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Dec. 4, 1979.

PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

REPORT
RESERVES AND GRADE OF COAL
IN THE
BONNET PLUME BASIN
YUKON TERRITORY

NTS 106-E

65° 30' N, 135° W

COAL EXPLORATION LICENCES

NOS. 72-73 and 77-98

Prepared by: O. Cullingham - Senior Geologist - Coal
and
D. Hope - Contract Geologist

Pan Ocean Report No. 25-79
November, 1979

ADDENDUM

Please note that Maps E-0767 to E-0770 inclusive listed under "LIST OF MAPS AND ILLUSTRATIONS" in the Table of Contents were not completed in time and will be finished when available.

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SUMMARY AND CONCLUSIONS

In 1977 coal was discovered by Pan Ocean personnel in the Bonnet Plume Basin located in the Yukon Territory. Subsequently Pan Ocean acquired control over 24 coal licences covering a total of 387,308 hectares (957,024 acres). Follow-up reconnaissance mapping and drilling during the 1978 field season established the basin as a potential source of a large quantity of high quality thermal coal. In 1979 a major drilling programme was intitiated which further established the potential of the basin and delineated sufficient reserves in one selected area - Illtyd Creek Deposit - to support a mine-mouth power development.

Investigations to-date show the Bonnet Plume Basin to contain a coalfield of major proportions containing high quality thermal coal in sufficient quantity to supply a viable electric power base in the Yukon Territory for its immediate needs and future growth for many years to come.

Measured, indicated and inferred in situ reserves in excess of 380 million tonnes have been established in four deposit areas (Table I).

Saleable tonnes of coal were calculated only for the Illtyd Creek Deposit, assuming:

Case a) a product derived from strip mining to a maximum cut-off ratio of 10:1 (cubic metres of rock to tonnes of coal), and

Case b) a product derived from underground mining to a depth of 300 metres below the surface.

For Case a) approximately 37.7 million tonnes of measured saleable coal have been calculated (Table VI). This coal has the following specifications:

TABLE I

PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

SUMMARY TABLE OF IN SITU GEOLOGICAL RESERVES

RESERVE AREA	AVERAGE TOTAL COAL THICKNESS (m)	AVERAGE TOTAL AREA (ha)	TONNES $\times 10^6$
MEASURED			
Illtyd Deposit (block B)	12.95	720	121
TOTAL MEASURED			121
INDICATED			
Illtyd Deposit (block B)	12.55	178	29
Wernecke Deposit (block A)	15.16	203	40
Airstrip Deposit (block C)	10.39	495	66
Wind River Deposit (block D)	25.26	104	34
TOTAL INDICATED			169
TOTAL MEASURED AND INDICATED			289
INFERRED			
Wernecke Deposit (block A)	17.80	180	33
Airstrip Deposit (block C)	2.64	825	28
Wind River Deposit (block D)	12.64	186	31
TOTAL INFERRED			92
TOTAL MEASURED, INDICATED AND INFERRED			381

TABLE VI

PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

ILLTYD CREEK DEPOSIT (BLOCK B)

SUMMARY OPEN PIT - MINEABLE RESERVE DATA - TO A CUT-OFF WASTE TO COAL TO BASE OF SEAM 3 OF 10:1

	AVERAGE THICKNESS (m)	TOTAL AREA (m^2)	IN-SITU MINEABLE TONNES	RESERVES TO 10:1 CUT-OFF					SALES SPECIFICATIONS				
				AREA (m^2)	IN-SITU TONNES	LESS GEOLOGICAL LOSSES (Where Applicable)	MINING RECOVERABLE TONNES	YIELD @ 1.90sg	SALES TONNES	RM %	ASH %	VOL. %	FC %	SPECIFIC ENERGY BTU's/LB
MEASURED														
No. 1 SEAM	6.96	7,060,921	63,866,892	3,088,400	29,921,617	461,843	27,986,785	62.2	17,306,318	5.0	20.1	32.9	42.1	9,089
No. 2 SEAM	3.66	7,190,298	34,179,153	3,652,800	20,930,741	894,436	18,032,675	79.2	14,239,234	5.3	13.3	34.7	46.5	10,019
No. 3 SEAM	2.33	7,353,723	22,880,741	3,449,600	12,178,611	400,647	10,600,168	58.6	6,175,422	4.9	19.2	32.6	43.0	9,185
TOTALS	12.91	21,604,944	120,926,786	10,190,800	63,030,969	1,756,926	56,619,627	68.0	37,720,974	5.1	17.0	33.6	44.2	9,511
INDICATED														
No. 1 SEAM	6.43	1,917,936	16,036,047	122,600	1,257,472	125,747	1,075,139	66.4	713,629	5.0	13.5	35.1	45.9	10,124
No. 2 SEAM	3.70	1,449,035	6,965,081	122,600	1,054,074	105,407	853,800	79.5	678,607	5.3	13.2	34.1	46.9	10,167
No. 3 SEAM	2.42	1,975,629	6,203,851	366,400	1,303,032	130,303	1,055,456	56.1	583,924	5.8	24.4	30.8	38.8	8,419
TOTALS	12.55	6,342,600	29,204,979	611,600	3,614,678	361,457	2,984,395	67.9	1,976,160	5.3	16.0	33.6	44.6	9,725
MEASURED & INDICATED														
No. 1 SEAM	6.85	8,978,857	79,902,939	3,211,000	31,179,089	587,590	29,061,924	62.4	18,019,947	5.0	19.8	33.0	42.3	9,133
No. 2 SEAM	3.66	8,639,333	41,144,234	3,775,400	21,984,815	999,843	18,886,475	79.2	14,917,841	5.3	13.3	34.7	46.5	10,026
No. 3 SEAM	2.40	9,329,354	29,084,591	3,816,000	13,481,643	530,950	11,655,624	58.4	6,759,346	5.0	19.6	32.5	42.7	9,121
TOTALS	12.91	26,947,544	150,131,765	10,802,400	66,645,547	2,118,383	59,604,023	68.0	39,697,134	5.1	16.9	33.7	44.2	9,522

Moisture	5.1%
Ash	17.0%
Volatile Content	33.6%
Fixed Carbon	44.2%
Specific Energy	9,500 BTU's/lb.
Sulphur	< 0.5%
Ash Fusion Temp.	> 2400° F

For Case b) approximately 35.3 million tonnes of measured saleable coal have been claculated (Table VII). This coal has the following specifications:

Moisture	5.2%
Ash	15.4%
Volatile Content	34.0%
Fixed Carbon	45.1%
Specific Energy	9,704 BTU's/lb.
Sulphur	< 0.5%
Ash Fusion Temp.	> 2400° F

Tonnages and specifications will be further refined upon completion of a mining study designed to determine the most efficient and practicable method(s) of mining.

TABLE VII

PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

ILLTYD DEPOSIT (BLOCK B)

SUMMARY UNDERGROUND MINING RESERVE DATA - TO A DEPTH OF 300 m.

	AVERAGE THICKNESS (m)	TOTAL AREA (m^2)	UNDERGROUND MINEABLE TONNES	GEOLOGICAL LOSSES OF 10 % (WHERE APPLICABLE)	UNDERGROUND RECOVERABLE TONNES (65%)	YIELD @ 1.90 s.g.	SALES TONNES	RM %	ASH %	VOL. %	FC %	SPECIFIC ENERGY BTU'S/LB.
MEASURED												
No. 1 Seam	3.53	7,060,921	32,416,397	1,404,329	20,157,844	69.9	13,820,991	5.2	16.1	34.0	44.4	9,623
No. 2 Seam	2.89	7,190,298	26,973,452	1,079,101	16,831,329	81.0	13,508,880	5.4	13.1	34.5	46.8	10,000
No. 3 Seam	2.17	7,353,725	20,707,523	1,076,736	12,760,012	63.9	8,001,238	4.9	19.1	32.7	43.0	9,225
TOTAL MEASURED	8.59	21,604,944	80,097,372	3,560,166	49,749,185	72.78	35,331,109	5.2	15.4	34.0	45.1	9,704
INDICATED												
No. 1 Seam	3.40	1,917,936	8,469,964	846,996	4,954,929	76.7	3,741,174	5.8	14.5	33.5	45.9	9,852
No. 2 Seam	2.84	1,449,035	5,346,800	534,680	3,127,878	83.6	2,611,846	6.2	13.5	33.5	46.5	10,047
No. 3 Seam	2.17	1,975,629	5,583,523	558,352	3,266,361	69.8	2,166,872	5.7	19.6	32.3	42.1	9.143
TOTAL INDICATED	8.41	5,342,600	19,400,287	1,940,028	11,349,168	77.1	8,519,892	5.9	15.3	33.2	45.2	9,754
MEASURED & INDICATED												
No. 1 Seam	3.50	8,978,857	40,886,361	2,251,325	25,112,773	71.35	17,562,165	5.3	15.7	33.9	44.7	9,675
No. 2 Seam	2.88	8,639,333	32,320,252	1,613,781	19,959,207	81.4	16,120,726	5.5	13.2	34.3	46.0	10,008
No. 3 Seam	2.17	9,329,354	26,291,046	1,635,088	16,026,373	65.2	10,168,110	5.1	19.2	32.6	42.8	9,206
TOTAL MEASURED & INDICATED	8.55	26,947,544	99,497,659	5,500,194	61,098,353	73.6	43,851,001	5.3	15.4	33.8	44.8	9,714
MEASURED												
No. 1 Seam	3.53	7,060,921	32,416,397	1,404,329	20,157,844	69.9	13,820,991	5.2	16.1	34.0	44.4	9,623
No. 2 Seam	2.89	7,190,298	26,973,452	1,079,101	16,831,329	81.0	13,508,880	5.4	13.1	34.5	46.8	10,000
TOTAL MEASURED	6.42	14,251,219	59,389,849	2,483,430	36,989,173	75.4	27,336,821	5.3	14.5	34.3	45.7	9,823
INDICATED												
No. 1 Seam	3.40	1,917,936	8,469,964	846,996	4,954,929	76.7	3,741,174	5.8	14.5	33.5	45.9	9,852
No. 2 Seam	2.84	1,449,035	5,346,800	534,680	3,127,878	83.6	2,611,846	6.2	13.5	33.5	46.5	10,047
TOTAL INDICATED	6.24	3,366,971	13,816,764	1,381,676	8,082,807	79.5	6,353,020	6.0	14.1	33.5	46.2	9,936
MEASURED & INDICATED												
No. 1 Seam	3.50	8,978,857	40,886,361	2,251,325	25,112,773	71.35	17,562,165	5.3	15.7	33.9	44.7	9,675
No. 2 Seam	2,88	8,639,333	32,320,252	1,613,781	19,959,207	81.4	16,120,726	5.5	13.2	34.3	46.0	10,008
TOTAL MEASURED & INDICATED	6.38	17,618,190	73,206,613	3,865,106	45,071,980	76.2	33,682,891	5.4	14.4	34.1	45.4	9,845

INTRODUCTION

Pan Ocean Oil Ltd. controls 24 coal exploration licences covering 387,308 hectares (957,024 acres) in the Bonnet Plume Basin of the northern Yukon Territory (Figure I). The licences are underlain by sedimentary rocks of Tertiary age containing lignitic coals in the north. Sedimentary rocks of Cretaceous age containing bituminous coals occur in the south.

Following the discovery of coal in rocks of Cretaceous age and the subsequent acquisition of coal licences in 1977, Pan Ocean carried out exploration programmes in 1978 and 1979 which established measured, indicated and inferred reserves of in excess of 380 million tonnes. The coal is ranked as high volatile 'C' bituminous (ASTM classification) and is considered to be a high quality thermal coal.

It is suggested that this deposit presents an attractive alternative to hydro power in the Yukon Territory and could supply the electrical needs of the Yukon for years to come. Not only are there sufficient resources for the Yukon's use but conceivably the Yukon could augment the supply of electrical needs for neighbouring areas. Because of the remote location of the deposit the coal is presently most suitable for utilization in the mine-mouth power development.

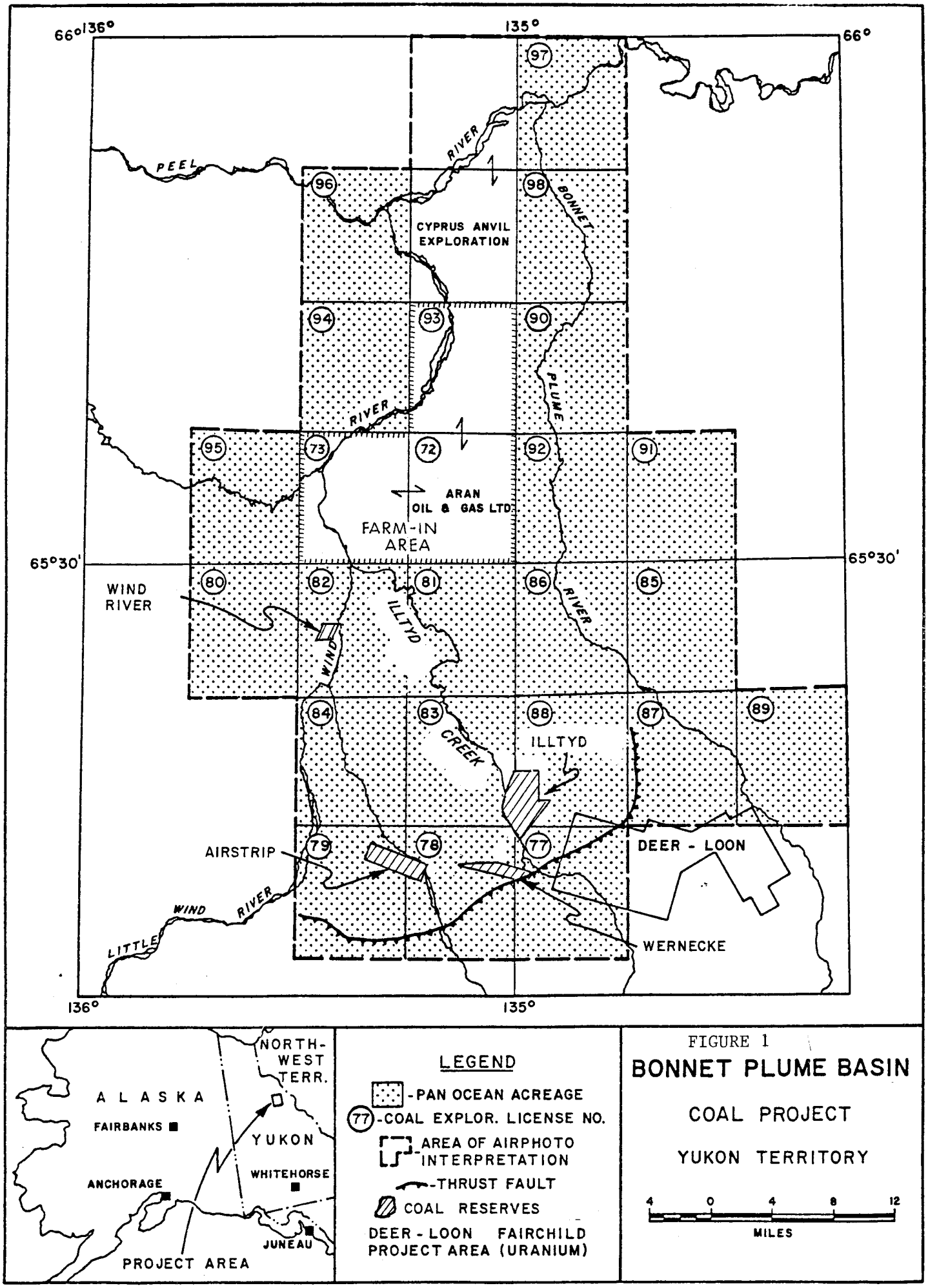


FIGURE 1

BONNET PLUME BASIN

COAL PROJECT

YUKON TERRITORY

LOCATION AND ACCESS

The Bonnet Plume coal basin is located in the northern Yukon Territory. It lies entirely within the Wind River map-area (NTS 106E). The centre of the basin is located by:

$65^{o}30'$ N Latitude

$135^{o}00'$ W Longitude

The basin is bounded on the north by the Richardson Mountains, on the east by the Knorr Ranges, on the south by the Wernecke Mountains and on the west by a rather ill-defined low hilly region west of the Wind River (Location Map C-0676).

The area is approximately 210km (130 miles) north of Mayo, 240km (150 miles) northeast of Dawson City and 330km (205 miles) south of Inuvik (Location Map C-0676). Air transportation is available out of most centres: however, suitable service is provided out of Mayo and being the nearest location to the property, is the centre most often utilized. The Dempster Highway passes 130km (80 miles) to the west of the property. A winter road from Elsa (the townsite for Keno Hill), 48km (30 miles) north of Mayo, enters the west side of the property along the Wind River valley. The distance along this road from Elsa to the property is approximately 165km (100 miles). This road could be upgraded into an all weather road if mining proceeds.

PHYSIOGRAPHY

The Bonnet Plume Basin forms a depression which is relatively featureless, generally having local relief of less than 200 metres and lying between 300 metres above sea level at the northern end and 800 metres above sea level at the Wernecke Deposit Area. Much of the area is low lying marshy terrain supporting stunted black spruce some larch and birch, an assortment of mosses and grasses, and willow and berry bushes. The interior marshy area is virtually devoid of outcrops.

Two major rivers traverse the property flowing from south to north; the Bonnet Plume River in the east and the Wind River in the west. Both rivers flow into the Peel River which flows from west to east across the northern margin of the basin. Major tributaries of the Wind River from south to north are the Little Wind River, Illtyd Creek and Hungry Horse Creek. These rivers are typically braided and often form valleys in excess of 2km wide.

Most of the Cretaceous rocks observed in outcrop occur along the Wind River and its tributaries and on low relief hills generally overlooking the river.

GEOLOGY

The Bonnet Plume Basin, as it exists today, is a structural and physiographic depression and is the culmination of a series of intermontane successor basins originating in the middle Cretaceous and developed within a structural depression at the southern extremity of the Richardson Anticlinorium.

The surface outcrops within the Bonnet Plume Basin consist of recent alluvial and possible lacustrine deposits of glacial origin; Tertiary mudstones, sandstones and shales containing lignite beds; and Cretaceous conglomerates, sandstones and shales containing coal seams. The Cretaceous and Tertiary sediments were deposited in a continental fluviatile sedimentary environment which unconformably overlie Proterozoic to Permian strata. Local pre-Cretaceous fensters within the basin have been produced by faulting.

The stratigraphy of the Bonnet Plume Basin sediments has been studied by Camsell (1906), Mountjoy (1967), Norris and Hopkins Jr. (1977) and Long (1978). Mountjoy applied the term Bonnet Plume Formation to this sequence of sediments; Norris and Hopkins refined the term into the Lower Bonnet Plume Formation and the Upper Bonnet Plume Formation separated by a 35 million year hiatus. The hiatus is in part marked by a structural unconformity which in places causes deposition of the Upper Bonnet Plume Formation directly on pre-Cretaceous rocks.

Palynology investigations by Rouse and Srivastava (1972) tentatively applied an age of Middle to Late Albian for the Lower Bonnet Plume. Recent and on-going palynological investigations by Sweet and Long of the G.S.C. is expected to shed new light on age relations of the sediments.

Investigations by Pan Ocean have been primarily restricted to that area underlain by the Lower Bonnet Plume Foramtion in the southern half of the basin.

The Lower Bonnet Plume Formation is composed of conglomerate, sandstone, siltstone, shale and coal seams and has an estimated thickness of 600-700m. The sediments are generally poorly cemented, but well indurated and the conglomerates and coarse sandstones often form resistant bluffs along the Wind River and its tributaries. The shales and mudstones generally break down rapidly upon exposure and are rarely seen in outcrop.

In 1977 six coal areas were mapped within the Lower Bonnet Plume Formation and during follow-up reconnaissance mapping in 1978 this number was increased to twelve coal areas. Two of the areas were drill tested in 1978 and established a combined total of indicated and inferred in situ coal reserves, greater than 96 million tonnes. In 1979 a programme of follow-up mapping and drilling established measured, indicated and inferred in situ coal reserves in excess of 380 million tonnes in four deposit areas (Table I). Speculative reserves could conceivably increase these reserves to greater than 1 billion tonnes in situ.

ILLTYD CREEK DEPOSIT (BLOCK B)

The Illtyd Creek Deposit is an area extending along the east side of Illtyd Creek for a distance of 5000 metres. The area is bounded on the west by Illtyd Creek, which coincides with the subcrop traces of the coal seams; to the south by a northeast-southwest striking fault; to the east by an arbitrary down-dip cut-off of a depth of 300 metres to the base of the No. 1 Coal Seam Horizon and to the north by an arbitrary line 250 metres north of the furthest north drill hole (BP-79-21).

The structure of the Illtyd Creek Deposit consists of a broad syncline plunging to the east. Maximum dips of 20^{o} occur along the western outcrop trace and at the north end of the deposit. Generally flatter dips occur at depth to the south and east. The structure of the deposit is illustrated by twelve east-west cross-sections drawn at 500m intervals throughout the length of the deposit and three north-south cross-sections across the axis of the syncline (Drawings X-0723 to X-0726 inclusive).

Outcrop over the Illtyd Creek Deposit consists primarily of conglomerate and coarse to conglomeratic sandstones with coal and carbonaceous shale exposures underlying the conglomerate at the south end of the area. Outcrop is mainly confined to the banks along Illtyd Creek and Mosquito Creek and is rarely exposed away from the creeks. A thick conglomerate unit forms a prominent ridge that can be traced the length of the deposit. Outcrop of the conglomerate occurs almost continuously along this ridge north from hole BP-78-2 for approximately 2000m to a point where the ridge diverges away from Illtyd Creek. To the south and north the outcrop along the ridge is intermittent to non-existent; however the ridge provides an excellent starting point for investigating the deposit. From outcrop and drill hole examination the conglomerate is thickly to massively bedded, moderately sorted, poorly cemented, well indurated and contains small to large, rounded to well rounded, blade, roller and semi-spherical pebbles predom-

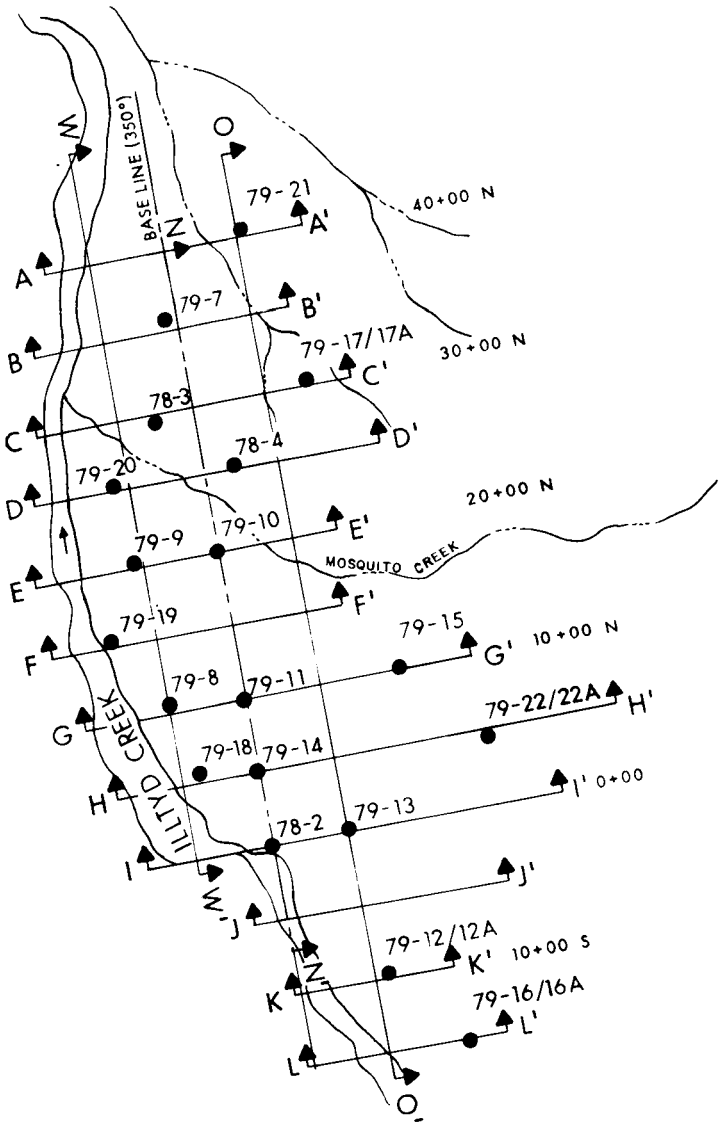
inantly of chert and quartzite. The matrix ranges upwards to 20% and consists usually of medium to coarse grained, subangular, quartz and chert sand. Lenses of cross-bedded sandstone occur infrequently throughout the unit. The conglomerate is persistent throughout the deposit and is 90 to 110m thick.

Outcrops of coal seams along Illtyd Creek below drill hole BP-78-2 are preserved from erosion due to the overlying conglomerate. Two identifiable seams occur in the cut bank along the creek and are identified in hole BP-78-2 as the No. 1 Seam Horizon and No. 2 Seam Horizon. Coal wash in the cut bank 200m north of the No. 2 Seam exposure is probably the surface exposure of the No. 3 Seam Horizon intersected in hole BP-78-2.

Nineteen diamond drill holes were drilled in the deposit area to establish the continuity of the three coal horizons and to provide adequate geological control in order to establish measured and indicated reserves (Drawing A-0681). A lithofacies fence diagram of the deposit graphically illustrates correlation throuthout the deposit (Drawing E-0767).

No. 1 Seam Horizon

The No. 1 Seam Horizon has an average thickness of 6.85m. Variation in horizon thickness throughout the deposit is depicted on the Coal Horizon Isopach Plan (Drawing E-0740). The No. 1 Seam Horizon is immediately overlain by the thick conglomerate unit described above. The contact is generally sharp and the roof conditions sound. The footwall of the Horizon is a medium dark gray shale which breaks down rapidly upon exposure. At the north end of the deposit the upper part of the horizon shales out thus causing a shale bed to be found between the top of the coal and the overlying conglomerate. A structure contour plan of the base of the Horizon illustrates the regular structure of the deposit (Drawing E-0728).



TO ACCOMPANY REPORT NO 25-79 BY ORC, DCH

PAN OCEAN OIL LTD.
CALGARY ALBERTA

PLAN– ILLTYD DEPOSIT (BLOCK 'B')

BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
SEPT. 1979	1: 50,000	106-E	A-04[illegible]

CBW

REVISED: NOVEMBER 21, 1979.

A fence diagram of the No. 1 Seam Horizon graphically illustrates correlation throughout the deposit (Drawing E-0768).

No. 2 Seam Horizon

The No. 2 Seam Horizon lies from 10 to 40m below the No. 1 Seam Horizon and has an average thickness of 3.66m. Intervening strata is generally a fining upwards sequence from a basal pebble conglomerate or coarse sandstone to shale. Varation in horizon thickness throughout the deposit is depicted by the No. 2 Seam Horizon Isopach Plan (Drawing E-0741). Note the development of a thick parting in the southern part of the deposit south of hole BP-79-11. The roof of the No. 2 Seam Horizon is variable from conglomerate to coarse grained sandstone and is generally sound. The contact with the roof rock is generally sharp. The footwall of the No. 2 Seam Horizon is shale which breaks down rapidly upon exposure. A structure contour plan of the base of the No. 2 Seam Horizon illustrates the regular structure of the deposit (Drawing E-0729). A fence diagram of the No. 2 Seam Horizon graphically illustrates correlation throughout the deposit(Drawing E-0769).

No. 3 Seam Horizon

The No. 3 Seam Horizon lies from 10 to 20m below the No. 2 Seam Horizon and has an average thickness of 2.40m. Intervening strata is variable from fining upwards sequences of conglomerate to shale to predominantly siltstone, fine grained sandstone, and shale. Varation of the No. 3 Seam Horizon thickness throughout the deposit is depicted on the No. 3 Seam Horizon Isopach Plan (Drawing E-0742). The roof of the No. 3 Seam Horizon is variable from shale to conglomerate The shale degrades rapidly upon exposure. The footwall of the horizon is generally carbonaceous shale which breaks down rapidly upon exposure. A structure contour plan of the No. 3 Seam Horizon illustrates the regular structure of the deposit (Drawing E-0730 attached). A fence diagram of the No. 3 Seam Horizon.

graphically illustrates correlation throughout the deposit (Drawing E-0770).

Three holes BP-79-7, BP-79-13 and BP-79-14 were drilled beyond the No. 3 Seam Horizon and intersected a 4th Seam Horizon from 20 to 40m below the No. 3 Seam Horizon. This horizon has a total thickness of from 7m to 16m and typically contains two benches of coal with a combined thickness of 3 to 4m. The parting consists of shale, siltstone and sandstone. This coal horizon has not been included in the calculated reserves of the Illtyd Creek Deposit; however, it does increase the potential of the deposit.

In Situ Geological Coal Reserves

In situ geological coal reserves of the Illtyd Creek Deposit were determined utilizing a polygon method. A polygon was constructed around each drill hole data point and the area calculated by constructing internal triangles and applying Hero's formula for the area of a triangle (Drawing E-0749-E0751). Each polygon was assigned a mineable thickness value equal to the intersected horizon less shale partings greater than or equal to 1m. Mineable Thickness Isopach Plans of each seam horizon were constructed (Drawings E-0743 to E-0745). A 1.30 specific gravity factor was applied in all cases to determine tonnage. Total in situ geological coal reserves of the Illtyd Deposit are tabulated in Table II.

Mineable and Saleable Coal Reserves

Mineable and saleable coal reserves of the Illtyd Creek Deposit have been determined considering two alternate mining methods.

Case a) Strip Mining: Mineable and saleable tonnes of coal have been calculated to cut-off stripping ratios of 4:1, 6:1, 8:1 and 10:1 (cubic metres of rock to tonnes of coal calculated to the base of the No. 3 Seam

TABLE II

PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

TABLE OF IN-SITU MEASURED & INDICATED RESERVES: ILLTYD DEPOSIT (BLOCK B)

	AVERAGE THICKNESS (m)	TOTAL AREA (m^2)	TONNES (FACTOR OF 1.3s.g.)
MEASURED			
No. 1 Seam	6.96	7,060,921	63,866,892
No. 2 Seam	3.66	7,190,298	34,179,153
TOTAL MEASURED	10.62	14,251,219	98,046,045
INDICATED			
No. 1 Seam	6.43	1,917,936	16,036,047
No. 2 Seam	3.70	1,449,035	6,965,081
TOTAL INDICATED	10.13	3,366,971	23,001,128
MEASURED & INDICATED			
No. 1 Seam	6.85	8,978,857	79,902,939
No. 2 Seam	3.66	8,639,333	41,144,234
TOTAL MEASURED & INDICATED	10.51	17,618,190	121,047,173
MEASURED			
No. 1 Seam	6.96	7,060,921	63,866,892
No. 2 Seam	3.66	7,190,298	34,179,153
No. 3 Seam	2.33	7,353,723	22,880,741
TOTAL MEASURED	12.95	21,604,944	120,926,786
INDICATED			
No. 1 Seam	6.43	1,917,936	16,036,047
No. 2 Seam	3.70	1,449,035	6,965,081
No. 3 Seam	2.42	1,975,629	6,203,851
TOTAL INDICATED	12.55	5,342,600	29,204,979
MEASURED & INDICATED			
No. 1 Seam	6.85	8,978,857	79,902,939
No. 2 Seam	3.66	8,639,333	41,144,234
No. 3 Seam	2.40	9,329,354	29,084,591
TOTAL MEASURED & INDICATED	12.91	26,947,544	150,131,765

Horizon). Drawings E-0755 to E-0757 inclusive illustrate the reserve areas at varying stripping ratios. Cut-off stripping ratios to the base of each seam were calculated and are illustrated by Drawings E-0746 to E-0748. However, stripping ratios improved with inclusion of each successively lower coal seam. For this reason the ratios to the base of No. 3 Seam Horizon were selected for use in reserve calculation.

The following methods or parametres have been used to calculate tonnage.

i) the area of each polygon within the designated stripping ratio was measured using a planimeter.

ii) the mineable thickness value assigned to each polygon for calculation of in situ reserves was applied.

iii) a 1.3 s.g. factor was used to determine tonnage.

iv) a geological loss of 10% was applied to the polygonal area adjacent to the southern boundary fault and to those polygons where seam subcrop traces extend beneath Illtyd Creek. (This is a provision to compensate for possible loss in reserves due to minor geological features. The selection of 10% is arbitrary and the application subjective).

v) a mining recovery of 95% was applied to the No. 1 Seam Horizon and 90% to the No. 2 and No. 3 Seam Horizons to determine mineable tonnes. (The selection of mining recovery was based on mining losses of 1/3 metre from the average thickness of horizons. In the case of the No. 1 Seam Horizon this represented a loss of approximately 5% and in the cases of the No. 2 and No. 3 Seam Horizons represented a loss of approximately 10%).

iv) a yield factor determined for each polygon from analytical results of the coal samples from the

polygon's borehole was applied to determine sales tonnes. (The yield was determined for for a mathematically recombined percentage of the ¼" x 28M fraction at -1.90s.g. and 100% of the 28M x 0 raw fraction over the selected thickness interval).

vii) The specifications of the sales product for each polygon area were determined from analytical results in the same manner as the yield (vi. above). The overall specifications were calculated on a weight distribution basis. Analytical results of testing and calculated values for recomposited intervals are recorded on drill hole graphic log forms for each hole and are incorporated in this report as Appendix C. Summaries of calculated reserves at each stripping ratio are tabulated in Tables III to VI inclusive. Details of the calculations are tabulated in Appendix A inclusive.

Case b) Underground Mining: In considering mineable and saleable tonnes of coal made available by underground mining the following methods and parameters have been assumed.

i) underground mining is possible to a depth of 300 metres.

ii) the area of each polygon has been determined as for in situ geological reserves.

iii) the thickness used is as for the in situ reserves in the case of seams up to 3.7m thick; or for the best 3.7m interval in the case of seams greater than 3.7m. Mining thickness values for each data point are shown on Drawings E-0752 to E0754 inclusive.

iv) a 1.3 s.g. factor was used to determine tonnage.

v) a geological loss of 10% was applied to the poly-

TABLE III

PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

ILLTYD CREEK DEPOSIT (BLOCK B)

SUMMARY OPEN PIT - MINEABLE RESERVE DATA - TO A CUT-OFF WASTE TO COAL TO BASE OF SEAM 3 OF 4:1

	AVERAGE THICKNESS (m)	TOTAL AREA (m^2)	IN-SITU	RESERVES TO 4:1 CUT-OFF						SALES SPECIFICATIONS				
				AREA (m^2)	IN-SITU TONNES	LESS GEOL. LOSSES (where applicable)	MINING RECOVERABLE TONNES	YIELD @1.90sg	SALES TONNES	RM %	ASH %	VOL. %	FC %	SPECIFIC ENERGY BTU's/LB
MEASURED														
No. 1 SEAM	6.96	7,060,921	63,866,892	264,000	2,656,436	-	2,390,792	61.8	1,554,360	4.9	20.9	32.9	41.1	8,830
No. 2 SEAM	3.66	7,190,298	34,179,153	366,800	2,087,914	147,419	1,746,445	78.9	1,374,950	5.8	11.4	35.3	47.3	10,215
No. 3 SEAM	2.33	7,353,723	22,880,741	518,600	1,917,921	79,639	1,703,054	58.3	991,803	5.1	16.0	33.7	44.6	9,623
TOTALS	12.91	21,604,944	120,926,786	1,149,400	6,713,271	227,058	5,840,291	66.9	3,921,113	5.3	15.9	34.1	44.4	9,577
INDICATED														
No. 1 SEAM	6.43	1,917,936	16,036,047	-	-	-	-	-	-	-	-	-	-	-
No. 2 SEAM	3.70	1,449,035	6,965,081	-	-	-	-	-	-	-	-	-	-	-
No. 3 SEAM	2.42	1,975,629	6,203,851	-	-	-	-	-	-	-	-	-	-	-
TOTALS	12.55	6,342,600	29,204,979	-	-	-	-	-	-	-	-	-	-	-
MEASURED & INDICATED														
No. 1 SEAM	6.85	8,978,857	79,902,939	-	-	-	-	-	-	-	-	-	-	-
No. 2 SEAM	3.66	8,639,333	41,144,234	-	-	-	-	-	-	-	-	-	-	-
No. 3 SEAM	2.40	9,329,354	29,084,591	-	-	-	-	-	-	-	-	-	-	-
TOTALS	12.91	26,947,544	150,131,765	1,149,400	6,713,271	227,058	5,840,291	66.9	3,921,113	5.3	15.9	34.1	44.4	9,577

APPENDIX BII

PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

ILLTYD CREEK DEPOSIT (BLOCK B)

¼" x 28M @ 1.90 s.g. Fraction

28M x 0 @ Raw Basis

UNDERGROUND MINEABLE RESERVE DATA - NO. 2 SEAM HORIZON

RESERVE AREA	INTERVAL FROM (m)	INTERVAL TO (m)	THICKNESS (m)	TOTAL AREA POLYGON (m^2)	VOLUME (v) OF COAL (m^3)	TONNES (t) FACTOR OF 1.3	GEOLOGICAL LOSS (Where Applicable)	TONNES (t)	MINEABLE TONNES (Recovery 65%)	YEILD @1.90sg	SALES TONNES	YIELD %	MOIST %	ASH %	VOL. %	FC %	SPECIFIC ENERGY BTU's/LB
78 2	61.58	65.07	3.49	323,157	1,127,818	1,466,163	--	1,466,163	953,006	82.0	781,465	82.0	6.7	9.1	35.8	48.4	10,564
78 3	119.22	121.65	2.43	542,632	1,318,596	1,714,174	--	1,714,174	1,114,213	74.1	825,632	74.1	6.8	15.0	33.4	44.8	9,531
79 7	54.22	55.51	1.29	416,054	536,710	697,723	--	697,723	453,520	62.8	284,810	62.8	4.6	16.2	33.1	46.1	9,277
79 8	113.83	116.57	2.74	289,642	793,619	1,031,705	--	1,031,705	670,608	80.2	537,828	80.2	5.6	11.2	34.8	48.4	9,876
79 9	155.73	159.20	3.47	337,184	1,170,028	1,521,037	--	1,521,037	988,674	90.2	891,784	90.2	5.0	12.7	34.1	48.1	9,905
79 10	259.69	262.87	3.18	649,531	2,065,509	2,685,161	268,516	2,416,645	1,570,819	83.9	1,317,917	83.9	4.1	12.9	35.6	47.4	9,899
79 11	156.98	160.68	3.70	499,323	1,847,495	2,401,744	--	2,401,744	1,561,133	76.6	1,195,828	76.6	6.3	11.5	36.5	45.6	10,090
79 12A	155.03	158.73	3.7	612,661	2,266,846	2,946,899	294,689	2,652,209	1,723,936	87.3	1,504,996	87.3	5.5	11.8	34.6	47.6	10,358
79 13	158.22	160.98	2.76	645,294	1,781,011	2,315,315	--	2,315,315	1,504,955	77.1	1,160,320	77.1	3.8	13.2	36.2	46.3	10,310
79 14 Seam 2A →	116.69	120.31	3.62	304,715	1,103,068	1,433,989	--	1,433,989	932,093	81.5	759,656	81.5	3.7	13.1	35.3	47.2	10,202
Seam 2B	128.58	131.28	2.70														
79 15	249.32	252.57	3.25	676,780	2,199,535	2,859,395	285,939	2,573,456	1,672,746	84.2	1,408,452	84.20	5.9	13.3	34.0	46.6	10,048
79 16A	--	--	--									--	--	--	--	--	--
79 17A	331.88	334.05	2.17	327,110	709,829	922,777	92,277	830,500	539,825	74.4	401,630	74.4	3.6	15.3	33.3	47.6	9,925
79 18	58.52	61.67	3.15	131,127	413,050	536,965	--	536,965	349,027	72.7	253,743	72.7	5.3	13.4	32.3	48.7	10,002
79 19	84.52	87.01	2.49	258,353	643,299	836,289	--	836,289	543,588	85.0	462,049	*85.0	*5.3	*11.9	*34.4	*48.2	*9,890
79 20	98.14	100.46	2.32	340,973	791,057	1,028,375	--	1,028,375	668,443	73.6	491,974	73.6	7.8	14.7	32.1	45.2	9,570
79 21	144.40	146.41	2.01	411,126	826,363	1,074,272	107,427	966,845	628,449	78.3	492,076	78.3	7.4	23.3	28.7	40.4	8,318
79 22A	221.84	224.56	2.72	424,634	1,155,004	1,501,506	150,151	1,351,355	878,381	84.1	738,718	84.1	6.9	12.8	33.2	47.0	10,134
TOTAL MEASURED				7,190,298		26,973,452	1,079,101	25,894,351	16,831,329	81.0	13,508,880	81.0	5.4	13.1	34.5	46.8	10,000
79 10	259.69	262.87	3.18	5,404	17,185	22,340	2,234	20,106	13,069	83.9	10,965	83.9	4.1	12.9	36.5	47.4	9,899
79 12A	155.03	158.73	3.70	269,564	997,387	1,296,603	129,660	1,166,943	758,513	87.3	662,182	87.3	5.5	11.8	34.6	47.6	10,358
79 13	158.22	160.98	2.76	169,665	468,275	608,758	60,876	547,882	356,123	77.1	274,571	77.1	3.8	13.2	36.2	46.3	10,310
79 15	249.32	252.57	3.25	79,363	257,930	335,309	33,531	301,778	196,155	84.2	165,163	84.2	5.9	13.3	34.0	46.6	10,048
79 17A	331.88	334.05	2.17	2,595	5,631	7,320	732	6,588	4,282	74.4	3,186	74.4	3.6	15.3	33.3	47.6	9,925
79 21	144.40	146.41	2.01	200,746	403,499	524,549	52,455	472,094	306,861	78.3	240,272	78.3	7.4	23.3	28.7	40.4	8,318
79 22A	221.84	224.56	2.72	721,697	1,963,016	2,551,920	255,192	2,296,728	1,492,873	84.1	1,255,507	84.1	6.9	12.8	33.2	47.0	10.134
TOTAL INDICATED				1,449,035		5,346,800	534,680	4,812,120	3,127,878	83.6	2,611,846	83.6	6.2	13.5	33.5	46.5	10,047
TOTAL MEASURED & INDICATED				8,639,333		32,320,252	1,613,781	30,706,471	19,959,207	81.4	16,120,726	81.4	5.5	13.2	34.3	46.0	10,008

* Values Interpolated ; Analytical Results Not Available

APPENDIX BI

PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

ILLTYD CREEK DEPOSIT (BLOCK B)

UNDERGROUND MINEABLE RESERVE DATA - NO. 1 SEAM HORIZON

½" x 28M @ -1.90s.g. fraction
28M x 0 @ Raw Basis

RESERVE AREA	INTERVAL FROM (m)	INTERVAL TO (m)	THICKNESS (m)	TOTAL AREA POLYGON (m^2)	VOLUME (v) OF COAL (m^3)	TONNES (t) FACTOR OF 1.30	LESS GEOL.LOSSES (where applicable)	TONNES (t)	MINEABLE TONNES (Recovery 65%)	YIELD @1,90sg %	SALES TONNES	YIELD %	RM %	ASH %	VOL. %	FC %	SPECIFIC ENERGY BTU's/LB
78 2	25.00	28.70	3.70	246,383	911,616	1,185,100	-	1,185,100	770,315	75.8	583,899	75.8	6.7	12.0	35.0	46.1	10,006
78 3	97.50	100.50	3.00	502,154	1,506,462	1,958,400	-	1,958,400	1,272,960	54.9	698,855	54.9	7.0	18.7	32.8	41.5	9,109
79 7	29.52	33.22	3.70	-	-	-	-	-	-	-	-	33.80	6.5	16.6	32.6	44.1	9,229
→	32.18	35.78	3.60	376,723	1,356,203	1,763,064	-	1,763,064	1,145,991	53.6	614,251	53.60	4.9	17.0	34.5	43.4	9,424
79 8	90.96	94.66	3.70	288,229	1,066,447	1,386,381	-	1,386,381	901,148	64.2	578,537	64.2	4.2	16.1	35.5	44.1	9,589
79 9	138.53	142.23	3.70	331,672	1,227,186	1,595,342	-	1,595,342	1,036,973	67.0	694,772	67.0	5.0	18.3	33.9	42.6	9,268
79 10	238.36	242.06	3.70	670,693	2,481,564	3,226,033	322,063	2,903,430	1,887,229	72.0	1,358,805	72.0	5.0	14.4	34.7	45.7	9,767
79 11	136.66	140.36	3.70	449,323	1,847,495	2,401,744	-	2,401,744	1,561,133	74.2	1,158,361	74.2	5.6	16.4	34.8	43.0	9,399
79 12A	112.13	115.83	3.70	444,052	1,642,993	2,135,890	213,589	1,922,301	1,249,496	86.6	1,082,063	86.6	5.4	8.0	36.8	49.4	10,888
79 13	127.42	131.12	3.70	645,294	2,387,587	3,103,864	-	3,103,864	2,017,512	76.4	1,541,379	76.4	4.6	15.2	34.5	45.4	8,867
79 14 Alternate	88.42	92.12	3.70	-	-	-	-	-	-	-	-	65.7	4.7	22.7	31.0	41.0	8,635
→	91.19	94.89	3.70	304,715	1,127,445	1,465,679	-	1,465,679	952,691	70.8	674,505	70.8	3.6	17.7	35.1	43.0	9,618
79 15	220.96	224.66	3.70	676,780	2,504,086	3,255,312	325,531	2,929,781	1,904,357	72.4	1,378,755	72.4	4.7	18.8	32.8	42.9	9,428
79 16A Not Drilled	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
79 17A	304.30	308.00	3.70	406,153	1,502,766	1,953,596	195,359	1,758,236	1,142,853	53.1	606,855	53.1	3.9	20.1	29.3	46.2	9,244
79 18	26.04	29.04	3.00	288,229	864,687	1,124,093	-	1,124,093	730,660	68.6	501,233	68.6	3.5	19.6	33.4	43.0	9,342
79 19	63.74	66.70	2.96	239,997	710,391	923,508	-	923,508	600,280	65.0	390,182	*65.0	*4.6	*17.2	*34.7	*43.3	*9,428
79 20 →	78.57	82.27	3.70	304,764	1,127,627	1,465,915	-	1,465,915	952,845	57.2	545,027	57.2	7.0	21.1	31.3	40.2	8,786
	80.80	84.50	3.70	-	-	-	-	-	-	-	-	62.5	6.6	24.5	31.2	37.4	8,432
79 21	123.08	124.62	1.54	-	-	-	-	-	-	-	-	83.8	7.5	23.1	31.0	38.2	8,323
→	123.08	126.21	3.13	411,127	1,286,827	1,672,876	167,287	1,505,588	978,632	58.7	574,457	58.7	6.9	27.1	29.7	35.8	7,759
79 22A	192.82	196.08	3.26	424,634	1,384,308	1,799,600	179,960	1,619,64	1,502,766	79.7	839,055	79.7	6.2	13.6	32.9	47.1	9,929
TOTAL MEASURED	-	-	-	7,060,921	-	32,416,397	1,404,329	31,012,068	20,157,844	69.9	13,820,991	69.9	5.2	16.1	34.0	44.4	9,623
79 10	238.36	242.06	3.70	26,000	96,200	125,060	12,506	112,554	73,160	72.0	52,675	72.0	5.0	14.4	34.7	45.7	9,767
79 12A	112.13	115.83	3.70	272,331	1,007,625	1,309,912	130,991	1,178,920	766,298	86.6	663,615	86.6	5.4	8.0	36.8	49.4	10,888
79 13	127.42	131.12	3.70	168,785	624,504	811,856	81,185	730,670	474,936	76.4	362,851	76.4	4.6	15.2	34.5	45.4	9,867
79 15	220.96	224.66	3.70	178,132	659,088	856,815	85,681	771,133	501,237	72.4	362,895	72.4	4.7	18.8	32.8	42.9	9,428
79 17A	304.30	308.00	3.70	50,015	185,055	240,572	24,057	216,515	140,735	53.1	74,730	53.2	3.9	20.1	29.3	46.2	9,244
79 21	123.08	126.21	3.13	330,976	1,035,955	1,346,741	134,674	1,212,067	787,844	58.7	462,464	58.7	6.9	27.1	29.7	35.8	7,759
79 22A	192.82	196.08	3.26	891,696	2,906,929	3,779,008	377,901	3,401,107	2,210,719	79.7	1,761,943	79.7	6.2	13.6	32.9	47.1	9,929
TOTAL INDICATED				1,917,936	-	8,469,964	846,996	7,622,968	4,954,929	76.7	3,741,174	76.7	4.8	14.5	33.5	45.9	9,852
TOTAL MEASURED & INDICATED				8,978,857	-	40,886,361	2,251,325	38,635,036	25,112,773	71.35	17,562,165	71.35	5.3	15.7	33.9	44.7	9,675

* Values Interpolated Analytical Results Not Available

APPENDIX BIII

PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

ILLTYD CREEK DEPOSIT (BLOCK B)

UNDERGROUND MINEABLE RESERVE DATA - NO. 3 SEAM HORIZON

¼" x 28M @ 1.90 sg fraction

28M x 0 @ Raw Basis

	RESERVE AREA	INTERVAL FROM (m)	INTERVAL TO (m)	THICKNESS (m)		TOTAL AREA POLYGON (m^2)	VOLUME (v) OF COAL (m^3)	TONNES (t) FACTOR OF 1.3	GEOLOGICAL LOSS(WHERE APPLICABLE)	TONNES (t)	MINEABLE TONNES (Recovery 65%)	YIELD @ 1.90sg %	SALES TONNES		YIELD %	RM %	ASH %	VOL. %	FC %	SPECIFIC ENERGY BTU's/#
78 2	NOTE: +28M Calculated → @ 1.70 s.g.	81.76	82.83	1.07		332,901	356,204	463,065	-	*463,065	300,992	87.6	263,669		87.6	3.9	16.0	35.1	45.0	9,856
		81.76	83.67	1.91											59.6	4.0	15.8	35.2	44.9	9,889
78 3		-	-	2.21																
79 7	→	78.20	79.14	0.94		406,664	382,264	496,943	-	496,943	323,013	42.9	138,572		42.9	7.0	24.5	33.2	35.0	8,164
		77.27	79.14	1.87											31.8	7.0	8.4	32.2	34.6	7,868
79 8		134.42	137.28	3.86		308,649	882,736	1,147,557	-	1,147,557	745,912	55.9	416,965		55.9	5.7	13.7	35.0	45.5	9,974
79 9		179.57	182.18	2.61		344,867	900,103	1,170,134	-	1,170,134	760,587	65.9	501,227		65.9	4.8	15.5	34.5	45.0	9,597
79 10		279.75	282.97	3.22		577,219	1,858,645	2,416,239	241,624	2,174,615	1,413,500	64.7	914,534		64.7	3.6	20.2	33.6	42.6	9,028
79 11		175.00	178.24	3.24											54.1	4.9	14.2	34.8	46.0	9,776
	→	176.00	178.24	2.24		499,323	1,118,483	1,454,028	-	1,454,028	945,118	64.8	612,437		64.8	4.5	14.2	35.6	45.5	9,815
79 12A		186.78	188.97	2.19		711,874	1,599,004	2,026,705	202,670	1,824,035	1,185,622	66.2	784,882		66.2	3.9	26.2	29.5	40.4	8,350
79 13		180.44	182.63	2.19		646,509	1,415,855	1,840,611	-	1,840,661	1,196,397	61.1	730,999		61.1	4.1	22.8	31.5	41.1	8,826
79 14	Seam - Shaled out					304,715	-	-	-	-	-	-	-		-	-	-	-	-	-
79 15		265.48	268.80	3.32		685,051	2,274,369	2,956,680	295,668	2,661,012	1,729,658	52.1	901,152		52.1	4.8	18.8	32.9	43.3	9,511
79 16A	NOT Drilled	-	-	-		-	-	-	-	-	-	-	-		-	-	-	-	-	-
79 17A		353.45	356.10	2.65		252,276	668,531	869,091	86,909	782,182	508,418	65.6	333,522		65.6	4.1	20.2	30.7	44.8	9,215
79 18		81.34	85.04	3.70		158,717	587,253	763,429	-	763,429	496,229	59.6	295,752		59.6	4.9	13.1	33.6	46.4	9,945
79 19		106.33	109.67	3.34		294,866	984,852	1,280,308	-	1,280,308	832,200	60.0	499,320		*60.0	*5.2	*14.6	*34.8	*45.3	*9,695
79 20	→	122.25	124.81	2.56		397,862	1,018,527	1,324,085	-	1,324,085	860,655	68.4	588,688		68.4	7.2	18.6	31.3	42.8	9,195
		122.25	125.72	3.47											59.9	6.8	22.1	30.1	40.6	8,745
79 21		164.52	167.15	2.63		411,126	1,081,261	1,405,640	140,564	1,265,076	822,299	57.5	422,822		57.5	6.6	28.5	28.4	36.3	7,752
79 22A		234.54	236.52	1.98		424,634	840,775	1,093,008	109,301	983,707	639,410	85.5	546,695		85.5	5.9	16.4	33.4	44.1	9,628
	TOTAL MEASURED					7,353,725		20,707,523	1,076,736	19,630,787	12,760,012	63.92	8,001,238		63.92	4.89	19.10	32.7	43.0	9,225
78 3	*NOTE: Not drilled in this hole - values interpolated			*2.21		596,468	1,318,194	1,713,652	171,365	1,542,287	1,002,487	50.0	501,243		*50.0	7.1	21.5	32.3	38.9	8,675
79 12A				2.19		266,220	583,022	757,928	75,793	682,135	443,388	66.2	293,523		66.2	3.9	26.2	29.5	40.4	8,350
79 13				2.19		169,683	371,606	483,087	48,087	434,779	282,606	61.1	172,672		61.1	4.1	22.8	31.5	41.1	8,826
79 15				3.32		56,871	188,812	245,455	24,545	220,910	143,59	52.1	74,811		52.1	4.8	18.8	32.9	43.3	9,511
79 21				2.63		120,520	316,968	412,058	41,206	370,852	241,054	57.5	138,606		57.5	6.6	28.5	28.4	36.3	7,752
79 22A				1.98		765,867	1,516,417	1,971,342	197,134	1,774,207	1,153,235	85.5	986,016		85.5	5.9	16.4	33.4	44.1	9,628
	TOTAL INDICATED					1,975,629		5,583,523	558,352	5,025,171	3,266,36	69.79	2,166,872		69.79	5.73	19.65	32.31	42.12	9,149
	TOTAL MEASURED & INDICATED			2.17		9,329,354		26,291,046	1,635,088	24,655,958	16,026,373	65.17	10,168,110		65.17	5.1	19.2	32.6	42.8	9,206

* Values Interpolated : Analytical Results Not Available

TABLE IV

PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

ILLTYD CREEK DEPOSIT (BLOCK B)

SUMMARY OPEN PIT - MINEABLE RESERVE DATA - TO A CUT-OFF WASTE TO COAL TO BASE OF SEAM 3 OF 6:1

	AVERAGE THICKNESS (m)	TOTAL AREA (m^2)	IN-SITU MINEABLE TONNES	RESERVES TO 6:1 CUT-OFF: AREA (m^2)	IN-SITU TONNES	LESS GEOL. LOSSES	MINING RECOVERABLE TONNES	YIELD @ 1.90sg	SALES TONNES	SALES SPECIFICATIONS: RM %	ASH %	VOL. %	FC %	SPECIFIC ENERGY BTU's/LB
MEASURED														
No. 1 SEAM	6.96	7,060,921	63,866,892	820,400	8,140,982	-	7,733,932	62.2	4,786,046	5.1	20.1	33.0	41.7	9,019
No. 2 SEAM	3.66	7,190,298	34,179,153	1,153,800	6,997,702	503,390	5,844,881	79.2	4,619,414	5.7	12.4	34.8	46.9	10,135
No. 3 SEAM	2.33	7,353,723	22,880,741	1,307,000	4,609,519	232,816	3,939,032	59.9	2,350,073	4.9	9.0	32.5	43.2	9,244
TOTALS	12.91	21,604,944	120,926,786	3,281,200	19,748,203	736,206	17,517,845	68.4	11,755,533	5.3	14.7	33.7	44.3	9,566
INDICATED														
No. 1 SEAM	6.43	1,917,936	16,036,047	-	-	-	-	-	-	-	-	-	-	-
No. 2 SEAM	3.70	1,449,035	6,965,081	-	-	-	-	-	-	-	-	-	-	-
No. 3 SEAM	2.42	1,975,629	6,203,851	91,600	358,431	35,843	290,329	51.4	149,229	6.9	23.3	31.6	37.8	8,454
TOTALS	12.55	6,342,600	29,204,979	91,600	358,431	35,843	290,329	51.4	149,229	6.9	23.3	31.6	37.8	8,454
MEASURED & INDICATED														
No. 1 SEAM	6.85	8,978,857	79,902,939	820,400	8,140,982	-	7,733,932	62.2	4,786,046	5.1	20.1	33.0	41.7	9,019
No. 2 SEAM	3.66	8,639,333	41,144,234	1,153,800	6,997,702	503,309	5,844,881	79.2	4,619,414	5.7	12.4	34.8	46.9	10,135
No. 3 SEAM	2.40	9,329,354	29,084,591	1,398,600	4,967,950	268,559	4,229,361	59.4	2,499,302	5.0	9.7	32.5	42.9	9,203
TOTALS	12,91	26,947,544	150,131,765	3,372,800	20,106,634	772,049	17,808,174	68.2	11,904,762	5.2	14.8	33.7	44.2	9,555

TABLE V

PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

ILLTYD CREEK DEPOSIT (BLOCK B)

SUMMARY OPEN PIT - MINEABLE RESERVE DATA - TO A CUT-OFF WASTE TO COAL TO BASE OF SEAM 3 OF 8:1

	AVERAGE THICKNESS (m)	TOTAL AREA (m^2)	IN-SITU MINEABLE TONNES	RESERVES TO 8:1 CUT-OFF: AREA (m^2)	IN-SITU TONNES	LESS GEOL. LOSSES (where applicable)	MINING RECOVERABLE TONNES	YIELD @1.90sg	SALES TONNES	SALES SPECIFICATIONS: RM %	ASH %	VOL. %	FC %	SPECIFIC ENERGY BTU's/LB
MEASURED														
NO. 1 SEAM	6.96	7,060,921	63,866,892	1,945,800	19,319,700	213,953	18,133,360	61.7	11,107,950	5.0	20.4	32.9	41.7	9,018
NO. 2 SEAM	3.66	7,190,298	34,179,153	2,418,800	14,376,365	894,436	12,133,736	79.9	9,667,553	5.4	12.9	34.6	46.9	10,071
NO. 3 SEAM	2.33	7,353,723	22,880,741	2,374,000	8,470,784	350,825	7,307,963	59.0	4,290,276	5.0	19.1	32.5	43.1	9,199
TOTALS	12.91	21,604,944	120,926,786	6,801,600	42,166,849	1,477,214	37,575,059	68.3	25,065,779	5.2	16.8	33.6	44.3	9,520
INDICATED														
NO. 1 SEAM	6.43	9,917,936	16,036,047	-	-	-	-	-	-	-	-	-	-	-
NO. 2 SEAM	3.70	1,449,035	6,965,081	-	-	-	-	-	-	-	-	-	-	-
NO. 3 SEAM	2.42	1,975,629	6,203,851	165,000	645,645	64,565	522,972	51.4	268,808	6.9	23.3	31.6	37.8	8,454
TOTALS	12.55	6,342,600	29,204,979	165,600	645,645	64,565	522,972	51.4	268,808	6.9	23.3	31.6	37.8	8,454
MEASURED & INDICATED														
NO. 1 SEAM	6.85	8,978,857	79,902,939	1,945,800	19,319,700	231,953	18,133,360	61.7	11,107,950	5.0	20.4	32.9	41.7	9,018
NO. 2 SEAM	3.66	8,639,333	41,144,234	2,481,800	14,376,365	894,436	12,133,736	79.9	9,667,553	5.4	12.9	34.6	46.9	10,071
NO. 3 SEAM	2.40	9,329,354	29,084,591	2,539,000	9,116,429	415,390	7,830,935	58.6	4,559,084	5.1	19.3	43.5	42.8	9,160
TOTALS	12.91	26,947,544	150,131,765	6,966,600	42,812,494	1,541,779	38,098,031	68.1	25,334,587	5.2	16.9	33.6	44.2	9,511

TABLE VI

PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

ILLTYD CREEK DEPOSIT (BLOCK B)

SUMMARY OPEN PIT - MINEABLE RESERVE DATA - TO A CUT-OFF WASTE TO COAL TO BASE OF SEAM 3 OF 10:1

	AVERAGE THICKNESS (m)	TOTAL AREA (m^2)	IN-SITU MINEABLE TONNES	RESERVES TO 10:1 CUT-OFF						SALES SPECIFICATIONS				
				AREA (m^2)	IN-SITU TONNES	LESS GEOLOGICAL LOSSES (Where Applicable)	MINING RECOVERABLE TONNES	YIELD @ 1.90sg	SALES TONNES	RM %	ASH %	VOL. %	FC %	SPECIFIC ENERGY BTU's/LB
MEASURED														
No. 1 SEAM	6.96	7,060,921	63,866,892	3,088,400	29,921,617	461,843	27,986,785	62.2	17,306,318	5.0	20.1	32.9	42.1	9,089
No. 2 SEAM	3.66	7,190,298	34,179,153	3,652,800	20,930,741	894,436	18,032,675	79.2	14,239,234	5.3	13.3	34.7	46.5	10,019
No. 3 SEAM	2.33	7,353,723	22,880,741	3,449,600	12,178,611	400,647	10,600,168	58.6	6,175,422	4.9	19.2	32.6	43.0	9,185
TOTALS	12.91	21,604,944	120,926,786	10,190,800	63,030,969	1,756,926	56,619,627	68.0	37,720,974	5.1	17.0	33.6	44.2	9,511
INDICATED														
No. 1 SEAM	6.43	1,917,936	16,036,047	122,600	1,257,472	125,747	1,075,139	66.4	713,629	5.0	13.5	35.1	45.9	10,124
No. 2 SEAM	3.70	1,449,035	6,965,081	122,600	1,054,074	105,407	853,800	79.5	678,607	5.3	13.2	34.1	46.9	10,167
No. 3 SEAM	2.42	1,975,629	6,203,851	366,400	1,303,032	130,303	1,055,456	56.1	583,924	5.8	24.4	30.8	38.8	8,419
TOTALS	12.55	6,342,600	29,204,979	611,600	3,614,678	361,457	2,984,395	67.9	1,976,160	5.3	16.0	33.6	44.6	9,725
MEASURED & INDICATED														
No. 1 SEAM	6.85	8,978,857	79,902,939	3,211,000	31,179,089	587,590	29,061,924	62.4	18,019,947	5.0	19.8	33.0	42.3	9,133
No. 2 SEAM	3.66	8,639,333	41,144,234	3,775,400	21,984,815	999,843	18,886,475	79.2	14,917,841	5.3	13.3	34.7	46.5	10,026
No. 3 SEAM	2.40	9,329,354	29,084,591	3,816,000	13,481,643	530,950	11,655,624	58.4	6,759,346	5.0	19.6	32.5	42.7	9,121
TOTALS	12.91	26,947,544	150,131,765	10,802,400	66,645,547	2,118,383	59,604,023	68.0	39,697,134	5.1	16.9	33.7	44.2	9,522

gon area adjacent to the southern boundary fault and to those polygons open down dip. (The selection of 10% is arbitrary and the application subjective).

vi) a mining recovery of 65% was applied to all seams. (This figure is considered conservative but should be adequate no matter what the method of underground mining selected).

vii) a yield factor determined for each polygon from analytical results was applied to determine sales tonnes. (The yield was determined for a mathematically recombined percentage of the ¼" x 28M fraction at -1.90 s.g. and 100% of the 28M x 0 fraction over the selected thickness interval).

viii) The specifications of the sales product for each polygon area was determined from analytical results in the same manner as yield above. The overall specifications are calculated on a weighted distribution basis.

A summary of the calculated reserves is tabulated in Table VII. Details of the calculations are tabulated in Appendix B inclusive.

The detailed mining method for the Illtyd Creek Deposit has not yet been determined and may incorporate a combination of strip mining and underground mining. Details of mining will be forthcoming upon extensive studies of alternate mining methods.

WERNECKE DEPOSIT (BLOCK A)

The Wernecke Deposit area occurs on the north flank of the Wernecke Mountains between Illtyd Creek to the east and the Wind River to the west (Location Map C-0676). The area is bounded on the south by over-riding Proterozoic age rocks along the Wernecke thrust and to the north by Cambrian rocks juxtaposed against Cretaceous rocks along a splay of the Deslauriers Fault.

TABLE VII

PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

ILLTYD DEPOSIT (BLOCK B)

SUMMARY UNDERGROUND MINING RESERVE DATA - TO A DEPTH OF 300 m.

	AVERAGE THICKNESS (m)	TOTAL AREA (m^2)	UNDERGROUND MINEABLE TONNES	GEOLOGICAL LOSSES OF 10 % (WHERE APPLICABLE)	UNDERGROUND RECOVERABLE TONNES (65%)	YIELD @ 1.90 s.g.	SALES TONNES	RM %	ASH %	VOL. %	FC %	SPECIFIC ENERGY BTU'S/LB.
MEASURED												
No. 1 Seam	3.53	7,060,921	32,416,397	1,404,329	20,157,844	69.9	13,820,991	5.2	16.1	34.0	44.4	9,623
No. 2 Seam	2.89	7,190,298	26,973,452	1,079,101	16,831,329	81.0	13,508,880	5.4	13.1	34.5	46.8	10,000
No. 3 Seam	2.17	7,353,725	20,707,523	1,076,736	12,760,012	63.9	8,001,238	4.9	19.1	32.7	43.0	9,225
TOTAL MEASURED	8.59	21,604,944	80,097,372	3,560,166	49,749,185	72.78	35,331,109	5.2	15.4	34.0	45.1	9,704
INDICATED												
No. 1 Seam	3.40	1,917,936	8,469,964	846,996	4,954,929	76.7	3,741,174	5.8	14.5	33.5	45.9	9,852
No. 2 Seam	2.84	1,449,035	5,346,800	534,680	3,127,878	83.6	2,611,846	6.2	13.5	33.5	46.5	10,047
No. 3 Seam	2.17	1,975,629	5,583,523	558,352	3,266,361	69.8	2,166,872	5.7	19.6	32.3	42.1	9.143
TOTAL INDICATED	8.41	5,342,600	19,400,287	1,940,028	11,349,168	77.1	8,519,892	5.9	15.3	33.2	45.2	9,754
MEASURED & INDICATED												
No. 1 Seam	3.50	8,978,857	40,886,361	2,251,325	25,112,773	71.35	17,562,165	5.3	15.7	33.9	44.7	9,675
No. 2 Seam	2.88	8,639,333	32,320,252	1,613,781	19,959,207	81.4	16,120,726	5.5	13.2	34.3	46.0	10,008
No. 3 Seam	2.17	9,329,354	26,291,046	1,635,088	16,026,373	65.2	10,168,110	5.1	19.2	32.6	42.8	9,206
TOTAL MEASURED & INDICATED	8.55	26,947,544	99,497,659	5,500,194	61,098,353	73.6	43,851,001	5.3	15.4	33.8	44.8	9,714
MEASURED												
No. 1 Seam	3.53	7,060,921	32,416,397	1,404,329	20,157,844	69.9	13,820,991	5.2	16.1	34.0	44.4	9,623
No. 2 Seam	2.89	7,190,298	26,973,452	1,079,101	16,831,329	81.0	13,508,880	5.4	13.1	34.5	46.8	10,000
TOTAL MEASURED	6.42	14,251,219	59,389,849	2,483,430	36,989,173	75.4	27,336,821	5.3	14.5	34.3	45.7	9,823
INDICATED												
No. 1 Seam	3.40	1,917,936	8,469,964	846,996	4,954,929	76.7	3,741,174	5.8	14.5	33.5	45.9	9,852
No. 2 Seam	2.84	1,449,035	5,346,800	534,680	3,127,878	83.6	2,611,846	6.2	13.5	33.5	46.5	10,047
TOTAL INDICATED	6.24	3,366,971	13,816,764	1,381,676	8,082,807	79.5	6,353,020	6.0	14.1	33.5	46.2	9,936
MEASURED & INDICATED												
No. 1 Seam	3.50	8,978,857	40,886,361	2,251,325	25,112,773	71.35	17,562,165	5.3	15.7	33.9	44.7	9,675
No. 2 Seam	2,88	8,639,333	32,320,252	1,613,781	19,959,207	81.4	16,120,726	5.5	13.2	34.3	46.0	10,008
TOTAL MEASURED & INDICATED	6.38	17,618,190	73,206,613	3,865,106	45,071,980	76.2	33,682,891	5.4	14.4	34.1	45.4	9,845

The basic structure of the Wernecke Deposit area is a monocline dipping south at 25^{o} to 35^{o}. The deposit has a well defined strike length of 4500m and a partially obscured strike length of a further 2500m (Drawing D-0764). Insufficient outcrop and/or topographic expression restricts further projection; however, future drilling may extend the strike length.

Outcrop over the Wernecke Deposit consists primarily of conglomerates and sandstones with recessive zones representing siltstones, shales or mudstones and coal horizons. Coal seams outcrop under a thick conglomerate in a creek at the east end of the deposit. Drill hole BP-78-1 was collared in the thick conglomerate adjacent to these showings and intersected two coal seam horizons. The horizons are correlated to the No. 1 Seam Horizon and No. 2 Seam Horizon, of the Illtyd Deposit.

No. 1 Seam Horizon

The No. 1 Seam Horizon has a thickness of 8.49m, however, only the upper 5.65m is considered mineable. The No. 1 Seam Horizon is in sharp contact with the overlying thick conglomerate unit. The conglomerate is usually sound. The floor of the horizon is carbonaceous shale and breaks down rapidly upon exposure.

No. 2 Seam Horizon

The No. 2 Seam Horizon has a thickness of 9.51m, and occurs 30m below the No. 1 Seam Horizon. Intervening strata is predominately conglomerate with interbeds of sandstone. The roof is a medium grained sandstone and is sound. The floor of the horizon is carbonaceous shale grading into mudstone which breaks down rapidly upon exposure.

No. 3 Seam Horizon

Drill hole BP-78-1 was not drilled deep enough to intersect the No. 3 Seam Horizon; however, coal float in recessive zones below

the No. 2 Seam Horizon indicates the existence of the horizon. This horizon has been included as inferred coal reserves within the Wernecke Deposit.

In Situ Geological Coal Reserves

In situ geological coal reserves underlying the Wernecke Deposit were determined utilizing the following assumptions, method and parametres:

i) assume a monocline configuration with an average dip of 30^{o}.

ii) assume a) No. 1 Seam Horizon has a thickness of 5.65m.
b) No. 2 Seam Horizon has a thickness of 9.51m.
c) No. 3 Seam Horizon has a thickness of 2.64m (average thickness of horizon at Illtyd Creek).

iii) assume a) strike length of 4500m for indicated reserves for the No. 1 and No. 2 Horizons.
b) strike length of 2500m for inferred reserves for the No. 1 and No. 2 Horizons.
c) strike length of 7000m for inferred reserves for the No. 3 Horizon.

iv) assume a constant plan width of 450m to a depth of 300m.

v) a 1.30 s.g. factor is used to determine tonnage. The in situ geological reserves for the Wernecke Deposit are tabulated in Table VIII.

AIRSTRIP DEPOSIT (BLOCK C)

The airstrip Deposit area occurs to the west of Wind River, approximately 6km due west of the Wernecke Deposit. The deposit is bounded to the north and east by the Wind River, to the south by the projected subcrop trace of the No. 3 Seam Horizon and to the west by a break in the topographic expression 5500m west of the Wind River (Location Map C-0676).

TABLE VIII

PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

TABLE OF IN-SITU INDICATED & INFERRED RESERVES: ALL AREAS EXCLUDING ILLTYD DEPOSIT (BLOCK B)

	THICKNESS (m)	STRIKE LENGTH (m)	PLAN WIDTH (m)	AREA (m^2)	VOLUME (m^2)	TONNES (Factor of 1.3)
WERNECKE DEPOSIT (BLOCK A)						
INDICATED						
NO. 1 SEAM	5.65	4,500	450	2,025,000	11,441,250	14,873,625
NO. 2 SEAM	9.51	4,500	450	2,025,000	19,257,750	25,035,075
TOTAL						39,908,700
INFERRED						
NO. 1 SEAM	5.65	2,500	450	1,125,000	6,356,250	8,263,125
NO. 2 SEAM	9.51	2,500	450	1,125,000	10,698,750	13,908,375
NO. 3 SEAM	2.64	7,000	450	3,150,000	8,316,000	10,810,800
TOTAL						32,982,300
TOTAL INFERRED & INDICATED						72,891,000
AIRSTRIP DEPOSIT (BLOCK C)						
INDICATED						
NO. 1 SEAM	5.50	5,500	750	4,125,000	22,687,500	29,493,750
NO. 2 SEAM	4.89	5,500	1,050	5,775,000	28,239,750	36,711,675
TOTAL						66,205,425
INFERRED						
NO. 3 SEAM	2.64	5,500	1,500	8,250,000	21,780,000	28,314,000
TOTAL INDICATED & INFERRED						94,519,425
WIND RIVER DEPOSIT (BLOCK D)						
INDICATED (Northern Block)						
NO. 1 SEAM	8.00	1,000	450	450,000	3,600,000	4,680,000
NO. 2 SEAM	4.53	1,400	1,100	1,540,000	6,976,200	9,069,060
TOTAL						13,749,060
INFERRED (Northern Block)						
No. 3 Seam	2,41	1,400	1,150	1,610,000	3,880,100	5,044,130
No. 4 Seam	1.39	1,400	1,200	1,680,000	2,335,200	3,035,760
No. 5 Seam	8.84	1,400	1,400	1,960,000	17,326,400	22,524,320
TOTAL						30,664,210
INDICATED (Southern Block)						
No. 2 Seam	5.28	600	350	210,000	1,108,800	1,441,440
No. 3 Seam	2.41	750	550	412,500	994,125	1,292,363
No. 4 Seam	1,39	850	750	637,500	886,125	1,151,962
No. 5 Seam	8.84	1,100	1,300	1,430,000	12,641,000	16,433,560
TOTAL						20,319,325
TOTAL INDICATED & INFERRED						64,672,595
TOTAL INDICATED & INFERRED FOR ALL AREAS EXCLUDING ILLTYD DEPOSIT						232,083,020

The basic structure of the Airstrip Deposit is a west-northwest east-southeast trending syncline having an apparent length of 5500m and a width of 1500m (Drawing D-0765). The syncline appears to be non-plunging and observed dips along the Wind River progressively steepen to 30^{o} to 40^{o} along the trace of the No. 3 Seam.

Outcrops along the Wind River consist of small pebble conglomerates and medium grained to conglomeratic sandstones with recessive zones in which coal seams occur. The No. 1 Seam Horizon, No. 2 Seam Horizon and a lower horizon thought to be the No. 3 Horizon all outcrop along the Wind River. Drill Hole A-79-23 was collared in a small to medium pebble conglomerate correlated to the thick conglomerate unit of the Illtyd Creek Area and was terminated after intersecting the No. 1 and No. 2 Seam Horizons.

No. 1 Seam Horizon

The No. 1 Seam Horizon has a thickness of 5.5m. The horizon is overlain by shale which breaks down rapidly upon exposure. In this area the No. 1 Seam Horizon is separated from the overlying conglomerate by 8.34m of shale. The floor of the No. 1 Seam Horizon is shale.

No. 2 Seam Horizon

The No. 2 Seam Horizon has a thickness of 4.89m and occurs 58m below the No. 1 Seam Horizon. Intervening strata is interbedded shale and sandstone with few beds of small to medium pebble conglomerate. The hanging wall of the horizon is shale which becomes carbonaceous as the horizon is approached. The floor of the horizon is gradational from carbonaceous shale, through shale to sandstone over 1.63m.

No. 3 Seam Horizon

Hole A-79-23 was terminated before intersecting the No. 3 Seam Horizon. However, a coal horizon thought to be the No. 3 Seam Horizon was traced along the Wind River for a distance of 2500m. The No. 3 Seam Horizon has been included in inferred reserves for the Airstrip Deposit.

In Situ Geological Coal Reserves

In situ geological coal reserves underlying the Airstrip Deposit were determined utilizing the following assumptions, method and parameters:

i) assume a syncline configuration.

ii) assume a) No. 1 Seam Horizon has a thickness of 5.5m.
b) No. 2 Seam Horizon has a thickness of 4.89m.
c) No. 3 Seam Horizon has a thickness of 2.64m.

iii) assume a strike length of 5500m for indicated and inferred reserves.

iv) assume a plan width of a) 750m for No. 1 Horizon.
b) 1050m for No. 2 Horizon.
c) 1500m for No. 3 Horizon.

v) a 1.30 s.g. factor is used to determine tonnage.

The in situ geological reserves for the Airstrip Deposit are tabualted in Table VIII.

WIND RIVER DEPOSIT (BLOCK D)

The Wind River Deposit area occurs on the west bank of the Wind River approximately 27km north of the Airstrip Deposit and 5500m south of the confluence with Illtyd Creek (Location Map C-0676). The deposit area occurs as a hill with a local relief of 180m capped by a granule conglomeratic sandstone.

The basic structure of the deposit is best described as a gently-dipping monocline with dips from 5 to 20° to the northeast. The area is divided into two blocks; a northern block and a southern block separated by an east-west fault against which the northern block has been displaced downwards relative to the southern block. The Wind River Deposit area is delimited in areal extent by the interpreted subcrop traces of coal seams, by the Wind River and to the north by a break in topographic expression (Drawing D-0766). Several coal occurrences adjacent to the north of the outlined area indicate increased potential in that direction; however, due to a lack of structural information have been excluded from reserves at this time.

Outcrops over the Wind River Deposit consist of conglomerates and medium grained to conglomeratic sandstones forming ridges up the east side of the hill separated by recessive zones which contain coal seam. Coal occurs intermittently along the Wind River underlying a persistent conglomeratic sandstone ridge. Further up the hill coal wash was encountered underlying a medium to large pebble conglomerate ridge. Drill hole W-79-1 was collared at the top of this ridge and intersected horizons tentatively correlated to the No. 1 Seam Horizon and the No. 2 Seam Horizon of the Illtyd Deposit. Hole W-79-6/6A was collared 1200m southeast of W-79-1 in the granule conglomeratic sandstone capping the hill. Four coal horizons were intersected in this hole; the upper two horizons have tentatively been correlated with the No. 2 Seam Horizon and No. 3 Seam Horizon of the Illtyd deposit and the lower two horizons are termed the No. 4 Seam Horizon and No. 5 Seam Horizon.

No. 1 Seam Horizon

The No. 1 Seam Horizon has a thickness of 8.0m. The horizon is overlain by a pebble conglomerate separated by a o.15m bed of medium to coarse grained sandstone. The conglomerate is moderately sound but exhibits weathering throughout decreasing with depth. The floor of the horizon is mudstone grading to sandstone over 3.5m. The mudstone breaks down rapidly upon exposure.

No. 2 Seam Horizon

The No. 2 Seam Horizon has a thickness of 4.53m in hole W-79-1 and 5.28m in hole W-79-6/6A. The horizon is in sharp contact with a sound conglomeratic sandstone to conglomerate hanging wall. The floor of the horizon is carbonaceous shale to shale which breaks down rapidly upon exposure.

No. 3 Seam Horizon

The No. 3 Seam Horizon has a thickness of 2.60m, however, only 2.41m is considered mineable. The hanging wall is gradational from sandstone, through carbonaceous shale to coal. The floor is gradational from carbonaceous shale, through shale to sandstone over an interval of 1.0m.

No. 4 Seam Horizon

The No. 4 Seam Horizon has a thickness of 1.39m. The hanging wall is carbonaceous shale and shale and breaks down rapidly upon exposure. The floor is a shale grading downwards into sandstone over an interval of 4.0m.

No. 5 Seam Horizon

The No. 5 Seam Horizon has a thickness of 9.75m; however, only the upper 8.84m is considered mineable. The hanging wall is shale and breaks down rapidly upon exposure. The floor is a sound fine-grained sandstone.

In Situ Geological Reserves

In situ geological coal reserves underlying the Wind River Deposit were determined utilizing the following assumptions, method and parameters:

i) assume a gently dipping monocline configuration.

ii) assume two blocks separated by an east-west fault and defined by drill hole W-79-1 into the northern block and by drill hole W-79-6/6A into the southern block.

iii) assume No. 3, No. 4 and No. 5 Seam Horizons occur underlying the northern block.

iv) assume a) No. 1 Seam Horizon is 8.0m thick,
b) No. 2 Seam Horizon is 4.53m thick in northern block; and is 5.28m thick in southern block,
c) No. 3 Seam Horizon is 2.41m thick,
d) No. 4 Seam Horizon is 1.39m thick.
e) No. 5 Seam Horizon is 8,84m thick,

v) assume areal extent in northern block is:
a) 450,000m^2 for No. 1 Seam Horizon.
b) 1,540,000m^2 for No. 2 Seam Horizon,
c) 1,610,000m^2 for No. 3 Seam Horizon.
d) 1,680,000m^2 for No. 4 Seam Horizon.
e) 1,960,000m^2 for No. 5 Seam Horizon,

vi) assume areal extent in southern block is:

a) 210,000m^2 for No. 2 Seam Horizon.

b) 412,500m^2 for No. 3 Seam Horizon.

c) 637,600m^2 for No. 4 Seam Horizon.

d) 1,430,000m^2 for No. 5 Seam Horizon.

vii) assume a) all reserves in the southern block are indicated.

b) reserves of No. 1 and No. 2 Seam Horizons in the northern block are indicated.

c) reserves of No. 3, No. 4 and No. 5 Seam Horizons in the northern block are inferred.

viii) a 1.30 s.g. factor is used to determine tonnage.

The in situ geological reserves for the Wind River Deposit are tabulated on Table VIII.

OTHER AREAS

Several other areas of Lower Bonnet Plume Formation containing known coal seams have been located in the basin and contain speculative reserves of considerable potential. Although no determination has been made for speculative reserves the total insitu geological reserves for the basin could be increased to greater than 1 billion tonnes.

