SCIENTIFIC DRILLING

HORIZONTAL SURVEY PROGRAM

MINIMUM CURVATURE CALCULATIONS(SPE-3362)

SUR: 937/S & 532/E P-35-17-34 30-025-32268

OPERATOR:	TEXACO E & P, INC. BHL 2	START: 5/26/99	FILE:
WELL:	VGWU #98 1937/S & 540/E	FINISH:	
LOCATION:	LEA COUNTY, NEW MEXICO I-35-17-34	INFORMATION PROVIDED BY:	
JOB NO:		DIRECTIONAL COORDINATOR: Lamb, Hoffman	

DIP1 =	-1.72	deg =	88.28	deg	MAG DECLINATION
TARGET1 =	5,960	ft TVD			TRUE
VS1 =	474	ft			
DIP2 =	-1.72	deg =	88.28	deg	
TARGET2 =	5,975	ft TVD			DIRECTION: 161.50
VS2 =	948	ft			

SVY #	MEASURED DEPTH	INCL (DRIFT)	AZIMUTH (DIR)	TRUE VERTICAL DEPTH	VERTICAL SECTION	DLS/ 100	CENTER LINE ABOVE(+) BELOW(-)	RIGHT(+) LEFT(-)	NORTH(+) SOUTH(-)	EAST(+) WEST(-)	QUAD FORMAT
TIE	5829	1.2	77.6	5827.4	5.8	0.0	118.5	-109.7	29.3	105.9	N 77.6 E
1	5883	25.2	144.8	5879.6	17.1	45.9	66.6	-113.6	19.9	113.2	S 35.2 E
2	5893	29.8	144.8	5888.5	21.5	46.0	57.9	-115.0	16.1	115.8	S 35.2 E
3	5903	34.6	144.4	5897.0	26.6	46.0	49.6	-116.5	11.8	118.9	S 35.6 E
4	5913	39.4	144.4	5905.0	32.3	48.0	41.8	-118.3	6.9	122.4	S 35.6 E
5	5923	44.1	143.7	5912.4	38.7	47.2	34.5	-120.3	1.5	126.3	S 36.3 E
6	5933	49.0	143.0	5919.3	45.6	49.3	27.8	-122.6	-4.3	130.7	S 37.0 E
7	5943	53.7	142.0	5925.5	53.0	47.6	21.8	-125.1	-10.5	135.4	S 38.0 E
8	5953	58.3	142.0	5931.1	60.8	46.0	16.5	-127.9	-17.1	140.5	S 38.0 E
9	5963	62.9	142.0	5936.0	69.0	46.0	11.8	-130.8	-23.9	145.9	S 38.0 E
10	5988	74.5	140.6	5945.1	90.8	46.7	3.4	-138.8	-42.1	160.4	S 39.4 E
11	5998	78.5	140.6	5947.4	99.9	40.0	1.3	-142.3	-49.6	166.6	S 39.4 E
12	6018	82.9	141.3	5950.7	118.4	22.3	-1.3	-149.2	-64.9	179.0	S 38.7 E
13	6028	84.8	141.6	5951.7	127.7	19.2	-2.1	-152.6	-72.7	185.2	S 38.4 E
14	6048	88.1	142.7	5953.0	146.5	17.4	-2.8	-159.2	-88.4	197.5	S 37.3 E
15	6072	89.2	143.0	5953.5	169.3	4.8	-2.7	-166.9	-107.6	212.0	S 37.0 E
16	6105	89.1	145.1	5954.0	200.7	6.4	-2.2	-176.8	-134.3	231.4	S 34.9 E
17	6135	88.5	148.0	5954.7	229.7	9.9	-2.0	-184.5	-159.3	247.9	S 32.0 E
18	6167	88.3	151.5	5955.5	261.0	11.0	-1.9	-191.0	-186.9	264.0	S 28.5 E
19	6198	88.4	156.0	5956.4	291.7	14.5	-1.9	-195.2	-214.7	277.7	S 24.0 E
20	6230	88.4	159.6	5957.3	323.6	11.2	-1.9	-197.3	-244.3	289.8	S 20.4 E
21	6261	90.0	162.7	5957.8	354.6	11.3	-1.4	-197.5	-273.6	299.8	S 17.3 E
22	6293	90.5	167.6	5957.6	386.6	15.4	-0.3	-195.4	-304.6	308.0	S 12.4 E
23	6325	90.7	172.6	5957.3	418.2	15.4	1.0	-190.7	-336.1	313.5	S 7.4 E
24	6334	90.2	174.0	5957.2	427.0	16.5	1.4	-188.8	-345.0	314.5	S 6.0 E
BIT	6371	90.2	181.0	5957.1	462.5	18.9	2.6	-178.6	-382.0	316.2	S 1.0 W

