SUMMARY OF WELL DATA: 4-1H ORQUIDEA WELL
SE SW 4-T20N-R2W, SANDOVAL COUNTY, NEW MEXICO

Operator: Gary-Williams Company
Well name: 4-1 H Orquidea
Location: 1650 fwl, 330 fsl (SESW)
section 4, T20N, R2W
Sandoval County, New Mexico
Elevation: 6875 KB

Formation Tops	Measured depth	True Vert. depth
Pictured Cliffs	578	578
Lewis Shale	680	680
Chacra	1034	1034
Cliff House	1420	1420
Menefee	2221	2221
Point Lookout (fault contact)	2770	2770
Mancos	2930	2930
kickoff point	3278	3278
"A" Sand	3837	3726
"B" Sand	4188	3882

Summary of Sidetracks and shows:

Horizontal wellbore entered 10 foot-thick target (located 30 feet TVD below top of the "A" Sand) at a Measured depth of 4047 (TVD of 3761) at a position 472 feet north, 112 feet east of the surface location. Wellbore stayed in Target zone for 777 feet, exiting target at a measured depth of 4824 (TVD of 3811) at a position 1242 feet north, 188 feet east of surface location. Fractured intervals and oil shows were encounted in the target zone at the following drill depths:

1. 4230 MD (3769 TVD): 5% green oil, 95% water flow to surface
2. 4370 MD (3802 TVD): 50% orange-brown paraffinic oil, 50% water flow to surface
3. 4645 MD (3796 TVD): 60% black-brown oil, 40% water flow to surface
4. 4820 MD (3810 TVD): minor amount of green oil circulated up, indeterminate water cut.

In attempting to get wellbore back into target zone, a down-to-the-north normal fault with 98 feet of throw on it

was encountered at a measured depth of 4941 (3816 TVD). Original wellbore drilled to a Measured depth TD of 5138 (TVD of 3817) at a position 1555 feet north, 201 feet east of surface location.

Sidetrack #1 was drilled from a kickoff point of 4980 MD (3818 TVD) at a position 1398 feet north, 195 feet east of surface location, down to encounter Target in downthrown position of the fault. Encountered the top "A" Sand at 5262 MD (3861 TVD) and top of target at 5547 MD (3899 TVD). Stayed in target for 200 feet until TD of first sidetrack at 5747 MD (3912 TVD) at a position 2158 feet north, 205 feet east of surface location. No shows of oil or gas were seen in Sidetrack #1.

Sidetrack #2 was drilled from a kickoff point of 3780 MD (3700 TVD) in the original wellbore at a position 220 feet north, 54 feet east of surface location, to encounter a 44 foot thick target within the "B" sand interval (actual top of target is 6 feet lower than "B" sand). Top of "B" sand at 4188 MD (3882 TVD), top of New Target at 4212 MD (3887 TVD). Stayed in Target interval for 244 feet to a TD of 4456 MD (3908 TVD) at a position 841 feet north, 155 feet east of surface location. No shows of oil or gas were seen in sidetrack #2.

Sidetrack #3 was drilled inadvertantly (while reaming sidetrack #2) from a kickoff point of 3780 MD (3700 TVD), the same kickoff point as sidetrack #2, to a TD of 4108 MD (3907 TVD) at a position 469 feet north, 112 feet east of the surface location. No tops are available from this sidetrack and no shows of oil or gas were seen.

David J. Masse
Petroleum Geologist
The Gary-Williams Company
2/93

STATE OF Colorado)
COUNTY OF Denver)

On this 4th day of May, 1993, before me a Notary Public duly commissioned and qualified in and for said county and state, personally came David J. Masse', Petroleum Geologist for The Gary-Williams Company, who is personally known to me to be the identical person whose name is affixed to the above instrument in the capacity stated, and he acknowledged the said instrument to be his free and voluntary act and deed and the free and voluntary act and deed of said corporation.

Witness my hand and official seal.

MY COMMISSION EXPIRES JAN. 21, 1996

Notary Public JOAN S. LUCERO

Geoservices-Directional — Deviation report

Well : ORQUIDEA #4-1H
Field : .....
Company : GARY WILLIAMS

Coordinates RECTANGULAR

Well head :		Target :		Impact :	
X =	0.0	X =	0.0	X =	0.0
Y =	0.0	Y =	0.0	Y =	0.0
Z =	0.0	Z =	0.0	Z =	0.0

Horizontal displacement 0.00 ft
Total vertical depth 0.00 ft — Kick off point 3278.00 ft
Magnetic declination 11.20 deg — Convergence 0.00 deg
Horizontal projection computed in azimuth North 355.00 deg. (NW 5.00)

Surv no	Measured depth feet	Drift angle degree	Azimut magnt. degree	Azimut geogr. degree	Vertical depth feet	Horizntl prjction feet	Horizntl displcmt feet	Average Az(geo) degree	Relative East/West feet	Coordinates. Nor/South feet	Dog leg dleg	dlgH /100ft	grBu
Computation method : Radius of curvature													
1	0.0	0.00	0.00	11.20	0.0	0.0	0.0	90.00	0.0 E	0.0 N	0.0	0.0	%100.0
2	3278.0	0.00	0.00	11.20	3278.0	0.1	0.1	11.20	0.0 E	0.1 N	0.0	0.0	0.0
3	3292.0	1.38	52.00	63.20	3292.0	0.2	0.2	30.53	0.1 E	0.2 N	9.8	4.5	9.8
4	3323.0	5.38	358.00	9.20	3322.9	1.6	2.0	35.58	1.1 E	1.6 N	15.2	-10.3	12.9
5	3354.0	9.00	354.50	5.70	3353.7	5.3	5.7	16.86	1.7 E	5.5 N	11.7	-1.4	11.7
6	3386.0	13.00	352.00	3.20	3385.1	11.4	11.7	10.44	2.1 E	11.5 N	12.6	-1.5	12.5
7	3416.0	16.50	351.50	2.70	3414.1	18.9	19.3	7.49	2.5 E	19.2 N	11.7	-0.4	11.7
8	3448.0	19.88	353.50	4.70	3444.5	28.8	29.3	6.20	3.2 E	29.1 N	10.7	2.0	10.6
9	3480.0	22.75	0.00	11.20	3474.3	40.1	40.9	6.70	4.8 E	40.6 N	11.6	7.4	9.0
10	3512.0	25.38	2.50	13.70	3503.5	52.6	53.9	8.09	7.6 E	53.4 N	8.8	3.2	8.2
11	3542.0	28.63	358.50	9.70	3530.2	65.6	67.5	8.81	10.3 E	66.7 N	12.4	-6.1	10.8
12	3575.0	31.75	359.00	10.20	3558.8	81.7	84.1	9.04	13.2 E	83.1 N	9.5	0.8	9.5
13	3606.0	35.50	2.00	13.20	3584.6	98.1	101.3	9.49	16.7 E	99.9 N	13.2	5.4	12.1
14	3637.0	39.50	5.00	16.20	3609.2	115.9	120.1	10.31	21.5 E	118.1 N	14.2	5.9	12.9
15	3668.0	43.63	5.50	16.70	3632.4	135.0	140.5	11.20	27.3 E	137.8 N	13.4	1.1	13.3
16	3700.0	47.75	5.50	16.70	3654.7	156.3	163.3	11.97	33.9 E	159.8 N	12.8	0.0	12.9
17	3730.0	52.25	5.50	16.70	3674.0	177.6	186.2	12.56	40.5 E	181.8 N	15.0	0.0	15.0
18	3761.0	56.88	5.00	16.20	3692.0	201.1	211.4	13.02	47.6 E	206.0 N	15.0	-1.3	14.9
19	3791.0	61.75	5.00	16.20	3707.3	225.2	237.2	13.37	54.8 E	230.8 N	16.2	0.0	16.2
20	3822.0	66.25	4.50	15.70	3720.8	251.2	265.0	13.64	62.5 E	257.5 N	14.6	-1.4	14.5
21	3854.0	70.63	3.50	14.70	3732.6	279.1	294.8	13.80	70.3 E	286.2 N	14.0	-2.9	13.7
22	3884.0	75.00	3.00	14.20	3741.5	306.1	323.4	13.85	77.4 E	314.0 N	14.6	-1.6	14.6
23	3907.0	79.00	3.00	14.20	3746.6	327.3	345.8	13.88	82.9 E	335.7 N	17.4	0.0	17.4
24	3939.0	83.63	2.50	13.70	3751.5	357.2	377.4	13.88	90.6 E	366.4 N	14.5	-1.5	14.5
25	3971.0	84.50	1.50	12.70	3754.8	387.4	409.3	13.83	97.8 E	397.4 N	4.1	-3.1	2.7
26	4002.0	84.50	0.00	11.20	3757.7	416.9	440.1	13.70	104.2 E	427.6 N	4.8	-4.8	0.0
27	4034.0	86.63	359.50	10.70	3760.2	447.6	472.0	13.51	110.3 E	458.9 N	6.8	-6.6	6.7
28	4065.0	87.13	359.50	10.70	3761.9	477.4	502.9	13.34	116.0 E	489.3 N	1.6	0.0	1.6
29	4097.0	86.88	358.50	9.70	3763.6	508.3	534.8	13.15	121.7 E	520.8 N	3.2	-3.1	-0.8
30	4128.0	86.25	358.50	9.70	3765.4	538.2	565.7	12.96	126.9 E	551.3 N	2.0	0.0	-2.0
31	4159.0	87.63	358.00	9.20	3767.1	568.2	596.6	12.78	132.0 E	581.8 N	4.7	-4.6	4.5
32	4188.0	89.25	358.00	9.20	3767.9	596.3	625.5	12.61	136.6 E	610.4 N	5.6	0.0	5.6
33	4253.0	86.25	358.00	9.20	3770.4	659.2	690.4	12.29	147.0 E	674.5 N	4.6	0.0	-4.6
34	4283.0	85.50	357.50	8.70	3772.6	688.3	720.2	12.15	151.6 E	704.1 N	3.0	-1.7	-2.5
35	4315.0	86.25	356.00	7.20	3774.9	719.4	752.1	11.98	156.1 E	735.7 N	5.2	-4.7	2.3

