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PR90/042

PETROFOCUS PTY LIMITED

ETINGIMBRA SOIL-GAS SURVEY

JANUARY 1990

SURVEY SUMMARY

SURVEY: MICROSEEPAGE.

ASK JOHN

ONSHORE

INTRODUCTION

Soil gas survey techniques are now being widely used by the petroleum exploration industry.

Anomalous concentrations of hydrocarbon gases were first reported above petroleum reservoirs in the 1930's (Laubmeyer, 1933; Sokolov, 1933; Horvitz, 1939). These results quickly lead to the development of techniques for use in petroleum exploration. In 1959 Sokolov summarized successful applications of the techniques in the U.S.S.R. as follows:

"Under favourable geological conditions, the proportion of correct predictions (from geochemical surveys) is rather high-about 70 percent. For instance, in the North Caucasus (Kuban), predictions made by gas surveys were confirmed in thirteen cases out of seventeen."

In the past, successful uses of geochemical techniques have been documented in the western literature. Results obtained by industry users in the course of normal exploration have commonly produced negative or, at best, equivocal results which have led the techniques to disfavour. In many instances the unsatisfactory results can be attributed to poor sample collection, storage, preparation and analytical procedures. Most importantly, however, results of many surveys have not been interpreted properly. There is, in general, a poor understanding of what can be expected from geochemical methods and, particularly, of their limitations.

Geochemical exploration techniques relies upon the vertical migration of light hydrocarbons that leak in trace amounts from petroleum reservoirs. The weight of evidence from reliable sources clearly demonstrates that vertical migration does, in fact, occur. It must now be conceded that light hydrocarbon gases do leak from at least some moderately deep to deep petroleum reservoirs and can be detected as microseeps located vertically above, or peripheral to, the surface projection of the reservoir as -

(i) free gas in the soil or absorbed to soil minerals (Debnam, 1969; Devine and Sears, 1977; Horvitz, 1972, 1979; Jones and Drozd, 1983; Richers et al., 1982; Rock, 1984; Matthews et al., 1984), or

(ii) as a chemical or mineralogical alteration of soil and surface rocks (Karstev, 1959; Donovan, 1974), or

(iii) in vegetation as either morphological or chemical effects (Donovan and Dalziel, 1977; Richers et al., 1982; Rock, 1984).

In addition, case studies conducted by Petrofocus since 1980 show, without a doubt, anomalous concentrations of light hydrocarbon gases directly above or immediately peripheral to the surface projection of many known petroleum reservoirs in Australia and North America.

SURVEY TECHNIQUES

In Petrofocus surveys, soil gas samples are carefully collected from depths ranging from 0.5 to 1 metres using a probe of proprietary design. The gas samples are carefully collected in syringes and analyzed in a portable laboratory at a nearby motel or field camp. Samples are analysed for the light alkanes, methane through N-Butane by a gas chromatographic technique. The sensitivity of the chromatograph, as presently employed, is approximately 0.5 ppmv methane, 0.05 ppmv ethane, 0.02 ppmv propane, and 0.005 ppmv butane. The alkane concentrations of samples are determined by comparison with known concentrations in a specially prepared gas standard.

INTERPRETATION OF RESULTS

Because of differences in the proportion of oil and gas from reservoir to reservoir, and in the composition of the oil and gas phases, together with differences in reservoir parameters and in soil characteristics from region to region, an attempt is always made to carry out orientation surveys over known reservoirs as close as possible to the survey area. By comparing results from the survey area with those from the known reservoir, an estimate can be made of the type of hydrocarbons giving rise to the micoseeps detected in the survey area. Estimates of the size of the hydrocarbon reservoir in the survey area are difficult to establish and can only be attempted within areas having closely similar reservoir and soil characteristics because the magnitude of an anomaly may be determined by the ease of the migration of gases from the reservoir, rather than by the volume of gas in the reservoir.

When an area is re-surveyed it is commonly found that the location and intensity of soil gas anomalies has changed somewhat. The reasons for this are not always simple, but commonly conditions under which the later surveys are conducted are different from those pertaining during the original survey. The greatest effects are experienced after substantial rainfall when soil gas concentrations are greatly reduced due to their being flushed out of the near-surface zone. Anomalous areas defined by the original survey are much subdued after rainfall but generally can still be distinguished over depressed background readings.

However, the interpretation of results of soil gas surveys is more concerned with the anomaly to background contrast rather than with the absolute magnitude of anomalies. Comparison with results obtained from over known reservoirs considerably facilitates interpretation of those obtained from survey areas, but when comparisons with known reservoirs in the same region is not undertaken, estimates of the commercial significance of soil gas anomalies cannot be reliably given.

TECHNICAL REFERENCES

Debnam, A.H., 1969. Geochemical prospecting for petroleum and natural gas in Canada. Geol. Surv. Can. Paper 64:15

Devine, S.B. and Sears, H.W., 1977. Soil hydrocarbon geochemistry, a potential exploration tool in the Cooper Basin, Australia. J. Geochem. Explor. 8, pp. 397-414.

Donovan, T.J., 1974. Petroleum microseepage at Cement, Oklahoma; evidence and mechanism. Bull., A.A.P.G., 58 pp. 429-446.

Donovan, T.J. and Dalziel, M.C., 1977. Late diagenetic indicators of buried oil and gas. U.S. Geol. Surv. Open File Rept. pp. 77-817.

Horvitz, L., 1939. On geochemical prospecting. Geophys. 4, pp. 210-225.

Horvitz, L., 1972. Vegetation and geochemical prospecting for petroleum. Bull. A.A.P.G. 56. pp. 925-940.

Horvitz, L., 1979. Near surface evidence of hydrocarbon movement from depth. In Problems of Petroleum Migrations. A.A.P.G. Stud. Geol., 10, pp. 241-270.

Jones, V.T. and Drozd, R.J., 1983. Predictions of oil or gas potential by near-surface geochemistry. A.A.P.G. Bull. 67, pp. 932-952.

Karstev, A.A., Tabasaranski, Z.A., Subbota, M.I. and Mogilevzkii, G.A., 1959. Geochemical methods of prospecting and exploration for petroleum and natural gas. UCLA Press.

Laubmeyer, G., 1933. A new geophysical prospecting method, especially for deposits of hydrocarbons. Petroleum, 29, pp. 1-4.

Matthews, M.D., Jones, V.T., and Richers, D.M., 1984. Remote Sensing and surface hydrocarbon seepage. Remote Sensing for Exploration Geology Conference, Colorado Springs, April 1984. Environmental Research Institute of Michigan, pp. 1-6.

Richers, D.M., Reed, R.J., Horstman, K.C., Michels, G.D., Baker, R.N., Lundel, L., and Marrs, R.W., 1982. Landsat and soil-gas geochemical study of Patrick Draw field, Sweetwater County, Wyoming. A.A.P.G. Bull., 66 pp.

903-922.

Rock, B.N., 1984. Remote detection of geobotanical anomalies associated with hydrocarbon microseepage. Remote Sensing for Exploration Geology Conference, Colorado Springs, CO., April 1984. Environmental Research Institute of Michigan, p. 24.

Sokolov, V.A., 1933. New prospecting method for petroleum and gas. Technika. Feb. Bull. NGRI No. 1.

INTERPRETATION

1. MCDILLS AREA

Seventysix (76) soil-gas samples were taken in the McDills anticlinal region. These consisted of three (3) east-west traverses and one (1) north-south traverse all along seismic lines shot in 1987.

Profiles showing the distribution of C2 to C4 along all 4 traverses are enclosed. Close inspection of these profiles shows that there are no clusters or anomalous high values on any traverse. Indeed C2 to C4 values are generally very low.

The highest concentration of C1 and C2 occurred at station 140 which was located close to the old McDill #1 well which is today a free-flowing artesian bore. This bore has created its own lake which is up to 1 mile long. We believe that the higher concentrations of C1 and C2 found at station 140 are associated with gas brought to the surface by the McDills artesian waters.

Slightly higher than average values of C1 and C2 also occurred at stations 136 and 137 located near the top of the McDills structure.

2. ETINGIMBRA AREA

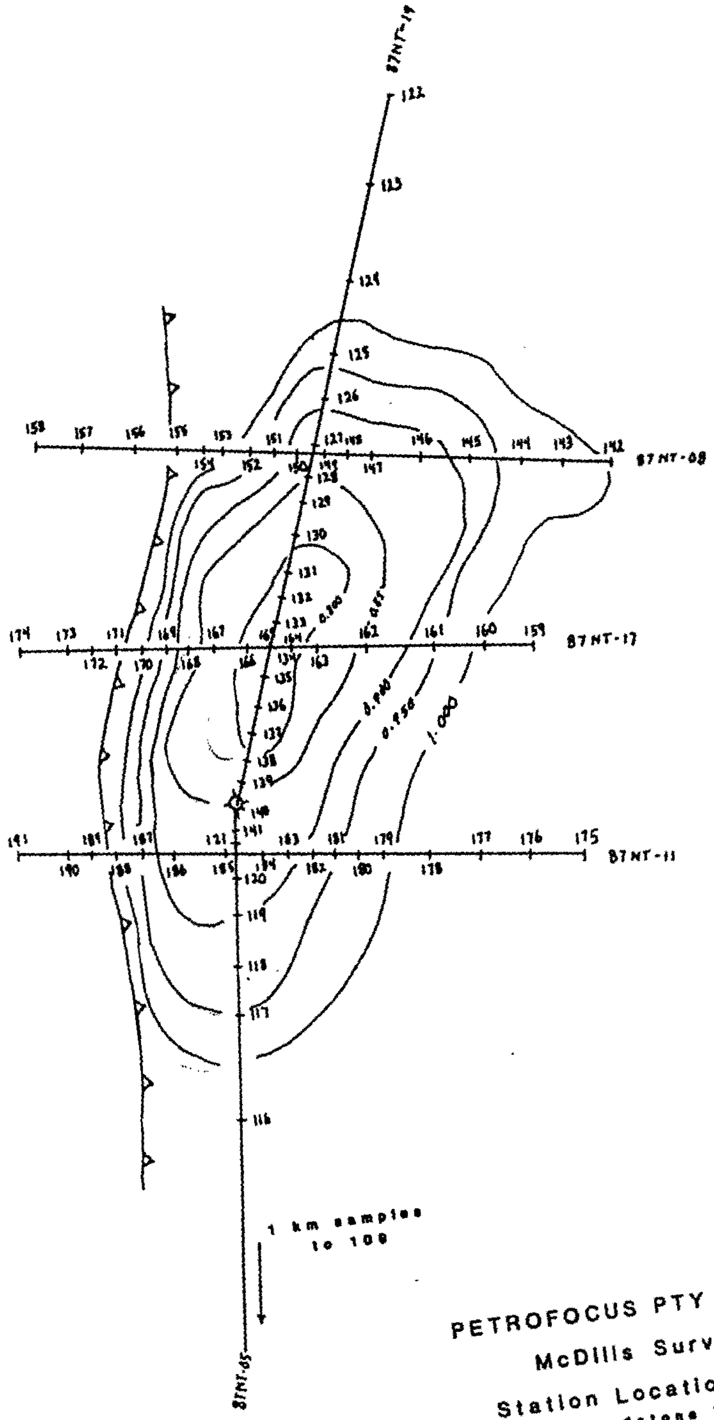
One hundred and twenty-four (124) samples were taken in the Etingimbra anticlinal area. These consisted of 4 traverses of samples taken along 1987 seismic lines.

