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IOENIX DRILLING SERVICES
 HORIZONTAL SURVEY PROGRAM
 MINIMUM CURVATURE CALCULATIONS(SPE-3362)
 30-025-33926

COPY

OPERATOR: TEXACO E & P, INC. WELL: N. VACUUM AB #28 LOCATION: LEA COUNTY, NEW MEXICO JOB NO: 73099	START: 05/18/97 FILE: SIDETRAK #01 FINISH: 06/06/97 INFORMATION PROVIDED BY: TEXACO E & P, INC HORIZONTAL COORDINATOR: PHILLIPS, RIOS
DIP1 = -13.21 deg = 76.79 deg TARGET1 = 8,712 ft TVD VS1 = 1,413 ft	DATE: 06/06/97 MAG DECLINATION 9.11 EAST
DIP2 = -13.21 deg = 76.79 deg TARGET2 = 8,835 ft TVD VS2 = 1,939 ft	TIME: 8:50 AM DIRECTION 222.58

TRUE							CENTER LINE				
SVY MEASURED	INCL	AZIMUTH	VERTICAL	VERTICAL	DLS/	ABOVE(+)	RIGHT(+)	NORTH(+)	EAST(+)	QUAD	
#	DEPTH	(DRIFT)	(DIR)	DEPTH	SECTION	100	BELOW(-)	LEFT(-)	SOUTH(-)	WEST(-)	FORMAT
TIE	8596	1.0	82.1	8595.4	-50.0	0.1	-227.3	-17.9	24.7	47.0	N 82.1 E
1	8632	3.1	216.4	8631.4	-49.2	10.7	-263.1	-18.2	24.0	46.7	S 36.4 W
2	8645	9.7	240.1	8644.3	-47.8	53.6	-275.7	-17.9	23.1	45.5	S 60.1 W
3	8676	27.6	241.8	8673.6	-38.5	57.8	-302.7	-14.7	18.4	36.9	S 61.8 W
4	8691	36.4	238.2	8686.3	-30.9	60.0	-313.6	-12.3	14.4	30.0	S 58.2 W
5	8708	45.9	236.8	8699.0	-20.1	56.1	-323.9	-9.5	8.4	20.6	S 56.8 W
6	8737	61.7	234.0	8716.1	2.7	55.0	-335.6	-4.4	-4.9	1.4	S 54.0 W
7	8767	70.7	233.1	8728.2	29.6	30.1	-341.4	0.8	-21.2	-20.6	S 53.1 W
8	8799	73.9	231.4	8737.9	59.6	11.2	-344.1	6.0	-39.9	-44.7	S 51.4 W
9	8830	73.8	228.8	8746.6	89.1	8.1	-345.8	9.9	-59.0	-67.6	S 48.8 W
10	8862	75.3	227.2	8755.1	119.8	6.7	-347.1	12.8	-79.6	-90.5	S 47.2 W
11	8894	79.6	225.1	8762.0	151.0	14.9	-346.7	14.7	-101.2	-113.0	S 45.1 W
12	8925	80.2	224.8	8767.5	181.5	2.2	-345.0	16.0	-122.8	-134.6	S 44.8 W
13	8957	80.5	223.8	8772.8	213.0	3.2	-343.0	16.9	-145.4	-156.6	S 43.8 W
14	8989	80.8	223.9	8778.0	244.6	1.0	-340.8	17.6	-168.2	-178.5	S 43.9 W
15	9021	80.9	222.9	8783.1	276.2	3.1	-338.4	18.1	-191.1	-200.2	S 42.9 W
16	9052	81.2	222.2	8788.0	306.8	2.4	-336.1	18.1	-213.7	-220.9	S 42.2 W
17	9082	80.3	218.9	8792.8	336.4	11.3	-334.0	17.0	-236.2	-240.1	S 38.9 W
18	9113	81.1	217.6	8797.8	366.9	4.9	-331.8	14.7	-260.2	-259.1	S 37.6 W
19	9144	81.3	216.6	8802.5	397.4	3.3	-329.4	11.8	-284.7	-277.6	S 36.6 W
20	9184	81.3	220.0	8808.6	436.8	8.4	-326.2	8.8	-315.7	-302.1	S 40.0 W
21	9215	81.9	220.8	8813.1	467.5	3.2	-323.5	7.7	-339.0	-321.9	S 40.8 W
22	9247	81.5	220.1	8817.7	499.1	2.5	-320.7	6.5	-363.1	-342.5	S 40.1 W
23	9280	81.7	219.7	8822.6	531.7	1.3	-317.9	5.0	-388.2	-363.4	S 39.7 W
24	9310	84.6	220.8	8826.1	561.5	10.3	-314.5	3.7	-410.9	-382.7	S 40.8 W
25	9342	84.7	220.8	8829.1	593.3	0.3	-310.0	2.8	-435.0	-403.5	S 40.8 W
26	9372	90.3	221.3	8830.4	623.3	18.7	-304.3	2.0	-457.6	-423.2	S 41.3 W
27	9404	93.9	222.6	8829.3	655.2	12.0	-295.6	1.6	-481.4	-444.5	S 42.6 W
28	9435	94.4	222.8	8827.0	686.2	1.7	-286.1	1.7	-504.1	-465.5	S 42.8 W
29	9467	100.5	222.6	8822.9	717.9	19.1	-274.5	1.7	-527.4	-487.0	S 42.6 W
30	9498	102.1	222.8	8816.8	748.3	5.2	-261.3	1.8	-549.8	-507.6	S 42.8 W

