



EOG Vanguard 30 State Com #1H Gyro+MWD 0-15475'MD Survey Geodetic Report (Def Survey)



Report Date: December 17, 2012 - 09:11 AM
Client: EOG Resources
Field: NM Lea County (NAD 27)

Survey / DLS Computation: Minimum Curvature / Lubinski
Vertical Section Azimuth: 355.340 ° (Grid North)
Vertical Section Origin: 0.000 ft, 0.000 ft

Structure / Blot: EOG Vanguard 30 State Com #1H / EOG Vanguard 30 State Com #1H
Well: EOG Vanguard 30 State Com #1H
Borehole: Original Borehole
UWI / API#: Unknown / Unknown
Survey Name: EOG Vanguard 30 State Com #1H Gyro+MWD 0-15475'MD
Survey Date: December 04, 2012
Tort / AHD / DDI / ERD Ratio: 201.051 ° / 6289.373 ft / 6.316 / 0.885
Coordinate Reference System: NAD27 New Mexico State Plane, Eastern Zone, US Feet
Location Lat / Long: N 32° 10' 54.40281", W 103° 30' 51.60300"
Location Grid N/E Y/X: N 430816.000 NUS, E 753387.000 NUS
CRS Grid Convergence Angle: 0.4362 °
Grid Scale Factor: 0.99998263