Profiles showing the distribution of C2 to C4 values along these traverses are enclosed. Once again, no obvious clusters of anomalous C1 to C4 values were found to occur.

The east-west profile along seismic line 87NT-16 is of general interest. Here slightly higher concentrations of C1 to C4 occur in and around the fault that bounds the western side of the Etingimbra structure. These higher values were repeated during a traverse made on the last day of the survey (samples 192-200).

Some higher values of C1 to C4 also occurred near this fault on the seismic line 87NT-15 (station 72), and on seismic line 87 NT3 (stations 22-25).

From these results we conclude that there is probably still some leakage of mainly C1 and C2 associated with the fault bordering the west side of the Etingimbra structure.



PETROFOCUS PTY LIMITED

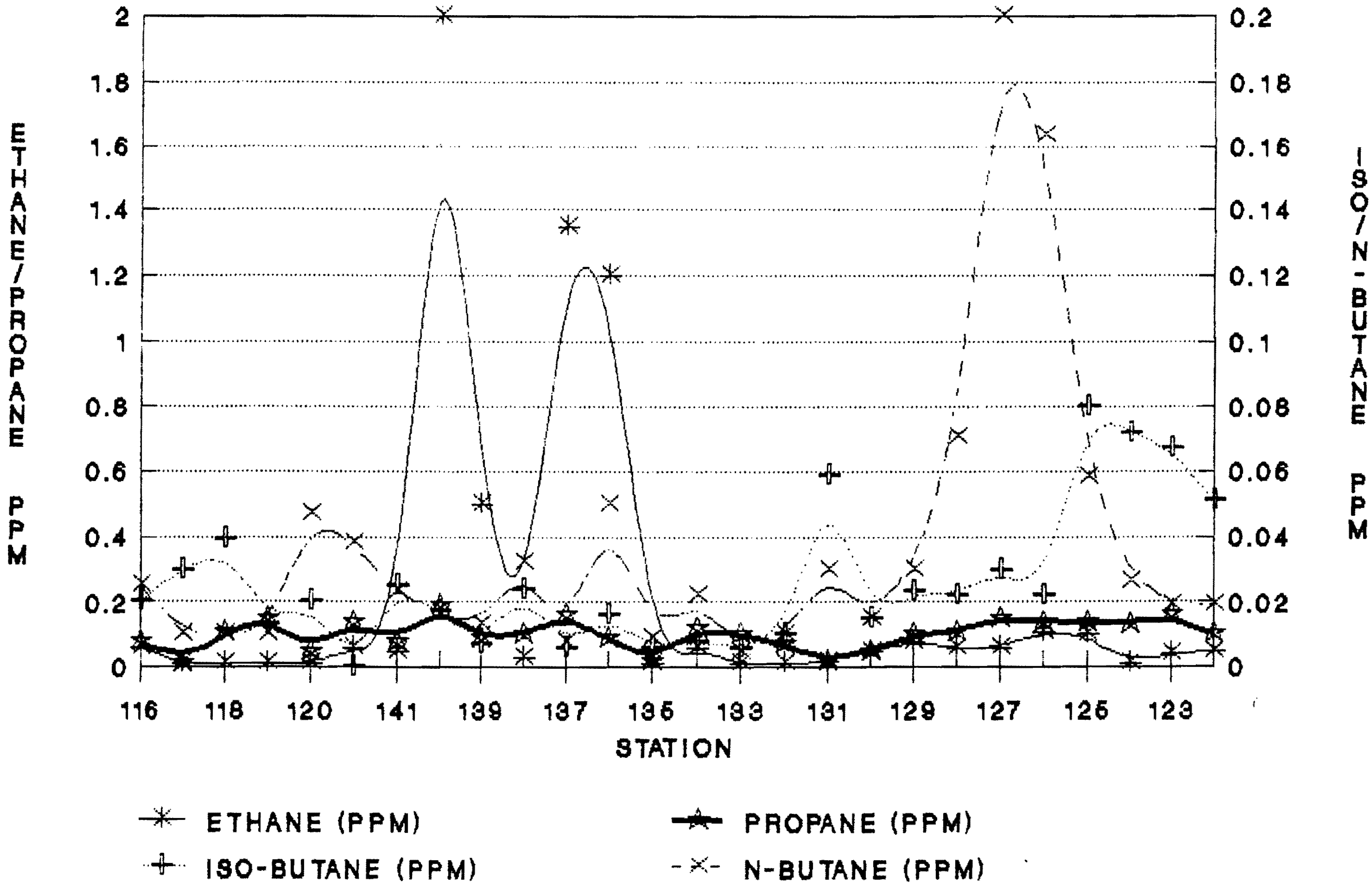
McDills Survey

Station Location Map

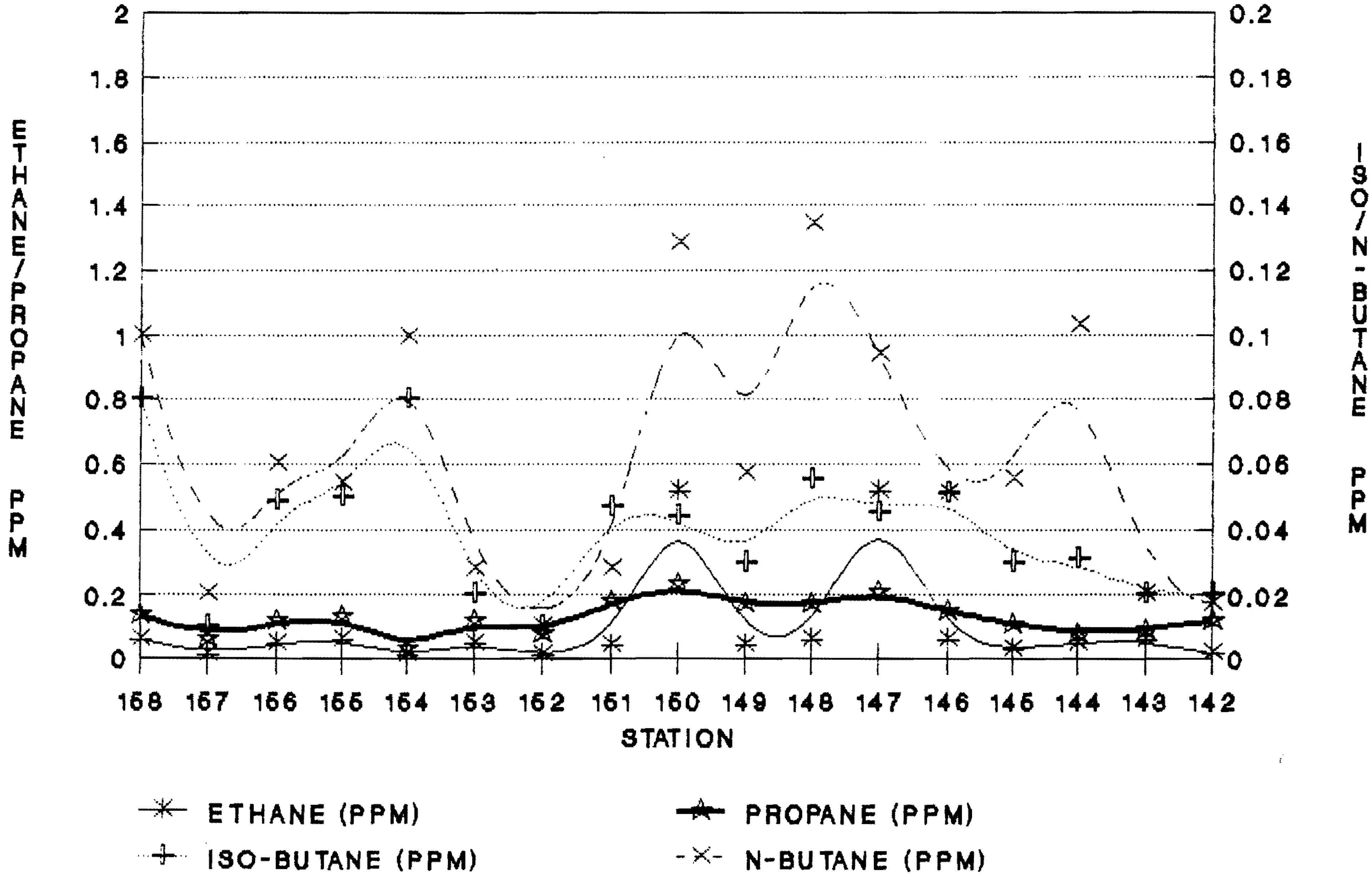
(With Langra Sandstone Time Structure)

