OK [redacted]

1400A 12506

Date 14 DEC 90

TELECO OILFIELD SERVICES
SURVEY CALCULATIONS
****

RECEIVED
JAN1 6 1991
OIL CON. DIV.
DIST. 3

Company: BLACKWOOD & NICHOLS
Well: N/E BLANCO 423-R
Location: RIO ARRIBA NEW MEXICO
Rig: BIG A # 23

We hereby certify that the surveys contained herein are to the best of our knowledge a true and accurate account of the well

Joe Senga
FIELD SUPERVISOR

TELECO Job # TRM-341
Grid Correction: 0.0°
Magnetic Declination: 12.5°
Total grid correction: 12.5°
Proposed Direction: 1.5°

RECEIVED
DEC 1 [illegible]
BLACKWOOD & NICHOLS CO., LTD.

MINIMUM CURVATURE CALCULATION
****

Meas Depth feet	Course Length feet	Incl deg	Azi deg	True Vert. Dp. feet	Vertical Section feet	Coordinates N/S feet	E/W feet	Closure Distance feet	Angle deg	Dog Leg Severity deg/100'
					INITIAL TIE IN COORDINATES					
400	0	0.0	0.0	400.00	0.02	0.02N	0.02E	0.03	N 45.00E	0.00
					TELECO SURVEYS					
415	15	0.2	205.2	415.00	-0.00	0.00S	0.01E	0.01	S 67.38E	1.33
471	56	0.2	299.4	471.00	-0.05	0.04S	0.12W	0.13	S 69.47W	0.52
530	59	1.5	341.2	529.99	0.73	0.74N	0.46W	0.87	N 31.76W	2.30
589	59	3.3	347.5	588.94	3.10	3.13N	1.07W	3.31	N 18.94W	3.08

Company: BLACKWOOD & NICHOLS, Well: N/E BLANCO 423-R, Location: RIO ARRIBA NEW MEXICO, Rig: BIG A # 23

Meas Depth feet	Course Length feet	Incl deg	Azi deg	True Vert. Dp. feet	Vertical Section feet	Coordinates N/S feet	E/W feet	Closure Distance feet	Angle deg	Dog Leg Severity deg/100'
649	60	5.6	350.7	648.75	7.65	7.70N	1.92W	7.94	N 14.00W	3.85
710	61	8.2	348.2	709.31	14.81	14.90N	3.29W	15.26	N 12.46W	4.29
769	59	10.8	349.3	767.49	24.30	24.45N	5.18W	24.99	N 11.96W	4.42
827	58	13.5	351.8	824.19	36.29	36.49N	7.15W	37.19	N 11.09W	4.74
887	60	16.6	356.7	882.13	51.74	51.99N	8.65W	52.70	N 9.44W	5.58
946	59	19.9	359.8	938.15	70.18	70.45N	9.17W	71.04	N 7.41W	5.83
1005	59	23.4	3.0	992.98	91.93	92.19N	8.59W	92.59	N 5.32W	6.26
1065	60	27.2	4.1	1047.22	117.55	117.78N	6.98W	117.99	N 3.39W	6.38
1125	60	29.9	4.8	1099.92	146.19	146.37N	4.75W	146.44	N 1.86W	4.53
1186	61	31.9	4.1	1152.26	177.47	177.60N	2.33W	177.61	N 0.75W	3.33
1246	60	35.4	3.0	1202.20	210.69	210.77N	0.28W	210.77	N 0.08W	5.92
1305	59	37.4	3.0	1249.68	245.69	245.74N	1.55E	245.74	N 0.36E	3.39
1364	59	39.2	3.0	1295.98	282.24	282.25N	3.46E	282.27	N 0.70E	3.05
1425	61	42.3	2.3	1342.19	322.05	322.02N	5.30E	322.07	N 0.94E	5.14

Company: BLACKWOOD & NICHOLS, Well: N/E BLANCO 423-R, Location: RIO ARRIBA NEW MEXICO, Rig: BIG A # 23