APPENDIX AI

PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

ILLTYD CREEK DEPOSIT (BLOCK B)

OPEN PIT - MINEABLE RESERVE DATA NO. 1 SEAM HORIZON

	INTERVAL FROM (m)	INTERVAL TO (m)	THICKNESS (m)	TOTAL AREA POLYGON (m^2)	VOLUME (v) OF COAL (m^3)	TONNES (t) FACTOR OF 1.30	YIELD %	RM %	ASH %	VOL. %	FC %	SPECIFIC ENERGY BTU's/LB	AREA @ 4:1 RATIO (m^2)	TONNES @ 4:1 RATIO	LESS GEOL. LOSSES (where applicable)	MINEABLE TONNES (Recovery 65%	YIELD @ -1.90sg %	SALES TONNES	AREA @ 6:1 RATIO (m^2)	TONNES @ 6:1 RATIO	LESS GEOL.LOSSES (where applicable)	MINEABLE TONNES (where applicable)	YIELD @-1.90 sg %	SALES TONNES	AREA @ 8:1 RATIO (m^2)	TONNES @ 8:1 RATIO	LESS GEOL. LOSSES (where applicable)	MINEABLE TONNES @Recovery 65%)	YIELD @ -19.0sg %	SALES TONNES	AREA @ 10:1 RATIO (m^2)	TONNES @ 10:1 RATIO	LESS GEOL. LOSSES (where applicable)	MINEABLE TONNES @ Recovery 65%)	YIELD @-1.90sg %	SALES TONNES
MEASURED																																					
BP-78-2	23.47	30.74	7.27	246,383	1,791,201	2,328,562	62.6	6.1	16.0	33.9	44.0	9,559	81,000	765,531		727,254	62.6	455,261	221,400	2,092,451		1,987,829	62.6	1,244,381	250,600	2,368,421		2,250,000	62.6	1,408,500	250,600	2,368,421		2,250,000	62.6	1,408,500
BP-78-3	94.70	100.50	5.80	502,154	2,912,495	3,786,245	64.1	6.0	25.8	30.7	37.6	8,291							18,800	141,752		134,664	64.1	86,320	91,200	687,648		653,266	64.1	418,743	175,000	1,319,500		1,253,525	64.1	803,510
BP-79-7	32.18	35.78	3.60	376,723	1,356,202	1,763,063	53.6	4.9	17.0	34.5	43.4	9,424													21,000	98,280		93,366	53.6	50,044	92,200	431,496		409,921	53.6	219,718
BP-79-8	88.68	96.67	7.99	288,229	2,302,948	2,993,832	63.7	4.1	22.0	33.2	40.6	8,772	36,800	382,242		363,130	63.7	231,314	100,400	1,042,855		990,712	63.7	631,084	281,200	2,920,824		2,774,783	63.7	1,767,537	288,400	2,995,611		2,845,830	63.7	1,812,794
BP-79-9	134.82	144.68	9.86	331,672	3,270,285	4,251,371	51.7	4.7	22.3	32.1	40.7	8,764	14,400	184,579		175,350	51.7	90,656	49,000	628,082		596,678	51.7	308,482	221,000	2,832,778		2,691,139	51.7	1,391,319	299,800	3,842,836		3,650,694	51.7	1,887,409
BP-79-10	237.84	245.73	7.89	670,693	5,291,770	6,879,301	65.2	4.6	17.6	34.4	43.4	9,379																			32,200	330,275		313,762	65.2	204,573
BP-79-11	133.51	141.66	8.15	499,323	4,069,485	5,290,330	60.1	5.4	22.5	32.6	39.5	8,561							66,800	688,641		654,209	66.4	434,395	50,600	536,107		509,302	60.1	306,090	227,800	2,413,541		2,292,864	60.1	1,378,011
BP-79-12A	110.34	118.27	7.93	444,052	3,530,215	4,589,279	66.4	5.0	13.4	35.1	46.0	10,163							22,400	191,027		181,476	65.4	118,685	225,000	2,319,525	231,953	1,983,194	66.4	1,316,841	448,000	4,618,432	* 461,843	3,948,759	66.4	2,621,976
BP-79-13	125.05	131.61	6.56	645,293	4,233,127	5,503,066	65.4	4.4	19.1	33.1	43.1	9,355													140,400	1,197,331		1,137,465	65.4	743,902	395,000	3,368,560		3,200,132	65.4	2,092,886
BP-79-14	88.42	96.89	6.47	304,715	1,971,507	2,562,959	68.3	4.2	20.8	32.8	45.7	9,021	9,200	77,381		73,512	68.3	50,209	37,200	312,889		297,245	68.3	203,018	103,200	868,015		824,614	68.3	563,212	261,800	2,202,000		2,091,900	68.3	1,428,768
BP-79-15	218.05	225.10	7.05	676,780	4,771,297	6,202,686	62.5	4.9	20.1	31.6	42.3	9,197																								
BP-79-16A	COAL HORIZONS NOT INTERSECTED																																			
BP-79-17A	303.88	310.90	7.02	406,153	2,851,193	3,706,551	48.3	3.9	22.8	30.0	42.8	8,892																								
BP-79-18	22.38	31.47	9.09	288,229	2,620,000	3,405,999	65.1	4.5	24.6	32.3	38.0	8,065	51,000	602,667		572,534	65.1	372,719	91,000	1,075,347		1,021,580	65.1	665,048	112,800	1,332,958		1,266,310	65.1	824,368	112,800	1,332,958		1,266,310	65.1	824,368
BP-79-19 Analytical results interpolated from BP-79-8 and BP-79-9	58.36	59.65	6.87	* 239,997	1,648,778	2,143,411	57.7	4.4	22.2	32.6	40.65	8,758	65,200	582,301		553,186	57.7	319,188	126,600	1,130,665		1,074,131	57.7	619,774	239,600	2,139,866		2,032,874	57.7	1,172,968	239,600	2,139,868		2,032,874	57.7	1,172,968
	61.12	66.70					Not Sampled for Analysis																													
BP-79-20	75.55	77.04											6,400	61,734		58,648	59.7	35,013	86,800	837,273		795,409	59.7	474,859	209,200	2,017,943		1,917,046	59.7	1,144,476	265,200	2,558,119		2,430,213	59.7	1,450,837
	78.57	84.50	7.42	304,764	2,261,348	2,939,752	59.7	6.8	23.7	30.5	38.6	8,736																								
BP-79-21	123.08	126.21	3.13	411,127	1,286,826	1,672,874	58.7	6.9	27.1	29.7	35.8	7,758																								
BP-79-22A	191.63	198.60	6.97	424,634	2,959,702	3,847,612	62.4	6.0	17.1	32.4	44.2	9,480																								
TOTALS			6.96	7,060,921	49,128,378	63,866,892							264,000	2,656,436		2,390,792	61.8	1,554,360	820,400	8,140,982		7,733,932	62.2	4,786,046	1,945,800	19,319,700	231,953	18,133,360	61.7	11,107,950	3,088,400	29,921,617	461,843	27,986,785	62.2	17,306,318
INDICATED																																				
BP-79-10	237.84	245.73	7.89	26,000	205,141	266,683	65.2	4.6	17.6	34.4	43.4	9,379																								
BP-79-12A	110.34	118.27	7.93	272,331	2,165,033	2,814,543	66.4	5.0	13.4	35.1	46.0	10,163																								
BP-79-13	125.05	131.61	6.56	168,785	1,107,232	1,439,401	65.4	4.4	19.1	33.1	43.1	9,355																								
BP-79-15	218.05	225.10	7.05	178,132	1,255,830	1,632,579	62.5	4.9	20.1	31.6	42.3	9,197																								
BP-79-17A	303.88	310.90	7.02	50,016	351,109	456,441	48.3	3.9	22.8	30.0	42.8	8,892																								
BP-79-21	123.08	126.21	3.13	330,977	1,035,957	1,346,744	58.7	6.9	27.1	29.7	35.8	7,758																								
BP-79-22A	191.63	198.60	6.97	891,696	6,215,119	8,079,655	62.4	6.0	17.1	32.4	44.2	9,480																								
TOTALS				1,917,936	12,335,421	16,036,047																									122,600	1,257,472	125,747	1,075,139	66.4	713,629
MEASURED & INDICATED TOTALS				8,978,857	61,463,799	79,902,939																									3,211,000	31,179,089	587,590	29,061,924	62.4	18,019,946

APPENDIX AII

PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

ILLTYD CREEK DEPOSIT (BLOCK B)

OPEN PIT - MINEABLE RESERVE DATA NO. 2 SEAM HORIZON

	INTERVALS FROM (m)	INTERVALS TO (m)	THICKNESS (m)	TOTAL AREA POLYGON (m^2)	VOLUME (v) OF COAL (m^3)	TONNES (t) FACTOR OF 1.30	YIELD %	RM %	ASH %	VOL. %	FC %	SPECIFIC ENERGY BTU's/LB	AREA @ 4:1 RATIO (m^2)	TONNES @ 4:1 RATIO	LESS GEOL. LOSSES (where applicalbe)	MINEABLE TONNES (Recovery 65%)	YIELD @-1.90sg %	SALES TONNES	AREA @ 6:1 RATIO (m^2)	TONNES @ 6:1 RATIO	LESS GEOL. LOSSES (where applicalbe)	MINEABLE TONNES (Recovery 65%)	YIELD @-1.90 sg %	SALES TONNES	AREA @ 8:1 RATIO (m^2)	TONNES @ 8:1 RATIO	LESS GEOL. LOSSES (where applicable)	MINEABLE TONNES (Recovery 65%)	YIELD @-1.90sg %	SALES TONNES	AREA @ 10:1 RATIO (m^2)	TONNES @ 10:1 RATIO	LESS GEOL. LOSSES (where applicable)	MINEABLE TONNES (Recovery 65%)	YIELD @-1.90 sg %	SALES TONNES
MEASURED																																				
BP-78-2	61.58	65.07	6.66	323,157	2,152,223	2,797,890	78.3	6.2	10.5	36.6	46.7	10,441	143,200	1,239,826	* 123,983	1,004,259	78.3	786,335	292,800	2,535,062	* 253,506	2,053,401	78.3	1,607,813	329,400	2,851,945	* 285,195	2,310,076	78.3	1,808,789	329,400	2,851,945	* 285,194	2,310,076	78.3	1,808,789
	66.84	70.01																																		
BP-78-3	119.77	121.65	2.43	542,632	1,318,597	1,714,176	85.6	6.0	19.4	31.8	42.8	9,044							57,600	181,958		163,763	85.6	140,181	129,400	408,775		367,897	85.6	314,920	207,800	656,440		590,796	85.6	505,722
BP-79-7	54.22	55.51	1.29	416,054	536,709	697,722													4,200	7,043		6,339	62.8	3,981	36,800	61,714		55,542	62.8	34,881	121,200	203,252		182,927	62.8	114,878
BP-79-8	113.83	116.57	2.74	289,642	793,619	1,031,705	80.2	5.6	11.2	34.8	48.4	9,876	37,200	132,506		119,256	80.2	95,643	98,600	351,213		316,092	80.2	253,506	280,800	1,000,210		900,189	80.2	721,951	289,800	1,032,268		929,041	80.2	745,091
BP-79-9	115.73	159.20	3.47	337,184	1,170,030	1,521,039	90.2	5.0	12.7	34.1	48.1	9,905	17,400	78,491		70,642	90.2	63,719	48,600	219,235		197,311	90.2	177,975	212,600	959,039		863,135	90.2	778,548	309,400	1,395,703		1,256,133	90.2	1,133,032
BP-79-10	259.69	262.87	3.18	649,531	2,065,510	2,685,163	83.9	4.1	12.9	35.6	47.4	9,899																			26,600	109,964		98,968	83.9	83,034
BP-79-11	156.98	161.33	4.35	499,323	2,172,056	2,823,673	74.9	6.3	13.2	35.5	44.8	9,859																			390,600	2,208,843		1,987,959	74.9	1,688,981
BP-79-12A	155.03	159.10	6.65	612,661	4,074,196	5,296,455	79.5	5.3	13.2	34.1	46.9	10,140	6,600	57,057		51,351	79.5	40,824	239,400	2,069,613	* 206,961	1,676,387	79.5	1,332,727	610,600	5,278,637	* 527,864	4,275,696	79.5	3,399,178	610,600	5,278,637	* 527,864	4,275,696	79.5	3,399,178
	160.79	163.37																																		
BP-79-13	158.22	160.98	5.41	645,294	3,491,040	4,538,351	78.7	3.9	14.9	35.1	45.5	10,044							23,400	164,572		148,115	78.7	116,566	142,200	1,000,093		900,083	78.8	708,366	414,600	2,915,882		2,624,294	78.7	2,065,319
	165.60	168.25																																		
BP-79-14	116.69	119.83	3.25	676,780	1,199,534	2,859,394	84.2	5.9	13.3	34.0	46.6	10,048																								
	128.58	131.28	5.84	304,715	1,779,536	2,313,397	76.0	3.7	13.9	35.5	46.4	10,103							32,400	245,981		221,383	76.0	168,251	103,400	785,013		706,512	76.0	536,949	264,200	2,005,806		1,805,226	76.0	1,371,972
	249.32	252.57																																		
BP-79-15	Coal Horizons Not Intersected																																			
BP-79-16A																																				
BP-79-17A	331.88	334.05	2.17	327,110	709,830	922,779	74.4	3.6	15.3	33.3	47.6	9,925																								
BP-79-18	58.52	61.67	3.15	131,127	413,051	536,967	72.7	5.3	13.4	32.3	48.7	10,002	68,800	281,736		253,562	72.7	184,340	109,000	446,355		401,720	72.7	292,050	129,400	529,893		476,904	72.7	346,709	129,400	529,893		476,904	72.7	346,709
BP-79-19 Analytical results interpolated from BP-79-8 & BP-79-9	84.52	87.01	2.49	258,353	643,299	836,289	85.2	* 5.3	* 11.9	* 34.45	* 48.3	* 9,890	72,400	234,359	* 23,436	189,831	85.2	161,736	132,600	429,226	* 42,923	347,673	85.2	296,218	251,400	813,782	* 81,378	659,163	85.2	561,607	251,400	813,782	* 81,378	659,163	85.2	561,607
BP-79-20	98.14	100.46	2.32	340,973	791,056	1,028,373	73.6	7.8	14.7	32.1	45.2	9,570	21,200	63,939		54,545	73.6	42,353	115,200	347,443		312,699	73.6	230,146	249,600	652,205		586,984	73.6	432,020	307,800	928,325		835,492	73.6	614,922
BP-79-21	144.40	146.41	2.01	411,127	826,364	1,074,274	78.3	7.4	23.3	28.7	40.4	8,318																								
BP-79-22A	221.84	224.56	2.72	424,634	1,155,006	1,501,507	84.1	6.9	12.8	33.2	47.0	10,134																								
TOTALS				7,190,298	26,291,656	34,179,153							366,800	2,087,914	147,419	1,746,445	78.9	1,374,950	1,153,800	6,997,702	503,390	5,844,881	79.2	4,619,414	2,481,800	14,376,365	894,436	12,133,736	79.9	9,667,553	3,632,800	20,930,741	894,436	18,032,675	79.2	14,239,234
INDICATED																																				
BP-79-10	259.69	262.87	3.18	5,404	17,185	22,340	83.9	4.1	12.9	35.6	47.4	9,899																								
BP-79-12A	155.03	159.10	6.65	269,564	1,792,601	2,330,381	79.5	5.3	13.2	34.1	46.9	10,170																			119,000	1,028,755	102,876	833,292	79.5	662,467
	160.79	163.37																																		
BP-79-13	158.22	160.98	5.41	169,665	917,890	1,193,257	78.7	3.9	14.9	35.1	45.5	10,044																			3,600	25,319	1,532	20,508	78.7	16,140
	165.60	168.25																																		
BP-79-15	249.32	252.57	3.25	79,363	257,931	335,310	84.2	5.9	13.3	34.0	46.6	10,048																								
BP-79-17A	331.88	334.05	2.17	2,595	5,632	7,321	74.4	3.6	15.3	33.3	47.6	9,925																								
BP-79-21	144.40	146.41	2.01	200,746	403,500	524,549	78.3	7.4	23.3	28.7	40.4	8,318																								
BP-79-22A	221.84	224.56	2.72	721,697	1,963,016	2,551,920	84.1	6.9	12.8	33.2	47.0	10,134																								
TOTALS				1,449,036	5,357,755	6,965,081																									122,600	1,054,074	105,407	835,800	79.5	678,607
MEASURED & INDICATED TOTALS				8,639,334	31,649,411	41,144,234																									3,775,400	21,984,815	999,843	18,886,475	79.2	14,917,841

APPENDIX AIII

PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

ILLTYD CREEK DEPOSIT (BLOCK B)

IN SITU RESERVE DATA NO. 3 SEAM HORIZON

	INTERVAL FROM (m)	INTERVAL TO (m)	THICKNESS (m)	TOTAL AREA POLYGON (m^2)	VOLUME (v) OF COAL (m^3)	TONNES (t) FACTOR OF 1.30	YIELD %	RM %	ASH %	VOL. %	FC %	SPECIFIC ENERGY BTU's/LB	AREA @ 4:1 RATIO (m^2)	TONNES @ 4:1 RATIO	LESS GEOLOGICAL LOSSES @ 10% (where applicable)	MINEABLE TONNES (Recovery 90%)	YIELD @-1.90sg %	SALES TONNES	AREA @ 6:1 RATIO (m^2)	TONNES @ 6:1 RATIO	LESS GEOL. LOSSES @ 10% (where applicable)	MINEABLE TONNES (Recovery 65%)	YIELD @-1.90sg %	SALES TONNES	AREA @ 8:1 RATIO (m^2)	TONNES @ 8:1 RATIO	LESS GEOL.LOSSES @ 10%(where applicable)	MINEABLE TONNES (Recovery 65%)	YIELD @-1.90 sg %	SALES TONNES	AREA @ 10:1 RATIO (m^2)	TONNES @ 10:1 RATIO	LESS GEOL. LOSSES @ 10%(where applicable)	MINEABLE TONNES Recovery 65%	YIELD @-1.90 s.g.	SALES TONNES
MEASURED																																				
BP-78-2 Note: washed @ -1.70s.g.	81.76	83.67	1.91	332,901	635,842	826,594	59.6	4.0	15.8	35.2	44.9	9,889	171,400	425,586	42,559	344,725	59.6	205,456	309,600	768,737	*76,874	622,677	59.6	371,115	334,800	831,308	*83,131	673,360	59.6	401,322	334,800	831,308	*83,131	673,359	59.6	401,322
BP-78-3	Not Intersected						-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14,405	42.9	6,180	80,800	119,746	-	107,771	42.9	46,234	181,600	269,131	-	242,218	42.9	103,912
BP-79-7	78.00	79.14	1.14	406,664	463,597	602,676	42.9	7.0	24.5	33.2	35.0	8,163	-	-	-	-	-	-	-	-	-	360,051	55.9	201,269	298,800	1,110,938	-	999,845	55.9	558,913	298,800	1,110,938	-	999,845	55.9	558,913
BP-79-8	134.42	137.28	2.86	308,649	882,738	1,147,559	55.9	5.7	13.7	35.0	45.5	9,794	54,400	202,259	-	182,033	55.9	101,757	107,600	400,057	-	221,996	54.4	120,766	221,400	1,030,396	-	927,356	54.4	504,482	302,400	1,407,370	-	1,266,633	54.4	689,048
BP-79-9	178.60	182.18	3.58	344,867	1,234,624	1,605,012	54.4	4.7	17.0	34.0	44.1	9,385	20,800	96,803	-	87,123	54.4	47,395	53,000	246,662	-	-	-	-	-	-	-	-	-	-	25,000	104,650	-	94,185	64.7	60,938
BP-79-10	279.79	282.97	3.22	577,219	1,858,646	2,416,240	64.7	3.6	20.2	33.6	42.6	9,028	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	421,800	1,776,622	-	1,598,959	54.1	865,037
BP-79-11	175.00	178.24	3.24	499,323	1,617,807	2,103,150	54.1	4.9	14.2	34.8	46.0	9,776	-	-	-	-	-	-	-	-	-	-	-	-	44,400	187,012	-	168,312	54.1	91,057	704,400	2,005,427	*200,543	1,624,396	66.2	1,075,350
BP-79-12A	186.78	188.97	2.19	711,875	1,559,006	2,026,707	66.2	3.9	26.2	29.5	40.4	8,350	5,000	14,235	-	12,812	66.2	8,481	326,600	929,830	*92,983	753,162	66.2	498,594	529,400	1,507,202	*150,720	1,220,833	66.2	808,192	400,000	1,138,800	-	1,024,920	61.1	626,226
BP-79-13	180.44	182.63	2.19	646,509	1,415,855	1,840,611	61.1	4.1	22.8	31.5	41.1	8,826	-	-	-	-	-	-	22,400	63,773	-	57,396	61.1	35,069	136,600	388,900	-	350,010	61.1	213,856	257,000	-	-	-	-	-
BP-79-14	-	-	0	304,715	-	-	-	-	-	-	-	-	83,800	-	-	-	-	-	34,600	-	-	-	-	-	96,400	-	-	-	-	-	-	-	-	-	-	-
BP-79-15	265.48	268.80	3.32	685,051	2,274,370	2,956,681	52.1	4.8	18.8	32.9	43.3	9,511	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BP-79-16A	Coal Horizons Not Intersected																																			
BP-79-17A	353.02	356.10	3.08	252,276	777,011	1,010,115	59.1	4.0	20.9	30.5	44.2	9,108	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BP-79-18	77.56	81.30	3.74	158,717	593,601	771,682	59.6	4.9	13.9	33.6	46.0	9,882	122,600	596,081	-	536,474	59.6	319,738	163,000	792,506	-	713,255	59.6	425,100	164,400	799,313	-	719,382	59.6	429,183	164,400	799,313	-	719,382	59.6	428,751
BP-79-19 Analytical Results Interpolated from BP-79-8 & BP-79-9	106.33	109.67	3.34	294,866	984,852	1,280,307	*55.1	*5.2	*15.35	*34.5	*44.80	* 9,590	85,400	370,807	*37,081	300,354	55.1	165,495	145,000	629,590	*62,959	509,968	55.1	280,992	269,400	1,169,735	*116,974	947,485	55.1	522,064	269,400	1,169,734	*116,974	947,485	55.1	522,064
-79-20	122.25	125.72	3.47	397,862	1,380,582	1,794,757	59.9	6.8	22.1	30.1	40.6	8,745	59,000	266,149	-	239,534	59.9	143,481	169,000	762,359	-	686,123	59.9	410,988	294,000	1,326,234	-	1,193,611	59.9	714,973	347,000	1,565,317	-	1,408,785	59.9	843,862
BP-79-21	164.52	167.15	2.63	411,126	1,081,263	1,405,642	57.5	6.6	28.5	28.4	36.3	7,752	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BP-79-22A	234.54	236.52	1.98	424,634	840,776	1,093,009	85.5	5.9	16.4	33.4	44.1	9,628	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTALS						22,880,741							518,600	1,971,921	79,639	1,703,054	58.3	991,803	1,307,000	4,609,519	232,816	3,939,032	59.9	2,350,073	2,374,000	8,470,784	350,825	7,307,963	59.0	4,290,276	3,449,600	12,178,611	400,647	10,600,168	58.6	6,175,422
INDICATED																																				
BP-79-3 Interpolated from BP-79-7 & BP-79-20			3.01	596,468	1,795,368	2,333,979	51.4	6.9	23.3	31.6	37.8	8,454	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	243,800	953,989	*95,399	772,731	51.4	397,184
BP-79-12A	186.78	188.97	2.19	266,220	583,021	757,928	66.2	3.9	26.2	29.5	40.4	8,350	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	119,000	338,793	*33,879	274,422	66.2	131,668
BP-79-13	180.44	182.63	2.19	169,683	371,606	483,088	61.1	4.1	22.8	31.5	41.1	8,826	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,600	10,249	*1,025	8,302	*61.1	5,072
BP-79-15	265.48	268.80	3.32	56,871	188,813	245,457	52.1	4.8	18.8	32.9	43.3	9,511	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BP-79-21	164.52	167.15	2.63	120,520	316,968	412,058	57.5	6.6	28.5	28.4	36.3	7,752	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BP-79-22A	234.54	236.52	1.98	765,867	1,516,416	1,971,341	85.5	5.9	16.4	33.4	44.1	9,628	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTALS				1,975,629	4,772,193	6,203,851							-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	366,400	1,303,032	130,303	1,055,456	56.1	583,924
MEASURED & INDICATED TOTALS				9,329,354	22,372,763	29,084,592							-	-	-	-	-	-	1,398,600	4,967,950	268,659	4,229,361	59.4	2,499,302	2,539,000	9,116,429	415,390	7,830,935	58.5	4,559,087	3,816,000	13,481,643	530,950	11,655,624	58.4	6,759,346

CANADA

Department of Energy, Mines and Resources, Surveys and Mapping Branch
Ministère de l'Énergie, des Mines et des Ressources, Direction des Levés et de la Cartographie

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Kilometres 0 50 100 150 200 Kilometres

Produced by the Surveys and Mapping Branch, Department of Energy, Mines and Resources, 1974
Établie par la Direction des levés et de la cartographie, Ministère de l'Énergie, des Mines et des Ressources, 1974

LEGEND - LÉGENDE

- RAILWAY - CHEMIN DE FER
- MOTOR ROAD - CHEMIN POUR VÉHICULE À MOTEUR
- WINTER ROAD - CHEMIN D'HIVER
- HIGHWAY NUMBER - NUMÉRO DE LA ROUTE (24)
- FERRY - TRAVERSIER Fy
- SHIPPING SERVICE - SERVICE DE MESSAGERIE
- AIRPORT - AÉROPORT
- AIRFIELD - CHAMP D'ATTERRISSAGE
- SEAPLANE ANCHORAGE - MOUILLAGE D'HYDRAVIONS

AIR DISTANCES BETWEEN MAIN CENTRES (in statute miles)
DISTANCES AÉRIENNES ENTRE CENTRES PRINCIPAUX (en milles terrestres)

Edmonton (Intl) - Fort McMurray	249	Edmonton (Intl) - Grande Prairie	250
Fort McMurray - Fort Smith	234	Grande Prairie - Fort St John	103
Fort Smith - Hay River	142	Fort St John - Fort Nelson	192
Hay River - Fort Simpson	192	Fort Nelson - Watson Lake	236
Fort Simpson - Wrigley	122	Watson Lake - Whitehorse	217
Wrigley - Norman Wells	175	Whitehorse - Dawson	264
Norman Wells - Inuvik	277		
		Grande Prairie - Prince George	176
Fort Smith - Fort Resolution	99	Prince George - Smithers	193
Fort Resolution - Yellowknife	93	Smithers - Terrace	61
Yellowknife - Cambridge Bay	528	Terrace - Prince Rupert	76

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RICHARDSON MOUNTAINS

PELLY RIVER

SNAKE R.

TREVOR RANGE

WIND R. DEPOSIT

6 5 3 4 2

ILLTYD DEPOSIT (BLOCK 'B')

AIRSTRIP DEPOSIT (WEST WIND)

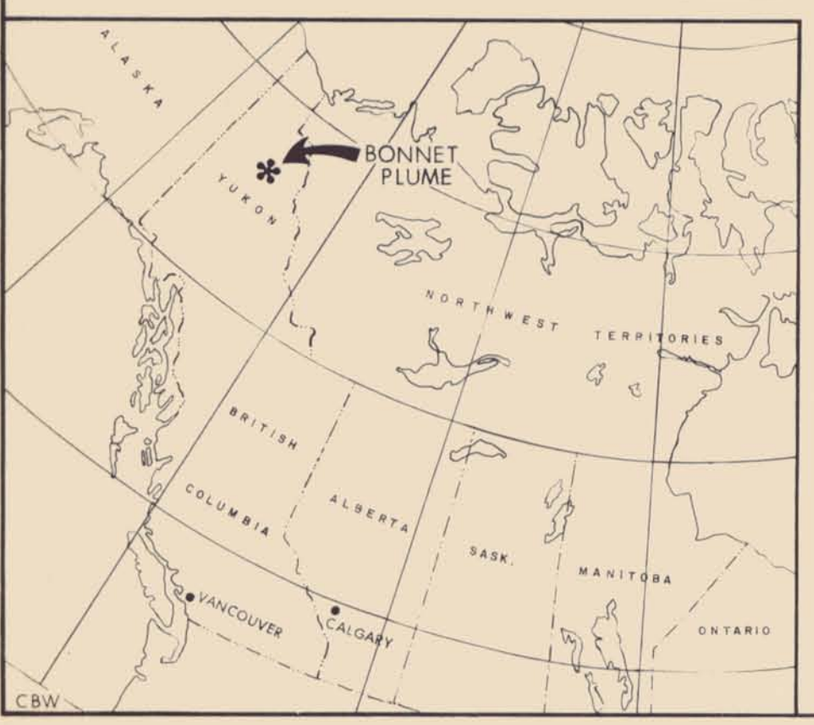
23

78-1

WERNECKE DEPOSIT (BLOCK 'A')

CAMP

WERNECKE MOUNTAINS



CBW

LEGEND

23 ⊙ LOCATION OF DIAMOND DRILL HOLE

5 0 5 10
km km

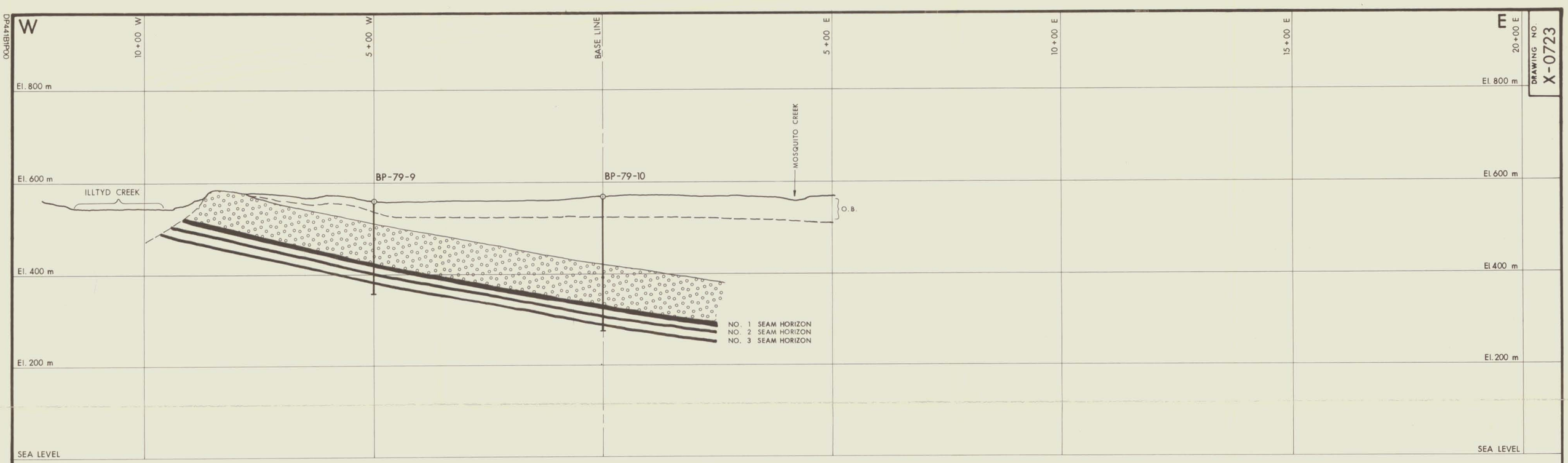
TO ACCOMPANY REPORT NO. 25-79 BY O.R.C., D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

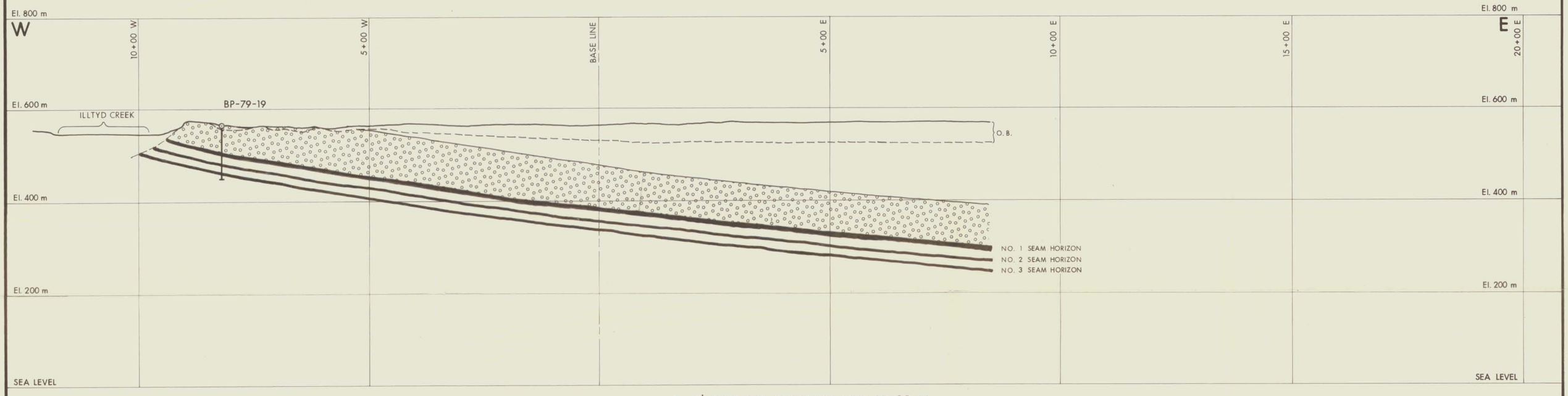
LOCATION OF COAL DEPOSITS

BONNET PLUME PROJECT

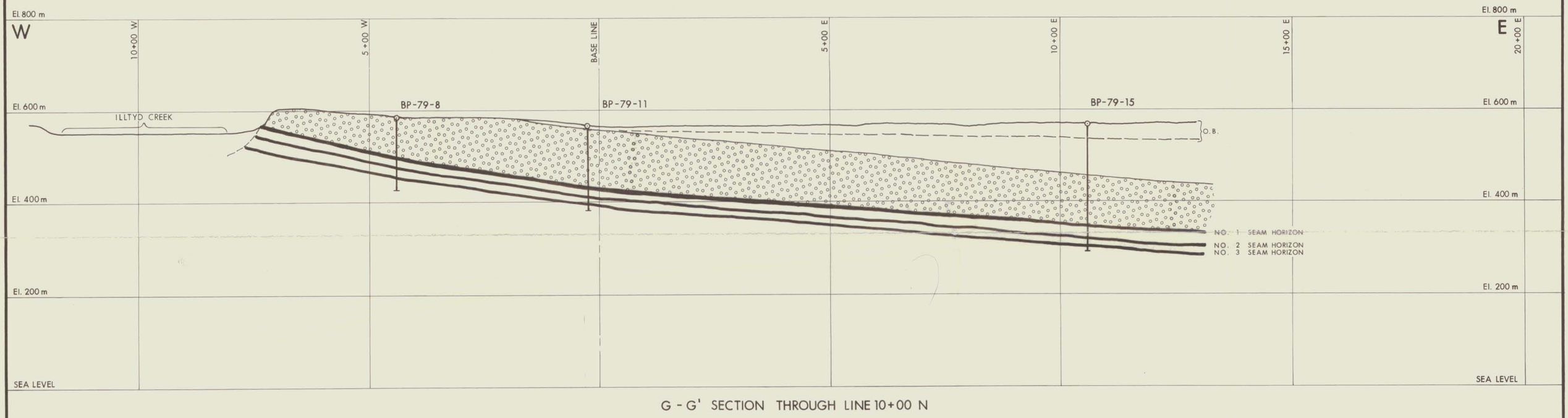
DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:250,000	106 E	C-0676



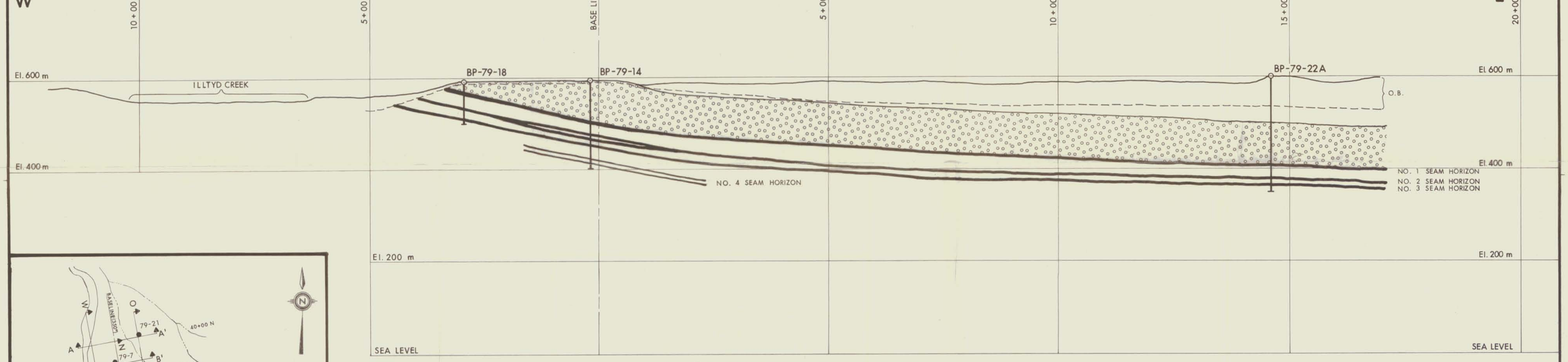
E - E' SECTION THROUGH LINE 20+00 N



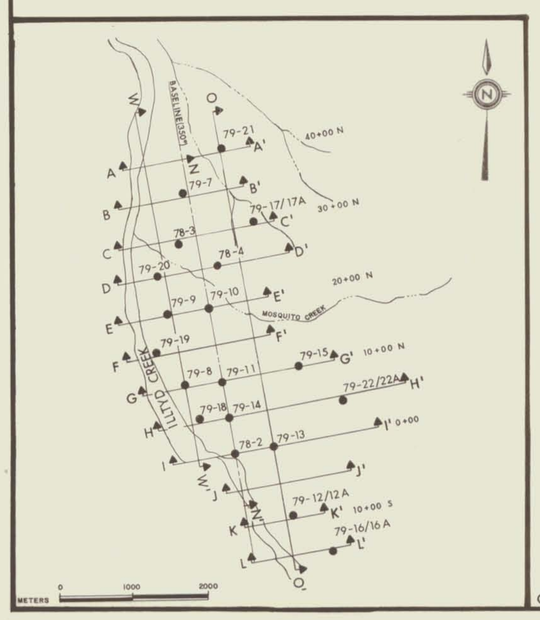
F - F' SECTION THROUGH LINE 15+00 N



G - G' SECTION THROUGH LINE 10+00 N



H - H' SECTION THROUGH LINE 5+00 N



CBW

LEGEND

- O.B. OVERBURDEN
- CONGLOMERATE
- UNDIFFERENTIATED LITHOLOGY
- MEASURED COAL RESERVE
- INDICATED COAL RESERVE

METERS 100 0 100 200 300 400 500

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C., D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ILLTYD CREEK DEPOSIT (BLOCK 'B')

BONNET PLUME PROJECT

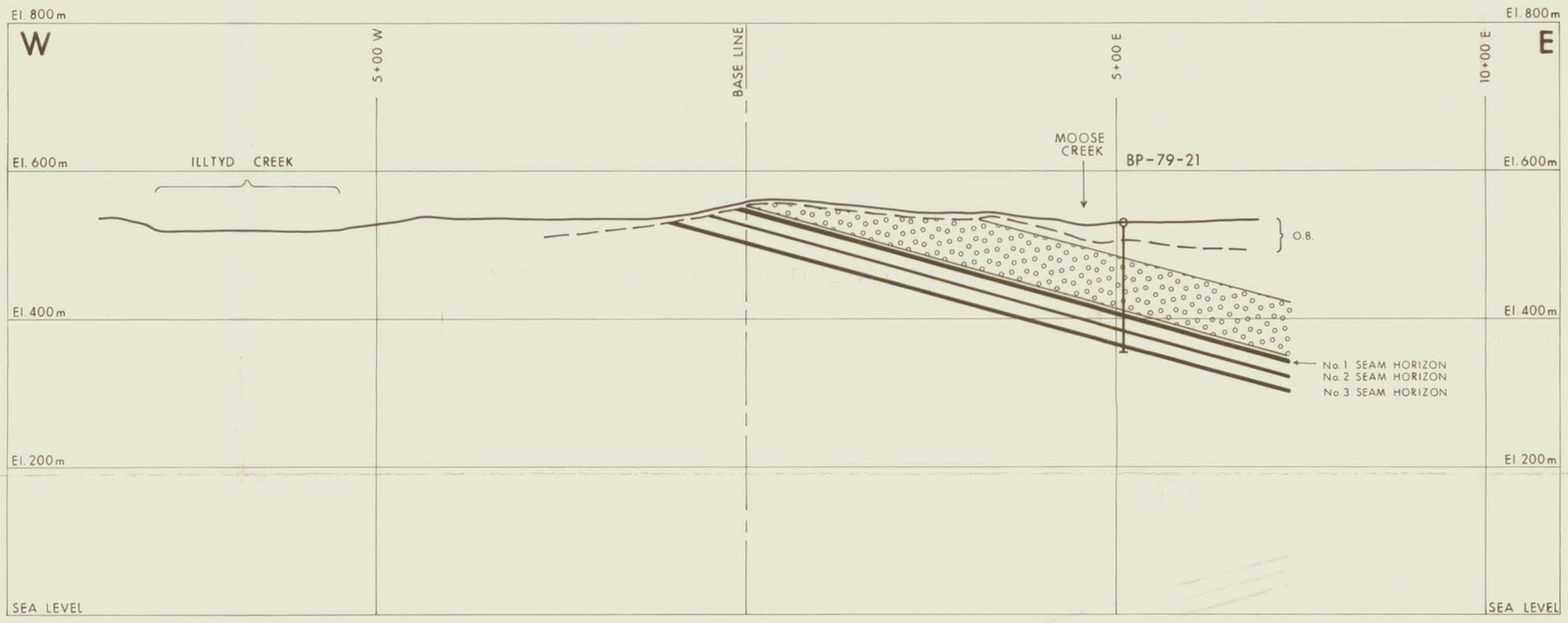
DATE	SCALE	NTS	DRAWING NO.
OCTOBER, 1979	1:5000	106 E	X-0723

DRAWING NO. X-0723

DP4191P00

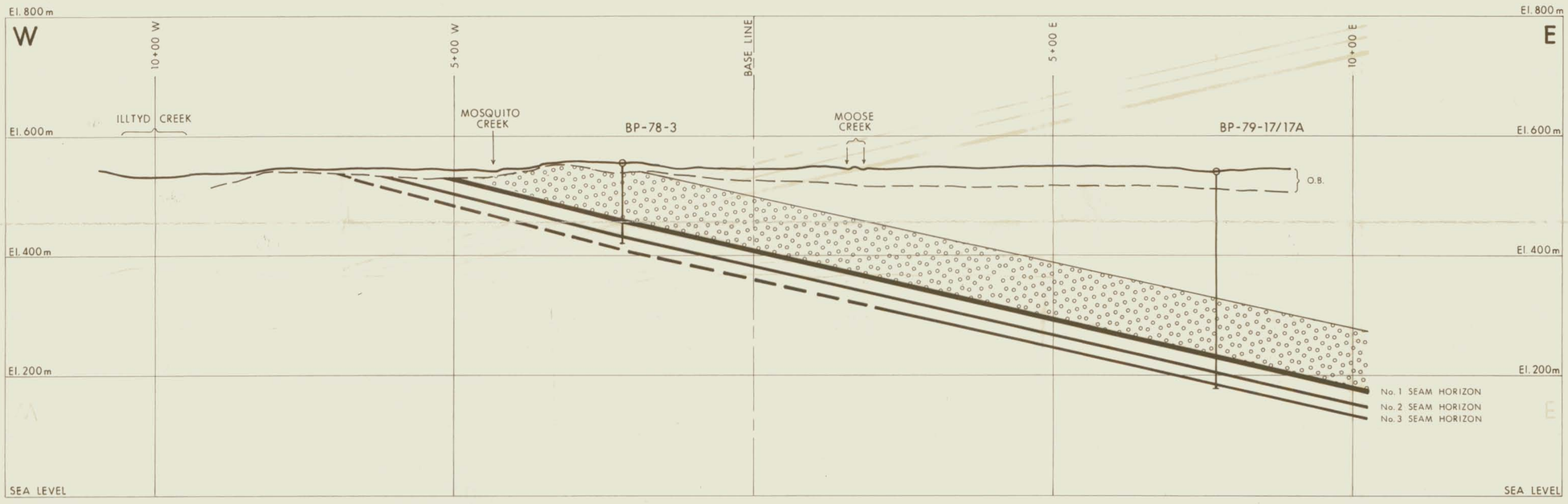
DP441BIP00

DRAWING NO. X-0724



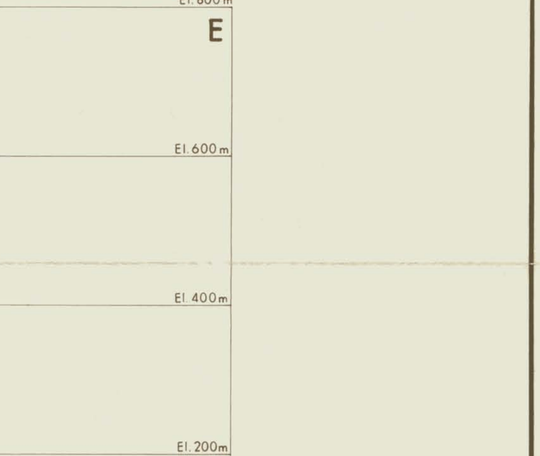
A-A' SECTION THROUGH LINE 40+00 N

B-B' SECTION THROUGH LINE 35+00 N



C-C' SECTION THROUGH LINE 30+00 N

D-D' SECTION THROUGH LINE 25+00 N



O.B. OVERBURDEN
CONGLOMERATE
UNDIFFERENTIATED LITHOLOGY
MEASURED COAL RESERVE
INDICATED COAL RESERVE

METERS 100 0 100 200 300 400 500

TO ACCOMPANY REPORT NO 25-79 BY O.R.C., D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ILLTYD CREEK DEPOSIT (BLOCK 'B')

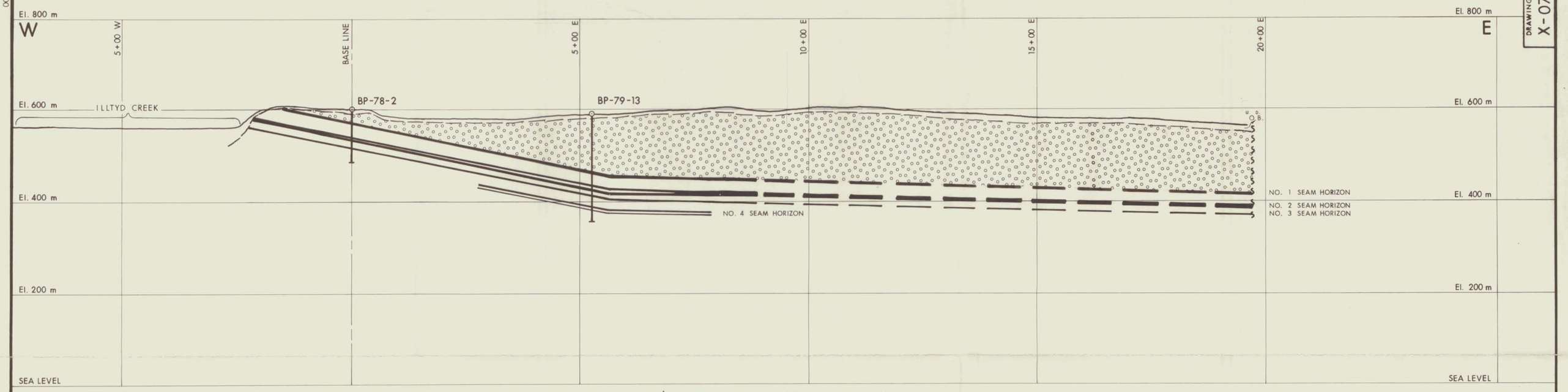
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
OCT; 1979	1:5000	106 E	X-0724

LW

DP41B1P00

DRAWING NO. X-0725



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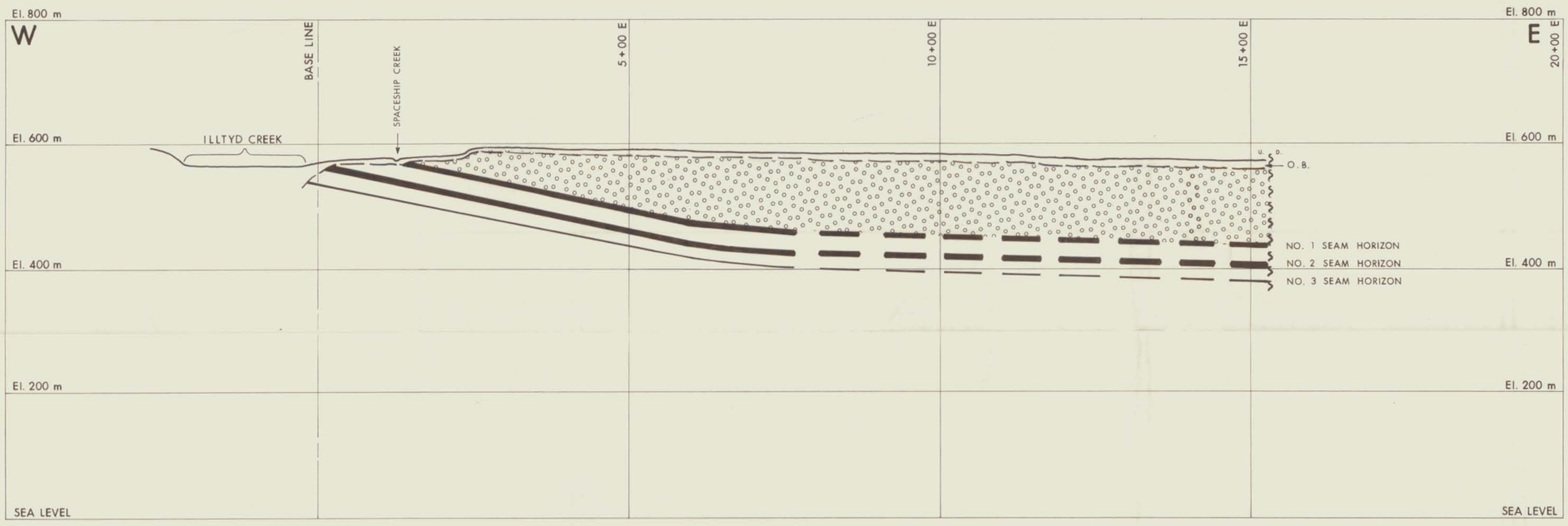
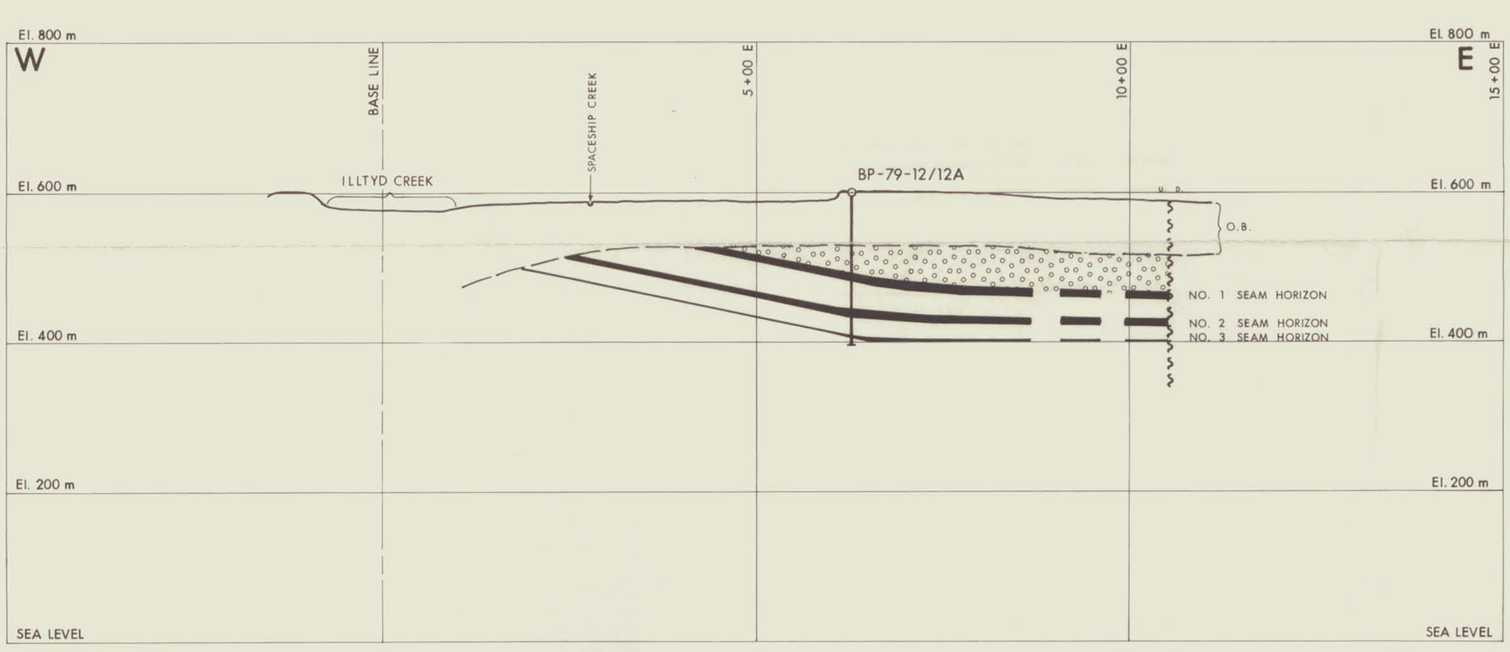


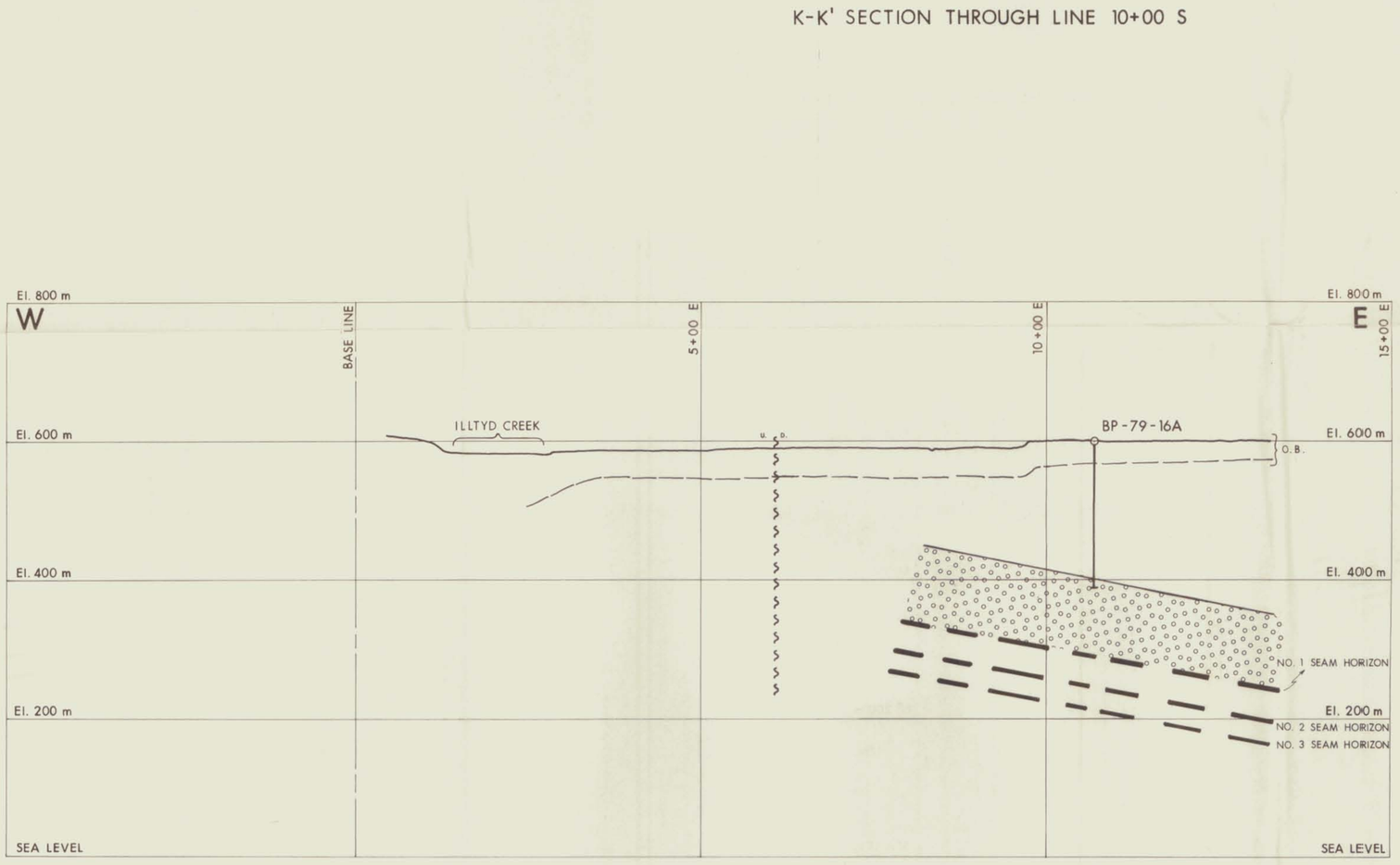
J-J' SECTION THROUGH LINE 5+00 S



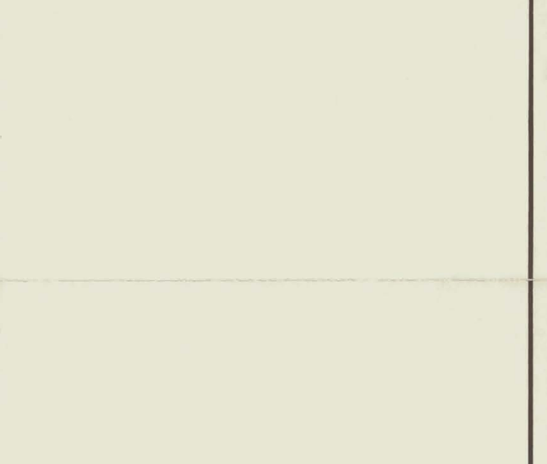
K-K' SECTION THROUGH LINE 10+00 S

LEGEND

- O.B. OVERBURDEN
- CONGLOMERATE
- UNDIFFERENTIATED LITHOLOGY
- MEASURED COAL RESERVE
- INDICATED COAL RESERVE



L-L' SECTION THROUGH LINE 15+00 S



METERS 100 0 100 200 300 400 500

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C., D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

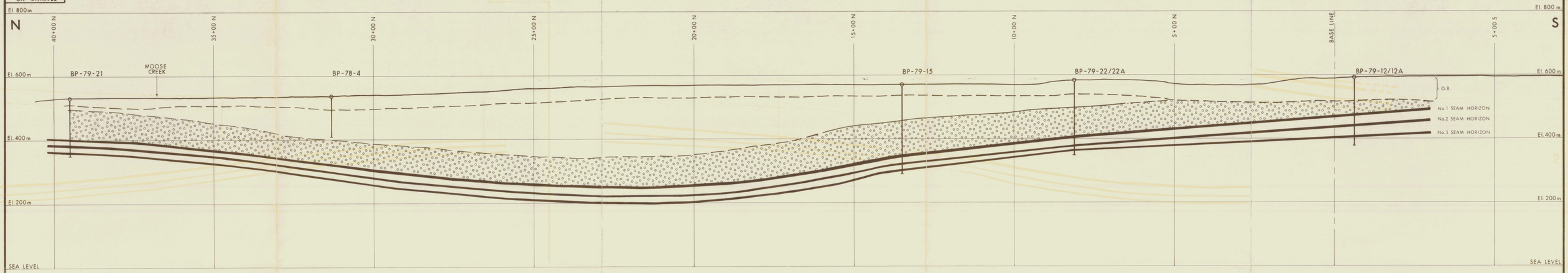
ILLTYD CREEK DEPOSIT (BLOCK 'B')

BONNET PLUME PROJECT

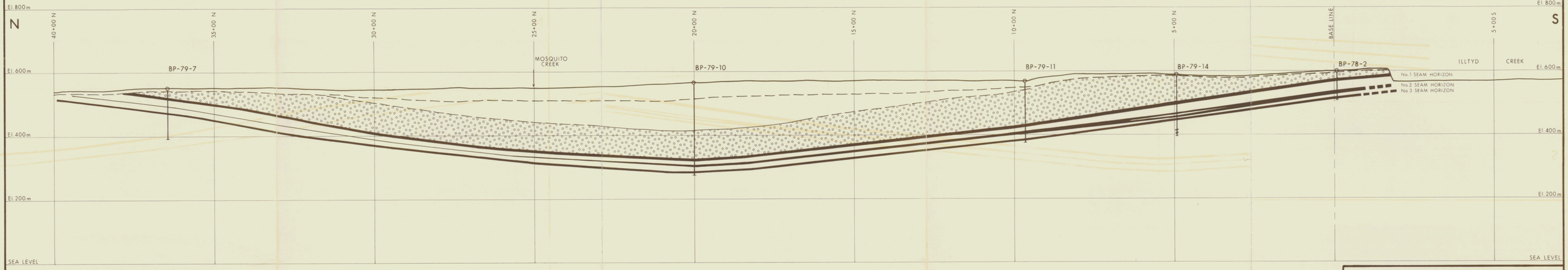
DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:5000	106 E	X-0725

CBW

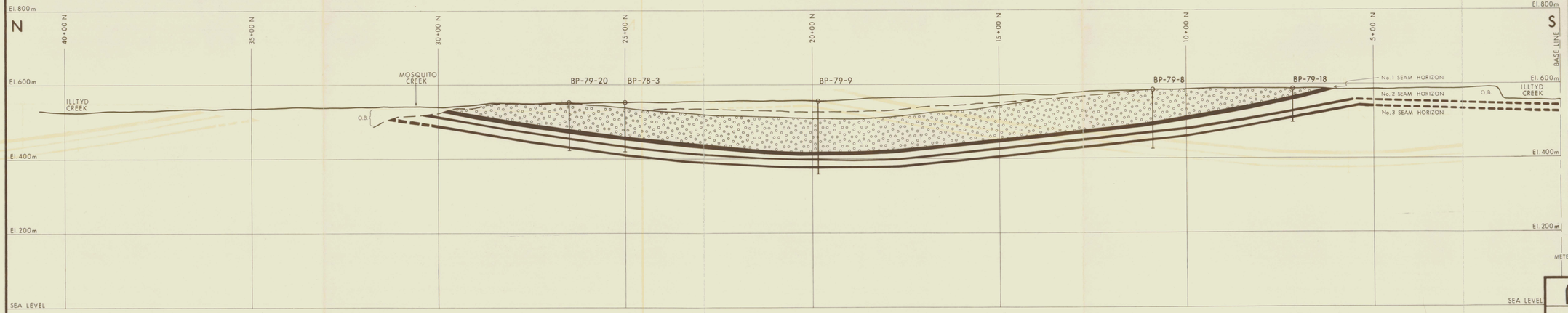
DRAWING NO X-0726



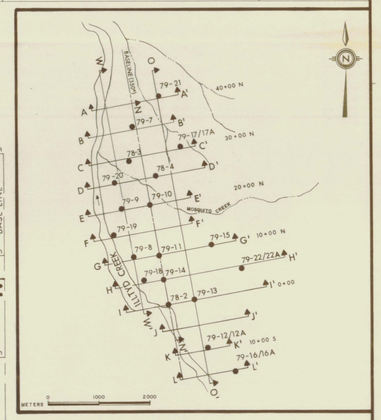
O-O' SECTION THROUGH LINE 5+00 E



N-N' SECTION THROUGH BASELINE



W-W' SECTION THROUGH LINE 5+00 W



METERS 100 0 100 200 300 400 500

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C. D.C.H.

LEGEND

- O.B. OVERBURDEN
- CONGLOMERATE
- UNDIFFERENTIATED LITHOLOGY
- MEASURED COAL RESERVE
- INDICATED COAL RESERVE

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ILLTYD CREEK DEPOSIT (BLOCK 'B')

BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOV, 1979	1:5000	106 E	X-0726

LW

DP441B1P00

BP-79-21
1404.38m

BP-79-7
520.15m

BP-79-17/17A
228.33m

BP-78-3
453.06m

BP-78-4
1306.36m
ESTIMATED

BP-79-20
471.79m

BP-79-9
410.56m

BP-79-10
322.20m

BP-79-19
498.0m

BP-79-8
488.11m

BP-79-11
425.11m

BP-79-15
342.53m

BP-79-22/22A
401.87m

BP-79-18
556.34m

BP-79-14
495.15m

BP-79-13
461.38m

BP-78-2
569.26m

BP-79-12/12A
479.01m

BP-79-16/16A
NOT INTERSECTED

APPROXIMATE SUBCROP TRACE OF BASE NO. 1 SEAM HORIZON

APPROXIMATE 300m OVERBURDEN CONTOUR BASE NO. 1 SEAM HORIZON

ILLTYD CREEK

TWIN LAKES CREEK

MISHAP CREEK

MOOSE CREEK

35+00 N
30+00 N
25+00 N
20+00 N
15+00 N
10+00 N
5+00 N
0+00
5+00 S
10+00 S

4000 m N
3000 m N
2000 m N
1000 m N
0000
1000 m E
2000 m E
1000 m W

LEGEND

- DEFINED
- APPROXIMATE
- ASSUMED TRACE BELOW ILLTYD CREEK

NOTE:
DATUM SEA LEVEL IN METERS
(HOLE 78-2 ASSUMED TO BE 600m ASL)
CONTOUR INTERVAL 10m

METERS 100 0 100 200 300 400 500

TO ACCOMPANY REPORT NO 25-79 BY O.R.C., D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

STRUCTURE CONTOURS
BASE NO. 1 SEAM HORIZON
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:5000	106 E	E-0728

LW

BP-79-21
615.82m

BP-79-7
499.58m

BP-78-3
568.09m

BP-79-17/17A
794.52m

BP-78-4
288.0m
ESTIMATED

BP-79-20
544.17m

BP-79-9
303.96m

BP-79-10
691.94m

BP-79-19
522.98m

BP-79-15
315.64m

BP-79-8
532.13m

BP-79-11
594.56m

BP-79-22/22A
624.09m

BP-79-18
473.85m

BP-79-14
541.23m

BP-79-13
575.15m

BP-78-2
470.0m

BP-79-12/12A
565.78m

BP-79-16/16A
NOT INTERSECTED

APPROXIMATE 300m OVERBURDEN CONTOUR BASE No.2 SEAM HORIZON

APPROXIMATE SUBCROP TRACE BASE NO. 2 SEAM HORIZON

U D

TWIN LAKES CREEK

MISHAP CREEK

ILLTYD CREEK

35+00 N

30+00 N

25+00 N

20+00 N

4000 m N

3000 m N

1000 m E

LEGEND

- DEFINED
- APPROXIMATE
- ASSUMED TRACE BELOW ILLTYD CREEK

NOTE:
DATUM SEA LEVEL IN METERS
CONTOUR INTERVAL 10m
(HOLE 78-2 ASSUMED TO BE 600m ASL)

100 0 100 200 300 400 500

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C. D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

STRUCTURE CONTOURS
BASE NO. 2 SEAM HORIZON

ILLTYD CREEK DEPOSIT (BLOCK 'B')

BONANZA PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:5000	106 E	E-0729

LW

BP-79-21
361.44 m

BP-79-7
474.37 m

BP-79-17/17A
183.43 m

BP-78-3
405.26 m
ESTIMATED

BP-78-4
273.0 m
ESTIMATED

BP-79-20
430.57 m

BP-79-9
372.12 m

BP-79-10
284.96 m

BP-79-19
455.13 m

BP-79-15
298.94 m

BP-79-8
447.01 m

BP-79-11
387.13 m

BP-79-22/22A
362.94 m

BP-79-18
506.34 m

BP-79-14
447.00 m

BP-79-13
410.47 m

BP-78-2
514.78 m

BP-79-12/12A
408.62 m

BP-79-16/16A
NOT INTERSECTED

APPROXIMATE 300m OVERBURDEN CONTOUR BASE NO.3 SEAM HORIZON

APPROXIMATE SUBCROP TRACE BASE NO.3 SEAM HORIZON

TWIN LAKES CREEK

MISLAP CREEK

ILLTYD CREEK

35+00 N

30+00 N

25+00 N

20+00 N

15+00 N

10+00 S

5+00 S

0+00

U

D

LEGEND

DEFINED

APPROXIMATE

ASSUMED TRACE BELOW ILLTYD CREEK

NOTE:
DATUM SEA LEVEL IN METRES
CONTOUR INTERVAL 10 m
(HOLE 78-2 ASSUMED TO BE 600m ASL)

100m 0 100 200 300 400 500m

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C., D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

STRUCTURE CONTOURS
BASE NO. 3 SEAM HORIZON
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:5000	106 E	E-0730

CBW

BP 79-21
4.21m

BP 79-7
6.58m

BP 79-17/17A
8.00m

BP 78-3
8.70m

BP 78-4
NOT INTERSECTED

BP 79-20
9.22m

BP 79-9
9.86m

BP 79-10
8.27m

BP 79-19
8.44m

BP 79-15
7.63m

BP 79-8
8.99m

BP 79-11
8.15m

BP 79-22A
6.97m

BP 79-14
8.20m

BP 79-18
10.05m

BP 79-13
6.67m

BP 78-2
7.27m

BP 79-12A
8.24m

BP 79-16A
NOT INTERSECTED

5
6
7
8
9
9
9
8
1
8

APPROXIMATE 300m OVERBURDEN CONTOUR BASE NO. 1 SEAM HORIZON

APPROXIMATE SUBCROP TRACE BASE NO. 1 SEAM HORIZON

U
D

LEGEND

DEFINED
APPROXIMATE
ASSUMED TRACE BELOW ILLTYD CREEK

100 0 100 200 300 400 500

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C. & D.C.H.

NOTE
CONTOUR INTERVAL 1m

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ISOPACH PLAN
NO. 1 SEAM HORIZON
ILLTYD CREEK DEPOSIT
(BLOCK 'B')

BONNET RLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
OCTOBER, 1979	1:5000	105 E	E-0740

BP 79-21
2.01m

BP 79-7
1.27m

2

BP 79-17/17A
2.17m

BP 78-3
2.43m

BP 78-4
NOT INTERSECTED

BP 79-20
2.32m

3

BP 79-9
3.47m

BP 79-10
3.18m

APPROXIMATE 300m OVERBURDEN CONTOUR BASE NO. 2 SEAM HORIZON

BP 79-19
2.96m

3

APPROXIMATE SUBCROP TRACE BASE NO. 2 SEAM HORIZON

4

BP 79-15
3.25m

5
6
7
8
9
10
11
12
13
14
15

BP 79-8
3.08m

BP 79-11
4.35m

BP 79-18
3.67m

BP 79-14
16.31m
8.45m

BP 79-13
10.03m
14.22m

BP 78-2
8.43m
7.77m

3

BP 79-22A
2.72m

U
D

BP 79-12A
8.34m
1.69m

BP 79-16A

LEGEND

DEFINED
APPROXIMATE
ASSUMED TRACE BELOW ILLTYD CREEK

METERS 100 0 100 200 300 400 500

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C. & D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ISOPACH PLAN NO. 2 SEAM HORIZON
ILLTYD CREEK DEPOSIT.
(BLOCK 'B')

BONANZA PRIME PROJECT

DATE	SCALE	NTS	DRAWING NO.
OCTOBER, 1979	1:5000	106 E	E-0741

NOTE
CONTOUR INTERVAL 1m
ISOPACH PLAN OF PARTING SEPARATING SEAM 2A FROM 2B

BP 79-21
2.63m

BP 79-7
4.29m

BP 79-17/17A
3.08m

BP 78-3
NOT INTERSECTED

BP 78-4
NOT INTERSECTED

BP 79-20
3.83m

BP 79-9
4.52m

BP 79-10
3.22m

BP 79-19
3.34m

BP 79-15
4.44m

BP 79-8
4.80m

BP 79-11
5.46m

BP 79-22A
3.13m

BP 79-18
4.43m

BP 79-14
2.97m

BP 79-13
2.19m

BP 78-2
3.36m

BP 79-12A
2.19m

BP 79-16A
NOT INTERSECTED

APPROXIMATE 300m OVERBURDEN CONTOUR BASE NO. 3 SEAM HORIZON

APPROX. SUBCROP TRACE BASE NO. 3 SEAM HORIZON

LEGEND

DEFINED

APPROXIMATE

ASSUMED TRACE BELOW ILLTYD CREEK

METERS 100 0 100 200 300 400 500

NOTE
CONTOUR INTERVAL 1m

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C. & D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ISOPACH PLAN
NO. 3 SEAM HORIZON
ILLTYD CREEK DEPOSIT
(BLOCK 'B')

BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
OCTOBER 1979	1:5000	106 E /	E-0742

BP 79-21
3.13 m

BP 79-7
3.6 m

BP 79-17/17A
7.02 m

BP 78-3
5.80 m

BP 78-4
NOT INTERSECTED

BP 79-20
7.42 m

BP 79-9
9.86 m

BP 79-10
7.89 m

BP 79-19
6.87 m

BP 79-8
7.99 m

BP 79-11
8.15 m

BP 79-18
9.09 m

BP 79-14
6.47 m

BP 79-15
7.05 m

BP 79-22A
6.97 m

BP 79-13
6.56 m

BP 78-2
7.27 m

BP 79-12A
7.95 m

BP 79-16A
NOT INTERSECTED

3.0 3.5 4.0 4.5 5.0 5.5 6.0 6.5 7.0 7.5 8.0 8.5 9.0

APPROXIMATE 300m OVERBURDEN CONTOUR BASE NO. 1 SEAM HORIZON

APPROXIMATE SUBCROP TRACE BASE NO. 1 SEAM HORIZON

U
D

ILLTYD CREEK

LEGEND

- DEFINED
- APPROXIMATE
- ASSUMED TRACE BELOW ILLTYD CREEK

NOTE:
CONTOUR INTERVAL 0.5m

100m 0 100 200 300 400 500m

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C., D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ISOPACH PLAN MINEABLE THICKNESS NO. 1 SEAM

ILLTYD CREEK DEPOSIT
(BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
OCTOBER, 1979	1:5000	106 E	E-0743

C.B.W.

BP 79-21
2.01 m

BP 79-7
1.29 m

1.5

2.0

BP 79-17/17A
2.17 m

BP 78-3
2.43 m

2.5

BP 78-4
NOT INTERSECTED

BP 79-20
2.32 m

3.0

BP 79-9
3.47 m

BP 79-10
3.18 m

APPROXIMATE 300m OVERBURDEN CONTOUR BASE NO.2 SEAM HORIZON

BP 79-19
2.49 m

2.5

3.0

3.5

BP 79-15
3.25 m

BP 79-8
2.74 m

BP 79-11
4.35 m

4.0

4.5

BP 79-22A
2.72 m

APPROXIMATE SUBCROP TRACE BASE NO. 2 SEAM HORIZON

BP 79-18
3.15 m

BP 79-14
5.84 m

5.0

5.5

6.0

BP 79-13
5.41 m

BP 78-2
6.66 m

6.5

U

D

BP 79-12A
6.65 m

BP 79-16A
NOT INTERSECTED

LEGEND

DEFINED

APPROXIMATE

ASSUMED TRACE BELOW ILLTYD CREEK

100m 0 100 200 300 400 500m

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C. & D.C.H.

NOTE
CONTOUR INTERVAL 0.5 m

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ISOPACH PLAN
MINEABLE THICKNESS NO. 2 SEAM
ILLTYD CREEK DEPOSIT
(BLOCK 'B')
BONNET PLOW PROJECT

DATE	SCALE	AFE	DRAWING NO.
OCTOBER, 1979	1:5000	1066	E-0744

C.B.W

BP 79-21
2.63 m

BP 79-7
1.14 m

1.5

2.0

BP 79-17/17A
3.08 m

BP 78-3
2.5
NOT INTERSECTED

3.0

BP 78-4
NOT INTERSECTED

BP 79-20
3.47 m

3.5

BP 79-9
3.58 m

BP 79-10
3.22 m

APPROXIMATE 300m OVERBURDEN CONTOUR BASE NO. 3 SEAM HORIZON

3.0

BP 79-19
3.34 m

2.5

BP 79-15
3.32 m

BP 79-8
2.86 m

BP 79-11
2.24 m

2.0

1.5

1.0

0.5

BP 79-14
0.0

3.0

3.5

BP 79-18
3.74 m

APPROXIMATE SUBCROP BASE NO. 3 SEAM HORIZON

BP 79-22A
1.98 m

2.0

BP 79-13
2.19 m

BP 78-2
1.91 m

U

D

LEGEND

DEFINED

APPROXIMATE

ASSUMED TRACE BELOW ILLTYD CREEK

BP 79-12A
2.19 m

BP 79-16A
NOT INTERSECTED

NOTE
CONTOUR INTERVAL 0.5 m

100m 0 100 200 300 400 500m

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C. & D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ISOPACH PLAN
MINEABLE THICKNESS NO. 3 SEAM
ILLTYD CREEK DEPOSIT
(BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
OCTOBER 1979	1:5000	106 E	E-0745

C.B.W.