Jan. 1990

HORIZON OPERATING COMPANY
MCDILLS STRUCTURE
N-S SOIL GAS PROFILE (SAMPLES 116-141)

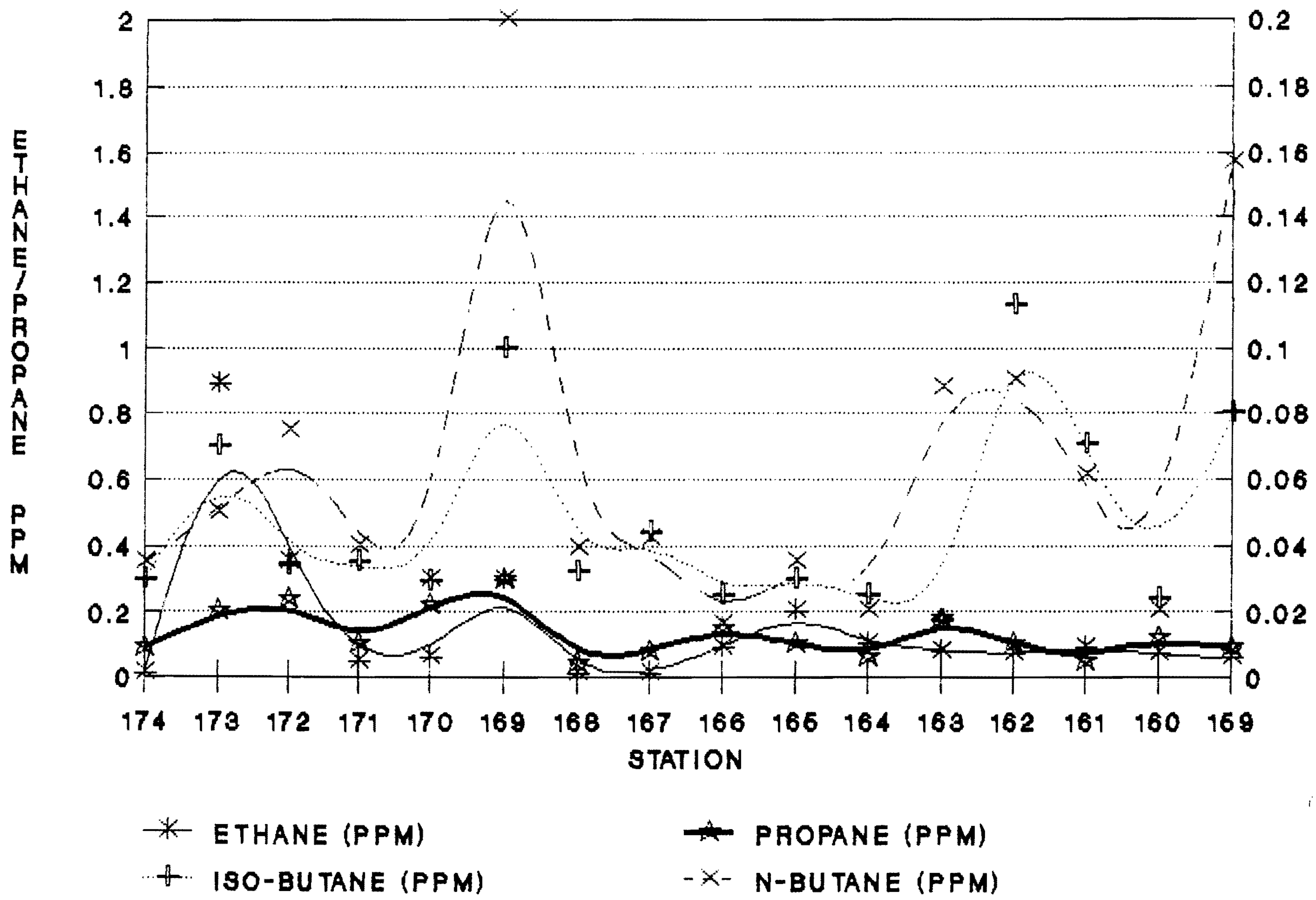


HORIZON OPERATING COMPANY
MCDILLS STRUCTURE
E-W SOIL GAS PROFILE (SAMPLES 142-158)