TVD Reference Datum: KB
TVD Reference Elevation: 3530.000 ft above
Seabed / Ground Elevation: 3505.000 ft above
Magnetic Declination: 7.477 °
Total Gravity Field Strength: 999.1509 mgn (9.8 based)
Total Magnetic Field Strength: 48435.454 nT
Magnetic Dip Angle: 80.081 °
Declination Date: December 04, 2012
Magnetic Declination Model: BGGM 2012
North Reference: Grid North
Grid Convergence Used: 0.4362 °
Total Corr Mag North→Grid North: 7.0408 °
Local Coord Referenced To: Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (ft/100ft)	Northing (NUS)	Easting (EUS)	Latitude (N/S ° ' ")	Longitude (E/W ° ' ")
Tie-In	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	430816.00	753387.00	N 32 10 54.40	W 103 30 51.60
	100.00	0.20	132.95	100.00	-0.13	-0.12	0.13	0.20	430815.88	753387.13	N 32 10 54.40	W 103 30 51.60
	200.00	0.45	72.20	200.00	-0.17	-0.12	0.63	0.39	430815.88	753387.63	N 32 10 54.40	W 103 30 51.60
	300.00	0.33	93.02	300.00	-0.12	-0.01	1.29	0.18	430815.99	753388.29	N 32 10 54.40	W 103 30 51.59
	400.00	0.12	53.24	400.00	-0.10	0.03	1.66	0.25	430816.03	753388.66	N 32 10 54.40	W 103 30 51.58
	500.00	0.15	42.91	499.99	0.04	0.19	1.84	0.04	430816.19	753388.84	N 32 10 54.40	W 103 30 51.58
	600.00	0.10	81.04	509.99	0.14	0.30	2.01	0.09	430816.30	753389.01	N 32 10 54.41	W 103 30 51.58
	700.00	0.23	86.01	699.99	0.14	0.33	2.30	0.13	430816.33	753389.30	N 32 10 54.41	W 103 30 51.58
	800.00	0.11	94.70	799.99	0.12	0.34	2.59	0.12	430816.34	753389.59	N 32 10 54.41	W 103 30 51.57
	900.00	0.28	58.31	899.99	0.22	0.45	2.90	0.20	430816.45	753389.80	N 32 10 54.41	W 103 30 51.57
Last Gyro	1000.00	0.47	82.99	999.99	0.48	0.76	3.47	0.19	430816.76	753390.47	N 32 10 54.41	W 103 30 51.56
	1100.00	0.54	53.28	1099.99	0.89	1.23	4.22	0.11	430817.23	753391.22	N 32 10 54.41	W 103 30 51.55
	1200.00	0.40	43.55	1199.98	1.37	1.77	4.84	0.16	430817.77	753391.84	N 32 10 54.42	W 103 30 51.55
	1255.00	0.32	51.20	1254.98	1.58	2.00	5.09	0.17	430818.00	753392.09	N 32 10 54.42	W 103 30 51.54
	1362.00	0.07	163.30	1361.98	1.69	2.13	5.34	0.33	430818.13	753392.34	N 32 10 54.42	W 103 30 51.54
	1551.00	0.07	59.37	1550.98	1.82	2.08	5.47	0.06	430818.08	753392.47	N 32 10 54.42	W 103 30 51.54
	1739.00	0.03	84.54	1738.98	1.87	2.14	5.82	0.02	430818.14	753392.82	N 32 10 54.42	W 103 30 51.54
	1925.00	0.00	7.04	1924.98	1.68	2.14	5.87	0.02	430818.14	753392.87	N 32 10 54.42	W 103 30 51.54
	2114.00	0.03	37.08	2113.98	1.71	2.18	5.70	0.02	430818.18	753392.70	N 32 10 54.42	W 103 30 51.54
	2302.00	0.07	334.45	2301.98	1.86	2.33	5.68	0.03	430818.33	753392.68	N 32 10 54.43	W 103 30 51.54
	2490.00	0.03	153.82	2489.98	1.92	2.38	5.85	0.05	430818.38	753392.85	N 32 10 54.43	W 103 30 51.54
	2678.00	0.03	356.90	2677.98	1.92	2.39	5.87	0.03	430818.39	753392.87	N 32 10 54.43	W 103 30 51.54
	2866.00	0.03	2.28	2865.98	2.02	2.49	5.87	0.00	430818.49	753392.87	N 32 10 54.43	W 103 30 51.54
	3052.00	0.03	27.83	3051.98	2.11	2.58	5.89	0.01	430818.58	753392.89	N 32 10 54.43	W 103 30 51.54
	3241.00	0.05	151.21	3240.98	2.06	2.55	5.76	0.04	430818.55	753392.76	N 32 10 54.43	W 103 30 51.54
	3431.00	0.07	176.66	3430.98	1.88	2.36	5.80	0.02	430818.36	753392.80	N 32 10 54.43	W 103 30 51.54