Well : ORQUIDEA #4-1H
Field : .....
Company : GARY WILLIAMS

Surv no	Measured depth feet	Drift angle degree	Azimut magnt. degree	Azimut geogr. degree	Vertical depth feet	Horizntl prjction feet	Horizntl displcmt feet	Average Az(geo) degree	.Relative East/West feet	Coordinates. Nor/South feet	Dog leg dleg	dlgH /100ft	grBu
Computation method : Radius of curvature													
36	4346.0	87.13	354.50	5.70	3776.7	749.7	782.9	11.76	159.5 E	766.5 N	5.6	-4.8	2.8
37	4378.0	86.38	354.00	5.20	3778.5	781.1	814.6	11.51	162.6 E	798.3 N	2.8	-1.6	-2.3
38	4410.0	85.88	354.00	5.20	3780.7	812.5	846.4	11.27	165.5 E	830.0 N	1.5	0.0	-1.6
39	4441.0	86.63	353.50	4.70	3782.7	843.0	877.1	11.05	168.1 E	860.9 N	2.9	-1.6	2.4
40	4473.0	87.50	352.00	3.20	3784.3	874.6	908.9	10.80	170.3 E	892.7 N	5.4	-4.7	2.7
41	4505.0	86.00	351.00	2.20	3786.1	906.2	940.5	10.53	171.8 E	924.7 N	5.6	-3.1	-4.7
42	4536.0	86.50	351.50	2.70	3788.2	936.9	971.1	10.27	173.2 E	955.6 N	2.3	1.6	1.6
43	4567.0	85.70	351.00	2.20	3790.3	967.6	1001.8	10.03	174.5 E	986.5 N	3.0	-1.6	-2.6
44	4598.0	85.13	351.00	2.20	3792.7	998.2	1032.4	9.80	175.7 E	1017.3 N	1.8	0.0	-1.8
45	4628.0	85.25	351.00	2.20	3795.3	1027.9	1062.0	9.58	176.8 E	1047.2 N	0.4	0.0	0.4
46	4659.0	86.75	351.00	2.20	3797.4	1058.6	1092.7	9.38	178.0 E	1078.1 N	4.8	0.0	4.8
47	4691.0	86.13	352.00	3.20	3799.4	1090.2	1124.4	9.19	179.5 E	1110.0 N	3.7	3.1	-1.9
48	4722.0	85.63	352.50	3.70	3801.6	1120.8	1155.2	9.03	181.4 E	1140.9 N	2.3	1.6	-1.6
49	4753.0	84.50	352.50	3.70	3804.3	1151.3	1186.0	8.89	183.4 E	1171.7 N	3.6	0.0	-3.6
50	4785.0	85.25	352.00	3.20	3807.2	1182.9	1217.7	8.75	185.3 E	1203.5 N	2.8	-1.6	2.3
51	4816.0	85.25	352.00	3.20	3809.7	1213.4	1248.4	8.61	187.0 E	1234.4 N	0.0	0.0	0.0
52	4847.0	85.88	352.00	3.20	3812.1	1244.0	1279.2	8.48	188.7 E	1265.2 N	2.0	0.0	2.0
53	4878.0	86.75	351.50	2.70	3814.1	1274.7	1310.0	8.35	190.3 E	1296.1 N	3.2	-1.6	2.8
54	4909.0	88.13	351.50	2.70	3815.5	1305.4	1340.8	8.22	191.8 E	1327.0 N	4.4	0.0	4.5
55	4941.0	88.50	351.50	2.70	3816.4	1337.1	1372.7	8.09	193.3 E	1359.0 N	1.2	0.0	1.2
56	4971.0	87.75	351.50	2.70	3817.4	1366.8	1402.5	7.98	194.7 E	1389.0 N	2.5	0.0	-2.5
57	5002.0	89.50	351.50	2.70	3818.2	1397.5	1433.4	7.87	196.2 E	1419.9 N	5.6	0.0	5.6
58	5032.0	89.38	351.00	2.20	3818.5	1427.2	1463.3	7.75	197.4 E	1449.9 N	1.7	-1.7	-0.4
59	5063.0	90.25	351.00	2.20	3818.6	1458.0	1494.1	7.64	198.6 E	1480.9 N	2.8	0.0	2.8
60	5095.0	91.25	350.50	1.70	3818.1	1489.7	1526.0	7.52	199.7 E	1512.8 N	3.5	-1.6	3.1

Sidetrack No. 1

Geoservices-Directional — Deviation report

Well : ORD. #4-1H (ST#1)
Field : .....
Company : GARY WILLIAMS

Coordinates RECTANGULAR

Well head :		Target :		Impact :	
X =	0.0	X =	0.0	X =	0.0
Y =	0.0	Y =	0.0	Y =	0.0
Z =	0.0	Z =	0.0	Z =	0.0

Horizontal displacement 0.00 ft
Total vertical depth 0.00 ft — Kick off point 3278.00 ft
Magnetic declination 11.20 deg — Convergence 0.00 deg
Horizontal projection computed in azimuth North 355.00 deg. (NW 5.00)

Surv no	Measured depth feet	Drift angle degree	Azimut magnt. degree	Azimut geogr. degree	Vertical depth feet	Horizntl prjction feet	Horizntl displcmt feet	Average Az(geo) degree	Relative Coordinates. East/West feet	Nor/South feet	Dog dleg	leg dlgH /100ft	grBu
Computation method : Radius of curvature													
1	0.0	0.00	0.00	11.20	0.0	0.0	0.0	90.00	0.0 E	0.0 N	0.0	0.0	%100.0
2	3278.0	0.00	0.00	11.20	3278.0	0.1	0.1	11.20	0.0 E	0.1 N	0.0	0.0	0.0
3	3292.0	1.38	52.00	63.20	3292.0	0.2	0.2	30.53	0.1 E	0.2 N	9.8	4.5	9.8
4	3323.0	5.38	358.00	9.20	3322.9	1.6	2.0	35.58	1.1 E	1.6 N	15.2	%-10.3	12.9
5	3354.0	9.00	354.50	5.70	3353.7	5.3	5.7	16.86	1.7 E	5.5 N	11.7	-1.4	11.7
6	3386.0	13.00	352.00	3.20	3385.1	11.4	11.7	10.44	2.1 E	11.5 N	12.6	-1.5	12.5
7	3416.0	16.50	351.50	2.70	3414.1	18.9	19.3	7.49	2.5 E	19.2 N	11.7	-0.4	11.7
8	3448.0	19.88	353.50	4.70	3444.5	28.8	29.3	6.20	3.2 E	29.1 N	10.7	2.0	10.6
9	3480.0	22.75	0.00	11.20	3474.3	40.1	40.9	6.70	4.8 E	40.6 N	11.6	7.4	9.0
10	3512.0	25.38	2.50	13.70	3503.5	52.6	53.9	8.09	7.6 E	53.4 N	8.8	3.2	8.2
11	3542.0	28.63	358.50	9.70	3530.2	65.6	67.5	8.81	10.3 E	66.7 N	12.4	-6.1	10.8
12	3575.0	31.75	359.00	10.20	3558.8	81.7	84.1	9.04	13.2 E	83.1 N	9.5	0.8	9.5
13	3606.0	35.50	2.00	13.20	3584.6	98.1	101.3	9.49	16.7 E	99.9 N	13.2	5.4	12.1
14	3637.0	39.50	5.00	16.20	3609.2	115.9	120.1	10.31	21.5 E	118.1 N	14.2	5.9	12.9
15	3668.0	43.63	5.50	16.70	3632.4	135.0	140.5	11.20	27.3 E	137.8 N	13.4	1.1	13.3
16	3700.0	47.75	5.50	16.70	3654.7	156.3	163.3	11.97	33.9 E	159.8 N	12.8	0.0	12.9
17	3730.0	52.25	5.50	16.70	3674.0	177.6	186.2	12.56	40.5 E	181.8 N	15.0	0.0	15.0
18	3761.0	56.88	5.00	16.20	3692.0	201.1	211.4	13.02	47.6 E	206.0 N	15.0	-1.3	14.9
19	3791.0	61.75	5.00	16.20	3707.3	225.2	237.2	13.37	54.8 E	230.8 N	16.2	0.0	16.2
20	3822.0	66.25	4.50	15.70	3720.8	251.2	265.0	13.64	62.5 E	257.5 N	14.6	-1.4	14.5
21	3854.0	70.63	3.50	14.70	3732.6	279.1	294.8	13.80	70.3 E	286.2 N	14.0	-2.9	13.7
22	3884.0	75.00	3.00	14.20	3741.5	306.1	323.4	13.85	77.4 E	314.0 N	14.6	-1.5	14.6
23	3907.0	79.00	3.00	14.20	3746.6	327.3	345.8	13.88	82.9 E	335.7 N	17.4	0.0	17.4
24	3939.0	83.63	2.50	13.70	3751.5	357.2	377.4	13.88	90.6 E	366.4 N	14.5	-1.5	14.5
25	3971.0	84.50	1.50	12.70	3754.8	387.4	409.3	13.83	97.8 E	397.4 N	4.1	-3.1	2.7
26	4002.0	84.50	0.00	11.20	3757.7	416.9	440.1	13.70	104.2 E	427.6 N	4.8	-4.8	0.0
27	4034.0	86.63	359.50	10.70	3760.2	447.6	472.0	13.51	110.3 E	458.9 N	6.8	-1.6	6.7
28	4065.0	87.13	359.50	10.70	3761.9	477.4	502.9	13.34	116.0 E	489.3 N	1.6	0.0	1.6
29	4097.0	86.88	358.50	9.70	3763.6	508.3	534.8	13.15	121.7 E	520.8 N	3.2	-3..	-0.8
30	4128.0	86.25	358.50	9.70	3765.4	538.2	565.7	12.96	126.9 E	551.3 N	2.0	0.0	-2.0
31	4159.0	87.63	358.00	9.20	3767.1	568.2	596.6	12.78	132.0 E	581.8 N	4.7	-1..	4.5
32	4188.0	89.25	358.00	9.20	3767.9	596.3	625.5	12.61	136.6 E	610.4 N	5.6	0.0	5.6
33	4253.0	86.25	358.00	9.20	3770.4	659.2	690.4	12.29	147.0 E	674.5 N	4.6	0.0	-4.6
34	4283.0	85.50	357.50	8.70	3772.6	688.3	720.2	12.15	151.6 E	704.1 N	3.0	-1..	-2.5
35	4315.0	86.25	356.00	7.20	3774.9	719.4	752.1	11.98	156.1 E	735.7 N	5.2	-4..	2.3

