Case 10696

REPORT OF

SUB-SURFACE DIRECTIONAL SURVEY

API

PETROLEUM DEVELOPMENT CORPORATION

STRANGE FEDERAL NO. 5

CHAVES COUNTY, NEW MEXICO

JOB NUMBER	TYPE OF SURVEY	DATE
430-1622	Gyroscopic Survey	July , 1993
430-1622	Steering Tool	July , 1993

SURVEY BY RON COLLINS/TIM STEPHENS

OFFICE: MIDLAND, TX

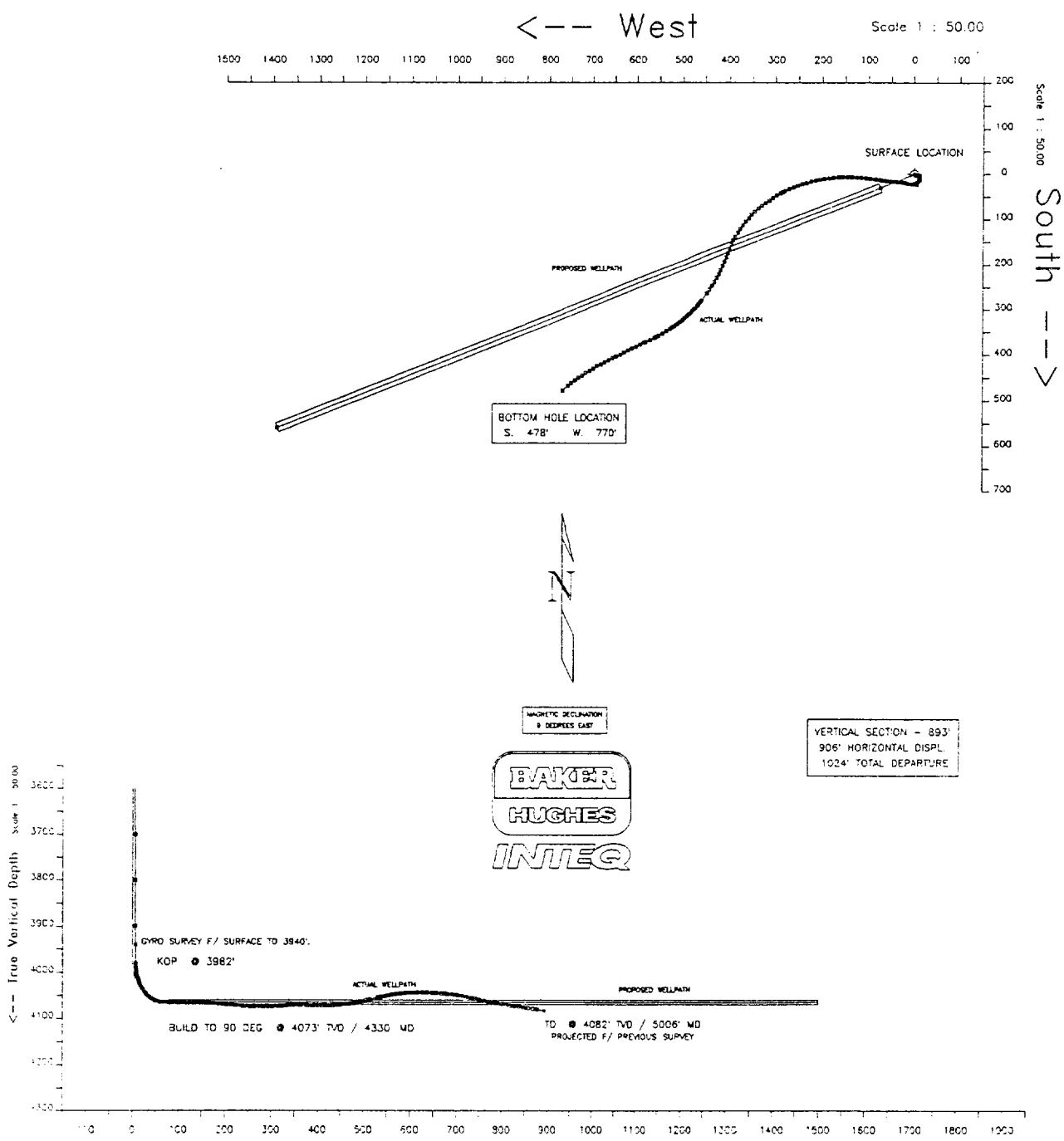
PETROLEUM DEVELOPMENT CORPORATION

Structure : STRANGE FEDERAL NO. 5

Field : TOM TOM Location : CHAVES COUNTY, NEW MEXICO

WELL PROFILE DATA

Point	MD	Inc	Dir	TVD	North	East
Tie on	0	0.00	248.08	0	0	0
KOP	3984	0.00	248.08	3984	0	0
End of Build	4110	90.00	248.08	4064	-30	-74
Target	5530	90.00	248.08	4064	-560	-1392



Scale 1 : 50.00

Vertical Section on 248.08 azimuth with reference 0.00 N, 0.00 E from structure

PETROLEUM DEVELOPMENT CORPORATION — SURVEY LISTING — Page 1
STRANGE FEDERAL NO. 5,slot #1 — Your ref : STEERING TOOL SRH SURVEY
TOM TOM,CHAVES COUNTY, NEW MEXICO — Last revised : 6-Jul-93

Measured Depth	Inclin. Degrees	Azimuth Degrees	True Vert. Depth	RECTANGULAR COORDINATES		Dogleg Deg/100Ft	Vert Sect	
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	0.00	
100.00	0.26	145.35	100.00	0.19 S	0.13 E	0.26	-0.05	
200.00	0.24	170.38	200.00	0.58 S	0.29 E	0.11	-0.06	
300.00	0.25	125.39	300.00	0.91 S	0.50 E	0.19	-0.13	