ORIGINAL LATERAL-L1

SCIENTIFIC DRILLING

HORIZONTAL SURVEY PROGRAM

MINIMUM CURVATURE CALCULATIONS(SPE-3362)

OPERATOR:	TEXACO E & P, INC.	START: 5/26/99	FILE:
WELL:	VGWU #98 SIDETRACK	FINISH:	
LOCATION:	LEA COUNTY, NEW MEXICO	INFORMATION PROVIDED BY:	
JOB NO:	32D0599111	DIRECTIONAL COORDINATOR:	Lamb, Hoffman

DIP1 =	-1.00	deg =	89.00	deg	MAG DECLINATION
TARGET1 =	5,972	ft TVD			
VS1 =	1,038	ft			TRUE
DIP2 =	-1.00	deg =	89.00	deg	
TARGET2 =	5,972	ft TVD			DIRECTION: 141.92
VS2 =	1,038	ft			

SVY #	MEASURED DEPTH	INCL (DRIFT)	AZIMUTH (DIR)	TRUE VERTICAL DEPTH	VERTICAL SECTION	DLS/ 100	CENTER LINE ABOVE(+) BELOW(-)	RIGHT(+) LEFT(-)	NORTH(+) SOUTH(-)	EAST(+) WEST(-)	QUAD FORMAT
11	5998	78.5	140.6	5947.4	141.8	40.0	8.9	-100.6	-49.6	166.6	S 39.4 E
12	6018	82.9	141.3	5950.7	161.5	22.3	6.0	-100.9	-64.9	179.0	S 38.7 E
13	6028	84.8	141.6	5951.7	171.5	19.2	5.1	-101.0	-72.7	185.2	S 38.4 E
14	6040	86.8	142.3	5952.6	183.4	17.4	4.5	-101.0	-82.1	192.6	S 37.7 E
15	6052	86.6	138.8	5953.3	195.4	28.8	4.0	-101.3	-91.3	200.2	S 41.2 E
16	6062	87.0	138.1	5953.9	205.4	8.1	3.6	-101.9	-98.8	206.9	S 41.9 E
17	6072	87.5	137.4	5954.3	215.3	8.6	3.3	-102.6	-106.2	213.6	S 42.6 E
18	6105	89.5	138.5	5955.2	248.2	6.9	3.0	-104.9	-130.7	235.7	S 41.5 E
19	6136	91.6	143.4	5954.9	279.2	17.2	3.8	-105.4	-154.8	255.2	S 36.6 E
20	6168	91.8	144.4	5954.0	311.2	3.2	5.4	-104.3	-180.6	274.0	S 35.6 E
21	6199	88.4	149.4	5953.9	342.1	19.5	5.9	-101.6	-206.6	291.0	S 30.6 E
22	6231	89.9	149.0	5954.4	373.8	4.9	6.0	-97.6	-234.1	307.3	S 31.0 E
23	6261	91.0	148.7	5954.1	403.6	3.8	6.8	-94.0	-259.7	322.9	S 31.3 E
24	6294	89.2	148.3	5954.1	436.4	5.6	7.4	-90.2	-287.9	340.1	S 31.7 E
25	6325	89.6	149.0	5954.4	467.1	2.6	7.6	-86.5	-314.3	356.2	S 31.0 E
26	6357	89.9	149.7	5954.6	498.9	2.4	8.0	-82.4	-341.9	372.5	S 30.3 E
27	6387	90.1	150.8	5954.6	528.5	3.7	8.6	-78.1	-367.9	387.4	S 29.2 E
28	6411	90.0	151.1	5954.5	552.3	1.3	9.0	-74.3	-388.9	399.1	S 28.9 E
29	6450	89.0	149.7	5954.9	590.8	4.4	9.3	-68.5	-422.8	418.3	S 30.3 E
30	6483	89.6	150.1	5955.3	623.5	2.2	9.5	-64.0	-451.3	434.9	S 29.9 E
31	6515	86.2	149.7	5956.4	655.2	10.7	8.9	-59.5	-479.0	450.9	S 30.3 E
32	6545	84.8	148.7	5958.8	684.8	5.7	7.0	-55.7	-504.7	466.2	S 31.3 E
33	6577	84.5	147.6	5961.8	716.5	3.5	4.6	-52.3	-531.8	483.1	S 32.4 E
34	6608	86.1	147.3	5964.3	747.3	5.3	2.6	-49.3	-557.8	499.7	S 32.7 E
35	6640	87.1	146.9	5966.2	779.1	3.4	1.3	-46.4	-584.6	517.0	S 33.1 E
36	6671	86.9	145.1	5967.8	809.9	5.8	0.2	-44.2	-610.3	534.3	S 34.9 E
BIT	6710	86.9	145.1	5970.0	848.8	0.0	-1.3	-42.0	-642.2	556.6	S 34.9 E