Geoservices-Directional — Deviation report

Well : ORQ. #4-1H (ST#1)
Field : .....
Company : GARY WILLIAMS

Surv no	Measured depth feet	Drift angle degree	Azimut magnt. degree	Azimut geogr. degree	Vertical depth feet	Horizntl prjction feet	Horizntl displcmt feet	Average Az(geo) degree	Relative East/West feet	Coordinates. Nor/South feet	Dog dleg	leg dlgH /100ft	grBu
Computation method : Radius of curvature													
36	4346.0	87.13	354.50	5.70	3776.7	749.7	782.9	11.76	159.5 E	766.5 N	5.6	-4.8	2.8
37	4378.0	86.38	354.00	5.20	3778.5	781.1	814.6	11.51	162.6 E	798.3 N	2.8	-1.6	-2.3
38	4410.0	85.88	354.00	5.20	3780.7	812.5	846.4	11.27	165.5 E	830.0 N	1.5	0.0	-1.6
39	4441.0	86.63	353.50	4.70	3782.7	843.0	877.1	11.05	168.1 E	860.9 N	2.9	1.6	2.4
40	4473.0	87.50	352.00	3.20	3784.3	874.6	908.9	10.80	170.3 E	892.7 N	5.4	4.7	2.7
41	4505.0	86.00	351.00	2.20	3786.1	906.2	940.5	10.53	171.8 E	924.7 N	5.6	-3.1	-4.7
42	4536.0	86.50	351.50	2.70	3788.2	936.9	971.1	10.27	173.2 E	955.6 N	2.3	1.6	1.6
43	4567.0	85.70	351.00	2.20	3790.3	967.6	1001.8	10.03	174.5 E	986.5 N	3.0	-1.6	-2.6
44	4598.0	85.13	351.00	2.20	3792.7	998.2	1032.4	9.80	175.7 E	1017.3 N	1.8	0.0	-1.8
45	4628.0	85.25	351.00	2.20	3795.3	1027.9	1062.0	9.58	176.8 E	1047.2 N	0.4	0.0	0.4
46	4659.0	86.75	351.00	2.20	3797.4	1058.6	1092.7	9.38	178.0 E	1078.1 N	4.8	0.0	4.8
47	4691.0	86.13	352.00	3.20	3799.4	1090.2	1124.4	9.19	179.5 E	1110.0 N	3.7	3.1	-1.9
48	4722.0	85.63	352.50	3.70	3801.6	1120.8	1155.2	9.03	181.4 E	1140.9 N	2.3	1.6	-1.6
49	4753.0	84.50	352.50	3.70	3804.3	1151.3	1186.0	8.89	183.4 E	1171.7 N	3.6	0.0	-3.6
50	4785.0	85.25	352.00	3.20	3807.2	1182.9	1217.7	8.75	185.3 E	1203.5 N	2.8	-1.6	2.3
51	4816.0	85.25	352.00	3.20	3809.7	1213.4	1248.4	8.61	187.0 E	1234.4 N	0.0	0.0	0.0
52	4847.0	85.88	352.00	3.20	3812.1	1244.0	1279.2	8.48	188.7 E	1265.2 N	2.0	0.0	2.0
53	4878.0	86.75	351.50	2.70	3814.1	1274.7	1310.0	8.35	190.3 E	1296.1 N	3.2	-1.6	2.8
54	4909.0	88.13	351.50	2.70	3815.5	1305.4	1340.8	8.22	191.8 E	1327.0 N	4.4	0.0	4.5
55	4941.0	88.50	351.50	2.70	3816.4	1337.1	1372.7	8.09	193.3 E	1359.0 N	1.2	0.0	1.2
56	4971.0	87.75	351.50	2.70	3817.4	1366.8	1402.5	7.98	194.7 E	1389.0 N	2.5	0.0	-2.5
57	5002.0	85.50	351.00	2.20	3819.2	1397.5	1433.3	7.86	196.0 E	1419.9 N	7.4	-1.6	-7.3
58	5034.0	82.75	351.50	2.70	3822.5	1429.0	1465.0	7.74	197.4 E	1451.7 N	8.7	1.6	-8.6
59	5065.0	79.88	352.00	3.20	3827.2	1459.4	1495.6	7.65	199.0 E	1482.3 N	9.4	1.6	-9.3
60	5095.0	78.38	351.50	2.70	3832.9	1488.5	1524.9	7.55	200.5 E	1511.7 N	5.2	-1.6	-5.0
61	5127.0	77.75	351.50	2.70	3839.5	1519.6	1556.1	7.46	202.0 E	1543.0 N	2.0	0.0	-2.0
62	5157.0	79.50	351.00	2.20	3845.4	1548.7	1585.4	7.36	203.2 E	1572.3 N	6.0	-1.6	5.8
63	5188.0	81.50	350.00	1.20	3850.5	1579.1	1615.8	7.26	204.1 E	1602.9 N	7.2	-3.2	6.5
64	5220.0	82.13	350.00	1.20	3855.1	1610.6	1647.3	7.14	204.8 E	1634.6 N	1.9	0.0	2.0
65	5251.0	82.63	349.50	0.70	3859.2	1641.1	1677.9	7.03	205.3 E	1665.3 N	2.3	-1.6	1.6
66	5282.0	82.13	349.50	0.70	3863.3	1671.7	1708.4	6.91	205.7 E	1696.0 N	1.6	0.0	-1.6
67	5314.0	82.13	349.50	0.70	3867.7	1703.3	1740.0	6.80	206.1 E	1727.7 N	0.0	0.0	0.0
68	5346.0	82.13	349.50	0.70	3872.1	1734.8	1771.5	6.69	206.4 E	1759.4 N	0.0	0.0	0.0
69	5377.0	82.13	348.50	359.70	3876.3	1765.4	1802.0	6.58	206.5 E	1790.1 N	3.2	%1147.1	0.0
70	5409.0	81.75	348.50	359.70	3880.8	1797.0	1833.5	6.46	206.4 E	1821.8 N	1.2	0.0	-1.2
71	5439.0	81.50	348.50	359.70	3885.2	1826.5	1862.9	6.36	206.2 E	1851.5 N	0.8	0.0	-0.8
72	5470.0	81.25	348.50	359.70	3889.8	1857.1	1893.4	6.25	206.1 E	1882.1 N	0.8	0.0	-0.8
73	5502.0	82.75	348.50	359.70	3894.3	1888.7	1924.9	6.14	205.9 E	1913.8 N	4.7	0.0	4.7
74	5533.0	84.50	349.00	0.20	3897.7	1919.4	1955.5	6.04	205.9 E	1944.6 N	5.8	%-1152.6	5.6
75	5563.0	86.75	349.00	0.20	3900.0	1949.1	1985.2	5.96	206.0 E	1974.5 N	7.5	0.0	7.5
76	5593.0	87.13	348.50	359.70	3901.6	1979.0	2015.0	5.87	206.0 E	2004.5 N	2.1	%1196.6	1.3
77	5625.0	87.63	348.50	359.70	3903.0	2010.8	2046.8	5.77	205.8 E	2036.5 N	1.6	0.0	1.6
78	5657.0	86.88	348.00	359.20	3904.6	2042.7	2078.6	5.67	205.5 E	2068.4 N	2.8	-1.6	-2.3

