

Northwest Natural Gas Company
Mist Gas Storage Field
OM 12-22-65
Mist Gas Field
Columbia Co., Oregon

S U R V E Y L I S T I N G

Well name : OM 12-22-65

Your ref : Survey 9/4/97
Our ref : svy3374

Date printed : 19-Jan-98
Date created : 29-Aug-97
Last revised : 1-Oct-97

Field is centred on n45 35 51.576,w123 9 14.292

Structure is centred on 1288888.450,862154.820

Measured Depth	Inclin. Degrees	Azimuth Degrees	True Vert. Depth	R E C T A N G U L A R C O O R D I N A T E S		Dogleg Deg/100Ft	Vert Sect
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	0.00
385.00	0.00	0.00	385.00	0.00 N	0.00 E	0.00	0.00
445.00	2.75	302.00	444.98	0.76 N	1.22 W	4.58	1.41
536.00	7.50	290.00	535.59	3.95 N	8.66 W	5.32	9.50
606.00	12.00	290.00	604.56	8.01 N	19.79 W	6.43	21.35
688.00	15.75	283.00	684.16	13.43 N	38.66 W	5.00	40.89
844.00	19.50	292.00	832.84	27.95 N	83.45 W	2.96	87.91
976.00	22.00	286.00	956.28	43.02 N	127.66 W	2.48	134.57
1098.00	22.00	286.00	1069.40	55.62 N	171.59 W	0.00	180.07
1221.00	23.00	287.00	1183.03	69.00 N	216.72 W	0.87	226.98
1415.00	24.50	287.00	1360.60	91.84 N	291.43 W	0.77	304.89
1834.00	24.50	287.00	1741.87	142.64 N	457.60 W	0.00	478.16

All data is in feet unless otherwise stated
 Coordinates are from OM 12-22-65 and TVDs are from wellhead.
 Vertical section is from wellhead on azimuth 291.29 degrees.
 Calculation uses the minimum curvature method.

Targets associated with this wellpath
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Target name	Position	T.V.D.	Local rectangular coords.	Date revised
Top Sand	1289789.000, 859991.000	1456.00	136.18N 349.45W	19-Aug-97

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Mist Gas Storage Field
OM 12-22-65
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Columbia Co., Oregon