BP 79-21
29.98:1

BP 79-7
6.24:1

BP 79-17/17A

BP 78-3
12.18:1

BP 78-4
NOT INTERSECTED

BP 79-20
7.80:1

BP 79-9
10.52:1

BP 79-10
23.15:1

BP 79-19
6.53:1

BP 79-15
23.79:1

BP 79-8
8.54:1

BP 79-11
12.79:1

BP 79-22 A
21.15:1

BP 79-14
10.51:1

BP 79-18
1.86:1

BP 79-13
14.66:1

BP 78-2
2.48:1

BP 79-12 A
10.68:1

BP 79-16 A
NOT INTERSECTED

APPROXIMATE 300m OVERBURDEN CONTOUR BASE No.1 SEAM HORIZON

APPROXIMATE SUBCROP TRACE BASE No.1 SEAM HORIZON

TWIN LAKES CREEK

MISHAP CREEK

ILLTYD CREEK

LEGEND

DEFINED

APPROXIMATE

ASSUMED TRACE BELOW ILLTYD CREEK

NOTE:
CONTOUR INTERVAL 1:1

100m 0 100 200 300 400 500m

TO ACCOMPANY REPORT No. 25-79 BY O.R.C., D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ROCK (WASTE) TO COAL RATIO
m^3 TO TONNES
BASE No. 1 SEAM HORIZON
ILLTYD CREEK DEPOSIT (BLOCK B)
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
OCTOBER, 1979	1:5000	106 E	E-0746

BP 79-21
24.14:1

BP 79-7
7.96:1

BP 78-3
10.66:1

BP 79-17/17A
27.19:1

BP 78-4
NOT INTERSECTED

BP 79-20
7.16:1

BP 79-9
8.42:1

BP 79-10
17.50:1

BP 79-19
6.38:1

BP 79-15
18.09:1

BP 79-8
7.59:1

BP 79-11
9.16:1

BP 79-22A
17.06:1

BP 79-14
6.89:1

BP 79-18
3.11:1

BP 79-13
9.75:1

BP 78-2
3.00:1

BP 79-12A
7.75:1

BP 79-16A
NOT INTERSECTED

6:1 7:1 8:1 9:1 10:1 11:1 12:1 13:1 14:1 15:1 16:1 17:1 18:1 19:1 20:1 21:1 22:1 23:1 24:1 25:1 26:1 27:1

APPROXIMATE 300m OVERBURDEN CONTOUR BASE No. 2 SEAM HORIZON

APPROXIMATE SUBCROP TRACE BASE No. 2 SEAM HORIZON

U D

LEGEND

- DEFINED
- APPROXIMATE
- ASSUMED TRACE BELOW ILLTYD CREEK

NOTE:
CONTOUR INTERVAL 1:1

100m 0 100 200 300 400 500m

TO ACCOMPANY REPORT No. 25-79 BY O.R.C., D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ROCK (WASTE) TO COAL RATIO
m^3 TO TONNES
BASE No. 2 SEAM HORIZON

ILLTYD CREEK DEPOSIT (BLOCK B)
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO
OCTOBER, 1979	1:5000	106E	E-0747

GEW

BP 79-21
15.78:1

BP 79-7
9.23:1

BP 78-3

BP 79-17/17A
21.56:1

BP 78-4

BP 79-20
6.53:1

BP 79-10
14.46:1

BP 79-9
7.52:1

BP 79-19
5.87:1

BP 79-15
14.38:1

BP 79-8
6.92:1

BP 79-11
8.44:1

BP 79-22 A
14.84:1

BP 79-18
3.14:1

BP 79-14
8.09:1

BP 79-13
9.15:1

BP 78-2
3.29:1

BP 79-12 A

BP 79-16A
NOT INTERSECTED

1:1 2:1 3:1 4:1 5:1 6:1 7:1 8:1 9:1 10:1 11:1 12:1 13:1 14:1 15:1 16:1 17:1 18:1 19:1 20:1 21:1

APPROXIMATE 300m OVERBURDEN CONTOUR BASE NO. 3 SEAM HORIZON

APPROXIMATE SUBCROP TRACE BASE NO. 3 SEAM HORIZON

U D

LEGEND

DEFINED

APPROXIMATE

ASSUMED TRACE BELOW ILLTYD CREEK

NOTE:
CONTOUR INTERVAL 1:1

100m 0 100 200 300 400 500m

TO ACCOMPANY REPORT NO. 25-79 BY ORC, D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ROCK (WASTE) TO COAL RATIO
m^3 TO TONNES
BASE NO. 3 SEAM HORIZON
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
OCTOBER, 1979	1:5000	106 E	E-0748

1000 m W
0000
1000 m E
2000 m E
4000 m N
3000 m N
2000 m N
1000 m N
1000 m S
BASE LINE 1350N
MOOSE CREEK
TWIN LAKES CREEK
MISHAP CREEK
MOSQUITO CREEK
CREEK
ILLTYD
BP 79-21
THK. 313m
BP 79-7
THK. 360 m
BP 79-17/17A
THK. 702m
BP 78-3
THK. 580m
BP 78-4
THK. 100m
BP 79-20
THK. 742m
BP 79-9
THK. 986m
BP 79-10
THK. 789m
BP 79-19
THK. 687m
BP 79-8
THK. 799m
BP 79-11
THK. 815m
BP 79-15
THK. 705m
BP 79-18
THK. 909m
BP 79-14
THK. 647m
BP 79-22A
THK. 697m
BP 79-13
THK. 656m
BP 78-2
THK. 727m
BP 79-12A
THK. 795m
BP 79-16A
35+00 N
30+00 N
25+00 N
20+00 N
15+00 N
10+00 N
5+00 N
0+00
5+00 S
10+00 S
15+00 S
APPROXIMATE 300m OVERBURDEN CONTOUR BASE NO. 1 SEAM HORIZON
APPROXIMATE SUBCROP TRACE BASE NO. 1 SEAM HORIZON
SPACESHIP
HATCHED AREA DENOTES INDICATED RESERVE AREA
DASHED LINE IS INTERNAL TRIANGLE CONSTRUCTION LINE FOR AREA CALCULATIONS
METERS 100 0 100 200 300 400 500
TO ACCOMPANY REPORT NO. 25-79 BY O.R.C., D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

INSITU MINEABLE RESERVE CALCULATION
POLYGON PLAN
NO. 1 SEAM HORIZON
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:5000	106 E	E-0749

LW

1000 m W
0000
1000 m E
2000 m E
4000 m N
3000 m N
2000 m N
1000 m N
0000
1000 m S

BASE LINE 1390m

BP 79-21
THK. 2.01m

BP 79-7
THK. 1.29m

BP 78-3
THK. 2.43m

BP 78-4

BP 79-20
THK. 2.32m

BP 79-9
THK. 3.47m

BP 79-10
THK. 3.18m

BP 79-17/17A
THK. 2.17m

BP 79-19
THK. 2.49m

BP 79-8
THK. 2.74m

BP 79-11
THK. 6.65m

BP 79-18
THK. 3.15m

BP 79-14
THK. 5.84m

BP 79-15
10+00 N
THK. 3.25m

BP 79-22A
5+00 N
THK. 2.72m

BP 79-13
THK. 5.41m

BP 78-2
THK. 6.66m

BP 79-12A
THK. 6.65m

BP 79-16A
15+00 S

35+00 N
30+00 N
25+00 N
20+00 N
15+00 N
10+00 N
5+00 N
0+00
5+00 S
10+00 S
15+00 S

MOOSE CREEK
TWIN LAKES CREEK
MUSHAP CREEK
MOSQUITO CREEK
SPACESHIP CREEK
ILLTYD CREEK

APPROXIMATE 300 m OVERBURDEN CONTOUR
APPROXIMATE SUBCROP TRACE BASE NO 2 SEAM HORIZON

HATCHED AREA DENOTES INDICATED RESERVE AREA

DASHED LINE IS INTERNAL TRIANGLE CONSTRUCTION LINE FOR AREA CALCULATIONS

100m 0 100 200 300 400 500m

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C., D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

INSITU MINEABLE RESERVE CALCULATION
POLYGON PLAN
NO.2 SEAM HORIZON
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:5000	106 E	E-0750

LW

BP 79-21
THK 2.63 m

BP 79-7
THK 1.14 m

BP 79-17/17A
THK 3.08 m

BP 78-3
THK 3.01 m

BP 78-4

BP 79-20
THK 3.47 m

BP 79-9
THK 3.58 m

BP 79-10
THK 3.22 m

BP 79-19
THK 3.34 m

BP 79-8
THK 2.86 m

BP 79-11
THK 3.24 m

BP 79-15
10+00 N
THK 3.32 m

BP 79-18
THK 3.74 m

BP 79-14
THK 0.0 m

BP 79-22A
5+00 N
THK 1.98 m

BP 79-13
THK 2.19 m

BP 78-2
THK 1.91 m

BP 79-12A
THK 2.19 m

BP 79-16A
15+00 S

35+00 N
30+00 N
25+00 N
20+00 N
15+00 N
10+00 N
5+00 N
0+00
5+00 S
10+00 S

BASE LINE (330°)

MOOSE CREEK

TWIN LAKES CREEK

MISHAP CREEK

MOSQUITO CREEK

ILLTYD CREEK

APPROXIMATE 300m OVERBURDEN CONTOUR

APPROXIMATE BASE NO. 3 SEAM HORIZON

APPROXIMATE SUBCROP TRACE BASE NO. 3 SEAM HORIZON

SPACESHIP CREEK

U D

HATCHED AREA DENOTES INDICATED RESERVE AREA

DASHED LINE IS INTERNAL TRIANGLE CONSTRUCTION LINE FOR AREA CALCULATIONS

100m 0 100 200 300 400 500m

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C., D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

INSITU MINEABLE RESERVE CALCULATION
POLYGON PLAN
NO. 3 SEAM HORIZON
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:5000	106 E	E-0751

CBW

BP 79-21
THK. 313m

BP 79-7
THK. 360 m

BP 79-17/17A
THK. 702m

BP 78-3
THK. 580m

BP 78-4
NOT INTERSECTED

BP 79-20
THK. 742m

BP 79-9
THK. 986m

BP 79-10
THK. 789m

BP 79-19
THK. 687m

BP 79-15
THK. 705m

BP 79-8
THK. 799m

BP 79-11
THK. 815m

BP 79-22A
THK. 697m

BP 79-18
THK. 909m

BP 79-14
THK. 647m

BP 79-13
THK. 656m

BP 78-2
THK. 727m

BP 79-12A
THK. 793m

BP 79-16A
NOT INTERSECTED

BASE LINE 1350 N

MOOSE CREEK

TWIN LAKES CREEK

MISHAP CREEK

MOSQUITO CREEK

SPACESHIP CREEK

ILLTYD CREEK

35+00 N

30+00 N

25+00 N

20+00 N

15+00 N

10+00 N

5+00 N

0+00

5+00 S

10+00 S

15+00 S

APPROXIMATE 300m OVERBURDEN CONTOUR

APPROXIMATE SUBCROP TRACE BASE NO. 1 SEAM HORIZON

APPROXIMATE SUBCROP TRACE BASE NO. 1 SEAM HORIZON

4000 m N

3000 m N

2000 m N

1000 m N

0000

1000 m W

1000 m E

2000 m E

1000 m S

HATCHED AREA DENOTES INDICATED RESERVE AREA

DASHED LINE IS INTERNAL TRIANGLE CONSTRUCTION LINE FOR AREA CALCULATIONS

METERS 100 0 100 200 300 400 500

TO ACCOMPANY REPORT NO. 25-79 BY ORC, DCH

PAN OCEAN OIL LTD.

CALGARY ALBERTA

SELECTED STRIPPING RATIO
RESERVE CALCULATION PLAN
NO. 1 SEAM HORIZON
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:5000	106 E	E-0755

1000 m W
0000
1000 m E
2000 m E
4000 m N
3000 m N
2000 m N
1000 m N
0000
1000 m S

BP 79-21
THK. 2.01m

BP 79-7
THK. 1.29m

BP 79-17/17A
THK. 2.17m

BP 78-3
THK. 2.43m

BP 78-4
NOT INTERSECTED

BP 79-20
THK. 2.32m

BP 79-9
THK. 3.47m

BP 79-10
THK. 3.18m

BP 79-19
THK. 2.49m

BP 79-8
THK. 2.74m

BP 79-11
THK. 4.35m

BP 79-15
10+00 N
THK. 3.25m

BP 79-18
THK. 3.15m

BP 79-14
THK. 5.84m

BP 79-22A
5+00 N
THK. 2.72m

BP 79-13
THK. 5.41m

BP 78-2
THK. 6.66m

BP 79-12A
THK. 6.65m

BP 79-16A
NOT INTERSECTED
15+00 S

35+00 N
30+00 N
25+00 N
20+00 N
15+00 N
10+00 N
5+00 N
0+00
5+00 S
10+00 S
15+00 S

BASE LINE 1350'

MOOSE CREEK

TWIN LAKES CREEK

MISHAP CREEK

MOSQUITO CREEK

APPROXIMATE 300 m OVERBURDEN CONTOUR BASE NO 2 SEAM HORIZON

APPROXIMATE SUBCROP TRACE BASE NO 2 SEAM HORIZON

ILLTYD CREEK

SPACESHIP CREEK

N

HATCHED AREA DENOTES INDICATED RESERVE AREA

DASHED LINE IS INTERNAL TRIANGLE CONSTRUCTION LINE FOR AREA CALCULATIONS

100m 0 100 200 300 400 500m

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C., D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

SELECTED STRIPPING RATIO
RESERVE CALCULATION PLAN
NO.2 SEAM HORIZON
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:5000	106 E	E-0756

LW

1000 m W
0000
1000 m E
2000 m E
4000 m N
3000 m N
2000 m N
1000 m N
1000 m S

BP 79-21
THK 2.63 m

BP 79-7
THK 1.14 m

BP 79-17/17A
THK 3.08 m

BP 78-3
THK 3.01 m (ESTIMATED)

BP 78-4
NOT INTERSECTED

BP 79-20
THK 3.47 m

BP 79-9
THK 3.58 m

BP 79-10
THK 3.22 m

BP 79-19
THK 3.34 m

BP 79-8
THK 2.86 m

BP 79-11
THK 3.24 m

BP 79-15
10+00 N
THK 3.32 m

BP 79-18
THK 3.74 m

BP 79-14
THK 0.0 m

BP 79-22A
5+00 N
THK 2.98 m

BP 79-13
THK 2.79 m

BP 78-2
THK 1.91 m

BP 79-12A
THK 2.19 m

BP 79-16A
NOT INTERSECTED
15+00 S

35+00 N
30+00 N
25+00 N
20+00 N
15+00 N
10+00 N
5+00 N
0+00
5+00 S
10+00 S
15+00 S

BASE LINE 1350 m

MOOSE CREEK

TWIN LAKES CREEK

MISHAP CREEK

MOSQUITO CREEK

SPACESHIP CREEK

ILLTYD CREEK

APPROXIMATE 300m OVERBURDEN CONTOUR

APPROXIMATE SUBCROP TRACE BASE NO. 3 SEAM HORIZON

BASE NO. 3 SEAM HORIZON

HATCHED AREA DENOTES INDICATED RESERVE AREA

DASHED LINE IS INTERNAL TRIANGLE CONSTRUCTION LINE FOR AREA CALCULATIONS

METERS 100 0 100 200 300 400 500

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C. D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

SELECTED STRIPPING RATIO
RESERVE CALCULATION PLAN
NO. 3 SEAM HORIZON
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:5000	106 E	E-0757

BP 79-21
THK. 3.13 m

BP 79-7
THK. 3.60 m

BP 79-17/17A
THK. 3.70 m

BP 78-3
THK. 3.0 m

BP 78-4
NOT INTERSECTED

BP 79-20
THK. 3.70 m

BP 79-19
THK. 2.96 m

BP 79-9
THK. 3.40 m

BP 79-10
THK. 3.70 m

BP 79-8
THK. 3.70 m

BP 79-11
THK. 3.70 m

BP 79-18
THK. 3.0 m

BP 79-14
THK. 3.70 m

BP 79-15
10+00 N
THK. 3.70 m

BP 79-22A
5+00 N
THK. 3.26 m

BP 79-13
THK. 3.70 m

BP 78-2
THK. 3.70 m

BP 79-12A
THK. 3.7 m

BP 79-16A
15+00 S

35+00 N
30+00 N
25+00 N
20+00 N
15+00 N OVERBURDEN CONTOUR BASE NO. 1 SEAM HORIZON
10+00 N
5+00 N
0+00
5+00 S
10+00 S
15+00 S

BASE LINE 135°

MOOSE CREEK

TWIN LAKES CREEK

MISHAP CREEKS

MOSQUITO CREEK

APPROXIMATE 300m

APPROXIMATE SUBCROP TRACE BASE NO.1 SEAM HORIZON

ILLTYD CREEK

SPACESHIP CREEK

4000 m N
3000 m N
2000 m N
1000 m N
1000 m S
1000 m W
0000
1000 m E
2000 m E

HATCHED AREA DENOTES INDICATED RESERVE AREA

DASHED LINE IS INTERNAL TRIANGLE CONSTRUCTION LINE FOR AREA CALCULATIONS

METERS 100 0 100 200 300 400 500

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C. D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

UNDERGROUND MINEABLE RESERVE CALCULATION
POLYGON PLAN
NO.1 SEAM
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:5000	106 E	E-0752

1000 m W | 0000 | 1000 m E | 2000 m E

4000 m N | 3000 m N | 2000 m N | 1000 m N | 0000 | 1000 m S

35+00 N | 30+00 N | 25+00 N | 20+00 N | 15+00 N | 10+00 S | 5+00 S | 0+00 | 5+00 N | 10+00 N

BASE LINE 13501

BP 79-21 ⊙ THK. 201m

BP 79-7 ⊙ THK. 129m

BP 79-17/17A ⊙ THK. 217m

BP 78-3 ⊙ THK. 243m

BP 78-4 ⊙ NOT INTERSECTED

BP 79-20 ⊙ THK. 232m

BP 79-9 ⊙ THK. 347m

BP 79-10 ⊙ THK. 318m

BP 79-19 ⊙ THK. 249m

BP 79-8 ⊙ THK. 274m

BP 79-11 ⊙ THK. 370m

BP 79-18 ⊙ THK. 315m

BP 79-14 ⊙ THK. 362m

BP 79-15 ⊙ 10+00 N THK. 325m

BP 79-22A ⊙ 5+00 N THK. 272m

BP 79-13 ⊙ THK. 276m

BP 78-2 ⊙ THK. 349m

BP 79-12A ⊙ THK. 370m

BP 79-16A ⊙ NOT INTERSECTED 15+00 S

TWIN LAKES CREEK

MISHAP CREEK

MOOSE CREEK

MOSQUITO CREEK

ILLTYD CREEK

SPACESHIP CREEK

APPROXIMATE 300 m OVERBURDEN CONTOUR BASE NO 2 SEAM HORIZON

APPROXIMATE SUBCROP TRACE BASE NO 2 SEAM HORIZON

U D

HATCHED AREA DENOTES INDICATED RESERVE AREA

DASHED LINE IS INTERNAL TRIANGLE CONSTRUCTION LINE FOR AREA CALCULATIONS

100m 0 100 200 300 400 500m

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C., D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

UNDERGROUND MINEABLE RESERVE CALCULATION
POLYGON PLAN
NO. 2 SEAM
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:5000	106 E	E-0753

LW

BP 79-21
THK. 2.63 m

BP 79-7
THK. 0.94 m

BP 79-17/17A
THK. 2.65 m

BP 78-3
THK. 2.21 m (ESTIMATED)

BP 78-4
NOT INTERSECTED

BP 79-20
THK. 3.47 m

BP 79-9
THK. 2.61 m

BP 79-10
THK. 3.22 m

BP 79-19
THK. 3.34 m

BP 79-8
THK. 2.86 m

BP 79-11
THK. 2.24 m

BP 79-15
THK. 3.32 m

BP 79-18
THK. 3.70 m

BP 79-14
THK. 0.00 m

BP 79-22A
THK. 1.98 m

BP 79-13
THK. 2.19 m

BP 78-2
THK. 1.07 m

BP 79-12A
THK. 2.19 m

BP 79-16A
NOT INTERSECTED

BASE LINE (350°)

35+00 N
30+00 N
25+00 N
20+00 N
15+00 N
10+00 N
5+00 N
0+00
5+00 S
10+00 S
15+00 S

4000 m N
3000 m N
2000 m N
1000 m N
0000
1000 m S

1000 m W
0000
1000 m E
2000 m E

MOOSE CREEK
TWIN LAKES CREEK
MISHAP CREEK
MOSQUITO CREEK
SPACESHIP CREEK
ILLTYD CREEK

APPROXIMATE 300m OVERBURDEN CONTOUR
APPROXIMATE BASE NO. 3 SEAM HORIZON
APPROXIMATE SUBCROP TRACE BASE NO. 3 SEAM HORIZON

HATCHED AREA DENOTES INDICATED RESERVE AREA

DASHED LINE IS INTERNAL TRIANGLE CONSTRUCTION LINE FOR AREA CALCULATIONS

METERS 100 0 100 200 300 400 500

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C. D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

UNDERGROUND MINEABLE RESERVE CALCULATION
POLYGON PLAN
NO.3 SEAM
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:5000	106 E	E-0754

CBW

DRAWING NO
D-0764

L 50+00 W

L 40+00 W

L 30+00 W

L 20+00 W

L 10+00 W

L 5+00 W

0+00

L 10+00 E

ILLTYD

CREEK

SUBCROP TRACE ? SEAM HORIZON

SUBCROP TRACE No.3 SEAM HORIZON

SUBCROP TRACE No.2 SEAM HORIZON

SUBCROP TRACE No.1 SEAM HORIZON

WERNECKE RESERVE AREA (BLOCK A)

BP-78-1

BASE LINE (285°)

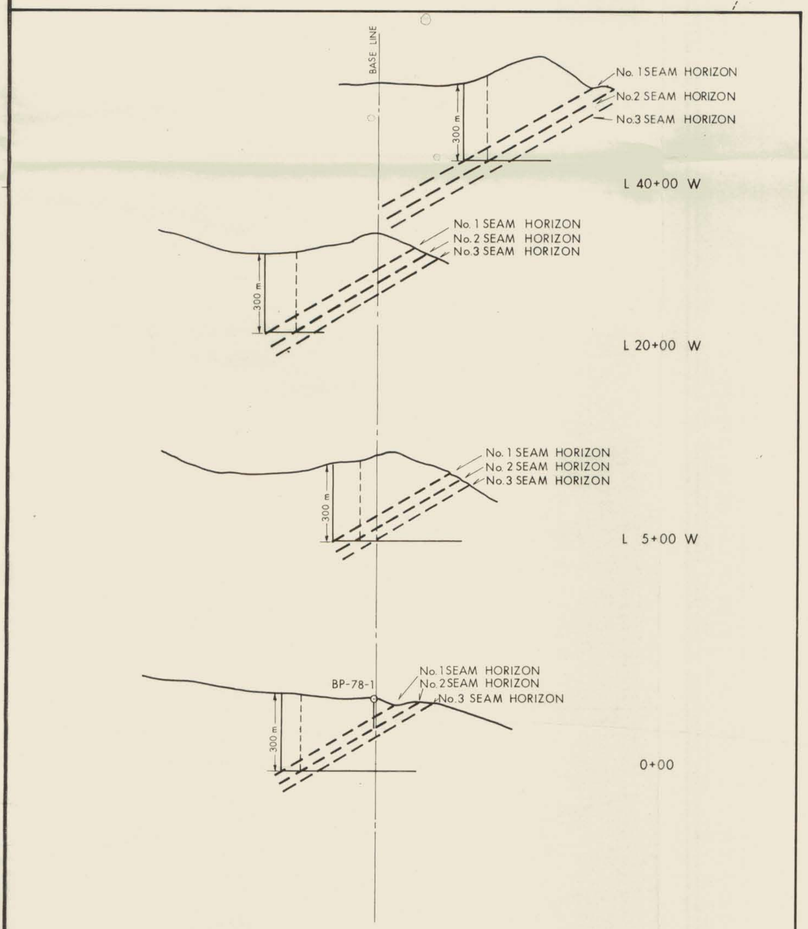
WERNECKE THRUST

N

LEGEND

- COAL OUTCROP
- INDICATED COAL
- INFERRED COAL
- CONGLOMERATE
- FAULT
- STREAM

meters 200 100 0 200 400 meters



SECTIONS ALONG STRIKE LENGTH

GEW

TO ACCOMPANY REPORT No. 25-79 BY O.R.C., D.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

WERNECKE DEPOSIT RESERVE AREA (BLOCK 'A')

BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOV, 1979	1:12,500	106 E	D-0764

DRAWING NO
D-0765

WIND RIVER

AIRSTRIP / DEPOSIT RESERVE AREA
(BLOCK 'C')

WIND RIVER WINTER ROAD

APPROXIMATE SUBCROP TRACE NO.3 SEAM HORIZON

TOP OF RIDGE FORMING SANDSTONE

APPROXIMATE SUBCROP TRACE NO.2 SEAM HORIZON

APPROXIMATE SUBCROP TRACE NO.1 SEAM HORIZON

APPROXIMATE SUBCROP TRACE NO.1 SEAM HORIZON

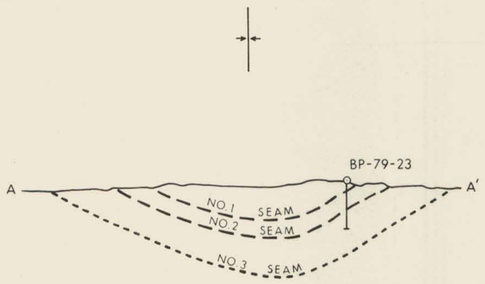
APPROXIMATE SUBCROP TRACE NO.2 SEAM HORIZON

APPROXIMATE SUBCROP TRACE NO.3 SEAM HORIZON

A-79-23

A

A'



SECTION THROUGH SYNCLINE

LEGEND

- INDICATED COAL
- INFERRED COAL
- X COAL OCCURRENCE
- SANDSTONE
- STREAM
- A-79-23 ○ DRILL HOLE

25 km 0 .25 .5 .75 1 km

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C., D.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

AIRSTRIP DEPOSIT RESERVE AREA
(BLOCK 'C')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOV. 1979	1:12,500	106 E	D-0765

LW

NORTHERN BLOCK

SOUTHERN BLOCK

SUBCROP TRACE No.2 SEAM

SUBCROP TRACE No.1 SEAM

SUBCROP TRACE No.4 SEAM

SUBCROP TRACE No.3 SEAM

SUBCROP TRACE No.5 SEAM

W-79-6/6A

W-79-1

A

A'

WIND RIVER WINTER ROAD

WIND RIVER

WIND

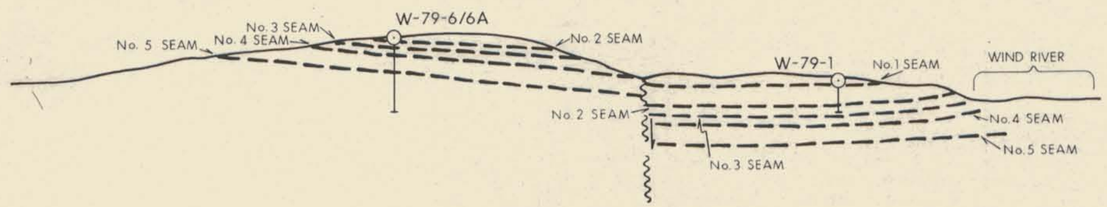
LEGEND

- × COAL OCCURRENCE
- INDICATED COAL
- INFERRED COAL
- CONGLOMERATE
- SANDSTONE
- FAULT
- STREAM

km .5 0 .25 .5km

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C., D.H.

SECTION A-A'



PAN OCEAN OIL LTD.
CALGARY ALBERTA

WIND RIVER DEPOSIT RESERVE AREA
(BLOCK 'D')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOV, 1979	1:12,500	106 E	C-0766

GEW

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y X
ELEVATION:
DIP: 90° BEARING
CORE SIZE: HQ CASING: 24'
BITS USED: JK SMIT
MUD USED: 12 BAGS / 24 HRS
FT. LEFT IN HOLE 24 FT.
DATE START: 30 JUNE, 1978 FINISH 5 JULY, 1978
DRILLER: CARON DIAMOND DRILLING OVERALL RECOVERY 81.7%
TESTS: NIL
SAMPLED BY: J.S. MCKINNEY DATE 6 JULY, 1978 ANALYZED BY: BIRTLEY

BOREHOLE NO. BP-78-1
PAN OCEAN OIL LTD. (PAGE 1)
MINING DIVISION – COAL

LOGGED BY: J.S. MCKINNEY DATE 6 JULY, 1978

SIGNED James S. McKinney

GEOLOGICAL LOG – SCALE: 1:500

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
		±7.50	OVERBURDEN - A FEW LIMESTONE, QUARTZITE AND CHERT PEBBLES IN MUD
7.5		17.50	CONGLOMERATE - WEATHERED, POOR RECOVERY OF LOOSE PEBBLES OF CHERT, QUARTZITE AND QUARTZ
25.0		18.74	CONGLOMERATE - 20-30mm PEBBLES OF BLACK CHERT (10%), GREY & BUFF QUARTZITE (20%), BLACK SLATEY CHERT(50%) VERY BRITTLE, GREEN MUDSTONE (1%). GRIT IN MATRIX, BLACK MUDSTONE (5%), QUARTZ (5%). ZONES 20-50 mm PEBBLES AT 72 m, 86m, 101m, 116m, 127m. THESE AVERAGE 0.15-0.30m THICK. PYRITE IN BASAL 100mm.
43.74		0.15	COAL - BRIGHT
43.89		1.90	SILTSTONE - GREY, SANDY IN PLACES DIPS 25-35° CROSS-BEDDED. GRIT BAND AT 45.6m
45.79		1.00	
46.79		0.65	CONGLOMERATE - 10mm PEBBLES
47.44		10.31	SANDSTONE - GREY, GRITTY, CROSS-BEDDED CONGLOMERATE – AS ABOVE, 10-20mm PEBBLES
57.75		0.15	SANDSTONE - GREY, COARSE GRAINED
57.90		5.89	CONGLOMERATE - VERY COARSE AT 63.09m. 10-20mm PEBBLES. PREDOMINATLY BLACK CHERT. PYRITE IN MATRIX.
63.79		8.49	NO. 1 SEAM HORIZON
72.28		4.98	MUDSTONE - SILTSTONE - GREY, BECOMMING FINE SANDSTONE AT BASE WITH SLUMP STRUCTURES.
77.26		16.04	CONGLOMERATE - AS ABOVE
93.30		2.45	SANDSTONE - GREY, FINE GRAINED, CROSS-BEDDED. SOME THIN (<1mm) CARBONACEOUS BANDS
95.75		6.67	CONGLOMERATE - AS ABOVE
102.42		1.26	SANDSTONE - GREY MEDIUM GRAINED TO GRITTY
103.68		9.51	NO. 2 SEAM HORIZON
113.19		0.78	SHALE - CARBONACEOUS GRADING INTO
113.97		2.77	MUDSTONE - GREY
116.74		E.O.H.	

No. 1 SEAM HORIZON

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
	5.89	ROOF CONGLOMERATE GOOD		
63.79		CARBONACEOUS SHALE 50 mm		
	1.81	BRIGHT COAL 250 mm	7814	1.81
		DULL COAL 800mm		
65.60				
	0.70	COAL - BRIGHT		
	0.45	COAL - DULL SHALEY		
	0.73	COAL - BRIGHT		
	0.35	COAL - DULL	7815	3.84
	1.61	COAL - BRIGHT		
69.44				
	2.84	SHALE - CARBONACEOUS COALY IN PLACES	7816	2.84
	4.98	FLOOR - MUDSTONE - SILTSTONE, GREY		

No. 2 SEAM HORIZON

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
	1.26	SANDSTONE - GOOD		
103.68				
	0.65	COAL - BRIGHT, THINBANDED SOME RESIN MINOR DULL		
	0.25	COAL DULL		
	0.67	COAL - BRIGHT	7817	3.30
	0.44	COAL - DULL		
	1.10	COAL - BRIGHT		
106.98				
	0.15	SHALE - CARBONACEOUS		
	0.33	COAL - BRIGHT AND DULL THICK BANDED		
	0.96	SHALE - CARBONACEOUS DIP 30°	7818	1.69
	0.22	COAL - DULL		
108.67				
	1.88	COAL - BRIGHT & DULL THICK BANDED		
	0.26	COAL - DULL		
	2.30	COAL - BRIGHT WITH MINOR DULL BANDS	7819	4.52
113.19				
		FLOOR - OKAY - SHALE CARBONACEOUS		

SIZE DIAMETER	SIZE WT %	SPEC GRAV	WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
+28	94.9	-1.50	14.4	4.4	7.5	36.6	51.5	11398	-	-
		-1.60	3.1	2.9	24.1	32.2	40.8	9006	-	-
		-1.70	3.0	3.6	35.4	25.6	35.4	7214	-	-
		+1.70	79.5	2.0	76.5	-	-	-	-	-
-28m	5.1	RAW	100.0	-	-	-	-	-	-	0.27
1/4×0	100.0	RAW	-	2.1	64.5	20.7	12.7	-	-	0.12
+28	94.9	-1.70	20.5	-	-	-	-	-	-	-
-28	5.1	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
+28	95.2	-1.50	58.7	4.2	6.1	38.6	51.1	11501	-	-
		-1.60	3.4	3.2	18.4	36.0	42.4	9815	-	-
		-1.70	3.2	3.8	29.8	29.5	36.9	7991	-	-
		+1.70	34.7	1.9	60.4	-	-	-	-	-
-28	4.8	RAW	100.0	-	-	-	-	-	-	0.29
1/4×0	100.0	RAW	100.0	3.4	26.6	34.3	35.7	8398	-	0.23
+28	95.2	-1.70	65.3	-	-	-	-	-	-	-
-28	4.8	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
+28	95.0	-1.50	9.8	4.3	7.1	36.1	52.5	11348	-	-
		-1.60	2.0	2.7	22.4	33.0	41.9	9434	-	-
		-1.70	1.8	2.4	34.1	29.0	34.5	7550	-	-
		+1.70	86.4	1.5	80.5	-	-	-	-	-
-28	5.0	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	RAW	100.0	2.1	71.1	14.6	12.2	-	-	0.15
+28	95.0	-1.70	13.6	-	-	-	-	-	-	-
-28	5.0	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
+28	96.2	-1.50	85.3	5.7	5.3	38.7	50.3	11453	-	-
		-1.60	2.9	4.8	20.5	33.5	41.2	9272	-	-
		-1.70	3.1	3.7	30.0	30.9	35.4	7986	-	-
		+1.70	8.7	2.1	53.6	-	-	-	-	-
-28	3.8	RAW	100.0	-	-	-	-	-	-	0.39
1/4×0	100.0	RAW	100.0	5.4	10.8	38.6	45.2	10574	-	0.33
+28	96.2	-1.70	91.3	-	-	-	-	-	-	-
-28	3.8	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
+28	95.6	-1.50	9.7	4.4	7.2	33.9	54.5	11372	-	-
		-1.60	1.8	3.7	17.6	30.6	48.1	9849	-	-
		-1.70	1.3	3.5	31.2	26.4	38.9	7813	-	-
		+1.70	87.2	1.8	79.1	-	-	-	-	-
-28	4.4	RAW	100.0	-	-	-	-	-	-	0.18
1/4×0	100.0	RAW	100.0	2.2	70.7	17.7	9.4	-	-	0.12
+28	95.6	-1.70	12.8	-	-	-	-	-	-	-
-28	4.4	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
+28	95.4	-1.50	59.7	4.9	6.0	35.9	53.2	11449	-	-
		-1.60	4.9	4.4	17.1	34.4	44.1	9850	-	-
		-1.70	6.7	2.8	28.0	31.8	37.4	8393	-	-
		+1.70	28.7	2.1	54.3	-	-	-	-	-
-28	4.6	RAW	100.0	-	-	-	-	-	-	0.37
1/4×0	100.0	RAW	100.0	5.1	22.4	32.9	39.6	8879	-	0.27
+28	95.4	-1.70	71.3	-	-	-	-	-	-	-
-28	4.6	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-

CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
14.4	4.4	7.5	36.6	51.5	11398	-	-
17.5	4.1	10.4	35.8	49.6	10974	-	-
20.5	4.1	14.1	34.3	47.5	10423	-	-
100.0	2.4	63.7	-	-	-	-	-
RAW	3.1	53.9	23.6	19.4	-	-	0.27
CALC	2.4	63.2	-	-	-	-	-
19.5	4.1	14.1	34.3	47.5	10423	-	-
5.1	3.1	53.9	23.6	19.4	4340*	-	-
24.6	3.8	22.4	32.1	41.7	9161	-	-
58.7	4.2	6.1	38.6	51.1	11501	-	-
62.1	4.2	6.8	38.5	50.6	11408	-	-
65.3	4.1	7.9	38.0	50.0	11241	-	-
100.0	3.4	26.1	-	-	-	-	-
RAW	4.2	20.5	32.9	42.4	9334	-	0.29
CALC	3.4	20.8	-	-	-	-	-
62.2	4.1	7.9	38.0	50.0	11241	-	-
4.8	4.2	20.5	32.9	42.4	9334	-	-
67.0	4.1	8.8	37.6	49.5	11104	-	-
9.8	4.3	7.1	36.1	52.5	11348	-	-
11.8	4.0	9.7	35.6	50.7	11022	-	-
13.6	3.8	12.9	34.7	48.6	10562	-	-
100.0	1.8	71.3	-	-	-	-	-
RAW	3.0	57.5	18.9	20.6	-	-	0.22
CALC	1.9	70.6	-	-	-	-	-
12.9	3.8	12.9	34.7	48.6	10562	-	-
5.0	3.0	57.5	18.9	20.6	3720*	-	-
17.9	3.6	25.4	30.3	40.6	8650	-	-
85.3	5.7	5.3	38.7	50.3	11453	-	-
88.2	5.7	5.8	38.5	50.0	11381	-	-
91.3	5.6	6.6	38.3	49.5	11266	-	-
100.0	5.3	10.7	-	-	-	-	-
RAW	5.9	11.1	38.9	44.1	10577	-	0.39
CALC	5.3	10.7	-	-	-	-	-
87.8	5.6	6.6	38.3	49.5	11266	-	-
3.8	5.9	11.1	38.9	44.1	10557	-	-
91.6	5.6	6.8	38.3	49.3	11237	-	-
9.7	4.4	7.2	33.9	54.5	11372	-	-
11.5	4.3	8.8	33.4	53.5	11134	-	-
12.8	4.2	11.1	32.6	52.0	10796	-	-
100.0	1.8	79.7	-	-	-	-	-
RAW	3.0	61.5	19.2	16.3	-	-	0.18
CALC	1.9	78.9	-	-	-	-	-
12.2	4.2	11.1	32.6	52.0	10796	-	-
4.4	3.0	61.5	19.2	16.3	3220*	-	-
16.6	3.9	24.5	29.2	42.5	8788	-	-
59.7	4.9	6.0	35.9	53.2	11449	-	-
64.6	4.9	6.8	35.8	52.5	11328	-	-
71.3	4.7	8.8	35.4	51.1	11052	-	-
100.0	3.9	21.9	-	-	-	-	-
RAW	5.8	17.5	34.6	42.1	9793	-	0.37
CALC	4.0	21.7	-	-	-	-	-
68.0	4.7	8.8	35.4	51.1	11052	-	-
4.6	5.8	17.5	34.6	42.1	9793	-	-
72.6	4.8	9.4	35.4	50.4	10972	-	-

CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
1.81	24.6	3.8	22.4	32.1	41.7	9161		
5.65	53.4	4.1	10.8	36.8	48.3	10817		
8.49	41.5	4.0	12.9	35.9	47.2	10504		
3.30	91.6	5.6	6.8	38.3	49.3	11237		
4.99	66.2	5.5	8.3	37.5	48.7	11029		
9.51	69.2	5.1	8.9	36.5	49.6	11000		

OTHER

87.4% RECOVERY
5.65 m COAL
4.94 m RECOVERED

99% RECOVERY
9.51 m COAL
9.40 m RECOVERED

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y X

ELEVATION:

DIP BEARING

CORE SIZE CASING

BITS USED

MUD USED

FT. LEFT IN HOLE FT.

DATE START FINISH

DRILLER

OVERALL RECOVERY

TESTS

SAMPLED BY DATE ANALYZED BY

BOREHOLE NO. BP-78-1 (PAGE 2)

PAN OCEAN OIL LTD.

MINING DIVISION – COAL

LOGGED BY DATE

SIGNED James S. McKinney

GEOLOGICAL LOG – SCALE:

DETAILS OF COAL SEAMS – SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
			SEE BP-78-1 (PAGE 1)

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			No. 1 SEAM HORIZON		
		5.89	ROOF CONGLOMERATE GOOD		
63.79			CARBONACEOUS SHALE 50 mm		
		1.81	BRIGHT COAL 250 mm	7814	1.81
			DULL COAL 800 mm		
65.60		0.70	COAL-BRIGHT		
		0.45	COAL-DULL SHALEY		
		0.73	COAL-BRIGHT		
		0.35	COAL-DULL	7815	3.84
		1.61	COAL-BRIGHT		
69.44					
		2.84	SHALE-CARBONACEOUS COALY IN PLACES	7816	2.84
		4.98	FLOOR-MUDSTONE-SILTSTONE, GREY		
			No. 2 SEAM HORIZON		
		1.26	SANDSTONE - GOOD		
103.68		0.65	COAL-BRIGHT, THINBANDED SOME RESIN MINOR DULL		
		0.25	COAL DULL		
		0.67	COAL-BRIGHT	7817	3.30
		0.44	COAL-DULL		
		1.10	COAL-BRIGHT		
106.98		0.15	SHALE-CARBONACEOUS		
		0.33	COAL-BRIGHT AND DULL THICK BANDED		
		0.96	SHALE-CARBONACEOUS DIP 30°	7818	1.69
108.67		0.22	COAL-DULL		
		1.88	COAL-BRIGHT & DULL THICK BANDED		
		0.26	COAL-DULL		
		2.30	COAL-BRIGHT WITH MINOR DULL BANDS	7819	4.52
113.19			FLOOR-OKAY-SHALE CARBONACEOUS		

SIZE DIAMETER	SIZE WT %	SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
		-1.70	-	-	-	-	-	-	-	-
+28	95.2	-1.80	2.5	2.0	31.3	27.4	39.3	8305	-	-
		-1.90	1.8	2.0	47.1	22.7	28.2	5894	-	-
		+1.90	75.2	1.6	79.4	13.9	5.1	-	-	-
+28	94.9	-1.80	23.0	-	-	-	-	-	-	-
-28	5.1	RAW	100.0	-	-	-	-	-	-	-
1/4×0	-	COMB	-	-	-	-	-	-	-	-
+28	94.9	1.90	24.8	-	-	-	-	-	-	-
-28	5.1	RAW	100.0	-	-	-	-	-	-	-
1/4×0	-	COMB	-	-	-	-	-	-	-	-
ULTIMATE ANALYSIS & ASH FUSION										
+28	-	-1.70	-	-	-	-	-	-	-	-
-28	-	RAW	-	-	-	-	-	-	-	-
		-1.70	-	-	-	-	-	-	-	-
		-1.80	3.0	2.4	28.4	29.8	39.4	8341	-	-
+28	95.2	-1.90	2.3	2.0	44.4	25.0	28.6	6087	-	-
		+1.90	29.5	1.7	66.1	19.7	12.5	-	-	-
+28	95.2	-1.80	68.3	-	-	-	-	-	-	-
-28	4.8	RAW	100.0	-	-	-	-	-	-	-
1/4×0	-	COMB	-	-	-	-	-	-	-	-
+28	95.2	-1.90	70.6	-	-	-	-	-	-	-
-28	4.8	RAW	100.0	-	-	-	-	-	-	-
1/4×0	-	COMB	-	-	-	-	-	-	-	-
ULTIMATE ANALYSIS & ASH FUSION										
+28	-	-1.70	-	-	-	-	-	-	-	-
-28	-	RAW	-	-	-	-	-	-	-	-
		-1.70	-	-	-	-	-	-	-	-
		-1.80	2.9	2.5	27.6	29.1	40.8	8693	-	-
+28	95.0	-1.90	1.3	2.3	47.1	23.5	27.1	6014	-	-
		+1.90	82.2	3.3	81.3	9.7	5.7	-	-	-
+28	95.0	-1.80	16.5	-	-	-	-	-	-	-
-28	5.0	RAW	100.0	-	-	-	-	-	-	-
1/4×0	-	COMB	-	-	-	-	-	-	-	-
+28	95.0	-1.90	17.8	-	-	-	-	-	-	-
-28	5.0	RAW	100.0	-	-	-	-	-	-	-
1/4×0	-	COMB	-	-	-	-	-	-	-	-
ULTIMATE ANALYSIS & ASH FUSION										
+28	-	1.70	-	-	-	-	-	-	-	-
-28	-	RAW	-	-	-	-	-	-	-	-
		-1.70	-	-	-	-	-	-	-	-
		-1.80	1.5	1.8	28.9	30.5	38.8	8343	-	-
+28	96.2	-1.90	1.2	1.4	45.0	25.7	27.9	5866	-	-
		+1.90	6.0	1.3	63.3	21.1	14.3	-	-	-
+28	96.2	-1.80	92.8	-	-	-	-	-	-	-
-28	3.8	RAW	100.0	-	-	-	-	-	-	-
1/4×0	-	COMB	-	-	-	-	-	-	-	-
+28	96.2	-1.90	94.0	-	-	-	-	-	-	-
-28	3.8	RAW	100.0	-	-	-	-	-	-	-
1/4×0	-	COMB	-	-	-	-	-	-	-	-
ULTIMATE ANALYSIS & ASH FUSION										
+28	-	-1.70	-	-	-	-	-	-	-	-
-28	-	RAW	-	-	-	-	-	-	-	-
		-1.70	-	-	-	-	-	-	-	-
		-1.80	TOTAL FLOAT AT -1.70, ALL MATERIAL SANK AT -1.80 AND -1.90							
+28	95.6	-1.90								
		+1.90	87.2	1.2	79.7	13.4	5.7	-	-	-
ULTIMATE ANALYSIS & ASH FUSION										
+28	-	-1.70	-	-	-	-	-	-	-	-
-28	-	RAW	-	-	-	-	-	-	-	-
1/4×0		COMB	AT -1.70	-	-	-	-	-	-	-
		-1.70	-	-	-	-	-	-	-	-
		-1.80	5.1	2.6	26.1	30.2	41.1	8630	-	-
+28	95.4	-1.90	2.4	2.1	43.6	25.0	29.3	6319	-	-
		+1.90	21.2	1.7	63.9	20.5	13.9	-	-	-
+28	95.4	-1.80	76.4	-	-	-	-	-	-	-
-28	4.6	RAW	100.0	-	-	-	-	-	-	-
1/4×0	-	COMB	-	-	-	-	-	-	-	-
+28	95.4	-1.90	78.8	-	-	-	-	-	-	-
-28	4.6	RAW	100.0	-	-	-	-	-	-	-
1/4×0	-	COMB	-	-	-	-	-	-	-	-
ULTIMATE ANALYSIS & ASH FUSION										
+28	-	-1.70	-	-	-	-	-	-	-	-
-28	-	RAW	-	-	-	-	-	-	-	-

CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S
20.5	4.1	14.1	34.3	47.5	10423	-	-
23.0	3.9	15.0	33.6	46.6	10192	-	-
24.8	3.7	18.2	32.8	45.3	9980	-	-
100.0	2.1	64.2	18.6	15.1	-	-	-
21.8	3.9	16.0	33.6	46.6	10192	-	-
5.1	3.1	53.9	23.6	19.4	4340*	-	-
26.9	3.8	23.2	31.7	41.4	9082	-	-
23.5	3.7	18.2	32.8	45.3	9980	-	-
5.1	3.1	53.9	23.6	19.4	4340*	-	-
28.6	3.6	24.6	31.1	40.7	8974	-	-
	H_2O	C	H	N	S	ASH	O
-	5.8	60.5	4.6	0.61	0.32	13.5	14.7
-	3.1	28.9	2.7	0.36	0.27	53.9	11.3
65.3	4.1	7.9	38.0	50.0	11241	-	-
68.3	4.0	8.8	37.6	49.5	11113	-	-
70.6	4.0	10.0	37.3	48.9	10949	-	-
100.0	3.3	26.5	32.1	38.1	-	-	-
65.0	4.0	8.8	37.6	49.5	11113	-	-
4.8	4.2	20.5	32.9	42.4	9334	-	-
69.8	4.0	9.6	37.3	49.0	10990	-	-
67.2	4.0	10.0	37.3	48.9	10949	-	-
4.8	4.2	20.5	32.9	42.4	9334	-	-
72.0	4.0	10.7	37.0	48.5	10841	-	-
	H_2O	C	H	N	S	ASH	O
-	6.21	64.3	4.9	0.76	0.27	7.48	16.1
-	4.19	55.0	4.24	0.59	0.29	20.5	15.1
13.6	3.8	12.9	34.7	48.6	10562	-	-
16.5	3.6	15.5	33.7	47.2	10233	-	-
17.8	3.5	17.8	33.0	45.8	9925	-	-
100.0	3.3	70.0	13.8	12.8	-	-	-
15.7	3.6	15.5	33.7	47.2	10233	-	-
5.0	3.0	57.5	18.9	20.6	3720*	-	-
20.7	3.0	25.6	30.1	40.8	8659	-	-
16.9	3.5	17.8	33.0	45.8	9925	-	-
5.0	3.0	57.5	18.9	20.6	3720*	-	-
21.9	3.4	28.9	29.8	40.0	8508	-	-
	H_2O	C	H	N	S	ASH	O
-	5.79	60.6	4.49	0.70	0.32	12.43	15.7
-	3.03	27.4	2.49	0.39	0.22	57.5	8.92
91.3	5.6	6.6	38.3	49.5	11266	-	-
92.8	5.5	7.0	38.1	49.3	11219	-	-
94.0	5.5	7.5	38.0	49.1	11150	-	-
100.0	5.2	10.8	37.0	47.0	-	-	-
89.3	5.5	7.0	38.1	49.3	11219	-	-
3.8	5.9	11.1	38.9	44.1	10557	-	-
93.1	5.5	7.2	38.1	49.1	11192	-	-
90.4	5.5	7.5	38.0	49.1	11150	-	-
3.8	5.9	11.1	38.9	44.1	10557	-	-
94.2	5.5	7.7	38.0	48.9	11126	-	-
	H_2O	C	H	N	S	ASH	O
-	6.69	65.3	4.96	0.67	0.40	6.38	15.6
-	5.93	62.2	4.68	0.62	0.39	11.09	15.1
12.8	4.2	11.1	32.6	52.0	10796	-	-
-	-	-	-	-	-	-	-
100.0	1.6	70.9	15.9	11.6	-	-	-
	H_2O	C	H	N	S	ASH	O
-	5.50	63.15	4.38	0.62	0.40	10.56	15.4
-	5.80	56.63	4.27	0.56	0.37	17.54	14.8
16.6	3.9	24.5	29.2	42.5	8788	-	-
						-	-
71.3	4.7	8.8	35.4	51.1	11052	-	-
76.4	4.6	10.0	35.1	50.4	10890	-	-
78.8	4.5	11.0	34.8	49.8	10751	-	-
100.0	3.9	22.2	31.7	42.2	8472	-	-
72.9	4.6	10.0	35.1	50.4	10890	-	-
4.6	5.8	17.5	34.6	42.1	9793	-	-
77.5	4.7	10.5	35.1	49.9	10824	-	-
75.2	4.5	11.0	34.8	49.8	10751	-	-
4.6	5.8	17.5	34.6	42.1	9793	-	-
79.8	4.6	11.4	34.8	49.4	10695	-	-
	H_2O	C	H	N	S	ASH	O
-	6.09	63.63	4.67	0.68	0.36	8.51	16.1
-	5.80	56.63	4.27	0.56	0.37	17.54	14.8

CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S
1.81	26.9	3.8	23.2	31.7	41.4	9082	-	-
1.81	28.6	3.6	24.6	31.1	40.7	8974	-	-
OXIDIZING						REDUCING		
I.D.T.	S.T.	HT	FT	IDT	ST	HT	FT	
2440	2580	2620	2640	2310	2400	2450	2560	
+2750	-	-	-	+2750	-	-	-	
5.65	56.1	4.0	11.7	36.4	47.8	10696	-	-
5.65	58.1	3.9	12.9	36.1	47.3	10547	-	-
OXIDIZING						REDUCING		
I.D.T.	S.T.	HT	FT	I.D.T.	S.T.	HT	FT	
2440	2460	2490	2510	2360	2420	2440	2480	
2640	2680	2700	2740	2500	2550	2600	2660	
8.49	44.2	3.8	13.9	35.4	46.7	10377	-	-
8.49	46.0	3.9	15.4	35.1	46.1	10222		
OXIDIZING						REDUCING		
I.D.T.	S.T.	HT	FT	I.D.T.	S.T.	HT	FT	
2380	2460	2540	2570	2200	2320	2360	2490	
2620	2750	+2750	-	2560	2640	2680	2740	
3.3	93.1	5.5	7.2	38.1	49.1	11192	-	-
3.3	94.2	5.5	7.7	38.0	48.9	11126		
OXIDIZING						REDUCING		
I.D.T.	S.T.	HT	FT	I.D.T.	S.T.	HT	FT	
2420	2450	2470	2510	2380	2400	2440	2460	
2400	2470	2520	2590	2220	2290	2340	2480	
4.99	67.2	5.4	8.6	37.4	48.5	10991	COMB	-1.80
4.99	67.9	5.4	9.1	37.3	48.4	10932	COMB	-1.90
9.51	72.1	5.0	9.6	36.2	49.2	10906	-	-
9.51	73.6	5.0	10.3	36.0	48.9	10810	-	-
OXIDIZING						REDUCING		
I.D.T.	S.T.	HT	FT	I.D.T.	S.T.	HT	FT	
2420	2500	2540	2620	2320	2440	2470	2560	
2680	2750	+2750	-	2480	2520	2540	2550	

OTHER
HARDGROVE 47
HARDGROVE 45

* FROM ASH / BTU CURVE

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y X
ELEVATION:
DIP: 90° BEARING
CORE SIZE: HQ CASING: 10

BITS USED: J.K. SMIT 100'S
MUD USED: 12 bags (50lb) / day
FT. LEFT IN HOLE: NIL FT.

DATE START 7 JULY, 1978 FINISH 10 JULY, 1978
DRILLER: CARON DIAMOND DRILLING OVERALL RECOVERY 79.1%
TESTS NONE
SAMPLED BY: J. S. McKINNEY DATE 10 JULY, 1978 ANALYZED BY: BIRTLEY

BOREHOLE NO. BP - 78 - 2
PAN OCEAN OIL LTD. (PAGE 1)
MINING DIVISION – COAL

LOGGED BY: J. S. McKINNEY DATE 10 JULY, 1978

SIGNED James S. McKinney

GEOLOGICAL LOG – SCALE: 1: 500

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
		12.8	OVERBURDEN - NO RECOVERY
12.8		10.67	CONGLOMERATE - 10-20mm PEBBLES OF CHERT QUARTZITE AND QUARTZ, POROUS. THIN SANDSTONE BEDS SCATTERED THROUGHOUT.
23.47		7.27	NO. 1 SEAM HORIZON
30.74		9.40	MUDSTONE - SILTSTONE, CARBONACEOUS AT TOP, GRADING DOWNWARD INTO GREY SILTSTONE.
39.78		13.25	SANDSTONE - GREY MEDIUM GRAINED SOME SLUMP STRUCTURE. MINOR THIN GRITS AND MUDSTONES SCATTERED THROUGHOUT.
53.03		5.70	GRIT - GREY SUB-ROUNDED
58.73		2.85	MUDSTONE, SANDSTONE, GRIT - CROSS-BEDDED
61.58		8.43	NO. 2 SEAM HORIZON
70.01		11.75	MUDSTONE - GREY SCATTERED COALY SHALE AND COALY MATERIAL. 0.76m CONGLOMERATE NEAR BASE
81.76		3.36	NO. 3 SEAM HORIZON
85.12		3.88	MUDSTONE, GREY, GRADING INTO SILTSTONE
89.00			END OF HOLE

DETAILS OF COAL SEAMS – SCALE: 1: 100

No. 1 SEAM HORIZON

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			ROOF - GOOD CONGLOMERATE SHALEY LAYER GROUND		1.53
23.47		0.08	SHALE - CARBONACEOUS	7821	
		0.53	COAL - MOSTLY BRIGHT		
		0.32	COAL - BRIGHT		
		0.57	SHALE - CARBONACEOUS		
25.00		0.30	COAL - BRIGHT		
		0.35	COAL - DULL AND SHALEY		
		1.13	COAL - BRIGHT	7822	1.84
26.84		0.58	COAL - DULL SHALEY		
		0.20	COAL - BRIGHT		
		0.57	COAL - DULL SHALEY		
		0.86	COAL - BRIGHT	7823	2.83
		0.20	COAL - DULL SHALEY		
		0.33	COAL - BRIGHT		
29.67		0.77	SHALE - CARBONACEOUS		
		0.23	COAL - BRIGHT	7824	
30.74			FLOOR - MUDSTONE - SILTSTONE CARBONACEOUS AT TOP		1.07

No. 2 SEAM HORIZON

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			ROOF - FAIR - MUDSTONE, SANDSTONE AND GRIT		1.97
61.58		0.56	COAL - MOSTLY BRIGHT	7825	
		0.66	COAL - DULL		
		0.75	COAL - BRIGHT		
63.55		0.40	SHALE - CARBONACEOUS		
		1.10	COAL - BRIGHT WITH CARBONACEOUS SHALE STRINGERS	7826	1.52
65.07		1.77	SHALE - CARBONACEOUS	N.A.	1.77
66.84			COAL - BRIGHT WITH OCCASIONAL THIN DULL COAL AND CARBONACEOUS SHALE STRINGERS	7827	3.17
		0.35	COAL - DULL		
		0.80	COAL - BRIGHT		
70.01					

SAMPLE NUMBER	SIZE DIAMETER	SIZE WT %	WEIGHT PERCENT SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S	OTHER
	+28	96.2	-1.50	26.9	6.6	9.4	34.9	49.1	10435	-	-	26.9	6.6	9.4	34.9	49.1	10435	-	-										
			-1.60	6.7	3.8	24.6	34.7	36.9	8647	-	-	33.6	6.0	12.4	34.7	46.7	10078	-	-										
			-1.70	4.7	3.4	34.3	33.2	33.2	7175	-	-	38.3	5.7	15.1	34.2	45.0	9722	-	-										
			+1.70	61.7	2.9	71.4	-	-	-	-	-	100.0	4.0	49.8	-	-	-	-	-										
	-28	3.8	RAW	100.0	-	-	-	-	-	-	-	RAW	6.0	49.3	23.7	21.0	-	-	0.33									
	1/4×0	100.0	RAW	100.0	6.2	49.5	23.8	20.5	-	-	0.14	CALC	4.0	49.8	-	-	-	-	-									
	+28	96.2	-1.70	38.3	-	-	-	-	-	-	-	36.8	5.7	15.1	34.2	45.0	9722	-	-										
	-28	3.8	RAW	100.0	-	-	-	-	-	-	-	3.8	6.0	49.3	23.7	21.0	5000*	-	-										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	40.6	5.7	18.3	33.2	42.8	9280	-	-	1.53	40.6	5.7	18.3	33.2	42.8	9280			
	+28	96.6	-1.50	83.2	7.7	6.0	36.0	50.3	10705	-	-	83.2	7.7	6.0	36.0	50.3	10705	-	-										
			-1.60	3.1	3.7	21.5	35.7	39.1	8976	-	-	86.3	7.7	6.6	36.0	49.9	10642	-	-										
			-1.70	1.6	3.4	32.7	30.0	33.9	7439	-	-	87.9	7.5	7.0	35.9	49.6	10585	-	-										
			+1.70	12.1	2.2	70.0	-	-	-	-	-	100.0	6.8	19.7	-	-	-	-	-										
	-28	3.4	RAW	100.0	-	-	-	-	-	-	-	RAW	8.2	17.9	34.8	39.1	9366	-	0.38									
	1/4×0	100.0	RAW	100.0	8.4	14.3	34.9	42.4	9371	-	0.24	CALC	6.9	19.6	-	-	-	-	-									
	+28	96.6	-1.70	87.9	-	-	-	-	-	-	-	84.9	7.5	7.0	35.9	49.6	10585	-	-										
	-28	3.4	RAW	100.0	-	-	-	-	-	-	-	3.4	8.2	17.9	34.8	39.1	9366	-	-										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	88.3	7.5	7.4	35.9	49.2	10538	-	-	3.37	66.6	7.0	10.4	35.2	47.4	10190			
	+28	94.3	-1.50	33.3	6.4	7.7	38.5	47.4	10778	-	-	33.3	6.4	7.7	38.5	47.4	10778	-	-										
			-1.60	11.1	6.4	14.8	32.9	45.9	9643	-	-	44.4	6.4	9.5	37.1	47.0	10494	-	-										
			-1.70	8.0	4.7	30.0	28.2	37.1	7723	-	-	52.4	6.1	12.6	35.7	45.5	10071	-	-										
			+1.70	47.6	2.7	64.9	-	-	-	-	-	100.0	4.5	37.5	-	-	-	-	-										
	-28	5.7	RAW	100.0	-	-	-	-	-	-	-	RAW	5.4	41.3	26.0	27.3	5891	-	0.29									
	1/4×0	100.0	RAW	100.0	6.0	36.8	27.0	30.2	6450	-	0.27	CALC	4.6	42.3	-	-	-	-	-									
	+28	94.3	-1.70	52.4	-	-	-	-	-	-	-	49.4	6.1	12.6	35.7	45.5	10071	-	-										
	-28	5.7	RAW	100.0	-	-	-	-	-	-	-	5.7	5.4	41.3	26.0	27.3	5891	-	-										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	55.1	6.0	15.6	34.7	43.7	9638	-	-	6.20	61.4	6.6	12.6	34.9	45.9	9963			
	+28	95.3	-1.50	11.2	9.6	10.3	34.9	50.2	10654	-	-	11.2	4.6	10.3	34.9	50.2	10654	-	-										
			-1.60	6.0	4.5	25.1	32.4	38.0	8663	-	-	17.2	4.6	15.5	34.0	45.9	9959	-	-										
			-1.70	8.2	3.0	36.2	28.0	32.8	7082	-	-	25.4	4.1	22.1	32.1	41.7	9030	-	-										
			+1.70	74.6	2.1	70.0	-	-	-	-	-	100.0	2.6	57.9	-	-	-	-	-										
	-28	4.7	RAW	100.0	-	-	-	-	-	-	-	RAW	4.4	53.8	23.4	18.4	-	-	0.29									
	1/4×0	100.0	RAW	100.0	4.0	57.0	19.8	-	-	-	0.20	CALC	2.7	57.7	-	-	-	-	-									
	+28	95.3	-1.70	25.4	-	-	-	-	-	-	-	24.2	4.1	22.1	32.1	41.7	9030	-	-										
	-28	4.7	RAW	100.0	-	-	-	-	-	-	-	4.7	4.4	53.8	23.4	18.4	4340*	-	-										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	28.9	4.2	27.3	30.7	37.8	8267	-	-	7.27	56.6	6.4	13.6	34.6	45.3	9836			
	+28	96.5	-1.50	87.3	7.3	5.2	36.0	51.5	10987	-	-	87.3	7.3	5.2	36.0	51.5	10987	-	-										
			-1.60	4.2	4.6	21.1	32.8	41.5	9154	-	-	91.5	7.2	5.9	35.9	51.0	10903	-	-										
			-1.70	3.0	3.7	29.6	32.0	34.7	7986	-	-	94.5	7.1	6.7	35.7	50.5	10810	-	-										
			+1.70	5.5	2.6	46.4	-	-	-	-	-	100.0	6.8	8.9	-	-	-	-	-										
	-28	3.5	RAW	100.0	-	-	-	-	-	-	-	RAW	8.8	11.9	38.3	41.0	9982	-	0.35									
	1/4×0	100.0	RAW	100.0	9.1	8.6	37.3	45.0	10080	-	-	CALC	6.7	9.0	-	-	-	-	-									
	+28	96.5	-1.70	94.5	-	-	-	-	-	-	-	91.2	7.1	6.7	35.7	50.5	10810	-	-										
	-28	3.5	RAW	100.0	-	-	-	-	-	-	-	3.5	8.8	11.9	38.3	41.0	9982	-	-										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	94.7	7.2	6.9	35.8	50.1	10779	-	-	1.97	94.7	7.2	6.9	35.8	50.1	10779			
	+28	95.7	-1.50	48.3	6.7	6.8	38.6	47.9	10996	-	-	48.3	6.7	6.8	38.6	47.9	10996	-	-										
			-1.60	6.5	4.4	20.9	32.3	42.4	9180	-	-	54.8	6.4	8.5	37.9	47.3	10780	-	-										
			-1.70	4.8	2.9	32.2	28.2	36.7	7615	-	-	59.6	6.1	10.4	37.1	46.4	10526	-	-										
			+1.70	40.4	1.5	73.0	-	-	-	-	-	100.0	4.3	35.7	-	-	-	-	-										
	-28	4.3	RAW	100.0	-	-	-	-	-	-	-	RAW	6.0	32.0	26.9	35.1	7382	-	0.33									
	1/4×0	100.0	RAW	100.0	5.9	34.5	28.2	31.4	6941	-	0.22	CALC	4.4	35.5	-	-	-	-	-									
	+28	95.7	-1.70	59.6	-	-	-	-	-	-	-	57.0	6.1	10.4	37.1	46.4	10526	-	-										
	-28	4.3	RAW	100.0	-	-	-	-	-	-	-	4.3	6.0	32.0	26.9	35.1	7382	-	-										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	61.3	6.1	11.9	36.4	45.6	10305	-	-	3.49	80.2	6.8	8.6	36.0	48.6	10621			
	1/4×0	100.0	RAW	0.0	-	100.0	-	-	-	-	-	0.00	0	0	0	0	0			5.26	53.2	6.8	8.6	36.0	48.6	10621			
	+28	96.1	-1.50	57.0	6.0	6.9	40.2	46.9	11020	-	-	57.0	6.0	6.9	40.2	46.9	11020	-	-										
			-1.60	4.6	3.7	22.0	31.4	42.9	9127	-	-	61.6	5.8	8.0	39.5	46.6	10878	-	-										
			-1.70	5.7	4.5	30.0	30.3	35.2	7758	-	-	67.3	5.7	9.9	38.8	45.6	10614	-	-										
			+1.70	32.7	2.3	58.7	-	-	-	-	-	100.0	4.6	25.8	-	-	-	-	-										
	-28	3.9	RAW	100.0	-	-	-	-	-	-	-	RAW	7.1	24.5	29.6	38.8	8247	-	0.26									
	1/4×0	100.0	RAW	100.0	6.9	25.4	31.6	36.1	8017	-	-	CALC	4.7	25.8	-	-	-	-	-									
	+28	96.1	-1.70	67.3	-	-	-	-	-	-	-	64.7	5.7	9.9	38.8	45.6	10614	-	-										
	-28	3.9	RAW	100.0	-	-	-	-	-	-	-	3.9	7.1	24.5	29.6	38.8	8247	-	-										
	1/4×0	100.0	COMP	-	-	-	-	-	-	-	-	68.6	5.8	10.7	38.2	45.2	10479	-	-	8.43	59.0	6.4	9.5	37.0	47.1	10559			

7.27m COAL 94.5% RECOVERY
6.87m RECOVERED

99% RECOVERY

8.43m COAL
8.36m RECOVERED

*FROM ASH/BTU CURVE

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y X
ELEVATION:
DIP BEARING
CORE SIZE CASING

BITS USED
MUD USED
FT. LEFT IN HOLE FT.

DATE START
DRILLER
TESTS
SAMPLED BY: R.J. MAZUR

FINISH
OVERALL RECOVERY
DATE 11 JULY, 1978 ANALYZED BY: BIRTLEY

BOREHOLE NO. BP-78-2
PAN OCEAN OIL LTD. (PAGE 2)
MINING DIVISION – COAL

LOGGED BY: R.J. MAZUR DATE 11 JULY, 1978

SIGNED James S. McKinney

GEOLOGICAL LOG – SCALE:

DETAILS OF COAL SEAMS – SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
			SEE PAGE 1

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			No. 3 SEAM HORIZON		
			ROOF - POOR MUDSTONE	7828	1.07
81.76		0.24	COAL - BRIGHT		
		0.190	COAL - DULL		0.61
		0.37	COAL - BRIGHT	N.A.	
82.83		0.61	MUDSTONE, GREY		
83.44		0.23	COAL - BRIGHT	7829	0.23
83.67		0.99	MUDSTONE, GREY		
84.66		0.46	COAL - DULL & BRIGHT	N.A.	
85.12			FLOOR - MUDSTONE	7830	0.99

SIZE		WEIGHT PERCENT									CUMULATIVE WEIGHT PERCENT								CUMULATIVE SAMPLE VALUES								OTHER
DIA-METER	WT %	SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S	THICK-NESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S	
+28	90.3	-1.50	64.0	4.0	9.8	37.0	49.2	10708	-	-	64.0	4.0	9.8	37.0	49.2	10708	-	-										
		-1.60	13.3	3.8	24.6	31.9	39.7	8701	-	-	77.3	4.0	12.4	36.1	47.6	10363	-	-										
		-1.70	9.0	3.4	35.7	27.3	33.6	7073	-	-	86.3	3.9	14.8	35.2	46.1	10020	-	-										
		+1.70	13.7	2.5	55.9	-	-	-	-	-	100.0	3.7	20.4	-	-	-	-	-										
-28	9.7	RAW	100.0	-	-	-	-	-	-	-	RAW	3.7	25.9	34.1	36.3	8542	-	0.45										
1/4×0	100.0	RAW	100.0	3.7	20.9	32.0	43.4	9186	-	0.43	CALC	3.7	20.9	-	-	-	-	-										
+28	90.3	-1.70	86.3	-	-	-	-	-	-	-	77.9	3.9	14.8	35.2	46.1	10020	-	-										
-28	9.7	RAW	100.0	-	-	-	-	-	-	-	9.7	3.7	25.9	34.1	36.3	8542	-	-										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	87.6	3.9	16.0	35.1	45.0	9856	-	-	1.07	87.6	3.9	16.0	35.1	45.0	9856			
-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	-	-	1.68	55.8	3.9	16.0	35.1	45.0	9856			
+28	92.5	-1.50	64.5	4.5	9.2	37.8	48.5	10899	-	-	64.5	4.5	9.2	37.8	48.5	10899	-	-										
		-1.60	15.1	4.3	27.0	31.5	37.2	8372	-	-	79.6	4.5	12.6	36.6	46.4	10419	-	-										
		-1.70	7.0	4.3	34.2	29.0	32.5	7257	-	-	86.6	4.5	14.3	36.0	45.2	10164	-	-										
		+1.70	13.4	2.1	74.0	-	-	-	-	-	100.0	4.1	23.3	-	-	-	-	-										
-28	7.5	RAW	100.0	-	-	-	-	-	-	-	RAW	6.4	22.0	34.6	37.0	8753	-	0.50										
1/4×0	100.0	RAW	100.0	5.5	21.8	31.1	41.6	8876	-	0.47	CALC	4.3	22.3	-	-	-	-	-										
+28	92.5	-1.70	86.6	-	-	-	-	-	-	-	80.1	4.5	14.3	36.0	45.2	10164	-	-										
-28	7.5	RAW	100.0	-	-	-	-	-	-	-	7.5	6.4	22.0	34.6	37.0	8753	-	-										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	87.6	4.7	15.0	35.8	44.5	10043	-	-	1.91	59.6	4.0	15.8	35.2	44.9	9889			
-	-	-	-	-	-	-	-	-	-	-	0	0	0	0	0	0	-	-	2.90	39.3	4.0	15.8	35.2	44.9	9889			
+28	91.0	-1.50	43.1	3.7	6.7	35.5	54.1	11361	-	-	43.1	3.7	6.7	35.5	54.1	11361	-	-										
		-1.60	13.0	4.5	22.1	30.9	42.5	8904	-	-	56.1	3.9	10.3	34.4	51.4	10792	-	-										
		-1.70	11.5	4.0	31.7	26.8	37.5	7518	-	-	67.6	3.9	13.9	33.1	49.1	10235	-	-										
		+1.70	32.4	2.5	56.5	-	-	-	-	-	100.0	3.5	27.7	-	-	-	-	-										
-28	9.0	RAW	100.0	-	-	-	-	-	-	-	RAW	5.7	24.3	34.3	35.7	8421	-	0.35										
1/4×0	100.0	RAW	100.0	5.9	27.3	27.8	39.0	7899	-	0.29	CALC	3.7	27.4	-	-	-	-	-										
+28	91.0	-1.70	67.6	-	-	-	-	-	-	-	61.5	3.9	13.9	33.1	49.1	10235	-	-										
-28	9.0	RAW	100.0	-	-	-	-	-	-	-	9.0	5.7	24.3	34.3	35.7	8421	-	-										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	70.5	4.1	15.2	33.3	47.4	10003	-	-	3.36	43.5	4.1	15.7	34.8	45.4	9914			

RECOVERY UNCERTAIN

LOCATION MAP

TN

SCALE:

COORDINATES: Y X

ELEVATION:

DIP BEARING

CORE SIZE CASING

BITS USED

MUD USED

FT. LEFT IN HOLE FT.

DATE START FINISH

DRILLER

OVERALL RECOVERY

TESTS

SAMPLED BY DATE ANALYZED BY

BOREHOLE NO. BP-78-2 (PAGE 3)

PAN OCEAN OIL LTD.

MINING DIVISION – COAL

LOGGED BY DATE

SIGNED James S. McKinney

GEOLOGICAL LOG – SCALE:

DETAILS OF COAL SEAMS – SCALE:

SEE BP-78-2 (PAGE 1)

NO. 1 SEAM HORIZON

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			ROOF - GOOD CONGLOMERATE SHALEY LAYER GROUND	7821	1.53
23.47		0.08	SHALE - CARBONACEOUS		
		0.53	COAL - MOSTLY BRIGHT		
		0.32	COAL - BRIGHT		
		0.57	SHALE - CARBONACEOUS		
25.00		0.30	COAL - BRIGHT		1.84
		0.35	COAL - DULL AND SHALEY	7822	
		1.13	COAL - BRIGHT		
26.84		0.58	COAL - DULL SHALEY		
		0.20	COAL - BRIGHT		
		0.57	COAL - DULL SHALEY		
		0.86	COAL - BRIGHT	7823	2.83
		0.20	COAL - DULL SHALEY		
29.67		0.33	COAL - BRIGHT		
		0.77	SHALE - CARBONACEOUS		
		0.23	COAL - BRIGHT	7824	
30.74			FLOOR - MUDSTONE - SILTSTONE CARBONACEOUS AT TOP		1.07

SIZE

DIA-METER	WT %	SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S
+28	96.2	-1.70	-	-	-	-	-	-	-	-
		-1.80	3.6	2.7	31.9	28.4	37.0	7793	-	-
		-1.90	1.9	2.8	46.6	24.6	26.0	6009	-	-
		+1.90	56.3	4.3	73.5	14.1	8.1	-	-	-
+28	96.2	-1.80	41.9	-	-	-	-	-	-	-
-28	3.8	RAW	100.0	-	-	-	-	-	-	-
+28	96.2	-1.90	43.8	-	-	-	-	-	-	-
-28	3.8	RAW	100.0	-	-	-	-	-	-	-
ULTIMATE ANALYSIS & ASH FUSION										
+28	-	-1.70	-	-	-	-	-	-	-	-
-28	-	RAW	-	-	-	-	-	-	-	-
+28	96.6	-1.70	-	-	-	-	-	-	-	-
		-1.80	0.9	2.6	32.5	29.0	35.9	7667	-	-
		-1.90	0.4	2.5	45.4	25.0	27.1	6197	-	-
		+1.90	10.8	2.4	73.8	15.9	7.9	-	-	-
+28	96.6	-1.80	88.8	-	-	-	-	-	-	-
-28	3.4	RAW	100.0	-	-	-	-	-	-	-
1/4×0	-	COMB	-	-	-	-	-	-	-	-
+28	96.6	-1.90	89.2	-	-	-	-	-	-	-
-28	3.4	RAW	100.0	-	-	-	-	-	-	-
1/4×0	-	COMB	-	-	-	-	-	-	-	-
ULTIMATE ANALYSIS & ASH FUSION										
+28	-	-1.70	-	-	-	-	-	-	-	-
-28	-	RAW	-	-	-	-	-	-	-	-
+28	94.3	-1.70	-	-	-	-	-	-	-	-
		-1.80	4.2	2.7	32.6	29.5	35.2	7758	-	-
		-1.90	3.3	2.4	47.3	25.8	24.5	5609	-	-
		+1.90	40.1	2.2	70.0	17.3	10.5	-	-	-
+28	94.3	-1.80	56.6	-	-	-	-	-	-	-
-28	5.7	RAW	100.0	-	-	-	-	-	-	-
1/4×0	-	COMB	-	-	-	-	-	-	-	-
+28	94.3	-1.90	59.9	-	-	-	-	-	-	-
-28	5.7	RAW	100.0	-	-	-	-	-	-	-
1/4×0	-	COMB	-	-	-	-	-	-	-	-
ULTIMATE ANALYSIS & ASH FUSION										
+28	-	-1.70	-	-	-	-	-	-	-	-
-28	-	RAW	-	-	-	-	-	-	-	-
+28	95.3	-1.70	-	-	-	-	-	-	-	-
		-1.80	8.8	3.0	33.8	28.0	35.2	7597	-	-
		-1.90	3.8	3.1	49.2	22.9	24.8	5231	-	-
		+1.90	62.0	2.4	73.8	14.7	9.1	-	-	-
+28	95.3	-1.80	34.2	-	-	-	-	-	-	-
-28	4.7	RAW	100.0	-	-	-	-	-	-	-
1/4×0	-	COMB	-	-	-	-	-	-	-	-
+28	95.3	-1.90	38.0	-	-	-	-	-	-	-
-28	4.7	RAW	100.0	-	-	-	-	-	-	-
1/4×0	-	COMB	-	-	-	-	-	-	-	-
ULTIMATE ANALYSIS & ASH FUSION										
+28	-	-1.70	-	-	-	-	-	-	-	-
-28	-	RAW	-	-	-	-	-	-	-	-

CUMULATIVE WEIGHT PERCENT

YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S
38.3	5.7	15.1	34.2	45.0	9722	-	-
41.9	5.4	16.5	33.7	44.3	9556	-	-
43.8	5.3	17.9	33.3	43.5	9402	-	-
100.0	4.8	49.2	22.5	23.6	-	-	-
40.3	5.4	16.5	33.7	44.3	9556	-	-
3.8	6.0	49.3	23.7	21.0	5000*	-	-
42.1	5.3	17.9	33.3	43.5	9402	-	-
3.8	6.0	49.3	23.7	21.0	5000 *	-	-
	H_2O	C	H	N	S	ASH	O
-	6.99	56.8	4.36	0.68	0.36	14.6	16.2
-	6.02	29.9	2.74	0.34	0.33	49.3	11.4
87.9	7.5	7.0	35.9	49.6	10585	-	-
88.8	7.5	7.3	35.8	49.5	10555	-	-
89.2	7.4	7.4	35.8	49.4	10535	-	-
100.0	6.9	14.6	33.6	44.9	-	-	-
85.7	7.5	7.3	35.8	49.5	10555	-	-
3.4	8.2	17.9	34.8	39.1	9366	-	-
89.1	7.5	7.7	35.8	49.1	10509	-	-
86.2	7.4	7.4	35.8	49.4	10535	-	-
3.4	8.2	17.9	34.8	39.1	9366	-	-
89.6	7.4	7.8	35.8	49.0	10490	-	-
	H_2O	C	H	N	S	ASH	O
-	8.09	61.98	4.80	0.71	0.36	6.69	17.4
-	8.15	54.07	4.21	0.66	0.38	17.91	14.6
52.4	6.1	12.6	35.7	45.5	10071	-	-
56.6	5.9	14.1	35.2	44.7	9899	-	-
59.9	5.7	15.9	34.7	43.6	9663	-	-
100.0	4.3	37.6	27.7	30.3	-	-	-
52.8	5.9	14.1	35.2	44.7	9899	-	-
5.7	5.4	41.3	26.0	27.3	5891	-	-
58.5	5.9	16.8	34.3	43.0	9508	-	-
56.5	5.7	15.9	34.7	43.6	9663	-	-
5.7	5.4	41.3	26.0	27.3	5891	-	-
62.2	5.7	18.2	33.9	42.1	9317	-	-
	H_2O	C	H	N	S	ASH	O
-	7.19	58.45	4.50	0.71	0.37	12.13	16.7
-	5.38	36.29	3.16	0.46	0.29	41.28	13.1
25.4	4.1	22.1	32.1	41.7	9030	-	-
34.2	3.8	25.1	31.1	40.0	8661	-	-
38.0	3.8	27.5	30.2	38.5	8318	-	-
100.0	2.9	56.2	20.6	20.3	-	-	-
32.6	3.8	25.1	31.1	40.0	8661	-	-
4.7	4.4	53.8	23.4	18.4	4340 *	-	-
37.3	3.9	28.7	30.1	37.3	8116	-	-
36.2	3.8	27.5	30.2	38.5	8318	-	-
4.7	4.4	53.8	23.4	18.4	4340 *	-	-
40.9	3.9	30.5	29.4	36.2	7861	-	-
	H_2O	C	H	N	S	ASH	O
-	5.83	52.31	4.03	0.69	0.36	21.32	15.5
-	4.42	28.27	2.62	0.41	0.29	53.78	10.2

CUMULATIVE SAMPLE VALUES

THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S
1.53	44.1	5.5	19.3	32.8	42.3	9163	-	-
1.53	45.9	5.4	20.5	32.5	41.6	9038	-	-
				REDUCING				
IDT	ST	HT	FT	IDT	ST	HT	FT	
2420	2500	2540	2610	2360	2440	2480	2560	
+2750	-	-	-	+2750				
3.37	68.7	6.9	11.1	34.9	47.1	10117		
3.37	69.8	6.8	11.6	34.8	46.8	10056		
				REDUCING				
IDT	ST	HT	FT	IDT	ST	HT	FT	
2340	2400	2440	2460	2140	2240	2300	2340	HARDGROVE 39
2220	2460	2520	2560	2100	2180	2260	2380	
6.2	64.0	6.5	13.5	34.7	45.4	9863		
6.20	66.3	6.3	14.4	34.4	44.8	9770		
				REDUCING				
IDT	ST	HT	FT	IDT	ST	HT	FT	
2400	2560	2580	2600	2290	2420	2460	2560	HARDGROVE 35
+2750	-	-	-	+2750	-	-	-	
7.27	60.1	6.3	14.9	34.2	44.6	9703		
7.27	62.6	6.1	16.0	33.9	44.0	9559		
				REDUCING				
IDT	ST	HT	FT	IDT	ST	HT	FT	
2580	2720	2740	+2750	2460	2620	2650	2720	
+2750	-	-	-	2700	+2750	-	-	

OTHER

*FROM ASH / BTU CURVE

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y X
ELEVATION:
DIP BEARING
CORE SIZE CASING

BITS USED
MUD USED
FT. LEFT IN HOLE FT.

