



Scientific Drilling



Survey Report

30-75.3302

Company: BP Date: 5/19/2006 Time: 14:48:20 Page: 1
 Field: SAN JUAN, New Mexico Co-ordinate(NE) Reference: Well: Zachary LS #1E, Grid North
 Site: SEC 25-T31N-R11W Vertical (TVD) Reference: SITE 5861.0
 Well: Zachary LS #1E Section (VS) Reference: Well (0.00N,0.00E,188.13Azi)
 Wellpath: actual Survey Calculation Method: Minimum Curvature Db: Sybase

Field: SAN JUAN, New Mexico
 SAN JUAN COUNTY, NEW MEXICO
 USA
 Map System: US State Plane Coordinate System 1983 Map Zone: New Mexico, Western Zone
 Geo Datum: GRS 1980 Coordinate System: Well Centre
 Sys Datum: Mean Sea Level Geomagnetic Model: bggm2005

Site: SEC 25-T31N-R11W

SAN JUAN NEW MEXICO

Site Position: Northing: 2135008.47 ft Latitude: 36 52 1.926 N
 From: Geographic Easting: 2690935.00 ft Longitude: 107 56 35.820 W
 Position Uncertainty: 0.00 ft North Reference: Grid
 Ground Level: 5847.00 ft Grid Convergence: -0.07 deg

Surf. 1750/S 220d/W
 BHL 881/S 2067/W
 MD 7237
 TVD 7139

Well: Zachary LS #1E

Slot Name:

Well Position: +N/-S 0.00 ft Northing: 2135008.47 ft Latitude: 36 52 1.926 N
 +E/-W 0.00 ft Easting: 2690935.00 ft Longitude: 107 56 35.820 W
 Position Uncertainty: 0.00 ft

Wellpath: actual

Current Datum: SITE Height 5861.00 ft Drilled From: Surface
 Magnetic Data: 4/25/2006 Tie-on Depth: 0.00 ft
 Field Strength: 51364 nT Above System Datum: Mean Sea Level
 Vertical Section: Depth From (TVD) +N/-S +E/-W Declination: 10.65 deg
 ft ft ft Mag Dip Angle: 63.69 deg
 0.00 0.00 0.00 Direction deg
 188.13

Survey Program for Definitive Wellpath

Date: 5/19/2006 Validated: No
 Actual From To Survey

Version: 2
 Toolcode

Tool Name

307.00 4221.00 MWD Survey (307.00-4221.00) MWD ISCWSA MWD - Standard
 4321.00 7237.00 projected Survey (4321.00-7237) INC+TREND Inclinator + known azi trend