S U R V E Y L I S T I N G

Well name : OM-12-22-65 S/T

Your ref : Logsurvey
Our ref : svy3394

Date printed : 19-Jan-98
Date created : 1-Oct-97
Last revised : 1-Oct-97

Field is centred on n45 35 51.576,w123 9 14.292

Structure is centred on 1288888.450,862154.820

Measured Depth	Inclin. Degrees	Azimuth Degrees	True Vert. Depth	R E C T A N G U L A R C O O R D I N A T E S		Dogleg Deg/100Ft	Vert Sect
0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	0.00
385.00	0.00	0.00	385.00	0.00 N	0.00 E	0.00	0.00
445.00	2.75	302.00	444.98	0.76 N	1.22 W	4.58	1.41
536.00	7.50	290.00	535.59	3.95 N	8.66 W	5.32	9.50
606.00	12.00	290.00	604.56	8.01 N	19.79 W	6.43	21.35
688.00	15.75	283.00	684.16	13.43 N	38.66 W	5.00	40.89
844.00	19.50	292.00	832.84	27.95 N	83.45 W	2.96	87.91
976.00	22.00	286.00	956.28	43.02 N	127.66 W	2.48	134.57
1098.00	22.00	286.00	1069.40	55.62 N	171.59 W	0.00	180.07
1221.00	23.00	287.00	1183.03	69.00 N	216.72 W	0.87	226.98
1415.00	24.50	287.00	1360.60	91.84 N	291.43 W	0.77	304.89
1484.00	24.50	287.00	1423.38	100.21 N	318.80 W	0.00	333.42
1484.50	24.57	280.59	1423.84	100.26 N	319.00 W	532.30	333.63
1485.00	24.54	280.37	1424.29	100.29 N	319.20 W	19.24	333.83
1490.00	24.44	279.46	1428.84	100.65 N	321.24 W	7.81	335.86
1500.00	24.34	277.76	1437.95	101.27 N	325.33 W	7.09	339.89
1530.00	22.99	273.52	1465.43	102.46 N	337.30 W	7.24	351.48
1560.00	22.32	274.82	1493.12	103.30 N	348.82 W	2.79	362.53
1590.00	21.41	286.85	1520.97	105.37 N	359.75 W	15.21	373.45
1620.00	20.89	259.19	1549.02	105.95 N	370.27 W	33.03	383.47
1650.00	19.97	270.17	1577.14	104.97 N	380.65 W	13.12	392.78
1680.00	19.26	269.48	1605.40	104.94 N	390.72 W	2.49	402.15
1710.00	18.50	273.33	1633.79	105.17 N	400.42 W	4.86	411.28
1740.00	17.90	273.20	1662.29	105.70 N	409.77 W	2.00	420.19
1770.00	17.16	272.86	1690.90	106.18 N	418.80 W	2.49	428.77
1800.00	16.51	272.68	1719.61	106.60 N	427.48 W	2.17	437.01
1830.00	16.02	272.57	1748.41	106.98 N	435.87 W	1.64	444.97
1860.00	15.42	272.77	1777.29	107.36 N	443.99 W	2.01	452.67
1890.00	14.88	272.63	1806.24	107.73 N	451.82 W	1.80	460.10
1920.00	14.32	272.66	1835.28	108.08 N	459.37 W	1.87	467.27
1950.00	13.81	272.41	1864.38	108.40 N	466.66 W	1.71	474.17
1980.00	13.24	272.28	1893.54	108.69 N	473.67 W	1.90	480.81
2010.00	12.72	271.90	1922.78	108.94 N	480.40 W	1.76	487.17
2040.00	12.20	272.20	1952.07	109.17 N	486.87 W	1.75	493.28
2070.00	11.61	272.11	1981.42	109.40 N	493.05 W	1.97	499.13
2100.00	11.20	272.33	2010.83	109.63 N	498.98 W	1.37	504.73
2130.00	10.71	271.96	2040.29	109.85 N	504.68 W	1.65	510.12
2160.00	10.25	272.43	2069.79	110.05 N	510.13 W	1.56	515.28
2190.00	9.69	271.77	2099.33	110.24 N	515.32 W	1.91	520.18
2220.00	9.27	272.19	2128.92	110.42 N	520.26 W	1.42	524.84
2250.00	8.91	271.89	2158.55	110.58 N	525.00 W	1.21	529.32
2280.00	8.52	271.77	2188.20	110.73 N	529.54 W	1.30	533.60
2310.00	8.20	272.01	2217.88	110.87 N	533.90 W	1.07	537.72
2330.00	8.22	272.01	2237.68	110.97 N	536.75 W	0.10	540.41

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Northwest Natural Gas Company

Schlumberger Anadrill

WELL **OM 12-22-65**

FIELD **Mist Gas Field**

RC **Taylor #7**

Magnetic Declination: Angle: 18.6488° FS: 54385.07 Date: 20 Aug 97
Model: IGRF Dis: 68.0620°

Let: N45°59'29.267"W Grid Corr: 1.97"W. Surface Columbia Co. OK, North AZ: 1250138.45
Lon: W123°17'35.498"E Scale Fact: 1 OK, North Y: 859854.82