Geoservices-Directional — Deviation report

Well : ORQ. #4-1H (ST#1)
Field : .....
Company : GARY WILLIAMS

Surv no	Measured depth feet	Drift angle degree	Azimut magnt. degree	Azimut geogr. degree	Vertical depth feet	Horizntl prjction feet	Horizntl displcmt feet	Average Az(geo) degree	.Relative Coordinates. East/West feet	Nor/South feet	Dog dleg	leg dlgH /100ft	grBu
Computation method : Radius of curvature													
79	5688.0	85.25	348.00	359.20	3906.7	2073.6	2109.3	5.58	205.0 E	2099.3 N	5.3	0.0	-5.3
80	5706.0	84.13	348.00	359.20	3908.4	2091.4	2127.1	5.52	204.8 E	2117.3 N	6.2	0.0	-6.2

Sidetrack No. 2

Geoservices-Directional — Deviation report

Well : ORD. #4-1H(ST#2)
Field : .....
Company : GARY WILLIAMS

Coordinates RECTANGULAR

Well head :		Target :		Impact :	
X =	0.0	X =	0.0	X =	0.0
Y =	0.0	Y =	0.0	Y =	0.0
Z =	0.0	Z =	0.0	Z =	0.0

Horizontal displacement 0.00 ft
Total vertical depth 0.00 ft Kick off point 3781.00 ft
Magnetic declination 11.20 deg Convergence 0.00 deg
Horizontal projection computed in azimuth North 355.00 deg. (NW 5.00)

Surv no	Measured depth feet	Drift angle degree	Azimut magnt. degree	Azimut geogr. degree	Vertical depth feet	Horizntl prjction feet	Horizntl displcmt feet	Average Az(geo) degree	.Relative Coordinates. East/West feet	Nor/South feet	Dog leg dleg	dl(H /100ft	grBu
Computation method : Radius of curvature													
1	0.0	0.00	0.00	11.20	0.0	0.0	0.0	90.00	0.0 E	0.0 N	0.0	0.0	%100.0
2	3278.0	0.00	0.00	11.20	3278.0	0.1	0.1	11.20	0.0 E	0.1 N	0.0	0.0	0.0
3	3292.0	1.38	52.00	63.20	3292.0	0.2	0.2	30.53	0.1 E	0.2 N	9.8	4.5	9.8
4	3323.0	5.38	358.00	9.20	3322.9	1.6	2.0	35.58	1.1 E	1.6 N	15.2	%-10.3	12.9
5	3354.0	9.00	354.50	5.70	3353.7	5.3	5.7	16.86	1.7 E	5.5 N	11.7	-1.4	11.7
6	3386.0	13.00	352.00	3.20	3385.1	11.4	11.7	10.44	2.1 E	11.5 N	12.6	-1.5	12.5
7	3416.0	16.50	351.50	2.70	3414.1	18.9	19.3	7.49	2.5 E	19.2 N	11.7	-0.4	11.7
8	3448.0	19.88	353.50	4.70	3444.5	28.8	29.3	6.20	3.2 E	29.1 N	10.7	2.0	10.6
9	3480.0	22.75	0.00	11.20	3474.3	40.1	40.9	6.70	4.8 E	40.6 N	11.6	7.4	9.0
10	3512.0	25.38	2.50	13.70	3503.5	52.6	53.9	8.09	7.6 E	53.4 N	8.8	3.2	8.2
11	3542.0	28.63	358.50	9.70	3530.2	65.6	67.5	8.81	10.3 E	66.7 N	12.4	-6.1	10.8
12	3575.0	31.75	359.00	10.20	3558.8	81.7	84.1	9.04	13.2 E	83.1 N	9.5	0.8	9.5
13	3606.0	35.50	2.00	13.20	3584.6	98.1	101.3	9.49	16.7 E	99.9 N	13.2	5.4	12.1
14	3637.0	39.50	5.00	16.20	3609.2	115.9	120.1	10.31	21.5 E	118.1 N	14.2	5.9	12.9
15	3668.0	43.63	5.50	16.70	3632.4	135.0	140.5	11.20	27.3 E	137.8 N	13.4	1.1	13.3
16	3700.0	47.75	5.50	16.70	3654.7	156.3	163.3	11.97	33.9 E	159.8 N	12.8	0.0	12.9
17	3730.0	52.25	5.50	16.70	3674.0	177.6	186.2	12.56	40.5 E	181.8 N	15.0	0.0	15.0
18	3761.0	56.88	5.00	16.20	3692.0	201.1	211.4	13.02	47.6 E	206.0 N	15.0	-1.5	14.9
19	3789.0	59.88	5.50	16.70	3706.6	223.3	235.2	13.37	54.4 E	228.9 N	10.8	1.5	10.7
20	3821.0	61.88	6.00	17.20	3722.2	249.2	263.1	13.75	62.5 E	255.6 N	6.4	1.4	6.2
21	3852.0	60.75	6.00	17.20	3737.1	274.4	290.3	14.07	70.6 E	281.6 N	3.6	0.0	-3.6
22	3884.0	60.25	3.50	14.70	3752.8	300.4	318.1	14.24	78.2 E	308.3 N	7.0	-6.4	-1.6
23	3915.0	59.38	2.50	13.70	3768.4	325.7	344.9	14.23	84.8 E	334.3 N	3.9	-2.8	-2.8
24	3946.0	59.00	1.00	12.20	3784.3	351.1	371.5	14.14	90.8 E	360.3 N	4.3	-4.2	-1.2
25	3977.0	58.00	0.00	11.20	3800.5	376.4	397.9	13.98	96.1 E	386.2 N	4.2	-2.8	-3.2
26	4002.0	59.25	0.00	11.20	3813.5	396.9	419.3	13.84	100.3 E	407.1 N	5.0	0.0	5.0
27	4033.0	62.38	359.50	10.70	3828.6	422.9	446.3	13.66	105.4 E	433.7 N	10.2	-1.4	10.1
28	4065.0	65.38	359.00	10.20	3842.7	450.6	475.0	13.47	110.6 E	461.9 N	9.5	-1.4	9.4
29	4097.0	68.25	357.00	8.20	3855.3	479.1	504.3	13.22	115.3 E	490.9 N	10.6	-5.7	9.0
30	4127.0	71.25	356.50	7.70	3865.7	506.5	532.3	12.94	119.2 E	518.8 N	10.1	-1.4	10.0
31	4159.0	74.50	357.00	8.20	3875.1	536.3	562.8	12.67	123.4 E	549.1 N	10.3	1.5	10.2
32	4190.0	77.62	357.00	8.20	3882.6	565.6	592.8	12.44	127.7 E	578.9 N	10.1	0.0	10.1
33	4218.0	80.50	357.00	8.20	3887.9	592.4	620.2	12.26	131.7 E	606.1 N	10.3	0.0	10.3
34	4253.0	83.88	356.50	7.70	3892.7	626.2	654.8	12.03	136.5 E	640.4 N	9.7	-1.4	9.7
35	4285.0	85.13	356.50	7.70	3895.7	657.2	686.6	11.83	140.7 E	672.0 N	3.9	0.0	3.9

Geoservices-Directional — Deviation report

Well : ORQ. #4-1H(ST#2)
Field : .....
Company : GARY WILLIAMS

Surv no	Measured depth feet	Drift angle degree	Azimut magnt. degree	Azimut geogr. degree	Vertical depth feet	Horizntl prjction feet	Horizntl displcmt feet	Average Az(geo) degree	Relative Coordinates. East/West feet	Nor/South feet	Dog leg dleg /100ft	leg flgH	leg grBu
Computation method : Radius of curvature													
36	4317.0	83.62	357.50	8.70	3898.9	688.2	718.3	11.67	145.3 E	703.5 N	5.6	3.1	-4.7
37	4380.0	85.63	357.50	8.70	3904.8	749.2	781.0	11.43	154.8 E	765.5 N	3.2	0.0	3.2

Sidetrack No. 3

Geoservices-Directional — Deviation report

Well : ORQ. #4-1H(ST#3)
Field : .....
Company : GARY WILLIAMS

Coordinates RECTANGULAR

Well head :		Target :		Impact :	
X =	0.0	X =	0.0	X =	0.0
Y =	0.0	Y =	0.0	Y =	0.0
Z =	0.0	Z =	0.0	Z =	0.0

Horizontal displacement 0.00 ft
Total vertical depth 0.00 ft — Kick off point 3825.00 ft
Magnetic declination 11.20 deg — Convergence 0.00 deg
Horizontal projection computed in azimuth North 355.00 deg. (NW 5.00)