400.00	0.48	125.92	400.00	1.28 S	1.02 E	0.23	-0.47	
500.00	0.53	135.45	499.99	1.86 S	1.69 E	0.10	-0.87	
600.00	0.59	132.49	599.99	2.54 S	2.39 E	0.07	-1.27	
700.00	0.56	110.78	699.98	3.06 S	3.23 E	0.22	-1.85	
800.00	0.64	76.00	799.98	3.10 S	4.23 E	0.37	-2.76	
900.00	0.71	66.52	899.97	2.71 S	5.34 E	0.13	-3.94	
1000.00	0.93	79.14	999.96	2.32 S	6.70 E	0.28	-5.35	
1100.00	1.15	107.50	1099.94	2.46 S	8.46 E	0.55	-6.92	
1200.00	1.35	129.40	1199.92	3.51 S	10.32 E	0.51	-8.26	
1300.00	1.39	151.27	1299.89	5.32 S	11.82 E	0.52	-8.97	
1400.00	1.24	171.08	1399.87	7.46 S	12.57 E	0.48	-8.87	
1500.00	1.02	186.67	1499.85	9.41 S	12.63 E	0.38	-8.20	
1600.00	1.16	219.43	1599.83	11.08 S	11.88 E	0.63	-6.89	
1700.00	0.91	231.44	1699.81	12.35 S	10.62 E	0.33	-5.24	
1800.00	0.88	221.05	1799.80	13.43 S	9.50 E	0.16	-3.80	
1900.00	0.99	218.57	1899.79	14.68 S	8.45 E	0.12	-2.36	
2000.00	0.98	220.66	1999.77	16.00 S	7.36 E	0.04	-0.85	
2100.00	0.86	223.91	2099.76	17.20 S	6.28 E	0.13	0.59	
2200.00	0.57	204.85	2199.75	18.19 S	5.55 E	0.37	1.64	
2300.00	0.43	196.37	2299.75	19.00 S	5.24 E	0.16	2.24	
2400.00	0.60	183.74	2399.74	19.88 S	5.10 E	0.20	2.69	
2500.00	0.45	184.49	2499.74	20.80 S	5.03 E	0.15	3.10	
2600.00	0.18	152.24	2599.74	21.32 S	5.07 E	0.31	3.25	
2700.00	0.16	236.65	2699.74	21.54 S	5.03 E	0.23	3.38	