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DIP1 = -13.21 deg = 76.79 deg TARGET1 = 8,712 ft TVD VS1 = 1,413 ft							DATE: 06/06/97 MAG DECLINATION 9.11 EAST TIME: 8:50 AM DIRECTION 222.58				
DIP2 = -13.21 deg = 76.79 deg TARGET2 = 8,835 ft TVD VS2 = 1,939 ft											
TRUE							CENTER LINE				
SVY #	MEASURED DEPTH	INCL (DRIFT)	AZIMUTH (DIR)	VERTICAL DEPTH	VERTICAL SECTION	DLS/ 100	ABOVE(+) BELOW(-)	RIGHT(+) LEFT(-)	NORTH(+) SOUTH(-)	EAST(+) WEST(-)	QUAD FORMAT
31	9530	102.3	222.8	8810.0	779.5	0.6	-247.2	1.9	-572.7	-528.9	S 42.8 W
32	9562	102.2	222.6	8803.2	810.8	0.7	-233.0	2.0	-595.7	-550.1	S 42.6 W
33	9594	101.8	222.3	8796.6	842.1	1.6	-219.0	1.9	-618.8	-571.2	S 42.3 W
34	9625	101.8	222.0	8790.2	872.5	0.9	-205.6	1.7	-641.3	-591.6	S 42.0 W
35	9657	101.7	222.2	8783.7	903.8	0.7	-191.7	1.4	-664.5	-612.6	S 42.2 W
36	9689	101.6	222.5	8777.3	935.1	1.0	-177.9	1.3	-687.7	-633.7	S 42.5 W
37	9720	101.0	222.3	8771.2	965.5	2.0	-164.7	1.2	-710.1	-654.2	S 42.3 W
38	9752	100.6	222.3	8765.2	997.0	1.3	-151.3	1.0	-733.4	-675.3	S 42.3 W
39	9783	101.1	222.0	8759.4	1027.4	1.9	-138.3	0.8	-756.0	-695.8	S 42.0 W
40	9815	103.2	222.5	8752.6	1058.7	6.7	-124.3	0.6	-779.1	-716.8	S 42.5 W
41	9846	103.3	222.3	8745.5	1088.9	0.7	-110.1	0.5	-801.4	-737.1	S 42.3 W
42	9878	103.4	222.4	8738.1	1120.0	0.4	-95.4	0.4	-824.4	-758.1	S 42.4 W
43	9911	103.1	222.4	8730.6	1152.1	0.9	-80.3	0.3	-848.1	-779.8	S 42.4 W
44	9942	103.2	222.2	8723.5	1182.3	0.7	-66.1	0.2	-870.5	-800.1	S 42.2 W
45	9973	103.0	222.4	8716.5	1212.5	0.9	-52.0	0.0	-892.8	-820.4	S 42.4 W
46	10005	100.0	223.7	8710.1	1243.9	10.2	-38.3	0.3	-915.7	-841.8	S 43.7 W
47	10036	94.0	223.8	8706.3	1274.6	19.4	-27.3	0.9	-937.9	-863.1	S 43.8 W
48	10068	87.7	222.7	8705.9	1306.6	20.0	-19.3	1.3	-961.2	-885.0	S 42.7 W
49	10100	86.8	223.5	8707.4	1338.5	3.8	-13.3	1.6	-984.6	-906.8	S 43.5 W
50	10134	82.3	223.2	8710.6	1372.4	13.3	-8.6	2.0	-1009.2	-930.1	S 43.2 W
51	10163	80.5	223.1	8715.0	1401.0	6.2	-6.2	2.3	-1030.1	-949.7	S 43.1 W
52	10195	80.3	223.2	8720.3	1432.6	0.7	-4.2	2.6	-1053.1	-971.3	S 43.2 W
53	10226	80.4	223.7	8725.5	1463.2	1.6	-2.2	3.1	-1075.3	-992.3	S 43.7 W
54	10258	80.6	224.0	8730.8	1494.7	1.1	-0.1	3.8	-1098.0	-1014.1	S 44.0 W
55	10289	80.5	223.6	8735.9	1525.3	1.3	2.0	4.4	-1120.1	-1035.3	S 43.6 W
56	10321	77.6	221.2	8741.9	1556.7	11.7	3.3	4.3	-1143.3	-1056.5	S 41.2 W
57	10353	77.4	221.7	8748.9	1587.9	1.6	3.7	3.7	-1166.7	-1077.2	S 41.7 W
58	10385	76.7	221.4	8756.0	1619.1	2.4	3.9	3.2	-1190.1	-1097.9	S 41.4 W
59	10416	76.8	222.1	8763.1	1649.3	2.2	3.9	2.7	-1212.6	-1117.9	S 42.1 W
60	10448	76.9	222.6	8770.4	1680.4	1.6	3.9	2.6	-1235.6	-1138.9	S 42.6 W