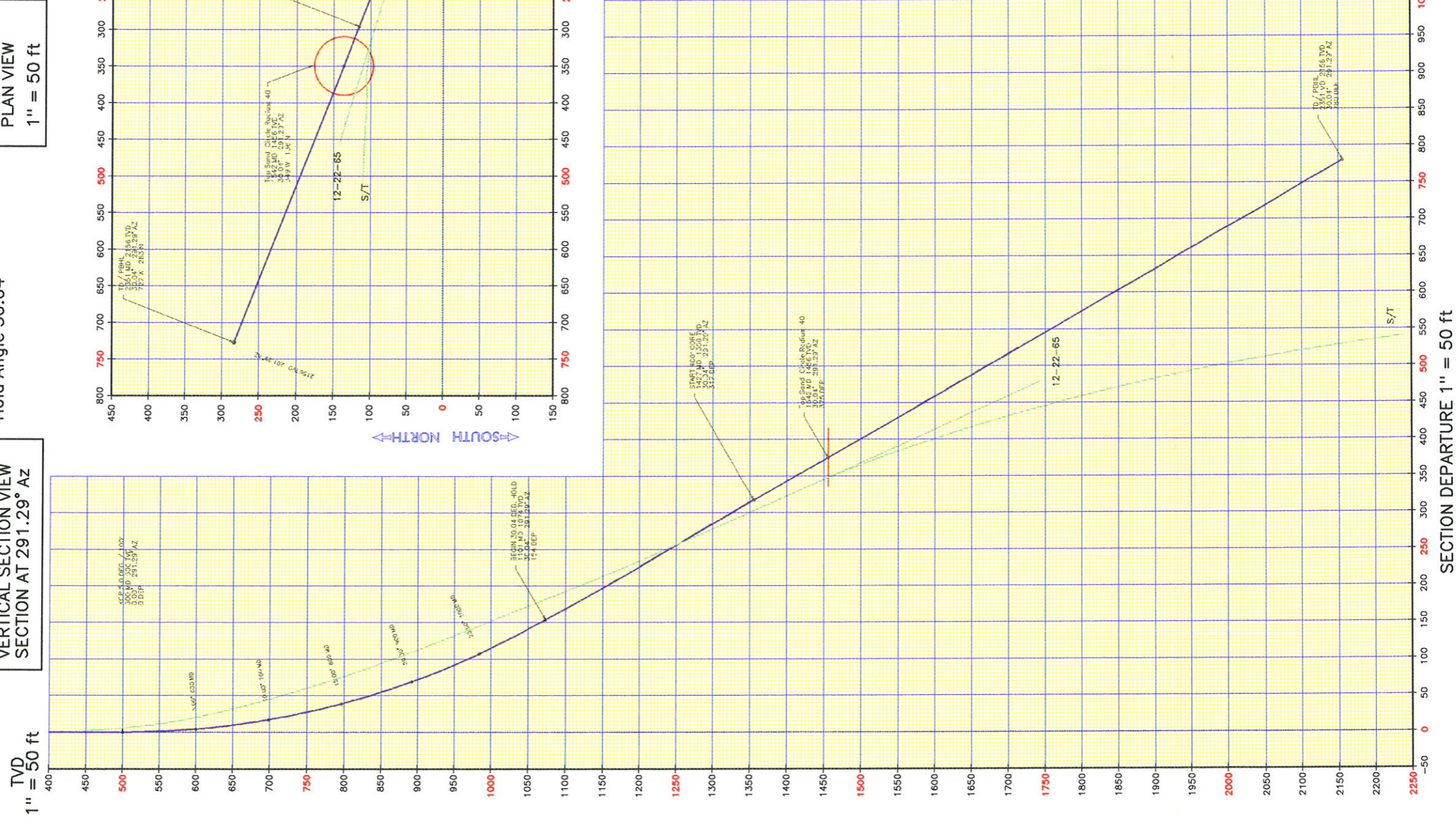
Drawn: 20 Jan 98
Plan#: REV 1

**VERTICAL SECTION VIEW
SECTION AT 291.29° AZ**
1" = 50 ft

Hold Angle 30.04°

**PLAN VIEW
1" = 50 ft**

Hold Azimuth 291.29°



MAP DRAWN TO LAMBERT GRID NORTH
OREGON NORTH ZONE



Magnetic to Grid North Correction = 20.62° East

- Existing Wells
- Proposed Well
- Prop. Well As Drilled

SECTION DEPARTURE 1" = 50 ft