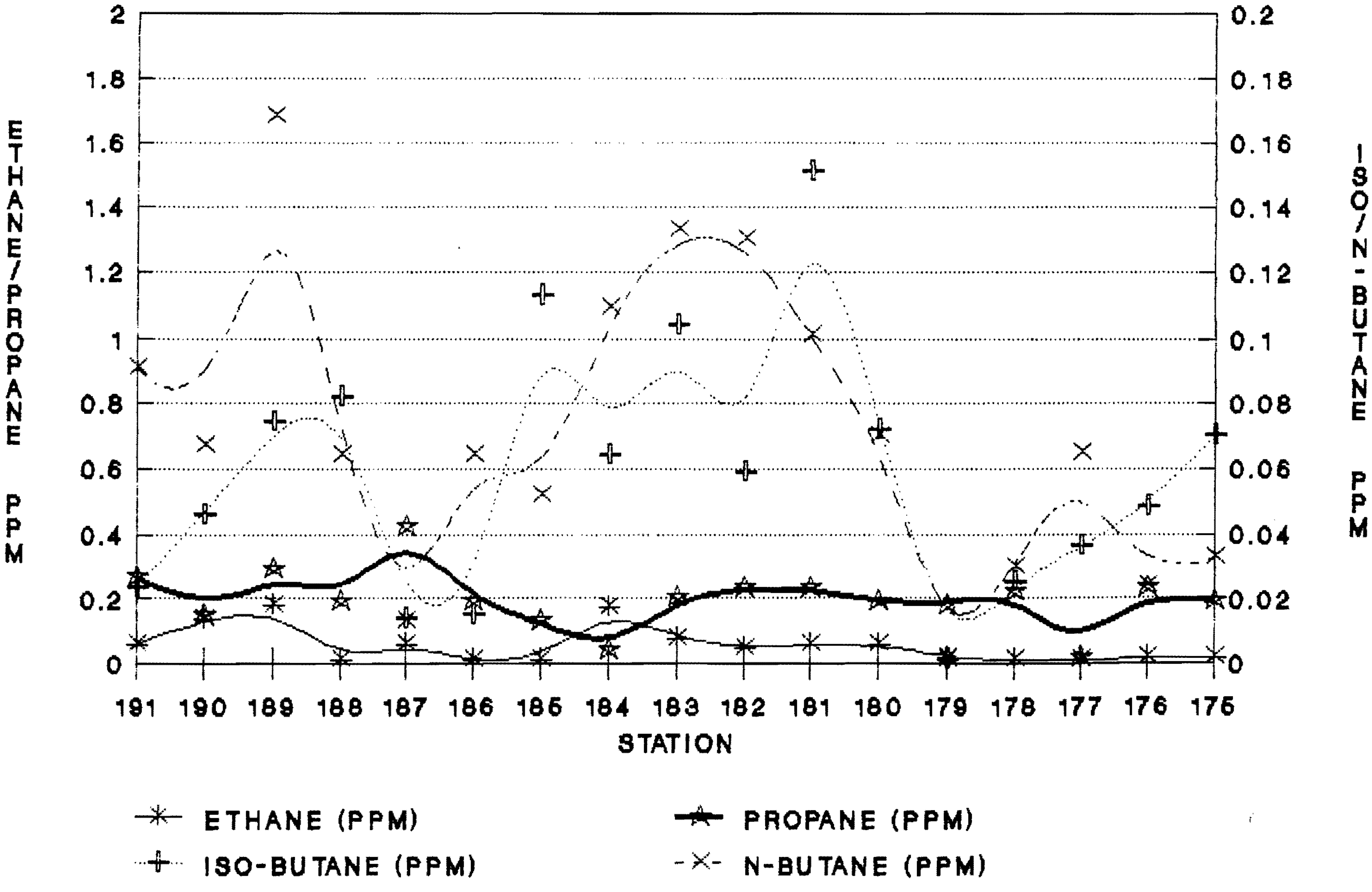
SAMPLES TAKEN ON 1/15/90

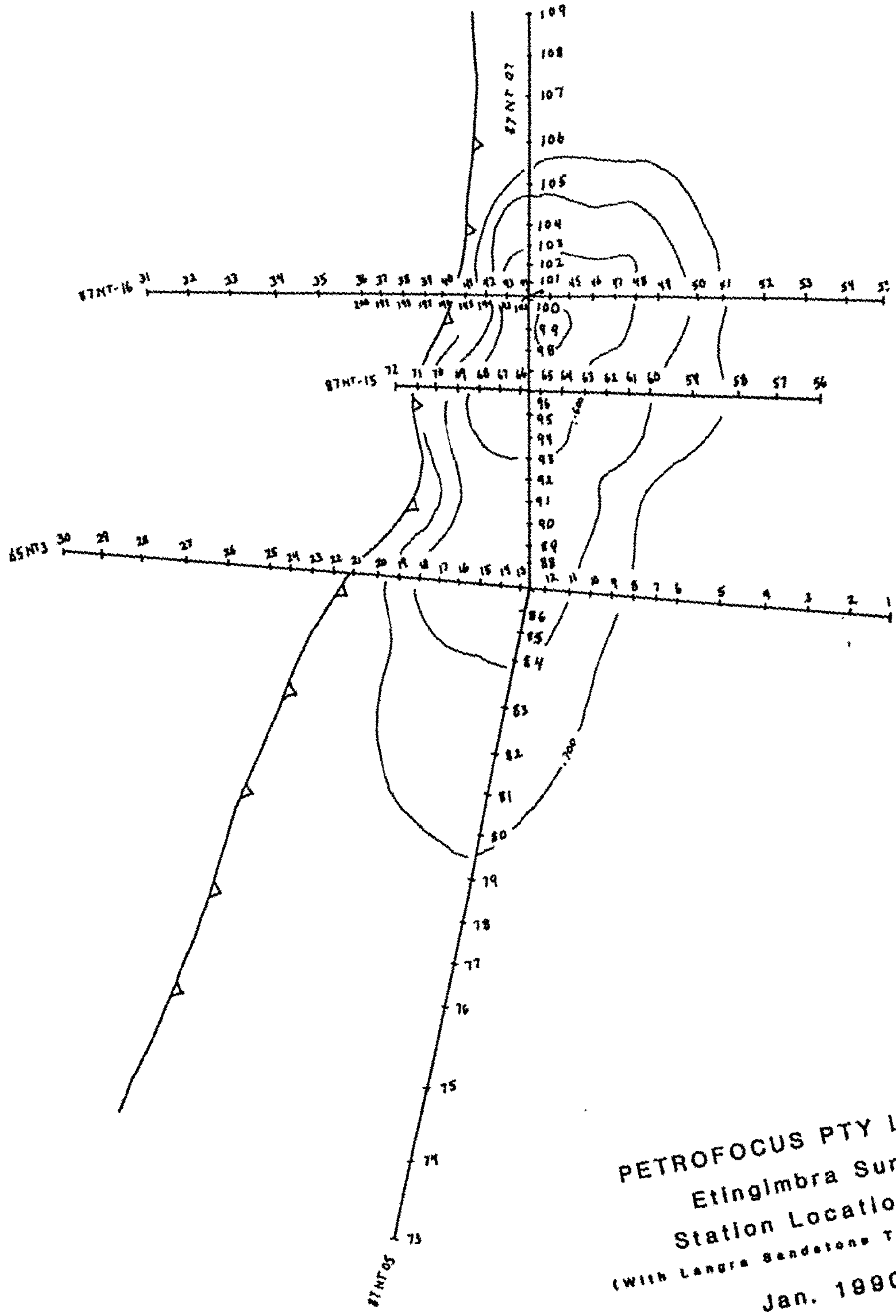
MCDILLS STRUCTURE
E-W SOIL GAS PROFILE



SAMPLES TAKEN ON 1/16/90
LEAST SQUARES CURVE

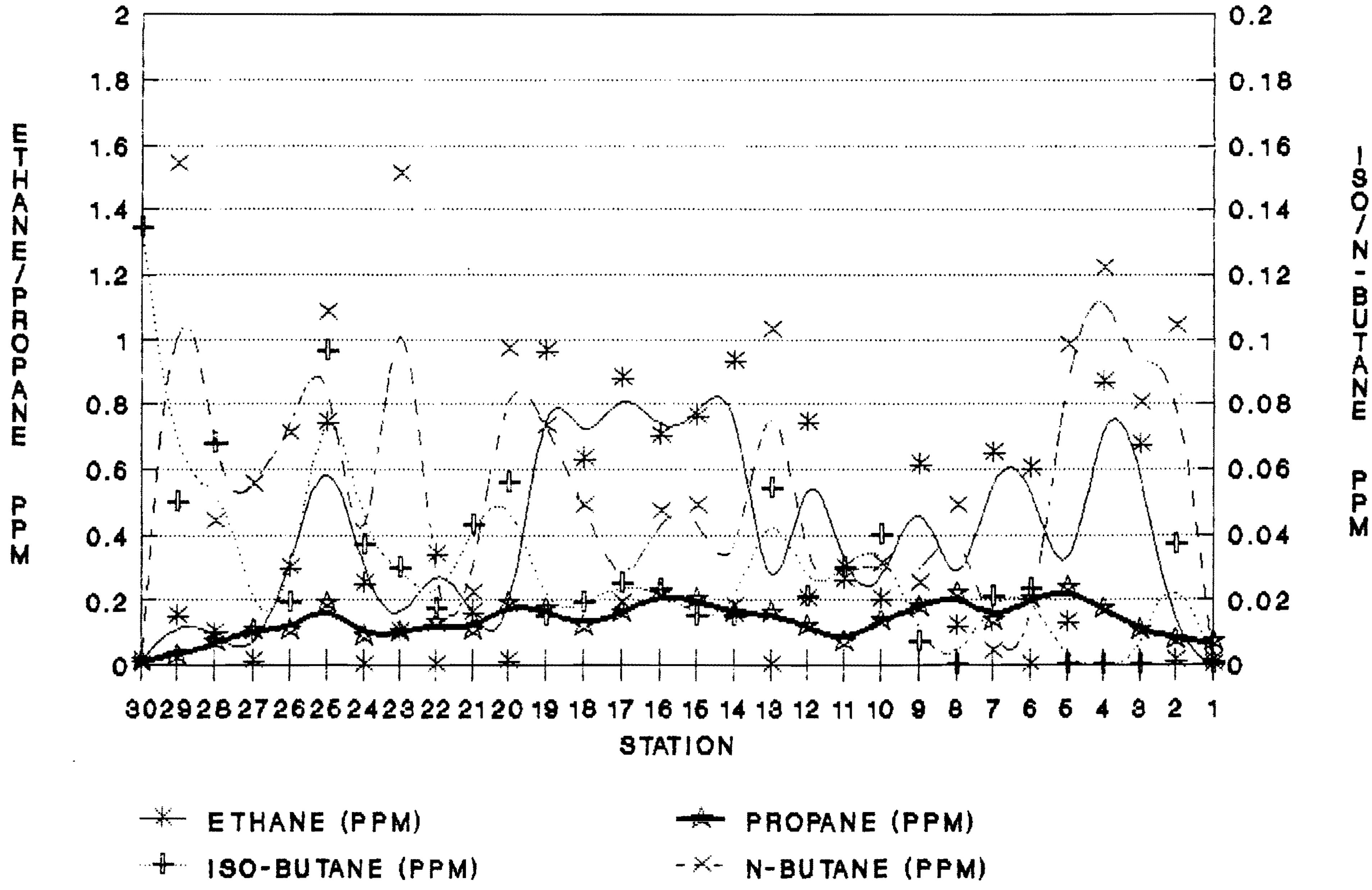
HORIZON OPERATING COMPANY
MCDILLS STRUCTURE
E-W SOIL GAS PROFILE (SAMPLES 175-191)





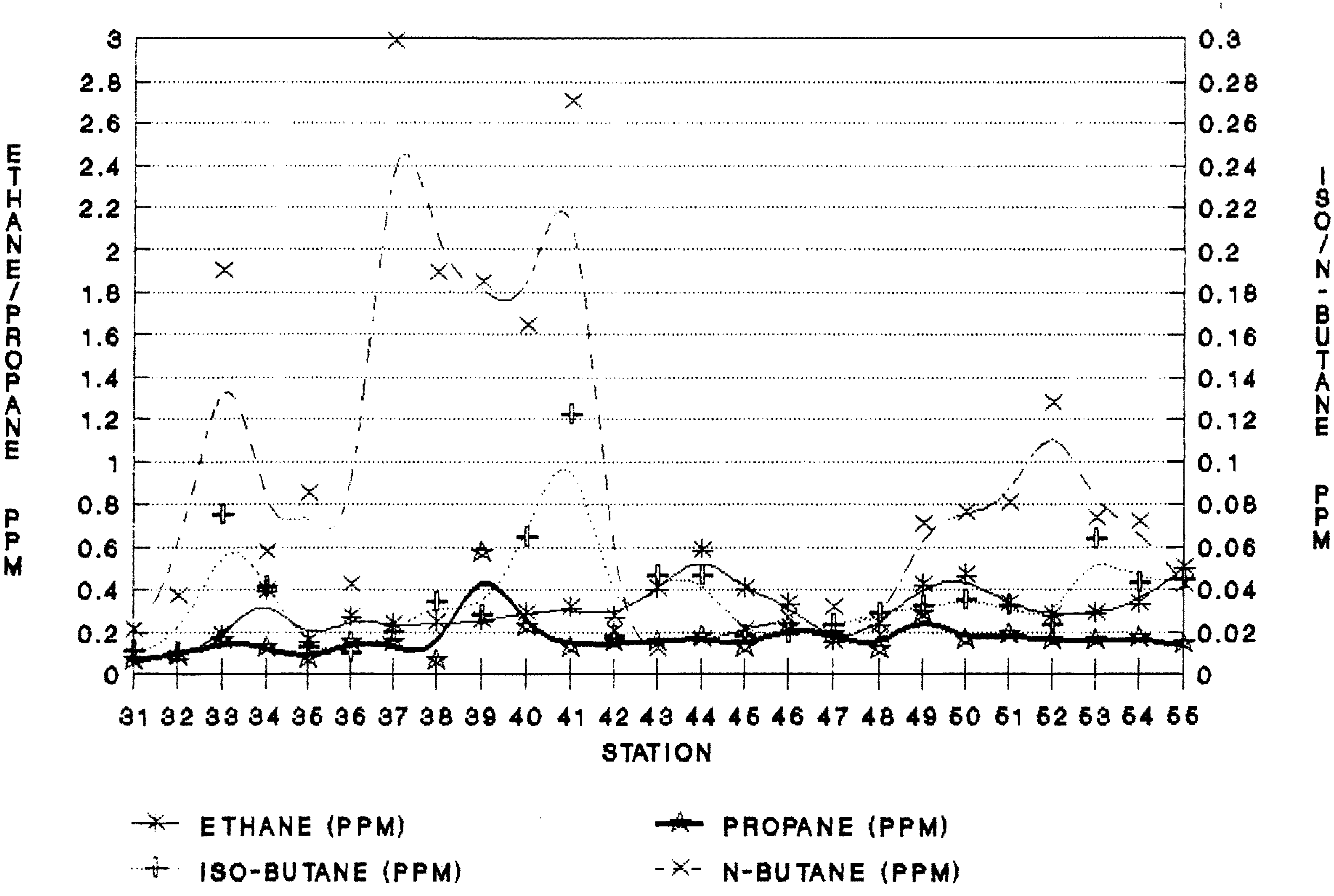
PETROFOCUS PTY LIMITED
Etingimbra Survey
Station Location Map
(With Langra Sandstone Time Structure)
Jan. 1990