2800.00	0.03	266.47	2799.74	21.62 S	4.89 E	0.13	3.54	
2900.00	0.15	150.46	2899.74	21.74 S	4.92 E	0.16	3.54	
3000.00	0.24	153.38	2999.74	22.04 S	5.08 E	0.09	3.51	
3100.00	0.09	230.65	3099.74	22.27 S	5.12 E	0.24	3.57	
3200.00	0.24	133.09	3199.74	22.47 S	5.21 E	0.27	3.55	
3300.00	0.29	268.55	3299.74	22.62 S	5.11 E	0.49	3.70	
3400.00	0.32	294.65	3399.74	22.50 S	4.60 E	0.14	4.13	
3500.00	0.39	288.26	3499.73	22.28 S	4.02 E	0.08	4.58	
3600.00	0.28	284.67	3599.73	22.11 S	3.46 E	0.11	5.04	
3700.00	0.59	310.33	3699.73	21.72 S	2.84 E	0.36	5.48	
3800.00	0.53	288.69	3799.72	21.24 S	2.00 E	0.22	6.07	
3900.00	0.58	317.80	3899.72	20.71 S	1.23 E	0.28	6.59	
3940.00	0.53	302.58	3939.72	20.46 S	0.94 E	0.39	6.77	GYRO SURVEY F/ SURFACE TO 3940'.
3980.00	1.00	311.70	3979.71	20.13 S	0.52 E	1.21	7.03	
3982.00	2.07	284.52	3981.71	20.11 S	0.47 E	63.26	7.07	KOP W/ 40' SRAB ASSEMBLY
3985.00	3.90	274.40	3984.71	20.09 S	0.32 E	63.26	7.20	
3990.00	5.90	215.60	3989.69	20.29 S	0.00 W	102.26	7.58	
3995.00	7.80	206.50	3994.66	20.80 S	0.30 W	43.65	8.04	
4000.00	10.40	242.60	3999.60	21.31 S	0.86 W	122.77	8.75	
4005.00	13.50	257.00	4004.49	21.65 S	1.82 W	85.58	9.78	
4010.00	16.00	264.60	4009.33	21.85 S	3.08 W	63.13	11.01	
4015.00	19.00	267.70	4014.09	21.94 S	4.58 W	62.81	12.44	