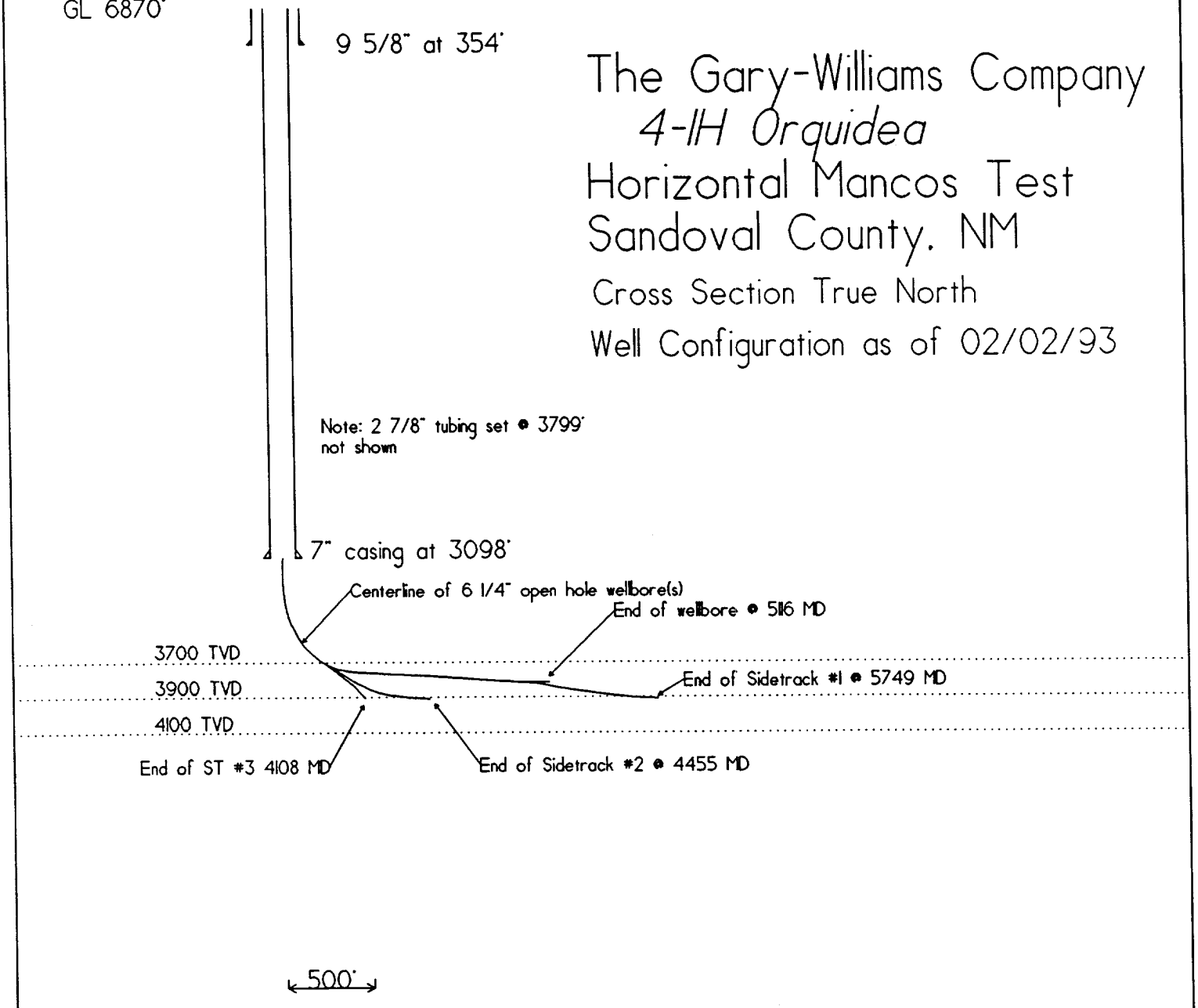
Surv no	Measured depth feet	Drift angle degree	Azimut magnt. degree	Azimut geogr. degree	Vertical depth feet	Horizntl prjction feet	Horizntl displcmt feet	Average Az(geo) degree	.Relative Coordinates. East/West feet	Nor/South feet	Dog dleg	leg dlgH /100ft	grBu
Computation method : Radius of curvature													
1	0.0	0.00	0.00	11.20	0.0	0.0	0.0	90.00	0.0 E	0.0 N	0.0	0.0	%100.0
2	3278.0	0.00	0.00	11.20	3278.0	0.1	0.1	11.20	0.0 E	0.1 N	0.0	0.0	0.0
3	3292.0	1.38	52.00	63.20	3292.0	0.2	0.2	30.53	0.1 E	0.2 N	9.8	4.5	9.8
4	3323.0	5.38	358.00	9.20	3322.9	1.6	2.0	35.58	1.1 E	1.6 N	15.2	-10.3	12.9
5	3354.0	9.00	354.50	5.70	3353.7	5.3	5.7	16.86	1.7 E	5.5 N	11.7	-1.4	11.7
6	3386.0	13.00	352.00	3.20	3385.1	11.4	11.7	10.44	2.1 E	11.5 N	12.6	-1.5	12.5
7	3416.0	16.50	351.50	2.70	3414.1	18.9	19.3	7.49	2.5 E	19.2 N	11.7	-0.4	11.7
8	3448.0	19.88	353.50	4.70	3444.5	28.8	29.3	6.20	3.2 E	29.1 N	10.7	2.0	10.6
9	3480.0	22.75	0.00	11.20	3474.3	40.1	40.9	6.70	4.8 E	40.6 N	11.6	7.4	9.0
10	3512.0	25.38	2.50	13.70	3503.5	52.6	53.9	8.09	7.6 E	53.4 N	8.8	3.2	8.2
11	3542.0	28.63	358.50	9.70	3530.2	65.6	67.5	8.81	10.3 E	66.7 N	12.4	-6.1	10.8
12	3575.0	31.75	359.00	10.20	3558.8	81.7	84.1	9.04	13.2 E	83.1 N	9.5	0.8	9.5
13	3606.0	35.50	2.00	13.20	3584.6	98.1	101.3	9.49	16.7 E	99.9 N	13.2	5.4	12.1
14	3637.0	39.50	5.00	16.20	3609.2	115.9	120.1	10.31	21.5 E	118.1 N	14.2	5.9	12.9
15	3668.0	43.63	5.50	16.70	3632.4	135.0	140.5	11.20	27.3 E	137.8 N	13.4	1.1	13.3
16	3700.0	47.75	5.50	16.70	3654.7	156.3	163.3	11.97	33.9 E	159.8 N	12.8	0.0	12.9
17	3730.0	52.25	5.50	16.70	3674.0	177.6	186.2	12.56	40.5 E	181.8 N	15.0	0.0	15.0
18	3761.0	56.88	5.00	16.20	3692.0	201.1	211.4	13.02	47.6 E	206.0 N	15.0	-1.3	14.9
19	3789.0	56.87	5.50	16.70	3707.2	222.9	234.8	13.36	54.3 E	228.5 N	1.5	1.5	-0.0
20	3821.0	55.60	5.50	16.70	3725.0	247.7	261.4	13.70	61.9 E	253.9 N	4.0	0.0	-4.0
21	3852.0	56.00	4.50	15.70	3742.5	271.6	287.0	13.93	69.1 E	278.6 N	2.9	-2.7	1.3
22	3884.0	56.00	3.50	14.70	3760.4	296.5	313.5	14.03	76.0 E	304.2 N	2.6	-2.6	0.0
23	3915.0	54.00	2.50	13.70	3778.1	320.4	338.9	14.05	82.3 E	328.8 N	7.0	-2.6	-6.5
24	3946.0	52.13	2.50	13.70	3796.8	343.9	363.7	14.02	88.1 E	352.9 N	6.0	0.0	-6.0
25	3977.0	50.00	1.00	12.20	3816.2	366.8	387.8	13.96	93.5 E	376.4 N	7.8	-3.8	-6.9
26	4002.0	48.00	359.50	10.70	3832.6	384.9	406.7	13.84	97.3 E	394.9 N	9.2	-4.5	-8.0
27	4033.0	46.75	0.50	11.70	3853.6	406.8	429.4	13.70	101.7 E	417.2 N	4.7	2.4	-4.0
28	4065.0	45.12	0.00	11.20	3875.9	428.9	452.4	13.58	106.3 E	439.8 N	5.2	-1.1	-5.1

Surface Location:
330' fsl. 1650' fwl
Sec. 4. T20N-R2W
GL 6870'