HORIZON OPERATING COMPANY
ETINGIMBRA #1 WELL
SOIL GAS PROFILE (SAMPLES 1-30)



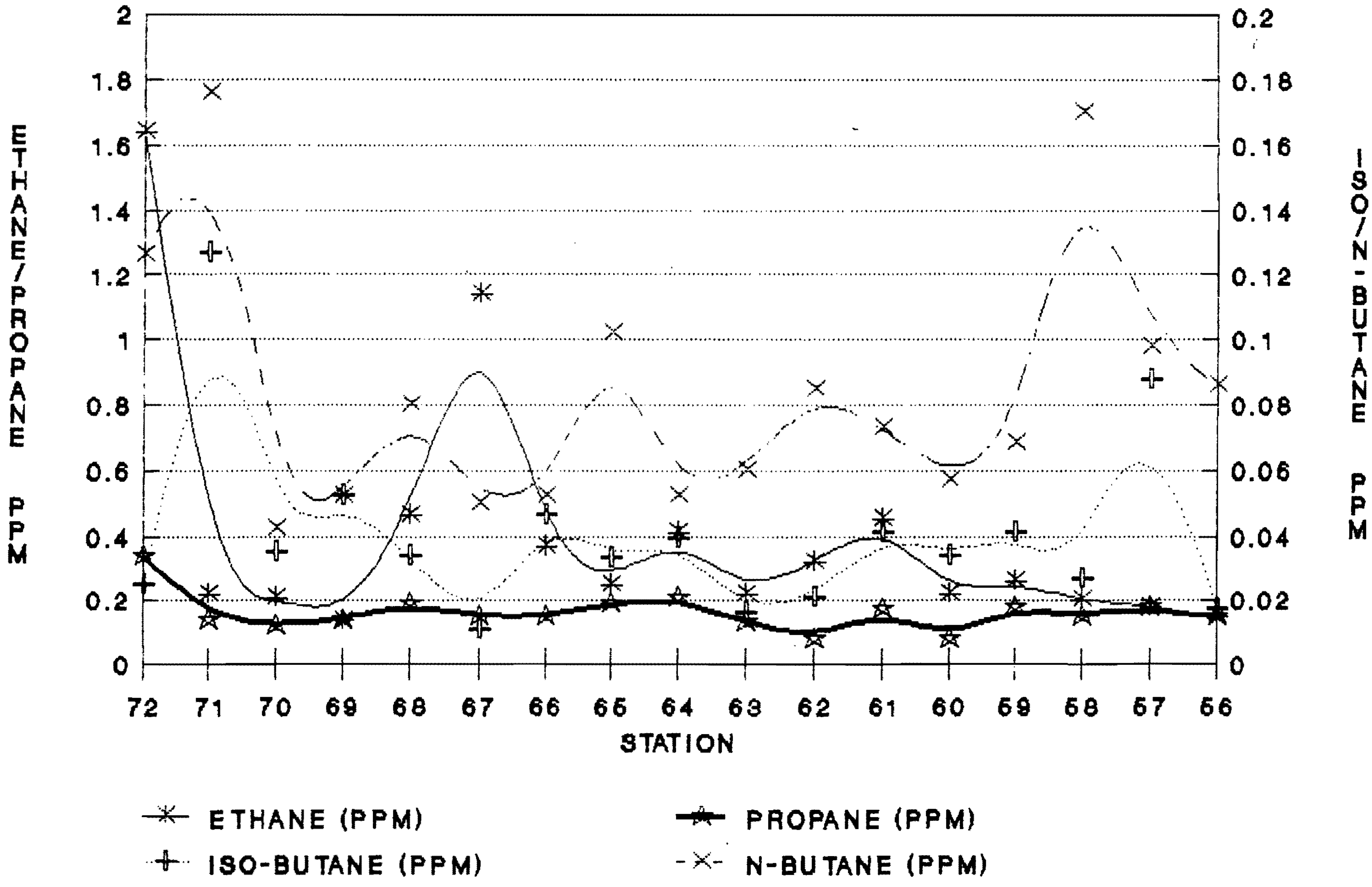
SAMPLES TAKEN ON 1/12/90

HORIZON OPERATING COMPANY
ETINGIMBRA #1 WELL
SOIL GAS PROFILE (SAMPLES 31-55)



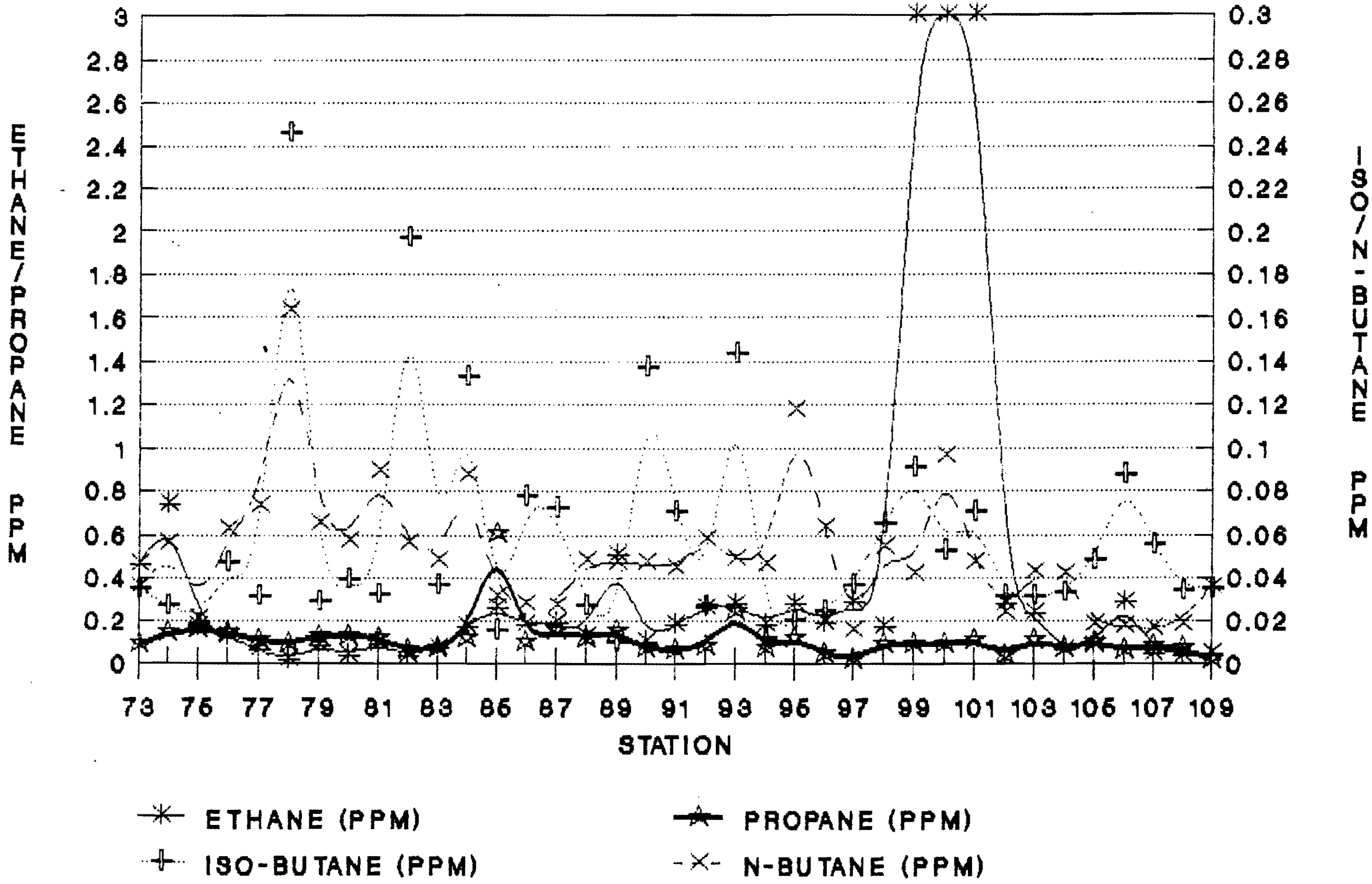
SAMPLES TAKEN ON 1/13/90

HORIZON OPERATING COMPANY
ETINGIMBRA #1 WELL
SOIL GAS PROFILE (SAMPLES 56-72)