All data is in feet unless otherwise stated
Coordinates from structure and TVD from wellhead.
Vertical section is from wellhead on azimuth 248.08 degrees.
Declination is 0.00 degrees, Convergence is 0.00 degrees.
Calculation uses the minimum curvature method.
Presented by Baker Hughes INTEQ

Measured Depth	Inclin. Degrees	Azimuth Degrees	True Vert. Depth	RECTANGULAR COORDINATES		Dogleg Deg/100Ft	Vert Sect
4020.00	22.10	272.20	4018.78	21.94 S	6.33 W	69.54	14.07
4025.00	25.10	275.70	4023.36	21.80 S	8.33 W	66.20	15.86
4030.00	29.40	279.90	4027.80	21.48 S	10.59 W	94.16	17.85
4035.00	33.30	282.10	4032.07	20.98 S	13.15 W	81.28	20.03
4040.00	36.80	283.90	4036.16	20.34 S	15.94 W	72.98	22.38
4045.00	40.00	283.40	4040.08	19.60 S	18.96 W	64.30	24.91
4050.00	43.50	282.00	4043.81	18.87 S	22.21 W	72.44	27.65
4055.00	47.60	279.80	4047.31	18.20 S	25.71 W	87.80	30.65
4060.00	51.70	277.40	4050.55	17.63 S	29.48 W	89.78	33.93
4065.00	56.50	275.70	4053.48	17.17 S	33.50 W	99.87	37.49
4070.00	60.90	274.70	4056.08	16.79 S	37.76 W	89.64	41.29
4075.00	65.20	273.70	4058.34	16.46 S	42.20 W	87.83	45.29
4080.00	69.70	272.90	4060.26	16.20 S	46.81 W	91.20	49.47
4085.00	74.50	272.50	4061.80	15.97 S	51.56 W	96.30	53.80
4090.00	77.80	271.90	4062.99	15.79 S	56.41 W	67.02	58.22
4095.00	82.20	279.40	4063.86	15.30 S	61.30 W	171.91	62.58
4100.00	87.60	280.10	4064.31	14.46 S	66.21 W	108.90	66.82
4105.00	91.30	280.20	4064.36	13.58 S	71.13 W	74.03	71.06
4110.00	92.20	279.70	4064.20	12.71 S	76.06 W	20.59	75.30
4120.00	92.10	278.20	4063.83	11.16 S	85.93 W	15.02	83.88
4130.00	91.70	276.30	4063.50	9.90 S	95.84 W	19.41	92.61
4140.00	91.30	274.80	4063.23	8.93 S	105.79 W	15.52	101.48
4150.00	90.40	274.30	4063.08	8.14 S	115.76 W	10.30	110.43
4160.00	89.90	273.00	4063.06	7.50 S	125.74 W	13.93	119.45
4170.00	89.30	271.90	4063.13	7.07 S	135.73 W	12.53	128.55
4180.00	87.60	270.50	4063.40	6.86 S	145.72 W	22.02	137.75
4190.00	86.00	269.10	4063.96	6.90 S	155.70 W	21.24	147.02
4200.00	85.40	267.50	4064.71	7.19 S	165.67 W	17.04	156.38
4210.00	85.20	266.00	4065.53	7.76 S	175.62 W	15.08	165.82
4220.00	84.90	264.90	4066.39	8.55 S	185.55 W	11.36	175.33
4230.00	84.00	260.20	4067.36	9.84 S	195.42 W	47.64	184.96
4240.00	83.90	257.60	4068.41	11.75 S	205.18 W	25.87	194.73
4250.00	84.40	256.10	4069.43	14.02 S	214.86 W	15.74	204.56
4260.00	84.90	255.00	4070.36	16.50 S	224.50 W	12.04	214.43
4270.00	85.60	253.50	4071.19	19.20 S	234.10 W	16.51	224.34
4280.00	86.70	252.20	4071.86	22.15 S	243.63 W	17.01	234.28
4290.00	87.20	249.90	4072.40	25.39 S	253.07 W	23.50	244.26
4300.00	88.30	248.40	4072.79	28.95 S	262.41 W	18.59	254.24
4310.00	89.00	246.20	4073.02	32.80 S	271.63 W	23.08	264.24
4320.00	89.40	244.50	4073.16	36.97 S	280.72 W	17.46	274.23
4325.00	89.60	243.20	4073.21	39.18 S	285.21 W	26.30	279.21
4330.00	89.70	239.60	4073.24	41.57 S	289.60 W	72.03	284.18
4340.00	90.50	238.00	4073.22	46.75 S	298.15 W	17.89	294.05
4350.00	92.10	236.80	4072.99	52.14 S	306.57 W	20.00	303.87
4360.00	93.30	235.50	4072.52	57.70 S	314.87 W	17.68	313.64
4370.00	94.70	233.50	4071.82	63.49 S	322.99 W	24.37	323.34
4380.00	95.10	231.60	4070.97	69.55 S	330.90 W	19.35	332.94
4390.00	93.20	228.30	4070.25	75.97 S	338.53 W	38.00	342.42
4400.00	91.60	225.70	4069.83	82.78 S	345.84 W	30.51	351.74
4410.00	89.50	222.80	4069.73	89.94 S	352.81 W	35.80	360.88

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Coordinates from structure and TVD from wellhead.
Vertical section is from wellhead on azimuth 248.08 degrees.
Declination is 0.00 degrees, Convergence is 0.00 degrees.
Calculation uses the minimum curvature method.
Presented by Baker Hughes INTEQ