Meas Depth feet	Course Length feet	Incl deg	Azi deg	True Vert. Dp. feet	Vertical Section feet	Coordinates N/S feet	E/W feet	Closure Distance feet	Angle deg	Dog Leg Severity deg/100
1487	62	45.9	2.0	1386.70	365.19	365.13N	6.91E	365.20	N 1.08E	5.82
1518	31	47.6	2.3	1407.94	387.76	387.69N	7.76E	387.77	N 1.15E	5.53
1548	30	49.5	2.3	1427.80	410.25	410.16N	8.66E	410.25	N 1.21E	6.33
1611	63	49.7	1.3	1468.63	458.22	458.11N	10.17E	458.23	N 1.27E	1.25
1673	62	50.4	0.5	1508.45	505.75	505.64N	10.91E	505.75	N 1.24E	1.50
1734	61	50.7	0.9	1547.21	552.84	552.73N	11.49E	552.85	N 1.19E	0.71
1797	63	50.4	0.2	1587.24	601.48	601.38N	11.96E	601.50	N 1.14E	0.98
1858	61	49.7	359.5	1626.41	648.23	648.14N	11.84E	648.25	N 1.05E	1.45
1917	59	49.0	359.1	1664.84	692.96	692.90N	11.29E	692.99	N 0.93E	1.29
1979	62	49.8	0.5	1705.19	740.01	739.97N	11.13E	740.06	N 0.86E	2.15
2041	62	49.9	0.9	1745.17	787.39	787.36N	11.71E	787.45	N 0.85E	0.52
2104	63	49.3	1.6	1786.00	835.37	835.32N	12.75E	835.42	N 0.87E	1.27
2166	62	48.9	1.8	1826.59	882.23	882.17N	14.14E	882.28	N 0.92E	0.69

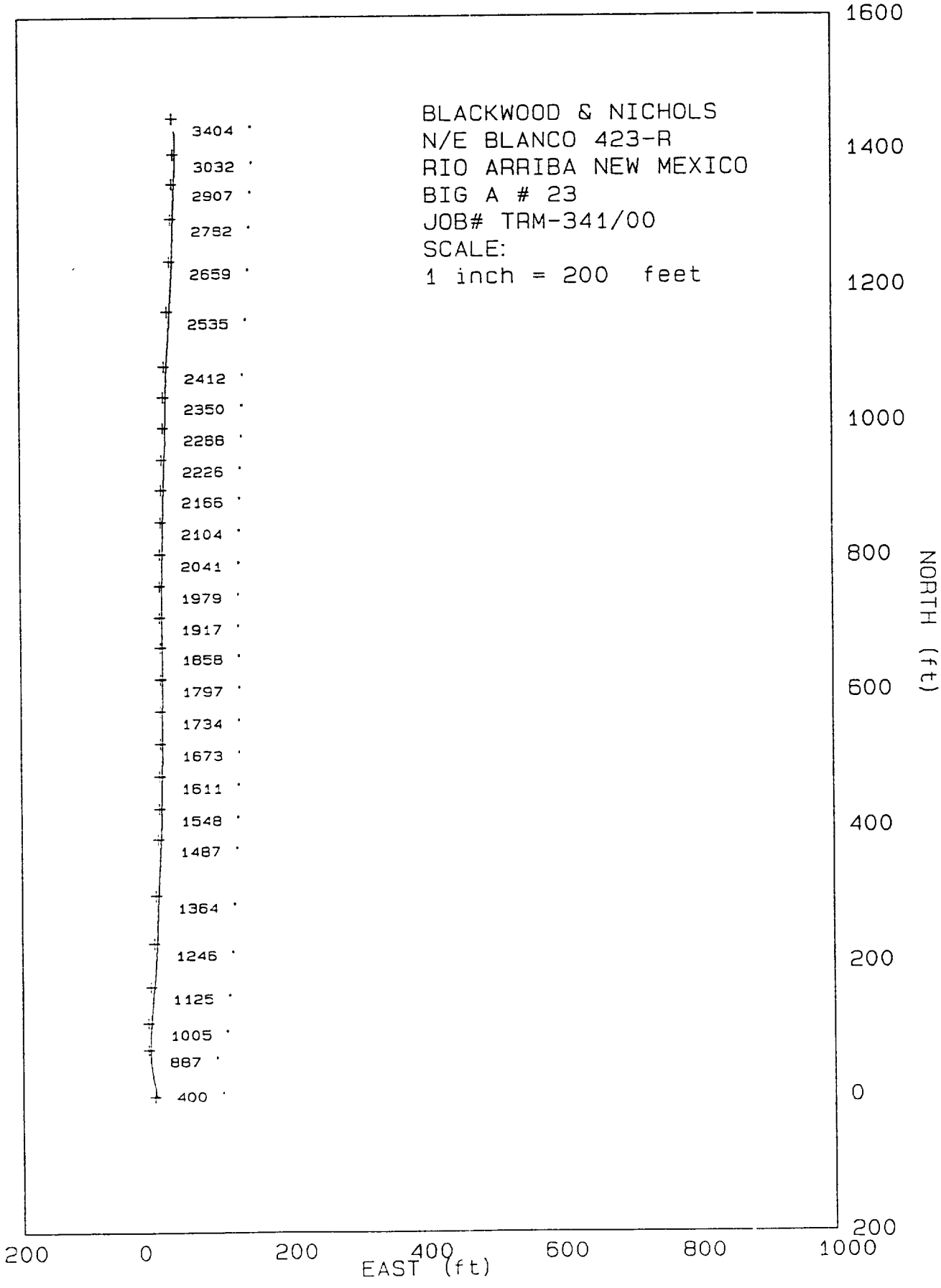
Company: BLACKWOOD & NICHOLS, Well: N/E BLANCO 423-R, Location: RIO ARRIBA NEW MEXICO, Rig: BIG A # 23