SIDETRACK OFF OF L1

SCIENTIFIC DRILLING

HORIZONTAL SURVEY PROGRAM

MINIMUM CURVATURE CALCULATIONS(SPE-3362)

OPERATOR: TEXACO E & P, INC.
WELL: VGWU #98 N. LATERAL
LOCATION: LEA COUNTY, NEW MEXICO
JOB NO: 32D0599111

START: 5/2/99
FINISH:
INFORMATION PROVIDED BY:
DIRECTIONAL COORDINATOR: Lamb, Hoffman

FILE: NORTH LATERAL

DIP1 = 0.00 deg = 90.00 deg
TARGET1 = 5,950 ft TVD
VS1 = 171 ft

DIP2 = 0.00 deg = 90.00 deg
TARGET2 = 5,948 ft TVD
VS2 = 500 ft

MAG DECLINATION
TRUE

DIRECTION: 0.00

SVY #	MEASURED DEPTH	INCL (DRIFT)	AZIMUTH (DIR)	TRUE VERTICAL DEPTH	VERTICAL SECTION	DLS/ 100	CENTER LINE ABOVE(+) BELOW(-)	RIGHT(+) LEFT(-)	NORTH(+) SOUTH(-)	EAST(+) WEST(-)	QUAD FORMAT
TIE	5809	1.2	77.9	5807.4	29.2	0.0	142.6	105.5	29.2	105.5	N 77.9 E
1	5863	22.2	117.0	5860.0	24.6	39.5	90.0	115.2	24.6	115.2	S 63.0 E
2	5873	26.2	106.8	5869.1	23.1	57.7	80.9	119.0	23.1	119.0	S 73.2 E
3	5883	30.5	102.6	5877.9	21.9	47.4	72.1	123.6	21.9	123.6	S 77.4 E
4	5893	34.7	102.3	5886.3	20.8	42.0	63.7	128.9	20.8	128.9	S 77.7 E
5	5903	38.9	102.3	5894.4	19.5	42.0	55.6	134.7	19.5	134.7	S 77.7 E
BIT	5940	54.4	102.3	5919.7	13.8	41.9	30.3	160.9	13.8	160.9	S 77.7 E

SECOND LATERAL - L2
MECHANICAL FAILURE
ON ORIENTATION

SC NTIFIC DRILLING

HORIZONTAL SURVEY PROGRAM

MINIMUM CURVATURE CALCULATIONS(SPE-3362)

OPERATOR:	TEXACO E & P, INC.	START: 5/2/99	FILE: NORTH LATERAL
WELL:	VGWU #98 N. LATERAL SIDETRACK #2	FINISH:	
LOCATION:	LEA COUNTY, NEW MEXICO	INFORMATION PROVIDED BY:	
JOB NO:	32D0599111	DIRECTIONAL COORDINATOR:	Lamb, Hoffman

DIP1 =	0.00	deg =	90.00	deg	MAG DECLINATION
TARGET1 =	5,943	ft TVD			
VS1 =	1,000	ft			TRUE
DIP2 =	0.00	deg =	90.00	deg	
TARGET2 =	5,943	ft TVD			DIRECTION: 0.00
VS2 =	1,000	ft			