Measured Depth	Inclin. Degrees	Azimuth Degrees	True Vert. Depth	RECTANGULAR COORDINATES		Dogleg Deg/100Ft	Vert Sect
4420.00	87.60	221.00	4069.98	97.38 S	359.49 W	26.17	369.85
4430.00	87.60	218.80	4070.40	105.05 S	365.90 W	21.98	378.66
4440.00	88.00	216.90	4070.79	112.94 S	372.03 W	19.40	387.29
4450.00	88.10	212.10	4071.13	121.17 S	377.69 W	47.98	395.62
4460.00	89.10	209.70	4071.37	129.75 S	382.82 W	25.99	403.58
4470.00	89.60	208.60	4071.48	138.48 S	387.69 W	12.08	411.36
4480.00	91.40	206.60	4071.40	147.34 S	392.32 W	26.91	418.97
4490.00	92.40	203.60	4071.07	156.39 S	396.56 W	31.61	426.28
4500.00	93.00	201.30	4070.60	165.62 S	400.38 W	23.74	433.26
4510.00	93.00	198.30	4070.07	175.02 S	403.76 W	29.96	439.91
4520.00	93.60	199.50	4069.50	184.46 S	406.99 W	13.40	446.43
4530.00	94.70	201.20	4068.77	193.81 S	410.46 W	20.21	453.14
4540.00	94.60	202.90	4067.96	203.05 S	414.20 W	16.97	460.06
4550.00	96.10	205.00	4067.03	212.15 S	418.24 W	25.73	467.21
4560.00	96.40	206.80	4065.94	221.09 S	422.59 W	18.14	474.57
4570.00	97.70	207.20	4064.71	229.93 S	427.09 W	13.59	482.05
4580.00	99.00	208.60	4063.26	238.68 S	431.72 W	19.00	489.61
4590.00	100.10	210.00	4061.60	247.28 S	436.55 W	17.65	497.30
4600.00	101.60	212.10	4059.72	255.69 S	441.61 W	25.50	505.14
4610.00	102.20	214.10	4057.66	263.89 S	446.95 W	20.47	513.16
4630.00	101.20	217.60	4053.60	279.76 S	458.42 W	17.85	529.72
4635.00	100.80	219.50	4052.65	283.60 S	461.48 W	38.15	533.99
4640.00	100.60	220.70	4051.72	287.36 S	464.65 W	23.92	538.33
4645.00	100.60	222.00	4050.80	291.04 S	467.89 W	25.56	542.72
4650.00	100.30	223.50	4049.89	294.66 S	471.23 W	30.11	547.16
4655.00	99.60	224.40	4049.03	298.20 S	474.65 W	22.59	551.66
4660.00	99.00	225.30	4048.22	301.70 S	478.13 W	21.44	556.19
4665.00	98.80	226.50	4047.44	305.14 S	481.68 W	24.05	560.76
4670.00	98.30	227.20	4046.70	308.52 S	485.28 W	17.08	565.37
4675.00	97.80	227.80	4046.00	311.86 S	488.93 W	15.53	570.01
4680.00	97.80	227.90	4045.32	315.19 S	492.61 W	1.98	574.66
4685.00	97.20	228.60	4044.67	318.49 S	496.30 W	18.35	579.32
4690.00	96.50	229.70	4044.07	321.73 S	500.06 W	25.94	584.02
4695.00	95.70	230.50	4043.54	324.92 S	503.87 W	22.56	588.74
4700.00	94.80	233.40	4043.08	327.99 S	507.79 W	60.50	593.53
4705.00	93.50	234.80	4042.72	330.92 S	511.83 W	38.16	598.37
4710.00	92.40	235.40	4042.47	333.77 S	515.93 W	25.05	603.23
4715.00	90.40	235.30	4042.34	336.61 S	520.04 W	40.05	608.11
4720.00	88.70	235.50	4042.38	339.45 S	524.16 W	34.23	612.98
4725.00	87.90	235.80	4042.53	342.27 S	528.28 W	17.09	617.86
4735.00	87.80	237.50	4042.91	347.77 S	536.63 W	17.02	627.66
4745.00	87.90	239.20	4043.28	353.01 S	545.14 W	17.02	637.51
4755.00	86.70	240.90	4043.75	358.00 S	553.79 W	20.79	647.40
4760.00	86.50	242.00	4044.05	360.38 S	558.17 W	22.32	652.36
4765.00	86.70	243.00	4044.35	362.69 S	562.60 W	20.36	657.32
4775.00	86.90	244.00	4044.90	367.14 S	571.54 W	10.18	667.28
4785.00	85.00	244.70	4045.61	371.46 S	580.53 W	20.24	677.23
4790.00	84.10	244.90	4046.08	373.58 S	585.03 W	18.44	682.20
4800.00	83.40	244.90	4047.17	377.80 S	594.03 W	7.00	692.12
4810.00	81.80	244.00	4048.46	382.07 S	602.98 W	18.32	702.02

All data is in feet unless otherwise stated
Coordinates from structure and TVD from wellhead.
Vertical section is from wellhead on azimuth 248.08 degrees.
Declination is 0.00 degrees, Convergence is 0.00 degrees.
Calculation uses the minimum curvature method.
Presented by Baker Hughes INTEQ