DATE START FINISH
DRILLER
TESTS
SAMPLED BY: J. S. McKINNEY
OVERALL RECOVERY
DATE: JULY 10, 1978 ANALYZED BY

BOREHOLE NO. BP-78-2
PAN OCEAN OIL LTD. (PAGE 4)
MINING DIVISION – COAL

LOGGED BY: J. S. McKINNEY DATE: JULY 10, 1978

SIGNED James S. McKinney

GEOLOGICAL LOG – SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
			SEE BP-78-2 (PAGE 1)

DETAILS OF COAL SEAMS – SCALE:

NO. 2 SEAM HORIZON

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	SEAM THICKNESS
		ROOF - FAIR - MUDSTONE, SANDSTONE AND GRIT		1.97
61.58	0.56	COAL - MOSTLY BRIGHT	7825	
	0.66	COAL - DULL		
	0.75	COAL - BRIGHT		
63.55	0.40	SHALE - CARBONACEOUS		
	1.10	COAL - BRIGHT WITH CARBONACEOUS SHALE STRINGERS	7826	1.52
65.07	1.77	SHALE - CARBONACEOUS	N.A.	
66.84		COAL - BRIGHT WITH OCCASIONAL THIN DULL COAL AND CARBONACEOUS SHALE STRINGERS		1.77
	0.35	COAL - DULL	7827	
	0.80	COAL - BRIGHT		3.17
70.01				

SIZE

DIAMETER	WT %	SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S
+28	96.5	-1.70	-	-	-	-	-	-	-	-
		-1.80	INSUFFICENT		SAMPLE	-	-	-	-	-
		-1.90	-	-	-	-	-	-	-	-
		+1.90	5.5	2.6	46.4	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
ULTIMATE ANALYSIS & ASH FUSION										
+28	-	-1.70	-	-	-	-	-	-	-	-
-28	-	RAW	-	-	-	-	-	-	-	-
+28	95.7	-1.70	-	-	-	-	-	-	-	-
		-1.80	3.1	2.3	26.7	30.7	40.3	8668	-	-
		-1.90	1.4	2.5	40.4	21.8	35.3	6967	-	-
		+1.90	35.9	1.8	78.1	13.7	6.4	-	-	-
+28	95.7	-1.80	62.7	-	-	-	-	-	-	-
-28	4.3	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
+28	95.7	-1.90	64.1	-	-	-	-	-	-	-
-28	4.3	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
ULTIMATE ANALYSIS & ASH FUSION										
+28	-	-1.70	-	-	-	-	-	-	-	-
-28	-	RAW	-	-	-	-	-	-	-	-
1/4×0	100.0	RAW	0.0	-	100.0	-	-	-	-	-
+28	96.1	-1.70	-	-	-	-	-	-	-	-
		-1.80	3.9	2.7	26.6	29.4	41.3	8749	-	-
		-1.90	2.0	2.8	40.4	24.9	31.9	6580	-	-
		+1.90	26.8	2.1	65.2	20.2	12.5	-	-	-
+28	96.1	-1.80	71.2	-	-	-	-	-	-	-
-28	3.9	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
+28	96.1	-1.90	73.2	-	-	-	-	-	-	-
-28	3.9	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
ULTIMATE ANALYSIS & ASH FUSION										
+28	-	-1.70	-	-	-	-	-	-	-	-
-28	-	RAW	-	-	-	-	-	-	-	-

WEIGHT PERCENT

YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S
94.5	7.1	6.7	35.7	50.5	10810	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
100.0	6.8	8.9	-	-	-	-	-
94.7	7.2	6.9	35.8	50.1	10779	-	-
	H_2O	C	H	N	S	ASH	O
-	7.85	62.23	4.74	0.66	0.36	6.35	
-	8.83	58.16	4.44	0.61	0.35	11.85	15.8
59.6	6.1	10.4	37.1	46.4	10526	-	-
62.7	5.9	11.2	36.8	46.1	10434	-	-
64.1	5.8	11.8	36.5	45.9	10358	-	-
100.0	4.4	35.6	28.3	31.7	6639	-	-
60.0	5.9	11.2	36.8	46.1	10434	-	-
4.3	6.0	32.0	26.9	35.1	7382	-	-
64.3	5.9	12.6	36.1	45.4	10230	-	-
61.3	5.8	11.8	36.5	45.9	10358	-	-
4.3	6.0	32.0	26.9	35.1	7382	-	-
65.6	5.8	13.1	35.9	45.2	10163	-	-
	H_2O	C	H	N	S	ASH	O
-	6.96	60.88	4.42	0.63	0.36	10.04	16.7
-	6.03	44.60	3.48	0.51	0.33	31.99	13.1
-	0.00	0	0	0	0	-	-
-	-	-	-	-	-	-	-
67.3	5.7	9.9	38.8	45.6	10614	-	-
71.2	5.5	10.8	38.3	45.4	10511	-	-
73.2	5.5	11.6	37.9	45.0	10404	-	-
100.0	4.6	26.0	33.2	36.3	7616	-	-
68.4	5.5	10.8	38.3	45.4	10511	-	-
3.9	7.1	24.5	29.6	38.8	8247	-	-
72.3	5.6	11.5	37.8	45.0	10389	-	-
70.4	5.5	11.6	37.9	45.0	10404	-	-
3.9	7.1	24.5	29.6	38.8	8247	-	-
74.3	5.6	12.3	37.5	44.7	10291	-	-
	H O	C	H	N	S	ASH	O
-	6.95	61.02	4.59	0.69	0.34	9.41	17.0
-	7.08	49.52	3.85	0.59	0.26	24.46	14.2

CUMULATIVE WEIGHT PERCENT

YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S
94.5	7.1	6.7	35.7	50.5	10810	-	-
94.7	7.2	6.9	35.8	50.1	10779	-	-
	H_2O	C	H	N	S	ASH	O
-	7.85	62.23	4.74	0.66	0.36	6.35	
-	8.83	58.16	4.44	0.61	0.35	11.85	15.8
59.6	6.1	10.4	37.1	46.4	10526	-	-
62.7	5.9	11.2	36.8	46.1	10434	-	-
64.1	5.8	11.8	36.5	45.9	10358	-	-
100.0	4.4	35.6	28.3	31.7	6639	-	-
60.0	5.9	11.2	36.8	46.1	10434	-	-
4.3	6.0	32.0	26.9	35.1	7382	-	-
64.3	5.9	12.6	36.1	45.4	10230	-	-
61.3	5.8	11.8	36.5	45.9	10358	-	-
4.3	6.0	32.0	26.9	35.1	7382	-	-
65.6	5.8	13.1	35.9	45.2	10163	-	-
	H_2O	C	H	N	S	ASH	O
-	6.96	60.88	4.42	0.63	0.36	10.04	16.7
-	6.03	44.60	3.48	0.51	0.33	31.99	13.1
-	0.00	0	0	0	0	-	-
-	-	-	-	-	-	-	-
67.3	5.7	9.9	38.8	45.6	10614	-	-
71.2	5.5	10.8	38.3	45.4	10511	-	-
73.2	5.5	11.6	37.9	45.0	10404	-	-
100.0	4.6	26.0	33.2	36.3	7616	-	-
68.4	5.5	10.8	38.3	45.4	10511	-	-
3.9	7.1	24.5	29.6	38.8	8247	-	-
72.3	5.6	11.5	37.8	45.0	10389	-	-
70.4	5.5	11.6	37.9	45.0	10404	-	-
3.9	7.1	24.5	29.6	38.8	8247	-	-
74.3	5.6	12.3	37.5	44.7	10291	-	-
	H O	C	H	N	S	ASH	O
-	6.95	61.02	4.59	0.69	0.34	9.41	17.0
-	7.08	49.52	3.85	0.59	0.26	24.46	14.2

CUMULATIVE SAMPLE VALUES

THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S
1.97	94.7	7.2	6.9	35.8	50.1	10779		
				OXIDIZING		REDUCING		
		IDT	ST	HT	FT	IDT	ST	HT	FT
		2440	2460	2480	2520	2280	2340	2390	2450
		2420	2480	2560	2520	1920	2080	2130	2200
3.49	81.5	6.8	8.9	35.9	48.5	10590			
3.49	82.0	6.7	9.1	35.8	48.4	10564			
		OXIDIZING				REDUCING			
		IDT	ST	HT	FT	IDT	ST	HT	FT
		2390	2460	2480	2530	2110	2160	2200	2290
		2740	+2750	-	-	2560	2650	2680	2730
5.26	54.0	6.8	8.9	35.9	48.5	10590	at -1.80		
5.26	54.4	6.7	9.1	35.8	48.4	10564	at -1.90		
8.43	60.9	6.2	10.0	36.8	46.9	10500			
8.43	61.9	6.2	10.5	36.6	46.7	10441			
		OXIDIZING				REDUCING			
		IDT	ST	HT	FT	IDT	ST	HT	FT
		2560	2580	2610	2630	2200	2480	2500	2550
		+2750	-	-	-	2640	2660	2680	2710

OTHER

HARDGROVE 42

HARDGROVE 41

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y X

ELEVATION:

DIP: 90° BEARING: 0

CORE SIZE: HQ CASING 48

BITS USED SMITH

MUD USED QUICK GEL

FT. LEFT IN HOLE NIL FT.

DATE START 29 JULY, 1978 FINISH: 6 AUGUST, 1978

DRILLER: CARON DIAMOND DRILLING OVERALL RECOVERY 86.2%

TESTS: NONE

SAMPLED BY: J.S. McKINNEY DATE: 15 SEPT., 1978 ANALYZED BY: BIRTLEY

BOREHOLE NO. BP-78-3

PAN OCEAN OIL LTD. (PAGE 1)

MINING DIVISION – COAL

LOGGED BY: R.F. McINTYRE DATE 6 AUGUST, 1978

SIGNED James S. McKinney

GEOLOGICAL LOG – SCALE: 1:500

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	THICKNESS	DESCRIPTION
	10.40	OVERBURDEN - ASSORTED PEBBLES IN MUD
10.4	0.30	MUDSTONE - GREY
10.7	4.20	OVERBURDEN ? NO RECOVERY
14.9	1.70	MUDSTONE - GREY
16.6	0.40	SANDSTONE - FINE GRAINED BUFF TO GREY
17.0	74.80	CONGLOMERATE - BLACK AND BUFF CHERT PEBBLE CONGLOMERATE WITH QUARTZITE AND QUARTZ PEBBLES. USUAL SIZE OF PEBBLES 25-50mm, POORLY CEMENTED, HIGH POROSITY, SEE WRITTEN LOG. SANDSTONE BEDS 0.1 TO 0.5m THICK AT 21.2, 29.0, 35.8, 88.8 AND 91.4m. MUDSTONE 0.1 TO 0.2m THICK AT 49.0, 52.4, 52.9, 87.3 AND 91.8m. DIPS APPEAR TO BE 10-15 DEGREES.
91.8	8.70	NO. 1 SEAM HORIZON
100.5	7.90	MUDSTONE - GREY
108.4	1.90	CONGLOMERATE - AS ABOVE
110.3	2.80	SANDSTONE - GREY
113.1	2.10	CONGLOMERATE - AS ABOVE
115.2	1.90	SANDSTONE - GREY
117.1	2.40	CONGLOMERATE - AS ABOVE
119.22	2.43	COAL - NO. 2 SEAM HORIZON ?
121.65	5.80	SANDSTONE - GREY, FINE GRAINED
129.7	0.50	CONGLOMERATE - AS ABOVE
130.2		E.O.H.

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
		No. 1 SEAM HORIZON		0.27
91.80	0.30	ROOF - GOOD CONGLOMERATE SILTSTONE	78311	2.63
92.07	0.31	COAL - THIN BANDED MOSTLY DULL W/1mm BRIGHT STRINGERS		
92.38		GRINDING - COAL & SH.?	N.A.	
	1.41	SHALE AND COALY SHALE		1.55
93.79	0.91	MUDSTONE ROOF - POOR		
94.70		COAL - BRIGHT	78312	
94.95		COAL - DULL W/SOME BRIGHT		
95.30		COAL - BRIGHT		
95.50		MUDSTONE		
95.70		SHALEY COAL		0.40
96.50		COAL - BRIGHT	78313	
96.90		SHALE - CARBONACEOUS	78314	
97.50		COAL - MOSTLY DULL, THICK BANDED SHALEY COAL IN PLACES	78315	0.60
100.50		FLOOR - POOR MUDSTONE, COALY SHALE AND SILTSTONE		3.00
		No. 2 SEAM HORIZON ?		1.33
119.22	0.60	CONGLOMERATE ROOF - GOOD COAL - BRIGHT AND DULL THICK BANDED	78321	
119.82	0.73	COAL - BRIGHT		
120.55	0.70	COAL - BRIGHT AND DULL THICK BANDED	78322	0.70
121.25	0.40	COALY SHALE		
121.65		FLOOR - POOR - MUDSTONE	78323	0.40

SIZE DIAMETER	SIZE WT %	SPEC GRAV	WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
+28	91.2	-1.70	81.8	4.8	17.6	31.0	46.6	9574	-	-
		-1.80	8.9	3.3	45.5	24.2	27.0	5826	-	-
		-1.90	5.8	3.2	52.7	21.4	22.7	5032	-	-
		+1.90	3.5	2.6	66.0	17.7	13.7	-	-	-
-28	8.8	RAW	-	-	-	-	-	-	-	-
1/4×0	100.0	RAW	100.0	8.2	63.1	28.5	40.4	8382	-	0.49
+28	91.2	-1.70	81.8	-	-	-	-	-	-	-
-28	8.8	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
+28	92.6	-1.70	34.0	6.8	13.6	34.8	44.8	9875	-	-
		-1.80	3.5	3.7	44.5	23.9	27.9	6007	-	-
		-1.90	7.9	3.3	53.4	20.6	22.7	4928	-	-
		+1.90	54.6	3.9	73.7	13.4	9.0	-	-	-
-28	7.4	RAW	-	-	-	-	-	-	-	-
1/4×0	100.0	RAW	100.0	7.1	50.1	21.0	21.8	4901	-	0.18
+28	92.6	-1.70	34.0	-	-	-	-	-	-	-
-28	7.4	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
+28	93.4	-1.70	98.2	6.4	5.7	37.3	50.6	10884	-	-
		+1.70	1.8	2.7	49.9	20.5	26.9	5505	-	-
-28	6.6	RAW	-	-	-	-	-	-	-	-
1/4×0	100.0	RAW	100.1	10.2	6.6	35.5	47.7	10394	-	0.29
+28	93.4	-1.70	98.2	-	-	-	-	-	-	-
-28	6.6	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
+28	94.3	-1.70	2.8	5.3	10.8	36.6	47.3	10445	-	-
		-1.80	0.3	4.4	44.3	24.9	26.4	5970	-	-
		-1.90	0.6	3.7	54.9	21.7	19.7	4711	-	-
		+1.90	96.3	4.1	80.7	12.3	2.9	-	-	-
-28	5.7	RAW	-	-	-	-	-	-	-	-
1/4×0	100.0	RAW	100.0	6.5	76.4	12.7	4.4	-	-	0.09
+28	94.3	-1.70	2.8	-	-	-	-	-	-	-
-28	5.7	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
+28	94.5	-1.70	52.3	6.9	17.1	33.4	42.6	9340	-	-
		-1.80	10.9	3.6	45.5	25.0	25.9	5863	-	-
		-1.90	15.0	3.4	51.8	23.6	21.2	5152	-	-
		+1.90	21.8	2.6	75.4	14.7	7.3	-	-	-
-28	5.5	RAW	-	-	-	-	-	-	-	-
1/4×0	100.0	RAW	100.0	7.8	39.0	25.9	27.3	6126	-	0.20
+28	44.5	-1.70	52.3	-	-	-	-	-	-	-
-28	5.5	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
+28	93.5	-1.70	93.8	6.9	13.6	34.1	45.4	9686	-	-
		-1.80	2.3	3.2	40.5	26.3	30.0	6616	-	-
		-1.90	1.3	3.1	46.8	24.3	25.8	5813	-	-
		+1.90	2.6	1.9	66.6	20.4	11.1	-	-	-
-28	6.5	RAW	-	-	-	-	-	-	-	-
1/4×0	100.0	RAW	100.0	9.9	15.7	32.2	42.2	9110	-	0.33
+28	93.5	-1.70	93.8	-	-	-	-	-	-	-
-28	6.5	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
+28	92.8	-1.70	51.0	5.2	15.4	32.2	47.2	9637	-	-
		-1.80	13.7	3.8	40.8	24.7	30.7	6492	-	-
		-1.90	11.9	3.1	47.6	23.4	25.9	5705	-	-
		+1.90	23.4	2.0	66.3	19.6	12.1	-	-	-
-28	7.2	RAW	-	-	-	-	-	-	-	-
1/4×0	100.0	RAW	100.0	7.6	33.4	25.8	33.2	7048	-	0.24
+28	92.8	-1.70	51.0	-	-	-	-	-	-	-
-28	7.2	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
+28	89.5	-1.70	35.0	4.8	17.8	31.9	45.5	9593	-	-
		-1.80	7.7	2.8	46.5	23.7	27.0	6014	-	-
		-1.90	11.0	2.7	54.9	19.6	22.8	4762	-	-
		+1.90	46.3	2.1	78.3	12.6	7.0	-	-	-
-28	10.5	RAW	-	-	-	-	-	-	-	-
1/4×0	100.0	RAW	100.0	-	-	-	-	-	-	-
+28	89.5	-1.70	35.0	-	-	-	-	-	-	-
-28	10.5	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-

CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
81.8	4.8	17.6	31.0	46.6	9574	-	-
90.7	4.7	20.3	30.3	44.7	9206	-	-
96.5	4.6	22.3	29.8	43.4	8955	-	-
100.0	4.5	23.8	29.4	42.3	-	-	-
RAW	6.8	20.6	27.0	45.6	9164	-	-
CALC	4.7	23.5	29.2	42.5	-	-	-
74.6	4.8	17.6	31.0	46.6	9574	-	-
8.8	6.8	20.6	27.0	45.6	9164	-	-
83.4	5.0	17.9	30.6	46.5	9530	-	-
34.0	6.8	13.6	34.8	44.8	9875	-	-
37.5	6.5	16.5	33.8	43.2	9514	-	-
45.4	6.0	22.9	31.5	39.7	8716	-	-
100.0	4.8	50.6	21.6	22.9	-	-	-
RAW	6.7	48.2	20.7	24.4	5159	-	-
CALC	4.9	50.4	21.5	23.0	-	-	-
31.5	6.8	13.6	34.8	44.8	9875	-	-
7.4	6.7	48.2	20.7	24.4	5159	-	-
38.9	6.8	20.2	32.1	41.0	8978	-	-
98.2	6.4	5.7	37.3	50.6	10884	-	-
100.0	6.3	6.5	37.0	50.2	10787	-	-
RAW	8.7	8.7	34.6	48.0	10467	-	-
CALC	6.5	6.7	36.8	50.1	10765	-	-
91.7	6.4	5.7	37.3	50.6	10884	-	-
6.6	8.7	8.7	34.6	48.0	10467	-	-
98.3	6.6	5.9	37.1	50.4	10856	-	-
2.8	5.3	10.8	36.6	47.3	10445	-	-
3.1	5.2	14.0	35.5	45.3	10011	-	-
3.7	4.9	20.7	33.2	41.1	9152	-	-
100.0	4.1	78.5	13.1	4.3	-	-	-
RAW	6.0	70.8	14.2	9.0	-	-	-
CALC	4.2	78.1	13.2	4.6	-	-	-
2.6	5.3	10.8	36.6	47.3	10445	-	-
5.7	6.0	70.8	14.2	9.0	2680*	-	-
8.3	5.8	52.0	21.2	21.0	5112	-	-
52.3	6.9	17.1	33.4	42.6	9340	-	-
63.2	6.3	22.0	31.9	39.7	8740	-	-
78.2	5.8	27.7	30.4	36.2	8052	-	-
100.0	5.1	38.1	26.9	29.9	-	-	-
RAW	7.6	33.1	27.6	31.7	7036	-	-
CALC	5.2	37.8	26.9	30.0	-	-	-
49.4	6.9	17.1	33.4	42.6	9340	-	-
5.5	7.6	33.1	27.6	31.7	7036	-	-
54.9	7.0	18.7	32.8	41.5	9109	-	-
93.8	6.9	13.6	34.1	45.4	9686	-	-
96.1	6.8	14.2	33.9	45.1	9613	-	-
97.4	6.7	14.7	33.8	44.8	9561	-	-
100.0	6.6	16.0	33.4	43.9	9313	-	-
RAW	8.4	17.8	31.1	42.7	9063	-	-
CALC	6.7	16.1	33.3	43.9	9297	-	-
87.7	6.9	13.6	34.1	45.4	9686	-	-
6.5	8.4	17.8	31.1	42.7	9063	-	-
94.2	7.0	13.9	33.9	45.2	9643	-	-
51.0	5.2	15.4	32.2	47.2	9637	-	-
64.7	4.9	20.8	30.6	43.7	8971	-	-
76.6	4.6	25.0	29.5	40.9	8464	-	-
100.0	4.0	34.6	27.2	34.2	-	-	-
RAW	7.1	30.6	25.9	37.0	7367	-	-
CALC	4.2	34.3	27.1	34.4	-	-	-
47.3	6.9	13.6	34.1	45.4	9686	-	-
7.2	7.1	30.6	25.9	37.0	7367	-	-
54.5	6.9	15.9	33.0	44.3	9380	-	-
35.0	4.8	17.8	31.9	45.5	9593	-	-
42.7	4.4	23.9	30.4	42.2	8948	-	-
53.7	4.1	29.5	28.2	38.2	8090	-	-
100.0	3.2	52.1	20.9	23.8	-	-	-
RAW	4.9	50.9	18.9	25.3	5056	-	-
CALC	3.4	52.0	20.7	23.9	-	-	-
31.3	4.8	17.8	31.9	45.5	9593	-	-
10.5	7.1	30.6	25.9	37.0	7367	-	-
41.8	5.4	21.0	30.4	43.4	9034	-	-

CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
1.55	38.9	6.8	20.2	32.1	41.0	8978		
1.95	51.2	6.7	14.6	34.1	44.7	9719		
2.55	41.0	6.7	16.3	33.5	43.6	9499		
5.55	48.5	6.9	17.8	33.1	42.3	9260		
1.33	94.2	7.0	13.9	33.9	45.2	9643		
2.03	80.5	7.0	14.4	33.7	45.0	9582		
2.43	74.1	6.8	15.0	33.4	44.8	9531		

OTHER

5.55m COAL 99% RECOVERY
5.51m RECOVERY

2.43m COAL 92% RECOVERY
2.24m RECOVERY

*FROM ASH/BTU CURVE

LOCATION MAP

TN

SCALE:

COORDINATES: Y X DATE START FINISH

ELEVATION: BITS USED DRILLER OVERALL RECOVERY

DIP BEARING MUD USED TESTS

CORE SIZE CASING FT. LEFT IN HOLE FT. SAMPLED BY DATE ANALYZED BY

BOREHOLE NO. BP-78-3 (PAGE 2)

PAN OCEAN OIL LTD.

MINING DIVISION – COAL

LOGGED BY DATE

SIGNED James S McElhanney

GEOLOGICAL LOG – SCALE:

DETAILS OF COAL SEAMS – SCALE:

SEE BP-78-3 (PAGE 1)

No. 1 SEAM HORIZON

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
		0.30	ROOF - GOOD CONGLOMERATE		
91.80			SILTSTONE		
92.07		0.31	COAL - THIN BANDED MOSTLY DULL W/1mm BRIGHT STRINGERS		1.55
92.38			GRINDING - COAL & SH.?		
		1.41	SHALE AND COALY SHALE		
93.79			MUDSTONE		
		0.91	ROOF - POOR		
94.70			COAL - BRIGHT	78312	0.40
94.95			COAL - DULL W/SOME BRIGHT		
95.30			COAL - BRIGHT		
95.50			MUDSTONE		
95.70			SHALEY COAL	78313	
96.50			COAL - BRIGHT		
96.90			SHALE - CARBONACEOUS	78314	0.60
97.50			COAL - MOSTLY DULL, THICK BANDED SHALEY COAL IN PLACES		
				78315	
					3.00
100.50			FLOOR - POOR MUDSTONE, COALY SHALE AND SILTSTONE		

SIZE DIAMETER	SIZE WT %	SPEC GRAV	WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S	OTHER
+28	92.6	-1.80	37.5	-	-	-	-	-	-	-	34.7	6.5	16.5	33.8	43.2	9514	-	-										
-28	7.4	RAW	100.0	-	-	-	-	-	-	-	7.4	6.7	48.2	20.7	24.4	5159	-	-										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	42.1	6.5	22.1	31.5	39.9	8748	-	-	1.55	42.1	6.5	22.1	31.5	39.9	8748	-	-	
+28	92.6	-1.90	45.4	-	-	-	-	-	-	-	42.0	6.0	22.9	31.5	39.7	8716	-	-										
-28	7.4	RAW	100.0	-	-	-	-	-	-	-	7.4	6.7	48.2	20.7	24.4	5159	-	-										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	49.4	6.1	26.7	29.9	37.4	8183	-	-	1.55	49.4	6.1	26.7	29.9	37.4	8183	-	-	
ULTIMATE ANALYSIS & ASH FUSION												H_2O	C	H	N	S	ASH	O	OXIDIZING						REDUCING			
																			IDT	ST	HT	FT	IDT	ST	HT	FT		
+28	-	-1.70	-	-	-	-	-	-	-	-	-	6.84	58.17	4.51	0.77	0.40	13.63	15.7	2280	2350	2400	2440	2220	2270	2300	2360		
-28	-	RAW	-	-	-	-	-	-	-	-	-	6.72	31.48	2.88	0.47	0.19	48.23	10.0	2690	+2750	-	-	2600	2690	2720	+2750		HARDGROVE 39
1/4×0		COMB	AT -1.70 + RAW -28								98.3	6.6	5.9	37.1	50.4	10856	-	-	1.95	53.6	6.5	16.0	33.6	43.8	9540	AT -1.80		
											-	-	-	-	-	-	-	-	1.95	59.4	6.3	19.6	32.3	41.8	9089	AT -1.90		
ULTIMATE ANALYSIS & ASH FUSION												H_2O	C	H	N	S	ASH	O	OXIDIZING						REDUCING			
																			IDT	ST	HT	FT	IDT	ST	HT	FT		
+28	-	-1.70	-	-	-	-	-	-	-	-	-	6.44	64.51	4.82	0.92	0.32	5.74	17.3	2200	2230	2240	2280	1890	1920	1980	2030		
-28	-	RAW	-	-	-	-	-	-	-	-	-	8.66	62.45	4.71	0.80	0.25	8.71	14.4	2160	2230	2310	2400	1980	2040	2110	2170		HARDGROVE 37
+28	94.3	-1.80	3.1	-	-	-	-	-	-	-	2.9	5.2	14.0	35.5	45.3	10011	-	-										
-28	5.7	RAW	100.0	-	-	-	-	-	-	-	5.7	6.0	70.8	14.2	9.0	2680*	-	-										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	8.6	5.7	51.6	21.4	21.2	5152	-	-	2.55	43.0	6.5	17.7	33.0	42.8	9334	-	-	
+28	94.3	-1.90	3.7	-	-	-	-	-	-	-	3.5	4.9	20.7	33.2	41.1	9152	-	-										
-28	5.7	RAW	100.0	-	-	-	-	-	-	-	5.7	6.0	70.8	14.2	9.0	2680*	-	-										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	9.2	5.6	51.7	21.4	21.2	5142	-	-	2.55	47.6	6.2	21.1	31.8	40.9	8910	-	-	
ULTIMATE ANALYSIS & ASH FUSION												H_2O	C	H	N	S	ASH	O	OXIDIZING						REDUCING			
																			IDT	ST	HT	FT	IDT	ST	HT	FT		
+28	-	-1.70	-	-	-	-	-	-	-	-	-	5.34	61.84	4.59	0.90	0.29	10.76	16.3	2230	2270	2300	2350	2120	2160	2200	2220		
-28	-	RAW	-	-	-	-	-	-	-	-	-	6.02	12.26	2.13	0.26	0.15	70.76	8.42	+2750	-	-	-	+2750	-	-	-		HARDGROVE 38
+28	94.5	-1.80	63.2	-	-	-	-	-	-	-	-	59.7	6.3	22.0	31.9	39.7	8740	-										
-28	5.5	RAW	100.0	-	-	-	-	-	-	-	-	5.5	7.6	33.1	27.6	31.7	7036	-										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	-	65.2	6.4	22.9	31.5	39.0	8596	-	5.55	55.0	6.4	21.0	32.0	40.4	8861	-	-	
+28	94.5	-1.90	78.2	-	-	-	-	-	-	-	-	73.9	5.8	27.7	30.4	36.2	8052	-										
-28	5.5	RAW	100.0	-	-	-	-	-	-	-	-	5.5	7.6	33.1	27.6	31.7	7036	-										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	-	79.4	5.9	28.1	30.2	35.9	7981	-	5.55	64.8	6.0	25.7	30.8	37.6	8294	-	-	
ULTIMATE ANALYSIS & ASH FUSION												H_2O	C	H	N	S	ASH	O	OXIDIZING						REDUCING			
																			IDT	ST	HT	FT	IDT	ST	HT	FT		
+28	-	-1.70	-	-	-	-	-	-	-	-	-	6.86	55.54	4.34	0.86	0.42	17.07	14.9	2320	2440	2500	2520	2220	2270	2290	2320		
-28	-	RAW	-	-	-	-	-	-	-	-	-	7.64	42.61	3.57	0.56	0.25	33.12	12.3	2740	+2750	-	-	2570	2690	2720	2730		HARDGROVE 38

No. 2 SEAM HORIZON?

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			CONGLOMERATE ROOF - GOOD		
119.22		0.60	COAL - BRIGHT AND DULL THICK BANDED	78321	1.33
119.82		0.73	COAL - BRIGHT		
120.55		0.70	COAL - BRIGHT AND DULL THICK BANDED	78322	0.70
121.25		0.40	COALY SHALE		
121.65			FLOOR - POOR - MUDSTONE	78323	

SIZE DIAMETER	SIZE WT %	SPEC GRAV	WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S	OTHER
+28	93.5	-1.80	96.1	-	-	-	-	-	-	-	89.9	6.8	14.2	33.9	45.1	9613	-											
-28	6.5	RAW	100.0	-	-	-	-	-	-	-	6.5	8.4	17.8	31.1	42.7	9063	-											
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	96.4	6.9	14.4	33.7	44.9	9576	-		1.33	96.4	6.9	14.4	33.7	44.9	9576	-	-	
+28	93.5	-1.90	97.4	-	-	-	-	-	-	-	91.1	6.7	14.7	33.8	44.8	9561	-											
-28	6.5	RAW	100.0	-	-	-	-	-	-	-	6.5	8.4	17.8	31.1	42.7	9063	-											
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	97.6	6.8	14.9	33.6	44.7	9528	-		1.33	97.6	6.6	14.9	33.6	44.7	9528			
ULTIMATE ANALYSIS & ASH FUSION												H_2O	C	H	N	S	ASH	O	OXIDIZING						REDUCING			
																			IDT	ST	HT	FT	IDT	ST	HT	FT		
+28	-	-1.70	-	-	-	-	-	-	-	-	-	6.88	57.75	4.43	0.74	0.44	13.63	16.1	+2750	-	-	-	2650	+2750	-	-		
-28	-	RAW	-	-	-	-	-	-	-	-	-	8.35	53.61	4.25	0.73	0.32	17.79	15.0	2660	2700	2720	2760	2480	2540	2560	2580		HARDGROVE 39
+28	92.8	-1.80	64.7	-	-	-	-	-	-	-	60.0	4.9	20.8	30.6	43.7	8971	-											
-28	7.2	RAW	100.0	-	-	-	-	-	-	-	7.2	7.1	30.6	25.9	37.0	7367	-											
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	67.2	5.1	21.9	30.1	43.0	8799	-		2.03	86.3	6.4	16.4	32.7	44.4	9367	-	-	
+28	92.8	-1.90	76.6	-	-	-	-	-	-	-	71.1	4.6	25.0	29.5	40.9	8464	-											
-28	7.2	RAW	100.0	-	-	-	-	-	-	-	7.2	7.1	30.6	25.9	37.0	7367	-											
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	78.3	4.8	25.5	29.2	40.5	8363	-		2.03	90.9	6.2	18.0	32.3	43.5	9182	-	-	
ULTIMATE ANALYSIS & ASH FUSION												H_2O	C	H	N	S	ASH	O	OXIDIZING						REDUCING			
																			IDT	ST	HT	FT	IDT	ST	HT	FT		
+28	-	-1.70	-	-	-	-	-	-	-	-	-	5.18	59.03	4.09	0.76	0.35	15.35	15.2	2620	2680	2700	2710	2400	2480	2560	2640		
-28	-	RAW	-	-	-	-	-	-	-	-	-	7.09	45.89	3.32	0.71	0.27	29.98	12.7	2710	+2750	-	-	2540	2610	2640	2700		HARDGROVE 39
+28	89.5	-1.80	42.7	-	-	-	-	-	-	-	38.2	4.4	23.9	30.4	42.2	8948	-											
-28	10.5	RAW	100.0	-	-	-	-	-	-	-	10.5	7.1	30.6	25.9	37.0	7367	-											
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	48.7	5.0	25.3	29.4	41.0	8607	-		2.43	80.1	6.3	17.3	32.4	44.0	9291	-	-	
+28	89.5	-1.90	53.7	-	-	-	-	-	-	-	48.1	4.1	29.5	28.2	38.2	8090	-											
-28	10.5	RAW	100.0	-	-	-	-	-	-	-	10.5	7.1	30.6	25.9	37.2	7367	-											
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	58.6	4.6	29.7	27.8	38.0	7460	-		2.43	85.6	6.0	19.4	31.8	42.8	9044	-	-	
ULTIMATE ANALYSIS & ASH FUSION												H_2O	C	H	N	S	ASH	O	OXIDIZING						REDUCING			
																			IDT	ST	HT	FT	IDT	ST	HT	FT		
+28	-	-1.70	-	-	-	-	-	-	-	-	-	4.79	57.51	4.06	0.74	0.40	17.82	14.7	2300	2490	2530	2580	2260	2360	2420	2500		
-28	-	RAW	-	-	-	-	-	-	-	-	-	4.90	31.85	2.53	0.55	0.23	50.91	9.1	2650	+2750	-	-	2590	2720	+2750	-		HARDGROVE 38

* FROM ASH/BTU CURVE

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y 8100 m W X 7100 m N OF S.E. CORNER CL 82 DATE START MAY 27, 1979 FINISH MAY 30, 1979

ELEVATION: APPROX. 469.4 m BITS USED J.K. SMIT SERIES 200 COMBINATION DRILLER CARON DRILLING OVERALL RECOVERY 92.5%

DIP -90° BEARING NA MUD USED 16 BAGS GEL, 17 BAGS TROL TESTS GAMMA RAY / SP / RESISTIVITY LOG

CORE SIZE H.Q. CASING 3.66 m LEFT IN HOLE NIL m SAMPLED BY O. CULLINGHAM DATE JUNE 2 ANALYZED BY BIRTLEY COAL & MINERALS TESTING SIGNED

BOREHOLE NO. W-79-1
PAN OCEAN OIL LTD.
MINING DIVISION – COAL

LOGGED BY O. CULLINGHAM DATE

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	THICKNESS	DESCRIPTION
3.65	3.65	OVERBURDEN - WEATHERED CONGLOMERATE CONTAINING CHERT FRAGMENTS BOULDERS AND PEBBLES, MINOR SANDSTONE AND COAL
11.40	7.93	CONGLOMERATE COARSENING DOWNWARD FROM GRANULES TO PEBBLES
19.85	8.45	NO. 1 SEAM HORIZON
22.91	3.06	MUDSTONE, VERY SOFT, LIGHT GRAY-BROWN SILTY NEAR BASE
36.15	13.24	SANDSTONE - FINE TO COARSE GRAINED, COARSENING DOWNWARD. LIGHT TO MEDIUM GRAY TO SALT AND PEPPER. WELL SORTED SUBANGULAR TO SUBROUNDED QUARTZ AND CHERT GRAINS. IN PLACES CROSS BEDDED. CONTAINS CARBONACEOUS MATERIAL WHICH CROSSES BEDDING. BROKEN SURFACE IS A DARK GRAY BROWN.
39.46	3.31	MUDSTONE - SOFT TO VERY SOFT, MEDIUM GRAY, SILTY AT BASE
61.29	21.86	CONGLOMERATE - POOR TO FAIR SORTING.
65.82	4.62	NO. 2 SEAM HORIZON
67.65	1.71	MUDSTONE - LIGHT GRAY, TAN COLOR BANDING PERPENDICULAR TO CORE AXIS
80.77	13.12	SANDSTONE - LIGHT TO MEDIUM GRAY TO SALT AND PEPPER, FINE TO MEDIUM GRAINED, WELL SORTED ANGULAR TO SUBANGULAR QUARTZ AND CHERT GRAINS. SILICA CEMENT, HARD, THINLY BEDDED AND CROSS BEDDED NEAR BASE. GET RARE COALIFIED PLANT FRAGMENTS
		TOTAL DEPTH

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
		No. 1 SEAM HORIZON		
		ROOF - CONGLOMERATE / SANDSTONE GOOD		
11.40	0.96	BRIGHT COAL 18cm CARBONACEOUS MUDSTONE 22cm COAL HARD, DULL TO BRIGHT 30cm MUDSTONE CARBONACEOUS 26cm	A0001	0.96
12.36	0.94	COAL - DULL 22 cm SHALY COAL 13cm 9cm 1st CORE COAL DULL TO VITREOUS 50cm	A0002	1.35
13.71	0.41	COALY MUDSTONE 20cm N.R. 21cm		
	1.35	COAL - BRIGHT, BANDED, COALY SHALE PARTINGS TOWARD BASE 124 cm CARBONACEOUS MUDSTONE 11cm	A0003	1.79
15.50	0.44	COAL - DULL TO BRIGHT 44 cm		
	0.10	MUDSTONE 10 cm		
	1.15	COAL BRIGHT, CLEAN & BANDED 115cm		
	0.31	NO RECOVERY 31 cm	A0004	2.56
	0.04	CARBONACEOUS MUDSTONE 4 cm		
	0.96	COAL, DULL TO BRIGHT, THINLY BANDED WITH CARBONACEOUS MUDSTONE 96 cm		
18.06		MUDSTONE 18 cm COAL BRIGHT BANDED 28 cm LOST CORE 7 cm		
	1.34	COAL 6 cm COALY MUDSTONE 22cm COAL, BRIGHT BANDED 53 cm	A0005	1.34
19.40		FLOOR - SHALE, SOFT, POOR		
		No. 2 SEAM HORIZON		
		ROOF - GRAULE TO PEBBLE CONGLOMERATE HARD, GOOD		
61.29	0.76	COAL, MOSTLY BRIGHT, THIN DULL PARTINGS AND BANDS 76cm	A0006	2.01
62.05	0.35	CARBONACEOUS MUDSTONE 35cm		
62.40	0.51	COAL, HARD AND BRIGHT 51 cm		
62.91	0.11	CARBONACEOUS MUDSTONE 11cm		
	0.28	SHALEY COAL 28cm DULL		
63.30	0.20	COAL BRIGHT 20 cm		
	0.02	CARBONACEOUS MUDSTONE 2cm		
	1.82	COAL BRIGHT 182 cm	A0007	2.07
		NO CORE 3 cm		
65.37	0.48	CARBONACEOUS MUDSTONE 25cm COAL AND SHALEY COAL 20cm	A0008	0.45
65.82		FLOOR - SHALE, POOR.		

SIZE DIAMETER	SIZE WT %	WEIGHT PERCENT SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	OTHER HGI
		-1.90	44.5	2.9	33.1	28.9	35.1	7972	-	0.51	44.5	2.9	33.1	28.9	35.1	7972	-	0.51									
0×1/4	100%	+1.90	55.5	1.3	74.5	-	-	-	-	-	100.0	2.0	56.1	-	-	-	-	-	8.00	61.3	4.4	18.8	31.0	45.6	9743			43
		RAW	-	-	-	-	-	-	-	-	100.0	1.5	56.1	24.7	17.7	4721	-	0.53										
		-1.90	57.3	2.8	31.7	26.0	39.5	8370	-	1.03	57.3	2.8	31.7	26.0	39.5	8370	-	1.03									
0×1/4	100%	+1.90	42.7	1.6	70.7	-	-	-	-	-	100.0	2.3	48.3	-	-	-	-	-	7.04	63.6	4.5	17.4	31.3	46.6	9911			47
		RAW	-	-	-	-	-	-	-	-	100.0	4.5	47.4	20.9	27.2	5626	-	0.75										
		-1.90	69.9	5.0	12.8	33.0	49.2	10409	-	0.39	69.9	5.0	12.8	33.0	49.2	10409	-	0.39									
0×1/4	100%	+1.90	30.1	1.8	71.9	-	-	-	-	-	100.0	4.0	30.6	-	-	-	-	-	5.69	65.2	4.9	14.5	32.4	48.1	10233			48
		RAW	-	-	-	-	-	-	-	-	100.0	8.3	30.1	27.7	33.9	7417	-	0.24										
		-1.90	67.9	5.6	12.8	32.8	48.8	10446	-	0.46	67.9	5.6	12.8	32.8	48.8	10446	-	0.46									
0×1/4	100%	+1.90	32.1	1.8	69.0	-	-	-	-	-	100.0	4.4	30.8	-	-	-	-	-	3.90	63.0	4.9	15.4	32.1	47.5	10143			43
		RAW	-	-	-	-	-	-	-	-	100.0	7.5	30.1	28.7	33.7	7623	-	0.34										
		-1.90	53.8	3.3	21.7	30.4	44.6	9415	-	0.39	53.8	3.3	21.7	30.4	44.6	9415	-	0.39									
0×1/4	100%	+1.90	46.2	1.2	78.4	-	-	-	-	-	100.0	2.3	47.9	-	-	-	-	-	1.34	53.8	3.3	21.7	30.4	44.6	9415			43
		RAW	-	-	-	-	-	-	-	-	100.0	5.4	47.0	23.1	24.5	5471	-	0.20										
		-1.90	58.1	4.3	17.3	31.6	46.8	9736	-	0.39	58.1	4.3	17.3	31.6	46.8	9736	-	0.39									
0×1/4	100%	+1.90	41.9	2.0	74.3	-	-	-	-	-	100.0	3.3	41.2	-	-	-	-	-	2.01	58.1	4.3	17.3	31.6	46.8	9736			44
		RAW	-	-	-	-	-	-	-	-	100.0	6.2	40.6	23.9	29.3	6094	-	0.20										
		-1.90	87.7	5.4	9.3	34.8	50.5	10930	-	0.40	87.7	5.4	9.3	34.8	50.5	10930	-	0.40									
0×1/4	100%	+1.90	12.3	1.6	70.3	-	-	-	-	-	100.0	4.9	16.8	-	-	-	-	-	4.08	73.1	4.9	12.4	33.5	49.0	10462			43
		RAW	-	-	-	-	-	-	-	-	100.0	8.6	15.9	31.7	43.8	9638	-	0.35										
		-1.90	20.7	3.3	18.0	31.9	46.8	10130	-	0.46	20.7	3.3	18.0	31.9	46.8	10130	-	0.46									
0×1/4	100%	+1.90	79.3	2.1	79.7	-	-	-	-	-	100.0	2.3	66.9	-	-	-	-	-	4.53	67.9	4.9	12.6	33.5	48.9	10452			51
		RAW	-	-	-	-	-	-	-	-	100.0	3.8	65.0	15.4	15.8	-	-	0.22										

GEW

LOCATION MAP

TN

SCALE:

BOREHOLE NO. W-79-2
PAN OCEAN OIL LTD.
MINING DIVISION – COAL

COORDINATES: Y 2300 m N X 5200 m W of SE corner of CL 82 DATE START MAY 29, 1979 FINISH JUNE 3, 1979

ELEVATION: BITS USED J.K. SMIT SERIES 200 COMBINATION DRILLER E. CARON DIAMOND DRILLING OVERALL RECOVERY 98 %

DIP BEARING MUD USED 34 BAGS GEL, 23 BAGS TROL TESTS GAMMA/SP/RESISTIVITY (OPEN HOLE)

CORE SIZE HQ CASING 8.53m HW FT LEFT IN HOLE —— FT. SAMPLED BY DATE ANALYZED BY

LOGGED BY O. CULLINGHAM DATE JUNE 5, 1979

SIGNED

GEOLOGICAL LOG – SCALE: 1:500

DETAILS OF COAL SEAMS – SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
		4.35	OVERBURDEN - CONGLOMERATE AND SANDSTONE RUBBLE
4.35		0.43	CARBONACEOUS MUDSTONE AND WEATHERED COAL - DULL, EARTHY
4.78		0.22	CONGLOMERATE RUBBLE
5.00		0.50	CARBONACEOUS SHALE
5.50		3.05	SHALE - MEDIUM GRAY BUFF, GRADATIONAL TO SILTSTONE AND SANDSTONE DOWNWARDS
8.55		4.25	SANDSTONE - MEDIUM GRAY BUFF TO MEDIUM GRAY BROWN, GRADATIONAL FROM FINE TO MEDIUM GRAINED, SALT AND PEPPER TEXTURE CHERT AND QUARTZ
12.80		8.62	SANDSTONE - MEDIUM GRAY, SALT AND PEPPER TEXTURE, MEDIUM TO COARSE COARSE GRAINED WITH SHORT INTERVALS OF GRANULE CONGLOMERATE AND CONGLOMERATIC SANDSTONE, CHERT AND QUARTZ, BEDDING @ 75° TO C/A
21.42		1.38	CONGLOMERATIC SANDSTONE - MEDIUM GRAY, PEBBLES OF WHITE TO BLACK CHERT AND QUARTZITE, PEBBLES TO 2cm ROUNDED TO SUBROUNDED, BLADE TO ROLLER, MEDIUM TO COARSE GRAINED SANDSTONE, CHERT AND QUARTZ
22.80			
23.67		0.87	SHALE - MEDIUM TO DARK GRAY, ABUNDANT WOODY FRAGMENTS, BLOKY, CONTACT BELOW @ 75° TO C/A
33.38		9.71	CONGLOMERATE - WHITE TO BLACK, FINE TO COARSE PEBBLE CONGLOMERATE, CHERT AND QUARTZITE, RUDIMENTARY ALIGNMENT OF PEBBLES PERPENDICULAR TO C/A. BITUMEN IN VUGS AND AROUND PEBBLES. SANDSTONE MATRIX OF MEDIUM TO COARSE GRAINS. SHORT INTERVALS OF SANDSTONE AND SHALE.
36.74		3.36	SHALE - MEDIUM TO DARK GRAY, FRAGMENTAL TO BLOCKY, IN PART CARBONACOUS THIN BANDS COALY SHALE
		19.37	SANDSTONE - MEDIUM GRAY TO MEDIUM GRAY BROWN, MEDIUM TO COARSE GRAINED, CHERT AND QUARTZ BEDS GRADATIONAL INTO CONGLOMERATE. BROKEN AND WEATHERED @ 44.20 TO 47.24 POSSIBLE FAULT
56.11		3.37	SILTSTONE - MEDIUM GRAY, FINELY CROSSBEDDED
59.48		9.22	SHALE AND CARBONACEOUS SHALE - MEDIUM DARK GRAY 10% CARBONACEOUS MATERIAL AND COALY SPLINTS THROUGHOUT. SANDSTONE @ 62.38 TO 62.50
68.70		4.30	SILTSTONE - MEDIUM GRAY, MASSIVE, 10% CARBON OR COALIFIED PLANT FRAGMENTS
73.00		14.30	SANDSTONE - MEDIUM GRAY TO MEDIUM GRAY BROWN, BEDS ARE GRADATIONAL FROM FINE TO PEBBLE CONGLOMERATE DOWNWARDS, CROSSBEDDED, BEDDING @ 75° TO C/A. FESTOON CROSSBEDDING @ 75.46 TO 75.90
87.30		20.81	SHALE WITH CARBONACEOUS SHALE AND SHALY COAL - MEDIUM DARK GRAY TO DARK GRAY, SILTY, 15% CARBONACEOUS FLECKS, BITUMAN IN CAVITIES AND LINING FRACTURES IN PART PETROLIFEOUS, SHORT INTERVALS OF SHALY COAL PROBABLE INTERVAL OF BURNT COAL SEAM
108.11		23.44	SANDSTONE/INTERBEDS OF SILTSTONE AND CONGLOMERATIC SANDSTONE - MEDIUM GRAY TO MEDIUM BROWNISH GRAY, BROWN COLOUR DUE TO HIGH CONCENTRATION OF RESIDUAL PETROLEUM, MEDIUM TO COARSE GRAINED, SHORT INTERVALS OF CONGLOMERATE. CLASTS ARE SUBANGULAR TO ROUNDED, BLADE TO ROLLER, CHERT, QUARTZITE, SHALE AND LIMESTONE 117.1 TO 117.25 MUDSTONE CONTAINING PYRITIZED WOOD FRAGMENTS.
131.55		4.09	MUDSTONE - DARK GRAY, MASSIVE, BLOCKY WHEN BROKEN. 134.0 TO 135.2 CARBONACEOUS WITH PARTINGS OF SHALY COAL AND COAL
135.64			TOTAL DEPTH 134.64

DETAILS OF COAL SEAMS							SIZE		WEIGHT PERCENT									CUMULATIVE WEIGHT PERCENT								CUMULATIVE SAMPLE VALUES									OTHER		
DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS		DIAMETER	WT %	SPEC GRAV	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I.	S	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I.	S	THICKNESS	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I.	S			
											RM	ASH	VOL	F.C.					RM	ASH	VOL	F.C.						RM	ASH	VOL	F.C.						

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y 5300 m N X 4100 m W of SE corner of CL 82
ELEVATION: APPROX. 560.83 m BITS USED J.K SMIT SERIE 200 COMBINATION
DIP 90° BEARING MUD USED 14 BAGS GEL, 16 BAGS TROL
CORE SIZE H.Q. CASING 2.44 m FT LEFT IN HOLE 0.61 m FT.

DATE START JUNE 1, 1979 FINISH JUNE 3, 1979
DRILLER CARON DIAMOND DRILLING OVERALL RECOVERY 93%
TESTS GAMMA, SP
SAMPLED BY DATE ANALYZED BY

BOREHOLE NO. W-79-3
PAN OCEAN OIL LTD.
MINING DIVISION – COAL

LOGGED BY O. CULLINGHAM DATE JUNE 5, 1979
SIGNED

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
0		2.43	OVERBURDEN - RUBBLE MEDIUM TO COARSE GRAINED, CHERT/QUARTZ SANDSTONE
2.43		13.41	SANDSTONE - MEDIUM GRAY, THICKLY TO MASIVALY BEDDED, MEDIUM TO COARSE GRAINED, MODERATELY SORTED, MAINLY QUARTZ AND CHERT, ABUNDENT LIMONITE GRAINS AND SOFT RED CLASTS OF PEBBLE SIZE. MINOR CARBONACEOUS PARTINGS AND SPLINTS.
15.84		11.30	SANDSTONE - MEDIUM GRAY, FINE TO VERY FINE GRAINED QUARTZ, CHERT, CROSSBEDDED, FESTOON CROSSBEDDING. FROM 19.08 TO 20.53 SANDSTONE BECOMES COARSE GRAINED, ABUNDANT LIMONITE STAINING AT BASE OF INTERVAL IN VUGS OR OPEN PORE SPACE. FROM 21.90 TO 22.05 SHALE PARTED TO BLOKY, 1cm THICK COAL WEDGE. PLANT FRAGMENTS AND IMPRESIONS. FROM 20.05 TO 22.70 SPLINTS OF CARBONACEOUS MATERIAL PARALLEL TO BEDDING THROUGHOUT
27.14		19.98	INTERBEDDED SHALE AND SILTSTONE AND THIN COAL BANDS - MEDIUM TO DARK GRAY. SILTY INTERVALS ARE SOUND AND SHALE INTERVALS ARE MORE FRACTURED, BLOCKY AND CARBONACEOUS, ABUNDANT PLANT FRAGMENTS. THE COAL IS MAINLY BRIGHT.
47.12		2.73	SANDSTONE - MEDIUM GRAY BROWN, HARD, MEDIUM GRAINED THICKLY BEDDED.
49.85		2.50	SHALE, CARBONACEOUS SHALE - DARK GRAY, COALIFIED PLANT REMINANTS.
52.35		0.52	CONGLOMERATIC SHALE - MEDIUM GRAY GRADIATIONAL FROM ABOVE
52.87		2.13	CONGLOMERATIC SILTSTONE - LIGHT GRAY CLASTS OF QUARTCITE, SILTSTONE AND MINOR SILTSTONE SHALE
55.00		1.85	SHALE - MEDIUM LIGHT GRAY, ABRUPTLY INTO RED MUDSTONE
56.85		1.25	MUDSTONE - HEMATITIC RED, 5% SOFT CLASTS OF MUDSTONE
58.10		3.20	SHALE - MEDIUM GRAY, PLANT FRAGMENTS.
61.30		10.02	LIMESTONE - VERY LIGHT GRAY TO CREAM COLOUR, PUKOSIC TEXTURE FAULT CONTACT AT TOP OF LIMESTONE
71.32			TOTAL DEPTH

DETAILS OF COAL SEAMS – SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS	SIZE: DIAMETER	SIZE: WT %	WEIGHT PERCENT: SPEC GRAV	WEIGHT PERCENT: YIELD	WEIGHT PERCENT: PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT: YIELD	CUMULATIVE WEIGHT PERCENT: PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I	S	CUMULATIVE SAMPLE VALUES: THICKNESS	CUMULATIVE SAMPLE VALUES: YIELD	CUMULATIVE SAMPLE VALUES: PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I.	S	OTHER

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y 3100 m N X 4100 m W of SE corner of CL 82
ELEVATION: APPROX. 541.02 m BITS USED: J.K. SMIT SERIES 200 COMBINATION
DIP: -90° BEARING: MUD USED: 33 BAGS GEL, 23 BAGS TROL
CORE SIZE: HQ & NQ CASING: 5.48 m m LEFT IN HOLE: NIL m
DATE START: JUNE 4, 1979 FINISH: JUNE 8, 1979
DRILLER: CARON DIAMOND DRILLING OVERALL RECOVERY: 79.5 %
TESTS: GAMMA LOG
SAMPLED BY: DATE: ANALYZED BY:

BOREHOLE NO. W-79-4
PAN OCEAN OIL LTD.
MINING DIVISION – COAL

LOGGED BY: D.HOPE DATE: JUNE 9, 1979
SIGNED:

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
		8.10	OVERBURDEN - COBBLES OF CHERT AND QUARTZITE, PIECES OF CHERT PEBBLE CONGLOMERATE, GENERALLY UNCONSOLIDATE.
8.10		10.36	SANDSTONE - SALT AND PEPPER COLOUR, COARSENING DOWNWARD CYCLES FROM FINE GRAINED THROUGH TO PEBBLE CONGLOMERATE. WELL SORTED. GRAINS OF QUARTZ AND CHERT. FINELY CROSS-LAMINATED AT TOP AND BELOW IS MASSIVE. RARE CARBONACEOUS SPLINTS THROUGHOUT
18.46		7.42	CONGLOMERATE - SALT AND PEPPER FRESH SURFACE. MASSIVE BEDDED. MODERATELY SORTED. PEBBLES OF QUARTZITE AND CHERT, BLACK, GRAY AND GREEN. MATRIX IS COARSE GRAINED SANDSTONE. CARBONACEOUS SPLINTS THROUGHOUT.
25.88		1.41	MUDSTONE - DARK GRAY, SOFT, SANDY, CARBONACEOUS MUDSTONE.
27.29		19.04	SANDSTONE - MEDIUM GRAY WEATHERING, SALT AND PEPPER FRESH SURFACE. THINLY BEDDED (BEDS 2-8 cm THICK), FINING DOWNWARD SEQUENCES. WELL SORTED QUARTZ AND CHERT. CARBONACEOUS AND HEMATITIC STAINS THROUGHOUT. UNIT IS CONGLOMERATIC AT TOP AND BECOMES PROGRESSIVELY FINER TOWARDS BASE. MATRIX, AT TOP, HAS ABOUT 5% CLAY.
46.33		7.81	SHALE - MEDIUM GRAY WEATHERING - EVIDENCE OF GRINDING AT 49.37 & 50.60
54.14		3.77	SHALE AND SILTSTONE - INTERBEDDED EACH OTHER. SILTSTONE HAS PINPOINT POROSITY AND CONTAINS ASPHALT AT 55.09-55.18 AND 55.44-55.63
57.91		18.29	SANDSTONE - MEDIUM BROWN WEATHERING SALT AND PEPPER COLOUR FRESH SURFACE. COARSENING DOWNWARD FROM FINE GRAINED, WELL SORTED. CARBONACEOUS PARTINGS AND SPLINTS THROUGHOUT UNIT. MASSIVE BEDDING, DISCONTINOUS CARBONACEOUS STRINGS FROM 66.56 TO 66.77 COAL - DULL, BADLY BROKEN AND CRUSHED GRINDING AT 68.52, 71.21-71.79, 73.40 AND 75.48. FROM 66.03 TO 72.36 HEAVY HEMATITIC STAINING ON WEATHERED AND FRACTURE SURFACES
76.20		1.52	CONGLOMERATIC SANDSTONE - VERY CARBONACEOUS, ABUNDANT HEMATITE
77.80		44.73	SHALE AND SILTSTONE - MEDIUM GRAY WEATHERING MASSIVE BEDDED UNIT OF SHALE AND SILTY SHALE, RARE SANDSTONES AND COALY HORIZOUTS. FROM 91.21 TO 91.48 LIGHT GRAY WEATHERING SILTSTONE. FROM 100.99 TO 108.39 CARBONACEOUS SHALE HORIZOUT. BADLY BROKEN, FRACTURE SURFACES ARE COALY AND BRIGHT-LIKE SLICKENSIDES
122.53			TOTAL DEPTH

DETAILS OF COAL SEAMS – SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS	SIZE: DIAMETER	SIZE: WT %	WEIGHT PERCENT: SPEC GRAV	YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT: YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I.	S	CUMULATIVE SAMPLE VALUES: THICKNESS	YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I.	S	OTHER		

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y 5300 m N X 4100 m N of SE corner of CL 82
ELEVATION: APPROX. 495.3 m
DIP: 90° BEARING:
CORE SIZE: H Q CASING: 11.58 m

BITS USED: JK SMIT SERIES 200 COMBINATION
MUD USED: 26 BAGS GEL 22 BAGS TROL
m LEFT IN HOLE: NIL m

DATE START: JUNE 4, 1979
DRILLER: CARON DIAMOND DRILLING
TESTS: GAMMA LOG
SAMPLED BY: O. CULLINGHAM

FINISH: JUNE 7, 1979
OVERALL RECOVERY: 94.5%
DATE: JUNE 9, 1979 ANALYZED BY:

BOREHOLE NO. W-79-5
PAN OCEAN OIL LTD.
MINING DIVISION – COAL

LOGGED BY: O. CULLINGHAM & D. HOPE DATE: JUNE 9, 1979
SIGNED:

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
		10.97	OVERBURDEN - BROKEN ROCK, PEBBLES AND BOULDERS
10.97		2.78	SANDSTONE - MEDIUM GRAY, MEDIUM GRAINED, WELL SORTED, ANGULAR TO SUBANGULAR, QUARTZ AND CHERT, CLEAN SAND; SOME CARBONACEOUS MATERIAL NEAR BASE OF INTERVAL.
13.75			
14.58		1.03	CONGLOMERATE - GRANULE TO PEBBLE, BLACK, GREEN AND GRAY CHERT AND QUARTZITE; COARSE GRAINED SANDSTONE MATRIX.
		5.23	SANDSTONE - AS FOR ABOVE; BEDDING @ 40° TO C/A
19.81			
20.42		0.61	SANDSTONE - AS FOR ABOVE EXCEPT FINE GRAIN, CONTAINS ABUNDANT CARBONACEOUS MATERIAL; BEDDING @ 50° TO C/A
		4.51	SANDSTONE - MEDIUM GRAY, MEDIUM TO COARSE GRAINED WITH INTERMITTENT DEVELOPMENT OF GRANULE TO PEBBLE CONGLOMERATE; CONTAINS PARTINGS OF CARBONACEOUS MATERIAL; PARTINGS @ 60° TO C/A IN PART WITH HEMATITE STAINING.
24.89			
26.30		1.41	SANDSTONE - FINE GRAINED, CHERT AND QUARTZ, OCCASIONAL BLOCKS OF CARBONACEOUS MATERIAL; CONTACT WITH ABOVE @ 60° TO C/A
		43.12	SANDSTONE - MEDIUM LIGHT GRAY, THICKLY TO MASSIVELY BEDDED, GENERALLY THE BEDS COARSEN DOWNWARDS FROM FINE GRAINED TO COARSE AND FREQUENTLY TO CONGLOMERATIC; ANGULAR TO SUB-ANGULAR GRAINS OF CHERT AND QUARTZ, MODERATE TO WELL SORTED, CARBONACEOUS SPLINTS, BLOCKS AND PARTINGS THROUGHOUT AND BECOMING MORE CONCENTRATED TOWARDS BASE. BEDDING @ 55° TO C/A
69.42		7.38	COAL AND SHALY COAL / COALY SHALE
76.80		3.05	SHALE AND MUDSTONE
79.85		1.45	COAL AND SHALY COAL
81.30		2.43	SHALE - MEDIUM LIGHT GRAY, FRAGMENTAL TO PARTED, PARTINGS @ 65° TO C/A
83.73		0.75	COALY SHALE - DULL TO VITREOUS COAL PARTINGS
84.48		2.99	SHALE - MEDIUM GRAY, PARTED TO THINLY BEDDED, SILTY DOWNWARDS BEDDING @ 65° TO C/A.
87.47		3.99	SANDSTONE - MEDIUM GRAY, MEDIUM GRAINED, THICK TO MASSIVE BEDDED, CARBONACEOUS CLASTS THROUGHOUT, CHERT AND QUARTZ GRAINS, 20% RESIDUAL PETROLEUM, STRONG ASPHALT ODOUR.
91.46		12.78	SHALE - MEDIUM TO DARK GRAY, BREAKS DOWN RAPIDLY TO RHOMBIC FRAGMENTS; THIN PARTINGS OF DULL SHALY COAL @ 55° TO C/A
104.24			FAULT CONTACT - SHEAR @ 30° TO C/A
		29.87	LIMESTONE - LIGHT GRAY, MASSIVELY BEDDED, APPEARS CRYSTALLIZED, 5% VUGS AT TOP OF INTERVAL; PETROLEUM RESIDUE ON FRACTURE FACES AND IN OPEN VUGS, WHEN HEATED RELEASES A HEAVY TAR.
			NOTE - HIGH GAMMA COUNTS FROM PROBE AT THE CONTACT AND @ 127.41 m
134.11			TOTAL DEPTH

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS	SIZE DIAMETER	SIZE WT %	WEIGHT PERCENT SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
			ROOF - SANDSTONE, HARD, MEDIUM TO COARSE GRAINED													
69.42			COALY SHALE SHALY COAL					-1.90	74.5	3.4	14.6	39.7	42.3	10489	-	0.91
		1.39	COAL - DULL TO BRIGHT, MINOR PYRITE, PARTED TO BANDED	A0009	1.39	0×1/4	100%	+1.90	25.5	2.4	70.3	-	-	-	-	-
			COALY SHALE CARBONACEOUS SHALE					RAW	-	-	-	-	-	-	-	-
70.81			COAL - VITREOUS TO BRIGHT					-1.90	2.8	4.8	14.9	32.7	47.6	10358	-	0.60
		0.48	SHALE - MEDIUM TO DARK GRAY CARBONACEOUS	A0010	0.48	0×1/4	100%	+1.90	97.2	0.8	79.8	-	-	-	-	-
71.29								RAW	-	-	-	-	-	-	-	-
		1.28	COAL - MOSTLY VITREOUS TO BRIGHT WITH DULL SHALY COAL PARTINGS AND BANDS.	A0011	1.28	0×1/4	100%	-1.90	82.7	2.2	14.7	33.0	50.1	10615	-	0.51
								+1.90	17.3	2.5	68.8	-	-	-	-	-
72.57								RAW	-	-	-	-	-	-	-	-
		0.68	SHALE - MEDIUM GRAY TO BUFF, CARBONACEOUS SOME RESIN <5%	NOT SAMPLED												
73.25		0.20	CLAY - LIGHT BUFF TO VERY LIGHT GRAY, FRIABLE													
73.45								-1.90	72.7	3.9	19.1	33.1	43.7	9766	-	0.59
		0.42	COAL - VITREOUS TO BRIGHT, PARTED TO BANDED, 1% PYRITE	A0012	0.55	0×1/4	100%	+1.90	27.3	3.3	69.8	-	-	-	-	-
73.87								RAW	-	-	-	-	-	-	-	-
74.00		0.13	COAL - DULL TO VITREOUS PARTINGS INPART SHALY													
		1.16	SHALE - MEDIUM GRAY, INPART CARBONACEOUS, CONTAINS WOODY FRAGMENTS, SOFT													
75.16		0.14	COAL - PARTED, VITREOUS													
75.30		0.17	CLAY - LIGHT GRAY, FRAGMENTAL TO FRIABLE, EASILY CRUSHED													
75.47		0.93	SHALE - MEDIUM GRAY, CARBONACEOUS AND COALIFIED WOOD FRAGMENTS CALCITE VEINLETS													
76.40		0.28	COAL - BRIGHT TO VITREOUS, PARTED TO BANDED, CALCITE VEINLETS													
76.68		0.12	COAL - DULL, PARTED, SOME VITREOUS CALCITE PARTINGS AND VEINLETS													
76.80		1.20	SHALE - DARK GRAY, PARTED TO FRAGMENTAL, CARBONACEOUS FLECKS.													
78.00		1.85	MUDSTONE - MEDIUM LIGHT GRAY, BREAKS DOWN RAPIDLY TO FRAGMENT SIZE RHOMBS CARBONACEOUS PLANT FRAGMENTS THROUGHOUT													
79.85			COAL AND SHALY COAL - DULL TO VITREOUS, BANDS OF BRIGHT COAL, BANDS AND PARTINGS OF DULL CARBONACEOUS SHALE BANDS @ 65° TO C/A					-1.90	59.2	4.5	13.4	30.8	51.3	10399	-	0.60
		1.45		A0013	1.45	0×1/4	100%	+1.90	40.8	2.6	78.0	-	-	-	-	-
								RAW	-	-	-	-	-	-	-	-
81.30		2.43	SHALE - MEDIUM LIGHT GRAY, PARTED TO FRAGMENTAL													
83.73		0.75	COALY SHALE - DULL MINOR VITREOUS COAL PARTINGS													
84.48			SHALE - MEDIUM GRAY, BECOMES SILTY DOWNWARDS, CARBONACEOUS SPLINTS AND FLECKS.													

DEPTH	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
69.42	74.5	3.4	14.6	39.7	42.3	10489	-	0.91
	100.0	3.2	28.8	-	-	-	-	-
	100.0	2.5	30.3	32.5	34.7	8664	-	0.72
70.81	2.8	4.8	14.9	32.7	47.6	10358	-	0.60
	100.0	1.0	80.0	-	-	-	-	-
	100.0	0.6	78.5	18.6	2.3	-	-	0.13
71.29	82.7	2.2	14.7	33.0	50.1	10615	-	0.51
	100.0	2.3	27.3	-	-	-	-	-
	100.0	3.1	24.4	30.6	41.9	9361	-	0.38
72.57								
73.25								
73.45	72.7	3.9	19.1	33.3	43.7	9766	-	0.59
	100.0	3.7	33.0	-	-	-	-	-
73.87	100.0	2.0	33.0	29.6	35.4	8198	-	0.43
74.00								
75.16								
75.30								
75.47								
76.40								
76.68								
76.80								
78.00								
79.85	59.2	4.5	13.4	30.9	51.3	10399	-	0.60
	100.0	3.7	39.8	-	-	-	-	-
	100.0	3.2	41.9	24.3	30.6	6652	-	0.31
81.30								
83.73								
84.48								

DEPTH	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
69.42	3.15	66.9	2.8	14.7	36.3	46.3	10551		
70.81	1.76	60.9	2.3	14.7	33.1	50.1	10611		
71.29	1.28	82.7	2.2	14.7	33.0	50.1	10615		
72.57									
73.25									
73.45	0.55	72.7	3.9	19.1	33.3	43.7	9766		
73.87									
74.00	4.58 (INCLUDES SAMPLES A0009 – A0012 INCL.)	54.7	3.0	15.4	35.8	45.9	10,426		
76.40									
76.68									
76.80									
78.00									
79.85	1.45	59.2	4.5	13.4	30.8	51.3	10399		
81.30									
83.73									
84.48									

OTHER

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y 6500 m N, X 9100 m W. of S.E. corner of CL 82
ELEVATION: APPROX. 564 m
DIP: 90° BEARING: -
CORE SIZE: HE TO 103.93 CASING: 6.71 m
BITS USED: J.K. SMIT COMBINATION
MUD USED: 99 BAGS QUICK GEL, 82 BAGS TROL
m LEFT IN HOLE: NIL m
4 HQ RODS; 1 HQ CORE BARREL & BIT
DATE START: JUNE 8, 1979 FINISH: JUNE 11, 1979
DRILLER: CARON DIAMOND DRILLING OVERALL RECOVERY: 97%
TESTS: GAMMA RAY
SAMPLED BY: O. CULLINGHAM DATE: JUNE 20 ANALYZED BY: BIRTLEY COAL AND MINERALS TESTING

BOREHOLE NO. W-79-6
PAN OCEAN OIL LTD. (PAGE 1)
MINING DIVISION – COAL

LOGGED BY: O. CULLINGHAM, D. HOPE DATE: JUNE 20, 1979
SIGNED:

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
2.39		2.39	OVERBURDEN
		4.73	CONGLOMERATIC SANDSTONE - MEDIUM GRAY, MEDIUM BEDDED. MORE CONGLOMERITIC BASALLY. SUBANGULAR PEBBLES IN MEDIUM AND COARSE GROUND SANDSTONE
7.12			
		5.28	No. 2 SEAM HORIZON
12.40			
12.63			
12.80		2.34	MUDSTONE - LIGHT BROWN, VERY SOFT, FLECKED WITH COAL AND CARBONACEOUS SANDSTONE.
15.14		4.08	SHALE - CARBONACEOUS, DARK GRAY WEATHERING, SOFT AND MALLEABLE WITH FINGERS. IN PARTS SILTY.
19.22			
20.63		1.41	SANDSTONE - LIGHT GRAY, MEDIUM TO FINE COARSE DOWNWARD.
21.87		1.24	SHALE - TRAVSITINE ZONE. INTRUSENT THE COAL CANTENT DOWNWARD
22.06			
24.47		2.41	No. 3 SEAM HORIZON
24.71		0.39	MUDSTONE - VERY CARBONACEOUS.
25.30			SANDSTONE - MEDIUM GRAY WEATHERING FINELY CROSS LAMINATED. VERY FINE TO MEDIUM GRAINED. WELL SORTED. CEMENTED WITH SILICA. FRIABLE CARBONACEOUS CROSSBANDS.
		7.86	
33.16			
		3.69	SANDSTONE - COARSENING DOWNWARDS FROM MEDIUM TO COARSE GRAINED. CONGLOMERITIC AT BASE LIGHT GRAY, GRADING TO THIN CONGLOMERITIC.
36.85		1.67	MUDSTONE AND CARBONACEOUS SHALE - DULL AND MEDIUM BROWN
38.52		1.39	No. 4 SEAM HORIZON
39.91		0.78	SHALE - DARK GRAY CARBONACEOUS. SPLINTS OF COAL
40.64		3.08	MUDSTONE - SHALE - MEDIUM GRAY, VERY SOFT AT TOP, BECOMES PROGRESSIVELY HARDER, SILTY AT BASE.
43.72		0.32	SANDSTONE - LIGHT GRAY, FINE TO MEDIUM GRAINED. CROSS LAMINATIONS
44.54			SANDSTONE - SALT AND PEPPER FRESH SURFACE, LIGHT GRAY TO RUSTY WEATHERING FINE TO MEDIUM GRAINED, WELL SORTED, LOW SPLEINITY, QUARTZ AND CHERT GRAINS. DOMINANTELY MASSIVE BEDDED, SLIGHTLY MUDDY, SLIGHTLY CARBONACEOUS, HARD SILICA CEMENT.
		10.93	
55.47			
		7.92	CONGLOMERATIC SANDSTONE - ROUNDED TO SUBROUNDED PEBBLES OF QUARTZ AND CHERT IN A MEDIUM TO COARSE GRAINED MATRIX. PEBBLES / cm AND SMALLER (AVERAGE IS 0.5 cm). SALT AND PEPPER FRESH. OCASIONAL IRONSTONE CONCRETIONS.
63.39		1.23	MUDSTONE - VERY CARBONACEOUS, SOFT AND FRIABLE.
64.62		1.42	COALY SHALE - AT TOP MEDIUM HARD CRUMBLY COAL
66.04			MUDSTONE - MEDIUM GRAY WEATHERING, VERY SOFT. RARE LIMONITIC STAINING
		7.83	
73.87			
		6.98	SANDSTONE - SLIGHT GRAY WEATHERING, SALT AND PEPPER, MASSIVE BEDDED, MEDIUM TO COARSE GRAINED. NEAR BASE BECOMES LIMONITIC STAINS. FROM 79.67 TO 80.03 FINELY CROSS LAMINATED CARBONACEOUS
80.85			
		6.63	SHALE - MEDIUM TO DARK GRAY, BECOMES CARBONACEOUS AND COALY DOWNWARDS. SEVERAL BRIGHT COAL BANDS UP TO 5 cm THICK
87.48			
		9.57	No. 5 SEAM HORIZON
97.05			
		4.14	SANDSTONE - MEDIUM GRAY GRADATIONAL COARSENING DOWNWARDS FROM SILTY SANDSTONE AT TOP TO FINE AT BASE. CARBONACEOUS CROSS LAMINATED 2-3 mm THICK.
101.19		2.44	SANDSTONE - MEDIUM GRAINED, BEDDED, LIGHT GRAY, CLEAN AND HARD. DOWNWARD BECOMES GRANULAR.
103.63			

NOTE - RODS BROKE IN HOLE @ 90 m; ALL ATTEMPTS TO RETRIVE RODS FAILED; WEDGED @ 88.15 m AND CONTINUED AS HOLE W-79-6A

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			No. 2 SEAM HORIZON		
		4.73	GOOD ROOF - CONGLOMERATIC SANDSTONE		
7.12					
7.30		0.18	SHALY COAL - DULL, VITREOUS PARTINGS		
		0.51	DULL TO VITREOUS COAL, BANDS OF SHALY COAL AND COALY SHALE.	A0014	0.92
7.81					
8.04		0.23	CARBONACEOUS SHALE		
		0.42	VITREOUS TO BRIGHT COAL, IRON STAINING		
8.46		0.04	NO CORE		
8.53		1.15	VITREOUS TO BRIGHT COAL PARTED AND BANDED		
9.68					
9.75		0.02	NO CORE	A0015	3.23
		1.07	VITREOUS TO BRIGHT, PARTED TO BANDED COAL.		
10.82					
11.09		0.27	COAL AND SHALY COAL.		
11.27		0.18	LOST CORE		
11.42		0.15	MUDSTONE - MEDIUM GRAY		
11.52		0.10	SHALY COAL DULL, SOME BRIGHT		
		0.78	DULL TO BRIGHT COAL PARTED TO BANDED	A0016	1.13
12.30					
12.40		0.10	DULL COAL, BANDED		
12.60		0.20	POOR FLOOR - CARBONACEOUS SHALE NO CORE		
12.80		2.34	MUDSTONE, VERY SOFT		
			No. 3 SEAM HORIZON		
		1.24	POOR ROOF - SHALE AND CARBONACEOUS SHALE		
22.06		0.21			
		1.40	MOSTLY BRIGHT COAL, SOME THIN INTERRELATIONS OF DULL COAL	A0017	2.10
23.46		0.32	DULL COAL - SHALE AT TOP AND BASE		
23.78		0.38	DULL TO VITREOUS COAL		
24.16		0.21	CARBONACEOUS & COALY SHALE	A0018	0.31
24.47					
24.67		0.24	POOR FLOOR - MUDDY SANDSTONE AND MUDSTONE		
		0.59			
			No. 4 SEAM HORIZON		
		0.28	BAD ROOF SHALE		
38.52		0.10	DENSE COAL, METALIC SHEEN		
38.62		1.00	MOSTLY BRIGHT COAL FEW PARTINGS OF DULL SHALEY COAL	A0019	1.39
39.62		0.29	DULL TO VITREOUS COAL, PARTINGS OF SHALE		
39.91		0.73	BAD FLOOR - CARBONACEOUS SOFT SHALE		
40.64		3.08			
			No. 5 SEAM HORIZON		
		6.63	BAD ROOF FRAGMENTED SHALE		
87.48		0.72	HARD AND MOSTLY BRIGHT COAL, FEW DULL PARTINGS OF SHALY COAL		
88.20		0.26	SHALE WITH SPLINTS OF COAL	A0020	1.52
88.46		0.54	MOSTLY BRIGHT AND HARD COAL, BANDED		
89.00		0.60	SHALE AND MUDSTONE, CARBONACEOUS		
89.60		0.11	COAL DULL BANDED	A0021	1.15
89.91		0.44	MUDSTONE - TEXTURAL APPERANCE OF REWORKED MUD		
90.15		0.77	MOSTLY BRIGHT COAL, CONCOIDAL FRACTURE, LIGHT % OF VITRAIN.	A0022	0.77
90.92		0.42	CARBONACEOUS SHALE, TAR OR PETROLEUM RESIDUE	A0023	0.42
91.34		3.07	COAL - DULL TO BRIGHT WITH SHORT INTERVALS OF CARBONACEOUS AND COALY SHALE.	A0024	3.07
94.41		1.90	COAL - MOSTLY BRIGHT WITH 0.17 cm OF DULL CARBONACEOUS SHALE AT TOP OF INTERVAL.	A0025	1.91
96.31		0.41	SHALE - FRAGMENTAL TO FRIABLE		
96.73		0.14	COAL - DULL TO BRIGHT	A0026	0.73
96.87		0.18			
97.05			FLOOR - SANDSTONE, GOOD		

SIZE		WEIGHT PERCENT									CUMULATIVE WEIGHT PERCENT								CUMULATIVE SAMPLE VALUES								OTHER		
DIAMETER	WT %	SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S	THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL.	F.C.	BTU	F.S.I.	S	HGI		
		-1.90	60.9	4.9	11.9	32.8	50.4	10039	-	0.41	60.9	4.9	11.9	32.8	50.4	10039	-	0.41	0.92	60.9	4.9	11.9	32.8	50.4	10039			39		
		+1.90	39.1	2.7	62.4	-	-	-	-	-	100.0	4.0	31.7	-	-	-	-	-											
0×1/4	100%	RAW	-	-	-	-	-	-	-	-	100.0	2.0	32.0	29.1	36.9	7553	-	0.26											
		-1.90	91.1	4.2	8.8	35.0	52.0	10541	-	0.43	91.1	4.2	8.8	35.0	52.0	10541	-	0.43	4.15	84.4	4.3	7.6	34.6	51.7	10460			41		
		+1.90	8.9	2.4	69.3	-	-	-	-	-	100.0	4.0	14.2	-	-	-	-	-											
0×1/4	100%	RAW	-	-	-	-	-	-	-	-	100.0	4.0	14.8	34.5	46.7	9892	-	0.23											
		-1.90	58.7	5.4	10.7	34.6	49.3	10508	-	0.34	58.7	5.4	10.7	34.6	49.3	10508	-	0.34	5.28	78.9	4.5	9.6	34.6	51.4	10468			40		
		+1.90	41.3	1.7	86.0	-	-	-	-	-	100.0	3.9	41.8	-	-	-	-	-											
0×1/4	100%	RAW	-	-	-	-	-	-	-	-	100.0	3.1	39.9	25.2	31.8	6686	-	0.22											
		-1.90	89.6	3.2	13.1	33.3	50.4	10568	-	0.51	89.6	3.2	13.1	33.3	50.4	10568	-	0.51	2.10	89.6	3.2	13.1	33.3	50.4	10568			39		
		+1.90	10.4	1.9	72.1	-	-	-	-	-	100.0	3.1	19.2	-	-	-	-	-											
0×1/4	100%	RAW	-	-	-	-	-	-	-	-	100.0	5.3	19.0	32.2	43.5	9664	-	0.32											
		-1.90	11.6	7.4	17.9	23.1	51.6	9273	-	0.48	11.6	7.4	17.9	23.1	51.6	9273	-	0.48	2.41	79.6	3.3	13.2	33.2	50.4	10543					
		+1.90	88.4	2.8	84.1	-	-	-	-	-	100.0	3.4	76.4	-	-	-	-	-											
0×1/4	100%	RAW	-	-	-	-	-	-	-	-	100.0	1.6	78.5	11.1	8.8	-	-	0.15											
		-1.90	79.4	2.9	12.4	33.0	51.7	10630	-	0.48	79.4	2.9	12.4	33.0	51.7	10630	-	0.48	1.39	79.4	2.9	12.4	33.0	51.7	10630			39		
		+1.90	20.6	3.5	71.2	-	-	-	-	-	100.0	3.0	24.5	-	-	-	-	-											
0×1/4	100%	RAW	-	-	-	-	-	-	-	-	100.0	4.8	25.6	29.4	40.2	8834	-	0.32											
		-1.90	80.0	3.9	10.0	32.6	53.5	10811	-	0.53	80.0	3.9	10.0	32.6	53.5	10811	-	0.53	8.84	76.3	3.9	8.7	33.6	53.6	11012			44		
		+1.90	20.0	3.2	69.3	-	-	-	-	-	100.0	3.8	21.9	-	-	-	-	-											
0×1/4	100%	RAW	-	-	-	-	-	-	-	-	100.0	5.5	21.1	29.5	43.9	9300	-	0.19											
		-1.90	28.9	5.8	21.3	25.7	47.2	9033	-	0.59	28.9	5.8	21.3	25.7	47.2	9033	-	0.59	7.32	75.5	3.9	8.5	33.8	53.6	11056			47		
		+1.90	71.1	4.1	82.6	-	-	-	-	-	100.0	4.6	64.9	-	-	-	-	-											
0×1/4	100%	RAW	-	-	-	-	-	-	-	-	100.0	4.4	66.2	16.6	12.8	2441	-	0.12											
		-1.90	97.3	3.8	4.4	34.6	57.2	11571	-	0.45	97.3	3.8	4.4	34.6	57.2	11571	-	0.45	6.17	84.2	3.7	7.7	34.4	54.1	11185			38		
		+1.90	2.7	3.7	73.1	-	-	-	-	-	100.0	3.8	6.3	-	-	-	-	-											
0×1/4	100%	RAW	-	-	-	-	-	-	-	-	100.0	6.3	5.6	34.8	53.3	11402	-	0.15											
		-1.90	10.3	6.0	26.5	27.2	40.3	8521	-	0.37	10.3	6.0	26.5	27.2	40.3	8521	-	0.37	5.40	82.4	3.7	8.2	34.3	53.5	11120			-		
		+1.96	89.7	4.3	76.3	-	-	-	-	-	100.0	4.5	71.2	-	-	-	-	-											
0×1/4	100%	RAW	-	-	-	-	-	-	-	-	100.0	4.3	71.8	20.5	3.4	-	-	0.10											
		-1.90	91.9	3.9	9.2	33.9	53.0	10952	-	0.58	91.9	3.9	9.2	33.9	53.0	10952	-	0.58	4.98	88.4	3.7	8.0	34.4	53.7	11146			44		
		+1.90	8.1	2.6	69.5	-	-	-	-	-	100.0	3.8	14.1	-	-	-	-	-											
0×1/4	100%	RAW	-	-	-	-	-	-	-	-	100.0	5.7	13.5	31.0	49.8	10472	-	0.15											
		-1.90	83.0	3.5	6.1	35.4	55.0	11492	-	0.33	83.0	3.5	6.1	35.4	55.0	11492	-	0.33	1.91	83.0	3.5	6.1	35.4	55.0	11492			45		
		+1.90	17.0	2.3	71.0	-	-	-	-	-	100.0	3.3	17.2	-	-	-	-	-											
0×1/4	100%	RAW	-	-	-	-	-	-	-	-	100.0	6.2	17.4	31.2	45.2	9654	-	0.21											
		-1.90	22.2	4.8	23.2	28.7	43.3	9182	-	0.42	22.2	4.8	23.2	28.7	43.3	9182	-	0.42					EXCLUDED					36		
		+1.90	77.8	1.6	90.5	-	-	-	-	-	100.0	2.3	75.6	-	-	-	-	-											
0×1/4	100%	RAW	-	-	-	-	-	-	-	-	100.0	2.1	78.0	11.4	8.5	-	-	0.11											

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y X
ELEVATION:
DIP: BEARING:
CORE SIZE: CASING:

BITS USED:
MUD USED:
m LEFT IN HOLE: m

DATE START: FINISH:
DRILLER: OVERALL RECOVERY:
TESTS:
SAMPLED BY: DATE: ANALYZED BY:

BOREHOLE NO. W-79-6
PAN OCEAN OIL LTD. (PAGE 2)
MINING DIVISION – COAL

LOGGED BY: DATE:
SIGNED:

GEOLOGICAL LOG – SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION

DETAILS OF COAL SEAMS – SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS	SIZE: DIAMETER	SIZE: WT %	WEIGHT PERCENT: SPEC GRAV	YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT: YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I.	S