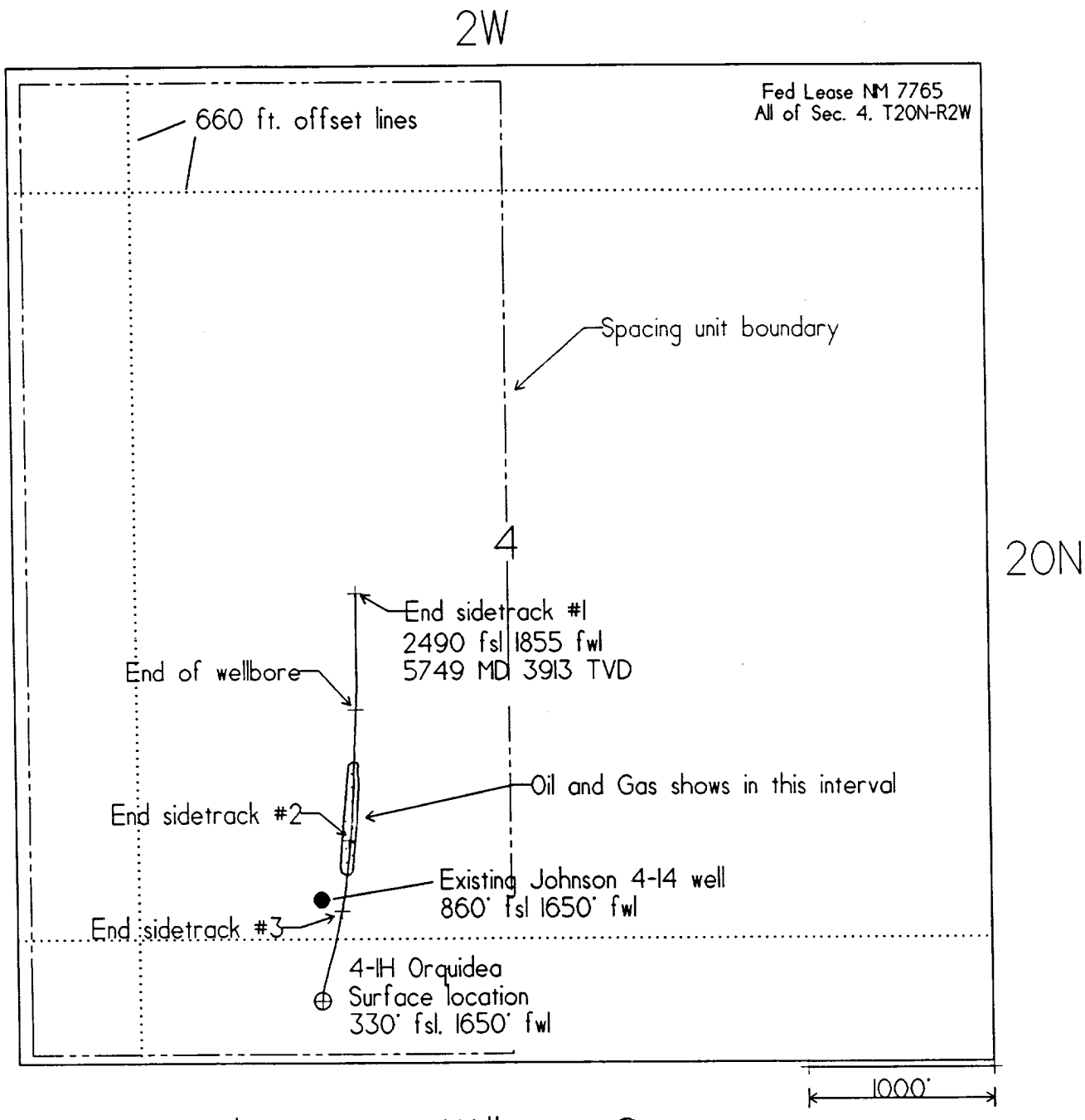
The Gary-Williams Company
4-IH Orquidea
Horizontal Mancos Test
Sandoval County. NM

Cross Section True North

Well Configuration as of 02/02/93



HEH 3/16/93



The Gary-Williams Company

4-IH Orquidea

Horizontal Mancos Test

Sandoval County, NM

Plan View of Wellbore as of 12/14/92

HEH 03/17/93

EASTMAN TELECO

SURVEY CALCULATION AND FIELD WORKSHEET

Job No. 0410-02664 Sidetrack No. _____ Page 1 of 3

npany THE GARY-WILLIAMS COMPANY Rig Contractor & No. 4 CORNERS - 4 Field GALLUP

ll Name & No. ORQUIDEA 4-1H Survey Section Name Definitive Survey ET Representative _____

WELL DATA

get TVD _____ (FT) Target Coord. N/S _____ Slot Coord. N/S 0.00 Grid Correction 0.460 Depths Measured From: RKB [X] MSL [ ] SS [ ]

get Description _____ Target Coord. E/W _____ Slot Coord. E/W 0.00 Magn. Declination 11.310 Calculation Method MINIMUM CURVATURE

get Direction _____ (DD) Build\Walk\DL per: 100ft [X] 30m [ ] 10m [ ] Vert. Sec. Azim. 355.00 Magn. to Map Corr. 10.850 Map North to: TRUE NORTH

SURVEY DATA

Date	Survey Tool Type	Survey Depth (FT)	Incl. Angle (DD)	Hole Direction (DD)	Course Length (FT)	TVD (FT)	Vertical Section	Total Coordinate N(+) / S(-) (FT)	Total Coordinate E(+) / W(-) (FT)	DL (Per 100 FT)	Build Rate Build (+) Drop (-)	Walk Rate Right (+) Left (-)	Comment
	UNKN	3277.99	0.00	0.00		3277.99	0.00	0.00	0.00				TIE IN POINT
	MWD	3278.00	0.00	0.00	0.01	3278.00	0.00	0.00	0.00	0.00	0.00		
	MWD	3292.00	1.38	63.20	14.00	3292.00	0.06	0.08	0.15	9.86	9.86		
	MWD	3323.00	5.38	9.20	31.00	3322.94	1.61	1.68	0.72	15.17	12.90	-174.19	
	MWD	3354.00	9.00	5.70	31.00	3353.69	5.40	5.53	1.19	11.76	11.68	-11.29	
	MWD	3386.00	13.00	3.20	32.00	3385.10	11.43	11.62	1.64	12.58	12.50	-7.81	
	MWD	3416.00	16.50	2.70	30.00	3414.11	18.99	19.24	2.03	11.67	11.67	-1.67	
	MWD	3448.00	19.88	4.70	32.00	3444.50	28.86	29.21	2.69	10.74	10.56	6.25	
	MWD	3480.00	22.75	11.20	32.00	3474.32	40.17	40.70	4.34	11.60	8.97	20.31	
	MWD	3512.00	25.37	13.70	32.00	3503.53	52.61	53.44	7.16	8.78	8.19	7.81	
	MWD	3542.00	28.63	9.70	30.00	3530.26	65.65	66.77	9.90	12.43	10.87	-13.33	
	MWD	3575.00	31.75	10.20	33.00	3558.78	81.68	83.11	12.77	9.48	9.45	1.52	
	MWD	3606.00	35.50	13.20	31.00	3584.59	98.11	99.91	16.27	13.23	12.10	9.68	
	MWD	3637.00	39.50	16.20	31.00	3609.18	115.86	118.15	21.08	14.18	12.90	9.68	
	MWD	3668.00	43.63	16.70	31.00	3632.37	135.00	137.87	26.90	13.36	13.32	1.61	
	MWD	3700.00	47.75	16.70	32.00	3654.72	156.27	159.80	33.48	12.88	12.88	0.00	
	MWD	3730.00	52.25	16.70	30.00	3674.00	177.62	181.80	40.08	15.00	15.00	0.00	
	MWD	3761.00	56.88	16.20	31.00	3691.97	201.12	206.02	47.23	14.99	14.94	-1.61	
	MWD	3791.00	61.75	16.20	30.00	3707.27	225.17	230.79	54.43	16.23	16.23	0.00	
	MWD	3822.00	66.25	15.70	31.00	3720.86	251.18	257.57	62.08	14.59	14.52	-1.61	
	MWD	3854.00	70.63	14.70	32.00	3732.62	279.11	286.28	69.88	13.99	13.69	-3.12	
	MWD	3884.00	75.00	14.20	30.00	3741.48	306.12	314.03	77.02	14.65	14.57	-1.67	
	MWD	3907.00	79.00	14.20	23.00	3746.65	327.28	335.75	82.52	17.39	17.39	0.00	
	MWD	3939.00	83.63	13.70	32.00	3751.48	357.20	366.45	90.14	14.55	14.47	-1.56	

EASTMAN TELECO

SURVEY CALCULATION AND FIELD WORKSHEET

Job No. 0410-02664 Sidetrack No. _____ Page 2 of 3

mpany THE GARY-WILLIAMS COMPANY Rig Contractor & No. 4 CORNERS - 4 Field GALLUP

ell Name & No. ORQUIDEA 4-1H Survey Section Name Definitive Survey ET Representative _____

WELL DATA

rget TVD _____ (FT) Target Coord. N/S _____ Slot Coord. N/S 0.00 Grid Correction 0.460 Depths Measured From: RKB [X] MSL [ ] SS [ ]

rget Description _____ Target Coord. E/W _____ Slot Coord. E/W 0.00 Magn. Declination 11.310 Calculation Method MINIMUM CURVATURE

rget Direction _____ (DD) Build\Walk\DL per: 100ft [X] 30m [ ] 10m [ ] Vert. Sec. Azim. 355.00 Magn. to Map Corr. 10.850 Map North to: TRUE NORTH