Survey

MD ft	Incl deg	Azim deg	TVD ft	+N/-S ft	+E/-W ft	VS ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	Tool/Comment
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	TIE LINE
200.00	0.54	240.80	200.00	-0.46	-0.82	0.57	0.27	0.27	0.00	9 5/8"
307.00	0.83	240.80	306.99	-1.08	-1.94	1.35	0.27	0.27	0.00	MWD ISCWSA
337.00	2.09	222.54	336.98	-1.59	-2.50	1.93	4.43	4.20	-60.87	MWD ISCWSA
367.00	3.61	220.21	366.94	-2.72	-3.48	3.18	5.08	5.07	-7.77	MWD ISCWSA
398.00	5.00	217.55	397.85	-4.53	-4.93	5.19	4.53	4.48	-8.58	MWD ISCWSA
459.00	8.21	217.84	458.44	-10.08	-9.23	11.29	5.26	5.26	0.48	MWD ISCWSA
490.00	9.12	215.63	489.09	-13.83	-12.02	15.39	3.13	2.94	-7.13	MWD ISCWSA
521.00	9.93	217.08	519.66	-17.96	-15.06	19.91	2.72	2.61	4.68	MWD ISCWSA
552.00	10.67	217.77	550.16	-22.36	-18.43	24.74	2.42	2.39	2.23	MWD ISCWSA
582.00	11.83	216.52	579.58	-27.03	-21.96	29.86	3.95	3.87	-4.17	MWD ISCWSA
612.00	12.65	216.02	608.90	-32.15	-25.72	35.47	2.76	2.73	-1.67	MWD ISCWSA
643.00	12.65	213.14	639.15	-37.74	-29.57	41.54	2.03	0.00	-9.29	MWD ISCWSA
673.00	12.67	208.09	668.42	-43.39	-32.92	47.61	3.69	0.07	-16.83	MWD ISCWSA
704.00	12.51	203.26	698.67	-49.48	-35.84	54.05	3.43	-0.52	-15.58	MWD ISCWSA
735.00	13.44	200.76	728.88	-55.93	-38.45	60.81	3.50	3.00	-8.06	MWD ISCWSA
765.00	14.25	199.23	758.01	-62.68	-40.90	67.83	2.96	2.70	-5.10	MWD ISCWSA
795.00	14.36	196.58	787.08	-69.73	-43.18	75.14	2.21	0.37	-8.83	MWD ISCWSA
830.00	14.36	194.73	820.99	-78.09	-45.52	83.74	1.31	0.00	-5.29	MWD ISCWSA
861.00	14.69	191.86	851.00	-85.65	-47.30	91.48	2.55	1.06	-9.26	MWD ISCWSA
893.00	15.32	188.09	881.91	-93.81	-48.73	99.76	3.63	1.97	-11.78	MWD ISCWSA
925.00	15.15	184.50	912.78	-102.16	-49.66	108.16	3.00	-0.53	-11.22	MWD ISCWSA

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Well: Zachary LS #1E	Section (VS) Reference:	Well (0.00N,0.00E,188.13Azi)	
Wellpath: actual	Survey Calculation Method:	Minimum Curvature	Db: Sybase