CUMULATIVE SAMPLE VALUES

No. 5 SEAM HORIZON

	THICKNESS	YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I.	S
A0020					EXCLUDED				
A0021					EXCLUDED				
A0022	6.17	84.2	3.7	7.7	34.4	54.1	11185		
A0023	5.40	82.4	3.7	8.2	34.3	53.5	11120		
A0024	4.98	88.4	3.7	8.0	34.4	53.7	11146		
A0025	1.91	83.0	3.5	6.1	35.4	55.0	11492		
A0026					EXCLUDED				

OTHER

No. 5 SEAM HORIZON

	THICKNESS	YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I.	S
A0020					EXCLUDED				
A0021					EXCLUDED				
A0022					EXCLUDED				
A0023					EXCLUDED				
A0024	3.07	91.9	3.9	9.2	33.9	53.0	10952		
A0025	3.70	90.3	3.8	8.7	34.1	53.3	11036		
A0026					EXCLUDED				

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y 6500 m N. X 9100m W of S.E. corner of CL 82
ELEVATION: APPROX 564 m BITS USED: J.K. SMIT COMBINATION
DIP: 90° BEARING: - MUD USED: AS FOR W-79-6
CORE SIZE: NQ CASING: 85.3 m NW m LEFT IN HOLE: NIL m

DATE START: JUNE 14, 1979 FINISH: JUNE 20, 1979
DRILLER: CARON DIAMOND DRILLING OVERALL RECOVERY: 93%
TESTS: GAMMA LOG
SAMPLED BY: O. CULLINGHAM DATE: JUNE 20 ANALYZED BY:

BOREHOLE NO. W-79-6A
PAN OCEAN OIL LTD. (PAGE 3)
MINING DIVISION – COAL

LOGGED BY: O. CULLINGHAM D. HOPE DATE: JUNE 20, 1979
SIGNED:

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	THICKNESS	DESCRIPTION
		TOP OF WEDGE
88.15	8.80	No. 5 SEAM HORIZON
96.95	0.43	SHALE - LIGHT GRAY, SILTY AND SOFT
97.38	4.15	SANDSTONE - MEDIUM GRAY, VERY FINE TO FINE GRAINED, FINELY CROSS-LAMINATED WITH CARBONACEOUS STRINGERS OF MUDSTONE
101.53	2.40	SANDSTONE - LIGHT GRAY, SALT AND PEPPER, MEDIUM TO COARSE GRAINED COARSENING DOWNWARD.
103.93	3.09	SHALE - MEDIUM TO DARK GRAY. FEW THIN CARBONACEOUS AND COALY INTERVALS.
107.02	0.94	COAL SEAM HORIZON
107.96	1.94	SHALE - MEDIUM TO DARK GRAY. CARBONACEOUS PLANT FRAGMENTS
109.90	0.25	COAL
110.95	13.90	SHALE, MUDSTONE, SILTSTONE - INTERBEDDED EACH OTHER. SILTSTONE INCREASES IN FREQUENCY DOWNWARDS. MEDIUM GRAY TO MEDIUM GRAY BROWN PETROLEUM RESIDUE AND CARBONACEOUS FLECKS AND PLANT FRAGMENTS THROUGHOUT. FROM 113.03 TO 113.16 DULL COAL WITH SOME VITREOUS PARTINGS FROM 118.62 TO 119.28 ESPECIALLY PETROLIFEROUS INTERVAL
124.06	1.68	SANDSTONE - MEDIUM GRAY BROWN, VERY FINE TO FINE GRAINED
125.73	1.08	SHALE - MEDIUM GRAY WITH CARBONACEOUS PLANT FRAGMENTS
126.81	8.36	SANDSTONE - MEDIUM GRAY, FINE TO COARSE GRAINED DOWNWARD. INTERVALS OF SHALE AND GRANULE CONGLOMERATE SPLINTS AND PARTINGS OF COAL FRAGMENTS. APPROXIMETLY 20% POROSITY FILLED WITH PETROLEUM RESIDUE
135.17	6.85	SHALE AND SANDSTONE - INTERBEDDED, GRADING FROM MEDIUM GRAY SLATE AND SILTSTONE TO FINE GRAINED SANDSTONE STRONG PETROLIFEROUS ODOUR.
142.02	2.46	SANDSTONE - LIGHT GRAY TO MEDIUM BROWN, COARSING GRAINED DOWNWARD
144.47	11.11	SANDSTONE - MEDIUM GRAY TO DARK GRAY BROWN, BRADING FROM TO CONGLOMERATIC DOWNWARD. GRAINS OF QUARTZ AND CHERT AND GRANULAS AND PEBBLES ARE SUBANGULAR TO SUBROUNDED. MASSIVE BEDDING, THIN BEDS OF SILTSTONE AND CONGLOMERATE AT BASE.
155.58	5.18	SILTSTONE - DARK GRAY, RUSTY WEATHERING, SANDY AND CROSSBEDDED AT TOP, FINING DOWNWARD
160.76	5.70	SILTSTONE - MEDIUM GRAY, SLIGHT SANDY, MASSIVE BEDDING. FROM 165.40 TO 165.55 CARBONACEOUS SHALE WITH COAL SPLINTS.
166.46	4.40	MUDSTONE - GREEN TO DARK GRAY, SOFT, MASSIVE BEDDED, THIN BEDS OF FINE GRAINED SANDSTONE
170.86	2.80	SANDSTONE - MEDIUM TO DARK GRAY, FINE GRAINED, ANGULAR GRAINS OF QUARTZ AND CHERT, FINELY LAMINATED
173.66	10.97	MUDSTONE - GREEN TO DARK GRAY, SOFT, TOWARD BASE, SAND INCRESING AND CARBON CONTENT DECRESING.
184.63	5.37	SANDSTONE - GREEN WEATHERING AND FRESH SURFACE. VERY FINE TO FINE GRAINED, MASSIVE BEDDED
190.00	2.84	MUDSTONE - GREEN, SOFT. DISAGREGATED AT BASE.
192.84	3.14	SILTSTONE TO SANDSTONE - GREEN TO MEDIUM GRAY, COARSENING FROM SILTSTONE TO CONGLOMERATIC SANDSTONE AT BASE
195.98		SANDSTONE TO SILTSTONE - MEDIUM GRAY, MASSIVE BEDDED, FINE GRAINED AND MORE CARBONACEOUS DOWNWARD.
199.64		TOTAL DEPTH

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS	SIZE DIAMETER	SIZE WT %	SPEC GRAV	WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	OTHER
107.02	3.09	BAD ROOF SHALE																															
107.02	0.94	MOSTLY BRIGHT HARD AND BANDED COAL	A0042	0.94	0×1/4	100%	-1.90	87.2	3.3	16.5	35.1	45.1	10532	-	0.93	87.2	3.3	16.5	35.1	45.1	10532	-	0.93	0.94	87.2	3.3	16.5	35.1	45.1	10532			40
							+1.90	12.8	1.4	69.3	-	-	-	-	-	100.0	3.4	10.2	-	-	-	-	-										
							RAW	-	-	-	-	-	-	-	-	100.0	4.6	22.6	33.1	39.7	9724	-	0.78										
107.96	1.94	SHALE - MEDIUM TO DARK GRAY WITH CARBONACEOUS PLANT FRAGMENTS																															
109.90	0.25	DULL TO VITREOUS COAL																															
110.25	13.90	BAD FLOOR SHALE																															

LOCATION MAP

TN

SCALE:

COORDINATES: Y 3100 m N, X 200 m W. of S.E. corner of CL 83
ELEVATION: 555.93 m
DIP -90° BEARING -
CORE SIZE HQ to 51.82 m, NQ to 159.11 m
CASING HW 4.88 m, NW a 2.35 m
BITS USED J.K. SMIT COMBINATION
MUD USED 171 BAGS GEL; 59 BAGS TROLL, 1 1/2 BAGS QUICK SEAL.
m LEFT IN HOLE 4.88 m of HW m, 79.25 m of NW
DATE START JUNE 9, 1979 FINISH JUNE 18, 1979
DRILLER CARON DIAMOND DRILLING OVERALL RECOVERY 71 %
TESTS GAMMA LOG
SAMPLED BY O CULLINGHAM DATE JUNE 18 ANALYZED BY BIRTLEY COAL & MINERALS TESTING

BOREHOLE NO. BP-79-7
PAN OCEAN OIL LTD.
MINING DIVISION – COAL

LOGGED BY O. CULLINGHAM, D. HOPE DATE JUNE 19, 1979
SIGNED

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	THICKNESS	DESCRIPTION
	7.70	OVERBURDEN - RUBBLE, PEBBLES AND COBBLES OF CHERT AND QUARTZITE PEBBLES ARE BLACK, WHITE, BLACK WITH QUARTZ VEINS.
7.90		
8.23	0.53	CONGLOMERATE - FINE TO COARSE PEBBLES IN COARSE SANDSTONE MATRIX.
	19.20	CONGLOMERATE - RUBBLE OF CONGLOMERATE AND MEDIUM TO COARSE GRAINED CONGLOMERATE SANDSTONE. (NOTE: MOST OF INTERVAL TRI CONED, VERY LITTLE RECOVERY.)
27.43		
29.20	1.77	SHALE - MEDIUM GRAY, MINOR PARTINGS OF CARBONACEOUS SHALE
	6.58	NO. 1 SEAM HORIZON
35.78		
	8.11	SHALE - MEDIUM DARK GRAY, WEATHERED LIGHT GRAY TO WHITISH. CONTAINS MINOR SPLINTS, PARTINGS, WEDGES AND FLECKS OF COAL AND CARBONACEOUS MATERIAL.
43.89		
	10.33	SANDSTONE - GRAY WEATHERING, FINE TO MEDIUM GRAINED, DOMINENTLY MASSIVE BEDDED. ZONES OF CROSS BEDDED, GRANULAR SANDSTONE AT 45.61-45.79 AND 46.33-47.00
54.22		
55.51	1.29	NO. 2 SEAM HORIZON
	3.44	MUDSTONE TO SHALE - MEDIUM GRAY, SOFT. MUDSTONE AT TOP, GRADING THROUGH TO SHALE AND SILTY SHALE TOWARDS BASE
59.00		
	2.84	SANDSTONE - MEDIUM GRAY, VERY FINE TO FINE GRAINED, THICK CROSS LAMINATED. CARBONACEOUS LAMINATIONS UP TO 5 cm
61.84		
	10.92	SANDSTONE - MEDIUM GRAY, COARSE GRANULAR GRAINED, QUARTZ AND BLACK CHERT GRAINS. TAR FOUND TO 64.62 IN 10-15 % EVIDENCE OF GRINDING IN UNIT
72.76		
	4.51	SHALE - DARK GRAY, HARD, SILTY AND CARBONACEOUS. MASSIVE BEDDING FROM 74.70-74.98 MEDIUM GRAY, FINE GRAINED SANDSTONE.
77.27		
	4.29	COAL HORIZON - VITREOUS TO BRIGHT BANDS OF COAL WITHIN PREDOMINENTLY CARBONACEOUS TO COALY SHALE INTERVAL NO. 3
81.56		
	4.90	MUDSTONE - MEDIUM GRAY BROWN, SOFT, SILTY, BECOMES MORE SILTY DOWNWARDS
86.46		
	4.88	SANDSTONE - MEDIUM GRAY, VERY FINE GRAINED, CROSS LAMINATED; THIN DARK CARBONACEOUS LAMINAE.
91.34		
	6.72	CONGLOMERATE - PEBBLES OF GRAY, BLACK AND GREEN CHERT AND QUATZITE. SORTING MODERATE TO POOR. MATRIX IS MEDIUM GRAINED SANDSTONE. DIRTY AND MASSIVE CONGLOMERATE
98.04		
	0.81	COALY SHALE - DULL TO BRIGHT, SOFT, GRINDING.
	3.53	MUDSTONE - MEDIUM GRAY BROWN. BASAL 0.4m BECOMES SILTY SOFT (FRIABLE) MUDSTONE
102.72		
	2.27	SANDSTONE - VERY FINE TO MEDIUM GRAINED, COARSENING DOWNWARDS. MEDIUM GRAY CROSS BEDDING.
104.96		
	12.84	CONGLOMERATE - LIGHT GRAY, MASSIVE BEDDED, PEBBLES OF BLACK, GREEN AND GRAY CHERT AND QUARTZITE. MODERATELY WELL CEMENTED. CONTAINS TAR, INCREASING AMOUNT DOWNWARD. SANDSTONE FROM 116.20 TO 116.86, MEDIUM GRAINED
117.51		
	0.69	MUDSTONE - MEDIUM GRAY, SOFT.
118.20		
	5.55	SANDSTONE - MEDIUM TO DARK GRAY, FINE TO COARSE GRAINED, COARSENING DOWNWARD. CROSS AND MASSIVE BEDDED. CONTAINS TAR.
123.75		
	2.85	GONGLOMERATIC SANDSTONE - QUARTZ AND CHERT GRAINS MODERATE SORTING AND CEMENTED WITH SILICA.
126.60		
128.11	1.51	NO. 4 SEAM HORIZON
	1.85	SHALE - MEDIUM GRAY BROWN, CARBONACEOUS TO COALY
129.96		
	12.04	SANDSTONE - LIGHT GRAY, FINE TO COARSE GRAINED - COARSENING DOWNWARD. CROSS BEDDED, WELL SORTED QUARTZ AND CHERT GRAINS. CARBONACEOUS PARTINGS AND SPLINTS THROUGHOUT
142.00		
	17.10	MUDSTONE AND SHALE - MEDIUM TO DARK GRAY, BECOMES SILTY TOWARDS BASE. COAL FROM 143.20 TO 143.65 AND 145.38 TO 146.00
159.11		

CBW

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
		No. 1 SEAM HORIZON		
	1.77	BAD ROOF SHALE		
29.20				
	0.32	SHALY COAL AND COALY SHALE		
29.52				
	0.25	COAL - DULL, PARTINGS OF COALY SHALE	A0027	0.86
29.77				
	0.09	CARBONACEOUS TO COALY SHALE		
29.86				
30.06		COAL - DULL TO VITROUS, WITH COALY SHALE		
	0.35	SHALE - MEDIUM DARK GRAY, COAL PARTINGS		
30.41			A0028	0.80
	0.45	CARBONACEOUS SHALE - DULL, FRIABLE		
30.86				
	0.27	COAL - DULL TO BRIGHT, BANDED	A0029	0.27
31.13				
	0.40	SHALE - MEDIUM DARK GRAY		
31.53			A0030	1.05
	0.65	NO CORE RECOVERED		
32.18				
	0.12	COAL - DULL TO VITREOUS		
32.30				
	0.22	COALY SHALE - DULL, BLOCKY		
32.52			A0031	1.04
	0.70	COAL - MOSTLY BRIGHT, BANDED CONCOIDAL FRACTURE		
33.22				
	0.70	SHALE - MEDIUM DARK GRAY BREAKS DOWN	A0032	0.92
33.92				
	0.22			
34.14				
	0.99	COAL - DULL TO VITREOUS, BRIGHT PARTINGS AND SPLINTS HIGH FUSAIN	A0033	1.64
35.28				
	0.38			
35.66				
	0.08	SHALE		
35.78				
	0.04	COAL		
	0.68	FLOOR - SHALE, DARK GRAY IN PART CARBONACEOUS, FRAGMENTAL.		
36.46				
		No. 2 SEAM HORIZON		
	10.33	GOOD ROOF SANDSTONE		
54.22				
	1.29	DIRTY, HEAVY AND FRESH COAL FROM 54.90 TO 55.12. BLACK CARBONACEOUS SHALE	A0034	1.29
55.51				
	3.34	BAD FLOOR SOFT MUDSTONE		
		No. 4 SEAM HORIZON		
	2.85	GOOD ROOF CONGLOMERITIC SANDSTONE		
126.60				
	1.51	COAL - MOSTLY BRIGHT PARTINGS OF DULL CARBONACEOUS TO COALY SHALE	A0039	1.51
128.11				
	1.85	BAD FLOOR SHALE		
		No. 3 SEAM HORIZON		
		ROOF SHALE, DARK GRAY, SILTY TO IMPURE CARBONACEOUS		
77.27				
	0.21	COAL - DULL, SHALEY		
77.48				
	0.52	SHALE - DARK GRAY	A0035	0.93
78.00				
	0.20	CARBONACEOUS & COALY SHALE		
78.20			A0036	0.24
	0.24	COAL, DULL TO BRIGHT		
78.44				
	0.1	CARBONACEOUS TO COALY SHALE		
78.74				
	0.21	COAL - VITREOUS TO BRIGHT		
78.95				
	0.14	SHALE - MEDIUM DARK GRAY		
79.14			A0037	1.42
	0.05	COAL - DULL TO VITREOUS		
	0.72	NO CORE		
79.86				
	0.26	CARBONACEOUS SHALE		
80.12				
	0.80	SHALE - MEDIUM TO DARK GRAY		
80.92				
	0.20	SHALE - AS ABOVE		
81.12				
	0.44	COAL - DULL TO BRIGHT, CONTAINS SHALE BANDS 81.26 TO 81.28	A0038	0.44
81.56				
		FLOOR - MEDIUM GRAY, BROWN SLIGHTLY SILTY		

SIZE DIAMETER	SIZE WT %	SAMPLE	SPEC GRAV	WEIGHT PERCENT YIELD	PROXIMATE RM	PROXIMATE ASH	PROXIMATE VOL	PROXIMATE F.C.	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	CUM PROXIMATE RM	CUM PROXIMATE ASH	CUM PROXIMATE VOL	CUM PROXIMATE F.C.	CUM BTU	CUM F.S.I.	CUM S
0×1/4	100%		-1.90	36.2	5.6	33.7	25.4	35.3	7055	-	0.51	36.2	5.6	33.7	25.4	35.3	7055	-	0.51
			+1.90	63.8	3.3	76.8	-	-	-	-	-	100.0	4.2	61.2	-	-	-	-	-
			RAW	-	-	-	-	-	-	-	-	100.0	3.8	60.1	16.2	19.9	3436	-	0.17
0×1/4	100%		-1.90	15.3	7.9	29.5	26.0	36.6	7194	-	0.30	15.3	7.9	29.5	26.0	36.6	7194	-	0.30
			+1.90	84.7	3.7	80.0	-	-	-	-	-	100.0	4.4	72.3	-	-	-	-	-
			RAW	-	-	-	-	-	-	-	-	100.0	2.8	74.4	12.1	10.7	-	-	0.13
0×1/4	100%		-1.90	73.3	6.6	18.1	33.9	41.4	9114	-	0.38	73.3	6.6	18.1	33.9	41.4	9114	-	0.38
			+1.90	26.7	3.3	67.3	-	-	-	-	-	100.0	5.7	31.3	-	-	-	-	-
			RAW	-	-	-	-	-	-	-	-	100.0	5.2	31.0	30.5	33.3	7547	-	0.29
0×1/4	100%		-1.90	2.6	6.8	17.2	35.8	40.2	9140	-	0.38	2.6	6.8	17.2	35.8	40.2	9140	-	0.38
			+1.90	97.4	3.4	83.0	-	-	-	-	-	100.0	3.5	81.3	-	-	-	-	-
			RAW	-	-	-	-	-	-	-	-	100.0	1.9	83.0	10.7	4.4	-	-	0.13
0×1/4	100%		-1.90	68.2	6.6	9.3	35.3	48.8	10215	-	0.36	68.2	6.6	9.3	35.3	48.8	10215	-	0.36
			+1.90	31.8	5.3	70.4	-	-	-	-	-	100.0	6.2	28.8	-	-	-	-	-
			RAW	-	-	-	-	-	-	-	-	100.0	6.8	27.4	29.9	35.9	7953	-	0.25
0×1/4	100%		-1.90	5.2	4.6	35.6	26.3	33.5	6668		0.32	5.2	4.6	35.6	26.3	33.5	6668	-	0.32
			+1.90	94.8	2.7	81.4	-	-	-	-	-	100.0	2.8	79.0	-	-	-	-	-
			RAW	-	-	-	-	-	-	-	-	100.0	5.2	77.8	12.8	4.2	-	-	0.13
0×1/4	100%		-1.90	71.7	4.0	20.9	34.5	40.6	9060	-	0.39	71.7	4.0	20.9	34.5	40.6	9060	-	0.39
			+1.90	28.3	1.6	72.3	-	-	-	-	-	100.0	3.3	35.5	-	-	-	-	-
			RAW	-	-	-	-	-	-	-	-	100.0	6.5	33.6	29.7	30.2	7143	-	0.28
0×1/4	100%		-1.90	62.8	4.6	16.2	33.1	46.1	9277	-	0.44	62.8	4.6	16.2	33.1	46.1	9277	-	0.44
			+1.90	37.2	1.6	72.0	-	-	-	-	-	100.0	3.5	37.0	-	-	-	-	-
			RAW	-	-	-	-	-	-	-	-	100.0	7.4	34.6	26.4	31.6	6436	-	0.19
0×1/4	100%		-1.90	70.0	4.1	10.4	35.4	50.1	10349	-	0.44	70.0	4.1	10.4	35.4	50.1	10349	-	0.44
			+1.90	30.0	1.4	80.6	-	-	-	-	-	100.0	3.3	31.5	-	-	-	-	-
			RAW	-	-	-	-	-	-	-	-	100.0	7.9	31.9	27.5	32.7	7366	-	0.2
0×1/4	100%		-1.90	11.6	6.1	37.9	24.4	31.6	5918	-	0.51	11.6	6.1	37.9	24.4	31.6	5918	-	0.51
			+1.90	88.4	1.9	72.1	-	-	-	-	-	100.0	2.4	68.2	-	-	-	-	-
			RAW	-	-	-	-	-	-	-	-	100.0	2.9	68.8	16.6	11.7	-	-	0.13
0×1/4	100%		-1.90	41.1	4.5	15.1	33.2	47.2	9535	-	0.51	41.1	4.5	15.1	33.2	47.2	9535	-	0.51
			+1.90	58.9	1.2	75.1	-	-	-	-	-	100.0	2.6	50.5	-	-	-	-	-
			RAW	-	-	-	-	-	-	-	-	100.0	4.1	49.1	24.5	22.3	5073	-	0.15
0×1/4	100%		-1.90	43.3	7.5	26.1	33.3	33.1	7943	-	0.34	43.3	7.5	26.1	33.3	33.1	7943	-	0.34
			+1.90	56.6	2.6	70.8	-	-	-	-	-	100.0	4.7	51.4	-	-	-	-	-
			RAW	-	-	-	-	-	-	-	-	100.0	3.9	51.5	22.4	22.2	4733	-	0.15
0×1/4	100%		-1.90	58.5	4.3	13.7	32.8	49.2	9978	-	0.57	58.5	4.3	13.7	32.8	49.2	9978	-	0.57
			+1.90	41.5	1.9	71.4	-	-	-	-	-	100.0	3.3	37.7	-	-	-	-	-
			RAW	-	-	-	-	-	-	-	-	100.0	5.7	37.4	26.8	30.1	6527	-	0.32

SAMPLE	CUM THICKNESS	CUM YIELD	CUM PROXIMATE RM	CUM PROXIMATE ASH	CUM PROXIMATE VOL	CUM PROXIMATE F.C.	CUM BTU	CUM F.S.I.	CUM S	H.G.I.
A0027						EXCLUDED				
A0028						EXCLUDED				
A0029						EXCLUDED				
A0030						EXCLUDED				
A0031	3.60	53.6	4.9	17.0	34.5	43.4	9424			
A0032	2.56	47.8	4.0	21.4	34.1	40.3	8966			
A0033	1.64	71.7	4.0	20.9	34.5	40.6	9060			
	3.70	33.8	6.5	16.6	32.6	44.1	9229			44
	3.16	33.4	6.7	13.4	33.9	45.7	9631			-
	2.36	39.5	6.6	11.3	35.1	46.9	9950			41
	2.09	35.2	6.6	9.5	35.4	48.4	10175			-
	1.04	68.2	6.6	9.3	35.3	48.8	10215			39
					EXCLUDED					-
					EXCLUDED					36
	1.29	62.8	4.6	16.2	33.1	46.1	9277			44
	1.51	70.0	4.1	10.4	35.4	50.1	10349			39
A0036	0.24	41.4	4.5	15.1	33.2	47.2	9535			
A0037	1.66	42.9	7.0	24.5	33.2	35.0	8163			
	0.93	11.6	6.1	37.9	24.4	31.6	5918			-
	1.17	17.7	5.4	27.1	28.6	39.1	7645			39
	2.59	31.8	7.0	8.4	32.2	34.6	7868			-
					EXCLUDED					

LOCATION MAP

TN

SCALE:

BOREHOLE NO. BP-79-8
PAN OCEAN OIL LTD.
MINING DIVISION – COAL

COORDINATES: Y 800 m N, X 550 m W of S.E. corner of CL 83
ELEVATION: 584.78 m
DIP: -90° BEARING: -
CORE SIZE: HQ to 133.5m NQ to 159.72m CASING: HW 10.36m NW 133.5m
BITS USED: J.K. SMIT COMBINATION
MUD USED: 168 BAGS GEL; 7 BAGS SEAL; 92 BAGS TROL; ¼ BAG CELLEX
m LEFT IN HOLE: NIL m

DATE START: JUNE 20, 1979 FINISH: JUNE 28, 1979
DRILLER: CARON DIAMOND DRILLING OVERALL RECOVERY: 79.2%
TESTS: GAMMA LOG
SAMPLED BY: O. CULLINGHAM, J. VILLAMILLE DATE: JUNE 29 ANALYZED BY: BIRTLEY COAL & MINERALS TESTING

LOGGED BY: O. CULLINGHAM, D. HOPE, J. VILAMILLE DATE: JUNE 29, 1979
SIGNED:

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
		88.68	CONGLOMERATE - MEDIUM GRAY WEATHERING, POORLY SORTED, PEBBLES AND COBBLES OF CHERT, QUARTZ AND QUARTZITE. AVERAGE 20-30 mm LARGEST IS GREATER THAN 70mm. MATRIX IS MEDIUM TO COARSE GRAINED SALT AND PEPPER SANDSTONE. SATURATED WITH TAR
88.68		7.99	No. 1 SEAM HORIZON
96.67		5.71	SHALE - MEDIUM GRAY, CUBIC WEATHERING, SILTY NEAR BASE
102.41		1.17	LIGHT GRAY, VERY FINE TO FINE GRAINED, GRADATIONAL TO SANDSTONE BELOW
104.58		8.26	MEDIUM GRAY WEATHERING, COARSE GRAINED TO CONGLOMERATIC - COARSENING DOWNWARD. CHIPS AND SPLINTS OF COAL THROUGHOUT, INCREASING ABUNDANCE TOWARD BASE. CROSSBEDDING AT 55° TO CORE AXIS
113.83		3.08	No. 2 SEAM HORIZON
116.91		5.68	MEDIUM GRAY, MASSIVE BEDDED, CUBIC WEATHERING, CONTAINS COALY SPLINTS. BECOMES SILTY TOWARD BASE
122.59		4.04	SANDSTONE - VERY FINE TO FINE GRAINED - COARSENING DOWNWARD, BECOMES MORE CARBONACEOUS TOWARD BARE. CROSS-BEDDED AT 70° TO CORE AXIS
126.63		6.48	MEDIUM GRAY WEATHERING, THICKLY CROSSBEDDED AT 45° TO CORE AXIS COARSE GRAINED TO CONGLOMERATE. COARSENING DOWNWARD. CHIPS AND SPLINTS OF COAL THROUGHOUT, BECOMING MORE ABUNDANT TOWARD BASE
132.97		4.80	No. 3 SEAM HORIZON
137.77		3.89	DARK GRAY, CARBONACEOUS AT TOP, MEDIUM GRAY, LESS CARBONACEOUS AT BASE - GRADATIONAL, CUBIC WEATHERING
141.66		4.77	SILTSTONE - LIGHT TO MEDIUM GRAY, MASSIVE BEDDED, 144.12 - 144.70 FINELY CROSS-LAMINATED AT 70° TO CORE AXIS
146.43		0.62	COALY SHALE AND COAL
147.15		5.25	SHALE - MEDIUM TO DARK GRAY, CARBONACEOUS TO COALY, ABUNDANT SPLINTS OF COAL THROUGHOUT
152.40		1.84	SILTSTONE - TRANSITION ZONE FROM CARBONACEOUS SHALE TO CONGLOMERATE
154.24		4.97	CONGLOMERATE - 0.5 cm to 3.0 cm DIAMETER PEBBLES OF CHERT AND QUARTZITE. MATRIX OF MEDIUM TO COARSE SALT AND PEPPER SANDSTONE
159.21			TOTAL DEPTH

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			No. 1 SEAM HORIZON		
		88.68	GOOD ROOF CONGLOMERATE		
88.68		0.67	COAL - DULL TO VITREOUS, SPLINTS AND BANDS OF BRIGHT COAL	A0061	0.67
89.35		0.74	CARBONACEOUS SHALE - DARK GRAY SPLINTS OF BRIGHT COAL	A0062	0.74
90.09		1.14	COAL - DULL TO VITREOUS, BANDED, MINOR THIN BANDS OF SHALE	A0063	1.14
91.23		0.51	CARBONACEOUS TO COALY SHALE	A0064	0.51
91.74		1.17	COAL - MOSTLY BRIGHT BANDED CONCOIDAL FRACTURE, WHITE WISPS OCCUR BETWEEN BANDS	A0065	1.17
92.91		0.52	CARBONACEOUS SHALE - THIN BANDS OF SHALE AND BRIGHT COAL	A0066	0.52
93.48		1.23	COAL - MOSTLY BRIGHT, PARTED TO BANDED, SPLINTS OF DULL COAL, MINOR PYRITE AND RESIN	A0067	1.23
93.59		0.50	CARBONACEOUS AND COALY SHALE BANDS OF BRIGHT COAL	A0068	0.50
94.66		0.25	COAL - BRIGHT	A0069	0.25
95.16		0.45	COALY SHALE WITH BANDS OF BRIGHT COAL	A0070	0.45
95.41		0.50	COAL - DULL TO VITREOUS	A0071	0.81
95.86		0.31	NO CORE		
96.36		5.71	BAD FLOOR SHALE		
96.67			**No. 2 SEAM HORIZON**		
		8.26	GOOD ROOF SANDSTONE		
113.83		0.46	COAL - MOSTLY BRIGHT, IRIDESCENT COLOURED STAINS		
114.29		0.36	COAL - DULL TO VITREOUS, LIGHT WEIGHT	A0072	1.08
114.65		0.26	NO CORE		
114.91		0.99	COAL - MOSTLY BRIGHT, PARTED TO THINLY BANDED, IRIDESCENT COLOURATION	A0073	0.99
115.90		0.23	SHALE - CARBONACEOUS TO COALY	A0074	0.23
116.13		0.44	SHALEY COAL - DULL, BLOCKY	A0075	0.44
116.57		0.34	SHALE - CARBONACEOUS TO COALY	A0076	0.34
116.91		5.68	BAD FLOOR SHALE		
122.59			**No. 3 SEAM HORIZON**		
		4.77	GOOD ROOF SANDSTONE		
132.97		0.55	COALY SHALE AND COAL, DULL TO VITREOUS	A0077	0.55
133.52		0.36	SHALE - MEDIUM LIGHT GRAY, BLOCKY		
133.88		0.64	NO CORE	A0078	0.90
134.42		0.79	COAL - VITREOUS TO BRIGHT AT TOP AND DULL LIGHT IN WEIGHT AT BASE	A0079	1.52
135.21		0.73	NO CORE		
135.94		0.33	COAL - BRIGHT	A0080	0.52
136.27		0.19	CARBONACEOUS TO COALY SHALE		
136.46		0.20	COAL - BRIGHT		
136.66		0.62	COAL - DULL TO VITREOUS, CARBONACEOUS SHALE FOR 0.09 m, AT BASE	A0081	1.31
137.28		0.49	NO CORE		
137.77		3.89	BAD FLOOR CARBONACEOUS SHALE		
141.66		4.77	BAD ROOF SILTSTONE		
146.43		0.72	COAL - GRADATIONAL DOWNWARD FROM COALY SHALE TO DULL COAL	A0082	0.72
147.15		5.25	BAD FLOOR SHALE		

SIZE DIAMETER	SIZE WT %	SPEC GRAV	WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	OTHER
0×1/4	100%	-1.90	83.9	4.9	23.0	30.8	41.3	8336	-	0.51	83.9	4.9	23.0	30.8	41.3	8336	-	0.51										
		+1.90	16.1	3.0	61.8	-	-	-	-	-	100.0	4.6	29.2	-	-	-	-	-					EXCLUDED					
		RAW	-	-	-	-	-	-	-	-	100.0	8.3	29.0	28.3	34.4	7568	-	0.25										
0×1/4	100%	-1.90	5.1	7.3	35.5	25.5	31.7	6488	-	0.29	5.1	7.3	35.5	25.5	31.7	6488	-	0.29										
		+1.90	94.9	2.3	79.7	-	-	-	-	-	100.0	2.6	77.5	-	-	-	-	-					EXCLUDED					
		RAW	-	-	-	-	-	-	-	-	100.0	3.5	76.6	13.8	6.1	-	-	0.06										
0×1/4	100%	-1.90	87.5	4.1	26.5	31.5	37.9	8160	-	0.37	87.5	4.1	26.5	31.5	37.9	8160	-	0.37	0.27	87.5	4.1	26.5	31.5	37.9	8160			
		+1.90	12.5	2.7	66.6	-	-	-	-	-	100.0	4.0	10.5	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	6.9	31.0	28.5	33.6	7461	-	0.15										
0×1/4	100%	-1.90	8.7	6.1	36.9	18.8	38.2	6434	-	0.30	8.7	6.1	36.9	18.8	38.2	6434	-	0.30										
		+1.90	91.3	3.2	72.4	-	-	-	-	-	100.0	3.5	69.3	-	-	-	-	-	0.78	35.9	4.4	28.1	29.4	37.9	7887			
		RAW	-	-	-	-	-	-	-	-	100.0	5.4	67.9	15.8	10.9	-	-	0.10										
0×1/4	100%	-1.90	90.6	4.3	9.3	37.7	48.7	10485	-	0.35	90.6	4.3	9.3	37.7	48.7	10485	-	0.35										
		+1.90	9.4	2.3	68.9	-	-	-	-	-	100.0	4.2	14.9	-	-	-	-	-	1.95	68.7	4.3	13.2	35.9	46.4	9941			
		RAW	-	-	-	-	-	-	-	-	100.0	9.1	12.9	34.9	43.1	9613	-	0.17										
0×1/4	100%	-1.90	9.7	5.8	36.3	27.1	30.8	6625	-	0.27	9.7	5.8	36.3	27.1	30.8	6625	-	0.27										
		+1.90	90.3	2.9	78.3	-	-	-	-	-	100.0	3.2	74.3	-	-	-	-	-	2.47	56.3	4.3	14.0	35.6	45.8	9820			
		RAW	-	-	-	-	-	-	-	-	100.0	4.9	72.9	14.5	7.7	-	-	0.08										
0×1/4	100%	-1.90	80.3	4.0	19.1	35.3	41.6	9264	-	0.24	80.3	4.0	19.1	35.3	41.6	9264	-	0.24										
		+1.90	19.7	1.9	71.9	-	-	-	-	-	100.0	3.6	29.5	-	-	-	-	-	3.70	64.2	4.2	16.1	35.5	44.1	9589			
		RAW	-	-	-	-	-	-	-	-	100.0	7.8	27.1	30.9	34.2	7828	-	0.19										
0×1/4	100%	-1.90	87.2	3.4	29.6	31.5	35.5	7786	-	0.34	87.2	3.4	29.6	31.5	35.5	7786	-	0.34										
		+1.90	12.8	1.7	68.9	-	-	-	-	-	100.0	3.2	34.6	-	-	-	-	-					EXCLUDED					
		RAW	-	-	-	-	-	-	-	-	100.0	6.2	33.6	29.5	30.7	7105	-	0.23										
0×1/4	100%	-1.90	91.2	2.7	25.7	33.9	37.7	8529	-	0.32	91.2	2.7	25.7	33.9	37.7	8529	-	0.32										
		+1.90	8.8	1.8	64.6	-	-	-	-	-	100.0	2.6	29.2	-	-	-	-	-					EXCLUDED					
		RAW	-	-	-	-	-	-	-	-	100.0	6.5	27.3	32.4	33.8	7950	-	0.27										
0×1/4	100%	-1.90	21.1	5.1	24.1	30.9	39.9	8273	-	0.36	21.1	5.1	24.1	30.9	39.9	8273	-	0.36										
		+1.90	78.9	1.4	76.3	-	-	-	-	-	100.0	2.2	65.3	-	-	-	-	-					EXCLUDED					
		RAW	-	-	-	-	-	-	-	-	100.0	3.2	64.8	18.8	13.2	2810	-	0.11										
0×1/4	100%	-1.90	73.1	3.9	30.5	30.4	35.2	7740	-	0.33	73.1	3.9	30.5	30.4	35.2	7740	-	0.33										
		+1.90	26.9	2.4	66.8	-	-	-	-	-	100.0	3.5	40.3	-	-	-	-	-	7.99	63.72	CUMULATIVE - 4.1	22.0	TOTAL SEAM 33.2	40.6	8772			
		RAW	-	-	-	-	-	-	-	-	100.0	6.7	37.4	26.3	29.6	6446	-	0.21										
0×1/4	100%	-1.90	97.1	5.3	10.5	34.2	50.0	10019	-	0.42	97.1	5.3	10.5	34.2	50.0	10019	-	0.42										
		+1.90	2.9	3.1	57.2	-	-	-	-	-	100.0	5.2	11.9	-	-	-	-	-	1.08	97.1	5.3	10.5	34.2	50.0	10019			
		RAW	-	-	-	-	-	-	-	-	100.0	9.8	11.8	32.4	46.0	9695	-	0.27										
0×1/4	100%	-1.90	96.1	5.7	7.2	37.5	49.6	10420	-	0.34	96.1	5.7	7.2	37.5	49.6	10420	-	0.34										
		+1.90	3.9	3.1	52.6	-	-	-	-	-	100.0	5.6	9.0	-	-	-	-	-	2.07	96.6	5.4	8.9	35.7	49.8	10209			
		RAW	-	-	-	-	-	-	-	-	100.0	8.7	8.5	36.2	46.6	10243	-	0.32										
0×1/4	100%	-1.90	14.0	7.4	25.5	28.8	38.3	7871	-	0.27	14.0	7.4	25.5	28.8	38.3	7871	-	0.27										
		+1.90	86.0	2.3	67.7	-	-	-	-	-	100.0	3.0	61.8	-	-	-	-	-	2.30	88.3	5.5	9.1	35.7	49.7	10172			
		RAW	-	-	-	-	-	-	-	-	100.0	3.5	61.7	20.7	14.1	3242	-	0.10										
0×1/4	100%	-1.90	38.0	5.9	34.5	25.3	34.3	6282	-	0.25	38.0	5.9	34.5	25.3	34.3	6282	-	0.25										
		+1.90	62.0	2.5	63.1	-	-	-	-	-	100.0	3.8	52.2	-	-	-	-	-	2.74	80.2	5.6	11.2	34.8	48.4	9876			
		RAW	-	-	-	-	-	-	-	-	100.0	4.7	51.4	21.6	22.3	4650	-	0.10										
0×1/4	100%	-1.90	33.1	5.1	45.2	20.2	29.5	5470	-	0.27	33.1	5.1	45.2	20.2	29.5	5470	-	0.27										
		+1.90	66.9	2.2	70.7	-	-	-	-	-	100.0	3.2	62.3	-	-	-	-	-	3.08	75.1	5.6	12.8	34.2	37.6	9662			
		RAW	-	-	-	-	-	-	-	-	100.0	4.4	61.3	15.6	18.7	3182	-	0.13										
0×1/4	100%	-1.90	30.0	5.2	36.3	25.3	33.2	6775	-	0.32	30.0	5.2	36.3	25.3	33.2	6775	-	0.32										
		+1.90	70.0	1.2	81.6	-	-	-	-	-	100.0	2.4	68.0	-	-	-	-	-			-		EXCLUDED					
		RAW	-	-	-	-	-	-	-	-	100.0	3.6	67.4	14.3	14.7	2359	-	0.15										
0×1/4	100%	-1.90	1.9	8.4	16.6	32.8	42.2	9076	-	0.34	1.9	8.4	16.6	32.8	42.2	9076	-	0.34										
		+1.90	98.1	1.2	90.1	-	-	-	-	-	100.0	1.3	88.7	-	-	-	-	-					EXCLUDED					
		RAW	-	-	-	-	-	-	-	-	100.0	1.3	89.4	6.8	2.5	-	-	0.06										
0×1/4	100%	-1.90	39.7	5.6	16.9	33.3	44.2	9408	-	0.30	89.7	5.6	16.9	33.3	44.2	9408	-	0.03	1.52	39.7	5.6	16.9	33.3	44.2	9408			
		+1.90	60.3	1.6	78.9	-	-	-	-	-	100.0	3.2	54.3	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	3.7	56.4	20.2	12.7	4011	-	0.17										
0×1/4	100%	-1.90	68.6	5.9	15.2	33.6	45.3	9435	-	0.32	68.6	5.9	15.2	33.6	45.3	9435	-	0.32	2.04	47.0	5.7	16.2	33.4	44.6	9418			
		+1.90	31.4	2.3	63.8	-	-	-	-	-	100.0	4.8	30.5	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	5.5	32.8	28.2	33.5	7179	-	0.15										
0×1/4	100%	-1.90	69.7	5.7	11.0	36.8	46.5	10190	-	0.32	69.7	5.7	11.0	36.8	46.5	10190	-	0.32	3.35	55.9	5.7	13.7	35.0	45.5	9794			
		+1.90	30.3	2.0	65.3	-	-	-	-	-	100.0	4.6	27.4	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	6.1	26.6	30.9	36.4	7929	-	0.20										
0×1/4	100%	-1.90	48.2	5.8	17.0	32.8	44.4	9368	-	0.40	48.2	5.8	17.0	32.8	44.4	9368	-	0.40	0.72	48.2	5.8	17.0	32.8	44.4	9368			
		+1.90	51.8	1.8	71.4	-	-	-	-	-	100.0	3.7	45.2	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	4.6	45.1	25.1	25.2	5418	-	0.20										

LW

LOCATION MAP

TN

SCALE:

COORDINATES: Y 1780 m W. X 720 m W. FROM S.E. CORNER OF CL 83
ELEVATION: 555.24 m BITS USED: J.K. SMIT COMBINATION
DIP: -90 BEARING: – MUD USED: 25 GALS. POLYDRILL NO. 325, 10 GALS. POLYPOWER NO. 357
CORE SIZE: HQ CASING: 25.6 HW m LEFT IN HOLE: NIL m

DATE START: JUNE 20, 1979. FINISH: JUNE 26, 1979.
DRILLER: CARON DIAMOND DRILLING LTD. OVERALL RECOVERY: 82.5%
TESTS: GAMMA RAY
SAMPLED BY: O. CULLINGHAM DATE: JUNE 27, 1979 ANALYZED BY: BIRTLEY COAL & MINERALS TESTING

BOREHOLE NO. BP-79-9
PAN OCEAN OIL LTD. (PAGE 1)
MINING DIVISION – COAL

LOGGED BY: D. HOPE, O. CULLINGHAM DATE: JUNE 30, 1979.
SIGNED: D. HOPE

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	THICKNESS	DESCRIPTION
	27.52	OVERBURDEN: COBBLE SIZED PIECES OF CONGLOMERATE AND SANDSTONE.
27.52	0.97	SHALE: CARBONACEOUS - CONTAINS BITUMEN.
28.49	1.51	SILTSTONE: LIGHT GRAY: MASSIVE BEDDED, RARE PLANT FRAGMENTS.
30.00	0.40	SHALE: CARBONACEOUS - CONTAINS BITUMEN.
30.40	3.08	SILTSTONE: LIGHT GRAY, MASSIVE BEDDED 32.20-33.48 FINELY CROSS LAMINATED (1-2 MM) WITH DARKER CARBONACE BANDS.
33.48	19.80	CONGLOMERATIC SANDSTONE: PEBBLE AVERAGE 30 MM, LARGEST 50 MM, POORLY SORTED, ROUNDED, LOW SPHERICITY CLASTS OF BLACK, GRAY, GREEN CHERT AND GRAY QUARTZITE. MATRIX IS FINE TO MEDIUM, ANGULAR, WELL SORTED SANDSTONE, QUARTZ AND CHERT. APPROXIMATELY 15% CLAY.
43.28	0.35	MUDSTONE: LIGHT GRAY BROWN, CONTAINS CARBONACEOUS CHIPS
43.73	0.77	SHALE, CARBONACEOUS, DARK GRAY TO BLACK.
44.50	2.42	SILTSTONE: LIGHT GRAY BROWN, SILT CONTENT INCREASES TO BASE.
46.92	87.90	CONGLOMERATE: MEDIUM GRAY WEATHERING, MASSIVE BEDDED, POORLY SORTED, ROUNDED TO SUBROUNDED, LOW SPHERICITY PEBBLES AND COBBLES OF BLACK, GRAY, GREEN CHERT AND GRAY AND WHITE QUARTZITE. VEINING IN PEBBLES COMMON. BIMODAL DISTRIBUTION; 0.5 CM AND 3.0 TO 5.0 CM DIAMETER. SOME CLASTS GREATER THAN 7.0 CM DIAMETER. MATRIX: MEDIUM TO COARSE GRAINED, SALT AND PEPPER SANDSTONE. POOR TO MODERARATELY WELL CEMENTED.
134.82	9.86	NO. 1 SEAM HORIZON
144.68	1.00	MUDSTONE: SOFT, LIGHT BROWN TO LIGHT GRAY WEATHERING.
145.68	2.72	SHALE: CARBONACEOUS, MASSIVE BEDDED. SLICKEN SIDES AT 146.20
148.40	6.40	SANDSTONE: PEBBLY, MEDIUM TO MASSIVE BEDDED, CROSS BEDDED AT 55° TO CORE AXIS. SLIGHTLY CARBONACEOUS IN UPPER HALF.
154.80	0.93	CONGLOMERATE, LIGHT GRAY WEATHERING, MASSIVE BEDDED, AVERAGE PEBBLE SIZE 10 MM, LARGEST 50 MM, POORLY SORTED, ROUNDED TO SUBROUNDED, MODERATE SPHERICITY, GRAY AND BLACK CHERT AND GRAY QUARTZITE.
155.73		

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
		NO. 1 SEAM HORIZON		
134.82	87.90	ROOF: CONGLOMERATE - GOOD		
135.37	0.55	COAL AND SHALEY COAL	A0043	1.24
135.65	0.29	SHALEY COAL		
136.06	0.41	COAL: 0.04 M SHALEY COAL		
136.84	0.78	SHALE, SLIGHTLY CARBONACEOUS SLICKEN SIDES ON CONTACT	A0044	0.78
137.06	0.22	COAL		
137.45	0.39	SHALE: CARBONACEOUS TO COALY	A0045	0.90
137.74	0.29	COAL		
138.24	0.50	SHALE: MINOR CARBONACEOUS AND COAL	A0046	0.50
139.30	1.06	COAL AND SHALEY COAL	A0047	2.05
140.29	0.99	COAL: MOSTLY BRIGHT, CONCOIDAL FRACTURE.		
140.81	0.52	SHALE: DULL CARBONACEOUS TO COALY	A0048	0.52
142.23	1.42	SHALEY COAL DULL TO VITREOUS WITH A FEW THIN BANDS OF BRIGHT COAL.	A0049	1.42
142.54	0.31	COALY SHALE TO SHALEY COAL		
142.94	0.40	COAL: DULL TO VITREOUS TO BRIGHT	A0050	0.82
143.05	0.11	SHALEY COAL AND COALY SHALE		
143.71	0.66	SHALE WITH 0.19 M OF SHALEY COAL	A0051	0.66
144.68	0.97	COALY SHALE AND SHALEY COAL 0.25 M TOTAL OF COAL.	A0052	0.97
	1.00	FLOOR MUDSTONE AND SHALE - POOR CUBIC WEATHERING.		

SIZE		WEIGHT PERCENT										CUMULATIVE WEIGHT PERCENT								CUMULATIVE SAMPLE VALUES									OTHER		
DIAMETER	WT %	SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S		YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	GI		
0×1/4	100%	-1.90	51.9	4.5	20.7	30.9	43.9	9027	-	0.30		51.9	4.5	20.7	30.9	43.9	9027	-	0.30					EXCLUDED				41		
		+1.90	48.1	2.0	70.7	-	-	-	-	-		100.0																			
		RAW	-	-	-	-	-	-	-	-		100.0	5.4	43.7	22.7	28.2	5433	-	0.19												
0×1/4	100%	-1.90	2.0	5.1	22.0	30.2	42.7	8796	-	0.30		2.0	5.1	22.0	30.2	42.7	8796	-	0.30					EXCLUDED						
		+1.90	98.0	1.7	89.0	-	-	-	-	-		100.0																			
		RAW	-	-	-	-	-	-	-	-		100.0	2.1	87.4	7.8	2.7	-	-	0.06												
0×1/4	100%	-1.90	36.2	3.6	24.3	31.6	40.5	8556	-	0.30		36.2	3.6	24.3	31.6	40.5	8556	-	0.30					EXCLUDED						
		+1.90	63.8	2.3	78.2	-	-	-	-	-		100.0																			
		RAW	-	-	-	-	-	-	-	-		100.0	5.6	56.1	20.5	17.8	3817	-	0.14												
0×1/4	100%	-1.90	2.3	7.4	26.2	28.4	30.8	7852	-	0.27		2.3	7.4	26.2	28.4	30.8	7852	-	0.27					EXCLUDED						
		+1.90	97.7	3.1	81.1	-	-	-	-	-		100.0																			
		RAW	-	-	-	-	-	-	-	-		100.0	4.2	79.2	12.6	4.0	-	-	0.10												
0×1/4	100%	-1.90	78.4	5.4	17.9	33.9	42.8	9276	-	0.48		78.4	5.4	17.9	33.9	42.8	9276	-	0.48	1.76	78.4	5.4	17.9	33.9	42.8	9276					
		+1.90	21.6	2.5	70.5	-	-	-	-	-		100.0																			
		RAW	-	-	-	-	-	-	-	-		100.0	7.6	27.6	29.2	35.6	7675	-	0.15												
0×1/4	100%	-1.90	3.4	5.0	31.9	28.9	34.2	7369	-	0.29		3.4	5.0	31.9	28.9	34.2	7369	-	0.29	2.28	61.2	5.3	18.1	33.8	42.6	9251					
		+1.90	96.6	2.5	78.9	-	-	-	-	-		100.0																			
		RAW	-	-	-	-	-	-	-	-		100.0	4.7	75.9	13.6	5.8	-	-	0.10												
0×1/4	100%	-1.90	76.2	4.5	18.6	34.2	42.7	9291	-	0.38		76.2	4.5	18.6	34.2	42.7	9291	-	0.38	3.70	67.0	5.0	18.3	33.9	42.6	9268					
		+1.90	23.8	1.9	72.0	-	-	-	-	-		100.0																			
		RAW	-	-	-	-	-	-	-	-		100.0	5.4	30.7	30.6	33.3	7724	-	0.21												
0×1/4	100%	-1.90	83.6	4.3	31.3	29.0	35.4	7707	-	0.38		83.6	4.3	31.3	29.0	35.4	7707	-	0.38					EXCLUDED						
		+1.90	16.4	1.8	63.6	-	-	-	-	-		100.0																			
		RAW	-	-	-	-	-	-	-	-		100.0	5.4	34.9	28.0	31.7	7277	-	0.25												
0×1/4	100%	-1.90	24.1	4.7	30.5	28.8	36.0	7552	-	0.40		24.1	4.7	30.5	28.8	36.0	7552	-	0.40					EXCLUDED						
		+1.90	75.9	1.8	76.8	-	-	-	-	-		100.0																			
		RAW	-	-	-	-	-	-	-	-		100.0	3.1	65.4	16.9	14.6	2725	-	0.11												
0×1/4	100%	-1.90	56.8	4.8	29.5	30.0	35.7	7601	-	0.42		56.8	4.8	29.5	30.0	35.7	7601	-	0.42	9.86	51.7	CUMULATIVE - 4.7	22.3	TOTAL 32.2	SEAM 40.7	8744					
		+1.90	43.2	1.9	71.7	-	-	-	-	-		100.0																			
		RAW	-	-	-	-	-	-	-	-		100.0	4.7	46.9	24.5	23.9	5378	-	0.25												

LOCATION MAP

TN ↑

SCALE: 1:500

COORDINATES: Y X

ELEVATION: BITS USED:

DIP: BEARING: MUD USED:

CORE SIZE: CASING: m LEFT IN HOLE: m

DATE START: FINISH:

DRILLER: OVERALL RECOVERY:

TESTS:

SAMPLED BY: DATE: ANALYZED BY:

BOREHOLE NO. BP-79-9
PAN OCEAN OIL LTD. (PAGE 2)
MINING DIVISION – COAL

LOGGED BY: DATE:

SIGNED:

GEOLOGICAL LOG – SCALE: 1:500

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
			CONTINUED FROM PAGE 1
155.73		3.47	No. 2 SEAM HORIZON
159.20		1.12	DARK GRAY TO BLACK, CARBONACEOUS, CONTAINS SPLINTS AND BANDS OF COAL
160.32		4.47	SHALE - MEDIUM GRAY WEATHERING, MASSIVE BEDDED, CUBIC WEATHERING
164.79		1.02	SANDSTONE - MEDIUM GRAY, MASSIVE BEDDED, SALT AND PEPPER
165.81		2.73	SANDSTONE - MEDIUM GRAY, MEDIUM GRAINED, CROSS-BEDDED AT 60° TO AXIS, WELL SORTED, ANGULAR, QUARTZ AND CHERT
168.54		0.41	SILTSTONE - LIGHT GRAY, MASSIVE BEDDED
168.95		8.25	SILTSTONE - MEDIUM GRAY, SHALEY, CARBONACEOUS NEAR TOP, GRADES TO SANDY AND CLEANER TOWARD BASE, CROSS LAMINATIONS 65° TO CORE AXIS
177.20		1.40	SANDSTONE - CROSSBEDDED 55° TO CORE AXIS, FINE TO COARSE GRAINED INTERBEDS
178.60		4.52	No. 3 SEAM HORIZON
183.12		3.34	SHALE - MEDIUM GRAY, CUBIC WEATHERING, CARBONACEOUS
186.46		4.21	SILTSTONE - GRAY, WEATHERING, SHALEY AT TOP, SANDY AT BASE, GRADATIONAL, MASSIVE BEDDED
190.65		3.51	SANDSTONE - FINE TO COARSE GRAINED, COARSENING DOWNWARD, IN PART CROSS-BEDDED 50° TO CORE AXIS
194.16		2.74	CONGLOMERATE - LIGHT GRAY, MODERATELY WELL SORTED, MASSIVE BEDDED, GREEN, BLACK, GRAY CHERT, GRAY QUARTZITE, AND OCCASIONAL BANDED SILTSTONE PEBBLES, 1-2 cm DIAMETER, LARGEST 3.5 cm
196.90			TOTAL DEPTH

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			No. 2 Seam Horizon		
		0.93	GOOD ROOF CONGLOMERATE		
155.73			COAL - MOSTLY BRIGHT TO VITREOUS, WELL BANDED, CONCOIDAL FRACTURE, 0.12m LOST CORE		
		2.38		A0053	2.38
158.12		0.51	SHALE, COALY SHALE AND DULL COAL	A0054	0.51
158.63		0.16	COAL - BRIGHT		
158.79		0.41	SHALEY COAL AND COALY SHALE	A0055	0.57
159.20			FLOOR - SHALE - POOR, CUBIC FRACTURING		
			No. 3 Seam Horizon		
		1.40	ROOF - SANDSTONE, GOOD		
178.60		0.97	SHALEY COAL, COALY SHALE, CARBONACEOUS SHALE AND 0.18m TOTAL OF COAL	A0056	0.97
179.57		0.88	COAL - BRIGHT, WELL BANDED, CONCHOIDAL FRACTURE	A0057	0.88
180.45		0.17	SHALE - COALY		
		0.22	COALY - BRIGHT BANDED BLOCK		
		0.18	MUDSTONE		
		0.60	COAL - DULL TO BRIGHT, PARTINGS OF CARBONACEOUS SHALE	A0058	1.73
181.62		0.56	COALY SHALE, CARBONACEOUS SHALE AND COAL		
182.18		0.67	SHALE - SLIGHTLY CARBONACEOUS	A0059	0.67
182.85		0.27	COAL - DULL TO VITREOUS, THINLY BANDED	A0060	0.29
183.12			FLOOR - CUBIC FRACTURING SHALE - POOR		

SIZE DIAMETER	SIZE WT %	SPEC GRAV	WEIGHT PERCENT YIELD	PROX RM	PROX ASH	PROX VOL	PROX F.C	BTU	F.S.I.	S	CUM WT PCT YIELD	CUM PROX RM	CUM PROX ASH	CUM PROX VOL	CUM PROX F.C	CUM BTU	CUM F.S.I	CUM S	CUM SAMPLE VALUES THICKNESS	CUM SAMPLE VALUES YIELD	CUM SAMPLE VALUES PROX RM	CUM SAMPLE VALUES PROX ASH	CUM SAMPLE VALUES PROX VOL	CUM SAMPLE VALUES PROX F.C	CUM SAMPLE VALUES BTU	CUM SAMPLE VALUES F.S.I.	CUM SAMPLE VALUES S	OTHER
0×1/4	100%	-1.90	95.2	5.2	9.8	35.4	49.6	10322	-	0.40	95.2	5.2	9.8	35.4	49.6	10322	-	0.40	2.38	95.2	5.2	9.8	35.4	49.6	10322			
		+1.90	4.8	1.9	63.3	-	-	-	-	-	100.0																	
		RAW	-	-	-	-	-	-	-	-	100.0	8.9	11.2	34.3	45.6	5600	-	0.27										
0×1/4	100%	-1.90	63.2	4.2	30.6	27.6	37.6	7248	-	0.38	63.2	4.2	30.6	27.6	37.6	7248	-	0.38	2.89	89.5	5.0	12.3	34.4	48.1	9939			
		+1.90	36.8	2.2	62.2	-	-	-	-	-	100.0																	
		RAW	-	-	-	-	-	-	-	-	100.0	5.5	41.8	25.3	27.4	5640	-	0.17										
0×1/4	100%	-1.90	94.0	4.7	14.4	32.5	48.4	9742	-	0.49	94.0	4.7	14.4	32.5	48.4	9742	-	0.49	3.46	90.2	5.0	12.7	34.1	48.1	9905			
		+1.90	6.0	2.1	54.9	-	-	-	-	-	100.0																	
		RAW	-	-	-	-	-	-	-	-	100.0	6.5	16.4	33.1	44.0	9400	-	0.23										
0×1/4	100%	-1.90	23.6	4.1	28.3	29.9	37.7	7791	-	0.43	23.6	4.1	28.3	29.9	37.7	7791	-	0.43	3.58	54.4	4.7	17.0	34.0	44.1	9385			
		+1.90	76.4	1.6	75.0	-	-	-	-	-	100.0								(INCLUDES SAMPLES A0056-A0058 INCL.)									
		RAW	-	-	-	-	-	-	-	-	100.0	3.2	63.0	18.4	15.4	3075	-	0.12										
0×1/4	100%	-1.90	82.6	4.8	9.4	36.2	49.6	10519	-	0.37	82.6	4.8	9.4	36.2	49.6	10519	-	0.37	0.88	82.6	4.8	9.4	36.2	49.6	10519			
		+1.90	17.4	1.7	62.1	-	-	-	-	-	100.0																	
		RAW	-	-	-	-	-	-	-	-	100.0	6.8	18.7	33.1	41.4	9045	-	0.25										
0×1/4	100%	-1.90	57.5	4.9	20.1	33.3	41.7	8925	-	0.39	57.5	4.9	20.1	33.3	41.7	8925	-	0.39	2.61	65.9	4.8	15.5	34.5	45.0	9597			
		+1.90	42.5	1.3	71.6	-	-	-	-	-	100.0																	
		RAW	-	-	-	-	-	-	-	-	100.0	5.8	41.9	26.4	25.9	5601	-	0.17										
0×1/4	100%	-1.90	1.9	5.7	20.7	32.5	41.1	8926	-	0.38	1.9	5.7	20.7	32.5	41.1	8926	-	0.38					EXCLUDED					
		+1.90	98.1	1.2	89.4	-	-	-	-	-	100.0																	
		RAW	-	-	-	-	-	-	-	-	100.0	7.2	86.8	8.4	2.6	-	-	0.06										
0×1/4	100%	-1.90	64.8	5.5	21.8	34.5	38.2	8797	-	0.49	64.8	5.5	21.8	34.5	38.2	8797	-	0.49					EXCLUDED					
		+1.90	35.2	2.7	74.3	-	-	-	-	-	100.0																	
		RAW	-	-	-	-	-	-	-	-	100.0	5.6	40.7	25.9	27.8	6218	-	0.29										

LW

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y 1860 m N X 240 m W of SE corner of CL 83
ELEVATION: 567.93 m BITS USED J.K. SMIT COMBINATION
DIP -90 BEARING - MUD USED 234 bags
CORE SIZE NQ CASING HW 15.24 NW 120.40 m LEFT IN HOLE NIL m

DATE START JUNE 26, 79 FINISH JULY 6, 79
DRILLER CARON DIAMOND DRILLING OVERALL RECOVERY 93 %
TESTS GAMMA RAY: ACID TEST @ 290 m
SAMPLED BY J.VILLAMIL & O.CULLINGHAM DATE JULY 9, 79 ANALYZED BY BIRTLEY COAL & MINERALS TESTING SIGNED

BOREHOLE NO. BP-79-10
PAN OCEAN OIL LTD. (PAGE 1)
MINING DIVISION – COAL

LOGGED BY J.VILLAMIL DATE JULY 8, 79

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
		50.19	OVERBURDEN
50.19		0.22	COAL - DULL, BANDED, SOFT AND CHERTY MINOR RESIN SPOTS
50.41		1.93	CARBONACEOUS SHALE - MEDIUM GRAY BROWNISH SILTSTONE TIE AT BASE
52.34		1.46	SANDSTONE - MEDIUM GRAY, GRADING FROM FINE TO COARSE GRAINED
53.80		0.61	SILTSTONE - MEDIUM TO DARK GRAY, LAYERS OF SHALE AND SS INTERBEDDED
54.41		1.79	SANDSTONE - SALT AND PEPPER COLOURED, GRADING FROM FINE TO CONGLOMERATE
56.20		1.22	CARBONACEOUS SHALE & COAL - VITREOUS TO BRIGHT, BANDED
57.42		4.83	MUDSTONE - LIGHT TO MEDIUM GRAY BROWNISH FRAGMENTED SOFT. CONTAINS MINOR SPLINTS AND FRAGMENTS OF DULL COAL
62.25		2.14	SHALE - CARBONACEOUS AT TOP, MEDIUM GRAY FRAGMENTAL
64.39		3.70	SILTSTONE & MUDSTONE - LIGHT TO MEDIUM GRAY BROWNISH, FRAGMENTED TO BLOCKY. SPLINTS OF BRIGHT COAL THROUGHOUT.
68.09		3.00	SANDSTONE - VERY FINE TO FINE GRAINED, MEDIUM GRAY BANDED, CROSS BEDDED, THIN BANDS AND SPLINTS OF DULL COAL AT BASE
71.09		1.40	CONGLOMERATIC SANDSTONE - LIGHT GRAY ORANGEISH DUE TO IRON OXIDES
72.49		2.19	SANDSTONE - LIGHT GRAY, MEDIUM TO COARSE GRAINED, GRAINS OF QUARTZ, CHERT AND QUARTZITE
74.68	?	15.24	SANDSTONE & CONGLOMERATE - MEDIUM TO COARSE SANDSTONE AND PEBBLE SIZE CONGLOMERATE GENERAL COMPOSITION IS: 55% CHERT (BLACK, GRAY AND GREEN) 45% QUARTZ (CLEAR AND MILKY) TRACES OF SILTY SHALE
89.92	? TRICONED	10.66	SANDSTONE - FINE TO MEDIUM GRAINED 50% QUARTZ (CLEAR AND MILKY) 50% CHERT (DOMINANTELY BLACK)
100.58	?	3.05	SANDSTONE & SHALE - FINE TO MEDIUM GRAINED. 42% QUARTZ, 42% BLACK CHERT AND 16% OF COMB. SHALE
103.63	?	6.10	SANDSTONE & SHALE - FINE GRAINED, DECEMENTED 80% CLEAR QUARTZ 15% BLACK CHERT 5% CARB. TO COALY SHALE
109.73	?	6.09	SANDSTONE - FINE GRAINED 35% QUARTZ (CLEAR AND MILKY) 65% CHERT (DOMINATELY BLACK)
115.82	?	4.58	SANDSTONE - FINE GRAINED 70% QUARTZ (MAINLY CLEAR, SOME MILKY) 30% CHERT (MAINLY BLACK, SOME GRAY)
120.40	core wash	1.21	FRAGMENTS OF QUARTZ, SILTSTONE AND SHALE
121.61		1.28	CARBONACEOUS SHALE AND MUDSTONE - MEDIUM GRAY BROWN
122.89		4.46	SANDSTONE - LIGHT TO MEDIUM GRAY, FINE TO CONGLOMERATIC, GRADING GRAIN SIZE COARSENING DOWNWARD. QUARTZ AND CHERT GRAINS AND SMALL PEBBLES
127.35		4.81	SILTY AND CARBONACEOUS SHALE - MEDIUM TO DARK GRAY BROWNISH, COAL FRAGMENTS TROUGHOUT. BECOMES SOFT AT BASE FROM HARD AT TOP
132.16		1.37	SILTSTONE - LIGHT GRAY, FINELY STRATIFIED COAL CONCRETIONS
133.89		1.67	SANDSTONE - LIGHT GRAY, FINE GRAINED, CROSSBEDDED.
135.56		4.67	CONGLOMERATIC SANDSTONE - SALT AND PEPPER TEXTURE, UNSTRATIFIED ALTERING LAYERS OF COARSE SANDSTONE AND SANDSTONE MATRIX SUPPORT CONGLOMERATES
140.23		6.53	CONGLOMERATE - MEDIUM GRAY MATTED, CLAST SUPPORTED, POLYGENETIC AND POLYMODAL SMALL TO LARGE PEBBLES OF QUARTZ, QUAREITE AND BLACK CHERT, POOR SORTED COARSE SANDSTONE MATRIX
146.76		0.47	CARBONACEOUS SHALE & DULL TO VITEROUS COAL
147.23		2.06	SILTSTONE - LIGHT GRAY, FINE LAMINATED, GRADING TO SANDSTONE
149.29		87.92	CONGLOMERATE - MEDIUM TO LIGHT GRAY, LARGE TO VERY LARGE PEBBLES OF MILKY QUARTZ (10%), CLEAR QUARTZ (15%) QUAREITE (60%) BLACK CHERT (5%)
162.50			

DETAILS OF COAL SEAMS – SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS	SIZE: DIAMETER	SIZE: WT %	WEIGHT PERCENT: SPEC GRAV	YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT: YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I	S	CUMULATIVE SAMPLE VALUES: THICKNESS	YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I.	S	OTHER

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y X DATE START FINISH

ELEVATION: BITS USED DRILLER OVERALL RECOVERY

DIP BEARING MUD USED TESTS LOGGED BY DATE

CORE SIZE CASING m LEFT IN HOLE m SAMPLED BY DATE ANALYZED BY SIGNED

BOREHOLE NO. BP-79-10
PAN OCEAN OIL LTD. (PAGE 2)
MINING DIVISION – COAL

GEOLOGICAL LOG – SCALE: 1:500

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	THICKNESS	DESCRIPTION
162.50		CONGLOMERATE (CONT) – LARGEST PEBBLES ARE GRAY COLOURED QUARTZITE ALL PEBBLES ARE INTO A POLYMODAL SANDSTONE MEDIUM TO COARSE GRAINED MATRIX. ABUNDANT TAR THROUGHOUT. MAINLY IN PARTS WITH POROSITY BETWEEN 15-25%. MOST OF PEBBLES ARE SUBROUNDED, POOR SORTED AND MEDIUM SPHERICITY. CONGLOMERATE IS NOT STRATIFIED BUT SOME INTERVALS ARE DISTINGUISHABLE AT: 165.40-165.80 LIGHT GRAY, FINE GRAINED SANDSTONE. 175.58-176.93 SMALL PEBBLE CONGLOMERATE SOME MATRIX ABUNDENT TAR AT BASE. 180.95-181.02 CARBONACEOUS SHALE. 207.60-208.32 SMALL SIZED COBBLE CONGLOMERATE 235.05-237.34 SMALL PEBBLES CONGLOMERATE 10% OF THE PEBBLES ARE OF GREENISH CHERT
237.46	8.27	NO. 1 SEAM HORIZON
245.73	6.51	SHALE – MEDIUM GRAY, FRAGMENTAL AND CARBONACEOUS WITH SPLINTS OF BRIGHT COAL THROUGHOUT. THIN INTERVALS OF BRIGHT COAL (NO MORE THAN 2-3cm)
252.24	1.49	SANDSTONE – MEDIUM GRAY, FINE TO MEDIUM GRAINED
253.76	5.93	CONGLOMERATE – LIGHT TO MEDIUM GRAY, SMALL TO MEDIUM SIZED PEBBLES OF GRAY QUARTZITE (50%); BLACK CHERT (20%); QUARTZ (25%) AND GRAY CHERT (5%). POORLY SORTED. MATRIX IS COARSE TO GRANULAR SANDSTONE.
259.69	3.18	NO. 2 SEAM HORIZON
262.87	4.68	SHALE & MUDSTONE – MEDIUM GRAY BROWNISH, FRAGMENTAL, SOFT AND SPLINTS OF BRIGHT COAL THROUGHOUT.
267.55	6.04	SANDSTONE – LIGHT TO MEDIUM GRAY, GRADING DOWNWARD FROM FINE TO COARSE GRAINED. CROSS-BEDDED SPLINTS OF DULL COAL AT BASE.
273.59	6.16	SHALE – MEDIUM TO DARK GRAY, CARBONACEOUS AND SILTY. FISSILE BREAKS ALONG BEDDING. SPLINTS AND BANDS OF BRIGHT COAL THROUGHOUT.
279.75	3.22	NO. 3 SEAM HORIZON
282.97	3.32	MUDSTONE – LIGHT TO MEDIUM BROWNISH. CARBONACEOUS SHALE AT TOP SPLINTS OF BRIGHT COAL AT BASE.
286.29	1.86	SILTSTONE – LIGHT GRAY. SLUMP STRUCTURES
288.15	3.16	SHALE – MEDIUM TO DARK GRAY, FRAGMENTAL AND FISSILE. INTERVAL OF SILTY SHALE MAINLY AT BASE
291.31		TOTAL DEPTH

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	SEAM THICKNESS	DIAMETER	WT %	SPEC GRAV	YIELD	PROX RM	PROX ASH	PROX VOL	PROX F.C	BTU	F.S.I.	S	CUM YIELD	CUM PROX RM	CUM PROX ASH	CUM PROX VOL	CUM PROX F.C	CUM BTU	CUM F.S.I.	CUM S	CUM THICKNESS	CUM SAMPLE YIELD	CUM SAMPLE PROX RM	CUM SAMPLE PROX ASH	CUM SAMPLE PROX VOL	CUM SAMPLE PROX F.C	CUM SAMPLE BTU	CUM SAMPLE F.S.I.	CUM SAMPLE S
		No. 1 SEAM HORIZON																														
237.46	0.38	GOOD ROOF CONGLOMERATE																														
237.84	0.69	CARBONACEOUS TO COALY SHALE	A-0104	0.38	0×1/4	100%	-1.90	10.1	4.0	22.3	31.7	42.0	8999	-	0.34	10.1	4.0	22.3	31.7	42.0	8999	-	0.34									
							+1.90	89.9	1.9	78.3	-	-	-	-	-	100.0	2.1	72.6	-	-	-	-	-					EXCLUDED				
							RAW	-	-	-	-	-	-	-	-	100.0	3.0	73.0	13.7	10.3	-	-	0.13									
238.53	0.53	BRIGHT COAL-BANDS OF DULL TO VITEROUS COAL	A-0105	1.22	0×1/4	100%	-1.90	70.3	5.4	16.6	31.7	46.3	9271	-	0.40	70.3	5.4	16.6	31.7	46.3	9271	-	0.40	0.7	70.3	5.4	16.6	31.7	46.3	9271		
							+1.90	29.7	2.3	65.2	-	-	-	-	-	100.0	4.5	31.0	-	-	-	-	-									
							RAW	-	-	-	-	-	-	-	-	100.0	6.8	30.7	28.1	34.4	7161	-	0.21									
239.06	0.26	DULL COAL-WOOD STRUCTURES AND 2% RESIN																														
239.32	0.35	CARBONACEOUS TO COALY SHALE	A-0106	0.26	0×1/4	100%	-1.90	6.8	4.5	25.6	30.4	39.5	8343	-	0.37	6.8	4.5	25.6	30.4	39.5	8343	-	0.37	0.96	53.1	5.3	16.9	31.6	46.0	9238		
							+1.90	93.2	2.0	83.8	-	-	-	-	-	100.0	2.2	79.8	-	-	-	-	-									
							RAW	-	-	-	-	-	-	-	-	100.0	2.5	80.6	11.4	5.5	-	-	0.10									
239.67	0.65	DULL COAL-PARTED AND BANDED																														
		BRIGHT COAL-PARTED TO FINELY BANDED, BANDS OF DULL COAL.	A-0107	1.35	0×1/4	100%	-1.90	67.7	4.6	21.7	32.6	41.1	8803	-	0.46	67.7	4.6	21.7	32.6	41.1	8803	-	0.46	2.31	61.6	4.8	19.9	32.2	42.8	8959		
240.32	0.35						+1.90	32.3	2.6	69.2	-	-	-	-	-	100.0	4.0	37.0	-	-	-	-	-									
		DULL TO VITREOUS COAL					RAW	-	-	-	-	-	-	-	-	100.0	6.8	36.7	26.9	29.6	6497	-	0.23									
240.67	1.39	BRIGHT COAL-PARTED AND BANDED, BREAKS WITH STRATIFICATION PLANES. CONCOIDAL FRACTURE.	A-0108	1.39	0×1/4	100%	-1.90	89.4	5.3	8.0	37.6	49.1	10693	-	0.36	89.4	5.3	8.0	37.6	49.1	10693	-	0.36	3.70	72.0	5.0	14.4	34.7	45.7	9767		
							+1.90	10.6	2.4	67.9	-	-	-	-	-	100.0	5.0	14.4	-	-	-	-	-									
							RAW	-	-	-	-	-	-	-	-	100.0	8.7	13.2	35.5	42.6	9672	-	0.19									
242.06	0.55	COALY SHALE-FRAGMENTAL LAMINATED AND FISSILE	A-0109	0.55	0×1/4	100%	-1.90	4.0	3.8	37.8	27.4	31.0	6626	-	0.29	4.0	3.8	37.8	27.4	31.0	6626	-	0.29									
242.61	0.41	BRIGHT COAL-MINOR RESIN					+1.90	96.0	2.5	80.2	-	-	-	-	-	100.0	2.6	78.5	-	-	-	-	-					EXCLUDED				
243.02	0.62	DULL TO VITREOUS COAL-SPLINTERS OF BRIGHT COAL THROUGHOUT					RAW	-	-	-	-	-	-	-	-	100.0	4.4	77.3	13.5	4.8	-	-	0.08									
243.64	0.90	VITREOUS TO BRIGHT COAL-CONCOIDAL FRACTURE.	A-0110	1.93	0×1/4	100%	-1.90	78.9	4.0	19.5	35.6	40.9	9243	-	0.34	78.9	4.0	19.5	35.6	40.9	9243	-	0.34	5.63	74.4	4.6	16.2	35.0	44.0	9576		
244.54	0.44	CARBONACEOUS TO COALY SHALE	A-0111	0.44			+1.90	21.1	2.0	71.4	-	-	-	-	-	100.0	3.6	30.5	-	-	-	-	-									
244.98	0.75	DULL TO VITREOUS COAL-THIN BANDS OF SHALE. MINOR RESIN	A-0112	0.75	0×1/4	100%	RAW	-	-	-	-	-	-	-	-	100.0	8.0	28.8	29.7	33.5	7548	-	0.23									
245.73	6.51	BAD FLOOR SHALE					-1.90	16.7	2.7	44.6	25.4	27.3	5653	-	0.30	16.7	2.7	44.6	25.4	27.3	5653	-	0.30	6.07	70.2	4.6	16.7	34.8	43.7	9508		
							+1.90	83.3	1.6	76.3	-	-	-	-	-	100.0	1.8	71.0	-	-	-	-	-									
							RAW	-	-	-	-	-	-	-	-	100.0	3.2	70.8	17.1	8.9	-	-	0.15									
		No. 2 SEAM HORIZON					-1.90	65.9	3.3	24.4	32.6	39.7	8463	-	0.42	65.9	3.3	24.4	32.6	39.7	8463	-	0.42	6.82	69.7	4.5	17.5	34.6	43.2	9400		
259.69	5.93	GOOD ROOF CONGLOMERATE			0×1/4	100%	+1.90	34.1	1.8	69.0	-	-	-	-	-	100.0	2.8	39.6	-	-	-	-	-									
							RAW	-	-	-	-	-	-	-	-	100.0	5.9	38.7	27.6	27.8	6223		0.32									
261.42	1.73	BRIGHT COAL-CONCOIDAL FRACTURE BLOCKY, HARD RARE WOOD STRUCTURES AND THIN LENSES OF CARBONACEOUS SHALE	A-0113	1.73	0×1/4	100%	-1.90	95.8	4.6	7.7	37.8	49.9	10601	-	0.34	95.8	4.6	7.7	37.8	49.9	10601		0.34	7.89	65.2	4.6	17.6 (INCLUDES A0109)	34.4	43.5	9379		
							+1.90	4.2	2.9	51.0	-	-	-	-	-	100.0	4.5	9.5	-	-	-	-	-									
							RAW	-	-	-	-	-	-	-	-	100.0	8.7	8.7	36.2	46.4	10153	-	0.40									
261.73	0.31	COALY SHALE-DARK GRAY TO BLACK	A-0114	0.31			-1.90	10.1	2.4	31.9	28.8	36.9	7405	-	0.30	10.1	2.4	31.9	28.8	36.9	7405		0.30									
262.05	0.32	DULL TO VITREOUS COAL			0×1/4	100%	+1.90	89.9	1.7	69.4	-	-	-	-	-	100.0	1.8	65.6	-	-	-	-	-	1.45	69.7	3.3	21.7	31.4	43.2	8748		
262.87	0.82	VITREOUS TO BRIGHT COAL-BANDED AND PARTED. THIN BANDS OF DULL COAL.	A-0115	1.14			RAW	-	-	-	-	-	-	-	-	100.0	3.3	65.1	19.0	12.6	-	-	0.10									
							-1.90	85.9	3.3	21.3	32.0	43.4	8791	-	0.34	85.9	3.3	21.3	32.0	43.4	8791	-	0.34									
267.55	4.68	BAD SHALE FLOOR			0×1/4	100%	+1.90	14.1	2.4	58.6	-	-	-	-	-	100.0	3.2	26.6	-	-	-	-	-	1.14	85.9	3.3	21.3	32.0	43.4	8791		
							RAW	-	-	-	-	-	-	-	-	100.0	6.6	28.5	30.4	37.2	7764	-	0.29									
		No. 3 SEAM HORIZON																														
279.75	6.16	BAD ROOF SHALE																														
280.64	0.89	DULL COAL-PARTED AND BANDED SPLINTS AND PARTINGS OF BRIGHT COAL																														
281.08	0.44	VITREOUS TO BRIGHT COAL																														
281.61	0.53	DULL TO VITREOUS-WISPS OF WHITE MATERIAL INTERBANDED	A-0116	3.22	0×1/4	100%	-1.90	64.7	3.6	20.2	33.6	42.6	9028	-	0.35	64.7	3.6	20.2	33.6	42.6	9028	-	0.35	3.22	64.7	3.6	20.2	33.6	42.6	9028		
282.17	0.56	VITREOUS TO BRIGHT COAL-CONCOIDAL FRACTURE.					+1.90	35.3	1.7	68.9	-	-	-	-	-	100.0	3.0	37.4	-	-	-	-	-									
282.97	0.80	DULL COAL-VITREOUS, BANDED WOOD STRUCTURES THROUGHOUT					RAW	-	-	-	-	-	-	-	-	100.0	5.5	37.3	28.0	29.2	6476	-	0.19									
286.29	3.32	BAD FLOOR MUDSTONE																														

GEW

LOCATION MAP

TN

SCALE:

COORDINATES: Y 1860 m N X 60 m W of SE corner of CL 83
ELEVATION: 566.77 m
DIP: -90° BEARING ——— BITS USED: J.K. SMIT Combination
CORE SIZE: HQ CASING: HW 9.14 m MUD USED 20.5 gals #325 (POLYDRILL) 16 gals #357 (POLYPOWDER)
FT LEFT IN HOLE NIL m.