SURVEY DATA

Date	Survey Tool Type	Survey Depth (FT)	Incl. Angle (DD)	Hole Direction (DD)	Course Length (FT)	TVD (FT)	Vertical Section	Total Coordinate N(+) / S(-) (FT)	Total Coordinate E(+) / W(-) (FT)	DL (Per 100 FT)	Build Rate Build (+) Drop (-)	Walk Rate Right (+) Left (-)	Comment
	MWD	3971.00	84.50	12.70	32.00	3754.79	387.43	397.43	97.41	4.13	2.72	-3.12	
	MWD	4002.00	84.50	11.20	31.00	3757.76	416.95	427.62	103.80	4.82	0.00	-4.84	
	MWD	4034.00	86.63	10.70	32.00	3760.24	447.62	458.94	109.86	6.84	6.66	-1.56	
	MWD	4065.00	87.13	10.70	31.00	3761.92	477.42	489.36	115.61	1.61	1.61	0.00	
	MWD	4097.00	86.88	9.70	32.00	3763.60	508.26	520.81	121.27	3.22	-0.78	-3.12	
	MWD	4128.00	86.25	9.70	31.00	3765.45	538.19	551.31	126.48	2.03	-2.03	0.00	
	MWD	4159.00	87.63	9.20	31.00	3767.11	568.16	581.84	131.56	4.73	4.45	-1.61	
	MWD	4188.00	89.25	9.20	29.00	3767.90	596.27	610.46	136.20	5.59	5.59	0.00	
	MWD	4253.00	86.25	9.20	65.00	3770.45	659.22	674.57	146.58	4.62	-4.62	0.00	
	MWD	4283.00	85.50	8.70	30.00	3772.61	688.26	704.12	151.24	3.00	-2.50	-1.67	
	MWD	4315.00	86.25	7.20	32.00	3774.91	719.37	735.74	155.65	5.23	2.34	-4.69	
	MWD	4346.00	87.13	5.70	31.00	3776.70	749.70	766.49	159.13	5.60	2.84	-4.84	
	MWD	4378.00	86.38	5.20	32.00	3778.51	781.12	798.29	162.16	2.82	-2.34	-1.56	
	MWD	4410.00	85.88	5.20	32.00	3780.67	812.54	830.08	165.05	1.56	-1.56	0.00	
	MWD	4441.00	86.63	4.70	31.00	3782.70	843.01	860.90	167.72	2.90	2.42	-1.61	
	MWD	4473.00	87.50	3.20	32.00	3784.33	874.58	892.78	169.92	5.41	2.72	-4.69	
	MWD	4505.00	86.00	2.20	32.00	3786.15	906.24	924.70	171.43	5.63	-4.69	-3.12	
	MWD	4536.00	86.50	2.70	31.00	3788.18	936.91	955.60	172.75	2.28	1.61	1.61	
	MWD	4567.00	85.75	2.20	31.00	3790.27	967.58	986.50	174.07	2.90	-2.42	-1.61	
	MWD	4598.00	85.13	2.20	31.00	3792.74	998.23	1017.38	175.26	2.00	-2.00	0.00	
	MWD	4628.00	85.25	2.20	30.00	3795.25	1027.89	1047.25	176.41	0.40	0.40	0.00	
	MWD	4659.00	86.75	2.20	31.00	3797.41	1058.57	1078.15	177.60	4.84	4.84	0.00	
	MWD	4691.00	86.13	3.20	32.00	3799.40	1090.22	1110.06	179.10	3.67	-1.94	3.12	
	MWD	4722.00	85.63	3.70	31.00	3801.63	1120.81	1140.92	180.96	2.28	-1.61	1.61	

EASTMAN TELECO

SURVEY CALCULATION AND FIELD WORKSHEET

Job No. 0410-02664 Sidetrack No. _____ Page 3 of 3

Company THE GARY-WILLIAMS COMPANY | Rig Contractor & No. 4 CORNERS - 4 | Field GALLUP

Well Name & No. ORQUIDEA 4-1H | Survey Section Name Definitive Survey | ET Representative _____

WELL DATA

Target TVD _____ (FT) | Target Coord. N/S _____ | Slot Coord. N/S 0.00 | Grid Correction 0.460 | Depths Measured From: RKB [X] MSL [ ] SS [ ]

Target Description _____ | Target Coord. E/W _____ | Slot Coord. E/W 0.00 | Magn. Declination 11.310 | Calculation Method MINIMUM CURVATURE

Target Direction _____ (DD) | Build\Walk\DL per: 100ft [X] 30m [ ] 10m [ ] | Vert. Sec. Azim. 355.00 | Magn. to Map Corr. 10.850 | Map North to: TRUE NORTH

SURVEY DATA

Date	Survey Tool Type	Survey Depth (FT)	Incl. Angle (DD)	Hole Direction (DD)	Course Length (FT)	TVD (FT)	Vertical Section	Total Coordinate N(+) / S(-) (FT)	Total Coordinate E(+) / W(-) (FT)	DL (Per 100 FT)	Build Rate Build (+) Drop (-)	Walk Rate Right (+) Left (-)	Comment
	MWD	4753.00	84.50	3.70	31.00	3804.29	1151.34	1171.74	182.95	3.64	-3.64	0.00	
	MWD	4784.00	85.25	3.20	31.00	3807.06	1181.88	1202.56	184.81	2.90	2.42	-1.61	
	MWD	4816.00	85.25	3.20	32.00	3809.71	1213.44	1234.40	186.59	0.00	0.00	0.00	
	MWD	4847.00	85.88	3.20	31.00	3812.11	1244.03	1265.26	188.32	2.03	2.03	0.00	
	MWD	4878.00	86.75	2.70	31.00	3814.10	1274.67	1296.15	189.91	3.24	2.81	-1.61	
	MWD	4909.00	88.13	2.70	31.00	3815.49	1305.36	1327.09	191.37	4.45	4.45	0.00	
	MWD	4941.00	88.50	2.70	32.00	3816.43	1337.06	1359.04	192.87	1.16	1.16	0.00	
	MWD	4971.00	87.75	2.70	30.00	3817.41	1366.77	1388.99	194.29	2.50	-2.50	0.00	
	MWD	5002.00	89.50	2.70	31.00	3818.15	1397.48	1419.94	195.75	5.64	5.64	0.00	
	MWD	5032.00	89.38	2.20	30.00	3818.45	1427.22	1449.92	197.03	1.71	-0.40	-1.67	
	MWD	5063.00	90.25	2.20	31.00	3818.55	1457.98	1480.89	198.22	2.81	2.81	0.00	
	MWD	5095.00	91.25	1.70	32.00	3818.13	1489.74	1512.87	199.31	3.49	3.12	-1.56	
? TD (projected)		5116	91	1.7	21.0	3818		1534	199.9				

EASTMAN TELECO

SURVEY CALCULATION AND FIELD WORKSHEET

Job No. 0410-02664 Sidetrack No. 1 Page 1 of 2

mpany THE GARY-WILLIAMS COMPANY Rig Contractor & No. 4 CORNERS - 4 Field GALLUP

ll Name & No. ORQUIDEA 4-1H Survey Section Name Definitive Survey ET Representative

WELL DATA

rget TVD (FT) Target Coord. N/S Slot Coord. N/S 0.00 Grid Correction 0.460 Depths Measured From: RKB [X] MSL [ ] SS [ ]

rget Description Target Coord. E/W Slot Coord. E/W 0.00 Magn. Declination 11.310 Calculation Method MINIMUM CURVATURE

rget Direction (DD) Build\Walk\DL per: 100ft [X] 30m [ ] 10m [ ] Vert. Sec. Azim. 355.00 Magn. to Map Corr. 10.850 Map North to: TRUE NORTH

SURVEY DATA

Date	Survey Tool Type	Survey Depth (FT)	Incl. Angle (DD)	Hole Direction (DD)	Course Length (FT)	TVD (FT)	Vertical Section	Total Coordinate N(+) / S(-) (FT)	Total Coordinate E(+) / W(-) (FT)	DL (Per 100 FT)	Build Rate Build (+) Drop (-)	Walk Rate Right (+) Left (-)	Comment
	MWD	4971.00	87.75	2.70		3817.41	1367.76	1388.99	194.28				TIE IN POINT
	MWD	5002.00	85.50	2.20	31.00	3819.23	1397.45	1419.90	195.60	7.43	-7.26	-1.61	
	MWD	5034.00	82.75	2.70	32.00	3822.51	1429.01	1451.70	196.96	8.73	-8.59	1.56	
	MWD	5065.00	79.88	3.20	31.00	3827.19	1459.36	1482.31	198.54	9.39	-9.26	1.61	
	MWD	5095.00	78.38	2.70	30.00	3832.85	1488.54	1511.73	200.06	5.26	-5.00	-1.67	
	MWD	5127.00	77.75	2.70	32.00	3839.46	1519.56	1543.00	201.53	1.97	-1.97	0.00	
	MWD	5157.00	79.50	2.20	30.00	3845.38	1548.73	1572.38	202.79	6.06	5.83	-1.67	
	MWD	5188.00	81.50	1.20	31.00	3850.50	1579.09	1602.94	203.69	7.19	6.45	-3.22	
	MWD	5220.00	82.13	1.20	32.00	3855.05	1610.58	1634.61	204.36	1.97	1.97	0.00	
	MWD	5251.00	82.63	0.70	31.00	3859.16	1641.14	1665.33	204.87	2.27	1.61	-1.61	
	MWD	5282.00	82.13	0.70	31.00	3863.28	1671.71	1696.06	205.24	1.61	-1.61	0.00	
	MWD	5314.00	82.13	0.70	32.00	3867.66	1703.26	1727.75	205.63	0.00	0.00	0.00	
	MWD	5346.00	82.13	0.70	32.00	3872.04	1734.80	1759.45	206.02	0.00	0.00	0.00	
	MWD	5377.00	82.13	359.70	31.00	3876.28	1765.38	1790.16	206.12	3.20	0.00	-3.23	
	MWD	5409.00	81.75	359.70	32.00	3880.77	1796.96	1821.84	205.96	1.19	-1.19	0.00	
	MWD	5439.00	81.50	359.70	30.00	3885.14	1826.54	1851.52	205.80	0.83	-0.83	0.00	
	MWD	5470.00	81.25	359.70	31.00	3889.79	1857.08	1882.17	205.64	0.81	-0.81	0.00	
	MWD	5502.00	82.75	359.70	32.00	3894.24	1888.66	1913.86	205.48	4.69	4.69	0.00	
	MWD	5533.00	84.50	0.20	31.00	3897.68	1919.36	1944.66	205.45	5.87	5.64	1.61	
	MWD	5563.00	86.75	0.20	30.00	3899.97	1949.14	1974.57	205.55	7.50	7.50	0.00	
	MWD	5593.00	87.13	359.70	30.00	3901.57	1978.99	2004.53	205.53	2.09	1.27	-1.67	
	MWD	5625.00	87.63	359.70	32.00	3903.04	2010.85	2036.50	205.36	1.56	1.56	0.00	
	MWD	5657.00	86.88	359.20	32.00	3904.57	2042.71	2068.46	205.05	2.82	-2.34	-1.56	
	MWD	5688.00	85.25	359.20	31.00	3906.70	2073.56	2099.38	204.62	5.26	-5.26	0.00	