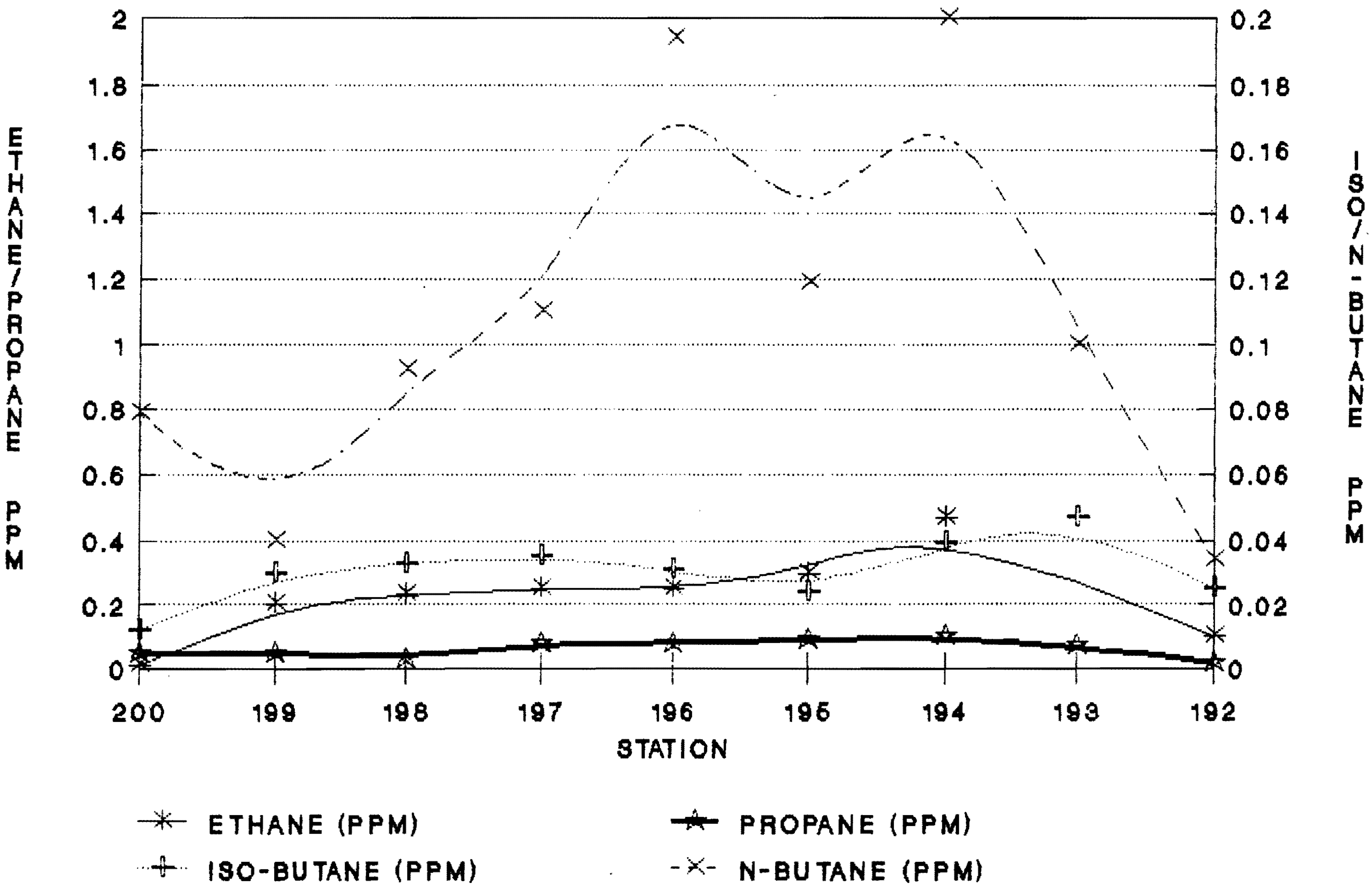
SAMPLES TAKEN ON 1/13/90

ETINGIMBRA #1 WELL
N-S SOIL GAS PROFILE (SAMPLES 73-109)



SAMPLES TAKEN ON 1/13/90

ETINGIMBRA #1 WELL
REPEAT SOIL GAS PROFILE (SAMPLES 192-20)



SAMPLES TAKEN ON 1/17/90

WEATHER

OVERCAST
VERY HUMID

PETROFOCUS PTY LIMITED

44 Margaret Street
Sydney NSW 2000
Tel: (02) 290-3919

Client HORIZON
Survey Area ETINGIMBRA
Line No.
Date 12.1.90
Operator BCF

11

SAMPLE NO.	C_1	C_2	C_3	C_4ISO	C_4N	DRAW	DEPTH	SLOPE	SOIL	COMPACTION	MOISTURE Wet Damp Dry	VEGET.
P1						*				1 2 3 4 5	Wet Damp Dry	
1	3.2	0.01	0.07	–	–	1	1	F	Sand	1 (2) 3 4 5	Wet Damp (Dry)	Scrub
2	5.3	0.01	0.08	0.037	0.104	2	1	F	"	1 (2) 3 4 5	Wet Damp (Dry)	"
3	6.6	0.67	0.11	–	0.080	2	1	S	"	1 (2) 3 4 5	Wet Damp (Dry)	"
4		0.87	0.17	–	0.122	2	1	F	"	1 (2) 3 4 5	Wet (Damp) Dry	"
5	8.0	0.13	0.24	–	0.098	1.5	1	F	"	1 (2) 3 4 5	Wet Damp (Dry)	"
6	10.2	0.6	0.20	0.023	–	1.5	1	S	"	1 (2) 3 4 5	Wet (Damp) Dry	"
7	6.5	0.65	0.14	0.021	0.004	1.5	1	F	"	1 (2) 3 4 5	Wet (Damp) Dry	"
8	9.1	0.12	0.22	–	0.049	2.5	1	F	"	1 (2) 3 4 5	Wet (Damp) Dry	"
9	15.6	.61	0.18	0.007	0.025	2.5	1	>	"	1 (2) 3 4 5	Wet (Damp) Dry	"
P10						*				1 2 3 4 5	Wet Damp Dry	
10	12.8	0.20	0.14	0.040	0.031	2.5	1	S	"	1 (2) 3 4 5	Wet (Damp) Dry	
11	8.9	0.26	0.07	0.030	0.030	1.5	.9	F	"	1 2 (3) 4 5	Wet (Damp) Dry	"
12	6.8	0.74	0.12	0.021	0.020	2.0	1	"	"	1 (2) 3 4 5	Wet (Damp) Dry	"
13	23.06	1.00	0.16	0.054	0.103	"	"	"	"	1 (2) 3 4 5	Wet (Damp) Dry	"
14	23.13	0.94	0.16	0.015	0.018	1.5	1	"	"	1 (2) 3 4 5	Wet (Damp) Dry	"
15	15.1	0.76	0.20	0.015	0.049	2.0	1	"	"	1 (2) 3 4 5	Wet (Damp) Dry	"
16	17.64	0.70	0.22	0.023	0.047	1.5	1	"	"	1 (2) 3 4 5	Wet (Damp) Dry	"
17	21.2	0.88	0.16	0.025	0.019	1.5	"	"	"	1 (2) 3 4 5	Wet (Damp) Dry	"
18	12.3	0.63	0.12	0.019	0.049	1	0.8	S	"	1 2 (3) 4 5	Wet (Damp) Dry	"
19	16.0	0.96	0.17	0.015	0.073	*1.5	0.8	F	"	1 (2) (3) 4 5	Wet (Damp) Dry	"
P20	~~0.74~~					*				1 2 3 4 5	Wet Damp Dry	
20	0.74	0.01	0.19	0.055	0.097	2.0	0.6	F	"	1 2 (3) 4 5	Wet (Damp) Dry	
21	3.9	0.16	0.11	0.049	0.022	2.0	0.9	F	"	1 (2) 3 4 5	Wet (Damp) Dry	"
22	10.9	0.34	0.13	0.017	–	2.5	1	F	"	1 (2) 3 4 5	Wet (Damp) Dry	"
23	6.7	~~0.40~~	0.10	0.030	0.151	2.0	1	F	"	1 (2) 3 4 5	Wet (Damp) Dry	"
24	1.4	0.25	0.086	0.037	–	3.0	0.7	F	"	1 2 (3) 4 5	Wet (Damp) Dry	"
25	13.6	0.74	0.19	0.096	0.108	2.0	0.9	F	"	1 (2) 3 4 5	Wet (Damp) Dry	
26	3.7	0.30	0.11	0.019	0.071	1.5	1.0	F	"	1 (2) 3 4 5	Wet (Damp) Dry	"
27	4.7	0.01	0.11	0.01	0.055	1	1	F	"	1 (2) 3 4 5	Wet (Damp) Dry	
28	6.0	0.104	0.07	0.068	0.044	1	1	F	"	1 (2) 3 4 5	Wet (Damp) Dry	
29	1.2	0.15	0.03	0.050	0.154	*1	1	F	"	1 (2) 3 4 5	Wet (Damp) Dry	
P30	~~[illegible]~~					*				1 2 3 4 5	Wet Damp Dry	
30	1.1	0.01	0.01	0.134	/	1	1	F	"	1 (2) 3 4 5	Wet Damp (Dry)	
31										1 2 3 4 5	Wet Damp Dry	

EATHER

CLEAR
SUNNY
SLIGHT BREEZE

PETROFOCUS PTY LIMITED

44 Margaret Street
Sydney NSW 2000
Tel: (02) 290-3919

Client: HORIZON
Survey Area: [illegible]
Line No. 87NT - 16
Date: 13-1-90
Operator: BCT