DATE START: JUNE 29, 1979 FINISH: JULY 4, 1979
DRILLER: CARON DIAMOND DRILLING OVERALL RECOVERY: 71 %
TESTS: GAMMA RAY
SAMPLED BY: O. CULLINGHAM DATE: JULY 5, 1979 ANALYZED BY: BIRTLEY COAL + MINERALS TESTING

BOREHOLE NO. BP-79-11
PAN OCEAN OIL LTD. (PAGE 1)
MINING DIVISION – COAL

LOGGED BY: D. HOPE O. CULLINGHAM DATE: JULY 7, 1979
SIGNED

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
	?	10.67	TRICONE SAMPLES: OVERBURDEN OR MORE PROBABLE, CONGLOMERATE AS BELOW.
10.67		10.13	MEDIUM GRAY, MASSIVE BEDDED, PEBBLES (ave. 10-30mm) AND COBBLES (LARGEST 75mm) OF GRAY, GREEN, BLACK CHERT AND GRAY QUARTZITE. VEINING IN PEBBLES COMMON. POORLY SORTED, WELL ROUNDED, LOW SPHERICITY MATRIX IS SALT AND PEPPER MEDIUM TO COARSE GRAINED SAND. GOOD POROSITY, TAR THROUGHOUT.
20.80		1.40	SILTY TO SANDY MUDSTONE - COARSES DOWNWARD TO CONGLO BELOW
22.20		105.22	MEDIUM GRAY, MASSIVE BEDDED, PEBBLES (ave 10-30mm) AND COBBLES (largest 75mm) OF GRAY, GREEN AND BLACK CHERT AND GRAY QUARTZITE. VEINING IN CLASTS COMMON. POORLY SORTED, WELL ROUNDED, LOW SPHERICITY. MATRIX IS MEDIUM TO COARSE SALT AND PEPPER SAND. TAR CONTENT DECREASES WITH DEPTH. SLICKENSIDES AT 53.40m FINE GRAINED SANDSTONE, THINLY TO MEDIUM BEDDED PERPENDICULAR TO CORE AXIS AT 65.58 TO 66.20m AND 82.43 TO 82.93m.
127.42		0.63	MEDIUM GRAY, MEDIUM GRAINED, WELL SORTED, ANGULAR, MODERATE SPHERICITY, QUARTZ AND CHERT THINLY BEDDED PERPEND. TO CORE AXIS.
128.10		5.41	INTERBEDS OF ABOVE SANDSTONE AND CONGLOMERATE NEAR TOP THINLY CROSS-BEDDED AT 70° TO CORE AXIS, TOWARD BASE BEDDING IS PERPENDICULAR TO CORE AXIS.
133.51		8.15	NO. 1 SEAM HORIZON
141.66			

CONTINUED ON PAGE 2

DETAILS OF COAL SEAMS – SCALE: 1:100

NO. 1 SEAM HORIZON

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			ROOF - SANDSTONE AND CONGLOMERATE GOOD		
133.51		0.62	COAL: DULL TO VITREOUS TO BRIGHT, PARTED TO BANDED 0.03m NO CORE	A0083	0.62
134.13		0.23	COALY SHALE 0.23m	A0084	0.59
		0.36	NO CORE		
134.72		0.25	COAL AND COALY SHALE	A0085	0.92
		0.13	SHALY COAL		
		0.34	NO CORE		
135.64		0.58	CARBONACEOUS SHALE	A0086	1.02
		0.32	SHALY COAL		
136.66		0.12	COALY SHALE	A0087	1.40
		1.40	COAL MOSTLY BRIGHT, PARTED TO BANDED LIGHT WEIGHT 0.06m (LOST CORE)		
138.06		0.58	CARBONACEOUS SHALE 0.01m (LOST CORE)	A0088	0.58
138.64		0.95	COAL, DULL TO VITREOUS TO BRIGHT, (0.06m) COALY SHALE (0.10m) CARBONACEOUS SHALE	A0089	0.95
139.59		1.00	COAL: VITREOUS BRIGHT, PARTED TO THINLY BANDED.	A0090	1.00
140.59		1.07	COAL, COALY SHALE AND CARBONACEOUS SHALE	A0091	1.07
141.66			FLOOR - POOR, MUDSTONE		

SIZE DIAMETER	SIZE WT %		SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	OTHER
		-1.90	77.3	5.8	13.2	33.5	47.5	9755	-	0.52	77.3	5.8	13.2	33.5	47.5	9755	-	0.54										
0×1/4	100%	+1.90	22.7	2.4	63.6	-	-	-	-	-	100.0	5.0	24.6	-	-	-	-								EXCLUDED			
		RAW	-	-	-	-	-	-	-	-	100.0	9.3	23.1	25.6	42.0	8100	-	0.46										
		-1.90	42.5	4.3	39.8	29.5	26.4	6186	-	0.29	42.5	4.3	39.8	29.5	26.4	6186	-	0.29										
0×1/4	100%	+1.90	57.5	1.9	70.2	-	-	-	-	-	100.0	2.9	57.3	-	-	-	-	-							EXCLUDED			
		RAW	-	-	-	-	-	-	-	-	100.0	5.6	55.0	22.5	16.9	3974	-	0.15										
		-1.90	59.5	5.1	38.9	26.9	29.1	6154	-	0.30	59.5	5.1	38.9	26.9	29.1	6154	-	0.30										
0×1/4	100%	+1.90	40.5	2.2	74.8	-	-	-	-	-	100.0	3.9	53.4	-	-	-	-	-							EXCLUDED			
		RAW	-	-	-	-	-	-	-	-	100.0	7.9	52.1	21.5	18.5	4116	-	0.17										
		-1.90	12.2	4.4	35.2	26.4	34.0	6972	-	0.34	12.2	4.4	35.2	26.4	34.0	6972	-	0.34										
0×1/4	100%	+1.90	87.8	3.7	77.0	-	-	-	-	-	100.0	3.8	71.9	-	-	-	-	-							EXCLUDED			
		RAW	-	-	-	-	-	-	-	-	100.0	7.1	69.8	14.8	8.3	-	-	0.08										
		-1.90	91.1	6.1	8.5	37.5	47.9	10491	-	0.32	91.1	6.1	8.5	37.5	47.9	10491	-	0.32	1.40	91.1	6.1	8.5	37.5	47.9	10491		
0×1/4	100%	+1.90	8.9	1.9	65.2	-	-	-	-	-	100.0	5.7	13.5	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	10.4	12.9	34.9	41.8	9495	-	0.25										
		-1.90	10.9	4.1	38.3	26.1	31.5	6480	-	0.28	10.9	4.1	38.3	26.1	31.5	6480	-	0.28	1.98	67.6	6.0	9.9	36.9	47.1	10301		
0×1/4	100%	+1.90	89.1	2.6	77.6	-	-	-	-	-	100.0	2.8	73.3	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	5.0	72.9	15.2	6.9	-	-	0.08										
		-1.90	73.1	5.1	25.8	31.7	37.4	8122	-	0.37	73.1	5.1	25.8	31.7	37.4	8122	-	0.37	2.93	69.3	5.6	15.3	35.1	43.8	9557		
0×1/4	100%	+1.90	26.9	2.1	68.5	-	-	-	-	-	100.0	4.3	37.3	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	8.1	34.8	28.4	28.7	6553	-	0.25										
		-1.90	92.7	5.7	19.6	33.8	40.9	8951	-	0.37	92.7	5.7	19.6	33.8	40.9	8951	-	0.37	3.70	74.2	5.6	16.4	34.8	43.0	9399		
0×1/4	100%	+1.90	7.3	2.5	61.0	-	-	-	-	-	100.0	5.5	22.6	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	9.1	22.3	32.8	35.8	8317	-	0.30										
		-1.90	50.1	4.1	35.5	28.9	31.5	6977	-	0.29	50.1	4.1	35.5	28.9	31.5	6977	-	0.29	8.15	60.1	5.4	22.5	32.6	39.5	8561		
0×1/4	100%	+1.90	49.9	2.5	71.4	-	-	-	-	-	100.0	3.3	53.4	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	5.8	51.6	22.3	20.3	4467	-	0.17										

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y X
ELEVATION:
DIP BEARING
CORE SIZE CASING

BITS USED
MUD USED
FT LEFT IN HOLE FT.

DATE START FINISH
DRILLER
TESTS
SAMPLED BY DATE ANALYZED BY

BOREHOLE NO. BP-79-11
PAN OCEAN OIL LTD. (PAGE 2)
MINING DIVISION – COAL

LOGGED BY DATE: JULY 7, 1979
SIGNED

GEOLOGICAL LOG – SCALE: 1 : 500

DETAILS OF COAL SEAMS – SCALE: 1 : 100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
			CONTINUED – FROM PAGE 1
141.66		6.26	MUDSTONE – MEDIUM BROWN TO MEDIUM GRAY, VERY SOFT, MASSIVE BEDDED CUBIC WEATHERING. COAL SPLINTS IN LOWER HALF OF UNIT. 143.20 – 143.41 – COALY SHALE
147.92		8.27	SANDSTONE – FINE TO COARSE GRAINED, COARSENING DOWNWARD ANGULAR, MODERATE SPHERICITY, WELL SORTED QUARTZ AND CHERT GRAINS. CROSS BEDDING AT 70° TO CORE AXIS CONGLOMERATIC NEAR BASE.
156.19		0.79	SANDY SILTSTONE – MEDIUM GRAY, MASSIVE BEDDED, CARBONACEOUS TOWARD BASE
156.98		4.35	NO. 2 SEAM HORIZON
161.33		4.79	MUDSTONE – LIGHT BROWN, VERY SOFT, RARE COAL SPLINTS, WEATHERING
166.12		1.52	SILTSTONE – MED. GRAY – SHALEY TO SANDY. COARSENING DOWNWARD
167.64		6.84	SANDSTONE – LIGHT GRAY TO SALT AND PEPPER, FINE GRAINED TO CONGLOMERATIC. COARSENING DOWNWARD. CROSS – BEDDING TO 50° TO CORE AXIS. RARE COAL SPLINTS. SHARP CONTACT WITH COAL BELOW
174.18		5.46	NO. 3 SEAM HORIZON
179.64		6.10	MUDSTONE – MEDIUM BROWN, VERY SOFT. CARBONACEOUS NEAR TOP, GRADING TO V.F. GRAINED SS AT BASE OF HOLE. 181.18 TO 181.28 SLICKENSIDES
185.74			END OF HOLE

NO. 2 SEAM HORIZON

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			ROOF – GOOD SILTSTONE AND SANDSTONE		
156.98		2.13	COAL – MOSTLY BRIGHT, BANDED A FEW THIN INTERVALS OF VITREOUS COAL 0.05m (LOST CORE)	A0092	2.13
159.11		0.45	SHALE, SHALY COAL, AND COAL		
159.56		0.88	COAL – DULL TO VITREOUS, PARTED TO BANDED, THIN BANDS OF SHALY COAL	A0093	1.50
160.61		0.17	NO CORE		
		0.60	COAL – DULL TO VITREOUS, PARTED TO BANDED. MINOR CARB. SHALE	A0094	0.72
161.33		0.12	COALY SHALE PLUS SHALY COAL		
			FLOOR – POOR, MUDSTONE		

SIZE DIAMETER	SIZE WT %	SPEC GRAV	WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VO	F.C	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	OTHER
0×1/4	100%	-1.90	97.4	6.5	8.8	37.1	47.6	10324	-	0.36	97.4	6.5	8.8	37.1	47.6	10324	-	0.36	2.13	97.4	6.5	8.8	37.1	47.6	10324			
		+1.90	2.3	3.0	58.5	-	-	-	-	-	100.0	6.4	10.0	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	10.5	10.1	35.8	43.6	9789	-	0.33										
0×1/4	100%	-1.90	47.8	5.7	18.6	35.2	40.5	9528	-	0.65	47.8	5.7	18.6	35.2	40.5	9528	-	0.65	3.63	76.9	6.2	11.3	36.6	45.7	10119			
		+1.90	52.2	2.0	69.1	-	-	-	-	-	100.0	3.4	44.5	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	6.1	43.5	26.7	23.7	5583	-	0.32										
0×1/4	100%	-1.90	65.0	6.4	24.5	29.5	39.6	8305	-	0.40	65.0	6.4	24.5	29.5	39.6	8305	-	0.40	4.35	74.9	6.3	13.2	35.5	44.8	9859			
		+1.90	35.0	2.3	70.0	-	-	-	-	-	100.0	1.1	40.4	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	7.2	39.4	25.1	28.3	6336	-	0.21										

NO. 3 SEAM HORIZON

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			ROOF – GOOD SANDSTONE		
174.18		0.30	CARBONACEOUS COALY SHALE		
		0.30	CARBONACEOUS SHALE	A0095	0.82
175.00		0.22	CARBONACEOUS TO COALY SHALE		
175.25		0.25	COAL – DULL TO BRIGHT, BANDED	A0096	0.25
		0.75	CARBONACEOUS TO COALY SHALE 0.06m SHALY COAL	A0097	0.75
176.00		0.90	COAL – DULL TO BRIGHT, MOSTLY BANDED OR PARTED (0.08m COALY SHALE)	A0098	0.90
176.90		0.37	SHALE AND CARBONACEOUS SHALE	A0099	0.37
177.27		0.97	COAL – BRIGHT, PARTED TO BANDED (0.28m SHALY COAL AND CARBONACEOUS SHALE)	A0100	0.97
178.24		0.62	CARBONACEOUS SHALE – CONTAINS PLANT FRAGMENTS & IMPRESSIONS	A0101	0.62
178.86		0.30	COAL AND COALY SHALE	A0102	0.30
179.16		0.48	CARBONACEOUS SHALE	A0103	0.48
179.64			FLOOR – POOR, MUDSTONE		

SIZE DIAMETER	SIZE WT %	SPEC GRAV	WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VO	F.C	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	OTHER
0×1/4	100%	-1.90	11.7	5.2	30.2	18.4	46.2	7717	-	0.34	11.7	5.2	30.2	18.4	46.2	7717	-	0.34										EXCLUDED
		+1.90	88.3	2.0	83.4	-	-	-	-	-	100.0	2.4	77.2	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	3.0	77.0	12.2	7.8	-	-	0.17										
0×1/4	100%	-1.90	81.7	8.9	5.6	31.7	53.8	10526	-	0.36	81.7	8.9	5.6	31.7	53.8	10526	-	0.36	0.25	81.7	8.9	5.6	31.7	53.8	10526			
		+1.90	18.3	2.6	77.1	-	-	-	-	-	100.0	7.7	18.7	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	9.4	19.3	28.2	43.1	8628	-	0.29										
0×1/4	100%	-1.90	13.0	3.1	31.9	28.5	36.5	7632	-	0.27	13.0	3.1	31.9	28.5	36.5	7632	-	0.27	1.00	30.1	7.0	14.0	30.6	48.2	9590			
		+1.90	87.0	1.6	79.1	-	-	-	-	-	100.0	1.8	73.0	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	3.4	72.9	13.8	9.9	-	-	0.11										
0×1/4	100%	-1.90	68.4	3.9	17.8	34.8	43.5	9493	-	0.33	68.4	3.9	17.8	34.8	43.5	9493	-	0.33	1.90	48.2	4.9	16.5	33.4	45.0	9525			
		+1.90	31.6	1.4	68.0	-	-	-	-	-	100.0	3.1	33.7	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	7.2	31.8	29.8	31.2	7067	-	0.27										
0×1/4	100%	-1.90	4.1	3.4	38.9	26.0	31.7	6132	-	0.24	4.1	3.4	38.9	26.0	31.7	6132	-	0.24	2.27	41.0	4.9	16.9	33.3	44.8	9470			
		+1.90	95.9	1.4	69.9	-	-	-	-	-	100.0	1.5	68.7	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	3.5	67.8	18.0	10.7	-	-	0.10										
0×1/4	100%	-1.90	84.7	5.0	11.1	36.5	47.4	10125	-	0.36	84.7	5.0	11.1	36.5	47.4	10125	-	0.36	3.24	54.1	4.9	14.2	34.8	46.0	9776			
		+1.90	15.3	1.7	62.5	-	-	-	-	-	100.0	4.5	19.0	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	8.6	18.5	33.8	39.1	8767	-	0.27										
0×1/4	100%	-1.90	13.4	3.2	34.9	30.1	31.8	6968	-	0.29	13.4	3.2	34.9	30.1	31.8	6968	-	0.29										EXCLUDED
		+1.90	86.6	1.2	77.9	-	-	-	-	-	100.0	1.5	72.2	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	2.3	72.0	18.4	7.3	-	-	0.10										
0×1/4	100%	-1.90	77.7	3.9	19.7	34.7	41.7	9292	-	0.36	77.7	3.9	19.7	34.7	41.7	9292	-	0.36										EXCLUDED
		+1.90	22.3	1.9	67.3	-	-	-	-	-	100.0	3.4	30.3	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	6.3	30.0	30.9	32.8	7601	-	0.27										
0×1/4	100%	-1.90	37.5	3.4	33.2	28.4	35.0	7451	-	0.32	37.5	3.4	33.2	28.4	35.0	7451	-	0.37										EXCLUDED
		+1.90	62.5	2.0	67.0	-	-	-	-	-	100.0	2.6	54.4	-	-	-	-	-										
		RAW	-	-	-	-	-	-	-	-	100.0	4.8	53.8	21.4	20.0	4267	-	0.17										

	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
A0092	2.13	97.4	6.5	8.8	37.1	47.6	10324		
A0093	3.63	76.9	6.2	11.3	36.6	45.7	10119		
A0094 (0.07) THK	3.70	76.6	6.3	11.5	36.5	45.6	10090		
A0098	2.24	64.8	4.5	14.2	35.6	45.5	9815		
A0099	1.34	62.4	4.9	11.6	36.3	47.1	10052		
A0100	0.97	84.7	5.0	11.1	36.5	47.4	10125		

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y 13,770 m N X 10,950 m W of S.E. corner of C.L. 77
ELEVATION: 597.59 m BITS USED J.K. SMIT COMBINATION
DIP 90° BEARING MUD USED 295 BAGS GEL, 153 BAGS TROL
CORE SIZE NQ CASING 12.19 HW 58.22 NW m LEFT IN HOLE NONE m
DATE START JULY 5/79 FINISH JULY 21/79
DRILLER CARON DIAMOND DRILLING LTD. OVERALL RECOVERY 72 %
TESTS NONE
SAMPLED BY D. HOPE DATE AUG. 3/79 ANALYZED BY BIRTLEY COAL & MINERALS TESTING SIGNED

BOREHOLE NO. BP-79-12 A
PAN OCEAN OIL LTD. (PAGE 1)
MINING DIVISION – COAL

LOGGED BY D. HOPE DATE AUG. 2/79

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	THICKNESS	DESCRIPTION
	30.48	TRICONE SAMPLES OVERBURDEN – MEDIUM GRAINED SIZE CHIPS OF CHERT, QUARZZ AND QUARTZITE
30.48	12.80	NO SAMPLES
43.28	16.76	OVERBURDEN – CORE IS LOOSE PEBBLES AND COBBLES OF QUARTZ, QUARTZITE, CHERT, SANDSTONE AND SHALE, APPROXIMATELY 20% LIMESTONE CLASTS.
60.04	9.45	TRICONE SAMPLES OVERBURDEN – MEDIUM SIZED CHIPS OF QUARTZ, QUARTZITE, CHERT AND SHALE.
69.49	22.56	CONGLOMERATE – LOOSE COBBLES AND PEBBLES OF CHERT AND QUARTZITE OCCASSIONAL QUARTZ VEINING IN COBBLES.
92.05	16.15	CONGLOMERATE – MEDIUM SIZE CHIPS OF CLEAR QUARTZ AND QUARTZITE, MILKY THROUGH BLACK AND GREEN CHERT TRICONE SAMPLES
108.20		
110.34	8.24	NO SAMPLES – BELIVED TO BE CONGLOMERATE No. 1 SEAM HORIZON
118.58	9.27	SHALE – MEDIUM GRAY CUBIC WEATHERING, RARE SPLINTS OF COAL NEAR TOP, BECOMES SILTY TOWARD BASE.
127.85	21.85	SANDSTONE – LIGHT GRAY WEATHERING, THICK TO MASSIVE BEDDED, VARIABLE FROM MEDIUM GRAINED TO FINE PEBBLED CONGLOMERATE GRADATIONAL
149.70		

CONTINUED ON SHEET 2

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
		No. 1 SEAM HORIZON		
		ROOF – CONGLOMERATE RUBBLE – DECEMENTED		
110.34		0.23 COAL AND SHALY COAL RECOVERED – RUBBLY	A0177	2.06
111.80	0.14	COAL – DULL TO BRIGHT		
112.07	0.08	SHALE AND COALY SHALE		
112.15	0.09	COAL – VITREOUS TO BRIGHT		
112.40	0.10	LOST CORE		
112.50	0.58	COAL – DULL TO VITREOUS 0.07 SHALE AT BASE		
113.08	0.61	COAL – BRIGHT		
113.69	0.72	LOST CORE	A0178	3.42
114.41	0.19	COAL – VITREOUS TO BRIGHT 0.05 CARB SHALE AT TOP		
114.60	0.58	LOST CORE		
115.18	0.64	COAL – DULL		
115.82	0.11	SHALE – CARBONACEOUS		
115.93	0.48	COAL AND SHALY COAL		
116.41	0.29	COAL – DULL TO VITREOUS		
116.70	0.41	COALY SHALE	A0179	2.45
117.10	0.28	COAL VITREOUS		
117.39	0.06	LOST CORE		
117.45	0.50	COALY SHALE		
117.95	0.32	SHALE – DARK GRAY; SL CARB		
118.27	0.31	FLOOR – SHALE AND CARBONACEOUS SHALE – POOR		
118.58				

SIZE DIAMETER	SIZE WT %	WEIGHT PERCENT SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	OTHER
1/4×28	92.8	-1.90	33.9	4.0	17.5	33.7	44.8	9604	-	0.23	33.9	4.0	17.5	33.7	44.8	9604	-	0.23										
		+1.90	66.1	1.8	76.6	-	-	-	-	-	100.0	2.5	56.6	-	-	-	-	-										
28×0	7.2	RAW	100.0	4.4	45.8	24.2	25.6	5443	-	0.23	100.0	4.4	45.8	24.2	25.6	5443	-	0.23										
1/4×0	100.0	RAW	100.0	4.0	55.4	21.6	19.0	4105	-	0.12	CALC.	2.7	55.3	-	-	-	-	-										
1/4×28	92.8	-1.90	33.9	-	-	-	-	-	-	-	31.4	4.0	17.5	33.7	44.8	9604	-	0.23										
28×0	7.2	RAW	100.0	-	-	-	-	-	-	-	7.2	4.4	45.8	24.2	25.6	5443	-	0.23										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	38.6	4.0	23.2	31.7	40.9	8861	-	0.23	7.93	66.4	5.0	13.4	35.1	46.0	10143			
1/4×28	92.5	-1.90	88.0	5.3	6.5	37.5	50.7	11073	-	0.22	88.0	5.3	6.5	37.5	50.7	11073	-	0.22										
		+1.90	12.0	1.6	65.2	-	-	-	-	-	100.0	4.9	13.5	-	-	-	-	-										
28×0	7.5	RAW	100.0	8.6	12.8	33.7	44.9	9689	-	0.30	100.0	8.6	12.8	33.7	44.9	9689	-	0.30										
1/4×0	100.0	RAW	100.0	9.2	12.5	34.6	43.7	9659	-	0.20	CALC.	5.2	13.4	-	-	-	-	-										
1/4×28	92.5	-1.90	88.0	-	-	-	-	-	-	-	81.4	5.3	6.5	37.5	50.7	11073	-	0.22										
28×0	7.5	RAW	100.0	-	-	-	-	-	-	-	7.5	8.6	12.8	33.7	44.9	9689	-	0.30										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	88.9	5.5	7.3	37.0	49.9	10987	-	0.23	5.87	76.2	5.2	11.6	35.7	46.9	10371			
1/4×28	91.8	-1.90	56.5	4.6	19.3	33.7	42.4	9274	-	0.33	56.5	4.6	19.3	33.7	42.4	9274	-	0.30										
		+1.90	43.5	1.8	70.1	-	-	-	-	-	100.0	3.4	41.4	-	-	-	-	-										
28×0	8.2	RAW	100.0	6.5	28.6	30.9	34.0	7667	-	0.43	100.0	6.5	28.6	30.9	34.0	7667	-	0.43										
1/4×0	100.0	RAW	100.0	6.0	38.4	27.4	28.2	6251	-	0.22	CALC.	3.6	40.3	-	-	-	-	-										
1/4×28	91.8	-1.90	-	-	-	-	-	-	-	-	50.4	4.6	19.3	33.7	42.4	9274	-	0.33										
28×0	8.2	RAW	100.0	-	-	-	-	-	-	-	8.2	6.5	28.6	30.9	34.0	7661	-	0.43										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	58.6	4.8	21.0	33.1	40.8	9068	-	0.34	2.45	58.6	4.8	21.0	33.1	40.8	9068			

A0177		2.06	38.6	4.0	23.2	31.7	40.7	8861	
A0178		5.48	69.9	5.1	10.5	35.9	48.0	10546	
A0179	0.28 THK	5.76	69.4	5.1	11.0	35.7	47.7	10485	

A0178		3.42	88.9	5.5	7.3	37.0	49.9	10987	
A0179	0.28 THK	3.70	86.6	5.4	8.0	36.8	49.4	10888	

BOREHOLE NO. BP.-79-12 A
PAN OCEAN OIL LTD. (PAGE 2)
MINING DIVISION – COAL

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y X

ELEVATION:

DIP BEARING

CORE SIZE CASING

BITS USED

MUD USED

FT. LEFT IN HOLE FT.

DATE START FINISH

DRILLER OVERALL RECOVERY

TESTS

SAMPLED BY DATE ANALYZED BY

LOGGED BY DATE

SIGNED

GEOLOGICAL LOG – SCALE: 1:500

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	THICKNESS	DESCRIPTION
		CONTINUED FROM SHEET 1
149.70	5.02	INTERBEDDED SANDSTONE AND SILTSTONE - LIGHT GRAY WEATHERING CROSSLAMINATED TO THINLY FESTOON CROSS-BEDDED
154.72	0.31	CONGLOMERATE
155.03	8.34	No. 2 SEAM HORIZON
163.37	3.72	SHALE - DARK TO MEDIUM GRAY, CARBONACEOUS AT TOP, NON-CARBONACEOUS AND SILTY AT BASE, GRADATIONAL
167.09	1.29	SILTSTONE - LIGHT GRAY WEATHERING
168.38	0.70	SANDSTONE - LIGHT GRAY, FINE TO MEDIUM-GRAY COARSENING DOWN
169.08	17.70	CONGLOMERATE - FINE PEBBLE CONGLOMERATE OF QUARTZITE AND CHERT, FINES DOWNWARD TO CONGLOMERATIC SANDSTONE AT BASE
186.78	2.19	No. 3 SEAM HORIZON
188.97	1.28	SHALE - MEDIUM TO DARK GRAY, CUBIC WEATHERING
190.25	0.77	CONGLOMERATIC SANDSTONE
191.02	10.13	CONGLOMERATIC - FINE PEBBLE CONGLOMERATE OF QUARTZITE AND CHERT
201.15	3.07	INTERBEDDED SANDSTONE AND SILTSTONE, FESTOON CROSSBEDDING
204.22	4.00	SANDSTONE - COARSE TO FINE GRAINED SANDSTONE, FINES DOWNWARD
208.22	0.39	MUDSTONE
208.60	0.49	SILTSTONE - LIGHT GRAY
209.09		END OF HOLE

No. 2 SEAM HORIZON

ROOF - SANDSTONE AND CONGLOMERITIC SANDSTONE GOOD

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	SAMPLE THICKNESS
155.03				
155.70	0.67	COAL - VITREOUS, HARD		
156.06	0.36	COAL - DULL		
156.61	0.55	COAL - DULL TO VITREOUS	A0180	2.55
156.88	0.27	COAL - BRIGHT		
	0.70	LOST CORE		
157.58	0.61	SHALY COAL		
158.19	0.31	COAL - VITREOUS TO BRIGHT	A0181	1.52
158.50	0.16	COALY SHALE		
158.66	0.19	COAL - BRIGHT		
158.85	0.25	LOST CORE		
159.10	1.31	SHALE (SEAM 2B)	A0182	1.31
160.41	0.16	SHALY COAL	A0183	0.38
160.57	0.22	SHALE		
160.79	0.22	COAL - DULL		
161.01	0.66	COAL - BRIGHT		
161.67	0.15	SHALE, COALY SHALE AND COAL	A0184	2.58
161.82	0.16			
161.98	0.07			
162.05	0.10			
162.15	0.64	COAL - BRIGHT		
162.79	0.17	COALY SHALE		
162.96	0.32	COAL - BRIGHT		
163.28	0.09	LOST CORE		
163.37		FLOOR - SHALE AND CARBONACEOUS SHALE		

No. 3 SEAM HORIZON

ROOF - SMALL PEBBLE CONGLOMERATE TO CONGLOMERATIC SANDSTONE GOOD

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	SAMPLE THICKNESS
186.78	0.26	COAL - VITREOUS		
187.04	0.41	SHALY COAL 0.04 LOST CORE		
187.45	0.43	SHALY COAL		
187.88	0.18	LOST CORE	A0185	2.19
188.06	0.21	COAL - DULL TO VITREOUS		
188.27	0.20	SHALY COAL		
188.47	0.14	COAL - DULL TO VITREOUS		
188.61	0.14	SHALY COAL		
188.75	0.22	COAL - DULL TO VITREOUS		
188.97		FLOOR - SHALE AND CARBONACEOUS SHALE		

SIZE		WEIGHT PERCENT									CUMULATIVE WEIGHT PERCENT								CUMULATIVE SAMPLE VALUES								OTHER
DIAMETER	WT %	SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I	S	THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	
1/4×28	91.8	-1.90	92.8	5.7	7.9	36.0	50.4	10833	-	0.30	92.8	5.7	7.9	36.0	50.4	10833	-	0.30										
		+1.90	7.2	1.6	59.1	-	-	-	-	-	100.0	5.4	11.6	-	-	-	-	-										
28×0	8.2	RAW	100.0	8.4	11.7	34.1	45.8	9961	-	0.37	100.0	8.4	11.7	34.1	45.8	9961	-	0.37										
1/4×0	100.0	RAW	100.0	8.8	11.5	34.5	45.2	9937	-	0.29	CALC.	5.6	11.6	-	-	-	-	-										
1/4×28	91.8	-1.90	92.8	-	-	-	-	-	-	-	85.1	5.7	7.9	36.0	50.4	10833	-	0.30										
28×0	8.2	RAW	100.0	-	-	-	-	-	-	-	8.2	8.4	11.7	34.1	45.8	9961	-	0.37										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	93.3	5.9	8.3	35.7	49.8	10818	-	0.31	2.55	93.3	5.9	8.3	35.7	49.8	10818			
1/4×28	91.4	-1.90	71.6	4.6	20.5	32.2	42.7	9183	-	0.20	71.6	4.6	20.5	32.2	42.7	9183	-	0.20										
		+1.90	28.4	2.1	67.4	-	-	-	-	-	100.0	3.9	33.8	-	-	-	-	-										
28×0	8.6	RAW	100.0	5.7	29.2	28.5	36.6	7734	-	0.19	100.0	5.7	29.2	28.5	36.6	7734	-	0.19										
1/4×0	100.0	RAW	100.0	6.0	31.8	28.4	33.8	7497	-	0.16	CALC.	4.0	33.4	-	-	-	-	-										
1/4×28	91.4	-1.90	71.6	-	-	-	-	-	-	-	65.4	4.6	20.5	32.2	42.7	9183	-	0.20										
28×0	8.6	RAW	100.0	-	-	-	-	-	-	-	8.6	5.7	29.2	28.5	36.6	7734	-	0.19										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	74.0	4.7	21.7	31.6	41.8	9075	-	0.20	4.07	86.0	5.5	12.6	34.3	47.2	10258			
1/4×28	89.5	-1.90	4.8	3.8	27.5	25.9	42.8	8188	-	0.24	4.8	3.8	27.5	25.9	42.8	8188	-	0.24										
		+1.90	95.2	2.1	82.0	-	-	-	-	-	100.0	2.2	79.3	-	-	-	-	-										
28×0	10.5	RAW	100.0	2.7	72.9	12.6	11.8	-	-	0.06	100.8	2.7	72.9	12.6	11.8	-	-	0.06										
1/4×0	100.0	RAW	100.0	2.4	79.1	10.4	8.1	-	-	0.08	CALC.	2.2	78.6	-	-	-	-	-										
1/4×28	89.5	-1.90	4.8	-	-	-	-	-	-	-	4.3	3.8	27.5	25.9	42.8	8188	-	0.24										
28×0	10.5	RAW	100.0	-	-	-	-	-	-	-	10.5	2.7	72.9	12.6	11.8	-	-	0.06										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	14.8	3.0	56.3	17.4	23.1	3090	-	0.20	5.38	68.7	5.3	14.8	33.4	45.9	9882			
1/4×28	87.2	-1.90	33.8	3.6	32.6	27.8	36.0	7460	-	0.15	33.8	3.6	32.6	27.8	36.0	7460	-	0.15										
		+1.90	66.2	1.7	75.5	-	-	-	-	-	100.0	2.3	61.0	-	-	-	-	-										
28×0	12.8	RAW	100.0	4.0	51.9	20.8	23.3	4607	-	0.12	100.0	4.0	51.9	20.8	23.3	4607	-	0.12										
1/4×0	100.0	RAW	100.0	3.6	59.3	18.3	18.8	-	-	0.10	CALC.	2.5	53.3	-	-	-	-	-										
1/4×28	87.2	-1.90	33.8	-	-	-	-	-	-	-	29.5	3.6	32.6	27.8	36.0	7460	-	0.15										
28×0	12.8	RAW	100.0	-	-	-	-	-	-	-	12.8	4.0	51.9	20.8	23.3	4607	-	0.12										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	42.3	3.7	38.8	25.5	31.8	6628	-	0.14	5.76	66.9	5.3	15.8	33.1	45.3	9747			
1/4×28	89.2	-1.90	65.5	4.7	11.0	35.3	49.0	10493	-	0.21	65.5	4.7	11.0	35.3	49.0	10493	-	0.21										
		+1.90	34.5	1.4	71.4	-	-	-	-	-	100.0	3.6	31.8	-	-	-	-	-										
28×0	10.8	RAW	100.0	7.1	27.4	28.4	37.1	7792	-	0.17	100.0	7.1	27.4	28.4	37.1	7792	-	0.17										
1/4×0	100.0	RAW	100.0	6.9	30.0	28.0	35.1	7362	-	0.16	CALC.	4.0	31.3	-	-	-	-	-										
1/4×28	89.2	-1.90	65.5	-	-	-	-	-	-	-	58.4	4.7	11.0	35.3	49.0	10493	-	0.21										
28×0	10.8	RAW	100.0	-	-	-	-	-	-	-	10.8	7.1	27.4	28.4	37.1	7792	-	0.17										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	69.2	5.0	14.5	33.7	46.4	9997	-	0.20	8.34	67.6	5.2	15.4	33.3	45.7	9826			
																			6.65	79.5	5.3	13.2	34.1	46.9	10170			
																			(EXCLUDES A0182 + A0183)									
1/4×28	87.1	-1.90	61.2	3.6	22.8	30.7	42.9	8877	-	0.27	61.2	3.6	22.8	30.7	42.9	8877	-	0.27										
		+1.90	38.8	1.3	72.1	-	-	-	-	-	100.0	2.7	41.9	-	-	-	-	-										
28×0	12.9	RAW	100.0	5.0	40.1	24.5	30.4	6177	-	0.20	100.0	5.0	40.1	24.5	30.4	6177	-	0.20										
1/4×0	100.0	RAW	100.0	4.9	41.2	24.8	29.1	6064		0.18	CALC.	3.0	41.5	-	-	-	-	-										
1/4×28	87.1	-1.90	61.2	-	-	-	-	-	-	-	53.3	3.6	22.8	30.7	42.9	8877	-	0.27										
28×0	12.9	RAW	100.0	-	-	-	-	-	-	-	12.9	5.0	40.1	24.5	30.4	6177	-	0.20										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	66.2	3.9	26.2	29.5	40.4	8350	-	0.26	2.19	66.2	3.9	26.2	29.5	40.4	8350			

A0180		2.55	93.3	5.9	8.3	35.7	49.8	10818	
A0181	1.15 THK	3.70	87.3	5.5	11.8	34.6	47.6	10358	
A0182						EXCLUDED			
A0183						EXCLUDED			
A0184						EXCLUDED			

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y12,820 m N X10,950 m W of S.E. Corner of CL 77
ELEVATION: 593.1 m BITS USED: J.K. SMIT Combination
DIP: 90° BEARING MUD USED: 45 gals poly 325, 10 gals poly 357
CORE SIZE: HQ CASING: PW 13.11 m HW 29.26 m m LEFT IN HOLE: 13.11 4.27 m
DATE START: JULY 6, 1979 FINISH: JULY 13, 1979
DRILLER: CARON DIAMOND DRILLING OVERALL RECOVERY: 95 %
TESTS: NONE
SAMPLED BY: D. HOPE
DATE: JULY 14, 1979 ANALYZED BY BIRTLEY COAL & MINERALS TESTING SIGNED

BOREHOLE NO. BP-79-13
PAN OCEAN OIL LTD. (PAGE 1)
MINING DIVISION – COAL

LOGGED BY: D. HOPE O. CULLINGHAM DATE: JULY 17, 1979

GEOLOGICAL LOG – SCALE: 1:500

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
			CONGLOMERATE - LIGHT GRAY WEATHERING, POORLY SORTED, ROUNDED TO SUB-ROUNDED, MODERATE SPHERICITY. CLASTS OF GRAY, BLACK AND GREEN CHERT AND WHITE AND HUFF QUARTZITE. AVERAGE SIZE 10-30mm; SOME CLASTS OVER 80mm DIAMETER. GOOD POROSITY AND PERMEABILITY, FAR THROUGHOUT MATRIX IS MEDIUM TO COARSE GRAINED SALT AND PEPPER SANDSTONE.
125.05		6.67	NO. 1 SEAM HORIZON
131.72		8.76	SHALE - CARBONACEOUS WITH COAL SPLINTS AT TOP - GRADES TO NON-CARBONACEOUS SILTSTONE BELOW
140.48		0.84	SILTSTONE - CROSS LAMINATED AT 70° CORE AXIS
141.32		15.83	SANDSTONE - LIGHT GRAY: INTERBEDS OF MEDIUM TO COARSE GRAINED TO CONGLOMERATIC PEBBLES UP TO 30mm DIAMETER GENERALLY COARSENS DOWNWARD. CROSS-BEDDING AT 60° TO CORE AXIS. WELL SORTED, ROUNDED TO SUB-ROUNDED, MODERATE TO HIGH SPHERICITY. THICK BEDDED. CONTACT AT BASE IS AT 25° TO CORE AXIS.
157.15		1.07	SILTSTONE - SHALEY TO SANDY
158.22			CONTINUED ON PAGE 2

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			ROOF - CONGLOMERATE GOOD		
125.05		0.18	COAL - VITREOUS WITH BRIGHT PANELS		
125.23		0.05	COALY SHALE		
125.28		0.32	COAL - DULL TO VITREOUS		
125.60		0.22	CARBONACEOUS COALY SHALE		
125.82		0.20	CARBONACEOUS SHALE		
126.02		0.16	COALY SHALE		
126.18		0.14	COAL - BRIGHT		
126.32		0.85	SHALEY COAL WITH CARBONACEOUS SHALE AND SHALE	A0119	1.61
127.17		0.25	CARBONACEOUS SHALE		
127.42		0.21	COAL - DULL TO VITREOUS		
127.33		1.29	COAL - MOSTLY BRIGHT, WITH CONCOIDAL FRACTURE, MINOR THIN BANDS OF SHALEY COAL (0.01m LOST CORE)	A0120	
128.93		0.10	COAL - MOSTLY BRIGHT		
129.03		0.05	CARBONACEOUS SHALE		
129.08		0.37	COAL - MOSTLY BRIGHT	A0121	0.42
129.45		0.46	CARBONACEOUS TO COALY SHALE	A0122	
129.91		0.35	COAL - DULL TO VITRE		
130.26		0.19	COAL - BRIGHT		
130.45		0.60	COAL - BRIGHT, BANDED, CONCOIDAL BLOCKY FRACTURE	A0123	0.46
131.05		0.23	COAL - DULL, BANDED		
131.28		0.05	COALY SHALE	A0124	
131.33		0.28	COAL - VITREOUS TO BRIGHT	A0125	0.35
131.61		0.11	CARBONACEOUS TO COALY SHALE	A0126	0.79
131.72			FLOOR - SHALE POOR	A0127	0.23
				A0033	0.33
					0.11

SAMPLE NUMBER	SIZE DIAMETER	SIZE WT %	WEIGHT PERCENT SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	OTHER
	1/4×28	92.0	-1.90	68.3	4.7	22.8	29.9	42.6	8749	-	0.26	68.3	4.7	22.8	29.9	42.6	8749	-	0.26										
			+1.90	31.7	2.9	56.7	-	-	-	-	-	100.0	4.3	33.5	-	-	-	-	-										
	28×0	8.0	RAW	100.0	4.6	30.0	26.7	38.7	7712	-	0.34	100.0	4.6	30.0	26.7	38.7	7712	-	0.34										
	1/4×0	100.0	RAW	100.0	3.8	34.3	28.1	33.8	6998	-	0.20	CALC.	4.3	33.2	-	-	-	-	-										
	1/4×28	92.0	-1.90	68.3	-	-	-	-	-	-	-	62.8	4.7	22.8	29.9	42.6	8749	-	0.26										
	28×0	8.0	RAW	100.0	-	-	-	-	-	-	-	8.0	4.6	30.0	26.7	38.8	7712	-	0.34										
	1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	70.8	4.6	23.6	29.5	42.1	8729	-	0.27	6.56	65.4	4.4	19.1	33.1	43.1	9355			
	1/4×28	92.9	-1.90	24.5	4.3	18.8	32.6	44.3	9330	-	0.23	24.5	4.3	18.8	32.6	44.3	9330	-	0.23										
			+1.90	75.5	2.1	68.7	-	-	-	-	-	100.0	2.6	56.5	-	-	-	-	-										
	28×0	7.1	RAW	100.0	5.2	48.5	22.4	23.9	4950	-	0.16	100.0	5.2	48.5	22.4	23.9	4950	-	0.16										
	1/4×0	100.0	RAW	100.0	4.5	55.2	21.7	18.6	4035	-	0.10	CALC.	2.8	55.9	-	-	-	-	-										
	1/4×28	92.9	-1.90	24.5	-	-	-	-	-	-	-	22.7	4.3	18.8	32.6	44.3	9330	-	0.23										
	28×0	7.1	RAW	100.0	-	-	-	-	-	-	-	7.1	5.2	48.5	22.4	23.9	4950	-	0.16										
	1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	29.8	4.5	26.9	29.8	38.7	8223	-	0.21	6.10	64.9	4.4	18.6	33.5	43.2	9418			
	1/4×28	93.5	-1.90	42.2	3.7	27.4	31.2	37.7	8233	-	0.19	42.2	3.7	27.4	31.2	37.7	8233	-	0.19										
			+1.90	57.8	1.9	75.4	-	-	-	-	-	100.0	2.6	55.1	-	-	-	-	-										
	28×0	6.5	RAW	100.0	4.5	50.4	22.8	22.3	4773	-	0.14	100.0	4.5	50.4	22.8	22.3	4773	-	0.10										
	1/4×0	100.0	RAW	100.0	3.7	54.1	22.8	19.4	4334	-	0.10	CALC.	2.7	54.8	-	-	-	-	-										
	1/4×28	93.5	-1.90	42.2	-	-	-	-	-	-	-	39.4	3.7	27.4	31.2	37.7	8233	-	0.19										
	28×0	6.5	RAW	100.0	-	-	-	-	-	-	-	6.5	4.5	50.4	22.8	22.3	4773	-	0.10										
	1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	45.9	3.8	31.2	29.7	35.1	7750	-	0.18	5.29	69.7	4.4	18.1	33.7	43.5	9488			
	1/4×28	92.5	-1.90	84.4	4.5	12.0	35.5	48.0	10274	-	0.22	84.4	4.5	12.0	35.5	48.0	10274	-	0.22										
			+1.90	15.6	2.0	66.2	-	-	-	-	-	100.0	4.1	20.5	-	-	-	-	-										
	28×0	7.5	RAW	100.0	7.1	18.2	32.6	42.1	9071	-	0.20	100.0	7.1	18.2	32.6	42.1	9071	-	0.20										
	1/4×0	100.0	RAW	100.0	6.8	19.3	32.5	41.4	9002	-	0.18	CALC.	4.3	20.3	-	-	-	-	-										
	1/4×28	92.5	-1.90	84.4	-	-	-	-	-	-	-	78.0	4.5	12.0	35.5	48.0	10274	-	0.22										
	28×0	7.5	RAW	100.0	-	-	-	-	-	-	-	7.5	7.1	18.2	32.6	42.1	9071	-	0.20										
	1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	85.5	4.7	12.8	35.1	47.2	10210	-	0.22	4.19	76.0	4.5	16.1	34.3	44.8	9763			
	1/4×28	93.1	-1.90	74.2	5.3	9.7	36.5	48.5	10574	-	0.23	74.2	5.3	9.7	36.5	48.5	10574	-	0.23										
			+1.90	25.8	1.6	73.7	-	-	-	-	-	100.0	4.3	26.2	-	-	-	-	-										
	28×0	6.9	RAW	100.0	7.2	19.5	33.5	54.2	8794	-	0.20	100.0	7.2	19.5	33.5	54.2	8794	-	0.20										
	1/4×0	100.0	RAW	100.0	6.3	25.1	31.5	37.1	8185	-	0.20	CALC.	4.5	25.7	-	-	-	-	-										
	1/4×28	93.1	-1.90	74.2	-	-	-	-	-	-	-	69.0	5.3	9.7	36.5	48.5	10574	-	0.23										
	28×0	6.9	RAW	100.0	-	-	-	-	-	-	-	6.9	7.2	19.5	33.5	54.2	8794	-	0.20										
	1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	75.9	5.4	10.8	36.1	49.1	10457	-	0.23	2.58	70.1	4.4	18.6	33.8	43.0	9423			
	1/4×28	94.5	-1.90	27.2	3.6	39.1	25.9	31.4	6505	-	0.17	27.2	3.6	39.1	25.9	31.4	6505	-	0.17										
			+1.90	72.8	2.1	66.0	-	-	-	-	-	100.0	2.5	58.7	-	-	-	-	-										
	28×0	5.5	RAW	100.0	4.6	50.7	22.7	22.0	4695	-	0.13	100.0	4.6	50.7	22.7	22.0	4695	-	0.13										
	1/4×0	100.0	RAW	100.0	3.5	58.0	19.8	18.7	3762	-	0.09	CALC.	2.6	58.6	-	-	-	-	-										
	1/4×28	94.5	-1.90	27.2	-	-	-	-	-	-	-	25.7	3.6	39.1	25.9	31.4	6505	-	0.17										
	28×0	5.5	RAW	100.0	-	-	-	-	-	-	-	5.5	4.6	50.7	22.7	22.0	4695	-	0.13										
	1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	31.2	3.7	41.5	25.2	29.3	6212	-	0.16	2.16	69.0	4.2	20.2	33.3	41.7	9202			
	1/4×28	92.9	-1.90	57.6	3.5	33.6	28.3	34.6	7172	-	0.28	57.6	3.5	33.6	28.3	34.6	7172	-	0.28										
			+1.90	42.4	1.9	64.4	-	-	-	-	-	100.0	2.8	46.7	-	-	-	-	-										
	28×0	7.1	RAW	100.0	6.2	36.9	27.4	29.5	6321	-	0.24	100.0	6.2	36.9	27.4	29.5	6321	-	0.24										
	1/4×0	100.0	RAW	100.0	4.8	45.4	23.7	26.1	5392	-	0.19	100.0	3.0	46.0	-	-	-	-	-										
	1/4×28	92.9	-1.90	57.6	-	-	-	-	-	-	-	53.5	3.5	33.6	28.3	34.6	7172	-	0.28										
	28×0	7.1	RAW	100.0	-	-	-	-	-	-	-	7.1	6.2	36.9	27.4	29.5	6321	-	0.24										
	1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	60.6	3.8	34.2	28.1	33.6	7106	-	0.28	1.70	79.2	4.2	18.0	34.2	43.0	9521			
	1/4×28	93.2	-1.90	90.5	4.4	8.7	37.7	49.2	10800	-	0.28	90.5	4.4	8.7	37.7	49.2	10800	-	0.28										
			+1.90	9.5	1.9	66.8	-	-	-	-	-	100.0	4.2	14.2	-	-	-	-	-										
	28×0	6.8	RAW	100.0	8.0	13.3	35.2	43.5	9750	-	0.26	100.0	8.0	13.3	35.2	43.5	9750	-	0.26										
	1/4×0	100.0	RAW	100.0	7.6	13.7	34.1	44.6	9716	-	0.24	CALC.	4.5	14.4	-	-	-	-	-										
	1/4×28	93.2	-1.90	90.5	-	-	-	-	-	-	-	84.3	4.4	8.7	37.7	49.2	10800	-	0.28										
	28×0	6.8	RAW	100.0	-	-	-	-	-	-	-	6.8	8.0	13.3	35.2	43.5	9750	-	0.26										
	1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	91.1	4.6	9.2	37.3	48.4	10760	-	0.28	1.35	84.0	4.3	15.0	35.3	44.8	9972			
	1/4×28	94.7	-1.90	80.0	3.5	40.0	27.2	29.3	6394	-	0.20	80.0	3.5	40.0	27.2	29.3	6394	-	0.20										
			+1.90	20.0	2.1	61.3	-	-	-	-	-	100.0	3.2	44.3	-	-	-	-	-										
	28×0	5.3	RAW	100.0	5.3	37.8	27.6	29.3	6485	-	0.20	100.0	5.3	37.8	27.6	29.3	6485	-	0.20										
	1/4×0	100.0	RAW	100.0	4.4	43.8	25.7	26.1	5704	-	0.16	CALC.	3.3	44.0	-	-	-	-	-										
	1/4×28	94.7	-1.90	80.0	-	-	-	-	-	-	-	75.7	3.5	40.0	27.2	29.3	6394	-	0.20										
	28×0	5.3	RAW	100.0	-	-	-	-	-	-	-	5.3	5.3	37.8	27.6	29.3	6485	-	0.20										
	1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	81.0	3.6	39.7	27.2	29.3	6499	-	0.20	0.56	74.1	3.9	25.1	32.0	38.6	8607			
	1/4×28	93.7	-1.90	67.2	4.3	11.5	36.5	47.7	10519	-	0.37	67.2	4.3	11.5	36.5	47.7	10519	-	0.37										
			+1.90	32.8	1.3	73.4	-	-	-	-	-	100.0	3.3	31.8	-	-	-	-	-										
	28×0	6.3	RAW	100.0	5.3	27.8	32.0	34.9	7895	-	0.34	100.0	5.3	27.8	32.0	34.9	7895	-	0.34										
	1/4×0	100.0	RAW	100.0	4.3	31.8	30.8	33.1	7586	-	0.27	CALC.	3.4	31.5	-	-	-	-	-										
	1/4×28	93.7	-1.90	67.2	-	-	-	-	-	-	-	63.0	4.3	11.5	36.5	47.7	10519	-	0.37										
	28×0	6.3	RAW	100.0	-	-	-	-	-	-	-	6.3	5.3	27.8	32.0	34.9	7895	-	0.34										
	1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	69.3	4.3	13.2	36.0	46.2	10326	-	0.37	0.33	69.3	4.3	13.2	36.0	46.2	10326			
	1/4×28	87.7	-1.90	16.3	4.6	12.8	35.1	47.5	10214	-	0.41	16.3	4.6	12.8	35.1	47.5	10214	-	0.14										
			+1.90	83.7	1.3	70.2	-	-	-	-	-	100.0	1.8	60.8	-	-	-	-	-										
	28×0	12.3	RAW	100.0	3.7	45.3	24.9	26.1	-	-	0.34	100.0	3.7	45.3	24.9	26.1	-	-	0.34										
	1/4×0	100.0	RAW	100.0	2.1	59.1	19.1	19.7	-	-	0.17	CALC.	2.0	58.9	-	-	-	-	-		EXCLUDED								
	1/4×28	87.7	-1.90	16.3	-	-	-	-	-	-	-	14.3	4.6	12.8	35.1	47.5	10214	-	0.14										
	28×0	12.3	RAW	100.0	-	-	-	-	-	-	-	12.3	3.7	45.3	24.9	26.1	-	-	0.34										
	1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	26.6	4.1	26.0	30.9	38.7	6132	-	0.23										

LB

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y X
ELEVATION:
DIP: BEARING:
CORE SIZE: CASING:
BITS USED:
MUD USED:
m LEFT IN HOLE: m
DATE START:
DRILLER:
TESTS:
SAMPLED BY:
FINISH:
OVERALL RECOVERY:
DATE: ANALYZED BY:

BOREHOLE NO. BP-79-13
PAN OCEAN OIL LTD. (PAGE 2)
MINING DIVISION – COAL

LOGGED BY: DATE:
SIGNED:

GEOLOGICAL LOG – SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION

DETAILS OF COAL SEAMS – SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS	SIZE: DIAMETER	SIZE: WT %	WEIGHT PERCENT: SPEC GRAV	YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I.	S

CUMULATIVE WEIGHT PERCENT

YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I	S

CUMULATIVE SAMPLE VALUES

	THICKNESS	YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I.	S
NO. 1 SEAM HORIZON									
A0117			EXCLUDED						
A0118			EXCLUDED						
A0119	1.10	45.9	3.8	31.2	29.7	35.1	7750		
A0120	2.71	69.4	4.4	17.7	33.6	43.9	9549		
A0121	3.13	70.2	4.5	16.7	34.0	44.7	9681		
A0122	3.59	65.2	4.5	18.2	33.4	43.7	9468		
A0123	3.94	64.8	4.4	19.5	33.0	42.9	9272		
A0124	4.73	69.2	4.5	17.2	33.9	44.1	9599		
A0125 (.13) THK	4.86	69.5	4.4	17.9	33.7	43.6	9502		
A0126			EXCLUDED						
A0127			EXCLUDED						

A0117			EXCLUDED						
A0118			EXCLUDED						
A0119			EXCLUDED						
A0120	1.61	85.5	4.7	12.8	35.1	47.2	10210		
A0121	2.03	83.5	4.8	12.4	35.2	47.5	10256		
A0122	2.49	73.8	4.7	14.6	34.5	46.1	9940		
A0123	2.84	72.2	4.6	16.7	33.8	44.8	9647		
A0124	3.63	76.3	4.6	14.7	34.7	45.7	9936		
A0125 (0.07) THK	3.70	76.4	4.6	15.2	34.5	45.4	9867		
A0126			EXCLUDED						
A0127			EXCLUDED						

OTHER

LOCATION MAP

TN

SCALE:

COORDINATES: Y X

ELEVATION: BITS USED:

DIP: BEARING: MUD USED:

CORE SIZE: CASING: m LEFT IN HOLE: m

DATE START: FINISH:

DRILLER: OVERALL RECOVERY:

TESTS:

SAMPLED BY: DATE: ANALYZED BY:

BOREHOLE NO. BP-79-13
PAN OCEAN OIL LTD. (PAGE 3)
MINING DIVISION – COAL

LOGGED BY: DATE:

SIGNED:

GEOLOGICAL LOG – SCALE:

DETAILS OF COAL SEAMS – SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS	SIZE DIAMETER	SIZE WT %	WEIGHT PERCENT SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	OTHER
			No. 2 SEAM HORIZON		1.41	1/4×28	93.6	-1.90	97.6	4.6	8.9	36.2	50.3	10712	-	0.28	97.6	4.6	8.9	36.2	50.3	10712	-	0.28										
								+1.90	2.4	2.1	54.8	-	-	-	-	-	100.0	4.5	10.0	-	-	-	-	-										
						28×0	6.4	RAW	100.0	8.0	11.6	35.3	45.1	9950	-	0.26	100.0	8.0	11.6	35.3	45.1	9950	-	0.26										
						1/4×0	100.0	RAW	100.0	8.0	9.9	36.1	46.0	10160	-	0.24	CALC.	4.7	10.1	-	-	-	-	-										
						1/4×28	93.6	-1.90	97.6	-	-	-	-	-	-	-	91.3	4.6	8.9	36.2	50.3	10712	-	0.28										
						28×0	6.4	RAW	100.0	-	-	-	-	-	-	-	6.4	8.0	11.6	35.3	45.1	9950	-	0.26										
						1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	97.7	4.8	9.1	36.1	49.7	10724	-	0.28	1.41	90.7	3.9	11.0	37.9	46.8	10627			
						1/4×28	93.8	-1.90	61.0	3.5	24.3	32.5	39.7	8709	-	0.19	61.0	3.5	24.3	32.5	39.7	8709	-	0.19										
								+1.90	39.0	1.6	66.9	-	-	-	-	-	100.0	2.8	40.9	-	-	-	-	-										
						28×0	6.2	RAW	100.0	5.9	34.0	28.4	31.7	7005	-	0.16	100.0	5.9	34.0	28.4	31.7	7005	-	0.16										
						1/4×0	100.0	RAW	100.0	5.1	40.0	27.2	27.7	6217	-	0.13	CALC.	3.0	40.5	-	-	-	-	-										
						1/4×28	93.8	-1.90	61.0	-	-	-	-	-	-	-	57.2	3.5	24.3	32.5	39.7	8709	-	0.19										
						28×0	6.2	RAW	100.0	-	-	-	-	-	-	-	6.2	5.9	34.0	28.4	31.7	7005	-	0.16										
						1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	57.4	3.5	24.3	32.4	39.6	8795	-	0.19	1.78	83.7	3.8	12.8	37.1	45.7	10366			
			ROOF - SILTSTONE, POOR																															
158.22		0.89	COAL - BRIGHT TO VITREOUS	A0128	0.37	1/4×28	94.4	-1.90	11.4	2.9	27.3	31.2	38.6	8324	-	0.19	11.4	2.9	27.3	31.2	38.6	8324	-	0.19										
159.11		0.52	COAL - BRIGHT TO VITREOUS					+1.90	88.6	1.4	71.2	-	-	-	-	-	100.0	1.6	66.2	-	-	-	-	-										
159.63		0.05	COAL - DULL TO BRIGHT			28×0	5.6	RAW	100.0	3.6	61.1	19.5	15.8	-	-	0.09	100.0	3.6	61.1	19.5	15.8	-	-	0.09										
159.68		0.09	- SHALE 0.07 m			1/4×0	100.0	RAW	100.0	3.2	65.7	18.9	12.2	-	-	0.05	CALC.	1.7	65.9	-	-	-	-	-										
159.85		0.17				1/4×28	94.4	-1.90	11.4	-	-	-	-	-	-	-	10.7	2.9	27.3	31.2	38.6	8324	-	0.19										
160.00		0.54	CARBONACEOUS SHALE	A0130	0.34	28×0	5.6	RAW	100.0	-	-	-	-	-	-	-	5.6	3.6	61.1	19.5	15.8	-	-	0.09										
160.54		0.20	COAL - VITREOUS TO BRIGHT			1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	16.3	3.1	40.6	26.5	29.6	5142	-	0.16	2.12	72.9	3.8	13.8	36.7	45.1	10178			
160.74		0.09	COAL - DULL TO BRIGHT																															
160.83		0.24	COAL - VITREOUS TO BRIGHT			1/4×28	93.1	-1.90	90.5	3.7	1.1.1	35.1	49.9	10694	-	0.21	90.5	3.7	11.1	35.1	49.9	10694	-	0.21										
160.97		0.11	COAL - DULL TO VITREOUS	A0131	0.44			+1.90	9.5	1.0	71.7	-	-	-	-	-	100.0	3.4	16.9	-	-	-	-	-										
160.98			FLOOR - SHALE - POOR			28×0	6.9	RAW	100.0	7.5	13.3	33.5	45.7	9787	-	0.19	100.0	7.5	13.3	33.5	45.7	9787	-	0.19										
						1/4×0	100.0	RAW	100.0	7.0	16.3	33.6	43.1	9519	-	0.19	CALC.	3.7	16.6	-	-	-	-	-										
						1/4×28	93.1	-1.90	90.5	-	-	-	-	-	-	-	84.2	3.7	11.1	35.1	49.9	10694	-	0.21										
						28×0	6.9	RAW	9.5	-	-	-	-	-	-	-	6.9	7.5	13.3	33.5	45.7	9787	-	0.19										
						1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	91.1	3.9	11.4	34.8	49.3	10660	-	0.21	2.76	77.1	3.8	13.2	36.2	46.3	10310			
						1/4×28	93.0	-1.90	79.7	3.5	17.4	33.9	45.2	9721	-	0.20	79.7	3.5	17.4	33.9	45.2	9721	-	0.20										
								+1.90	20.3	1.3	64.9	-	-	-	-	-	100.1	3.0	27.0	-	-	-	-	-										
						28×0	7.0	RAW	100.0	6.7	22.5	32.6	38.2	8475	-	0.18	100.0	6.7	22.5	32.6	38.2	8475	-	0.18										
						1/4×0	100.0	RAW	100.0	6.3	25.9	31.0	36.8	8083	-	0.17	CALC.	3.3	26.7	-	-	-	-	-										
						1/4×28	93.0	-1.90	79.7	-	-	-	-	-	-	-	74.1	3.5	17.4	33.9	45.2	9721	-	0.20										
						28×0	7.0	RAW	100.0	-	-	-	-	-	-	-	7.0	6.7	22.5	32.6	38.2	8475	-	0.18										
						1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	81.1	3.7	18.1	33.7	44.1	9626	-	0.20	3.36	77.8	3.8	14.1	35.7	45.9	10183			
						1/4×28	93.8	-1.90	63.8	3.9	31.7	27.8	36.6	7501	-	0.15	63.8	3.9	31.7	27.8	36.6	7501	-	0.15										
								+1.90	36.2	1.3	68.3	-	-	-	-	-	100.0	3.0	45.0	-	-	-	-	-										
						28×0	6.2	RAW	100.0	5.9	35.4	26.1	32.6	6686	-	0.27	100.0	5.9	35.4	26.1	32.6	6686	-	0.27										
						1/4×0	100.0	RAW	100.0	3.3	45.0	25.7	26.0	5707	-	0.09	CALC.	3.2	44.4				-	-										
						1/4×28	93.8	-1.90	63.8	-	-	-	-	-	-	-	59.8	3.9	31.7	27.8	36.6	7501	-	0.15										
						28×0	6.2	RAW	100.0	-	-	-	-	-	-	-	6.2	5.9	35.4	26.1	32.6	6686	-	0.27										
			ROOF - SHALE - POOR			1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	66.0	4.0	32.2	27.5	36.0	7486	-	0.16	3.55	77.2	3.8	14.9	35.3	45.4	10059			
						1/4×28	93.4	-1.90	90.1	3.7	10.3	38.5	47.5	10709	-	0.25	90.1	3.7	10.3	38.5	47.5	10709	-	0.25										
165.60		0.26	COAL - DULL TO VITREOUS	A0132	0.19			+1.90	9.9	1.4	67.9	-	-	-	-	-	100.0	3.5	16.0	-	-	-	-	-										
165.86		0.34	COAL - VITREOUS TO BRIGHT			28×0	6.6	RAW	100.0	7.5	15.8	34.2	42.5	9420	-	0.23	100.0	7.5	15.8	34.2	42.5	9420	-	0.23										
166.20		0.19	SHALE AND SHALEY COAL			1/4×0	100.0	RAW	100.0	7.5	15.5	34.4	42.6	9567	-	0.24	CALC.	3.8	16.0	-	-	-	-	-										
166.39		0.34	COAL - BRIGHT	A0134	0.34	1/4×28	93.4	-1.90	90.1	-	-	-	-	-	-	-	84.1	3.7	10.3	38.5	47.5	10709	-	0.25										
166.73		0.44	COAL - BRIGHT			28×0	6.6	RAW	100.0	-	-	-	-	-	-	-	6.6	7.5	15.8	34.5	42.5	9420	-	0.23										
167.17		0.16	COAL - DULL TO VITREOUS			1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	90.7	3.9	11.0	37.9	46.8	10627	-	0.25	3.89	78.4	3.8	14.5	35.6	45.5	10117			
167.33		0.11	SHALE COAL - VITREOUS TO BRIGHT																															
167.44		0.18	SHALE			1/4×28	95.0	-1.90	94.9	3.4	13.6	35.2	47.8	10203	-	0.27	94.9	3.4	13.6	35.2	47.8	10203	-	0.27										
167.62		0.13	COAL - MOSTLY BRIGHT	A0135	0.60			+1.90	5.1	2.1	62.0	-	-	-	-	-	100.0	3.3	16.1	-	-	-	-	-										
167.75		0.32	SHALE CARBONACES			28×0	5.0	RAW	100.0	7.9	14.8	33.5	43.8	9524	-	0.23	100.0	7.9	14.8	33.5	43.8	9524	-	0.23										
168.05		0.06	LOSE CORE	A0136		1/4×0	100.0	RAW	100.0	7.9	15.2	34.0	42.9	9601	-	0.24	CALC.	3.2	18.4	-	-	-	-	-										
168.11		0.14				1/4×28	95.0	-1.90	94.9	-	-	-	-	-	-	-	90.1	3.4	13.6	35.2	47.8	10203	-	0.27										
168.25			FLOOR - SHALE - POOR			28×0	5.0	RAW	100.0	-	-	-	-	-	-	-	5.0	7.9	14.8	33.5	43.8	9524	-	0.23										
						1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	95.1	3.6	13.7	35.0	47.3	10221	-	0.27	4.49	80.6	3.7	14.4	35.5	45.8	10133			
						1/4×28	93.1	-1.90	45.0	2.4	30.8	28.6	38.2	7882	-	0.19	45.0	2.4	30.8	28.6	38.2	7882	-	0.19										
								+1.90	55.0	1.3	70.9	-	-	-	-	-	100.0	1.8	52.9	-	-	-	-	-										
						28×0	6.9	RAW	100.0	5.1	39.4	27.4	28.1	6262	-	0.16	100.0	5.1	39.4	27.4	28.1	6262	-	0.16										
						1/4×0	100.0	RAW	100.0	4.2	51.1	22.7	22.0	4705	-	0.12	CALC.	2.0	52.0	-	-	-	-	-										
						1/4×28	93.1	-1.90	45.0	-	-	-	-	-	-	-	41.9	2.4	30.8	28.6	38.2	7882	-	0.19										
						28×0	6.9	RAW	100.0	-	-	-	-	-	-	-	6.9	5.1	39.4	27.4	28.1	6262	-	0.16										
						1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	48.8	2.7	33.0	28.2	35.5	7558	-	0.19	4.89	78.0	3.7	15.3	35.1	45.3	10001			
						1/4×28	92.4	-1.90	83.8	5.5	10.7	35.7	48.1	10436	-	0.25	83.8	5.5	10.7	35.7	48.1	10436	-	0.25										
								+1.90	16.2	2.4	68.1	-	-	-	-	-	100.0	5.0	20.0	-	-	-	-	-										
						28×0	7.6	RAW	100.0	6.1	19.0	33.0	41.9	9209	-	0.23	100.0	6.1	19.0	33.0	41.9	9209	-	0.23										
						1/4×0	100.0	RAW	100.0	6.3	20.0	33.3	40.4	9054	-	0.22	CALC.	5.1	19.9	-	-	-	-	-										
						1/4×28	92.4	-1.90	83.8	-	-	-	-	-	-	-	77.4	5.5	10.7	35.7	48.1	10436	-	0.25										
						28×0	7.6	RAW	100.0	-	-	-	-	-	-	-	7.6	6.1	19.0	33.0	41.9	9209	-	0.23										
						1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	85.0	5.5	11.5	35.4	47.4	10409	-	0.25	5.41	78.7	3.9	14.9	35.1	45.5	10044			

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y X

ELEVATION: BITS USED:

DIP: BEARING: MUD USED:

CORE SIZE: CASING: m LEFT IN HOLE: m

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SAMPLED BY: DATE: ANALYZED BY:

BOREHOLE NO. BP-79-13
PAN OCEAN OIL LTD. (PAGE 4)
MINING DIVISION – COAL

LOGGED BY: DATE:

SIGNED:

GEOLOGICAL LOG – SCALE:

DETAILS OF COAL SEAMS – SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS	SIZE DIAMETER	SIZE WT %	WEIGHT PERCENT SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	FC	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	FC	BTU	F.S.I.	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	FC	BTU	F.S.I.	S	OTHER
										1/4×28	93.2	-1.90	96.9	4.6	17.5	33.8	44.1	9630	-	0.36	96.9	4.6	17.5	33.8	44.1	9630	-	0.36										
												+1.90	3.1	2.7	58.4	-	-	-	-	-	100.0	4.5	18.7	-	-	-	-	-										
										28×0	6.8	RAW	100.0	7.2	18.0	33.7	41.1	9048	-	0.33	100.0	7.2	18.0	33.7	41.1	9048	-	0.33										
										1/4×0	100.0	RAW	100.0	7.2	18.8	33.1	40.9	9178	-	0.35	CALC.	4.7	18.6	-	-	-	-	-										
										1/4×28	93.2	-1.90	96.9	-	-	-	-	-	-	-	90.3	4.6	17.5	33.8	44.1	9630	-	0.36										
										28×0	6.8	RAW	100.0	-	-	-	-	-	-	-	6.8	7.2	18.0	33.7	41.1	9048	-	0.33										
										1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	97.1	4.7	17.5	33.7	43.7	9663	-	0.36	0.45	97.1	4.7	17.5	33.7	43.7	9663			
										1/4×28	93.1	-1.90	14.3	4.0	29.3	29.6	37.1	8030	-	0.17	14.3	4.0	29.3	29.6	37.1	8030	-	0.17										
												+1.90	85.7	1.6	81.0	-	-	-	-	-	100.0	1.9	73.6	-	-	-	-	-										
										28×0	6.9	RAW	100.0	3.7	62.9	17.3	16.1	-	-	0.39	100.0	3.7	62.9	17.3	16.1	-	-	0.39										
										1/4×0	100.0	RAW	100.0	2.9	72.4	14.5	10.2	-	-	0.12	CALC.	2.0	72.9	-	-	-	-	-										
										1/4×28	93.1	-1.90	14.3	-	-	-	-	-	-	-	13.3	4.0	29.3	29.6	37.1	8030	-	0.17										
										28×0	6.9	RAW	100.0	-	-	-	-	-	-	-	6.9	3.7	62.9	17.3	16.1	-	-	0.39										
										1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	20.2	3.9	40.2	25.6	30.2	5522	-	0.25	0.89	50.0	4.5	21.3	32.3	41.4	8963			
										1/4×28	93.0	-1.90	77.2	4.3	21.4	32.2	42.1	9023	-	0.44	77.2	4.3	21.4	32.2	42.1	9023	-	0.44										
												+1.90	22.8	2.3	70.7	-	-	-	-	-	100.0	3.4	32.6	-	-	-	-	-										
										28×0	7.0	RAW	100.0	6.0	29.2	29.6	35.2	7542	-	0.37	100.0	6.0	29.2	29.6	35.2	7542	-	0.37										
										1/4×0	100.0	RAW	100.0	4.2	32.6	28.9	34.3	7378	-	0.19	CALC.	3.6	32.4	-	-	-	-	-										
										1/4×28	93.0	-1.90	77.2	-	-	-	-	-	-	-	71.7	4.3	21.4	32.2	42.1	9023	-	0.44										
										28×0	7.0	RAW	100.0	-	-	-	-	-	-	-	7.0	6.0	29.2	29.6	35.2	7542	-	0.37										
										1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	78.7	4.4	22.3	31.8	41.2	8940	-	0.43	1.06	62.2	4.5	21.5	32.2	41.3	8958			
										1/4×28	92.4	-1.90	23.6	3.6	30.9	27.4	38.1	7626	-	0.09	23.6	3.6	30.9	27.4	38.1	7626	-	0.09										
												1.90	76.4	1.8	78.7	-	-	-	-	-	100.0	2.2	67.4	-	-	-	-	-										
										28×0	7.6	RAW	100.0	4.3	54.1	20.5	21.1	4272	-	0.15	100.0	4.3	54.1	20.5	21.1	4272	-	0.15										
										1/4×0	100.0	RAW	100.0	3.0	65.6	17.3	14.1	-	-	0.12	CALC.	2.4	66.4	-	-	-	-	-										
										1/4×28	92.4	-1.90	23.6	-	-	-	-	-	-	-	21.8	3.6	30.9	27.4	38.1	7626	-	0.09										
										28×0	7.6	RAW	100.0	-	-	-	-	-	-	-	7.6	4.3	54.1	20.5	21.1	4272	-	0.15										
										1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	29.4	3.7	37.7	25.3	33.1	6736	-	0.11	1.62	50.8	4.3	24.7	30.8	39.7	8514			
										1/4×28	93.3	-1.90	89.5	3.7	19.8	32.5	44.0	9303	-	0.26	89.5	3.7	19.8	32.5	44.0	9303	-	0.26										
												+1.90	10.5	2.2	61.9	-	-	-	-	-	100.0	3.5	24.2	-	-	-	-	-										
										28×0	6.7	RAW	100.0	6.9	20.3	33.3	39.5	8762	-	0.25	100.0	6.9	20.3	33.3	39.5	8762	-	0.25										
										1/4×0	100.0	RAW	100.0	6.7	24.7	30.4	38.2	8228	-	0.29	CALC.	3.7	23.9	-	-	-	-	-										
										1/4×28	93.3	-1.90	89.5	-	-	-	-	-	-	-	83.5	3.7	19.8	32.5	44.0	9303	-	0.26										
										28×0	6.7	RAW	100.0	-	-	-	-	-	-	-	6.7	6.9	20.3	33.3	39.5	8762	-	0.25										
										1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	90.2	3.9	19.8	32.6	43.4	9328	-	0.26	2.19	61.1	4.1	22.8	31.5	41.1	8826			

LOCATION MAP

TN

SCALE:

COORDINATES: Y X

ELEVATION:

DIP BEARING

CORE SIZE CASING

BITS USED

MUD USED

m LEFT IN HOLE

DATE START FINISH

DRILLER OVERALL RECOVERY

TESTS

SAMPLED BY DATE ANALYZED BY

BOREHOLE NO. BP - 79 - 13

PAN OCEAN OIL LTD. (PAGE 5)

MINING DIVISION - COAL

LOGGED BY DATE

SIGNED

GEOLOGICAL LOG — SCALE: 1:500

DETAILS OF COAL SEAMS — SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
			CONTINUED FROM PAGE 1
158.22		2.76	No. 2 SEAM HORIZON : No.2A SEAM
160.98		3.81	SHALE - MEDIUM TO DARK GRAY, CUBIC WEATHERING, RARE SPLINTS OF VITREOUS COAL
164.79		0.81	CARBONACEOUS SHALE WITH SPLINTS OF COAL
165.60		2.65	No. 2 SEAM HORIZON : No.2B SEAM
168.25		1.18	SHALE CARBONACEOUS
169.43		6.24	SILTSTONE - LIGHT TO MEDIUM GRAY, THINLY BEDDED, VARIES FROM SLIGHTLY SANDY TO SLIGHTLY SHALEY
175.67		3.13	SHALE - GRAY TO MEDIUM GRAY-BROWN SILTY TOWARD BASE
178.80		1.23	SILTSTONE - SANDY CROSS BEDDED, CROSS LAMINATED
180.03		0.41	SHALE - CARBONACEOUS
180.44		2.19	No. 3 SEAM HORIZON
182.63		2.72	SHALE - MEDIUM TO DARK GRAY, CARBONACEOUS WITH COALY SPLINTS
185.35		1.21	SILTSTONE - MEDIUM GRAY HARD THINLY BEDDED
186.56		4.35	SANDSTONE - LIGHT GRAY MEDIUM GRAINED TO CONGLOMERATIC COARSENS DOWDWARD, POORLY SORTED, ANGULAR LOW SPHERICITY GRAINS OF QUARTZ AND BLACK CHERT
190.91		3.05	CONGLOMERATE - LIGHT GRAY, POORLY SORTED, MASSIVE BEDDED 10-30mm PEBBLES OF BLACK, GRAY & GREEN CHERT + LIGHT + DARK GRAY QUARTZITE
193.96		8.79	SANDSTONE - LIGHT GRAY, FINE GRAINED, WELL SORTED, SUBANGULAR TO SUBROUNDED, LOW SPHERICITY GRAINS OF QUARTZ AND BLACK CHERT, THINLY BEDDED AT 70° TO CORE AXIS GRADES TO SILTSTONE BELOW
202.75		1.16	SILTSTONE - MEDIUM GRAY, MASSIVE, GRADES TO SILTY SHALE TOWARD BASE
203.91		0.10	SHALE - BLACK, CARBONACEOUS
204.01		2.22	No. 4 SEAM HORIZON : No. 4A SEAM
206.23		0.46	MUDSTONE - MEDIUM BROWN, SOFT, CUBIC WEATHERING
206.69		2.39	SHALE - MEDIUM TO DARK GRAY, SILTY IN PLACES, SLIGHTY CARBONACEOUS
209.08		1.42	No. 4 SEAM HORIZON : No. 4B SEAM
210.50		4.57	MUDSTONE - MEDIUM, BROWN, MEDIUM SOFT, SILTY, NON-CARBONACEOUS, MASSIVE BEDDED
215.80			

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			NO. 4 SEAM HORIZON		
			NO. 4A SEAM		
			ROOF : SILTSTONE AND SHALE		
204.01		0.09	COAL : DULL TO VITREOUS	A0143	0.37
204.10		0.28	COAL : VITREOUS TO BRIGHT		
204.38		1.26	COAL : MOSTLY BRIGHT	A0144	1.85
205.64		0.10	LOST CORE		
205.74		0.49	COAL : MOSTY BRIGHT		
206.23			FLOOR : SHALE POOR		
			NO. 4B SEAM		
			ROOF : SHALE, POOR		
209.45		0.25	COAL : VITREOUS TO BRIGHT	A0145	0.52
209.70		0.27	DULL SHALEY COAL		
209.97		0.39	COAL : VITREOUS TO BRIGHT	A0146	0.90
210.36		0.26	COAL : BRIGHT		
210.62		0.25	COAL : BRIGHT		
210.87			FLOOR : SHALE, POOR		

SIZE DIAMETER	SIZE WT %	SPEC GRAV	WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	OTHER
1/4×28	94.0	-1.90	82.7	4.2	13.9	34.3	47.6	10137	-	0.21	82.7	4.2	13.9	34.3	47.6	10137	-	0.21										
		+1.90	17.3	1.4	69.4	-	-	-	-	-	100.0	3.7	23.5	-	-	-	-	-										
28×0	6.0	RAW	100.0	5.9	23.2	31.1	39.8	8495	-	0.17	100.0	5.9	23.2	31.1	39.8	8495	-	0.17										
1/4×0	100.0	RAW	100.0	5.8	23.0	31.2	40.0	8507	-	0.23	CALC.	3.8	23.5	-	-	-	-	-										
1/4×28	94.0	-1.90	82.7	-	-	-	-	-	-	-	77.7	4.2	13.9	34.3	47.6	10137	-	0.21										
28×0	6.0	RAW	100.0	-	-	-	-	-	-	-	6.0	5.9	23.2	31.1	39.8	8495	-	0.17										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	83.7	4.3	14.8	33.9	46.8	10071	-	0.21	0.37	83.7	4.3	14.8	33.9	46.8	10071			
1/4×28	93.3	-1.90	96.9	3.5	8.2	36.6	51.7	11047	-	0.18	96.9	3.5	8.2	36.6	51.7	11047	-	0.18										
		+1.90	3.1	2.0	58.5	-	-	-	-	-	100.0	3.4	9.8	-	-	-	-	-										
28×0	6.7	RAW	100.0	6.7	14.4	34.0	44.9	9729	-	0.22	100.0	6.7	14.4	34.0	44.9	9729	-	0.22										
1/4×0	100.0	RAW	100.0	6.9	10.0	34.4	48.7	10374	-	0.22	CALC.	3.6	10.1	-	-	-	-	-										
1/4×28	93.3	-1.90	96.9	-	-	-	-	-	-	-	90.4	3.5	8.2	36.6	51.7	11047	-	0.18										
28×0	6.7	RAW	3.1	-	-	-	-	-	-	-	6.7	6.7	14.4	34.0	44.9	9729	-	0.22										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	97.1	3.7	8.9	36.2	50.8	10979	-	0.18	2.22	94.8	3.7	9.7	35.8	50.2	10845			
1/4×28	92.7	-1.90	92.2	3.4	29.9	29.1	37.6	7917	-	0.20	92.2	3.4	29.9	29.1	37.6	7917	-	0.20										
		+1.90	7.8	2.0	61.7	-	-	-	-	-	100.0	3.3	32.4	-	-	-	-	-										
28×0	7.3	RAW	100.0	5.9	29.8	29.1	35.2	7677	-	0.15	100.0	5.9	29.8	29.1	35.2	7677	-	0.15										
1/4×0	100.0	RAW	100.0	6.2	31.4	27.4	35.0	7299	-	0.27	CALC.	3.5	32.2	-	-	-	-	-										
1/4×28	92.7	-1.90	92.2	-	-	-	-	-	-	-	85.4	3.4	29.9	29.1	37.6	7917	-	0.20										
28×0	7.3	RAW	100.0	-	-	-	-	-	-	-	7.3	5.4	29.8	29.1	35.2	7677	-	0.15										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	92.7	3.6	29.8	29.1	37.2	7982	-	0.20	0.52	92.7	3.6	29.8	29.1	37.2	7982			
1/4×28	92.9	-1.90	91.0	3.9	8.0	37.2	50.9	11041	-	0.22	91.0	3.9	8.0	37.2	50.9	11041	-	0.22										
		+1.90	9.0	1.4	71.5	-	-	-	-	-	100.0	3.7	13.7	-	-	-	-	-										
28×0	7.1	RAW	100.0	7.4	13.8	34.3	44.5	9657	-	0.20	100.0	7.4	13.8	34.3	44.5	9657	-	0.20										
1/4×0	100.0	RAW	100.0	7.6	13.1	34.6	44.7	9822	-	0.23	CALC	4.0	13.7	-	-	-	-	-										
1/4×28	92.9	-1.90	91.0	-	-	-	-	-	-	-	84.5	3.9	8.0	37.2	50.9	11041	-	0.22										
28×0	7.1	RAW	100.0	-	-	-	-	-	-	-	7.1	7.4	13.8	34.3	44.5	9657	-	0.20										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	91.6	4.1	8.8	36.8	50.0	10986	-	0.22	1.42	92.0	3.9	16.5	33.9	45.2	9852			

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y 460 m N X 025 W of SE corner of CL 83
ELEVATION: 591.77 BITS USED: J.K. SMIT COMBINATION
DIP: 90° BEARING: MUD USED: 55 GALS POLY 325, 30 GALS POLY 357
CORE SIZE: HQ CASING: HW 3.65 m LEFT IN HOLE: 0.61 m
DATE START: JULY 14, 1979 FINISH: JULY 21, 1979
DRILLER: CARON DIAMOND DRILLING OVERALL RECOVERY: 91.74%
TESTS:
SAMPLED BY: D. HOPE DATE: JULY 26, 79 ANALYZED BY: BIRTLEY COAL & MINERALS TESTING SIGNED:

