

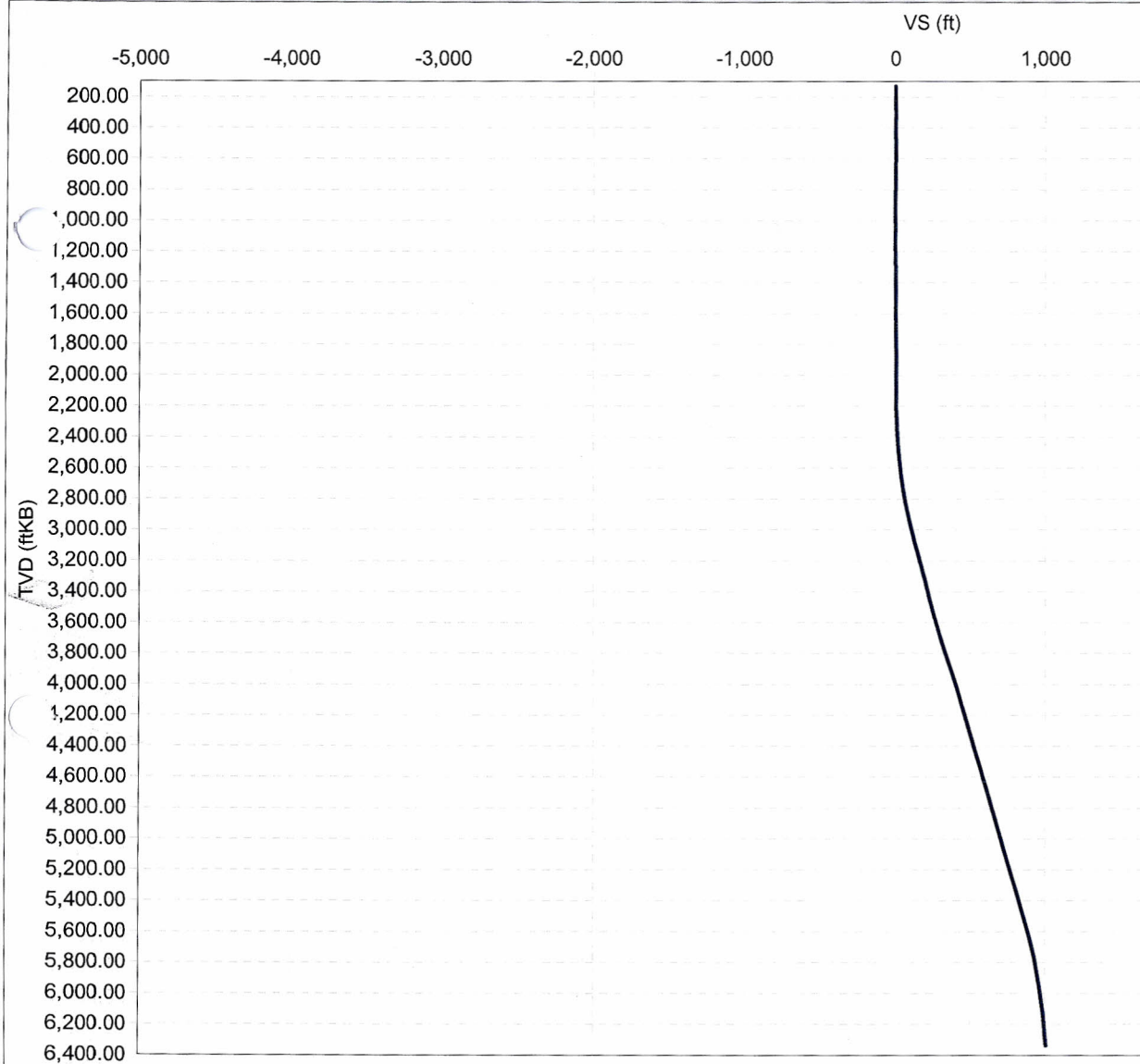


Directional Plot

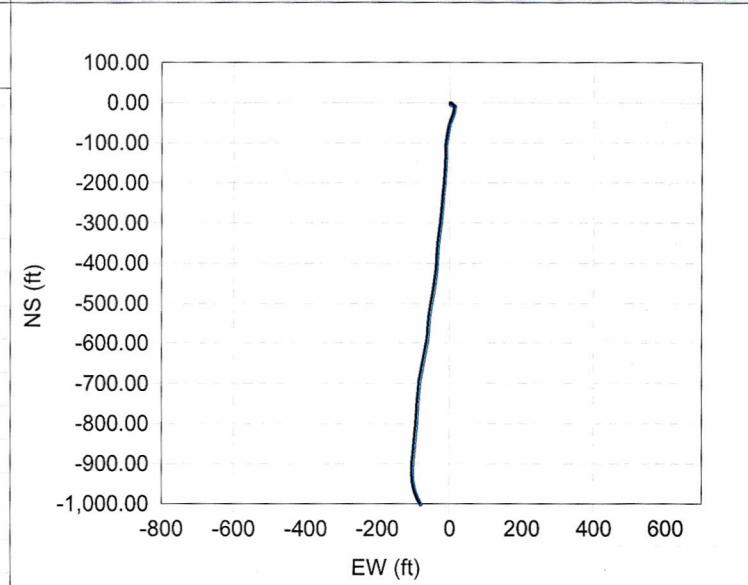
11/15/18
11/25/18
12/18/18

Well Name Emerald 94X	Lease Emerald	Field Name Rangely	Business Unit Mid-Continent/Alaska	Surface UWI 0510311855	Surface ChevNo MZ1576
Wellbore Name Original Hole	Directional Type Shallow Kick Off 'S'	Kick Off Depth (ftKB)	Total Depth of Wellbore (ftKB) 6,795.00	Wellbore UWI 051031185500	Wellbore ChevNo MZ1576-00

Vertical Section



Plan



— VS vs TVD

— VS vs TVD



Directional Survey Data

Well Name Emerald 94X	Lease Emerald	Field Name Rangely	Business Unit Mid-Continent/Alaska	Surface UWI 0510311855	Surface ChevNo MZ1576	
Wellbore Name Original Hole	Directional Type Shallow Kick Off 'S'	Wellbore UWI 051031185500	Wellbore ChevNo MZ1576-00	Kick Off Depth (ftKB)	Total Depth (ftKB) 6,795.00	Date TD Reached (wellbore) 6/15/2011 09:00
UTM Northing (Y) (ft)	UTM Easting (X) (ft)	UTM Grid Zone	Latitude (DMS)	Longitude (DMS)	Closure Direction (*) 184.65	

Directional Surveys			
Description Surveys	Planned? No	Definitive? Yes	Note Correction