2/

SAMPLE NO.	C_1	C_2	C_3	C_4ISO	C_4N	DRAW	DEPTH	SLOPE	SOIL	COMPACTION	MOISTURE Wet Damp Dry	VEGET.
31										1 2 3 4 5	Wet Damp Dry	
31	7.0	0.08	0.06	0.011	0.021	2	0.9	S/E	Sandy	(2)	(Dry)	Spinifex
32	2.4	0.07	0.09	0.01	0.037	.5	1.0	F	"	(2)	(Damp/Dry)	"
33	17.4	0.18	0.16	0.075	0.190	1.5	0.9	F	"	(3)	(Dry)	"
34	12.4	0.39	0.13	0.041	0.057	1	.1	F	"	(3)	(Dry)	"
35	2.5	0.15	0.07	0.033	0.085	1.5	0.9	"	"	(3)	(Dry)	"
36	11.9	0.27	0.15	0.010	0.042	2.5	1	S/E	"	(3)	(Dry)	"
37	16.3	0.23	0.15	0.020	0.298	1.5	1	F	"	(2)	(Dry)	"
38	15.8	0.24	0.06	0.034	0.189	2.0	1	"	"	(2)	(Dry)	"
39	12.1	0.25	0.57	0.028	0.184	1.0	0.9	"	"	(2)	(Dry)	"
40	21.1	0.29	0.22	0.064	0.164	1	1	"	"	(2)	(Dry)	"
40	~~8.7~~	—	~~0.13~~	~~0.122~~	~~0.270~~					1 2 3 4 5	Wet Damp Dry	
41	8.7	0.31	0.13	0.122	0.270	1.5	1	S/W	"	(2)	(Dry)	"
42	12.0	0.27	0.15	0.018	0.020	2.0	1	"	"	(2)	(Dry)	"
43	17.6	0.20	0.15	0.046	0.012	2.5	1	"	"	(2)	(Dry)	"
44	5.0	0.58	0.18	0.016	0.016	3.0	0.8	F	"	(3)	(Dry)	"
45	10.5	0.40	0.13	0.018	0.021	1.5	0.8	S/W	"	(3)	(Dry)	"
46	9.7	0.33	0.22	0.019	0.026	1.5	0.9	S/E	"	(2)	(Dry)	"
47	6.8	0.15	0.19	0.023	0.031	2.3	1.0	S/E		(2)	(Dry)	
48	6.4	0.23	0.12	0.029	0.018	2.4	1.0	S/E	"	(2)	(Dry)	"
49	12.8	0.42	0.29	0.032	0.070	3	0.8	S/W	"	(3)	(Dry)	"
50										1 2 3 4 5	Wet Damp Dry	
50	14.3	0.46	0.16	0.035	0.076	1.4	0.9	S/W	"	(3)	(Dry)	"
51	12.8	0.33	0.19	0.032	0.080	2.0	1.0	S/W	"	(3)	(Dry)	"
52	2.4	0.28	0.16	0.023	0.127	2.0	1.0	S/W	"	(3)	(Dry)	"
53	6.4	0.29	0.16	0.063	0.073	1.5	0.9	F	"	(3)	(Dry)	"
54	4.6	0.33	0.17	0.043	0.071	1	1	S/E	"	(2)	(Dry)	"
55	13.6	0.50	0.14	0.045	0.042	1	1	S/W	"	(3)	(Dry)	"
	87 NT - 15									1 2 3 4 5	Wet Damp Dry	
56	6.7	0.15	0.15	0.017	0.026	1	1	S/W	"	(2)	(Dry)	"
57	6.2	0.18	0.18	0.058	0.098	1.5	1	S/E	"	(2)	(Dry)	"
58	11.8	0.20	0.15	0.027	0.170	3.0	1	F	"	(2)	(Dry)	"
59A	22.1	0.40	0.24	0.065	0.056	2.5	1	F	"	(2)	(Dry)	"
59	11.7	0.26	0.18	0.041	0.068	2	1	S/W	"			
260										1 2 3 4 5	Wet Damp Dry	"
20	[illegible]	0.21	0.08	0.034	0.057	2	0.8	S/W		(3)	(Dry)	"
										1 2 3 4 5	Wet Damp Dry	

...THER

PETROFOCUS PTY LIMITED
44 Margaret Street
Sydney NSW 2000
Tel: (02) 290-3919

Client ____________
Survey Area ____________
Line No. NT87-15
Date 13-1-90
Operator TSC

3/

SAMPLE NO.	C_1	C_2	C_3	C_4ISO	C_4N	DRAW	DEPTH	SLOPE	SOIL	COMPACTION	MOISTURE (Wet Damp Dry)	VEGET.
1	16.4	0.45	0.17	0.041	0.073	2	1	S/W	S(N)	2	Dry	Nitx
62	6.1	0.32	0.081	0.021	0.085	1.5	1	F	"	2	Dry	"
3	16.8	0.22	0.126	0.016	0.060	1.5	0.9	FS/W	"	2	Dry	"
64	27.8	0.41	0.21	0.039	0.052	2.5	0.9	S/W	"	2	Dry	"
5	16.2	0.25	0.19	0.033	0.102	3.0	0.8	F	"	3	Dry	"
66	10.9	0.37	0.15	0.046	0.052	4	0.7	S/W	"	4	Dry	"
7	15.3	1.14	0.15	0.011	0.050	2	1.0	S/E	"	2	Dry	"
68	21.6	0.46	0.19	0.034	0.080	2	1	S/E	"	2	Dry	"
69	12.9	0.14	0.14	0.052	0.052	2	1	S/W	"	2	Dry	"
70										1 2 3 4 5	Wet Damp Dry	
70	15.4	0.21	0.12	0.035	0.042	1.5	1	S/W	"	2	Dry	"
71	15.01	0.22	0.14	0.027	0.176	2.0	1	S/E	"	2	Dry	"
72	25.9	1.64	0.34	0.025	0.126	2.5	1	S/E	"	2	Dry	"
		87NT - 05		14-1-90						1 2 3 4 5	Wet Damp Dry	
P73										1 2 3 4 5	Wet Damp Dry	
73	16.6	0.46	0.09	0.035	0.036	.5	1	flat	"	2	Dry	"
74	20.2	0.74	0.14	0.027	0.056	2.0	1	flat	"	2	Dry	"
75	10.2	0.17	0.16	0.018	0.021	3.0	1	"	"	2	Dry	"
76	17.1	0.13	0.14	0.047	0.062	3.0	.9	"	"	3	Dry	"
77	17.2	0.06	0.11	0.031	0.073	2.0	1	"	"	2	Dry	"
78	20.7	0.02	0.09	0.246	0.163	0.5	1	"	"	2	Dry	"
79	18.5	0.08	0.13	0.029	0.065	1.0	1	"	"	2	Dry	"
80	6.3	0.04	0.13	0.039	0.057	0.5	1	"	"	2	Dry	"
81	10.9	0.09	0.12	0.032	0.089	1.5	1	"	"	2	Dry	"
82	1.7	0.04	0.06	0.197	0.056	0.5	0.8	"	"	3	Dry	"
P82						...		..		1 2 3 4 5	Wet Damp Dry	
83	11.8	0.07	0.07	0.037	0.048	2.8	1	"	"	2	Dry	"
84	8.0	0.17	0.12	0.133	0.087	1.5	.9	"	"	2	Dry	"
85	8.7	0.26	0.61	0.015	0.031	1.5	1	"	"	2	Dry	"
86	7.9	0.18	0.10	0.078	0.028	1.5	.9	"	"	2	Dry	"
87	2.9	0.19	0.16	0.072	0.027	2	.8	"	"	3	Dry	"
88	4.9	0.13	0.12	0.027	0.048	0.5	.8	"	"	3	Dry	"
89	15.0	0.51	0.15	0.010	0.047	0.5	1	"	"	2	Dry	"
90	1.5	0.10	0.07	0.137	0.047	0.5	1	"	"	2	Dry	"
91	1.1	0.18	0.06	0.070	0.045	0.5	1	"	"	2	Dry	"
92	2.6	0.26	0.06	0.027	0.058	0.8	0.8	"	"	3	Dry	"

P93

EATHER

PETROFOCUS PTY LIMITED

44 Margaret Street
Sydney NSW 2000
Tel: (02) 290-3919

Client [illegible]
Survey Area [illegible]
Line No. 07
Date
Operator

*

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SAMPLE NO.	C_1	C_2	C_3	C_4ISO	C_4N	DRAW	DEPTH	SLOPE	SOIL	COMPACTION	MOISTURE Wet Damp Dry	VEGET.
93	15.0	0.28	0.24	0.143	0.049	1.5	1	flat	red sand	1 (2) 3 4 5	Wet Damp (Dry)	sparse
94	11.3	0.18	0.07	0.012	0.046	2.0	.8	"	"	1 (2 3) 4 5	Wet Damp (Dry)	"
95	29.4	0.28	0.12	0.020	0.118	.5	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
96	12.9	0.19	0.05	0.024	0.063	1.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
97	2.9	0.29	0.02	0.037	0.015	0.4	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
98	11.02	0.17	0.09	0.065	0.054	0.8	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
99	39.6	6.35	0.09	0.091	0.042	1.2	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
100	56.3	10.6	0.09	0.053	0.096	0.5	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
101	52.9	5.42	0.11	0.070	0.047	0.5	1.2	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
			15-1-90		87 NT	-07				1 2 3 4 5	Wet Damp Dry	
P102	—	—		—	—	--				1 2 3 4 5	Wet Damp Dry	
102	27.7	0.28	0.04	0.031	0.023	1.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
103	30.8	0.23	0.11	0.031	0.043	1.5	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
104	18.5	0.06	0.07	0.033	0.042	1.5	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
105	10.8	0.08	0.10	0.048	0.018	2.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
106	12.5	0.29	0.06	0.087	0.017	3.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
107	1.7	0.05	0.08	0.055	0.016	1.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
108	1.0	0.04	0.07	0.034	0.018	0.6	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
109	5.8	0.05	0.02	0.035	0.036	0.8	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
110	13.9	0.06	0.12	0.021	0.037	0.4	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
111	3.0	0.07	0.10	0.051	0.040	1	0.8	"	"	1 (2 3) 4 5	Wet Damp (Dry)	"
P112	—					—	—	—	—	1 2 3 4 5	Wet Damp Dry	"
112	5.1	0.09	0.10	0.048	0.096	2.0	1	ft	"	1 (2) 3 4 5	Wet Damp (Dry)	"
113	3.0	0.08	0.05	0.049	0.059	1.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
114	13.5	0.07	0.13	0.029	0.021	1.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
115	1.7	0.03	0.07	0.024	0.029	2.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
116	2.9	0.06	0.08	0.020	0.025	2.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
117	11.1	0.01	0.01	0.030	0.040	0.4	.9	"	"	1 (2 3) 4 5	Wet Damp (Dry)	"
118	2.9	0.01	0.11	0.039	0.010	1.4	.8	"	"	1 (2 3) 4 5	Wet Damp (Dry)	"
119	3.3	0.01	0.15	0.013	0.010	0.6	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
120	0.9	0.01	0.05	0.020	0.047	2.8	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
121	4.4	0.06	0.14		0.038	0.5	.8	"	"	1 (2 3) 4 5	Wet Damp (Dry)	"
P122						—	—	—	—	1 2 3 4 5	Wet Damp Dry	
122	5.0	0.05	0.10	0.051	0.019	1.5	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
123	3.1	0.04	0.16	0.067	0.014	1.5	.9	"	"	1 (2 3) 4 5	Wet Damp (Dry)	"
124	3.4	0.01	0.13	0.072	0.026	2.5	1	"	"	1 (2) 3 4 5	Wet Damp Dry	

FATHER

Clear
Warm?