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DIP2 = -13.21 deg = 76.79 deg TARGET2 = 8,835 ft TVD VS2 = 1,939 ft	

		TRUE		CENTER LINE						
SVY MEASURED	INCL	AZIMUTH	VERTICAL	VERTICAL	DLS/	ABOVE(+)	RIGHT(+)	NORTH(+)	EAST(+)	QUAD
#	DEPTH	(DRIFT)	(DIR)	DEPTH	SECTION	100	BELOW(-)	LEFT(-)	SOUTH(-)	WEST(-) FORMAT
61	10479	76.5	222.4	8777.6	1710.6	1.4	3.8	2.6	-1257.8	-1159.3 S 42.4 W
62	10509	76.2	223.0	8784.6	1739.8	2.2	3.6	2.6	-1279.3	-1179.1 S 43.0 W
63	10541	76.6	223.2	8792.2	1770.9	1.4	3.4	2.9	-1302.0	-1200.3 S 43.2 W
64	10572	76.8	222.6	8799.3	1801.0	2.0	3.3	3.1	-1324.1	-1220.9 S 42.6 W
65	10603	77.6	223.4	8806.2	1831.3	3.6	3.6	3.3	-1346.2	-1241.5 S 43.4 W
66	10635	77.2	223.1	8813.1	1862.5	1.5	3.9	3.7	-1368.9	-1262.9 S 43.1 W
67	10666	76.8	222.4	8820.1	1892.7	2.6	4.0	3.8	-1391.1	-1283.4 S 42.4 W
68	10694	76.3	222.0	8826.6	1919.9	2.3	3.9	3.6	-1411.3	-1301.7 S 42.0 W
BIT	10728	75.7	221.5	8834.9	1952.9	2.3	3.3	3.1	-1435.9	-1323.7 S 41.5 W

SOUTH 1435.9 FEET, WEST 1323.7 FEET
CLOSURE DISTANCE = 1952.9 FEET
CLOSURE DIRECTION = 222.7 AZIMUTH
S - 42 DEG - 42 MIN - W