	3621.00	0.03	293.17	3620.98	1.79	2.27	5.76	0.05	430818.27	753392.76	N 32 10 54.42	W 103 30 51.54
	3811.00	0.00	7.04	3810.98	1.81	2.29	5.72	0.02	430818.29	753392.72	N 32 10 54.42	W 103 30 51.54
	3997.00	0.03	253.36	3996.98	1.80	2.27	5.67	0.02	430818.27	753392.67	N 32 10 54.42	W 103 30 51.54
	4187.00	0.08	4.30	4186.98	1.92	2.39	5.83	0.05	430818.39	753392.83	N 32 10 54.43	W 103 30 51.54
	4376.00	0.10	31.66	4375.98	2.19	2.66	5.73	0.02	430818.66	753392.73	N 32 10 54.43	W 103 30 51.54
	4565.00	0.05	162.12	4564.98	2.24	2.72	5.84	0.07	430818.72	753392.84	N 32 10 54.43	W 103 30 51.53
	4756.00	0.00	7.04	4755.98	2.16	2.64	5.87	0.03	430818.64	753392.87	N 32 10 54.43	W 103 30 51.53
	4947.00	0.03	342.99	4946.98	2.21	2.69	5.85	0.02	430818.69	753392.85	N 32 10 54.43	W 103 30 51.53
	5090.00	0.08	204.07	5089.98	2.16	2.64	5.80	0.07	430818.64	753392.80	N 32 10 54.43	W 103 30 51.54
	5168.00	0.10	262.79	5167.98	2.11	2.58	5.71	0.12	430818.66	753392.71	N 32 10 54.43	W 103 30 51.54
	5214.00	0.14	278.53	5213.98	2.12	2.56	5.82	0.12	430818.58	753392.82	N 32 10 54.43	W 103 30 51.54
	5402.00	1.46	192.80	5401.98	-0.11	0.29	4.86	0.78	430818.29	753391.86	N 32 10 54.41	W 103 30 51.55
	5592.00	2.21	191.62	5591.86	-5.94	-5.66	3.59	0.40	430810.34	753390.59	N 32 10 54.35	W 103 30 51.58
	5780.00	0.21	259.91	5779.81	-9.45	-9.27	2.52	1.14	430808.73	753389.52	N 32 10 54.31	W 103 30 51.57
Casing	5968.00	0.40	336.21	5967.81	-8.86	-8.73	1.91	0.22	430807.27	753388.91	N 32 10 54.32	W 103 30 51.58
	6156.00	0.07	283.75	6155.81	-8.20	-8.11	1.54	0.19	430807.69	753388.54	N 32 10 54.32	W 103 30 51.59
	6345.00	0.14	317.83	6344.81	-7.99	-7.91	1.27	0.05	430808.09	753388.27	N 32 10 54.32	W 103 30 51.59
	6533.00	0.05	177.99	6532.81	-7.88	-7.82	1.12	0.10	430808.18	753388.12	N 32 10 54.33	W 103 30 51.59
	6722.00	0.03	65.50	6721.81	-7.85	-7.88	1.17	0.04	430808.12	753388.17	N 32 10 54.32	W 103 30 51.59
	6911.00	0.03	355.54	6910.81	-7.88	-7.81	1.21	0.02	430808.19	753388.21	N 32 10 54.33	W 103 30 51.59
	7101.00	0.14	230.21	7100.81	-7.97	-7.91	1.02	0.08	430808.09	753388.02	N 32 10 54.32	W 103 30 51.59
	7291.00	0.14	198.57	7290.81	-8.31	-8.28	0.77	0.04	430807.72	753387.77	N 32 10 54.32	W 103 30 51.59
	7482.00	0.14	185.23	7481.81	-8.78	-8.73	0.68	0.02	430807.27	753387.68	N 32 10 54.32	W 103 30 51.60
	7672.00	0.15	75.89	7671.81	-8.95	-8.90	0.90	0.12	430807.10	753387.90	N 32 10 54.31	W 103 30 51.59
	7861.00	0.24	295.88	7860.81	-8.71	-8.67	0.78	0.19	430807.33	753387.78	N 32 10 54.32	W 103 30 51.59
	8050.00	0.34	135.74	8049.81	-8.94	-8.90	0.82	0.30	430807.10	753387.82	N 32 10 54.31	W 103 30 51.59
	8238.00	0.28	28.20	8237.80	-8.98	-8.89	1.42	0.27	430807.11	753388.42	N 32 10 54.31	W 103 30 51.59
	8427.00	0.34	311.26	8426.80	-8.19	-8.12	1.22	0.21	430807.88	753388.22	N 32 10 54.32	W 103 30 51.59
	8615.00	0.17	206.14	8614.80	-8.03	-8.00	0.66	0.22	430808.00	753387.88	N 32 10 54.32	W 103 30 51.60
	8804.00	0.17	84.10	8803.80	-8.28	-8.22	0.83	0.16	430807.78	753387.83	N 32 10 54.32	W 103 30 51.59
	8978.00	0.14	73.44	8977.80	-8.24	-8.19	1.03	0.08	430807.81	753388.03	N 32 10 54.32	W 103 30 51.59
	8956.00	2.59	327.41	8958.77	-8.61	-8.62	0.14	3.25	430809.38	753387.14	N 32 10 54.34	W 103 30 51.60