PETROFOCUS PTY LIMITED

44 Margaret Street
Sydney NSW 2000
Tel: (02) 290-3919

Client HORIZON
Survey Area [illegible]
Line No.
Date 15-1-90
Operator BCA

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SAMPLE NO.	C_1	C_2	C_3	C_4ISO	C_4N	DRAW	DEPTH	SLOPE	SOIL	COMPACTION	MOISTURE Wet Damp Dry	VEGET.
125	2.3	0.010	0.14	0.080	0.058	.5	.9	flat	ck	1 (2) 3 4 5	Wet Damp (Dry)	"
126	1.6	0.11	0.14	0.022	0.163	.6	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
127	1.7	0.06	0.15	0.030	0.206	1	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
128	4.3	0.06	0.11	0.022	0.071	0.6	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
129	1.5	0.08	0.10	0.023	0.030	1.5	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
130	1.7	0.05	0.05	0.015	0.015	.4	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
131	3.4	0.02	0.02	0.059	0.030	1.5	1	"	"	(1) 2 3 4 5	Wet Damp (Dry)	"
P132				16-1-90	87	NT-19		—	—	1 2 3 4 5	Wet Damp Dry	
132	1.0	0.01	0.07	0.010	0.010	1.6	0.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
133	1.0	0.01	0.10	0.006	0.005	1.0	0.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
134	10.6	0.06	0.12	0.008	0.022	3.1	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
135	1.0	0.01	0.02	0.006	0.009	0.4	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
136	24.8	1.20	0.09	0.016	0.050	0.5	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
137	30.3	1.35	0.16	0.006	0.008	0.6	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
138	19.7	0.03	0.10	0.024	0.032	1.5	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
139	17.9	0.50	0.09	0.007	0.013	3.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
140	50.0	8.77	0.19	0.017	0.016	2.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
141	1.8	0.05	0.08	0.025	0.023	2.0	1	"	"	(1 2) 3 4 5	Wet Damp (Dry)	"
142P	~~1.0~~	~~0.02~~	~~0.03~~	~~0.061~~	~~0.813~~		—	—	—	1 2 3 4 5	Wet Damp Dry	
142	14.9	0.02	0.12	0.020	0.017	0.4	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
143	17.0	0.06	0.09	0.020	0.020	0.4	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
144	8.0	0.05	0.08	0.031	0.103	0.7	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
145	2.3	0.03	0.11	0.030	0.055	0.6	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
146	15.3	0.06	0.15	0.051	0.051	0.6	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
147	20.6	0.52	0.21	0.065	0.094	1.8	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
148	14.1	0.06	0.17	0.055	0.134	0.5	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
149	2.7	0.04	0.17	0.030	0.057	1.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
150	13.8	0.52	0.23	0.044	0.128	2.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
151	1.7	0.04	0.18	0.047	0.028	1.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
152P	0					~~0.7~~	~~.9~~			~~1 (2) 3 4 5~~	Wet Damp (Dry)	"
152	2.1	0.01	0.08	0.010	0.010	0.7	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
153	1.3	0.05	0.12	0.020	0.028	0.4	1	"	"	1 2 3 4 5	Wet Damp (Dry)	"
154	1.0	0.01	0.03	0.080	0.099	1.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
155	1.6	0.06	0.13	0.050	0.054	0.4	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
156	2.3	0.05	0.12	0.049	0.060	1.2	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
157	1.4	0.01	0.06	0.010	0.010	0.3	.8	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"

44 Margaret Street
Sydney NSW 2000
Tel: (02) 290-3919

Survey Area ______
Line No. ______
Date ______
Operator ______

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6/7

SAMPLE NO.	C_1	C_2	C_3	C_4ISO	C_4N	DRAW	DEPTH	SLOPE	SOIL	COMPACTION	MOISTURE	VEGET.
158	1.6	0.06	0.14	0.080	0.100	.6	.9	f	[illegible]	1 (2) 3 4 5	Wet Damp (Dry)	[illegible]
159P						—	—	—	—	1 2 3 4 5	Wet Damp Dry	
159	1.8	0.06	0.08?	0.080	0.157	1.5	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
160	2.0	0.07	0.12	0.024	0.020	1.8	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
161	1.1	0.09	0.05	0.071	0.061	1.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
162	1.1	0.07	0.10	0.113	0.090	1.5	.8	"	"	1 2 (3) 4 5	Wet Damp (Dry)	"
163	1.7	0.08	0.18	0.019	0.088	3.4	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
164	1.0	0.10	0.06	0.025	0.020	0.3	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
165	3.4	0.20	0.10	0.030	0.035	1	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
166	2.0	0.09	0.15	0.025	0.016	0.8	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
167	1.0	0.01	0.08	0.044	0.042	1.1	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
168	1.0	0.01	0.04	0.032	0.039	0.6	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
169P						—	—	—	—	1 2 3 4 5	Wet Damp Dry	
169	8.9	0.30	0.30	0.100	0.200	3.6	1	"	"	1 (2)(3) 4 5	Wet Damp (Dry)	"
170	1.6	0.06	0.22	0.029	0.030	2.8	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
171	1.2	0.05	0.10	0.035	0.040	2.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
172	1.7	0.35	0.24	0.034	0.075	2.8	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
173	1.5	0.89	0.20	0.070	0.050	2.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
174	1.0	0.01	0.09	0.030	0.035	0.6	.7	"	"	1 2 (3) 4 5	Wet Damp (Dry)	"
175	7.4?	0.02	0.14	0.070	0.033	0.6	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
176	1.1	0.02	0.23	0.048	0.024	0.8	.8	"	"	1 2 (3) 4 5	Wet Damp (Dry)	"
177	1.0	0.01	0.02	0.03?	0.065	0.5	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
178	1.5	0.01	0.22	0.025	0.030	0.6	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
179P						—	—	—	—	1 2 3 4 5	Wet Damp Dry	
179	1.1	0.02	0.18	0.001	0.001	1.5	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
180	1.9	0.06	0.14	0.072?	0.070	1.0	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
181	1.0	0.06	0.23	0.151	0.401	2.2	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
182	1.4	0.05	0.23	0.059	0.130	3.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
183	1.2	0.08	0.20	0.104	0.133	1.5	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
184	1.0	0.17	0.04	0.064?	0.109	0.7	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
185	1.0	0.01	0.13	0.113	0.052	1.8	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
186	2.0	0.01	0.14	0.045?	0.064	2.2	.7	"	"	1 2 (3) 4 5	Wet Damp (Dry)	"
187	1.5	0.06	0.42	0.014	0.013	1	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
188	1.0	0.01	0.19	0.082	0.064	0.4	.8	"	"	1 2 (3) 4 5	Wet Damp (Dry)	"
189	1.3	0.18	0.29	0.074	0.168	0.5	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"

WEATHER

PETROFOCUS PTY LIMITED

44 Margaret Street
Sydney NSW 2000
Tel: (02) 290-3919

Client ____________
Survey Area ____________
Line No. ____________
Date ____________
Operator ____________

7/7

SAMPLE NO.	C_1	C_2	C_3	C_4ISO	C_4N	DRAW	DEPTH	SLOPE	SOIL	COMPACTION	MOISTURE	VEGET.
								flat	red sand		Wet Damp Dry	Sparse
191	8.2	0.06	0.27	0.023	0.091	4.0	.7	"	"	1 2 (3) 4 5	Wet Damp Dry	"
191P	.	- -	- - - -	-	——	——	——	——	——	1 2 3 4 5	Wet Damp Dry	
192A	13.8	0.10	0.02	0.025	0.034	2.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
192B	10.7	0.12	0.03	0.035	0.047	2.5	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
192P						——	——	——	——	1 2 3 4 5	Wet Damp Dry	
193	11.3		0.07	0.067	0.100	2.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
194	9.9	0.47	0.10	0.039	0.214	3.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
195	9.0	0.30	0.09	0.024	0.119	3.0	1	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
196	11.0	0.25	0.08	0.031	0.194	0.6	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
197	21.3	0.25	0.08	0.035	0.110	1.2	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
198	1.5	0.23	0.03	0.033	0.092	2.1	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
199	1.6	0.20	0.05	0.020	0.040	1.4	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
200	1.4	0.010	0.05	0.012	0.079	2.8	.9	"	"	1 (2) 3 4 5	Wet Damp (Dry)	"
										1 2 3 4 5	Wet Damp Dry	
										1 2 3 4 5	Wet Damp Dry	
										1 2 3 4 5	Wet Damp Dry	
										1 2 3 4 5	Wet Damp Dry	
										1 2 3 4 5	Wet Damp Dry	
										1 2 3 4 5	Wet Damp Dry	
										1 2 3 4 5	Wet Damp Dry	
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										1 2 3 4 5	Wet Damp Dry	
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										1 2 3 4 5	Wet Damp Dry	
										1 2 3 4 5	Wet Damp Dry	
										1 2 3 4 5	Wet Damp Dry	
										1 2 3 4 5	Wet Damp Dry	
										1 2 3 4 5	Wet Damp Dry	