Survey

MD ft	Incl deg	Azim deg	TVD ft	+N/-S ft	+E/-W ft	VS ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	Tool/Comment
987.00	13.27	178.06	972.89	-117.35	-50.05	123.25	3.96	-3.03	-10.39	MWD ISCWSA
1051.00	12.91	174.56	1035.22	-131.81	-49.12	137.44	1.36	-0.56	-5.47	MWD ISCWSA
1058.98	12.88	174.96	1043.00	-133.59	-48.96	139.17	1.19	-0.42	4.96	OJO ALAMO
1114.00	12.66	177.74	1096.66	-145.72	-48.19	151.07	1.19	-0.39	5.06	MWD ISCWSA
1132.80	12.72	178.87	1115.00	-149.84	-48.06	155.13	1.36	0.30	6.02	KIRTLAND
1178.00	12.87	181.55	1159.08	-159.85	-48.10	165.05	1.36	0.34	5.93	MWD ISCWSA
1242.00	12.68	179.28	1221.50	-174.00	-48.21	179.07	0.84	-0.30	-3.55	MWD ISCWSA
1302.00	12.86	180.33	1280.02	-187.26	-48.16	192.19	0.49	0.30	1.75	MWD ISCWSA
1366.00	12.60	179.07	1342.44	-201.36	-48.09	206.14	0.59	-0.41	-1.97	MWD ISCWSA
1430.00	12.43	184.96	1404.92	-215.21	-48.57	219.91	2.01	-0.27	9.20	MWD ISCWSA
1494.00	12.17	185.46	1467.45	-228.78	-49.81	233.53	0.44	-0.41	0.78	MWD ISCWSA
1558.00	11.99	185.82	1530.04	-242.11	-51.13	246.91	0.30	-0.28	0.56	MWD ISCWSA
1622.00	12.16	184.50	1592.62	-255.44	-52.33	260.28	0.51	0.27	-2.06	MWD ISCWSA
1686.00	12.55	186.60	1655.14	-269.07	-53.66	273.96	0.93	0.61	3.28	MWD ISCWSA
1750.00	13.00	186.95	1717.56	-283.12	-55.33	288.10	0.71	0.70	0.55	MWD ISCWSA
1813.00	12.55	185.26	1779.00	-296.97	-56.81	302.02	0.93	-0.71	-2.68	MWD ISCWSA
1878.00	12.44	188.48	1842.46	-310.93	-58.49	316.08	1.08	-0.17	4.95	MWD ISCWSA
1934.84	12.05	184.60	1898.00	-322.90	-59.87	328.12	1.60	-0.69	-6.82	FRUITLAND
1941.00	12.01	184.17	1904.03	-324.18	-59.97	329.40	1.60	-0.63	-7.05	MWD ISCWSA
2005.00	11.81	186.03	1966.65	-337.33	-61.14	342.59	0.68	-0.31	2.91	MWD ISCWSA
2069.00	12.15	187.98	2029.26	-350.52	-62.76	355.87	0.83	0.53	3.05	MWD ISCWSA
2132.00	12.30	188.81	2090.83	-363.71	-64.71	369.21	0.37	0.24	1.32	MWD ISCWSA
2185.45	12.79	189.91	2143.00	-375.17	-66.60	380.82	1.02	0.92	2.06	Fruitland Coal
2194.00	12.87	190.08	2151.34	-377.04	-66.93	382.72	1.02	0.92	1.97	MWD ISCWSA
2256.00	12.65	188.93	2211.81	-390.54	-69.19	396.40	0.54	-0.35	-1.85	MWD ISCWSA
2318.00	12.49	187.71	2272.32	-403.89	-71.15	409.90	0.50	-0.26	-1.97	MWD ISCWSA
2381.00	12.93	187.68	2333.78	-417.63	-73.00	423.76	0.70	0.70	-0.05	MWD ISCWSA
2445.00	12.77	186.41	2396.18	-431.76	-74.75	437.99	0.51	-0.25	-1.98	MWD ISCWSA
2508.00	13.12	185.47	2457.58	-445.79	-76.21	452.09	0.65	0.56	-1.49	MWD ISCWSA
2550.45	12.05	184.98	2499.00	-455.00	-77.05	461.33	2.53	-2.52	-1.16	PICTURED CLIFFS
2572.00	11.51	184.69	2520.10	-459.39	-77.42	465.72	2.53	-2.51	-1.33	MWD ISCWSA
2633.00	11.85	185.56	2579.84	-471.69	-78.53	478.05	0.63	0.56	1.43	MWD ISCWSA
2697.00	12.42	188.17	2642.41	-485.04	-80.14	491.50	1.24	0.89	4.08	MWD ISCWSA
2759.00	13.27	187.75	2702.86	-498.69	-82.05	505.28	1.38	1.37	-0.68	MWD ISCWSA
2786.88	13.03	188.50	2730.00	-504.97	-82.95	511.63	1.05	-0.85	2.70	LEWIS
2823.00	12.73	189.52	2765.21	-512.92	-84.21	519.68	1.05	-0.84	2.81	MWD ISCWSA
2887.00	12.79	186.84	2827.63	-526.91	-86.22	533.81	0.93	0.09	-4.19	MWD ISCWSA
2949.00	13.04	186.32	2888.07	-540.68	-87.80	547.66	0.44	0.40	-0.84	MWD ISCWSA
3012.00	13.14	184.17	2949.43	-554.88	-89.11	561.91	0.79	0.16	-3.41	MWD ISCWSA
3075.00	13.16	185.76	3010.78	-569.16	-90.35	576.22	0.58	0.03	2.52	MWD ISCWSA
3139.00	13.99	190.22	3072.99	-584.02	-92.45	591.23	2.09	1.30	6.97	MWD ISCWSA
3203.00	14.11	188.40	3135.08	-599.36	-94.96	606.76	0.72	0.19	-2.84	MWD ISCWSA
3274.00	14.13	189.30	3203.93	-616.47	-97.63	624.08	0.31	0.03	1.27	MWD ISCWSA
3338.00	14.35	188.32	3265.97	-632.03	-100.04	639.82	0.51	0.34	-1.53	MWD ISCWSA
3401.00	14.19	186.16	3327.02	-647.43	-102.00	655.35	0.88	-0.25	-3.43	MWD ISCWSA
3464.00	13.90	187.16	3388.14	-662.61	-103.77	670.63	0.60	-0.46	1.59	MWD ISCWSA
3495.00	13.31	185.20	3418.27	-669.86	-104.56	677.92	2.42	-1.90	-6.32	MWD ISCWSA
3527.00	12.80	187.07	3449.44	-677.05	-105.33	685.14	2.07	-1.59	5.84	MWD ISCWSA
3559.00	12.29	187.47	3480.68	-683.94	-106.21	692.09	1.62	-1.59	1.25	MWD ISCWSA
3590.00	12.35	186.46	3510.96	-690.51	-107.01	698.70	0.72	0.19	-3.26	MWD ISCWSA
3653.00	13.54	186.91	3572.36	-704.53	-108.65	712.81	1.90	1.89	0.71	MWD ISCWSA
3716.00	14.45	187.43	3633.49	-719.64	-110.56	728.04	1.46	1.44	0.83	MWD ISCWSA
3779.00	14.08	186.92	3694.55	-735.04	-112.50	743.56	0.62	-0.59	-0.81	MWD ISCWSA