SEP 30 2013

SWISS
RENTAL UNITS

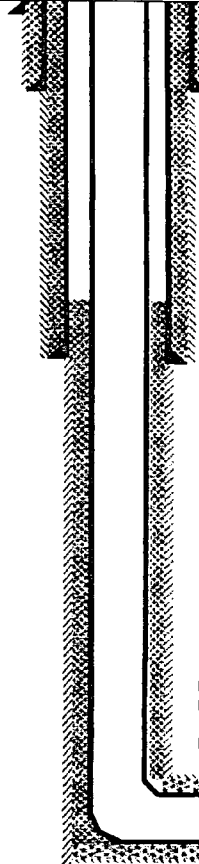
Comments	MD (ft)	Incl (°)	Azlm Grid (°)	TVD (ft)	VSEC (ft)	N8 (ft)	EW (ft)	DL8 ("/100ft)	Northing (NUS)	Easting (EUS)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')
	13905.00	90.55	354.52	9329.74	4598.43	4581.41	-395.91	0.87	435397.32	752991.09	N 32 11 39.77	W 103 30 55.80
	13998.00	90.24	353.82	9329.10	4691.41	4673.92	-405.36	0.82	435489.83	752981.65	N 32 11 40.68	W 103 30 55.81
	14093.00	91.24	353.95	9327.87	4786.37	4768.37	-415.48	1.06	435584.28	752971.53	N 32 11 41.62	W 103 30 56.02
	14188.00	91.34	353.65	9325.74	4881.31	4862.80	-425.74	0.33	435678.70	752961.27	N 32 11 42.55	W 103 30 56.13
	14282.00	91.41	355.96	9323.48	4975.27	4958.38	-434.25	2.46	435772.28	752952.78	N 32 11 43.48	W 103 30 56.22
	14376.00	91.54	359.18	9321.06	5069.16	5050.25	-438.23	3.43	435866.15	752948.78	N 32 11 44.41	W 103 30 56.25
	14472.00	91.31	1.40	9318.67	5164.78	5146.21	-437.74	2.32	435962.11	752940.27	N 32 11 45.38	W 103 30 56.24
	14566.00	91.13	1.33	9316.67	5258.22	5240.16	-435.50	0.21	436056.06	752931.50	N 32 11 46.29	W 103 30 56.21
	14661.00	91.13	0.28	9314.80	5352.77	5335.13	-434.17	1.11	436151.03	752922.84	N 32 11 47.23	W 103 30 56.18
	14753.00	91.03	358.43	9313.06	5444.52	5427.11	-435.21	2.01	436243.00	752915.80	N 32 11 48.14	W 103 30 56.19
	14847.00	91.20	355.88	9311.23	5538.45	5520.97	-439.87	2.72	436336.96	752907.14	N 32 11 49.07	W 103 30 56.23
	14942.00	91.20	354.73	9309.24	5633.43	5615.82	-447.64	1.21	436431.52	752899.36	N 32 11 50.00	W 103 30 56.31
	15034.00	91.17	354.31	9307.34	5725.40	5707.18	-456.43	0.46	436523.07	752890.58	N 32 11 50.91	W 103 30 56.41
	15128.00	91.34	353.42	9305.28	5819.35	5800.82	-466.47	0.96	436616.51	752882.54	N 32 11 51.84	W 103 30 56.52
	15223.00	91.72	353.80	9302.74	5914.27	5895.00	-477.04	0.57	436710.88	752874.97	N 32 11 52.77	W 103 30 56.63
	15318.00	91.41	353.11	9300.15	6009.18	5989.34	-487.88	0.80	436805.23	752866.14	N 32 11 53.71	W 103 30 56.75
North hardline crossing	15374.50	91.26	352.73	9298.63	6065.62	6045.40	-494.83	0.72	436861.28	752857.18	N 32 11 54.26	W 103 30 56.83
Last MWD	15411.00	91.17	352.48	9298.06	6102.06	6081.59	-499.53	0.72	436897.47	752847.48	N 32 11 54.62	W 103 30 56.88
Projection to Bit	15431.00	91.07	352.75	9297.67	6122.04	6101.42	-502.10	1.44	436917.30	752844.91	N 32 11 54.82	W 103 30 56.91
	15475.00	91.07	352.75	9296.84	6165.99	6145.06	-507.85	0.00	436950.94	752837.36	N 32 11 55.25	W 103 30 56.97

Survey Type: Def Survey

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma
Survey Program:

Description	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	0.000	25.000	Act Stns	30.000	30.000	SLB_NSG+MSHOT-Depth Only	Original Borehole / EOG Vanguard 30 State Com #1H Gyro+MWD 0-15475'MD
	25.000	1255.000	Act Stns	30.000	30.000	SLB_NSG+MSHOT	Original Borehole / EOG Vanguard 30 State Com #1H
	1255.000	15431.000	Act Stns	30.000	30.000	SLB_MWD-STD	Original Borehole / EOG Vanguard 30 State Com #1H
	15431.000	15475.000	Act Stns	30.000	30.000	SLB_BLIND+TREND	Original Borehole / EOG Vanguard 30 State Com #1H