BOREHOLE NO. BP-79-14
PAN OCEAN OIL LTD. (PAGE 1)
MINING DIVISION – COAL

LOGGED BY: D. HOPE DATE: JULY 26, 1979

GEOLOGICAL LOG – SCALE: 1:500

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
3.50		3.50	OVERBURDEN: LIKE CONGLOMERATE AS BELOW
			CONGLOMERATE: LIGHT GRAY WEATHERING, POORLY SORTED (0.5 cm TO 8.0 cm CLASTS) ROUNDED TO SUB-ROUNDED LOW SPHERITY CLASTS OF WHITE GRAY BLACK AND GREEN CHERT AND LIGHT GRAY QUARTZITE QUARTZ VEINING IN PEBBLES IS COMMON MATRIX IS MEDIUM TO COARSE GRAINED SANDSTONE
		82.50	
86.00		2.42	SANDSTONE – GRAY FINE GRAINED, POORLY SORTED, MUDDY
88.42		8.20	No. 1 SEAM HORIZON
96.62		4.08	MUDSTONE – SOFT, CUBIC WEATHERING, RARE SPLINTS OF COAL AT TOP
100.70		2.73	SILTSTONE – SHALEY, RARE TINY COAL SPLINTS
103.43		3.02	SILTSTONE/SANDSTONE INTERBEDS, LOW ANGLE CROSS LAMINATIONS
106.45		10.24	SANDSTONE – MEDIUM GRAINED TO CONGLOMERATIC, COARSENING DOWNWARD
116.69		3.62	No. 2 SEAM HORIZON SEAM 2A
120.31		8.27	SILTSTONE – SHALEY TO SANDY, THIN TO MEDIUM BEDDED, SOFT DEFORMATION STRUCTURES, RARE COAL SPLINTS
128.58		4.42	No. 2 SEAM HORIZON SEAM 2B
133.00		8.80	SHALE – MEDIUM TO DARK GRAY, CUBIC WEATHERING, IN PLACES SLIGHTLY SILTY, RARE CARBONACEOUS ZONES
141.80		2.97	No. 3 SEAM HORIZON
144.77		0.76	SILTSTONE – SHALEY TO SANDY – COARSENING DOWNWARD
149.13		3.60	SANDSTONE – VERY FINE TO MEDIUM GRAINED, VARIABLE, GRADATIONAL
			CONTINUED ON PAGE 2

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			No. 1 SEAM HORIZON		
88.42			ROOF – SANDSTONE, GOOD		
88.49		0.07	LOST CORE		
88.85		0.36	COAL – DULL – COATED WITH ASH		
89.00		0.04	COAL – DULL		
89.04		0.57	LOST CORE	A0147	1.19
89.39		0.22	COAL – BRIGHT		
89.61		0.22	COAL – DULL		
			COAL – DULL TO VITREOUS		
90.20		0.59	SHALE – THIN SPLINTS OF COAL NEAR BASE	A0148	1.11
90.53		0.33	SHALEY COAL		
90.72		0.19	COALY SHALE		
91.01		0.29	COAL – VITREOUS TO BRIGHT	A0149	0.41
91.13		0.12	COAL – RUBBLY		
91.45		0.32	SHALE – DARK GRAY WEATHERING	A0150	0.53
91.58		0.13	COAL – VITREOUS TO BRIGHT		
91.66		0.08	SHALE – DARK GRAY		
92.05		0.39	COAL – VITREOUS	A0151	0.67
92.23		0.18	COAL – VITREOUS TO BRIGHT		
92.43		0.20	SHALE – DARK GRAY		
92.63		0.20	COAL – RUBBLY	A0152	0.43
92.76		0.13	COAL – VITREOUS TO BRIGHT		
		0.50	SHALE – DARK GRAY, HARD CUBIC FRACTURING	A0153	0.50
93.26		0.31	COAL – VITREOUS TO BRIGHT	A0154	0.31
93.57		0.22	COAL – SHALE		
93.79		0.16	SHALE – COAL	A0155	0.93
93.95		0.55	SHALEY COAL		
94.50		0.39	COAL – BRIGHT	A0156	0.39
94.89		0.21	SHALEY COAL		
95.10		0.30	SHALE – CARBONACEOUS TO COALY		
95.40		0.10	COAL – VITREOUS TO BRIGHT	A0157	1.73
95.50		0.06	SHALE – DARK GRAY		
		0.67	SHALE – CARBONACEOUS TO COALY		
96.23		0.39	SHALE – SLIGHTLY CARBONACEOUS, RARE COAL		
96.62			FLOOR – MUDSTONE, POOR SPLINTS		

SIZE DIAMETER	SIZE WT %	SPEC GRAV	WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	OTHER
1/4×28	68.3	-1.90	75.5	5.1	17.2	31.3	46.4	9493	-	0.33	75.5	5.1	17.2	31.3	46.4	9493	-	0.33										
		+1.90	24.5	2.2	57.7	-	-	-	-	-	100.0	4.4	27.1	-	-	-	-	-										
28×0	31.7	RAW	100.0	5.5	41.9	22.6	30.0	5880	-	0.22	100.0	5.5	41.9	22.6	30.0	5880	-	0.22										
1/4×0	100.0	RAW	100.0	6.3	30.7	27.2	35.8	7345	-	0.28	CALC.	4.7	31.8	-	-	-	-	-										
1/4×28	68.3	-1.90	75.5	-	-	-	-	-	-	-	51.5	5.1	17.2	31.3	46.4	9493	-	0.33										
28×0	31.7	RAW	100.0	-	-	-	-	-	-	-	31.7	5.5	41.9	22.6	30.0	5880	-	0.22										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	83.2	5.2	27.0	27.8	39.8	8146	-	0.29	1.19	83.2	5.2	27.0	27.8	39.8	8146			
1/4×28	92.5	-1.90	31.2	4.0	24.4	30.8	40.8	8565	-	0.16	31.2	4.0	24.4	30.8	40.8	8565	-	0.16										
		+1.90	68.8	2.0	78.0	-	-	-	-	-	100.0	2.6	61.3	-	-	-	-	-										
28×0	7.5	RAW	100.0	4.8	56.6	19.7	18.9	-	-	0.15	100.0	4.8	56.6	19.7	18.9	-	-	0.15										
1/4×0	100.0	RAW	100.0	4.6	60.7	19.2	15.5	-	-	0.09	CALC	2.8	60.9	-	-	-	-	-										
1/4×28	92.5	-1.90	31.2	-	-	-	-	-	-	-	28.8	4.0	24.4	30.8	40.8	8565	-	0.16										
28×0	7.5	RAW	100.0	-	-	-	-	-	-	-	7.5	4.8	56.6	19.7	18.9	-	-	0.15										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	36.3	4.1	32.0	28.1	35.5	6621	-	0.16	2.30	60.5	4.8	28.4	27.8	38.5	7704			
1/4×28	93.6	-1.90	93.8	6.3	14.1	35.2	44.4	9824	-	0.26	93.8	6.3	14.1	35.2	44.4	9824	-	0.26										
		+1.90	6.2	3.6	59.6	-	-	-	-	-	100.0	6.1	16.9	-	-	-	-	-										
28×0	6.4	RAW	100.0	7.4	19.6	32.5	40.5	8843	-	0.22	100.0	7.4	19.6	32.5	40.5	8843	-	0.22										
1/4×0	100.0	RAW	100.0	8.1	17.2	33.6	41.1	9193	-	0.23	CALC.	6.2	17.0	-	-	-	-	-										
1/4×28	93.6	-1.90	93.8	-	-	-	-	-	-	-	87.8	6.3	14.1	35.2	44.4	9824	-	0.26										
28×0	6.4	RAW	100.0	-	-	-	-	-	-	-	6.4	7.4	19.6	32.5	40.5	8843	-	0.22										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	94.2	6.3	14.5	34.9	44.0	9840	-	0.26	2.71	65.6	5.1	25.4	29.4	39.4	8168			
1/4×28	91.5	-1.90	34.2	4.1	22.2	31.8	41.9	8844	-	0.22	34.2	4.1	22.2	31.8	41.9	8844	-	0.22										
		+1.90	65.8	2.6	72.3	-	-	-	-	-	100.0	3.1	55.2	-	-	-	-	-										
28×0	8.5	RAW	100.0	6.0	46.6	22.0	25.4	5136	-	0.19	100.0	6.0	46.6	22.0	25.4	5136	-	0.19										
1/4×0	100.0	RAW	100.0	5.7	53.5	19.2	21.6	4136	-	0.13	CALC	3.3	54.5	-	-	-	-	-										
1/4×28	91.5	-1.90	34.2	-	-	-	-	-	-	-	31.3	4.1	22.2	31.8	41.9	8844	-	0.22										
28×0	8.5	RAW	100.0	-	-	-	-	-	-	-	8.5	6.0	46.6	22.0	25.4	5136	-	0.19										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	39.8	4.5	29.1	29.0	37.2	7884	-	0.21	3.24	61.4	5.1	25.8	29.3	39.4	8138			
1/4×28	94.1	-1.90	95.8	3.0	8.8	39.3	48.9	10921	-	0.21	95.8	3.0	8.8	39.3	48.9	10921	-	0.21										
		+1.90	4.2	2.5	66.7	-	-	-	-	-	100.0	3.0	11.2	-	-	-	-	-										
28×0	5.9	RAW	100.0	8.1	11.9	34.9	45.1	9980	-	0.21	100.0	8.1	11.9	34.9	45.1	9980	-	0.21										
1/4×0	100.0	RAW	100.0	8.4	10.9	36.3	44.4	10061	-	0.22	CALC	3.3	11.2	-	-	-	-	-										
1/4×28	94.1	-1.90	-	-	-	-	-	-	-	-	90.1	3.0	8.8	39.3	48.9	10921	-	0.21										
28×0	5.9	RAW	-	-	-	-	-	-	-	-	5.9	8.1	11.9	34.9	45.1	9980	-	0.21										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	96.0	3.3	9.2	38.6	48.3	10875	-	0.21	3.91	67.3	4.6	21.7	31.6	41.6	8806			
1/4×28	93.9	-1.90	79.4	3.1	9.9	37.8	49.2	10763	-	0.21	79.4	3.1	9.9	37.8	49.2	10763	-	0.21										
		+1.90	20.6	2.4	68.5	-	-	-	-	-	100.0	3.0	22.0	-	-	-	-	-										
28×0	6.1	RAW	100.0	7.6	17.3	32.5	42.6	9288	-	0.18	100.0	7.6	17.3	32.5	42.6	9288	-	0.18										
1/4×0	100.0	RAW	100.0	7.5	20.2	32.1	40.2	8912	-	0.20	CALC	3.3	21.7	-	-	-	-	-										
1/4×28	93.9	-1.90	79.4	-	-	-	-	-	-	-	74.5	3.1	9.9	37.8	49.2	10763	-	0.21										
28×0	6.1	RAW	100.0	-	-	-	-	-	-	-	6.1	7.6	17.3	32.5	42.6	9288	-	0.18										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	80.6	3.4	11.1	36.9	48.0	10612	-	0.21	4.34	68.6	4.5	20.5	32.2	42.3	9016			
1/4×28	94.5	-1.90	5.2	3.5	38.5	27.1	30.9	6600	-	0.16	5.2	3.5	38.5	27.1	30.9	6600	-	0.16										
		+1.90	94.8	1.8	77.6	-	-	-	-	-	100.0	1.9	75.6	-	-	-	-	-										
28×0	5.5	RAW	100.0	4.3	67.3	16.6	11.8	-	-	0.06	100.0	4.3	67.3	16.6	11.8	-	-	0.06										
1/4×0	100.0	RAW	100.0	3.5	74.2	15.0	7.3	-	-	0.05	CALC.	2.0	75.1	-	-	-	-	-										
1/4×28	94.5	-1.90	5.2	-	-	-	-	-	-	-	4.9	3.5	38.5	27.1	30.9	6600	-	0.16										
28×0	5.5	RAW	100.0	-	-	-	-	-	-	-	5.5	4.3	67.3	16.6	11.8	-	-	0.06										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	10.4	3.9	55.1	21.0	19.8	2870	-	0.15	4.84	67.6	4.5	21.1	32.0	41.9	8911			
1/4×28	92.5	-1.90	95.3	3.9	14.5	38.0	43.6	10060	-	0.31	95.3	3.9	14.5	38.0	43.6	10060	-	0.31										
		+1.90	4.7	2.4	62.3	-	-	-	-	-	100.0	3.8	16.7	-	-	-	-	-										
28×0	7.5	RAW	100.0	7.0	16.2	35.6	41.2	9505	-	0.38	100.0	7.0	16.2	35.6	41.2	9505	-	0.38										
1/4×0	100.0	RAW	100.0	7.3	16.5	35.6	40.6	9468	-	0.37	CALC	4.0	16.7	-	-	-	-	-										
1/4×28	92.5	-1.90	95.3	-	-	-	-	-	-	-	88.1	3.9	14.5	38.0	43.6	10060	-	0.31										
28×0	7.5	RAW	100.0	-	-	-	-	-	-	-	7.5	7.0	16.2	35.6	41.2	9505	-	0.38										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	95.6	4.1	14.7	37.6	43.2	10082	-	0.32	5.15	64.6	4.4	20.5	32.5	42.0	9015			
1/4×28	93.5	-1.90	83.0	3.5	29.6	31.1	35.8	7882	-	0.24	83.0	3.5	29.6	31.1	35.8	7882	-	0.24										
		+1.90	17.0	2.0	62.1	-	-	-	-	-	100.0	3.2	35.1	-	-	-	-	-										
28×0	6.5	RAW	100.0	6.6	29.3	29.5	34.6	7566	-	0.35	100.0	6.6	29.3	29.5	34.6	7566	-	0.35										
1/4×0	100.0	RAW	100.0	6.3	34.4	28.5	30.8	6897	-	0.23	CALC	3.4	34.7	-	-	-	-	-										
1/4×28	93.5	-1.90	83.0	-	-	-	-	-	-	-	77.6	3.5	29.6	31.1	35.8	7882	-	0.34										
28×0	6.5	RAW	100.0	-	-	-	-	-	-	-	6.5	6.6	29.3	29.5	34.6	7566	-	0.35										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	78.1	3.4	29.6	31.1	35.8	7978	-	0.34	6.08	66.6	4.2	22.1	32.2	40.9	8829			
1/4×28	93.6	-1.90	94.7	4.2	6.4	39.1	50.3	11185	-	0.28	94.7	4.2	6.4	39.1	50.3	11185	-	0.28										
		+1.90	5.3	1.7	65.8	-	-	-	-	-	100.0	4.0	9.5	-	-	-	-	-										
28×0	6.4	RAW	100.0	7.5	10.1	35.9	46.5	10257	-	0.28	100.0	7.5	10.1	35.9	46.5	10257	-	0.28										
1/4×0	100.0	RAW	100.0	8.5	10.1	36.1	45.3	10172	-	0.26	CALC.	4.2	9.5	-	-	-	-	-										
1/4×28	93.6	-1.90	94.7	-	-	-	-	-	-	-	88.6	4.2	6.4	39.1	50.3	11185	-	0.28										
28×0	6.4	RAW	100.0	-	-	-	-	-	-	-	6.4	7.5	10.1	35.9	46.5	10257	-	0.28										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	95.0	4.4	6.8	38.7	49.8	11174	-	0.28	6.47	68.3	4.2	20.8	32.8	45.7	9021			
1/4×28	93.5	-1.90	46.3	2.8	28.3	31.2	37.7	8302	-	0.30	46.3	2.8	28.3	31.2	37.7	8302	-	0.30										
		+1.90	53.7	1.6	74.9	-	-	-	-	-	100.0	2.2	53.3	-	-	-	-	-										
28×0	6.5	RAW	100.0	5.3	42.6	25.2	26.9	5797	-	0.37	100.0	5.3	42.6	25.2	26.9	5797	-	0.37										
1/4×0	100.0	RAW	100.0	4.7	52.7	14.5	28.1	4399	-	0.20	CALC	2.4	52.6	-	-	-	-	-										
1/4×28	93.5	-1.90	46.3	-	-	-	-	-	-	-	40.2	2.8	28.3	31.2	37.7	8302	-	0.30										
28×0	6.5	RAW	100.0	-	-	-	-	-	-	-	6.5	5.3	42.6	25.2	26.9	5797	-	0.37										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	46.7	3.1	31.6	29.?	35.1	7811	-	0.31	8.20	63.8	4.1	22.5	32.3	44.0	8834			

LOCATION MAP

TN

SCALE:

COORDINATES: Y X

ELEVATION: BITS USED:

DIP: BEARING: MUD USED:

CORE SIZE: CASING: m LEFT IN HOLE: m

DATE START: FINISH:

DRILLER: OVERALL RECOVERY:

TESTS:

SAMPLED BY: DATE: ANALYZED BY:

BOREHOLE NO. BP-79-14
PAN OCEAN OIL LTD. (PAGE 2)
MINING DIVISION – COAL

LOGGED BY: DATE:

SIGNED:

GEOLOGICAL LOG – SCALE:

DETAILS OF COAL SEAMS – SCALE:

GEOLOGICAL LOG				DETAILS OF COAL SEAMS						SIZE		WEIGHT PERCENT								CUMULATIVE WEIGHT PERCENT								CUMULATIVE SAMPLE VALUES								OTHER		
DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS	DIA-METER	WT %	SPEC GRAV	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I.	S	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I	S	THICK-NESS	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I.	S			
														RM	ASH	VOL.	F.C.					RM	ASH	VOL.	F.C.						RM	ASH	VOL.	F.C.						
																													NO. 1 SEAM HORIZON										
																													A0150	(0.47) THK	3.70	70.8	3.6	17.7	35.1	43.0	9618			
																													A0151		3.23	75.3	3.6	16.8	35.6	43.5	9751			
																													A0152		2.56	69.9	3.7	19.5	34.5	41.8	9348			
																													A0153		2.13	67.8	3.8	21.6	34.0	40.3	9045			
																													A0154		1.63	85.4	3.8	20.3	34.5	41.1	9275			
																													A0155		1.32	83.0	3.7	21.8	33.6	40.5	9057			
																													A0156		0.39	95.0	4.4	6.8	38.7	49.8	11174			
																													A0147		1.19	83.2	5.2	27.0	27.8	39.8	8146			
																													A0148		2.30	60.5	4.8	28.4	27.8	38.5	7704			
																													A0149		2.71	65.6	5.1	25.4	29.4	39.7	8168			
																													A0150		3.24	61.4	5.1	25.8	29.3	39.4	8138			
																													A0151	(0.46) THK	3.70	65.7	4.7	22.7	31.0	41.0	8635			

LOCATION MAP

TN

SCALE:

COORDINATES: Y X

ELEVATION:

DIP: BEARING:

CORE SIZE: CASING:

BITS USED: J.K. SMIT

MUD USED: 55 POLY 325, 30 POLY 357 GALS.

m LEFT IN HOLE: m

DATE START: FINISH:

DRILLER: OVERALL RECOVERY:

TESTS:

SAMPLED BY: DATE: ANALYZED BY:

BOREHOLE NO. BP-79-14
PAN OCEAN OIL LTD. (PAGE 3)
MINING DIVISION – COAL

LOGGED BY: DATE:

SIGNED:

GEOLOGICAL LOG – SCALE: 1:500

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
			CONTINUED FROM PAGE NO. 1
149.13		11.50	CONGLOMERATE: MEDIUM WELL SORTED, 0.5 CM TO 2.0 CM CLASTS OF GRAY QUARTZITE AND BLACK, GRAY AND GREEN CHERT, ROUNDED TO SUBROUNDED, LOW SPHERICITY GRAINS. MATRIX IS MEDIUM GRAINED SALT AND PEPPLE.
160.63		0.38	SILTSTONE: MEDIUM GRAY, HARD, CUBIC TO BLOCKY FRACTURING.
161.01		10.12	SANDSTONE: SALT AND PEPPER, MEDIUM TO COARSE GRAINED, CONGLOMERATIC NEAR BASE. CROSS-BEDDING UP TO 60° TO CORE AXIS.
171.13		1.68	NO. 4 SEAM HORIZON SEAM 4A
172.81		1.57	SHALE: CARBONACEOUS AT TOP, NON-CARBONACEOUS AT BASE.
174.38		2.10	SILTSTONE: LIGHT GRAY WEATHERING, MASSIVE BEDDED
176.48		2.83	SANDSTONE: FINE TO MEDIUM GRAINED, SMALL SCALE FESTOON CROSS-BEDDING.
179.31		1.77	NO. 4 SEAM HORIZON SEAM 4B
181.08		3.50	SHALE: THIN SPLINTS OF COAL AND CARBONACEOUS ZONES THROUGHOUT, BECOMES SILTY TOWARDS BASE.
184.58		6.53	SANDSTONE: VERY FINE TO MEDIUM GRAINED, COARSENS DOWNWARD, SMALL PEBBLES NEAR BASE, FESTOON CROSS-BEDDING IN FINER UPPER HALF. CROSS-BEDDING AT 60° TO CORE AXIS IN COARSE LOWER HALF.
191.11			

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			No.2 SEAM HORIZON SEAM 2A		
			ROOF - SANDSTONE, GOOD		
116.69		0.30	COAL - BRIGHT		
116.99		0.20	COAL - DULL, SLIGHTLY SHALEY	A0158	0.88
117.19		0.14	COAL - BRIGHT		
117.33		0.17	COAL - DULL TO VITREOUS		
117.50		0.43	COAL - BRIGHT, LIGHT, HARD		
117.93		0.05	LOST CORE	A0159	1.02
117.98		0.26	COAL - BRIGHT, LIGHT, HARD		
118.24		0.15	SHALEY COAL		
118.39		0.13	COAL - VITREOUS TO BRIGHT		
118.52		0.54	SHALE - CARBONACEOUS TO COALY	A0160	0.54
119.06		0.38	COAL - VITREOUS TO BRIGHT		
119.44		0.04	LOST CORE	A0161	0.77
119.48		0.18	COAL - VITREOUS TO BRIGHT		
119.66		0.17	COAL - DULL, SLIGHTLY SHALEY		
119.83		0.30	SHALEY COAL	A0162	0.48
120.13		0.18	SHALEY CARBONACEOUS TO COALY		
120.31			FLOOR - SILTSTONE, FAIRLY SOLID IN PLACES		
			No.2 SEAM HORIZON SEAM 2B		
			ROOF - SILTSTONE, POOR		
128.58		0.12	COAL - DULL TO VITREOUS	A0163	0.27
128.70		0.15	COAL - DULL TO BRIGHT		
128.85		0.42	COALY SHALE	A0164	0.42
129.27		0.28	COAL - MOSTLY BRIGHT		
129.55		0.35	SHALEY COAL	A0165	1.01
129.90		0.21	COAL - BRIGHT		
130.11		0.04	LOST CORE		
130.15		0.13	COAL - BRIGHT TO DULL		
130.28		0.32	SHALE - DARK GRAY	A0166	0.32
130.60		0.30	COAL - BRIGHT		
130.90		0.10	SHALE - DARK GRAY	A0167	0.68
131.00		0.15	COAL - BRIGHT		
131.13		0.13	COAL - VITREOUS TO BRIGHT		
131.28		0.23	SHALE - DARK GRAY		
131.51		0.16	LOST CORE	A0168	0.66
131.67		0.15	SHALE - DARK GRAY		
131.82		0.12	SHALE - LIGHT GRAY SILTCEOUS		
131.94		0.14	COALY SHALE		
132.08		0.36	COAL - DULL, SHALEY		
132.44		0.50	SHALE - CARBONACEOUS TO COALY	A0169	1.06
132.94		0.06	LOST CORE		
133.00			FLOOR - SHALE, POOR		

SIZE DIAMETER	SIZE WT %	WEIGHT PERCENT SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	OTHER
1/4×28	93.0	-1.90	93.5	3.1	11.6	35.9	49.4	10570	-	0.36	93.5	3.1	11.6	35.9	49.4	10570	-	0.36										
		+1.90	6.5	1.4	67.2	-	-	-	-	-	100.0	3.0	15.2	-	-	-	-	-										
28×0	7.0	RAW	100.0	7.4	14.9	34.7	43.0	9478	-	0.39	100.0	7.4	14.9	34.7	43.0	9478	-	0.39										
1/4×0	100.0	RAW	100.0	8.0	14.2	33.1	44.7	9509	-	0.38	CALC	3.3	15.2	-	-	-	-	-										
1/4×28	93.0	-1.90	93.5	-	-	-	-	-	-	-	86.9	3.1	11.6	35.9	49.4	10570	-	0.36										
28×0	7.0	RAW	100.0	-	-	-	-	-	-	-	7.0	7.4	14.9	34.7	43.0	9478	-	0.39										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	93.9	3.4	12.1	35.7	48.3	10393	-	0.36	0.81	93.9	3.4	12.1	35.7	48.3	10393			
1/4×28	93.4	-1.90	95.4	3.9	7.5	38.8	49.8	10838	-	0.23	95.4	3.9	7.5	38.8	49.8	10838	-	0.23										
		+1.90	4.6	1.7	63.7	-	-	-	-	-	100.0	3.8	10.0	-	-	-	-	-										
28×0	6.6	RAW	100.0	8.3	10.8	35.3	45.6	9787	-	0.22	100.0	8.3	10.8	35.8	45.6	9787	-	0.22										
1/4×0	100.0	RAW	100.0	8.9	10.3	35.4	45.4	9813	-	0.20	CALC	4.1	10.0	-	-	-	-	-										
1/4×28	93.4	-1.90	95.4	-	-	-	-	-	-	-	89.1	3.9	7.5	38.8	49.8	10838	-	0.23										
28×0	6.6	RAW	100.0	-	-	-	-	-	-	-	6.6	8.3	10.8	35.3	45.6	9787	-	0.22										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	95.7	4.2	7.9	38.3	49.2	10790	-	0.23	1.83	94.9	3.8	9.7	37.1	48.8	10616			
1/4×28	92.7	-1.90	33.0	2.7	25.1	32.2	40.0	8699	-	0.09	33.0	2.7	25.1	32.2	40.0	8699	-	0.09										
		+1.90	67.0	1.8	71.2	-	-	-	-	-	100.0	2.1	56.0	-	-	-	-	-										
28×0	7.3	RAW	100.0	4.5	44.8	23.9	26.8	5594	-	0.13	100.0	4.5	44.8	23.9	26.8	5594	-	0.13										
1/4×0	100.0	RAW	100.0	4.1	54.4	21.8	19.7	4245	-	0.10	CALC	2.3	55.2	-	-	-	-	-										
1/4×28	92.7	-1.90	33.0	-	-	-	-	-	-	-	30.6	2.7	25.1	32.2	40.0	8699	-	0.09										
28×0	7.3	RAW	100.0	-	-	-	-	-	-	-	7.3	4.5	44.8	23.9	26.8	5594	-	0.13										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	37.9	3.0	30.7	29.8	36.2	7912	-	0.10	2.37	81.9	3.7	11.9	36.3	47.4	10331			
1/4×28	92.7	-1.90	92.7	3.2	9.7	35.6	51.5	10710	-	0.25	92.7	3.2	9.7	35.6	51.5	10710	-	0.25										
		+1.90	7.3	5.6	67.8	-	-	-	-	-	100.0	3.4	13.9	-	-	-	-	-										
28×0	7.3	RAW	100.0	8.5	13.9	32.9	44.7	9391	-	0.20	100.0	8.5	13.9	32.9	44.7	9391	-	0.20										
1/4×0	100.0	RAW	100.0	8.6	13.6	32.9	44.9	9478	-	0.20	CALC	3.8	13.9	-	-	-	-	-										
1/4×28	92.7	-1.90	92.7	-	-	-	-	-	-	-	85.9	3.2	9.7	35.6	51.5	10710	-	0.25										
28×0	7.3	RAW	100.0	-	-	-	-	-	-	-	7.3	8.5	13.9	32.9	44.7	9478	-	0.20										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	93.2	3.6	10.4	35.1	50.2	10578	-	0.25	3.14	84.6	3.7	11.5	36.0	48.2	10397			
1/4×28	92.7	-1.90	57.9	3.5	26.7	30.2	39.6	8579	-	0.31	57.9	3.5	26.7	30.2	39.6	8579	-	0.31										
		+1.90	42.1	2.3	70.5	-	-	-	-	-	100.0	3.0	45.1	-	-	-	-	-										
28×0	7.3	RAW	100.0	5.8	35.0	25.3	33.9	7268	-	0.29	100.0	5.8	35.0	25.3	33.9	7268	-	0.29										
1/4×0	100.0	RAW	100.0	5.7	43.8	23.2	27.3	5703	-	0.24	CALC	3.2	44.4	-	-	-	-	-										
1/4×28	92.7	-1.90	57.9	-	-	-	-	-	-	-	53.7	3.5	26.7	30.2	39.6	8579	-	0.31										
28×0	7.3	RAW	100.0	-	-	-	-	-	-	-	7.3	5.8	35.0	25.3	33.9	7268	-	0.29										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	61.0	3.7	28.2	29.3	38.5	8434	-	0.31	3.62	81.5	3.7	13.1	35.3	47.2	10202			
1/4×28	93.1	-1.90	71.9	3.8	19.2	33.3	43.7	9505	-	0.16	71.9	3.8	19.2	33.3	43.7	9505	-	0.16										
		+1.90	28.1	1.6	72.5	-	-	-	-	-	100.0	3.2	34.2	-	-	-	-	-										
28×0	6.9	RAW	100.0	3.9	27.5	31.4	37.2	8151	-	0.16	100.0	3.9	27.5	31.4	37.2	8151	-	0.16										
1/4×0	100.0	RAW	100.0	5.8	33.9	27.7	32.6	7128	-	0.15	CALC	3.2	33.7	-	-	-	-	-										
1/4×28	93.1	-1.90	71.9	-	-	-	-	-	-	-	66.9	3.8	19.2	33.3	43.7	9505	-	0.16										
28×0	6.9	RAW	100.0	-	-	-	-	-	-	-	6.9	3.9	27.5	31.4	37.2	8151	-	0.16										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	73.8	3.8	19.9	33.1	43.0	9471	-	0.16	0.27	73.8	3.8	19.9	33.1	43.0	9471			
1/4×28	90.7	-1.90	69.1	3.5	29.8	29.2	37.5	8111	-	0.14	69.1	3.5	29.8	29.2	37.5	8111	-	0.14										
		+1.90	30.9	2.3	71.6	-	-	-	-	-	100.0	3.1	42.7	-	-	-	-	-										
28×0	9.3	RAW	100.0	5.6	35.7	27.4	31.3	6937	-	0.14	100.0	5.6	35.7	27.4	31.3	6937	-	0.14										
1/4×0	100.0	RAW	100.0	5.5	41.5	24.4	38.6	6052	-	0.13	CALC	3.1	42.0	-	-	-	-	-										
1/4×28	90.7	-1.90	69.1	-	-	-	-	-	-	-	62.7	3.5	29.8	29.2	37.5	8111	-	0.14										
28×0	9.3	RAW	RAW	-	-	-	-	-	-	-	9.3	3.6	35.7	27.4	31.3	6937	-	0.14										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	72.0	3.5	30.5	28.9	36.6	8051	-	0.14	0.69	72.7	3.6	26.2	30.5	39.1	8615			
1/4×28	93.0	-1.90	77.0	3.1	13.4	36.4	47.1	10310	-	0.21	77.0	3.1	13.4	36.4	47.1	10310	-	0.21										
		+1.90	23.0	1.8	63.1	-	-	-	-	-	100.0	2.8	24.8	-	-	-	-	-										
28×0	7.0	RAW	100.0	6.4	22.0	34.5	37.1	8589	-	0.18	100.0	6.4	22.0	34.5	37.1	8589	-	0.18										
1/4×0	100.0	RAW	100.0	6.6	24.4	32.2	36.8	8134	-	0.20	CALC	3.0	24.6	-	-	-	-	-										
1/4×28	93.0	-1.90	77.0	-	-	-	-	-	-	-	71.6	3.1	13.4	36.4	47.1	10310	-	0.21										
28×0	7.0	RAW	100.0	-	-	-	-	-	-	-	7.0	6.4	22.0	34.5	37.1	8589	-	0.18										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	78.6	3.3	14.8	36.0	45.4	10117	-	0.21	1.70	76.2	3.4	19.2	33.9	42.9	9535			
1/4×28	93.9	-1.90	5.8	3.8	19.5	33.3	43.4	9382	-	0.27	5.8	3.8	19.5	33.3	43.4	9382	-	0.27										
		+1.90	94.2	1.6	70.7	-	-	-	-	-	100.0	1.7	67.7	-	-	-	-	-										
28×0	6.1	RAW	100.0	3.3	60.6	18.9	17.2	-	-	0.09	100.0	3.3	60.6	18.9	17.2	-	-	0.09										
1/4×0	100.0	RAW	100.0	3.0	66.6	17.8	12.6	-	-	0.06	CALC	1.8	67.3	-	-	-	-	-										
1/4×28	93.9	-1.90	5.8								5.4	3.8	19.5	33.3	43.4	9382	-	0.27										
28×0	6.1	RAW	100.0								6.1	3.3	60.6	18.9	17.2	-	-	0.09										
1/4×0	100.0	COMB	-								11.5	3.5	39.8	26.1	30.4	4832	-	0.25	2.02	63.3	3.4	19.9	33.6	42.5	9366			
1/4×28	91.6	-1.90	75.0	4.2	10.1	36.7	49.0	10635	-	0.22	75.0	4.2	10.1	36.7	49.0	10635	-	0.22										
		+1.90	25.0	1.8	62.7	-	-	-	-	-	100.0	3.6	23.2	-	-	-	-	-										
28×0	8.4	RAW	100.0	6.1	21.6	34.4	37.9	8654	-	0.16	100.0	6.1	21.6	34.4	37.9	8654	-	0.16										
1/4×0	100.0	RAW	100.0	6.5	22.4	33.4	37.7	8416	-	0.21	CALC	3.8	24.9	-	-	-	-	-										
1/4×28	91.6	-1.90	75.0	-	-	-	-	-	-	-	68.7	4.2	10.1	36.7	49.0	10635	-	0.22										
28×0	8.4	RAW	100.0	-	-	-	-	-	-	-	8.4	6.1	21.6	34.4	37.9	8654	-	0.16										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	77.1	4.4	11.8	36.3	47.3	10431	-	0.21	2.70	66.0	3.7	17.6	34.7	43.8	9665			
1/4×28	93.9	-1.90	3.8	2.8	36.0	28.2	33.0	6956	-	0.19	3.8	2.8	36.0	28.2	33.0	6956	-	0.19										
		+1.90	96.2	1.1	79.8	-	-	-	-	-	100.0	1.2	78.1	-	-	-	-	-										
28×0	6.1	RAW	100.0	2.3	71.1	17.1	9.5	-	-	0.05	100.0	2.3	71.1	17.1	9.5	-	-	0.05										
1/4×0	100.0	RAW	100.0	1.8	77.4	15.5	5.3	-	-	0.04	CALC	1.3	77.7	-	-	-	-	-										
1/4×28	93.9	-1.90	3.8	-	-	-	-	-	-	-	35.7	2.8	36.0	28.2	33.0	6956	-	0.19										
28×0	6.1	RAW	100.0	-	-	-	-	-	-	-	6.1	2.3	71.1	17.1	9.5	-	-	0.05										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	41.8	2.7	40.3	26.8	30.1	6197	-	0.17	3.36	61.9	3.5	20.6	33.4	42.0	9218			
1/4×28	93.4	-1.90	41.3	3.2	34.1	29.2	33.5	7459	-	0.23	41.3	3.2	34.1	29.2	33.5	7459	-	0.23										
		+1.90	58.7	2.0	74.4	-	-	-	-	-	100.0	2.5	57.8	-	-	-	-	-										
28×0	6.6	RAW	100.0	5.1	48.4	22.7	23.8	5016	-	0.18	100.0	5.1	48.4	22.7	23.8	5016	-	0.18										
1/4×0	100.0	RAW	100.0	4.6	56.2	20.4	18.8	3915	-	0.11	CALC	2.7	57.2	-	-	-	-	-										
1/4×28	93.4	-1.90	41.3	-	-	-	-	-	-	-	38.6	3.2	34.1	29.2	33.5	7459	-	0.23										
28×0	6.6	RAW	100.0	-	-	-	-	-	-	-	6.6	5.1	48.4	22.7	23.8	5016	-	0.18										
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	45.2	3.4	37.1	27.8	31.4	7032	-	0.23	4.42	58.0	3.5	23.6	32.3	40.1	8819			
																			5.84	76.0	3.7	13.9	35.5	46.4	10103			

[SAMPLES A0158 TO A0167 INCL.]

CBW

LOCATION MAP

TN

SCALE:

COORDINATES: Y X

ELEVATION: BITS USED:

DIP: BEARING: MUD USED:

CORE SIZE: CASING: m LEFT IN HOLE: m

DATE START: FINISH:

DRILLER: OVERALL RECOVERY:

TESTS:

SAMPLED BY: DATE: ANALYZED BY:

BOREHOLE NO. BP-79-14

PAN OCEAN OIL LTD. (PAGE 4)

MINING DIVISION – COAL

LOGGED BY: DATE:

SIGNED:

GEOLOGICAL LOG – SCALE:

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS	SIZE DIA-METER	SIZE WT %	WEIGHT PERCENT SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I	S	CUMULATIVE SAMPLE VALUES THICK-NESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	OTHER
			No. 3 SEAM HORIZON			1/4×28	93.0	-1.90	88.4	2.4	17.7	33.2	46.7	9822	-	0.33	88.4	2.4	17.7	33.2	46.7	9822	-	0.33										
								+1.90	11.6	2.4	63.3	-	-	-	-	-	100.0	2.4	23.0	-	-	-	-	-										
						28×0	7.0	RAW	100.0	6.7	20.8	32.6	39.9	8755	-	0.28	100.0	6.7	20.8	32.6	39.9	8755	-	0.28										
						1/4×0	100.0	RAW	100.0	7.3	21.7	30.9	40.1	8619	-	0.28	CALC.	2.7	22.8	-	-	-	-	-										
						1/4×28	93.0	-1.90	88.4	-	-	-	-	-	-	-	82.2	2.4	17.7	33.2	46.7	9822	-	0.33										
			ROOF-SHALE POOR		0.38	28×0	7.0	RAW	100.0	-	-	-	-	-	-	-	7.0	6.7	20.8	32.6	39.9	8755	-	0.28										
				A0170		1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	89.2	2.7	18.2	33.0	45.3	9713	-	0.33	0.38	89.2	2.7	18.2	33.0	45.3	9713			
141.80		0.38	SHALEY COAL																													
142.18		0.74	SHALE - MEDIUM GRAY, CUBIC FRACTURING			1/4×28	91.0	-1.90	8.8	3.3	35.8	26.4	34.5	7141	-	0.30	8.8	3.3	35.8	26.4	34.5	7141	-	0.30										
								+1.90	91.2	1.0	84.0	-	-	-	-	-	100.0	1.2	79.8	-	-	-	-	-										
142.92		0.26	SHALE - CARBONACEOUS WITH COAL			28×0	9.0	RAW	100.0	3.5	72.3	16.2	8.0	-	-	0.14	100.0	3.5	72.3	16.2	8.0	-	-	0.14										
143.18						1/4×0	100.0	RAW	100.0	2.9	78.1	10.9	8.1	-	-	0.08	CALC.	1.4	79.1	-	-	-	-	-										
		1.29	SHALE - DARK GRAY RARE COAL SPLINTS AND PARTINGS	A0171	2.29	1/4×28	91.0	-1.90	8.8	-	-	-	-	-	-	-	8.0	3.3	35.8	26.4	34.5	7141	-	0.30										
						28×0	9.0	RAW	100.0	-	-	-	-	-	-	-	9.0	3.5	72.3	16.2	8.0	-	-	0.14										
144.42						1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	17.0	3.4	55.6	20.8	20.0	3352	-	0.28	2.67	27.2	3.0	38.1	26.4	31.7	6312			
144.60		0.13	SHALEY COAL																													
144.65		0.05	COAL - BRIGHT																													
144.71		0.06	SHALY SHALE																													
144.77		0.06	SHALEY COAL			1/4×28	92.0	-1.90	72.3	3.4	14.0	34.6	48.0	10181	-	0.36	72.3	3.4	14.0	34.6	48.0	10181	-	0.36										
			FLOOR - SILTSTONE, POOR	A0172				+1.90	27.7	2.0	71.5	-	-	-	-	-	100.0	3.0	29.9	-	-	-	-	-										
					0.30	28×0	8.0	RAW	100.0	6.5	23.8	33.9	35.8	8339	-	0.31	100.0	6.5	23.8	33.9	35.8	8339	-	0.31										
						1/4×0	100.0	RAW	100.0	6.7	29.2	27.4	36.7	7755	-	0.27	CALC.	3.3	29.4	-	-	-	-	-										
						1/4×28	92.0	-1.90	72.3	-	-	-	-	-	-	-	66.5	3.4	14.0	34.6	48.0	10181	-	0.36										
						28×0	8.0	RAW	100.0	-	-	-	-	-	-	-	8.0	6.5	23.8	33.9	35.8	8339	-	0.31										
						1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	74.5	3.7	15.8	34.4	45.7	9932	-	0.35	2.97	32.0	3.2	32.9	28.3	35.0	7162			
			No. 4 SEAM HORIZON SEAM 4A																													
			ROOF - SANDSTONE, GOOD			1/4×28	93.0	-1.90	97.0	4.0	7.4	38.0	50.6	11041	-	0.23	97.0	4.0	7.4	38.0	50.6	11041	-	0.23										
171.13								+1.90	3.0	2.3	52.9	-	-	-	-	-	100.0	3.9	8.7	-	-	-	-	-										
171.30		0.17	COAL - VITREOUS, BANDED			28×0	7.0	RAW	100.0	8.3	13.0	33.1	45.6	9735	-	0.21	100.0	8.3	13.0	33.1	45.6	9735	-	0.21										
		0.41	COAL - VITREOUS TO BRIGHT			1/4×0	100.0	RAW	100.0	9.2	8.4	35.0	47.4	10339	-	0.21	CALC.	4.2	9.0	-	-	-	-	-										
171.71		0.11	COAL - BRIGHT, HARD, GLASSY																													
171.82		0.86	COAL - VITREOUS TO BRIGHT, BANDED	A0173	1.69	1/4×28	93.0	-1.90	97.0	-	-	-	-	-	-	-	90.2	4.0	7.4	38.0	50.6	11041	-	0.23										
						28×0	7.0	RAW	100.0	-	-	-	-	-	-	-	7.0	8.3	13.0	33.1	45.6	9735	-	0.21										
172.68		0.07	COAL - DULL TO VITREOUS			1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	97.2	4.3	8.1	37.3	49.9	10955	-	0.23	1.69	97.2	4.3	8.1	37.3	49.9	10955			
172.76		0.06	LOST CORE																													
172.81			FLOOR - SHALE, POOR																													
			No. 4 SEAM HORIZON SEAM 4B																													
			ROOF - SANDSTONE, GOOD			1/4×28	93.7	-1.90	97.7	3.5	20.1	32.8	43.6	9328	-	0.40	97.7	3.5	20.1	32.8	43.6	9328	-	0.40										
179.31								+1.90	2.3	3.0	50.8	-	-	-	-	-	100.0	3.5	20.8	-	-	-	-	-										
179.51		0.20	COAL - BRIGHT			28×0	6.3	RAW	100.0	7.9	20.0	31.1	41.0	8866	-	0.36	100.0	7.9	20.0	31.1	41.0	8866	-	0.36										
179.71		0.20	COAL - DULL TO VITREOUS			1/4×0	100.0	RAW	100.0	8.5	19.6	31.7	40.2	8788	-	0.36	CALC.	3.8	20.7	-	-	-	-	-										
179.83		0.12	COAL - VITREOUS TO BRIGHT			1/4×28	93.7	-1.90	97.7	-	-	-	-	-	-	-	91.5	3.5	20.1	32.8	43.6	9328	-	0.40										
179.99		0.08	SHALEY COAL			28×0	6.3	RAW	100.0	-	-	-	-	-	-	-	6.3	7.9	20.0	31.1	41.0	8866	-	0.36										
180.11		0.12	COAL - VITREOUS TO BRIGHT			1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	97.8	3.7	20.0	32.5	43.2	9361	-	0.40	0.52	97.8	3.7	20.0	32.5	43.2	9361			
180.25		0.14	COAL - BRIGHT																													
180.39		0.06	LOST CORE			1/4×28	92.7	-1.90	56.4	4.0	26.6	29.1	40.3	8301	-	0.22	56.4	4.0	26.6	29.1	40.3	8301	-	0.22										
180.44		0.64	COAL - BRIGHT					+1.90	43.6	1.9	61.2	-	-	-	-	-	100.0	3.1	41.7	-	-	-	-	-										
				A0174	0.52	28×0	7.3	RAW	100.0	6.2	35.6	25.1	33.1	6679	-	0.20	100.0	6.2	35.6	25.1	33.1	6679	-	0.20										
						1/4×0	100.0	RAW	100.0	6.3	40.5	24.8	28.4	5995	-	0.16	CALC.	3.3	41.2	-	-	-	-	-										
				A0175	0.28	1/4×28	92.7	-1.90	56.4	-	-	-	-	-	-	-	52.3	4.0	26.6	29.1	40.3	8301	-	0.22										
						28×0	7.3	RAW	100.0	-	-	-	-	-	-	-	7.3	6.2	35.6	25.1	33.1	6679	-	0.20										
				A0176		1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	59.6	4.2	28.2	28.3	39.0	8108	-	0.22	0.80	84.4	3.8	22.0	31.4	42.1	9051			
181.08			FLOOR - SHALE, POOR																													
						1/4×28	94.0	-1.90	97.3	5.7	4.4	37.7	52.2	11308	-	0.23	97.3	5.7	4.4	37.7	52.2	11308	-	0.23										
								+1.90	2.7	2.0	58.6	-	-	-	-	-	100.0	5.6	5.8	-	-	-	-	-										
					0.97	28×0	6.0	RAW	100.0	8.8	8.0	36.0	47.2	10400	-	0.22	100.0	8.8	8.0	36.0	47.2	10400	-	0.22										
						1/4×0	100.0	RAW	100.0	9.6	5.8	36.8	47.8	10645	-	0.24	CALC.	5.8	5.9	-	-	-	-	-										
						1/4×28	94.0	-1.90	97.3	-	-	-	-	-	-	-	91.7	5.7	4.4	37.7	52.2	11308	-	0.23										
						28×0	6.0	RAW	100.0	-	-	-	-	-	-	-	6.0	8.8	8.0	36.0	47.2	10400	-	0.22										
						1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	97.7	5.8	4.7	37.5	51.7	11318	-	0.23	1.77	91.2	4.9	11.9	34.9	47.7	10374			

LOCATION MAP

TN

SCALE:

BOREHOLE NO. BP-79-15
PAN OCEAN OIL LTD. (PAGE 1)
MINING DIVISION – COAL

COORDINATES: Y 1040 m N X 10,640 m W of SE corner of CL 88 DATE START: JULY 22, 1979 FINISH: JULY 29, 1979
ELEVATION: BITS USED: J.K. SMIT COMBINATION DRILLER: CARON DIAMOND DRILLING OVERALL RECOVERY: 95.47%
DIP: -90° BEARING: - MUD USED: 70 GALLONS POLYDRILL : 40 GALS. TESTS: NONE
CORE SIZE: NQ CASING: HW 1.22 m m LEFT IN HOLE: HW NIL m POLYPOWDER SAMPLED BY: O. CULLINGHAM DATE: AUGUST 13/79 ANALYZED BY: BIRTLEY COAL & MINERALS TESTING SIGNED:
NW 96.62 m NW 94.49 m

LOGGED BY: O. CULLINGHAM DATE: AUGUST 1, 1979

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	THICKNESS	DESCRIPTION
	33.53	OVERBURDEN: TRICONE SAMPLES ASSORTMENT OF ROCK CHIPS, CHERT, QUARTZITE, SILTSTONE, LIMESTONE AND SHALE IMBEDDED IN CLAY.
33.53	15.24	SILTSTONE AND SANDSTONE; WEATHERED FRAGMENTS OF SILTSTONE, SANDSTONE AND MINOR SHALE. (TRICONE SAMPLES)
78.77	9.14	MUDSTONE; MEDIUM LIGHT GRAY, FEW FRAGMENTS OF SILTSTONE AND SANDSTONE. (TRICONE SAMPLES)
57.91	6.10	SILTSTONE CARBONACEOUS SHALE AND SANDSTONE; FRAGMENTS OF ABOVE; MAY IN PART BE CONGLOMERATE APPROX. 5% COAL FRAGMENTS. (TRICONED)
64.01	3.05	MUDSTONE; MEDIUM LIGHT GRAY (TRICONED)
67.06	9.14	SILTSTONE, SANDSTONE TO GRANULE CONGLOMERATIC; UP TO 5% COAL FRAGMENTS. (TRICONED)
76.20	20.42	MUDSTONE; MEDIUM LIGHT GRAY. SLIGHTLY SILTY TO SANDY. (TRICONED)
96.62	4.84	MUDSTONE; MEDIUM TO DARK GRAY BROWN
01.46	2.78	SILTSTONE / SANDSTONE; MEDIUM GRAY, SILT TO VERY FINE GRAINED SANDSTONE.
104.24	3.41	SANDSTONE AND IN PART CONGLOMERATIC SANDSTONE.
107.65	5.95	MUDSTONE; MEDIUM TO DARK GRAY BROWN, BECOMES SILTY BASALLY GRADATIONAL TO CONGLOMERATE BELOW
113.60	104.45	CONGLOMERATE; MASSIVE, MEDIUM TO VERY LARGE PEBBLE CONGLOMERATE, OCCASIONAL COBBLES AND POORLY SORTED, THIN BEDS OF MEDIUM AND COURSE GRAINED SANDSTONE. CLASTS ARE WHITE THROUGH BLACK CHERT AND QUARTZITE WITH FEW PEBBLES OF GREEN CHERT. PEBBLES ARE WELL ROUNDED AND ARE BLADE, ROLL AND SEMI SPHERICAL. BEDS USUALLY SHOW SOME DEGREE OF COURSEING DOWNWARDS.
162.5		

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
		NO. 1 SEAM HORIZON		
		ROOF: CONGLOMERATE, GOOD		
218.05	0.12	COAL – VITREOUS TO BRIGHT		
218.17	0.11	SHALE – CARBONACEOUS		
218.28	0.22	COAL – VITREOUS		
218.50	0.04	LOST CORE		
218.54	0.15	COAL – VITREOUS		
218.69	0.22	SHALE – CARBONACEOUS TO COALY	AO 197	1.50
218.91	0.09	COAL – DULL TO VITREOUS		
219.00	0.55	SHALE – CARBONACEOUS		
219.55	0.34	COAL – DULL TO VITREOUS		
219.89	0.17	COALY SHALE		
220.06	0.30	LOST CORE		
220.07	0.30	COAL – DULL TO VITREOUS		
220.37	0.34	SHALE – CARBONACEOUS	AO 198	2.20
220.71	0.68	COAL – VITREOUS TO BRIGHT		
221.39	0.09	SHALE – CARBONACEOUS		
221.48	0.01	COAL – DULL TO BRIGHT		
221.49	0.01	LOST CORE		
221.50	0.09	COAL – BRIGHT		
221.59	0.09	SHALE – CARBONACEOUS		
221.68	0.21	COAL – VITREOUS TO BRIGHT		
221.89	0.03	SHALE COALY		
221.92	0.25	COAL – VITREOUS TO BRIGHT		
222.17	0.20	SHALE – CARBONACEOUS		
222.37	0.13	COAL – DULL TO VITREOUS	AO 199	2.91
222.50	0.03	LOST CORE		
222.53	0.11	SHALE		
222.64	0.13	COAL – VITREOUS		
222.77	0.20			
222.97	1.18	COAL – VITREOUS TO BRIGHT		
224.15				
224.66	0.44	SHALEY COAL	AO 200	0.44
225.10	0.58	SHALE – CARBONACEOUS TO COALY	AO 201	0.58
225.68		FLOOR: MUDSTONE, POOR		
		NO. 2 SEAM HORIZON		
		ROOF: SANDSTONE TO CONGLOMERATE, GOOD		
249.32	0.18	COAL – VITREOUS TO BRIGHT		
249.50	0.15	COAL – DULL TO VITREOUS		
249.65	0.60	COAL – VITREOUS TO BRIGHT		
250.25	0.03	SHALE – CARBONACEOUS TO COALY		
250.28	0.19	LOST CORE		
250.47	0.64	COAL – VITREOUS TO BRIGHT	AO 202	3.25
251.11	0.08	SHALEY COAL		
251.20	0.19	COAL – DULL TO BRIGHT		
251.39	0.15	SHALE – CARBONACEOUS TO COALY		
251.54	0.45	COAL – VITREOUS TO BRIGHT		
251.99	0.08	LOST CORE		
252.07	0.50	COAL – VITREOUS TO BRIGHT		
252.57		FLOOR – MUDSTONE AND SILTSTONE POOR		

SAMPLE NUMBER	SIZE DIAMETER	SIZE WT %	SPEC GRAV	WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	OTHER
	1/4×28	91.1	-1.90	30.8	5.2	23.3	29.8	41.7	8413	-	0.33	30.8	5.2	23.3	29.8	41.7	8413	-	0.33										
			+1.90	69.2	2.9	76.6	-	-	-	-	-	100.0	3.6	60.2	-	-	-	-	-										
	28×0	8.9	RAW	100.0	5.0	45.1	21.4	28.5	5430	-	0.31	100.0	5.0	45.1	21.4	28.5	5430	-	0.31										
	1/4×0	100.0	RAW	100.0	3.9	58.5	19.5	18.1	-	-	0.13	CALC.	3.7	58.9	-	-	-	-	-										
	1/4×28	91.1	-1.90	30.8	-	-	-	-	-	-	-	28.0	5.2	23.3	29.8	41.7	8413	-	0.33										
	28×0	8.9	RAW	100.0	-	-	-	-	-	-	-	8.9	5.0	45.1	21.4	28.5	5430	-	0.31										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	36.9	5.1	28.4	27.8	38.6	7809	-	0.33	1.50	36.9	5.1	28.4	27.8	38.6	7809			
	1/4×28	93.6	-1.90	61.1	5.6	18.0	32.2	44.2	9418	-	0.46	61.1	5.6	18.0	32.2	44.2	9418	-	0.46										
			+1.90	38.9	2.9	76.1	-	-	-	-	-	100.0	4.5	40.6	-	-	-	-	-										
	28×0	6.4	RAW	100.0	5.1	34.4	26.3	34.2	7024	-	0.23	100.0	5.1	34.4	26.3	34.2	7024	-	0.23										
	1/4×0	100.0	RAW	100.0	4.7	40.1	26.1	29.1	6205	-	0.24	CALC	4.5	40.2	-	-	-	-	-										
	1/4×28	93.6	-1.90	61.1	-	-	-	-	-	-	-	57.2	5.6	18.0	32.2	44.2	9418	-	0.46										
	28×0	6.4	RAW	100.0	-	-	-	-	-	-	-	6.4	5.1	34.4	26.3	34.2	7024	-	0.23										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	63.6	5.5	19.5	29.4	43.2	9288	-	0.44	3.70	52.7	5.3	22.0	28.9	41.9	8868			
	1/4×28	94.1	-1.90	73.2	4.6	17.9	34.0	43.5	9478	-	0.35	73.2	4.6	17.9	34.0	43.5	9478	-	0.35										
			+1.90	26.8	2.4	70.7	-	-	-	-	-	100.0	4.0	32.0	-	-	-	-	-										
	28×0	5.9	RAW	100.0	5.0	27.3	30.8	36.9	8168	-	0.26	100.0	5.0	27.3	30.8	36.9	8168	-	0.26										
	1/4×0	100.0	RAW	100.0	4.7	30.9	30.2	34.2	7495	-	0.25	CALC	4.0	31.7	-	-	-	-	-										
	1/4×28	94.1	-1.90	73.2	-	-	-	-	-	-	-	68.9	4.6	17.9	34.0	43.5	9478	-	0.35										
	28×0	5.9	RAW	100.0	-	-	-	-	-	-	-	5.9	5.0	27.3	30.8	36.9	8168	-	0.26										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	74.8	4.6	18.7	33.7	42.9	9461	-	0.34	6.61	62.4	4.9	20.2	31.4	42.4	9180			
	1/4×28	96.0	-1.90	61.8	4.3	17.9	35.2	42.6	9500	-	0.46	61.8	4.3	17.9	35.2	42.6	9500	-	0.46										
			+1.90	38.2	1.7	70.6	-	-	-	-	-	100.0	3.3	38.0	-	-	-	-	-										
	28×0	4.0	RAW	100.0	4.0	36.0	29.2	30.8	6909	-	0.36	100.0	4.0	36.0	29.2	30.8	6909	-	0.36										
	1/4×0	100.0	RAW	100.0	3.3	38.1	29.0	29.6	6682	-	0.38	CALC	3.3	37.9	-	-	-	-	-										
	1/4×28	96.0	-1.90	61.8	-	-	-	-	-	-	-	59.3	4.3	17.9	35.2	42.6	9500	-	0.46										
	28×0	4.0	RAW	100.0	-	-	-	-	-	-	-	4.0	4.0	36.0	29.2	30.8	6909	-	0.36										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	63.3	4.2	18.9	34.8	41.9	9442	-	0.45	7.05	62.5	4.9	20.1	31.6	42.3	9197			
	1/4×28	93.5	-1.90	27.0	4.3	25.1	30.4	40.2	8597	-	0.27	27.0	4.3	25.1	30.4	40.2	8597	-	0.27										
			+1.90	73.0	1.5	74.4	-	-	-	-	-	100.0	2.3	61.0	-	-	-	-	-										
	28×0	6.5	RAW	100.0	3.5	46.7	26.5	23.3	5429	-	0.08	100.0	3.5	46.7	26.5	23.3	5429	-	0.08										
	1/4×0	100.0	RAW	100.0	2.4	60.1	21.7	15.8	-	-	0.21	CALC	2.4	60.1	-	-	-	-	-										
	1/4×28	93.5	-1.90	27.0	-	-	-	-	-	-	-	25.2	4.3	25.1	30.4	40.2	8597	-	0.27										
	28×0	6.5	RAW	100.0	-	-	-	-	-	-	-	6.5	3.5	46.7	26.5	23.3	5429	-	0.08										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	31.7	4.1	28.8	29.7	39.2	8143	-	0.23	7.63	60.1	4.8	20.5	31.5	42.2	9155			
	1/4×28	93.6	-1.90	83.1	6.0	12.7	34.2	47.1	10038	-	0.40	83.1	6.0	12.7	34.2	47.1	10038	-	0.40										
			+1.90	16.9	1.9	66.2	-	-	-	-	-	100.0	5.3	21.7	-	-	-	-	-										
	28×0	6.4	RAW	100.0	5.7	21.0	32.1	41.2	8884	-	0.42	100.0	5.7	21.0	32.1	41.2	8884	-	0.42										
	1/4×0	100.0	RAW	100.0	5.5	21.7	32.7	40.1	8826		0.41	CALC	5.3	21.6	-	-	-	-	-										
	1/4×28	93.6	-1.90	83.1	-	-	-	-	-	-	-	77.8	6.0	12.7	34.2	47.1	10038	-	0.40										
	28×0	6.4	RAW	100.0	-	-	-	-	-	-	-	6.4	5.7	21.0	32.1	41.2	8884	-	0.42										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	84.2	5.9	13.3	34.0	46.6	10048	-	0.40	3.25	84.2	5.9	13.3	34.0	46.6	10048			

	THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
A0197	EXCLUDED								
A0198 (0.79) THK	3.70	72.4	4.7	18.8	32.8	42.9	9428		
A0199	2.91	74.8	4.6	18.7	33.7	42.9	9461		
A0200	EXCLUDED								
A0201	EXCLUDED								

LOCATION MAP

TN

SCALE:

COORDINATES: Y X

ELEVATION: BITS USED:

DIP: BEARING: MUD USED:

CORE SIZE: CASING: m LEFT IN HOLE: m

DATE START: FINISH:

DRILLER: OVERALL RECOVERY:

TESTS:

SAMPLED BY: DATE: ANALYZED BY:

BOREHOLE NO. BP-79-15

PAN OCEAN OIL LTD. (PAGE 2)

MINING DIVISION – COAL

LOGGED BY: DATE:

SIGNED:

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
162.5			
218.05		7.63	NO. 1 SEAM HORIZON
225.68		6.71	MUDSTONE; MEDIUM GRAY BROWN, IN PART CARBONACEOUS, SILTY, BASALLY,
232.39		2.00	SANDSTONE; FINE GRAINED.
234.39		14.93	SANDSTONE; CONGLOMERATIC SANDSTONE AND CONGLOMERTE; MEDIUM GRAY, MEDIUM COARSE AND GRANULE CONGLOMERATIC, SHORT INTERVALS OF SMALL AND MEDIUM PEBBLE CONGLOMERATE.
249.32		3.25	NO. 2 SEAM HORIZON
252.57		12.91	MUDSTONE AND SILTSTONE; MEDIUM GRAY TO MEDIUM BROWNISH GRAY, SOME CARBONACEOUS PLANT FRAGMENTS AND PLANT IMPRESSIONS.
265.48		4.44	NO. 3 SEAM HORIZON
269.27		5.66	SHALE; MEDIUM TO MEDIUM DARK GRAY, IN PART CARBONACEOUS.
274.93			END OF HOLE

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			NO. 3 SEAM HORIZON		
			ROOF: MUDSTONE AND SILTSTONE POOR		
264.83		0.65	SHALE – CARBONACEOUS TO COALY		
265.48		0.29	COAL – MOSTLY BRIGHT		
265.77		0.08	CARBONACEOUS SHALE		
265.85		0.08	COAL – DULL TO BRIGHT		
265.97		0.08	SHALE – CARBONACEOUS		
266.05		0.09	COAL		
266.14		0.20	SHALE – CARBONACEOUS TO COALY		
266.20		0.41	COAL – VITREOUS		
266.61		0.22	SHALE – CARBONACEOUS		
266.83		0.59	COAL – VITREOUS TO BRIGHT		
267.41		0.08	SHALE – CARBONACEOUS	AO 203	3.32
267.49		0.39	COAL – VITREOUS TO BRIGHT		
267.83		0.28	SHALE – CARBONACEOUS		
268.16		0.14	SHALE – LIGHT GRAY		
268.30		0.11	COAL – VITREOUS TO BRIGHT		
268.41		0.05	SHALE – CARBONACEOUS		
268.46		0.34	COAL – VITREOUS		
268.80		0.35	SHALE – CARBONACEOUS		
269.15		0.12	SHALEY COAL		
269.27			FLOOR – SHALE, POOR		

DEPTH	SIZE DIAMETER	SIZE WT %	SPEC GRAV	WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	OTHER
264.83	1/4×28	93.2	-1.90	48.6	4.9	16.2	33.7	45.2	9807	-	0.36	48.6	4.9	16.2	33.7	45.2	9807	-	0.36									
	+1.90	51.4	1.7	73.3	-	-	-	-	-	-	-	100.0	3.3	45.5	-	-	-	-	-									
	28×0	6.8	RAW	100.0	4.1	40.0	27.0	28.9	6307	-	0.23	100.0	4.1	40.0	27.0	28.9	6307	-	0.23									
	1/4×0	100.0	RAW	100.0	3.8	43.3	26.3	26.6	5866	-	0.23	CALC	3.3	45.1	-	-	-	-	-									
	1/4×28	93.2	-1.90	48.6	-	-	-	-	-	-	-	45.3	4.9	16.2	33.7	45.2	9807	-	0.36									
	28×0	6.8	RAW	100.0	-	-	-	-	-	-	-	6.8	4.1	40.0	27.0	28.9	6307	-	0.23									
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	52.1	4.8	18.8	32.9	43.3	9511	-	0.34	3.32	52.1	4.8	18.8	32.9	43.3	9511			

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y 12,340 m N. X 10,190 m W. OF S.E. CORNER OF CL 77.
ELEVATION: 598.65 m
DIP - 90° BEARING -
CORE SIZE NQ CASING N.W. 12.19 m N.W. 30.48 m
BITS USED J.K. SMIT NO.3 COMBINATION
MUD USED 199 BAGS OIL: 122 BAGS TROL.
LEFT IN HOLE NIL
DATE START JULY 27, 1979 FINISH AUGUST 5, 1979
DRILLER CARON DRILLMOND DRILLING OVERALL RECOVERY 79%
TESTS
SAMPLED BY O. CULLINGHAM
DATE AUGUST 5/79 ANALYZED BY BIRTLEY COAL & MINERALS TESTING SIGNED

BOREHOLE NO. BP-79-16A
PAN OCEAN OIL LTD. (PAGE 1)
MINING DIVISION - COAL

LOGGED BY O. CULLINGHAM DATE AUGUST 5, 1979

GEOLOGICAL LOG - SCALE: 1:500

DETAILS OF COAL SEAMS - SCALE:

DEPTH	THICKNESS	DESCRIPTION
	30.18	OVERBURDEN: TRICONED TO 15.54, CHIPS OF QUARTZ AND CHERTS, LIMONITE STAINING; SOME FRAGMENTS OF SILTSTONE AND GRAY SHALE. 15.54-30.18 PEBBLES AND COBBLES OF QUARTZITE, CHERT AND LIMESTONE, FEW CHUNKS, PROBABLY BOULDERS, OF GRAPHITIC SCHIST.
30.18	7.01	MUDSTONE & SANDY MUDSTONE: MEDIUM GRAY TO MEDIUM GRAY BROWN; IN PART SANDY.
37.19	4.06	CARBONACEOUS TO COALY SHALE: THIN COALY SHALE AND SHALEY COAL STRINGERS.
41.25	2.51	MUDSTONE: LIGHT GRAY TO LIGHT GRAY GREEN.
43.76	8.74	SANDSTONE: GRADATIONAL FROM VERY FINE GRAINED TO GRANULE CONGLOMERATIC.
52.50	0.60	CARBONACEOUS AND COALY SHALE:
53.10	12.30	MUDSTONE, MEDIUM GRAY, SHORT INTERVALS OF SILTSTONE AND VERY FINE GRAINED SANDSTONE.
65.40	0.74	CARBONACEOUS AND COALY SHALE / COAL STRINGERS.
66.14	6.10	MUDSTONE / SILTSTONE: MEDIUM GRAY, GRADATIONAL TO SANDSTONE BELOW.
72.24	7.62	SANDSTONE: SILTSTONE TO MEDIUM GRAINED TO GRANULE CONGLOMERATIC AT BASE.
79.86	0.10	MUDSTONE: MEDIUM GRAY.
79.96	1.79	COAL, CARBONACEOUS AND COALY SHALE.
81.75	8.21	MUDSTONE: MEDIUM GRAY, CONTAINS SPLINTS OF VITREOUS AND BRIGHT COAL.
89.96	1.20	CARBONACEOUS TO COALY SHALE AND COAL:
91.16	2.62	MUDSTONE: MEDIUM TO MEDIUM DARK GRAY.
93.78	1.32	CARBONACEOUS TO COALY SHALE AND COAL:
95.10	1.52	MUDSTONE: MEDIUM GRAY.
96.62	9.83	SANDSTONE: FINE GRAINED TO GRANULE CONGLOMERATIC, GRADATIONAL FROM ABOVE, SHORT INTERVALS OF MEDIUM PEBBLE CONGLOMERATE AT BASE OF BEDS.
106.45	9.98	MUDSTONE: MEDIUM GRAY, CONTAINS, SHORT INTERVALS OF SANDSTONE - MINOR COAL AND CARBONACEOUS AND COALY SHALE.
116.43	13.72	SANDSTONE, VERY FINE GRAINED TO SMALL PEBBLE CONGLOMERATIC; BEDS COARSEN DOWNWARDS.
130.15	6.85	MUDSTONE: MEDIUM GRAY AND MEDIUM GRAY GREEN.
137.00	7.48	SILTSTONE AND VERY FINE GRAINED SANDSTONE
144.48	8.62	SANDSTONE: MEDIUM GRAINED WITH SHORT INTERVALS OF COARSE TO GRANULE CONGLOMERATIC.
153.10	12.10	MUDSTONE, CARBONACEOUS MUDSTONE AND THIN COAL BANDS:

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	SEAM THICKNESS
		ROOF - SANDSTONE MEDIUM GRAINED TO GRANULE CONGLOMERATE GOOD		
79.86 / 79.96	1.59	COAL - VITREOUS TO BRIGHT SHALY IN ROOF AND FLOOR	A0186	1.59
81.55 / 81.75		FLOOR - MUDSTONE MEDIUM GREY, BLOCKY		

SIZE DIAMETER	SIZE WT %	SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
1/4×28	88.0	-1.90 +1.90	84.1 15.9	5.0 3.5	17.8 28.6	33.7 -	43.5 -	9441 -	- -	0.34 -
28×0	12.0	RAW	100.0	7.5	27.0	27.5	38.0	7771	-	0.34
1/4×0	100.0	RAW	100.0	8.7	25.7	28.9	36.7	7920	-	0.28
1/4×28	88.0	-1.90	84.1	-	-	-	-	- -	-	-
28×0	12.0	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-

CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I	S
84.1 100.0	5.0 4.8	17.8 27.5	33.7 -	43.5 -	9441 -	- -	0.34 -
100.0	7.5	27.0	27.5	38.0	7771	-	0.34
CALC	5.1	27.4	-	-	-	-	-
74.0	5.0	17.8	33.7	43.5	9441	-	0.34
12.0	7.5	27.0	27.5	38.0	7771	-	0.34
86.0	5.3	19.6	32.4	42.4	9208	-	0.34

CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I	S
1.59	86.0	5.3	19.6	32.4	42.4	9208		

OTHER

LOCATION MAP

TN

SCALE:

COORDINATES: Y X

ELEVATION:

DIP: BEARING:

CORE SIZE: CASING:

BITS USED:

MUD USED:

m LEFT IN HOLE: m

DATE START: FINISH:

DRILLER: OVERALL RECOVERY:

TESTS:

SAMPLED BY: DATE: ANALYZED BY:

BOREHOLE NO. BP-79-16A
PAN OCEAN OIL LTD. (PAGE 2)
MINING DIVISION – COAL

LOGGED BY: O. CULLINGHAM DATE: AUGUST 5, 1979

SIGNED:

GEOLOGICAL LOG – SCALE: 1: 500

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
65.20			
		19.81	SANDSTONE, GRADATIONAL FROM ABOVE THROUGHT SILTSTONE TO VERY FINE GRAINED SANDSTONE TO MEDIUM GRAINED AND SMALL TO MEDIUM PEBBLE CONGLOMERATIC.
185.01			
		4.58	CONGLOMERATE, MEDIUM PEBBLE CONGLOMERATE, QUARTZITE AND CHERT.
189.59			
		4.11	MUDSTONE: MEDIUM DARK GRAY BROWN TO BROWNISH GRAY.
193.70			
		8.14	CONGLOMERATE: MEDIUM PEBBLE CONGLOMERATE WITH FEW SHORT INTERVALS OF LARGE PEBBLE CONGLOMERATE.
			END OF HOLE
211.84			

DETAILS OF COAL SEAMS – SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS	SIZE: DIAMETER	SIZE: WT %	WEIGHT PERCENT: SPEC GRAV	YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I	S	CUMULATIVE WEIGHT PERCENT: YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I	S	CUMULATIVE SAMPLE VALUES: THICKNESS	YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I	S	OTHER		

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y 375 m N X 325 m W of S.E. corner of CL 83
ELEVATION: 539.53 m
DIP: -90° BEARING: NA
CORE SIZE: N Q CASING: HW 2.8 m NW 82.3 m
BITS USED: J.K. SMIT COMBINATION
MUD USED: 145 gallons POLYDRILL; 105 gallons POLYPOWDER
m LEFT IN HOLE: NIL m NIL

DATE START: JULY 30/79 FINISH: AUGUST 17/79
DRILLER: CARON DIAMOND DRILLING OVERALL RECOVERY: 97%
TESTS: GAMMA LOG 300m; DIP TESTS @ 120m -89° & @ 360m - 83.5°
SAMPLED BY: O. CULLINGHAM
DATE: AUGUST 26/79 ANALYZED BY: BIRTLEY COAL + MINERALS TESTING

BOREHOLE NO. BP-79-17
PAN OCEAN OIL LTD. (PAGE 1 OF 4)
MINING DIVISION - COAL

LOGGED BY: O. CULLINGHAM, D. HOPE DATE: AUGUST 26/79
SIGNED:

GEOLOGICAL LOG - SCALE: 1:500

DEPTH	THICKNESS	DESCRIPTION
		NO SAMPLE
27.43		TRICONE SAMPLES - SANDSTONE, FINE TO MEDIUM GRAINED, QUARTZ AND CHERT WITH APPROXIMATELY 10% SHALE.
33.35	6.08	SANDSTONE - MEDIUM GRAY TO MEDIUM GRAY BROWN, FINE TO COARSE GRAINED COARSENING DOWNWARD. BEDDING @ 78° TO CORE AXIS.
39.61	4.34	CARBONACEOUS TO COALY MUDSTONE AND COAL
43.95	2.34	MUDSTONE - SOFT, CONTAINS COAL MATERIAL THROUGHOUT
46.29	2.51	CARBONACEOUS MUDSTONE
48.80	2.30	MUDSTONE
51.10	1.42	COAL AND COALY MUDSTONE
52.52	8.20	MUDSTONE - MEDIUM BROWNISH GRAY, SOFT IN PART WITH MUDDY TEXTURE
60.72	7.38	SANDSTONE - MEDIUM TO MEDIUM DARK GRAY, FINE TO MEDIUM GRAINED, GRADATIONAL DOWNWARD.
68.10	1.52	MUDSTONE - MEDIUM BROWISH GRAY
69.62	0.14	CARBONACEOUS TO COALY MUDSTONE
69.76	0.74	MUDSTONE - MEDIUM GRAY GREEN
70.50	3.26	MUDSTONE - MEDIUM GRAY GREEN GRADES TO MEDIUM BROWNISH GRAY
73.76	0.94	MUDSTONE - LIGHT GRAY, SOFT, SANDY.
74.70	13.00	SANDSTONE - MEDIUM GRAY, FINE GRAINED TO CONGLOMERATIC GRADATION DOWNWARD.
87.70	1.11	MUDSTONE - MEDIUM BROWNISH GRAY
88.81	0.87	COAL AND COALY SHALE
89.68	4.84	MUDSTONE - MEDIUM TO MEDIUM LIGHT GRAY.
94.52	13.33	SANDSTONE - MEDIUM GRAY, FINE GRAINED TO SMALL PEBBLE CONGLOMERATIC, GRADATIONAL
107.85	5.25	MUDSTONE - MEDIUM GRAY BROWN, SOFT FRAGMENTAL TO BLOCKY
113.10	15.00	SANDSTONE - MEDIUM GRAY, FINE TO MEDIUM GRAINED WITH SHORT INTERVALS OF COARSE GRANULE CONGLOMERATIC
128.10	2.82	MUDSTONE - MEDIUM GRAY BROWN, FRAGMENTAL
130.92	1.21	CARBONACEOUS AND COALY MUDSTONE
132.13	6.15	MUDSTONE - MEDIUM GRAY-BROWN, SOFT FRAGMENTAL, IN PART SANDY
138.28	2.17	SILTSTONE - MEDIUM GRAY, CROSS-BEDDED, SLUMPS.
140.45	4.58	MUDSTONE - MEDIUM GRAY BROWN, SOFT FRAGMENTAL TO BLOCKY
145.03	9.50	SANDSTONE - MEDIUM GRAY, MEDIUM TO COARSE GRAINED WITH SHORT INTERVALS OF GRANULE CONGLOMERATIC
154.53	22.62	SILTSTONE AND MUDSTONE - MEDIUM GRAY-BROWN TO MEDIUM GRAY. SHORT INTERVALS OF CARBONACEOUS AND COALY MUDSTONE. MUDSTONES ARE FRAGMENTAL AND SOFT. SILTSTONES ARE GENERALLY MODERATLY HARD AND SOUND.
160.00		

(CONTINUED ON PAGE 2)

DETAILS OF COAL SEAMS - SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS	SIZE: DIAMETER	SIZE: WT %	WEIGHT PERCENT: SPEC GRAV	YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C.	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT: YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C.	BTU	F.S.I.	S	CUMULATIVE SAMPLE VALUES: THICKNESS	YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C.	BTU	F.S.I.	S	OTHER

LOCATION MAP

TN

SCALE:

COORDINATES: Y X

ELEVATION:

DIP: BEARING:

CORE SIZE: CASING:

BITS USED:

MUD USED:

m LEFT IN HOLE: m

DATE START: FINISH:

DRILLER: OVERALL RECOVERY:

TESTS:

SAMPLED BY: DATE: ANALYZED BY:

BOREHOLE NO. BP-79-17
PAN OCEAN OIL LTD. (PAGE 2)
MINING DIVISION – COAL

LOGGED BY: DATE:

SIGNED:

GEOLOGICAL LOG – SCALE: 1:500

DETAILS OF COAL SEAMS – SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
160.00			(CONTINUED FROM PAGE 1)
177.15		2.35	SANDSTONE- FINE TO MEDIUM GRADATIONAL DOWNWARD
179.50		4.60	MUDSTONE - MEDIUM GRAY BROWN, CARBONACEOUS AT TOP BECOMING LESS DOWN SECTION.
184.10		5.27	SANDSTONE - MEDIUM GRAY, GRADES DOWNWARD TO MEDIUM GRAINED GRADATIONAL FROM MUDSTONE
189.37		8.30	SHALE - MEDIUM BROWNISH GRAY, CUBIC WEATHERING
197.67		2.13	SANDSTONE - MEDIUM GRAY, SILT TO FINE GRAINED
199.80		5.20	SHALE - MEDIUM LIGHT GRAY TO GREENISH GRAY, FRAGMENTAL TO BLOCKY, CUBIC FRACTURING.
205.00		1.76	SANDSTONE - MEDIUM GRAY, SILT TO FINE GRAINED
206.76		1.15	SHALE - MEDIUM DARK GRAY
207.91		1.59	SANDSTONE - MEDIUM GRAY, FINE GRAINED CROSS-BEDDED.
209.50		7.88	CONGLOMERATE - MEDIUM TO VERY LARGE PEBBLE CONGLOMERATE, POORLY PEBBLE CONGLOMERATE, POORLY SORTED CHERT AND QUARTZITE
217.38		2.84	SHALE AND SANDSTONE - MEDIUM GRAY
220.22		2.89	CONGLOMERATE - AS ABOVE
223.11			RODS BROKE AT 75.59 m. ALL ATTEMPTS TO RETRIVE RODS FAILED AND THE HOLE WAS WEDGED AT 82.30 m AND 79-17A COMMENCED

DETAILS OF COAL SEAMS					SIZE		WEIGHT PERCENT								CUMULATIVE WEIGHT PERCENT							CUMULATIVE SAMPLE VALUES							OTHER		
DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS	DIAMETER	WT %	SPEC GRAV	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I.	S	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I.	S	THICKNESS	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I.	S			
										RM	ASH	VOL	F.C.					RM	ASH	VOL	F.C.						RM	ASH	VOL	F.C.						

