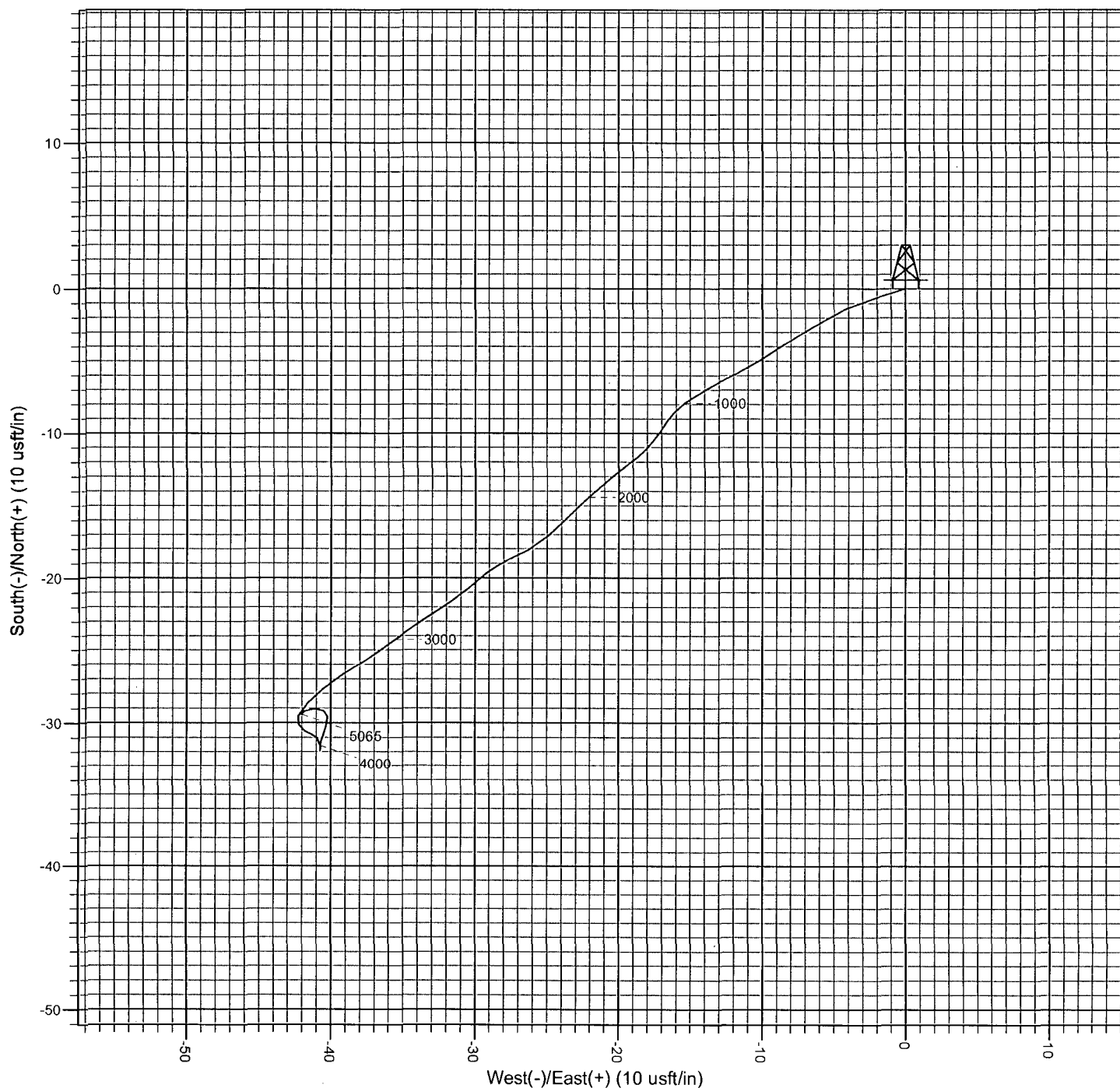


Scientific Drilling

Project: Red Lake
Eddy County, NM
Well: Moncrief State #1
Wellbore: VH - Job #32K10121244
Design: VH - Job #32K10121244

WELL DETAILS: Moncrief State #1
WELL @ 0.00usft (Original Well Elev)
Ground Level: 0.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	660982.92	555401.07	32° 49' 1.200 N	104° 9' 10.800 W	



PROJECT DETAILS: Red Lake	SITE DETAILS: Eddy County, NM
Geodetic System: US State Plane 1927 (Exact solution)	Site Centre Latitude: 32° 49' 12.000 N
Datum: NAD 1927 (NADCON CONUS)	Longitude: 104° 8' 42.000 W
Ellipsoid: Clarke 1866	Positional Uncertainty: 0.00
Zone: New Mexico East 3001	Convergence: 0.10
System Datum: Mean Sea Level	Local North: Grid