CURRENT WELL SKETCH

DEPTH (ft)	MARKERS (KB)	LITHOLOGY	OGRID: 7377 API: 30-025-40817 AFE: 105346 SPUD: 11/29/12 @ 20:00 hrs FRR: 12/18/12 @ 11:00 hrs RIG: Cactus #139	Vanguard 30 State Com #1H Red Hills(Bone Spring) Field Lea County, New Mexico	SURF: 220' FSL & 835' FWL LOC: Sec. 30 SURVEY: T-24-S, R-34-E GL: 3505.0' KB: 3530.0' ZERO: 25.0' AGL	HOLE SIZE	MW (ppg)	MUD	BHST (°F)	LOT (ppg)	EVALUATION												
2,000'	Rustler - 1170'			<u>20" Conductor @ 130'</u>	Surface Casing @ 1,300' 13-3/8" 54.5# J-55 STC Cement w/ 600 sx Class C + 4.0% Bentonite + 1.0% CaCl2 + 0.25 pps Celloflake + 0.005 pps Static Free (13.5 ppg, 1.746 yd), followed by 300 sx Class C + 1.0% CaCl2 (14.8 ppg, 1.335 yd). Bump plug w/ 1130 psi and circ 160 sx to surface TOC @ 4,700' Intermediate Casing @ 5,168' 9-5/8", 40#, J-55, LT&C (0' - 4,023") 9-5/8", 40#, HCK-55, LT&C (4,023' - 5,168") Cement w/ 1100 sx Class C + 2.0% SMS + 10.0% Salt + 0.7% R-3 + 0.25 pps Celloflake + 0.005 pps Static Free (12.7 ppg, 2.22 yd), followed by 200 sx Class C + 0.60% FL-62 + 0.45% CD-32 + 0.2% SMS + 0.005 pps Static Free (14.8 ppg, 1.33 yd). Bump plug and circ 317 sx to surface KOP @ 9,003' md/tvd EOC @ -9,753' md / 9500' tvd @ 90° inclination 12"/100' build rate Hold 90° inclination to TD <table border="1"><thead><tr><th>HOLE</th><th>MW (ppg)</th><th>MUD</th><th>BHST (°F)</th><th>LOT (ppg)</th><th>EVAL</th></tr></thead><tbody><tr><td>8-3/4"</td><td>8.0-8.3</td><td>CBW</td><td>156</td><td>N/A</td><td>Mud</td></tr></tbody></table>	HOLE	MW (ppg)	MUD	BHST (°F)	LOT (ppg)	EVAL	8-3/4"	8.0-8.3	CBW	156	N/A	Mud	17-1/2"	8.6	FW	65		Mud Log
HOLE	MW (ppg)			MUD		BHST (°F)	LOT (ppg)	EVAL															
8-3/4"	8.0-8.3			CBW		156	N/A	Mud															
3,000'	T / Salado - 1300'																						
5,000'	B / Salado - 4925' Lamar - 5285' Bell Canyon - 5315'								12-1/4"	10.0	Brine Water		NA	Mud Log									
6,000'	Cherry Canyon - 6260'											117											
7,000'																							
8,000'	Brushy Canyon - 7775'								8-3/4"	8.4			N/A	Mud Log									
9,000'	Bone Spring Lime - 9225'									9.0	WBW												
10,000'	Massive Carbonate - 9490'																						
11,000'									156														

Production Casing @ 15,345' MD, 9,297' TVD
5-1/2" 17# HCP-110 LTC (MJ @ 8833')
Cement w/ 350 sx 60:40:0 Class C + 0.4% MPA-5 + 15 pps BA-90 + 1% BA-10A + 5% A-10 + 0.8% ASA-301 + 3% SMS + 2.75% R-21 + 8 pps LCM-1 + 0.005 pps Static Free (10.8 ppg, 3.67 yd), followed by 400 sx 50:50:10 Class H + 0.8% FL-52 + 0.3% ASA-301 + 0.5% SMS + 2% Salt + 0.55% R-21 + 3 pps LCM-1 + 0.25 pps Celloflake + 0.005 pps Static Free (11.8 ppg, 2.38 yd), followed by 1450 sx 50:50:2 Class H + 0.65% FL-52 + 0.5% CD-32 + 0.4% SMS + 2% Salt + 0.1% R-3 + 0.001 pps Static Free (14.2 ppg, 1.28 yd). Bump plug w/ 3045 psi and overdisplace w/ 4 bbls. Did not circ cement

Orig Eng: S. Munsell

Date: 12/18/2012