SVY #	MEASURED DEPTH	INCL (DRIFT)	AZIMUTH (DIR)	TRUE VERTICAL DEPTH	VERTICAL SECTION	DLS/ 100	CENTER LINE ABOVE(+) BELOW(-)	RIGHT(+) LEFT(-)	NORTH(+) SOUTH(-)	EAST(+) WEST(-)	QUAD FORMAT
TIE	5809	1.2	77.9	5807.4	29.2	0.0	135.6	105.5	29.2	105.5	N 77.9 E
1	5887	30.4	2.4	5881.8	49.6	38.6	61.2	107.1	49.6	107.1	N 2.4 E
2	5917	42.7	3.1	5905.8	67.4	41.0	37.2	108.0	67.4	108.0	N 3.1 E
3	5949	55.4	3.8	5926.7	91.4	39.7	16.3	109.5	91.4	109.5	N 3.8 E
4	5980	67.7	2.8	5941.5	118.6	39.8	1.5	111.0	118.6	111.0	N 2.8 E
5	5990	71.8	2.8	5944.9	128.0	41.0	-1.9	111.5	128.0	111.5	N 2.8 E
6	6000	75.7	2.4	5947.7	137.6	39.2	-4.7	111.9	137.6	111.9	N 2.4 E
7	6009	79.1	3.5	5949.7	146.3	39.6	-6.7	112.4	146.3	112.4	N 3.5 E
8	6042	89.2	2.4	5953.1	179.1	30.8	-10.1	114.1	179.1	114.1	N 2.4 E
9	6073	88.5	357.1	5953.7	210.1	17.2	-10.7	113.9	210.1	113.9	N 2.9 W
10	6104	90.3	352.9	5954.0	240.9	14.7	-11.0	111.2	240.9	111.2	N 7.1 W
11	6136	92.0	351.5	5953.4	272.6	6.9	-10.4	106.9	272.6	106.9	N 8.5 W
12	6168	91.4	351.5	5952.4	304.3	1.9	-9.4	102.1	304.3	102.1	N 8.5 W
13	6199	90.6	351.5	5951.9	334.9	2.6	-8.9	97.6	334.9	97.6	N 8.5 W
14	6231	91.3	350.5	5951.3	366.5	3.8	-8.3	92.6	366.5	92.6	N 9.5 W
15	6262	92.7	351.2	5950.3	397.1	5.0	-7.3	87.6	397.1	87.6	N 8.8 W
16	6293	93.4	350.8	5948.6	427.7	2.6	-5.6	82.8	427.7	82.8	N 9.2 W
17	6325	93.9	350.1	5946.6	459.2	2.7	-3.6	77.5	459.2	77.5	N 9.9 W
18	6357	94.0	349.4	5944.4	490.6	2.2	-1.4	71.8	490.6	71.8	N 10.6 W
19	6388	91.4	349.4	5942.9	521.0	8.4	0.1	66.1	521.0	66.1	N 10.6 W
20	6420	91.3	349.4	5942.2	552.5	0.3	0.8	60.2	552.5	60.2	N 10.6 W
21	6452	91.6	349.0	5941.3	583.9	1.6	1.7	54.2	583.9	54.2	N 11.0 W
22	6484	89.5	349.8	5941.0	615.3	7.0	2.0	48.4	615.3	48.4	N 10.2 W
23	6515	90.4	349.4	5941.1	645.8	3.2	1.9	42.8	645.8	42.8	N 10.6 W
24	6546	91.4	349.8	5940.6	676.3	3.5	2.4	37.2	676.3	37.2	N 10.2 W
25	6578	90.7	353.3	5940.0	707.9	11.2	3.0	32.5	707.9	32.5	N 6.7 W
26	6609	92.2	353.3	5939.2	738.7	4.8	3.8	28.8	738.7	28.8	N 6.7 W
27	6641	88.6	351.9	5939.0	770.5	12.1	4.0	24.7	770.5	24.7	N 8.1 W
28	6673	85.6	351.9	5940.6	802.1	9.4	2.4	20.2	802.1	20.2	N 8.1 W
29	6704	86.3	351.9	5942.8	832.7	2.3	0.2	15.9	832.7	15.9	N 8.1 W
30	6736	87.1	352.2	5944.6	864.3	2.7	-1.6	11.4	864.3	11.4	N 7.8 W
31	6768	87.7	351.2	5946.1	896.0	3.6	-3.1	6.8	896.0	6.8	N 8.8 W
32	6799	88.4	351.9	5947.1	926.6	3.2	-4.1	2.3	926.6	2.3	N 8.1 W
33	6831	88.9	351.9	5947.9	958.3	1.6	-4.9	-2.2	958.3	-2.2	N 8.1 W
BIT	6873	88.9	351.9	5948.7	1000.0	0.0	-5.7	-8.2	1000.0	-8.2	N 8.1 W

SIDETRACK OFF OF L2