Survey Data											
Survey Company	Date	MD (ftKB)	TVD (ftKB)	Incl (°)	Azm (°)	VS (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Build (°/100ft)	Turn (°/100ft)
Scientific Drilling	6/1/2011	126.00	126.00	0.62	144.98	0.52	-0.56	0.39	0.49	0.49	115.06
Scientific Drilling	6/1/2011	219.00	218.99	0.73	128.12	1.24	-1.34	1.15	0.24	0.12	-18.13
Scientific Drilling	6/1/2011	311.00	310.99	0.70	295.97	1.36	-1.45	1.10	1.55	-0.03	182.45
Scientific Drilling	6/1/2011	403.00	402.98	0.51	250.84	1.32	-1.34	0.21	0.54	-0.21	-49.05
Scientific Drilling	6/1/2011	495.00	494.97	1.67	142.08	2.47	-2.53	0.65	2.06	1.26	-118.22
Scientific Drilling	6/1/2011	588.00	587.96	1.06	5.94	2.61	-2.75	1.57	2.73	-0.66	-146.39
Scientific Drilling	6/1/2011	680.00	679.94	1.18	353.60	0.83	-0.96	1.55	0.29	0.13	377.89
Scientific Drilling	6/1/2011	772.00	771.93	0.18	17.10	-0.24	0.12	1.49	1.11	-1.09	-365.76
Scientific Drilling	6/1/2011	862.00	861.93	0.52	335.00	-0.73	0.63	1.36	0.45	0.38	353.22
Scientific Drilling	6/2/2011	952.00	951.93	1.06	244.70	-0.67	0.64	0.43	1.31	0.60	-100.33
Scientific Drilling	6/2/2011	1,042.00	1,041.92	0.62	79.76	-0.38	0.37	0.16	1.85	-0.49	-183.27
Scientific Drilling	6/2/2011	1,132.00	1,131.92	0.20	38.58	-0.64	0.58	0.74	0.54	-0.47	-45.76
Scientific Drilling	6/2/2011	1,222.00	1,221.91	1.23	178.82	0.19	-0.26	0.85	1.54	1.14	155.82
Scientific Drilling	6/2/2011	1,312.00	1,311.90	0.59	123.52	1.38	-1.48	1.26	1.13	-0.71	-61.44
Scientific Drilling	6/2/2011	1,403.00	1,402.89	1.32	87.94	1.48	-1.70	2.70	1.00	0.80	-39.10
Scientific Drilling	6/2/2011	1,493.00	1,492.87	1.30	100.63	1.47	-1.86	4.74	0.32	-0.02	14.10
Scientific Drilling	6/2/2011	1,583.00	1,582.85	0.98	168.52	2.31	-2.80	5.89	1.44	-0.36	75.43
Scientific Drilling	6/2/2011	1,673.00	1,672.84	0.88	170.73	3.72	-4.23	6.16	0.12	-0.11	2.46
Scientific Drilling	6/2/2011	1,763.00	1,762.83	1.14	113.51	4.68	-5.27	7.09	1.10	0.29	-63.58
Scientific Drilling	6/2/2011	1,853.00	1,852.81	1.09	124.45	5.40	-6.11	8.62	0.24	-0.06	12.16
Scientific Drilling	6/2/2011	1,943.00	1,942.80	0.48	132.13	6.05	-6.85	9.60	0.69	-0.68	8.53
Scientific Drilling	6/5/2011	2,015.00	2,014.80	1.06	60.34	5.86	-6.72	10.41	1.41	0.81	-99.71
Scientific Drilling	6/5/2011	2,105.00	2,104.79	0.74	101.21	5.46	-6.43	11.70	0.77	-0.36	45.41
Scientific Drilling	6/5/2011	2,195.00	2,194.77	1.64	184.27	6.81	-7.82	12.17	1.91	1.00	92.29
Scientific Drilling	6/5/2011	2,285.00	2,284.73	1.95	198.59	9.59	-10.56	11.59	0.60	0.34	15.91
Scientific Drilling	6/5/2011	2,375.00	2,374.63	3.46	194.89	13.74	-14.64	10.40	1.69	1.68	-4.11
Scientific Drilling	6/5/2011	2,465.00	2,464.38	5.02	187.54	20.35	-21.16	9.19	1.83	1.73	-8.17
Scientific Drilling	6/5/2011	2,555.00	2,553.95	6.20	200.99	28.95	-29.61	6.93	1.95	1.31	14.94
Scientific Drilling	6/5/2011	2,646.00	2,644.20	8.50	207.83	39.85	-40.14	2.03	2.70	2.53	7.52
Scientific Drilling	6/5/2011	2,736.00	2,733.10	9.42	195.85	53.19	-53.11	-3.09	2.31	1.02	-13.31
Scientific Drilling	6/5/2011	2,826.00	2,821.60	11.58	188.99	69.42	-69.12	-6.51	2.77	2.40	-7.62
Scientific Drilling	6/5/2011	2,961.00	2,953.40	13.38	189.93	98.49	-97.89	-11.32	1.34	1.33	0.70
Scientific Drilling	6/5/2011	3,006.00	2,997.11	14.16	180.84	109.17	-108.53	-12.30	5.10	1.73	-20.20
Scientific Drilling	6/5/2011	3,096.00	3,084.10	15.56	180.05	132.18	-131.61	-12.47	1.57	1.56	-0.88
Scientific Drilling	6/5/2011	3,186.00	3,170.82	15.48	183.03	156.22	-155.67	-13.12	0.89	-0.09	3.31
Scientific Drilling	6/5/2011	3,276.00	3,257.55	15.51	185.41	180.26	-179.64	-14.89	0.71	0.03	2.64
Scientific Drilling	6/5/2011	3,366.00	3,344.57	14.07	186.55	203.23	-202.49	-17.27	1.63	-1.60	1.27
Scientific Drilling	6/5/2011	3,456.00	3,431.85	14.16	184.44	225.17	-224.34	-19.37	0.58	0.10	-2.34
Scientific Drilling	6/6/2011	3,546.00	3,518.71	16.18	185.58	248.72	-247.80	-21.44	2.27	2.24	1.27