Measured Depth	Inclin. Degrees	Azimuth Degrees	True Vert. Depth	RECTANGULAR COORDINATES	Dogleg Deg/100Ft	Vert Sect	
4820.00	80.00	244.50	4050.04	386.36 S 611.87 W	18.66	711.87	
4830.00	78.30	243.50	4051.92	390.67 S 620.70 W	19.63	721.67	
4840.00	77.20	243.60	4054.05	395.02 S 629.45 W	11.04	731.41	
4850.00	77.00	242.80	4056.28	399.41 S 638.15 W	8.05	741.12	
4860.00	77.60	247.70	4058.48	403.50 S 647.01 W	48.18	750.86	
4870.00	79.30	246.00	4060.48	407.35 S 656.01 W	23.80	760.66	
4880.00	80.20	244.50	4062.26	411.47 S 664.95 W	17.29	770.48	
4890.00	80.30	243.40	4063.96	415.80 S 673.80 W	10.89	780.31	
4900.00	80.50	242.20	4065.62	420.30 S 682.57 W	12.00	790.13	
4910.00	80.60	241.20	4067.26	424.98 S 691.26 W	9.91	799.94	
4920.00	80.70	240.70	4068.89	429.77 S 699.88 W	5.03	809.73	
4930.00	80.60	239.60	4070.51	434.68 S 708.44 W	10.90	819.50	
4940.00	80.90	238.10	4072.12	439.79 S 716.89 W	15.10	829.24	
4950.00	81.00	236.70	4073.69	445.11 S 725.21 W	13.86	838.94	
4960.00	82.20	237.30	4075.16	450.50 S 733.50 W	13.39	848.65	
4970.00	81.30	234.50	4076.59	456.04 S 741.70 W	29.13	858.33	
4980.00	81.50	233.40	4078.09	461.86 S 749.69 W	11.06	867.91	
4990.00	81.10	232.50	4079.60	467.82 S 757.58 W	9.75	877.46	
5006.00	80.50	231.00	4082.16	477.60 S 769.99 W	9.98	892.61	PROJECTED F/ PREVIOUS SURVEY

All data is in feet unless otherwise stated
Coordinates from structure and TVD from wellhead.
Vertical section is from wellhead on azimuth 248.08 degrees.
Declination is 0.00 degrees, Convergence is 0.00 degrees.
Calculation uses the minimum curvature method.
Presented by Baker Hughes INTEQ

BAKER HUGHES INTEQ

2105 Market Street Midland, Texas 79703
915-694-9517 Fax 915-694-5648

SURVEY CERTIFICATION SHEET

STATE OF TEXAS
COUNTY OF MIDLAND

I, Tim Stephens, in the employ of Baker Hughes *INTEQ* did on the days of June 16, , 19 93 thru July 1, , 19 93 conduct or supervise the taking of a Gyroscopic survey by the method of magnetic orientation from a depth of 0 feet to 3940 feet, with recordings of inclination and direction being obtained at approximate intervals of 100 feet.

This survey was conducted at the request of Petroleum Development Corporation for their Strange Federal No. 5, Chaves County, State of New Mexico.

The data for this survey and the calculation were obtained and performed by me according to standards and procedures as set forth by Baker Hughes *INTEQ* and is true and correct to the best of my knowledge.

Tim Stephens

Directional Supervisor/Surveyor

BAKER HUGHES INTEQ

2105 Market Street Midland, Texas 79703
915-694-9517 Fax 915-694-5648

SURVEY CERTIFICATION SHEET

STATE OF TEXAS
COUNTY OF MIDLAND

I, Tim Stephens, in the employ of Baker Hughes *INTEQ* did on the days of June 16, , 19 93 thru July 1, , 19 93 conduct or supervise the taking of a Steering Tool survey by the method of magnetic orientation from a depth of 3940 feet to 5006 feet, with recordings of inclination and direction being obtained at approximate intervals of 10 feet.

This survey was conducted at the request of Petroleum Development Corporation for their Strange Federal No. 5, Chaves County, State of New Mexico.

The data for this survey and the calculation were obtained and performed by me according to standards and procedures as set forth by Baker Hughes *INTEQ* and is true and correct to the best of my knowledge.

Tim Stephens

Directional Supervisor/Surveyor