Scientific Drilling

Survey Report

Company: BP	Date: 5/19/2006	Time: 14:48:20	Page: 3
Field: SAN JUAN, New Mexico	Co-ordinate(NE) Reference: Well: Zachary LS #1E, Grid North		
Site: SEC 25-T31N-R11W	Vertical (TVD) Reference: SITE 5861.0		
Well: Zachary LS #1E	Section (VS) Reference: Well (0.00N,0.00E,188.13Azi)		
Wellpath: actual	Survey Calculation Method: Minimum Curvature	Db: Sybase	

Survey

MD ft	Incl deg	Azim deg	TVD ft	+N/-S ft	+E/-W ft	VS ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	Tool/Comment
3842.00	14.33	186.24	3755.62	-750.40	-114.27	759.02	0.48	0.40	-1.08	MWD ISCWSA
3906.00	12.73	189.87	3817.85	-765.22	-116.34	773.98	2.83	-2.50	5.67	MWD ISCWSA
3967.00	13.04	188.76	3877.31	-778.65	-118.54	787.58	0.65	0.51	-1.82	MWD ISCWSA
4031.00	13.05	188.64	3939.66	-792.92	-120.72	802.03	0.05	0.02	-0.19	MWD ISCWSA
4095.00	12.11	189.40	4002.12	-806.69	-122.90	815.97	1.49	-1.47	1.19	MWD ISCWSA
4102.04	12.05	189.60	4009.00	-808.14	-123.15	817.44	1.06	-0.88	2.80	CLIFF HOUSE
4158.00	11.56	191.24	4063.78	-819.40	-125.21	828.88	1.06	-0.87	2.94	MWD ISCWSA
4221.00	11.00	189.18	4125.56	-831.53	-127.40	841.19	1.09	-0.89	-3.27	MWD ISCWSA
4321.00	8.00	189.18	4224.18	-847.82	-130.04	857.69	3.00	-3.00	0.00	INC+TREND
4403.40	5.53	189.18	4306.00	-857.40	-131.58	867.39	3.00	-3.00	0.00	MENELEE
4421.00	5.00	189.18	4323.53	-858.99	-131.84	869.01	3.00	-3.00	0.00	INC+TREND
4503.66	2.52	189.18	4406.00	-864.34	-132.71	874.42	3.00	-3.00	0.00	casing point
4519.00	2.06	189.18	4421.33	-864.95	-132.80	875.04	3.00	-3.00	0.00	7"
4619.00	1.06	189.18	4521.29	-867.64	-133.24	877.76	1.00	-1.00	0.00	INC+TREND
4719.00	0.06	189.18	4621.29	-868.60	-133.39	878.74	1.00	-1.00	0.00	INC+TREND
4725.00	0.00	189.18	4627.29	-868.60	-133.39	878.74	1.00	-1.00	0.00	INC+TREND
4853.71	0.00	189.18	4756.00	-868.60	-133.39	878.74	0.00	0.00	0.00	POINT LOOK OUT
5255.71	0.00	189.18	5158.00	-868.60	-133.39	878.74	0.00	0.00	0.00	MANCOS
6865.71	0.00	189.18	6768.00	-868.60	-133.39	878.74	0.00	0.00	0.00	GREENHORN
6911.71	0.00	189.18	6814.00	-868.60	-133.39	878.74	0.00	0.00	0.00	GRANEROS
6951.71	0.00	189.18	6854.00	-868.60	-133.39	878.74	0.00	0.00	0.00	PAGUATE
6967.71	0.00	189.18	6870.00	-868.60	-133.39	878.74	0.00	0.00	0.00	TWO WELLS
7091.71	0.00	189.18	6994.00	-868.60	-133.39	878.74	0.00	0.00	0.00	CUBERO
7127.71	0.00	189.18	7030.00	-868.60	-133.39	878.74	0.00	0.00	0.00	L. CUBERO
7169.71	0.00	189.18	7072.00	-868.60	-133.39	878.74	0.00	0.00	0.00	ENCINAL CYN.
7237.00	0.00	189.18	7139.29	-868.60	-133.39	878.74	0.00	0.00	0.00	4 1/2"