Meas Depth feet	Course Length feet	Incl deg	Azi deg	True Vert. Dp. feet	Vertical Section feet	Coordinates N/S feet	Coordinates E/W feet	Closure Distance feet	Closure Angle deg	Dog Leg Severity deg/100'
2226	60	48.9	1.6	1866.03	927.44	927.36N	15.48E	927.49	N 0.96E	0.25
2288	62	48.4	1.8	1907.00	973.98	973.88N	16.86E	974.03	N 0.99E	0.84
2350	62	47.8	1.3	1948.40	1020.13	1020.01N	18.11E	1020.17	N 1.02E	1.14
2412	62	44.0	2.0	1991.54	1064.65	1064.51N	19.39E	1064.69	N 1.04E	6.18
2444	32	42.8	2.7	2014.79	1086.63	1086.48N	20.29E	1086.67	N 1.07E	4.04
2535	91	39.6	3.7	2083.25	1146.54	1146.31N	23.62E	1146.56	N 1.18E	3.59
2596	61	35.9	3.4	2131.48	1183.85	1183.58N	25.93E	1183.87	N 1.26E	6.07
2659	63	34.5	2.0	2182.95	1220.16	1219.85N	27.65E	1220.17	N 1.30E	2.57
2720	61	30.9	2.3	2234.28	1253.10	1252.78N	28.88E	1253.11	N 1.32E	5.91
2782	62	27.2	2.3	2288.47	1283.20	1282.86N	30.09E	1283.21	N 1.34E	5.97
2845	63	24.4	2.3	2345.18	1310.62	1310.25N	31.19E	1310.62	N 1.36E	4.44
2907	62	22.4	1.6	2402.08	1335.24	1334.86N	32.03E	1335.24	N 1.37E	3.26
2970	63	20.3	2.3	2460.75	1358.17	1357.78N	32.81E	1358.17	N 1.38E	3.36