EASTMAN TELECO

SURVEY CALCULATION AND FIELD WORKSHEET

Job No. 0410-02664 Sidetrack No. 1 Page 2 of 2

npany THE GARY-WILLIAMS COMPANY Rig Contractor & No. 4 CORNERS - 4 Field GALLUP

l Name & No. ORQUIDEA 4-1H Survey Section Name Definitive Survey ET Representative

WELL DATA

get TVD (FT)	Target Coord. N/S	Slot Coord. N/S 0.00	Grid Correction 0.460	Depths Measured From: RKB [X] MSL [ ] SS [ ]
get Description	Target Coord. E/W	Slot Coord. E/W 0.00	Magn. Declination 11.310	Calculation Method MINIMUM CURVATURE
get Direction (DD)	Build\Walk\DL per: 100ft [X] 30m [ ] 10m [ ]	Vert. Sec. Azim. 355.00	Magn. to Map Corr. 10.850	Map North to: TRUE NORTH

SURVEY DATA

Date	Survey Tool Type	Survey Depth (FT)	Incl. Angle (DD)	Hole Direction (DD)	Course Length (FT)	TVD (FT)	Vertical Section	Total Coordinate N(+) / S(-) (FT)	Total Coordinate E(+) / W(-) (FT)	DL (Per 100 FT)	Build Rate Build (+) Drop (-)	Walk Rate Right (+) Left (-)	Comment
	MWD	5706.00	84.13	359.20	18.00	3908.36	2091.43	2117.30	204.37	6.22	-6.22	0.00	
TD (projected)		5749	94	359	43	3913		2160	205				

EASTMAN TELECO
A Baker Hughes Company

SURVEY CALCULATION AND FIELD WORKSHEET

Job No. 0410-02664 Sidetrack No. 2 Page 1 of 1

Company THE GARY-WILLIAMS COMPANY | Rig Contractor & No. 4 CORNERS - 4 | Field GALLUP

Well Name & No. ORQUIDEA 4-1H | Survey Section Name Definitive Survey | ET Representative

WELL DATA

Target TVD (FT) | Target Coord. N/S | Slot Coord. N/S 0.00 | Grid Correction 0.460 | Depths Measured From: RKB [X] MSL [ ] SS [ ]

Target Description | Target Coord. E/W | Slot Coord. E/W 0.00 | Magn. Declination 11.310 | Calculation Method MINIMUM CURVATURE

Target Direction (DD) | Build\Walk\DL per: 100ft [X] 30m [ ] 10m [ ] | Vert. Sec. Azim. 355.00 | Magn. to Map Corr. 10.850 | Map North to: TRUE NORTH

SURVEY DATA

Date	Survey Tool Type	Survey Depth (FT)	Incl. Angle (DD)	Hole Direction (DD)	Course Length (FT)	TVD (FT)	Vertical Section	Total Coordinate N(+) / S(-) (FT)	Total Coordinate E(+) / W(-) (FT)	DL (Per 100 FT)	Build Rate Build (+) Drop (-)	Walk Rate Right (+) Left (-)	Comment
	MWD	3761.00	56.88	16.20		3691.97	201.91	206.03	47.23				TIE IN POINT
	MWD	3789.00	59.88	16.70	28.00	3706.65	223.32	228.89	53.98	10.82	10.71	1.78	
	MWD	3821.00	61.88	17.20	32.00	3722.22	249.24	255.63	62.13	6.40	6.25	1.56	
	MWD	3852.00	60.75	17.20	31.00	3737.10	274.42	281.61	70.18	3.64	-3.64	0.00	
	MWD	3884.00	60.25	14.70	32.00	3752.86	300.43	308.39	77.83	6.98	-1.56	-7.81	
	MWD	3915.00	59.38	13.70	31.00	3768.44	325.74	334.36	84.40	3.96	-2.81	-3.22	
	MWD	3946.00	59.00	12.20	31.00	3784.32	351.06	360.31	90.37	4.33	-1.22	-4.84	
	MWD	3977.00	58.00	11.20	31.00	3800.52	376.38	386.19	95.73	4.24	-3.22	-3.22	
	MWD	4002.00	59.25	11.20	25.00	3813.54	396.88	407.13	99.88	5.00	5.00	0.00	
	MWD	4033.00	62.38	10.70	31.00	3828.65	422.90	433.70	105.02	10.19	10.10	-1.61	
	MWD	4065.00	65.38	10.20	32.00	3842.74	450.58	461.95	110.22	9.48	9.37	-1.56	
	MWD	4097.00	68.25	8.20	32.00	3855.34	479.10	490.98	114.92	10.65	8.97	-6.25	
	MWD	4127.00	71.25	7.70	30.00	3865.72	506.53	518.86	118.81	10.12	10.00	-1.67	
	MWD	4159.00	74.50	8.20	32.00	3875.14	536.32	549.14	123.04	10.26	10.16	1.56	
	MWD	4190.00	77.62	8.20	31.00	3882.61	565.61	578.91	127.33	10.06	10.06	0.00	
	MWD	4218.00	80.50	8.20	28.00	3887.92	592.38	606.12	131.25	10.28	10.28	0.00	
	MWD	4253.00	83.88	7.70	35.00	3892.68	626.16	640.46	136.05	9.76	9.66	-1.43	
	MWD	4285.00	85.13	7.70	32.00	3895.74	657.24	672.02	140.32	3.91	3.91	0.00	
	MWD	4317.00	83.62	8.70	32.00	3898.88	688.24	703.54	144.86	5.65	-4.72	3.12	
	MWD	4380.00	85.63	8.70	63.00	3904.78	749.18	765.54	154.34	3.19	3.19	0.00	
TD (projected)		4455	85.6	8.7	75	3910		839	154				

EASTMAN TELECO

SURVEY CALCULATION AND FIELD WORKSHEET

Job No. 0410-02664 Sidetrack No 3 Page 1 of 1

ompany THE GARY-WILLIAMS COMPANY Rig Contractor & No. 4 CORNERS - 4 Field GALLUP

ell Name & No. ORQUIDEA 4-1H Survey Section Name Definitive Survey ET Representative

WELL DATA

rget TVD (FT) Target Coord. N/S Slot Coord. N/S 0.00 Grid Correction 0.460 Depths Measured From: RKB [X] MSL [ ] SS [ ]

rget Description Target Coord. E/W Slot Coord. E/W 0.00 Magn. Declination 11.310 Calculation Method MINIMUM CURVATURE

rget Direction (DD) Build\Walk\DL per: 100ft [X] 30m [ ] 10m [ ] Vert. Sec. Azim. 355.00 Magn. to Map Corr. 10.850 Map North to: TRUE NORTH

SURVEY DATA

Date	Survey Tool Type	Survey Depth (FT)	Incl. Angle (DD)	Hole Direction (DD)	Course Length (FT)	TVD (FT)	Vertical Section	Total Coordinate N(+) / S(-) (FT)	Total Coordinate E(+) / W(-) (FT)	DL (Per 100 FT)	Build Rate Build (+) Drop (-)	Walk Rate Right (+) Left (-)	Comment
	MWD	3761.00	56.88	16.20		3691.97	201.91	206.03	47.23				TIE IN POINT
	MWD	3789.00	56.87	16.70	28.00	3707.27	222.95	228.52	53.87	1.50	-0.04	1.78	
	MWD	3821.00	55.60	16.70	32.00	3725.06	247.67	254.00	61.51	3.97	-3.97	0.00	
	MWD	3852.00	56.00	15.70	31.00	3742.48	271.58	278.62	68.67	2.96	1.29	-3.22	
	MWD	3884.00	56.00	14.70	32.00	3760.38	296.47	304.22	75.62	2.59	0.00	-3.12	
	MWD	3915.00	54.00	13.70	31.00	3778.16	320.45	328.84	81.85	6.97	-6.45	-3.22	
	MWD	3946.00	52.13	13.70	31.00	3796.78	343.92	352.91	87.72	6.03	-6.03	0.00	
	MWD	3977.00	50.00	12.20	31.00	3816.26	366.86	376.40	93.13	7.83	-6.87	-4.84	
	MWD	4002.00	48.00	10.70	25.00	3832.66	384.95	394.90	96.88	9.19	-8.00	-6.00	
	MWD	4033.00	46.75	11.70	31.00	3853.66	406.85	417.27	101.31	4.68	-4.03	3.22	
	MWD	4065.00	45.12	11.20	32.00	3875.91	428.90	439.80	105.87	5.22	-5.09	-1.56	
ojected	~~MWD~~	4108.00	42.90	11.20	43.00	3906.84	457.59	469.11	111.68	5.16	-5.16	0.00	
TD													