Targets

Name	Description Dip.	Dir.	TVD ft	+N/-S ft	+E/-W ft	Map Northing ft	Map Easting ft	<--- Latitude ---> Deg Min Sec			<--- Longitude ---> Deg Min Sec		
Fruitland Coal			2143.00	-402.40	-57.50	2134606.10	2690877.51	36	51	57.947 N	107	56	36.522 W
casing point			4406.00	-910.00	-130.00	2134098.54	2690805.01	36	51	52.927 N	107	56	37.407 W
PBHL			7140.00	-910.00	-130.00	2134098.54	2690805.01	36	51	52.927 N	107	56	37.407 W
-Circle (Radius: 100)													

Casing Points

MD ft	TVD ft	Diameter in	Hole Size in	Name
200.00	200.00	9.625	12.250	9 5/8"
4519.00	4421.33	7.000	8.750	7"
7237.00	7139.29	4.500	6.250	4 1/2"

Formations

MD ft	TVD ft	Formations	Lithology	Dip Angle deg	Dip Direction deg
1058.98	1043.00	OJO ALAMO		0.00	0.00
1132.80	1115.00	KIRTLAND		0.00	0.00
1934.84	1898.00	FRUITLAND		0.00	0.00
2185.45	2143.00	FRUITLAND COAL		0.00	0.00
2550.45	2499.00	PICTURED CLIFFS		0.00	0.00
2786.88	2730.00	LEWIS		0.00	0.00
4102.04	4009.00	CLIFF HOUSE		0.00	0.00
4403.40	4306.00	MENELEE		0.00	0.00
4853.71	4756.00	POINT LOOK OUT		0.00	0.00
5255.71	5158.00	MANCOS		0.00	0.00

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Wellpath: actual	Survey Calculation Method:	Minimum Curvature	Db: Sybase

Formations

MD ft	TVD ft	Formations	Lithology	Dip Angle deg	Dip Direction deg
6865.71	6768.00	GREENHORN		0.00	0.00
6911.71	6814.00	GRANEROS		0.00	0.00
6967.71	6870.00	TWO WELLS		0.00	0.00
6951.71	6854.00	PAGUATE		0.00	0.00
7091.71	6994.00	CUBERO		0.00	0.00
7127.71	7030.00	L. CUBERO		0.00	0.00
7169.71	7072.00	ENCINAL CYN.		0.00	0.00