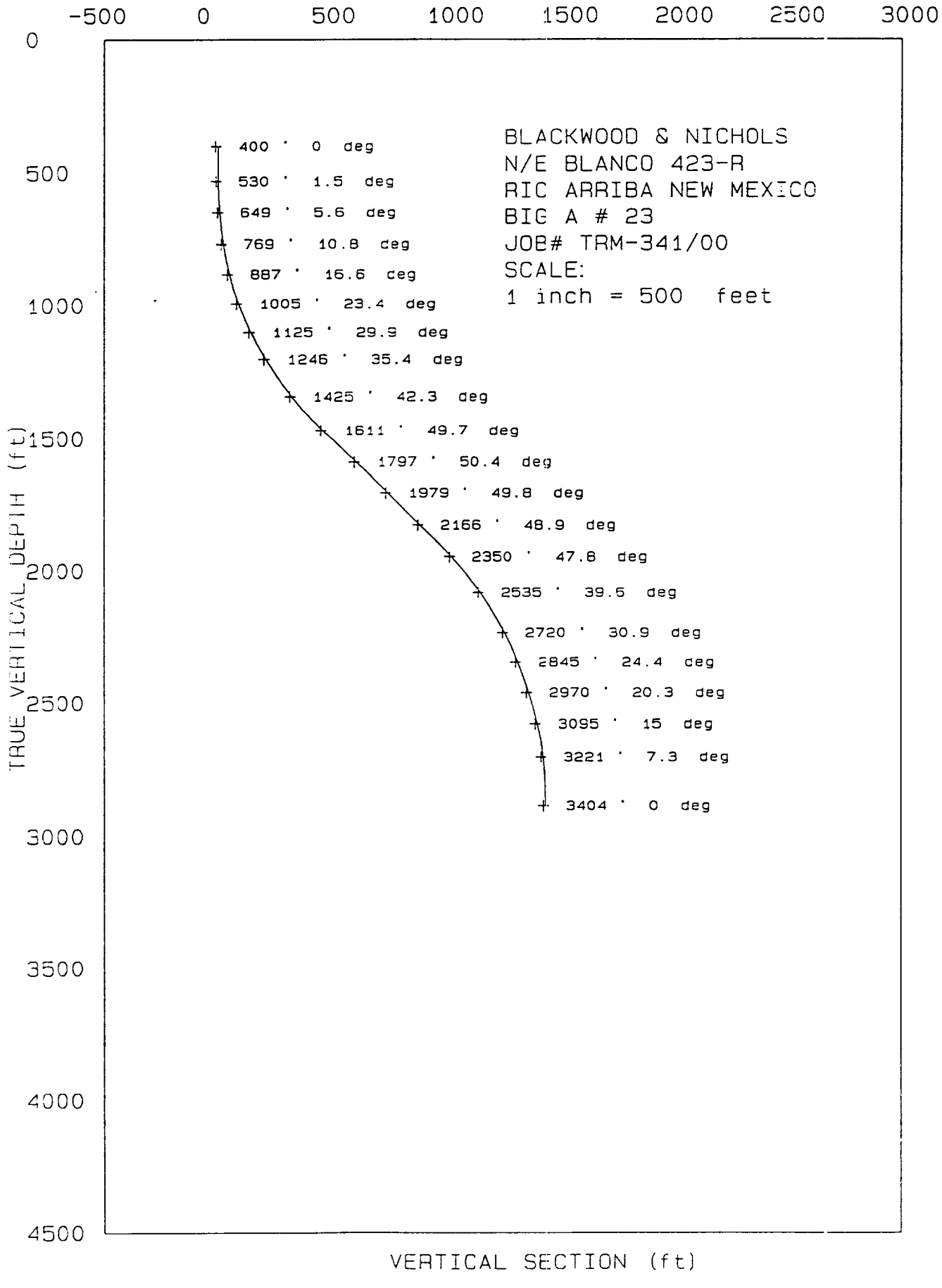
Company: BLACKWOOD & NICHOLS, Well: N/E BLANCO 423-R, Location: RIO ARRIBA NEW MEXICO, Rig: BIG A # 23

Meas Depth feet	Course Length feet	Incl deg	Azi deg	True Vert. Dp. feet	Vertical Section feet	Coordinates N/S feet	E/W feet	Closure Distance feet		Angle deg	Dog Leg Severity deg/100'
3032	62	18.1	2.7	2519.30	1378.56	1378.15N	33.69E	1378.56	N	1.40E	3.56
3095	63	15.0	0.9	2579.69	1396.50	1396.08N	34.28E	1396.50	N	1.41E	4.99
3158	63	11.3	359.5	2641.02	1410.82	1410.41N	34.36E	1410.83	N	1.40E	5.89
3221	63	7.3	358.4	2703.18	1420.99	1420.59N	34.19E	1421.00	N	1.38E	6.36
3283	62	4.3	351.8	2764.86	1427.22	1426.82N	33.75E	1427.22	N	1.35E	4.95
3342	59	1.7	354.8	2823.77	1430.27	1429.89N	33.35E	1430.27	N	1.34E	4.41
PROJECTED BOTTOM HOLE LOCATION											
3404	62	0.0	356.4	2885.76	1431.18	1430.80N	33.27E	1431.19	N	1.33E	2.74

TELECO Oilfield Services
PLAN VIEW



TELECO Oilfield Services
VERTICAL PROJECTION



County of: La Plata

State of: Colorado

Signature: Elizabeth Boyd

Elizabeth Boyd
Notary Public
Commission Expires 8-10-91

1-14-91
Date

484 Turner Drive
Durango, Coloardo 81301