Directional Survey Data

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Survey Data											
Survey Company	Date	MD (ftKB)	TVD (ftKB)	Incl (°)	Azm (°)	VS (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Build (°/100ft)	Turn (°/100ft)
Scientific Drilling	6/6/2011	3,636.00	3,605.11	16.31	185.74	273.89	-272.85	-23.93	0.15	0.14	0.18
Scientific Drilling	6/6/2011	3,727.00	3,692.04	18.08	187.33	300.77	-299.57	-27.01	2.01	1.95	1.75
Scientific Drilling	6/6/2011	3,817.00	3,777.35	19.08	187.87	329.41	-328.00	-30.80	1.13	1.11	0.60
Scientific Drilling	6/6/2011	3,907.00	3,862.50	18.73	186.46	358.54	-356.93	-34.44	0.64	-0.39	-1.57
Scientific Drilling	6/6/2011	3,997.00	3,947.86	18.24	182.38	387.06	-385.36	-36.65	1.54	-0.54	-4.53
Scientific Drilling	6/6/2011	4,087.00	4,033.49	17.59	183.91	414.73	-413.00	-38.16	0.89	-0.72	1.70
Scientific Drilling	6/6/2011	4,178.00	4,120.58	16.18	190.07	441.11	-439.20	-41.32	2.50	-1.55	6.77
Scientific Drilling	6/6/2011	4,223.00	4,163.79	16.18	189.36	453.60	-451.56	-43.44	0.44	0.00	-1.58
Scientific Drilling	6/6/2011	4,313.00	4,250.07	16.88	191.47	479.07	-476.74	-48.07	1.02	0.78	2.34
Scientific Drilling	6/6/2011	4,403.00	4,336.18	16.97	190.59	505.11	-502.46	-53.09	0.30	0.10	-0.98
Scientific Drilling	6/6/2011	4,493.00	4,422.26	16.95	188.45	531.26	-528.35	-57.43	0.69	-0.02	-2.38
Scientific Drilling	6/7/2011	4,583.00	4,508.55	16.09	183.65	556.82	-553.77	-60.15	1.79	-0.96	-5.33
Scientific Drilling	6/7/2011	4,673.00	4,594.76	17.27	183.97	582.65	-579.54	-61.87	1.32	1.31	0.36
Scientific Drilling	6/7/2011	4,718.00	4,637.74	17.27	191.17	595.97	-592.76	-63.62	4.75	0.00	16.00
Scientific Drilling	6/7/2011	4,808.00	4,723.89	16.36	193.26	621.78	-618.21	-69.12	1.21	-1.01	2.32
Scientific Drilling	6/7/2011	4,898.00	4,810.21	16.53	191.82	647.01	-643.08	-74.65	0.49	0.19	-1.60
Scientific Drilling	6/7/2011	4,988.00	4,896.45	16.71	191.74	672.55	-668.28	-79.90	0.20	0.20	-0.09
Scientific Drilling	6/7/2011	5,079.00	4,983.66	16.48	189.08	698.41	-693.83	-84.60	0.87	-0.25	-2.92
Scientific Drilling	6/7/2011	5,169.00	5,069.93	16.65	185.77	724.02	-719.27	-87.91	1.07	0.19	-3.68
Scientific Drilling	6/7/2011	5,259.00	5,156.03	17.20	184.05	750.22	-745.37	-90.15	0.83	0.61	-1.91
Scientific Drilling	6/7/2011	5,349.00	5,241.83	17.94	182.77	777.38	-772.49	-91.76	0.93	0.82	-1.42
Scientific Drilling	6/7/2011	5,439.00	5,327.91	16.00	185.06	803.64	-798.69	-93.52	2.28	-2.16	2.54
Scientific Drilling	6/7/2011	5,529.00	5,414.33	16.44	186.81	828.77	-823.69	-96.13	0.73	0.49	1.94
Scientific Drilling	6/7/2011	5,620.00	5,501.53	16.76	186.56	854.75	-849.51	-99.15	0.36	0.35	-0.27
Scientific Drilling	6/7/2011	5,710.00	5,587.90	15.89	185.74	880.04	-874.66	-101.87	1.00	-0.97	-0.91
Scientific Drilling	6/7/2011	5,800.00	5,674.69	14.83	186.57	903.87	-898.36	-104.42	1.20	-1.18	0.92
Scientific Drilling	6/7/2011	5,890.00	5,762.30	11.63	178.10	924.40	-918.88	-105.44	4.15	-3.56	-9.41
Scientific Drilling	6/7/2011	5,980.00	5,850.62	10.52	173.80	941.49	-936.12	-104.25	1.54	-1.23	-4.78
Scientific Drilling	6/7/2011	6,025.00	5,894.89	10.13	171.39	949.37	-944.11	-103.21	1.29	-0.87	-5.36
Scientific Drilling	6/7/2011	6,070.00	5,939.20	10.02	167.13	956.96	-951.84	-101.75	1.67	-0.24	-9.47
Scientific Drilling	6/7/2011	6,160.00	6,027.93	9.28	163.01	971.17	-966.42	-97.88	1.12	-0.82	-4.58
Scientific Drilling	6/7/2011	6,251.00	6,117.89	8.06	156.27	983.60	-979.27	-93.17	1.74	-1.34	-7.41
Scientific Drilling	6/7/2011	6,341.00	6,207.28	5.19	147.28	992.39	-988.48	-88.43	3.38	-3.19	-9.99
Scientific Drilling	6/7/2011	6,415.00	6,280.91	6.24	147.70	998.27	-994.69	-84.47	1.42	1.42	0.57
Scientific Drilling	6/7/2011	6,470.00	6,335.58	6.24	147.70	1,003.04	-999.74	-81.28	0.00	0.00	0.00