LOCATION MAP

TN

SCALE:

COORDINATES: Y 375 m N X 325 m W of SE. corner of CL 83
ELEVATION: 539.53 m BITS USED: J.K. SMIT COMBINATION
DIP: -90° BEARING: N.A. MUD USED: 145 gallons POLYDRILL, 105 gallons POLYPOWDER
CORE SIZE: NQ CASING: HW 2.8 m, NW 82.3 m m LEFT IN HOLE: NIL m, NIL

DATE START: JULY 30/79 FINISH: AUGUST 17/79
DRILLER: CARON DIAMOND DRILLING OVERALL RECOVERY: 97%
TESTS: GAMMA LOG 300m, DIP TESTS @ 120m - 89°& @ 360m - 83.5°
SAMPLED BY: O.CULLINGHAM DATE: AUGUST 26/79 ANALYZED BY: BIRTLEY COAL + MINERALS TESTING

BOREHOLE NO. BP-79-17A
PAN OCEAN OIL LTD. (PAGE 3)
MINING DIVISION – COAL

LOGGED BY: O.CULLINGHAM, D. HOPE DATE: AUGUST 26/79
SIGNED:

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	THICKNESS	DESCRIPTION
		HOLE BP-79-17A COMMENCED BY WEDGING AT 82.30m IN HOLE BP-79-17 GRAPHIC LOG FOR HOLE BP-79-17A COMMENCES AT TOP OF THICK CONGLOMERATE.
210		CONGLOMERATE - MASSIVE, CROSSBEDDED, LARGE PEBBLE CONGLOMERATE, LARGE PEBBLE CONGLOMERATE, PEBBLES ARE WELL ROUNDED, BLADE, ROLLER AND SEMI-SPHERICAL, CHERT AND QUARTZITE FROM WHITE THROUGH BLACK, FEW GREEN. LENSES AND CROSS-BEDS OF SANDSTONE AND SILTY SHALE.
217.95		
221.10		
223.33		
225.05		
238.10		
238.90		
244.50		
245.40	93.20	
286.00		
303.20	8.00	No. 1 SEAM HORIZON
311.20	6.05	CARBONACEOUS TO COALY SHALE - MEDIUM TO DARK GRAY, DULL, CONTAINS SPLINTS, BANDS AND STRINGERS OF COAL TO 0.05 m THICK.
317.25	4.92	SANDSTONE - GRADATIONAL DOWNWARDS FROM VERY FINE GRAINED TO CONGLOMERATIC.
322.17	5.43	CONGLOMERATE - SMALL TO MEDIUM PEBBLE, WELL ROUNDED, BLADE, ROLLER AND SEMI-SPHERICAL, CHERT AND QUARTZITE
327.60	4.28	SANDSTONE - MEDIUM GRAINED TO CONGLOMERATIC
331.88	2.17	No. 2 SEAM HORIZON
334.05	3.27	SHALE - MEDIUM GRAY, FRAGMENTAL
337.32	7.53	SANDSTONE - VERY FINE TO CONGLOMERATIC COARSENS DOWNWARD, CROSS-BEDDED
344.85	5.15	SHALE - MEDIUM DARK TO DARK GRAY, IN PART CARBONACEOUS
350.00	3.02	SHALEY SANDSTONE/SANDY SHALE - LAMINATED, CROSS-BEDDED
353.02	3.08	No. 3 SEAM HORIZON
356.10	4.30	SHALE/CARBONACEOUS AND COALY INTERVALS
360.40	1.40	SHALEY SILTSTONE/SILTY SHALE - LAMINATED, CROSS-BEDDED
361.80		

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
		No. 1 SEAM HORIZON		
		ROOF: CONGLOMERATE, GOOD	A0204	0.68
303.20	0.68	CARBONACEOUS AND COALY SHALE THIN COAL BANDS AT TOP		
303.88	0.30	COAL - DULL TO VITREOUS/PARTINGS AND BANDS OF SHALEY COAL, CARBONACEOUS AND COALY SHALE AND SHALE.	A0205	2.21
	0.73			
	0.23			
	0.39			
	0.19			
	0.37	COAL - VITREOUS AND BRIGHT	A0206	0.67
306.09	0.67	SHALE - MEDIUM GRAY		
306.76	0.23			
	0.23	COAL AND CARBONACEOUS AND COALY SHALE	A0207	1.24
307.22	0.78	COAL - VITREOUS AND BRIGHT		
308.00	0.63	SHALE - DULL, FRAGMENTAL	A0208	0.63
308.63	1.27	COAL - MOSTLY VITREOUS AND BRIGHT, CONTAINS FEW PARTINGS OF COALY SHALE.		
309.86	0.24	CARBONACEOUS AND COALY SHALE/ SHALY COAL	A0209	2.27
310.22	0.12			
	0.39			
310.61	0.29	COAL - DULL TO VITREOUS	A0210	0.30
310.90	0.30	CARBONACEOUS SHALE - 030 COAL AT BASE		
311.20		FLOOR - CARBONACEOUS SHALE, POOR		

SAMPLE NUMBER	THICKNESS	SIZE DIAMETER	SIZE WT %	SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
A0204	0.68	1/4×28	92.0	-1.90	12.2	3.1	28.4	29.0	39.5	8142	-	0.44
				+1.90	87.8	1.4	85.7	-	-	-	-	-
		28×0	8.0	RAW	100.0	2.7	74.5	11.6	11.2	-	-	0.13
		1/4×0	100.0	RAW	100.0	2.2	78.1	10.7	9.0	-	-	0.12
		1/4×28	92.0	-1.90	12.2	-	-	-	-	-	-	-
		28×0	8.0	RAW	100.0	-	-	-	-	-	-	-
		1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-
A0205	2.21	1/4×28	93.0	-1.90	58.2	3.3	21.8	31.3	43.6	8972	-	0.35
				+1.90	41.8	1.4	72.6	-	-	-	-	-
		28×0	7.0	RAW	100.0	6.3	35.6	25.3	32.8	6640	-	0.18
		1/4×0	100.0	RAW	100.0	4.6	42.6	24.9	27.9	5826	-	0.24
		1/4×28	93.0	-1.90	58.2	-	-	-	-	-	-	-
		28×0	7.0	RAW	100.0	-	-	-	-	-	-	-
		1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-
A0206	0.67	1/4×28	96.6	-1.90	2.2	5.3	32.6	27.2	34.9	7533	-	0.42
				+1.90	97.8	3.0	82.6	-	-	-	-	-
		28×0	3.4	RAW	100.0	3.0	75.0	12.8	9.2	-	-	0.17
		1/4×0	100.0	RAW	100.0	3.1	81.3	9.5	6.1	-	-	0.17
		1/4×28	96.6	-1.90	2.2	-	-	-	-	-	-	-
		28×0	3.4	RAW	100.0	-	-	-	-	-	-	-
		1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-
A0207	1.24	1/4×28	94.5	-1.90	65.5	4.3	11.0	28.9	55.8	10525	-	0.34
				+1.90	34.5	2.6	73.9	-	-	-	-	-
		28×0	5.5	RAW	100.0	4.6	36.2	26.6	32.6	6941	-	0.17
		1/4×0	100.0	RAW	100.0	4.5	32.2	23.9	38.4	7450	-	0.20
		1/4×28	94.5	-1.90	65.5	-	-	-	-	-	-	-
		28×0	5.5	RAW	100.0	-	-	-	-	-	-	-
		1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-
A0208	0.63	1/4×28	95.8	-1.90	2.0	4.5	34.5	27.7	33.3	7078	-	0.39
				+1.90	98.0	3.0	82.9	-	-	-	-	-
		28×0	4.2	RAW	100.0	3.7	79.7	12.9	3.7	-	-	0.06
		1/4×0	100.0	RAW	100.0	3.1	81.6	12.1	3.2	-	-	0.10
		1/4×28	95.8	-1.90	2.0	-	-	-	-	-	-	-
		28×0	4.2	RAW	100.0	-	-	-	-	-	-	-
		1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-
A0209	2.27	1/4×28	94.3	-1.90	47.0	4.0	23.4	32.7	39.9	8827	-	0.44
				+1.90	53.0	5.8	73.3	-	-	-	-	-
		28×0	5.7	RAW	100.0	4.1	44.0	25.5	26.4	5719	-	0.25
		1/4×0	100.0	RAW	100.0	3.3	49.4	23.4	23.9	5054	-	0.24
		1/4×28	94.3	-1.90	47.0	-	-	-	-	-	-	-
		28×0	5.7	RAW	100.0	-	-	-	-	-	-	-
		1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-
A0210	0.30	1/4×28	97.4	-1.90	15.4	4.4	39.9	26.1	29.6	6312	-	0.42
				+1.90	84.6	1.7	76.5	-	-	-	-	-
		28×0	2.6	RAW	100.0	2.5	68.2	16.0	13.3	-	-	0.23
		1/4×0	100.0	RAW	100.0	2.1	70.8	16.4	10.7	-	-	0.19
		1/4×28	97.4	-1.90	15.4	-	-	-	-	-	-	-
		28×0	2.6	RAW	100.0	-	-	-	-	-	-	-
		1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-

CUMULATIVE WEIGHT PERCENT

YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
12.2	3.1	28.4	29.0	39.5	8142	-	0.44
100.0	1.6	78.7	-	-	-	-	-
100.0	2.7	74.5	11.6	11.2	-	-	0.13
CALC.	1.7	78.4	-	-	-	-	-
11.2	3.1	28.4	29.0	39.5	8142	-	0.44
8.0	2.7	74.5	11.6	11.2	-	-	0.13
19.2	2.9	46.0	22.3	28.6	5116	-	0.31
58.2	3.3	21.8	31.3	43.6	8972	-	0.35
100.0	2.5	43.0	-	-	-	-	-
100.0	6.3	35.6	25.3	32.8	6640	-	0.18
CALC.	2.8	42.5	-	-	-	-	-
54.1	3.3	21.8	31.3	43.6	8972	-	0.35
7.0	6.3	35.6	25.3	32.8	6640	-	0.18
61.1	3.6	24.5	30.1	41.4	8606	-	0.33
2.2	5.3	32.6	27.2	34.9	7533	-	0.42
100.0	3.0	81.5	-	-	-	-	-
100.0	3.0	75.0	12.8	9.2	-	-	0.17
CALC.	3.0	81.3	-	-	-	-	-
2.1	5.3	32.6	27.2	34.9	7533	-	0.42
3.4	3.0	75.0	12.8	9.2	-	-	0.17
5.5	3.8	52.8	20.3	22.6	4026	-	0.39
65.5	4.3	11.0	28.9	55.8	10525	-	0.34
100.0	3.7	32.7	-	-	-	-	-
100.0	4.6	36.2	26.6	32.6	6941	-	0.17
CALC.	3.7	32.9	-	-	-	-	-
61.9	4.3	11.0	28.9	55.8	10525	-	0.34
5.5	4.6	36.2	26.6	32.6	6941	-	0.17
67.4	4.3	13.1	28.7	53.7	10309	-	0.33
2.0	4.5	34.5	27.7	33.3	7078	-	0.39
100.0	4.9	49.8	-	-	-	-	-
100.0	3.7	79.7	12.9	3.7	-	-	0.06
CALC.	4.8	51.0	-	-	-	-	-
1.9	4.5	34.5	27.7	33.3	7078	-	0.39
4.2	3.7	79.7	12.9	3.7	-	-	0.06
6.1	3.9	63.6	18.1	14.2	2608	-	0.33
47.0	4.0	23.4	32.7	39.9	8827	-	0.44
100.0	4.9	49.8	-	-	-	-	-
100.0	4.1	44.0	25.5	26.4	5719	-	0.25
CALC.	4.8	49.5	-	-	-	-	-
44.3	4.0	23.4	32.7	39.9	8827	-	0.44
5.7	4.1	44.0	25.5	26.4	5719	-	0.25
50.0	4.0	25.8	31.8	38.3	8560	-	0.42
15.4	4.4	39.9	26.1	29.6	6312	-	0.42
100.0	2.1	70.9	-	-	-	-	-
100.0	2.5	68.2	16.0	13.3	-	-	0.23
CALC.	2.1	70.8	-	-	-	-	-
15.0	4.4	39.9	26.1	29.6	6312	-	0.42
2.6	2.5	68.2	16.0	13.3	-	-	0.23
17.6	4.1	42.4	25.1	28.1	5841	-	0.39

CUMULATIVE SAMPLE VALUES

THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
7.70	45.8	3.8	23.7	29.7	42.3	8752		
7.02	48.3	3.9	22.8	30.0	42.8	8892		
4.81	42.5	4.1	21.8	30.0	43.8	9080		
4.14	48.5	4.1	21.2	30.2	44.2	9173		
2.90	40.4	4.0	27.0	31.5	37.5	8365		
2.27	50.0	4.0	25.8	31.8	38.3	8560		
	EXCLUDED							

OTHER

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y X

ELEVATION:

DIP: BEARING:

CORE SIZE: CASING:

BITS USED:

MUD USED:

m LEFT IN HOLE: m

DATE START: FINISH:

DRILLER: OVERALL RECOVERY:

TESTS:

SAMPLED BY: DATE: ANALYZED BY:

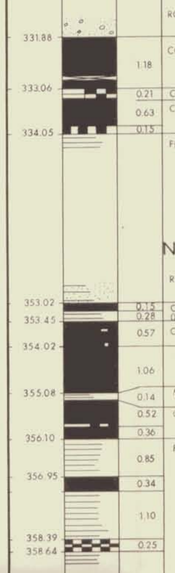
BOREHOLE NO. BP-79-17A
PAN OCEAN OIL LTD. (PAGE 4)
MINING DIVISION – COAL

LOGGED BY: DATE:

SIGNED:

GEOLOGICAL LOG – SCALE:

DETAILS OF COAL SEAMS – SCALE:



No. 2 SEAM HORIZON

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			ROOF-SANDSTONE AND CONGLOMERATIC SANDSTONE, GOOD		
331.88		1.18	COAL-BRIGHT, BANDED, CONCHOIDAL AND BLOCKY FRACTURE		
333.06		0.21	CARBONACEOUS AND COALY SHALE	A0211	2.17
		0.63	COAL-MOSTLY BRIGHT, BECOMES SHALY IN BASAL 0.15m		
334.05		0.15	FLOOR-SHALE, FRAGMENTAL, POOR		

No. 3 SEAM HORIZON

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			ROOF-LAMINATED SHALE AND SANDSTONE, PLATY		
353.02		0.15	CARBONACEOUS AND COALY SHALE	A0212	0.43
353.45		0.28	0.15m COAL AT TOP		
		0.57	COAL-MOSTLY BRIGHT, FEW BANDS OF DULL CARBONACEOUS SHALE		
354.02		1.06			
		0.14	MUDSTONE-MEDIUM BROWN CARBONACEOUS	A0213	2.65
355.08		0.52	COAL-BRIGHT, PARTINGS OF DULL COALY SHALE IN DENSE BASALTY		
		0.36			
356.10		0.85	FLOOR-CARBONACEOUS SHALE, COAL STRINGERS		
356.95		0.34			
		1.10			
358.39		0.25			
358.64					

SAMPLE NUMBER	SIZE DIAMETER	SIZE WT %	SPEC GRAV	WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	OTHER
A0211	1/4×28	95.6	-1.90	73.2	3.5	14.5	33.6	48.4	9958	-	0.50	73.2	3.5	14.5	33.6	48.4	9958	-	0.50										
			+1.90	26.8	1.4	75.2	-	-	-	-	-	100.0	2.9	30.8	-	-	-	-	-										
	28×0	4.4	RAW	100.0	5.6	23.2	30.7	40.5	8550	-	0.33	100.0	5.6	23.2	30.7	40.5	8550	-	0.33										
	1/4×0	100.0	RAW	100.0	4.7	30.1	38.7	36.5	7696	-	0.33	CALC	3.0	30.5	-	-	-	-	-										
	1/4×28	95.6	-1.90	73.2	-	-	-	-	-	-	-	70.0	3.5	14.5	33.6	48.4	9958	-	0.50										
	28×0	4.4	RAW	100.0	-	-	-	-	-	-	-	4.4	5.6	23.2	30.7	40.5	8550	-	0.33										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	74.4	3.6	15.3	33.3	47.6	9925	-	0.49	2.17	74.4	3.6	15.3	33.3	47.6	9925			
A0212	1/4×28	97.2	-1.90	17.0	3.1	32.9	29.5	34.5	7832	-	0.76	17.0	3.1	32.9	29.5	34.5	7832	-	0.76										
			+1.90	83.0	1.5	77.1	-	-	-	-	-	100.0	1.8	69.6	-	-	-	-	-										
	28×0	2.8	RAW	100.0	2.8	58.3	20.2	18.7	-	-	0.44	100.0	2.8	58.3	20.2	18.7	-	-	0.44										
	1/4×0	100.0	RAW	100.0	1.9	69.0	17.9	11.2	-	-	0.33	CALC	1.8	69.3	-	-	-	-	-										
	1/4×28	97.2	-1.90	17.0	-	-	-	-	-	-	-	16.5	3.1	32.9	29.5	34.5	7832	-	0.76										
	28×0	2.8	RAW	100.0	-	-	-	-	-	-	-	2.8	2.8	58.3	20.2	18.7	-	-	0.44										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	19.3	3.0	36.2	28.2	32.4	6888	-	0.71	3.08	59.1	4.0	20.9	30.5	44.2	9108			
A0213	1/4×28	94.6	-1.90	63.6	4.1	18.9	30.9	46.1	9329	-	0.44	63.6	4.1	18.9	30.9	46.1	9329	-	0.44										
			+1.90	36.4	1.7	71.9	-	-	-	-	-	100.0	3.2	38.2	-	-	-	-	-										
	28×0	5.4	RAW	100.0	4.8	33.9	28.9	32.4	7132	-	0.31	100.0	4.8	33.9	28.9	32.4	7132	-	0.31										
	1/4×0	100.0	RAW	100.0	4.0	38.1	27.6	30.3	6584	-	0.23	CALC	3.3	38.0	-	-	-	-	-										
	1/4×28	94.6	-1.90	63.6	-	-	-	-	-	-	-	60.2	4.1	18.8	30.9	46.1	9329	-	0.44										
	28×0	5.4	RAW	100.0	-	-	-	-	-	-	-	5.4	4.8	33.9	28.9	32.4	7132	-	0.31										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	65.6	4.1	20.2	30.7	44.8	9215	-	0.43	2.65	65.6	4.1	20.2	30.7	44.8	9215			

No. 1 SEAM HORIZON

SAMPLE NUMBER		CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S	OTHER
A0204	EXCLUDED										
A0205 (1.79) THK A0206		3.70	53.1	3.9	20.1	29.3	46.2	9244			
		1.91	45.6	4.2	14.7	28.3	52.3	10043			
A0207		1.24	67.4	4.3	13.1	28.7	53.7	10309			
A0208	EXCLUDED										
A0209	EXCLUDED										
A0210	EXCLUDED										

LOCATION MAP

TN

SCALE:

COORDINATES: Y 325 m W. X 375 m N. OF S.E. CORNER OF CL 83
ELEVATION: 588.34 m BITS USED: J. K. SMIT COMBINATION
DIP: 90° BEARING: N/A MUD USED: 79 BAGS MUD, 34 BAGS TROL.
CORE SIZE: HQ CASING: HW 6.10 m LEFT IN HOLE: 1 GAL. NIL. m 325

DATE START: AUGUST 6, 1979 FINISH: AUGUST 9, 1979
DRILLER: CARON DIAMOND DRILLING OVERALL RECOVERY: 56.3%
TESTS: GAMMA
SAMPLED BY: D. HOPE
DATE: AUGUST 11/79 ANALYZED BY: BIRTLY COAL & MINERALS TESTING SIGNED:

BOREHOLE NO. BP-79-18
PAN OCEAN OIL LTD. (PAGE 1)
MINING DIVISION – COAL

LOGGED BY: D. HOPE DATE: AUGUST 10, 1979.

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	THICKNESS	DESCRIPTION
	17.07	CONGLOMERATE: BADLY BROKEN AND DISAGGREGATED CORE, PEBBLES AND COBBLES OF CHERT AND QUARTZITE. TAR SATURATED
17.07		
18.90	1.83	MUDSTONE AND CAVINGS
	3.05	CONGLOMERATE: AS ABOVE
21.95		
	10.05	NO. 1 SEAM HORIZON
32.00		
32.24	0.24	SHALE: CARBONACEOUS WITH SPLINTS AND FLECKS OF COAL
	8.17	MUDSTONE: MEDIUM GRAY TO GRAY-BROWN, SOFT, CARBONACEOUS IN PART, MASSIVE BEDDED, CUBIC WEATHERING.
40.41		
42.28	1.87	SILTSTONE: LIGHT GRAY THINLY BEDDING TO LAMINATED.
		SANDSTONE: LIGHT GRAY TO SALT AND PEPPER, FINE GRAINED, GRADING DOWNWARD TO COARSE GRAINED AND CONGLOMERATIC AT BASE. CROSS BEDDED UP TO 65° TO AXIS.
58.52		
	3.66	NO. 2 SEAM HORIZON
62.18		
	2.52	SILTSTONE - WITH THIN INTERBEDS OF SANDSTONE - SHALE
64.70		
65.55	0.85	MUDSTONE - MEDIUM BROWN, HARD, Mmassive SHALE - DARK GRAY, CARBONACEOUS ZONES THROUGHOUT, CUBIC WEATHERING SANDY SHALE ZONE @ 69.19 - 71.22.
	12.01	
77.56		
	4.43	NO. 3 SEAM HORIZON
81.99		
83.15	1.15	SHALE - DARK GRAY, CARBONACEOUS, COAL FLECKS
	3.81	SHALE - MEDIUM TO DARK GRAY, HARD, BLOCKY
86.96		TOTAL DEPTH

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
		NO. 1 SEAM HORIZON		
21.95		ROOF: CONGLOMERATE, POOR		
22.02	0.07	TAR AND CAVINGS EXCLUDED		
22.38	0.36	LOST CORE		
22.71	0.33	COAL: DULL		
	0.76	COAL: DULL		
23.47	0.08	COAL: DULL		
23.57	0.10	SHALE: CARBONACEOUS	AO 187	2.79
23.65	0.43	LOST CORE		
24.08	0.07	SHALE: CARBONACEOUS		
24.15	0.45	COAL: DULL TO VITREOUS		
24.60	0.09	LOST CORE		
24.69	0.15	COAL: DULL TO VITREOUS		
24.84	0.09	LOST CORE		
24.93	0.09	COAL: DULL TO VITREOUS		
25.02	0.09	SHALEY COAL		
	0.87	SHALE: MEDIUM TO DARK GRAY	AO188	0.87
26.04	0.48	COAL: DULL TO VITREOUS		
26.52	0.30	COAL: VITREOUS		
26.82	0.06	SHALE: CARBONACEOUS		
26.88	0.21	COAL: DULL TO VITREOUS	AO 189	1.33
27.08	0.28	COAL: MOSTLY VITREOUS		
27.37	0.34	SHALE: CARBONACEOUS		
27.71	0.33	LOST CORE		
28.04	0.07	SHALE: CARBONACEOUS		
28.11	0.21	COAL: DULL TO BRIGHT		
28.32	0.08	SHALEY COAL		
28.40	0.08	SHALE: CARBONACEOUS	AO 190	1.67
28.48	0.12	COAL: DULL		
28.60	0.10	SHALE: CARBONACEOUS		
28.70	0.14	COAL: DULL TO BRIGHT		
28.84	0.58	SHALE: CARBONACEOUS		
29.04	0.05	LOST CORE		
29.54	0.18	SHALE: CARBONACEOUS		
29.72	0.21	COAL: DULL, SOFT		
29.93	0.13	COAL: DULL, SOFT		
30.06	0.08	COAL: DULL TO VITREOUS		
30.14	0.15	BANDED VITREOUS TO BRIGHT	AO 191	2.24
30.29	0.08	COAL: BRIGHT		
30.37	0.08	SHALEY COAL		
30.45	0.13	COAL: BRIGHT		
30.58	0.16	SHALEY COAL		
30.74	0.18	LOST CORE		
30.92	0.15	SHALE: CARBONACEOUS		
31.07	0.20	COAL: VITREOUS TO BRIGHT		
31.27	0.33	SHALE: CARBONACEOUS	AO 192	0.53
31.47	0.20	LOST CORE		
31.80		FLOOR: MUDSTONE AND SHALE POOR		
32.00				
		NO. 2 SEAM HORIZON		
		ROOF - SANDSTONE, GOOD		
58.52	0.18	COAL - DULL TO VITREOUS LOWER		
	0.12	0.12 m NO CORE		
	0.21	COAL - DULL TO VITREOUS		
59.03	0.87	COAL - BRIGHT, BANDED	A0193	1.96
59.90	0.45	NO CORE		
60.35	0.12	COAL - BRIGHT		
60.47	0.26	SHALE - CARBONACEOUS		
60.73	0.23	NO CORE		
60.96	0.50	COAL - DULL TO VITREOUS	A0194	1.71
61.46	0.21	SHALY COAL		
61.67	0.51	NO CORE		
62.18		FLOOR - SHALE, POOR		

SAMPLE NUMBER	DIAMETER	WT %	SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
	1/4×28	84.1	-1.90	70.8	5.5	22.8	33.4	38.3	7516	-	0.52
			+1.90	29.2	2.2	74.9	-	-	-	-	-
	28×0	15.9	RAW	100.0	8.7	34.9	29.5	26.9	5684	-	1.21
	1/4×0	100.0	RAW	100.0	6.7	37.9	28.4	27.5	5582	-	0.52
	1/4×28	84.1	-1.90	70.8	-	-	-	-	-	-	-
	28×0	15.9	RAW	100.0	-	-	-	-	-	-	-
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
	1/4×28	90.7	-1.90	3.2	3.5	29.0	25.3	42.2	7825	-	0.26
			+1.90	96.3	2.0	80.9	-	-	-	-	-
	28×0	9.3	RAW	100.0	3.7	74.9	13.1	8.3	-	-	0.10
	1/4×0	100.0	RAW	100.0	3.3	78.7	12.5	5.5	-	-	0.08
	1/4×28	90.7	-1.90	3.2	-	-	-	-	-	-	-
	28×0	9.3	RAW	100.0	-	-	-	-	-	-	-
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
	1/4×28	93.3	-1.90	85.7	3.5	9.8	37.6	49.1	10686	-	0.40
			+1.90	14.3	1.5	77.5	-	-	-	-	-
	28×0	6.7	RAW	100.0	5.4	21.4	33.6	39.6	8910	-	0.33
	1/4×0	100.0	RAW	100.0	6.0	19.9	33.8	40.3	8968	-	0.24
	1/4×28	93.3	-1.90	85.7	-	-	-	-	-	-	-
	28×0	6.7	RAW	100.0	-	-	-	-	-	-	-
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
AO 189	1/4×28	92.1	-1.90	50.4	3.3	27.1	30.3	39.3	8254	-	0.48
			+1.90	49.6	2.2	73.5	-	-	-	-	-
	28×0	7.9	RAW	100.0	5.1	44.0	23.6	27.3	5501	-	0.40
AO 190	1/4×0	100.0	RAW	100.0	4.9	48.3	22.8	24.0	4958	-	0.23
	1/4×28	92.1	-1.90	50.4	-	-	-	-	-	-	-
	28×0	7.9	RAW	100.0	-	-	-	-	-	-	-
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
	1/4×28	91.7	-1.90	63.1	3.5	24.6	32.7	39.2	8497	-	0.40
			+1.90	36.9	2.4	67.9	-	-	-	-	-
AO 191	28×0	8.3	RAW	100.0	4.9	33.5	29.7	31.9	7177	-	0.36
	1/4×0	100.3	RAW	100.0	4.7	39.1	27.7	28.5	5886	-	0.33
	1/4×28	91.7	-1.90	63.1	-	-	-	-	-	-	-
	28×0	8.3	RAW	100.0	-	-	-	-	-	-	-
AO 192	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
	1/4×28	93.1	-1.90	71.1	5.6	22.0	31.8	40.6	8829	-	0.31
			+1.90	28.9	1.9	63.7	-	-	-	-	-
	28×0	6.9	RAW	100.0	5.3	24.1	29.5	41.1	8632	-	0.43
	1/4×0	100.0	RAW	100.0	4.5	33.8	29.2	32.5	7229	-	0.41
	1/4×28	93.1	-1.90	71.1	-	-	-	-	-	-	-
	28×0	6.9	RAW	100.0	-	-	-	-	-	-	-
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
	1/4×28	93.2	-1.90	92.0	5.9	8.0	36.0	50.1	10592	-	0.33
			+1.90	8.0	2.1	69.7	-	-	-	-	-
A0193	28×0	6.8	RAW	100.0	6.2	15.4	34.1	44.3	9575	-	0.39
	1/4×0	100.0	RAW	100.0	6.6	13.4	34.7	45.3	9764	-	0.56
	1/4×28	93.2	-1.90	92.0	-	-	-	-	-	-	-
	28×0	6.8	RAW	100.0	-	-	-	-	-	-	-
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
A0194	1/4×28	92.6	-1.90	46.2	4.2	20.6	25.1	50.1	9089	-	0.25
			+1.90	53.8	1.5	76.4	-	-	-	-	-
	28×0	7.4	RAW	100.0	4.1	42.4	25.0	28.5	5963	-	0.18
	1/4×0	100.0	RAW	100.0	3.5	49.0	23.0	24.5	5054	-	0.20
	1/4×28	92.6	-1.90	46.2	-	-	-	-	-	-	-
	28×0	7.4	RAW	100.0	-	-	-	-	-	-	-
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-

CUMULATIVE WEIGHT PERCENT

YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I	S
70.8	5.5	22.8	33.4	38.3	7516	-	0.52
100.0	4.5	38.0	-	-	-	-	-
100.0	8.7	34.9	29.5	26.9	5684	-	1.21
CALC.	5.2	37.5	-	-	-	-	-
59.5	5.5	22.8	33.4	38.3	7516	-	0.52
15.9	8.7	34.9	29.5	26.9	5684	-	1.21
75.4	6.1	26.4	32.2	34.9	7065		0.67
3.2	3.5	29.0	25.3	42.2	7825	-	0.26
100.0	2.0	79.2	-	-	-	-	-
100.0	3.7	74.9	13.1	8.3	-	-	0.10
CALC.	2.2	78.8	-	-	-	-	-
2.9	3.5	29.0	25.3	42.2	7825	-	0.26
9.3	3.7	74.9	13.1	8.3	-	-	0.10
12.2	3.6	64.4	15.8	16.0	1878	-	0.22
85.7	3.5	9.8	37.6	49.1	10686	-	0.40
100.0	3.2	19.5	-	-	-	-	-
100.0	5.4	21.4	33.6	39.6	8910	-	0.33
CALC.	3.3	19.6	-	-	-	-	-
79.9	3.5	9.8	37.6	49.1	10686	-	0.40
6.7	5.4	21.4	33.6	39.6	8910	-	0.33
86.6	3.6	11.1	37.1	48.0	10578	-	0.39
50.4	3.3	27.1	30.3	39.3	8250	-	0.48
100.0	2.7	50.1	-	-	-	-	-
100.0	5.1	44.0	23.6	27.3	5501	-	0.40
CALC.	2.9	49.6	-	-	-	-	-
46.4	3.3	27.1	30.3	39.3	8250	-	0.48
7.9	5.1	44.0	23.6	27.3	5501	-	0.40
54.3	3.5	30.6	28.9	36.8	7773	-	0.47
63.1	3.5	24.6	32.7	39.2	8497	-	0.40
100.0	3.1	40.6	-	-	-	-	-
100.0	4.9	33.5	29.7	31.9	7177	-	0.36
CALC.	3.2	40.0	-	-	-	-	-
5.9	3.5	24.6	32.7	39.2	8497	-	0.40
8.3	4.9	33.5	29.7	31.9	7177	-	0.36
66.2	3.6	26.0	32.2	37.9	8372	-	0.39
71.1	5.6	22.0	31.8	40.6	8829	-	0.31
100.0	4.5	34.0	-	-	-	-	-
100.0	5.3	24.1	29.5	41.1	8632	-	0.43
CALC.	4.6	33.2	-	-	-	-	-
66.2	5.6	22.0	31.8	40.6	8829	-	0.31
6.9	5.3	24.1	29.5	41.1	8632	-	0.43
73.1	5.5	22.1	31.5	40.6	8905	-	0.32
92.0	5.9	8.0	36.0	50.1	10592	-	0.33
100.0	5.6	12.9	-	-	-	-	-
100.0	6.2	15.4	34.1	44.3	9575	-	0.39
CALC.	5.6	13.0	-	-	-	-	-
35.7	5.9	8.0	36.0	50.1	10592	-	0.33
6.8	6.2	15.4	34.1	44.3	9575	-	0.39
92.5	5.9	8.5	35.8	49.6	10607	-	0.33
46.2	4.2	20.6	25.1	50.1	9089	-	0.25
100.0	2.7	50.6	-	-	-	-	-
100.0	4.1	42.4	25.0	28.5	5963	-	0.18
CALC.	2.8	50.0	-	-	-	-	-
42.8	4.2	20.6	25.1	50.1	9089	-	0.25
7.4	4.1	42.4	25.0	28.5	5963	-	0.18
50.2	4.1	23.7	25.0	46.9	8733	-	0.24

CUMULATIVE SAMPLE VALUES

SAMPLE NUMBER	THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
	3.22	75.4	6.1	26.4	32.2	34.9	7065		
	4.09	61.9	5.9	27.9	31.5	34.1	6847		
	5.42	68.0	5.2	22.7	33.2	38.4	8013		
	7.09	64.7	4.9	24.2	32.4	38.1	7965		
	9.33	65.1	4.5	24.6	32.3	38.0	8065		
	9.86	65.5	4.6	24.5	32.3	38.2	8115		
A0187					EXCLUDED				
A0188					EXCLUDED				
A0189	3.00	68.6	3.5	19.6	33.4	43.0	9342		
A0190	1.67	54.3	3.5	30.6	28.9	36.8	7773		
A0191					EXCLUDED				
A0192					EXCLUDED				
	1.95	92.5	5.9	8.5	35.8	49.6	10607		
	3.66	72.7	5.3	13.4	32.3	48.7	10002		

OTHER

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y X

ELEVATION: BITS USED:

DIP: BEARING: MUD USED:

CORE SIZE: CASING: m LEFT IN HOLE: m

DATE START: FINISH:

DRILLER: OVERALL RECOVERY:

TESTS:

SAMPLED BY: DATE: ANALYZED BY:

BOREHOLE NO. BP-79-18

PAN OCEAN OIL LTD. (PAGE 2)

MINING DIVISION – COAL

LOGGED BY: DATE:

SIGNED:

GEOLOGICAL LOG – SCALE: 1:500

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS	SIZE DIAMETER	SIZE WT %	WEIGHT PERCENT SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	OTHER
			NO. 3 SEAM HORIZON																															
77.56			ROOF: SHALE, POOR																															
		0.18	COAL: VITREOUS TO BRIGHT			1/4×28	93.0	-1.90	56.8	5.0	15.5	33.8	45.7	9805	-	0.39	56.8	5.0	15.5	33.8	45.7	9805	-	0.39										
77.90		0.18	COAL: AS ABOVE					+1.90	43.2	1.9	68.4	-	-	-	-	-	100.0	3.7	38.3	-	-	-	-	-										
		0.26	COALY SHALE			28×0	7.0	RAW	100.0	5.1	34.4	29.9	30.6	6998	-	0.30	100.0	5.1	34.4	29.9	30.6	6998	-	0.30										
		0.18	COAL: BRIGHT BANDED			1/4×0	100.0	RAW	100.0	4.4	38.3	26.3	31.0	6493	-	0.31	CALC	3.8	38.0	-	-	-	-	-										
78.45		0.11	SHALE COAT																															
78.64		0.19	LOST CORE			1/4×28	93.0	-1.90	56.8	-	-	-	-	-	-	-	52.8	5.0	15.5	33.8	45.7	9805	-	0.39										
		0.20	COAL: DULL TO BRIGHT	AO 195	2.60																													
		0.13	SHALE: COAL			28×0	7.0	RAW	100.0	-	-	-	-	-	-	-	7.0	5.1	34.4	29.9	30.6	6998	-	0.30										
		0.18	COAL: DULL TO VITREOUS																															
79.30		0.20	COALY SHALE			1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	59.8	5.0	17.7	33.3	43.9	9565	-	0.38	2.60	59.8	5.0	17.7	33.3	43.9	9565			
80.16		0.86	LOST CORE																															
		0.47	COAL: MOSTLY BRIGHT			1/4×28	93.5	-1.90	56.7	5.0	9.1	34.6	51.3	10638	-	0.30	56.7	5.0	9.1	34.6	51.3	10628	-	0.30										
80.63		0.14	LOST CORE					+1.90	43.3	1.8	70.4	-	-	-	-	-	100.0	3.6	35.6	-	-	-	-	-										
80.77		0.27	COALY SHALE	AO 196	1.83	28×0	6.5	RAW	100.0	4.9	33.7	29.9	31.5	7065	-	0.22	100.0	4.9	33.7	29.9	31.5	7065	-	0.22										
81.30		0.26	COAL: VITREOUS SOFT			1/4×0	100.0	RAW	100.0	5.2	34.0	28.0	32.8	7028	-	0.21	CALC	3.7	35.5	-	-	-	-	-										
		0.69	LOST CORE			1/4×28	93.5	-1.90	56.7	-	-	-	-	-	-	-	53.0	5.0	9.1	34.6	51.3	10628	-	0.30										
81.99						28×0	6.5	RAW	100.0	-	-	-	-	-	-	-	6.5	4.9	33.7	29.9	31.5	7065	-	0.22										
			FLOOR: SHALE, POOR			1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	59.5	4.9	8.5	34.1	49.1	10337	-	0.29	4.43	59.6	4.9	13.9	33.6	46.0	9882			

A0195	THK 1.87	3.70	59.6	4.9	13.1	33.6	46.4	9945				
A0196		1.83	59.5	4.9	8.5	34.1	49.1	10337				

LOCATION MAP

TN

SCALE:

COORDINATES: Y 1270 m N X 955 m W of S.E. corner of CL 83
ELEVATION: 564.80 m BITS USED: J.K. SMIT COMBINATION
DIP: 90° BEARING: N/A MUD USED:
CORE SIZE: HQ CASING: 3.05 HW m LEFT IN HOLE: 0 m
DATE START: AUGUST 10/79 FINISH: AUGUST 13/79
DRILLER: CARON DIAMOND DRILLING OVERALL RECOVERY: 85.07
TESTS:
SAMPLED BY: DATE: AUGUST 15/79 ANALYZED BY: BIRTLEY COAL + MINERALS TESTING

BOREHOLE NO. BP-79-19
PAN OCEAN OIL LTD. (PAGE 1)
MINING DIVISION – COAL

LOGGED BY: O. CULLINGHAM, D. HOPE DATE: AUGUST 15/79
SIGNED:

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
			OVERBURDEN – DISAGGREGATED CONGLOMERATE
			SEE BELOW
7.92			CONGLOMERATE – LIGHT GRAY, MASSIVE BEDDED, PEBBLE TO COBBLE CONGLOMERATE POORLY SORTED, ROUNDED, LOW SPHERITY, CLASTS OF QUARTZ AND CHERT, WITH SOME QUARTZ VEINING IN A MATRIX OF MEDIUM TO COARSE GRAINED SALT AND PEPPER SANDSTONE, GOOD POROSITY, TAR SATURATED
58.36		8.44	No. 1 SEAM HORIZON
66.80		6.08	SHALE – MEDIUM GRAY, SLIGHTLY CARBONACEOUS IN PART. CONTAINS PLANT FRAGMENTS AND IMPRINTS
72.88		11.64	SANDSTONE/CONGLOMERATIC SANDSTONE – FINE GRAINED TO CONGLOMERATIC COARSENS DOWNWARD. QUARTZ AND CHERT COMPOSITIONS.
84.52		2.96	No. 2 SEAM HORIZON
87.48		1.52	SHALE – MEDIUM GRAY. GRADATIONAL TO SILTSTONE BELOW
89.00		12.02	SANDSTONE/CONGLOMERATIC SANDSTONE – SILTSTONE TO CONGLOMERATIC SANDSTONE, GRADATIONAL DOWNWARD.
101.02		5.31	SHALE – MEDIUM GRAY IN PART CARBONACEOUS, FLECKS AND SPLINTS OF COAL THROUGHOUT
106.33		3.34	No. 3 SEAM HORIZON
109.67		4.49	SHALE – DARK TO MEDIUM GRAY, LIGHTENS DOWNWARD.
114.16			

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			No. 1 SEAM HORIZON		
			ROOF – CONGLOMERATE, GOOD		
58.36		0.10	COAL – DULL TO VITREOUS		
58.46		0.06	COAL – DULL TO VITREOUS LOST CORE		
58.52		0.08	COAL – DULL TO VITREOUS		
58.60		0.20	SHALEY COAL		
58.80		0.03	COAL – DULL TO VITREOUS		
58.83		0.32	SHALE – CARBONACEOUS TO COALY		
59.15		0.35	COAL – VITREOUS		
59.50		0.15	SHALE – CARBONACEOUS TO COALY		
59.65		0.26	SHALE – MEDIUM GRAY, BLOCKY	NOT	
59.91		0.66	SHALE – CARBONACEOUS	SAMPLED	
60.57		0.55	COAL – DULL TO VITREOUS	FOR	
61.12		0.11	SHALE – CARBONACEOUS TO COALY	ANALYSIS	
61.23		0.08	COAL – VITREOUS		
61.31		0.18	COAL – VITREOUS TO BRIGHT		
61.49		0.30	SHALEY COAL		
61.79		0.05	SHALE – CARBONACEOUS		
61.84		0.06	COAL – DULL TO VITREOUS		
61.90		0.14	SHALE – CARBONACEOUS	(SAMPLED	
62.04		0.24	COAL – DULL TO VITREOUS	FOR	
62.28		0.10	SHALE – CARBONACEOUS	PALYNOLOGY	
62.38		0.66	COAL – VITREOUS TO BRIGHT	AND	
63.04		0.70	SHALE – DARK GRAY, DULL, BLOCKY	PETROGRAPHY)	
63.74		0.87	COAL – VITREOUS AND BRIGHT		
64.61		0.01	LOST CORE		
64.62		0.44	COAL – VITREOUS AND BRIGHT		
65.06		0.29	SHALE – CARBONACEOUS		
65.35		0.45	COAL – DULL TO VITREOUS		
65.80		0.16	SHALE – CARBONACEOUS		
65.96		0.16	COAL – DULL TO VITREOUS		
66.12		0.06	SHALE – CARBONACEOUS		
66.18		0.52	COAL – DULL TO BRIGHT		
66.70		0.10	SHALE – CARBONACEOUS TO COALY		
66.80			FLOOR – SHALE, POOR		
			No. 2 SEAM HORIZON		
			ROOF – SANDSTONE, GOOD		
84.52		1.31	COAL – MOSTLY VITREOUS TO BRIGHT, PARTED TO BANDED, BLOCKY 0.03 CARBONACEOUS SHALE AT BASE		
85.83		0.12	NO CORE		
85.95		0.18	SHALE – CARBONACEOUS		
86.13		0.39	SHALEY COAL		
86.52		0.53	COAL – VITREOUS TO BRIGHT, BASAL 0.04 IS CARBONACEOUS SHALE	NOT SAMPLED FOR ANALYSIS	
87.05		0.43	NO CORE		
87.48			FLOOR – SHALE IS POOR	(SAMPLED FOR PALYNOLOGY AND PETROGRAPHY)	

	SIZE		WEIGHT PERCENT									CUMULATIVE WEIGHT PERCENT							CUMULATIVE SAMPLE VALUES							OTHER		
	DIAMETER	WT %	SPEC GRAV	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I.	S	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I.	S	THICKNESS	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I.	S			
					RM	ASH	VOL	F.C.					RM	ASH	VOL	F.C.						RM	ASH	VOL	F.C.						

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y X
ELEVATION:
DIP: BEARING:
CORE SIZE: CASING:

BITS USED:
MUD USED:
m LEFT IN HOLE: m

DATE START: FINISH:
DRILLER: OVERALL RECOVERY:
TESTS:
SAMPLED BY: DATE: ANALYZED BY:

BOREHOLE NO. BP-79-19
PAN OCEAN OIL LTD. (PAGE 2)
MINING DIVISION – COAL

LOGGED BY: DATE:
SIGNED:

GEOLOGICAL LOG – SCALE:

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS	SIZE: DIAMETER	SIZE: WT %	WEIGHT PERCENT: SPEC GRAV	YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT: YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I	S	CUMULATIVE SAMPLE VALUES: THICKNESS	YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I.	S	OTHER
			No. 3 SEAM HORIZON																																
106.33			ROOF-SHALE, POOR																																
106.52		0.19	COAL-DULL TO VITREOUS																																
106.62		0.10	SHALE																																
106.97		0.35	SHALEY COAL																																
107.27		0.30	SHALE-CARBONACEOUS TO COAL																																
107.35		0.08	SHALEY COAL																																
107.68		0.33	COAL-VITREOUS TO BRIGHT																																
		0.26	COAL-DULL TO VITREOUS																																
107.94		0.66	SHALEY COAL																																
108.60		0.62	SHALE																																
108.72		0.08	COAL VITREOUS																																
108.80		0.01	LOST CORE																																
108.81		0.31	COAL-DULL TO BRIGHT																																
109.12		0.55	SHALEY COAL																																
109.67			FLOOR-SHALEY, POOR																																

NOT SAMPLED FOR ANALYSIS

(SAMPLED FOR PALYNOLOGY AND PETROGRAPHY)

LOCATION MAP

TN

SCALE:

COORDINATES: Y 2240 m N X 930 m W. of S.E. corner of CL83
ELEVATION: 556.29 BITS USED: J.K. SMIT COMBINATION
DIP: -90° BEARING: - MUD USED: 55 GALS POLY 325
CORE SIZE: HQ CASING: HW-3.66 m LEFT IN HOLE: NIL m
10 GALS POLY 357

DATE START: AUG. 17, 1979 FINISH: AUG. 20, 1979
DRILLER: CARON DIAMOND DRILLING OVERALL RECOVERY: 91%
TESTS:
SAMPLED BY: O. CULLINGHAM DATE: AUG., 1979 ANALYZED BY: BIRTLEY COAL + MINERALS TESTING

BOREHOLE NO. BP-79-20
PAN OCEAN OIL LTD. (PAGE 1)
MINING DIVISION – COAL

LOGGED BY: D. HOPE, O. CULLINGHAM DATE: AUG. 1979
SIGNED:

GEOLOGICAL LOG – SCALE: 1:500

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
75.28		75.28	CONGLOMERATE - THICK TO MASSIVELY BEDDED, POORLY SORTED, ROUNDED, LOW TO MODERATE SPHERICITY; QUARTZ AND CHERT PEBBLES; SOME QUARTZ VEINING IN CHERT PEBBLES; RARE SANDSTONE INTERBEDS. SATURATED WITH TAR.
75.28		9.22	No. 1 SEAM HORIZON
84.50		5.86	SHALE - DARK GRAY; IN PART CARBONACEOUS
90.36		5.09	SANDSTONE/CONGLOMERATE - GRADATIONAL SEQUENCE OF BEDS OF SANDSTONE TO CONGLOMERATE
95.45		1.17	SHALE - MEDIUM GRAY, BLOCKY
96.62		1.52	CONGLOMERATIC SANDSTONE
98.14		2.32	No. 2 SEAM HORIZON
100.46		4.18	SHALE - MEDIUM TO DARK GRAY; SILTY BASALLY
104.64		1.14	SILTSTONE/SHALE - MEDIUM TO DARK GRAY; PARTED
105.78		15.22	SANDSTONE - GRADATIONAL FROM SILTSTONE TO A FINE PEBBLE CONGLOMERATE CROSS-BEDDED.
121.00		0.89	SHALE - MEDIUM TO DARK GRAY
121.89		3.83	No. 3 SEAM HORIZON
125.72		1.81	SHALE - CARBONACEOUS AT TOP, MEDIUM TO DARK GRAY
127.53		1.09	SILTSTONE - LIGHT GRAY; FESTOON CROSS-BEDDING
128.62		3.05	SILTSTONE/SHALE - MEDIUM TO LIGHT GRAY
131.67			

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			No. 1 SEAM HORIZON		
			ROOF CONGLOMERATE, GOOD		
75.28		0.27	CARBONACEOUS SHALE		
75.55		0.48	COAL - VITREOUS; SPLINTS AND PARTINGS, BRIGHT COAL		
		0.37	CARBONACEOUS AND COALY SHALE	A0220	1.49
		0.42	COAL - VITREOUS; SPLINTS AND PARTINGS OF BRIGHT COAL		
97.04		0.22	CARBONACEOUS TO COALY SHALE; SHALY COAL		
		1.53	SHALE - SOFT, FRAGMENTAL, IN PART CARBONACEOUS (NOT SAMPLED)		
78.57		0.72	COAL - DULL TO VITREOUS PARTINGS AND BANDS OF BRIGHT COAL		
79.29		0.57	CARBONACEOUS TO COALY SHALE	A0221	2.35
79.86		1.06	COAL - VITREOUS AND BRIGHT, CONTAINS 0.14 m BAND OF HARD BLOCKY SHALE		
80.92		0.58	SHALE - DULL, FRAGMENTAL TO BLOCKY, SLIGHTLY CARBONACEOUS	A0222	0.58
81.50		0.90	COAL DULL TO BRIGHT, BANDED		
82.40		0.26	SHALE - DULL, HARD, BLOCKY		
82.66		0.67	COAL - DULL TO BRIGHT, MINOR CARBONACEOUS SHALE PARTINGS	A0223	3.00
83.33		0.46	CARBONACEOUS TO COALY SHALE		
83.79		0.61	COAL - VITREOUS AND BRIGHT		
84.40		0.10	CARBONACEOUS AND COALY SHALE		
84.50			FLOOR - CARBONACEOUS TO DARK GRAY SHALE, POOR		
			No. 2 SEAM HORIZON		
			ROOF - CONGLOMERATIC SANDSTONE, PARTIALLY DECEMENTED; POOR		
98.14		0.98	COAL - DULL TO VITREOUS		
99.12		0.71	CARBONACEOUS TO COALY SHALE AND SHALY COAL	A0224	2.32
99.83		0.63	COAL - VITREOUS AND BRIGHT		
100.46			FLOOR SHALE - SOFT, MEDIUM TO DARK GRAY POOR		
			No. 3 SEAM HORIZON		
			ROOF SHALE - DARK GRAY, CARBONACEOUS		
121.89		0.36	CARBONACEOUS AND COALY SHALE	A0225	0.36
122.25		1.30	COAL - VITREOUS AND BRIGHT; ONE 0.12 BAND OF SHALY COAL		
123.55		0.16	SHALE - MEDIUM GRAY BROWN	A0226	2.56
		1.10	COAL - DULL TO BRIGHT, PARTINGS OF DULL SHALY COAL AND COALY SHALE		
124.81		0.58	SHALE - DULL, FRAGMENTAL, SOFT; MEDIUM GRAY BROWN	A0227	0.58
125.39		0.33	COAL - DULL TO VITREOUS	A0228	0.33
125.72			FLOOR - SHALE, POOR		

SAMPLE NUMBER	THICKNESS	SIZE DIAMETER	SIZE WT %	SPEC GRAV	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
				-1.90	42.8	7.2	28.0	26.8	38.0	9568	-	0.35
		1/4×28	92.7	+1.90	57.2	2.5	79.8	-	-	-	-	-
		28×0	7.3	RAW	100.0	4.7	53.7	19.0	22.6	4301	-	0.15
		1/4×0	100.0	RAW	100.0	4.5	57.1	18.4	20.0	3822	-	0.13
		1/4×28	92.7	-1.90	42.8	-	-	-	-	-	-	-
A0220	1.49	28×0	7.3	RAW	100.0	-	-	-	-	-	-	-
		1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-
		1/4×28	93.8	-1.90	61.2	7.5	17.4	32.3	42.8	9179	-	0.47
				+1.90	38.8	3.3	73.9	-	-	-	-	-
		28×0	6.2	RAW	100.0	6.3	36.8	26.1	30.8	6579	-	0.21
		1/4×0	100.0	RAW	100.0	6.7	39.1	25.8	28.4	6188	-	0.36
		1/4×28	93.8	-1.90	61.2	-	-	-	-	-	-	-
		28×0	6.2	RAW	100.0	-	-	-	-	-	-	-
A0221	2.35	1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-
		1/4×28	96.0	-1.90	7.5	6.1	34.7	26.1	33.1	7028	-	0.40
				+1.90	92.5	3.8	78.6	-	-	-	-	-
		28×0	4.0	RAW	100.0	5.0	69.4	14.6	11.0	-	-	0.13
		1/4×0	100.0	RAW	100.0	3.9	75.5	14.5	6.1	-	-	0.12
		1/4×28	96.0	-1.90	7.5	-	-	-	-	-	-	-
		28×0	4.0	RAW	100.0	-	-	-	-	-	-	-
A0223	3.00	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
		1/4×28	93.6	-1.90	70.5	6.7	23.4	31.7	38.2	8530	-	0.48
				+1.90	29.5	3.1	69.6	-	-	-	-	-
		28×0	6.4	RAW	100.0	6.5	32.0	30.3	31.2	7287	-	0.33
		1/4×0	100.0	RAW	100.0	6.4	36.7	28.4	28.5	6545	-	0.38
		1/4×28	93.6	-1.90	70.5	-	-	-	-	-	-	-
		28×0	6.4	RAW	100.0	-	-	-	-	-	-	-
		1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-
		1/4×28	93.4	-1.90	71.7	8.0	13.8	32.3	45.9	9612	-	0.39
				+1.90	28.3	2.8	68.8	-	-	-	-	-
		28×0	6.6	RAW	100.0	6.7	26.2	30.4	36.7	7864	-	0.31
		1/4×0	100.0	RAW	100.0	6.7	29.8	28.6	34.9	7455	-	0.34
A0224	2.32	1/4×28	93.4	-1.90	71.7	-	-	-	-	-	-	-
		28×0	6.6	RAW	100.0	-	-	-	-	-	-	-
		1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-
		1/4×28	94.7	-1.90	30.5	5.9	33.3	27.6	33.2	7191	-	0.39
				+1.90	69.5	2.9	71.8	-	-	-	-	-
		28×0	5.3	RAW	100.0	4.1	54.7	21.2	20.0	4195	-	0.20
		1/4×0	100.0	RAW	100.0	3.3	59.5	20.4	16.8	-	-	0.17
		1/4×28	94.7	-1.90	30.5	-	-	-	-	-	-	-
		28×0	5.3	RAW	100.0	-	-	-	-	-	-	-
		1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-
		1/4×28	93.4	-1.90	66.2	7.3	17.1	31.6	44.0	9314	-	0.41
				+1.90	33.8	2.0	71.7	-	-	-	-	-
		28×0	6.6	RAW	100.0	6.4	34.8	28.2	30.6	6842	-	0.25
		1/4×0	100.0	RAW	100.0	7.1	35.2	26.8	30.9	6558	-	0.22
		1/4×28	93.4	-1.90	66.2	-	-	-	-	-	-	-
		28×0	6.6	RAW	100.0	-	-	-	-	-	-	-
A0226	2.56	1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-
		1/4×28	84.1	-1.90	1.0	7.2	17.6	31.4	43.2	9280	-	0.36
				+1.90	99.0	2.2	89.8	-	-	-	-	-
		28×0	15.9	RAW	100.0	2.4	89.1	6.2	2.3	-	-	0.09
		1/4×0	100.0	RAW	100.0	2.4	89.2	6.9	1.5	-	-	0.10
		1/4×28	84.1	-1.90	1.0	-	-	-	-	-	-	-
		28×0	15.9	RAW	100.0	-	-	-	-	-	-	-
A0227	0.58	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
		1/4×28	93.6	-1.90	70.5	6.7	23.4	31.7	38.2	8530	-	0.48
				+1.90	29.5	3.1	69.6	-	-	-	-	-
		28×0	6.4	RAW	100.0	6.5	32.0	30.3	31.2	7287	-	0.33
		1/4×0	100.0	RAW	100.0	6.4	36.7	28.4	28.5	6545	-	0.38
		1/4×28	93.6	-1.90	70.5	-	-	-	-	-	-	-
		28×0	6.4	RAW	100.0	-	-	-	-	-	-	-
A0228	0.33	1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-
		1/4×28	87.4	-1.90	65.7	6.8	22.4	30.8	40.0	8760	-	0.61
				+1.90	34.3	3.7	70.5	-	-	-	-	-
		28×0	12.6	RAW	100.0	4.2	46.2	24.9	24.7	5464	-	0.31
		1/4×0	100.0	RAW	100.0	3.5	39.6	8.7	28.2	6462	-	0.42
		1/4×28	87.4	-1.90	65.7	-	-	-	-	-	-	-
		28×0	12.6	RAW	100.0	-	-	-	-	-	-	-
		1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-

CUMULATIVE WEIGHT PERCENT

YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
42.8	7.2	28.0	26.8	38.0	9568	-	0.35
100.0	4.5	57.6	-	-	-	-	-
100.0	4.7	53.7	19.0	22.6	4301	-	0.15
CALC	4.5	57.3	-	-	-	-	-
39.7	7.2	28.0	26.8	38.0	9568	-	0.35
7.3	4.7	53.7	19.0	22.6	4301	-	0.15
47.0	6.8	30.7	26.0	36.5	9096	-	0.32
61.2	7.5	17.4	32.3	42.8	9179	-	0.47
100.0	5.9	39.3	-	-	-	-	-
100.0	6.3	36.8	26.1	30.8	6579	-	0.21
CALC	5.9	39.1	-	-	-	-	-
57.4	7.5	17.4	32.3	42.8	9179	-	0.47
6.2	6.3	36.8	26.1	30.8	6579	-	0.21
63.6	7.3	19.0	31.7	41.8	9055	-	0.44
7.5	6.1	34.7	26.1	33.1	7028	-	0.40
100.0	4.0	75.3	-	-	-	-	-
100.0	5.0	69.4	14.6	11.0	-	-	0.13
CALC	4.0	75.1	-	-	-	-	-
7.2	6.1	34.7	26.1	33.1	7028	-	0.40
4.0	5.0	69.4	14.6	11.0	-	-	0.13
11.2	5.7	45.5	22.5	26.1	4923	-	0.30
70.5	6.7	23.4	31.7	38.2	8530	-	0.48
100.0	5.6	37.0	-	-	-	-	-
100.0	6.5	32.0	30.3	31.2	7287	-	0.33
CALC	5.7	36.7	-	-	-	-	-
66.0	6.7	23.4	31.7	38.2	8530	-	0.48
6.4	6.5	32.0	30.3	31.2	7287	-	0.33
72.4	6.6	24.1	31.5	37.6	8516	-	0.47
67.0	8.0	13.8	32.3	45.9	9612	-	0.39
100.0	6.5	29.4	-	-	-	-	-
100.0	6.7	26.2	30.4	36.7	7864	-	0.31
CALC	6.5	29.2	-	-	-	-	-
67.0	8.0	13.8	32.3	45.9	9612	-	0.39
6.6	6.7	26.2	30.4	36.7	7864	-	0.31
73.6	7.8	14.7	32.1	45.2	9570	-	0.38
30.5	5.9	33.3	27.6	33.2	7191	-	0.39
100.0	3.8	60.1	-	-	-	-	-
100.0	4.1	54.7	21.2	20.0	4195	-	0.20
CALC	3.8	59.8	-	-	-	-	-
28.9	5.9	33.3	27.6	33.2	7191	-	0.39
5.3	4.1	54.7	21.2	20.0	4195	-	0.20
34.2	5.6	35.7	26.8	31.7	6946	-	0.36
66.2	7.3	17.1	31.6	44.0	9314	-	0.41
100.0	5.5	35.5	-	-	-	-	-
100.0	6.4	34.8	28.2	30.6	6842	-	0.25
CALC	5.6	35.4	-	-	-	-	-
61.8	7.3	17.1	31.6	44.0	9314	-	0.41
6.6	6.4	34.8	28.2	30.6	6842	-	0.25
68.4	7.2	18.6	31.3	42.8	9195	-	0.39
1.0	7.2	17.6	31.4	43.2	9280	-	0.36
100.0	2.2	89.1	-	-	-	-	-
100.0	2.4	89.1	6.2	2.3	-	-	0.09
CALC	2.2	89.1	-	-	-	-	-
0.8	7.2	17.6	31.4	43.2	9280	-	0.36
15.9	2.4	89.1	6.2	2.3	-	-	0.09
16.7	2.6	79.7	9.5	7.6	1313	-	0.09
65.7	6.8	22.4	30.8	40.0	8760	-	0.61
100.0	5.7	38.9	-	-	-	-	-
100.0	4.2	46.2	24.9	24.7	5464	-	0.31
CALC	5.5	39.8	-	-	-	-	-
57.4	6.8	22.4	30.8	40.0	8760	-	0.61
12.6	4.2	46.2	24.9	24.7	5464	-	0.31
70.0	6.3	25.2	30.1	38.1	8459	-	0.56

CUMULATIVE SAMPLE VALUES

THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C	BTU	F.S.I.	S
1.49	47.0	6.8	30.7	26.0	36.5	9096	-	0.32
3.84	57.1	7.1	22.7	29.8	40.1	9068	-	0.44
4.42	51.1	7.1	23.3	29.6	39.7	8948	-	0.30
2.32	75.6	7.8	14.7	32.1	45.2	9570	-	0.38
0.36	34.2	5.6	35.7	26.8	31.7	6946	-	0.36
2.92	64.1	7.0	19.7	31.0	42.0	9047	-	0.39
3.50	56.3	6.8	22.6	29.9	40.3	8667	-	0.36
3.83	57.4	6.8	22.9	29.9	40.1	8645	-	0.56

OTHER

LW

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y X
ELEVATION:
DIP: BEARING:
CORE SIZE: CASING:

BITS USED:
MUD USED:
m LEFT IN HOLE: m

DATE START: FINISH:
DRILLER: OVERALL RECOVERY:
TESTS:
SAMPLED BY: DATE: ANALYZED BY:

BOREHOLE NO. BP-79-20
PAN OCEAN OIL LTD. (PAGE 2)
MINING DIVISION – COAL

LOGGED BY: DATE:
SIGNED:

GEOLOGICAL LOG – SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION

DETAILS OF COAL SEAMS – SCALE:

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS	SIZE: DIAMETER	SIZE: WT %	WEIGHT PERCENT: SPEC GRAV	YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL	F.C	BTU	F.S.I.	S

CUMULATIVE WEIGHT PERCENT

YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL.	F.C.	BTU	F.S.I	S

CUMULATIVE SAMPLE VALUES

	THICK-NESS	YIELD	PROXIMATE ANALYSIS: RM	ASH	VOL.	F.C.	BTU	F.S.I.	S
No. 1 SEAM HORIZON									
A0220	EXCLUDED								
A0221	2.35	63.6	7.3	19.0	31.7	41.8	9055		
A0222	2.93	53.2	7.2	20.1	31.3	41.1	8882		
A0223 (0.77) THK	3.70	57.2	7.0	21.1	31.3	40.2	8786		
No. 1 SEAM HORIZON									
A0220	EXCLUDED								
A0221 (0.12) THK	3.70	62.5	6.6	24.5	31.2	37.4	8432		
A0222	3.58	62.4	6.5	24.7	31.2	37.2	8411		
A0223	3.00	72.4	6.6	24.1	31.5	37.6	8516		
No. 3 SEAM HORIZON									
A0225	EXCLUDED								
A0226	2.56	68.4	7.2	18.6	31.3	42.8	9195		
A0227	3.14	58.8	6.9	21.8	30.1	40.9	8781		
A0228	3.47	59.9	6.8	22.1	30.1	40.6	8745		

OTHER

LOCATION MAP

TN

SCALE:

COORDINATES: Y 3850 m N. X 045m W. OF S.E. CORNER OF CL 83
ELEVATION: 530.59 m BITS USED: J.K. SMIT COMBINATION
DIP: 90° BEARING: MUD USED: 75 GALS. POLY 325; 50 GALS. POLY 357
CORE SIZE: NQ CASING: 9.75 m LEFT IN HOLE: 0 m
DATE START: AUGUST 23, 1979 FINISH: AUGUST 27, 1979
DRILLER: CARON DIAMOND DRILLING OVERALL RECOVERY: 86 %
TESTS:
SAMPLED BY: D. HOPE DATE: AUGUST 1979 ANALYZED BY: BIRTLEY COAL & MINERALS TESTING SIGNED:

BOREHOLE NO. BP-79-21
PAN OCEAN OIL LTD. (PAGE 1)
MINING DIVISION – COAL

LOGGED BY: D. HOPE DATE: AUGUST 28, 1979

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	THICKNESS	DESCRIPTION
	21.39	OVERBURDEN: BROKEN DISAGGREGATED CORE, SOFT SANDY MUD, PIECE OF LARGE BOULDERS OF QUARTZITE, CHERT, CARBONATE AND SHALE.
21.39		
	26.59	SHALE TO CONGLOMERATE: GRADATIONAL SEQUENCE OF INTERBEDS OF SHALE TO COBBLE CONGLOMERATE; HEAVILY TAR STAINED. (44.81-44.98) COAL: DULL TO VITREOUS, SHALEY.
47.98		
	69.97	CONGLOMERATE: POORLY SORTED, PEBBLES TO COBBLES, QUARTZITE AND CHERT, SALT AND PEPPER MEDIUM TO COURSE GRAINED SANDSTONE MATRIX. GOOD POROSITY, TAR SATURATED
117.95		
	4.05	SHALE: LIGHT TO MEDIUM GRAY-BROWN, CUBIC WEATHERING
122.00		
	4.21	NO. 1 SEAM HORIZON
126.21		
	8.38	SHALE: MEDIUM TO DARK GRAY-BROWN, CARBONAREOUS NEAR TOP, SILTY AT BASE
134.95		
	5.60	SANDSTONE: VERY FINE GRAINED TO PEBBLE CONGLOMERATE, COARSENS DOWNWARD
140.27		
	4.13	CONGLOMERATE: FINE TO MEDIUM PEBBLE CONGLOMERATE, MODERATELY WELL SORTED.
144.40		
	2.01	NO. 2 SEAM HORIZON
146.41		
	3.59	SHALE: CARBONACEOUS NEAR TOP, SILTY AT BASE.
150.00		
	7.15	SANDSTONE: FINE TO COARSE GRAINED, COARSENING DOWNWARD. CARBONACEOUS PARTINGS THROUGHOUT
157.15		

CONTINUED ON PAGE 2

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
		NO. 1 SEAM HORIZON		
		ROOF: SHALE, POOR		
122.00				
122.57	0.57	COALY SHALE	AO 214	1.08
122.64	0.07	COAL: DULL TO VITREOUS		
123.08	0.44	SHALE: CARBONACEOUS		
123.29	0.21	COAL: DULL TO VITREOUS		
123.57	0.28	SHALEY COAL		
123.92	0.35	COAL: MOSTLY BRIGHT	AO 215	1.54
	0.70	COAL: DULL TO BRIGHT		
124.62	0.23	SHALE: CARBONACEOUS		
124.85	0.57	SHALEY COAL	AO 216	1.59
125.42	0.12	SHALE: CARBONACEOUS		
125.54	0.19	SHALE: CARBONACEOUS		
125.73	0.19	COAL: DULL TO VITREOUS		
125.93	0.29	SHALEY COAL		
126.21		FLOOR: SHALE, POOR		
		NO. 2 SEAM HORIZON		
144.40		ROOF: CONGLOMERATE GOOD		
145.48	1.08	COAL: DULL TO VITREOUS	AO 217	2.01
145.59	0.11	COAL: AS ABOVE		
145.77	0.18	COALY SHALE		
145.94	0.17	SHALEY COAL		
146.41	0.47	COAL: DULL TO VITREOUS		
		FLOOR: SHALE, SOFT, POOR		

SAMPLE NUMBER	SIZE DIAMETER	SIZE WT %	SPEC GRAV	WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	OTHER
	1/4×28	91.6	-1.90	13.6	6.7	29.4	28.6	35.3	7753	-	0.36	13.6	6.7	29.4	28.6	35.3	7753	-	0.36										
			+1.90	86.4	2.5	80.9	-	-	-	-	-	100.0	3.1	73.9	-	-	-	-	-										
	28×0	8.4	RAW	100.0	3.5	67.0	15.7	13.8	-	-	0.16	100.0	3.5	67.0	15.7	13.8	-	-	0.16										
	1/4×0	100.0	RAW	100.0	2.6	74.0	13.7	9.5	-	-	0.12	CALC	3.1	73.3	-	-	-	-	-										
	1/4×28	91.6	-1.90	13.6	-	-	-	-	-	-	-	12.4	6.7	29.4	28.6	35.3	7753	-	0.36										
	28×0	8.4	RAW	100.0	-	-	-	-	-	-	-	8.4	3.5	67.0	15.7	13.8	-	-	0.16										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	20.8	5.4	39.2	25.2	29.6	5820	-	0.28	1.08	20.8	5.4	39.2	25.2	29.6	5820			
AO 214	1/4×28	93.4	-1.90	82.7	7.6	22.7	31.1	38.6	8276	-	0.33	82.7	7.6	22.7	31.1	38.6	8276	-	0.33										
			+1.90	17.3	3.6	68.8	-	-	-	-	-	100.0	6.9	30.7	-	-	-	-	-										
	28×0	6.6	RAW	100.0	6.5	29.6	30.1	33.8	7620	-	0.19	100.0	6.5	29.6	30.1	33.8	7620	-	0.19										
	1/4×0	100.0	RAW	100.0	6.8	31.3	30.0	31.9	7453	-	0.23	CALC	6.9	30.6	-	-	-	-	-										
AO 215	1/4×28	93.4	-1.90	82.7	-	-	-	-	-	-	-	77.2	7.6	22.7	31.1	38.6	8276	-	0.33										
	28×0	6.6	RAW	100.0	-	-	-	-	-	-	-	6.6	6.5	29.6	30.1	33.8	7620	-	0.19										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	83.8	7.5	23.1	31.0	38.2	8323	-	0.32	2.62	57.8	7.1	25.4	30.1	36.9	7951			
AO 216	1/4×28	92.8	-1.90	29.3	6.4	32.5	28.2	32.9	7327	-	0.19	29.3	6.4	32.5	28.2	32.9	7327	-	0.19										
			+1.90	70.7	2.6	78.7	-	-	-	-	-	100.0	3.7	65.2	-	-	-	-	-										
	28×0	7.2	RAW	100.0	3.8	62.8	18.7	14.7	-	-	0.29	100.0	3.8	62.8	18.7	14.7	-	-	0.29										
	1/4×0	100.0	RAW	100.0	3.5	65.7	19.2	11.6	-	-	0.15	CALC	3.7	65.0	-	-	-	-	-										
	1/4×28	92.8	-1.90	29.3	-	-	-	-	-	-	-	27.2	6.4	32.5	28.2	32.9	7327	-	0.19										
	28×0	7.2	RAW	100.0	-	-	-	-	-	-	-	7.2	3.2	62.8	18.7	14.7	-	-	0.29										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	34.4	5.8	36.6	26.9	30.4	6425	-	0.21	4.12	48.9	6.8	28.4	29.2	35.1	7546			
AO 217	1/4×28	93.3	-1.90	76.7	7.5	22.7	28.9	40.9	8309	-	0.36	76.7	7.5	22.7	28.9	40.9	8309	-	0.36										
			+1.90	23.3	2.7	70.2	-	-	-	-	-	100.0	6.4	33.8	-	-	-	-	-										
	28×0	6.7	RAW	100.0	7.0	31.1	27.0	34.9	7274	-	0.31	100.0	7.0	31.1	27.0	34.9	7274	-	0.31										
	1/4×0	100.0	RAW	100.0	7.0	33.9	26.2	32.9	6803	-	0.25	CALC	6.4	33.6	-	-	-	-	-										
	1/4×28	93.3	-1.90	76.7	-	-	-	-	-	-	-	71.6	7.5	22.7	28.9	40.9	8309	-	0.36										
	28×0	6.7	RAW	100.0	-	-	-	-	-	-	-	6.7	7.0	31.1	27.0	34.9	7274	-	0.31										
	1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	78.3	7.4	23.3	28.7	40.4	8318	-	0.36	2.01	78.3	7.4	23.3	28.7	40.4	8318			

A0214																				EXCLUDED									
A0215																				1.54	83.8	7.5	23.1	31.0	38.2	8323			
A0216																				3.13	58.7	6.9	27.1	29.7	35.8	7758			

LOCATION MAP

TN

SCALE:

COORDINATES: Y X

ELEVATION: BITS USED:

DIP: BEARING: MUD USED:

CORE SIZE: CASING: m LEFT IN HOLE: m

DATE START: FINISH:

DRILLER: OVERALL RECOVERY:

TESTS:

SAMPLED BY: DATE: ANALYZED BY:

BOREHOLE NO. BP-79-21
PAN OCEAN OIL LTD. (PAGE 2)
MINING DIVISION – COAL

LOGGED BY: DATE:

SIGNED:

GEOLOGICAL LOG – SCALE: 1:500

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
			CONTINUED FROM PAGE 1
157.15		7.37	SHALE, DARK GRAY, HARD, BLOCKY, CARBONACEOUS AT TOP, SILTY AND LAMINATED TO THINLY BEDDED AT BASE.
164.52		2.63	NO. 3 SEAM HORIZON
167.15		0.82	COAL SHALE - CARBONACEOUS
168.93		7.19	SHALE/SILTSTONE, MEDIUM BROWN TO DARK GRAY, CARBONACEOUS AT TOP GRADES TO SILTSTONE AT BASE (0.52 m) COAL IN UNIT (SHOWN)
174.34			END OF HOLE

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			NO. 3 SEAM HORIZON		
			ROOF: SHALE, BLOCKY, MODERATELY GOOD:		
164.52		0.12	COAL: VITREOUS		
164.64		0.33	SHALEY COAL		
164.97		0.12	COAL: DULL TO VITREOUS		
165.09		0.13	COAL: DULL		
165.22		0.07	COAL AS ABOVE		
165.29		0.31	SHALEY COAL		
165.60		0.09	COAL: DULL TO VITREOUS		
165.69		0.28	SHALEY COAL	AO 218	2.63
165.97		0.25	COAL: VITREOUS TO BRIGHT		
166.22		0.15	SHALE: MEDIUM GRAY-BROWN		
166.37		0.12	COAL: DULL		
166.49		0.23	SHALEY COAL		
166.72		0.43	SHALEY COAL		
167.15		1.26	SHALE: SLIGHTLY CARBONACEOUS		
168.41		0.52	COAL: DULL, SOFT PLATY	AO 219	0.52
168.93			FLOOR: SHALE, SOFT, POOR		

SIZE DIAMETER	SIZE WT %	SPEC GRAV	WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	CUMULATIVE WEIGHT PERCENT YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I	S	CUMULATIVE SAMPLE VALUES THICKNESS	YIELD	PROXIMATE ANALYSIS RM	ASH	VOL	F.C.	BTU	F.S.I.	S	OTHER
1/4×28	93.6	-1.90	54.6	6.7	27.2	28.7	37.4	7843	-	0.43	54.6	6.7	27.2	28.7	37.4	7843	-	0.43									
		+1.90	45.4	2.5	70.1	-	-	-	-	-	100.0	4.8	46.7	-	-	-	-	-									
28×0	6.4	RAW	100.0	5.9	41.0	26.4	26.7	5992	-	0.22	100.0	5.9	41.0	26.4	26.7	5992	-	0.22									
1/4×0	100.0	RAW	100.0	5.5	46.2	24.3	24.0	5258	-	0.21	CALC.	4.9	46.3	-	-	-	-	-									
1/4×28	93.6	-1.90	54.6	-	-	-	-	-	-	-	51.1	6.7	27.2	28.7	37.4	7843	-	0.43									
28×0	6.4	RAW	100.0	-	-	-	-	-	-	-	6.4	5.9	41.0	26.4	26.7	5992	-	0.22									
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	57.5	6.6	28.5	28.4	36.3	7752	-	0.41	2.63	57.5	6.6	28.5	28.4	36.3	7752		
1/4×28	91.7	-1.90	46.0	6.8	26.2	30.2	36.8	8233	-	0.58	46.0	6.8	26.2	30.2	36.8	8233	-	0.58									
		+1.90	54.0	3.8	71.0	-	-	-	-	-	100.0	5.2	50.4	-	-	-	-	-									
28×0	8.3	RAW	100.0	4.2	53.7	21.7	20.4	4324	-	0.33	100.0	4.2	53.7	21.7	20.4	4324	-	0.33									
1/4×0	100.0	RAW	100.0	5.0	50.7	21.9	22.4	4683	-	0.42	CALC.	5.2	50.7	-	-	-	-	-									
1/4×28	91.7	-1.90	46.0	-	-	-	-	-	-	-	42.2	6.8	26.2	30.2	36.8	8233	-	0.58									
28×0	8.3	RAW	100.0	-	-	-	-	-	-	-	8.3	4.2	53.7	21.7	20.4	4324	-	0.33									
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	50.5	6.3	29.1	29.2	35.0	7903	-	0.54	3.15	56.3	6.5	28.5	28.5	36.1	7774		

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y 10,050m W X 650m N of SE corner of CL 88
ELEVATION: 600.47m BITS USED: J.K. SMIT COMBINATION
DIP: 90° BEARING: MUD USED:
CORE SIZE: NQ CASING: HW 9.75m NW 29.26m m LEFT IN HOLE: NIL m

DATE START: AUG 28/1979 FINISH: SEPT 18/1979
DRILLER: E CARON DIAMOND DRILLING OVERALL RECOVERY: 89%
TESTS: GAMMA LOG
SAMPLED BY: O. CULLINGHAM DATE: OCT 9/79 ANALYZED BY: BIRTLEY COAL + MINERALS TESTING

BOREHOLE NO. BP-79-22/22A
PAN OCEAN OIL LTD. (PAGE 1)
MINING DIVISION – COAL

LOGGED BY: O. CULLINGHAM DATE:
SIGNED:

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	THICKNESS	DESCRIPTION
	60.37	OVERBURDEN – PROBABLE GLACIAL SANDS AND CLAYS, COBBLES AND BOULDERS OF VARIOUS LITHOLOGIES NEAR SURFACE, INTERVALS OF COBBLES AND BOULDERS AND UNCONSOLIDATED SANDS AND CLAYS
60.37	2.11	SANDSTONE – MEDIUM TO COARSE GRAINED; POORLY CEMENTED
62.48	17.38	SHALE – MEDIUM TO DARK GREY, SOFT – IN PART WITH SOFT PLASTICINE TEXTURE. CONTAINS THIN CARBONACEOUS AND COALY SECTIONS
79.86	6.09	SHALE – MEDIUM GRAY, MASSIVE BEDDED, SILTY AND SANDY BASALLY
85.95	6.55	SANDSTONE, CONGLOMERATIC SANDSTONE AND CONGLOMERATE; MEDIUM GRAY BROWN TO MEDIUM GRAY, IN PART RUBBLY
92.50	6.50	SHALE – MEDIUM TO MEDIUM-DARK GRAY; RELATIVELY COMPETENT; THIN CARBONACEOUS AND COALY SECTIONS, BECOMES SILTY AND SANDY BASALLY
99.00	7.00	SANDSTONE, CONGLOMERATIC SANDSTONE AND CONGLOMERATE GRADATIONAL FROM UNIT ABOVE TO CONGLOMERATE AND BACK TO SANDSTONE AT BASE
106.00		CONTINUED ON PAGE 2

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
		No. 1 SEAM HORIZON		
		ROOF – GOOD, CONGLOMERATE		
191.63	0.53	DOMINANTLY COAL AND SHALEY	A0237	0.53
192.16	0.66	CARBONACEOUS SHALE	A0238	0.66
192.82	3.26	COAL – DOMINANTLY VITREOUS TO BRIGHT, BLOCKY TO CONCOIDAL FRACTURE, MINOR DULL COAL AND RARE SHALEY COAL AND COALY SHALE. 0.05m LOST CORE	A0239	3.26
195.20	0.60			
196.08	0.79	CARBONACEOUS SHALE	A0240	0.79
196.87	1.73	DOMINANTLY COAL; DULL TO BRIGHT RARE CARBONACEOUS TO COALY SHALE	A0241	1.73
198.60		FLOOR – MODERATE, RELATIVELY COMPETENT SHALE		
		No. 2 SEAM HORIZON		
		ROOF – GOOD, CONGLOMERATE		
221.84	0.31	COAL – BRIGHT		
222.15	0.05	COAL – DULL		
222.20	1.13	COAL – MOSTLY BRIGHT		
223.33	0.66	ALTERNATING; COAL, SHALEY COAL AND CARBONACEOUS SHALE	A0242	2.72
223.99	0.57	COAL – MOSTLY BRIGHT		
224.56		FLOOR – POOR, SHALE – FRACTURES ALONG BEDDING		

WEIGHT PERCENT

SIZE DIAMETER	SIZE WT %	SPEC GRAV	YIELD	PROX RM	PROX ASH	PROX VOL	PROX F.C.	BTU	F.S.I.	S
1/4×28	95.2	-1.90	66.5	5.1	22.5	30.5	41.9	8622	-	-
		+1.90	33.5	2.8	61.7	-	-	-	-	-
28×0	4.8	RAW	100.0	7.1	29.6	27.1	36.2	7270	-	-
1/4×0	100.0	RAW	100.0	4.6	35.3	27.0	33.1	6873	-	-
1/4×28	95.2	-1.90	66.5	-	-	-	-	-	-	-
28×0	4.8	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
1/4×28	95.2	-1.90	1.3	5.6	35.3	24.6	34.5	6779	-	-
		+1.90	98.7	2.1	79.0	-	-	-	-	-
28×0	4.8	RAW	100.0	3.5	74.3	12.9	9.3	-	-	-
1/4×0	100.0	RAW	100.0	2.4	78.0	13.3	6.3	-	-	
1/4×28	95.2	-1.90	1.3	-	-	-	-	-	-	-
28×0	4.8	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
		-1.90	78.5	6.1	12.9	33.2	47.8	9962	-	-
1/4×28	94.5	+1.90	21.5	1.9	67.9	-	-	-	-	-
28×0	5.5	RAW	100.0	8.0	21.1	30.7	40.2	8540	-	
1/4×0	100.0	RAW	100.0	8.2	24.0	29.9	37.9	8724	-	
1/4×28	94.5	-1.90	78.5	-	-	-	-	-	-	-
28×0	5.5	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
1/4×28	94.9	-1.90	2.2	3.9	38.9	23.0	34.2	6416	-	-
		+1.90	97.8	1.9	78.7	-	-	-	-	-
28×0	5.1	RAW	100.0	2.9	72.6	16.1	8.4	-	-	-
1/4×0	100.0	RAW	100.0	2.2	77.3	13.7	6.8	-	-	-
1/4×28	94.9	-1.90	2.2	-	-	-	-	-	-	-
28×0	5.1	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
1/4×28	94.9	-1.90	73.8	6.1	18.4	33.5	42.0	9362	-	-
		+1.90	26.2	2.4	65.2	-	-	-	-	-
28×0	5.1	RAW	100.0	7.5	28.5	29.9	34.1	7563	-	
1/4×0	100.0	RAW	100.0	7.8	29.6	29.0	34.6	7366	-	
1/4×28	94.9	-1.90	73.8	-	-	-	-	-	-	-
28×0	5.1	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-
1/4×28	94.3	-1.90	83.1	6.9	12.0	33.4	47.7	10163	-	-
		+1.90	16.9	2.7	73.2	-	-	-	-	-
28×0	5.7	RAW	100.0	7.5	23.0	30.9	38.6	8499	-	
1/4×0	100.0	RAW	100.0	7.9	22.7	30.1	39.3	8308	-	
1/4×28	94.3	-1.90	83.1	-	-	-	-	-	-	-
28×0	5.7	RAW	100.0	-	-	-	-	-	-	-
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-

CUMULATIVE WEIGHT PERCENT

YIELD	PROX RM	PROX ASH	PROX VOL	PROX F.C.	BTU	F.S.I.	S
66.5	5.1	22.5	30.5	41.9	8622	-	0.25
100.0	4.3	35.6	-	-	-	-	-
100.0	7.1	29.6	27.1	36.2	7270	-	0.21
CALC.	4.4	35.3	-	-	-	-	-
63.3	5.1	22.5	30.5	41.9	8622	-	0.25
4.8	7.1	29.6	27.1	36.2	7270	-	0.21
68.1	5.2	23.1	30.1	41.3	8587	-	0.25
1.3	5.6	35.3	24.6	34.5	6779	-	0.23
100.0	2.1	78.4	-	-	-	-	-
100.0	3.5	74.3	12.9	9.3	-	-	0.07
CALC.	2.2	78.2	-	-	-	-	-
1.2	5.1	35.3	24.6	34.5	6779	-	0.23
4.8	3.5	74.3	12.9	9.3	-	-	0.07
6.0	3.9	63.1	16.2	16.5	2032	-	0.10
78.5	6.1	12.9	33.2	47.8	9962	-	0.31
100.0	5.2	24.7	-	-	-	-	-
100.0	8.0	21.1	30.7	40.2	8540	-	0.27
CALC.	5.3	24.5	-	-	-	-	-
74.2	6.1	12.9	33.2	47.8	9962	-	0.31
5.5	8.0	21.1	30.7	40.2	8540	-	0.27
79.7	6.2	13.6	32.9	47.1	9929	-	0.31
2.2	3.9	38.9	23.0	34.2	6416	-	0.29
100.0	1.9	77.8	-	-	-	-	-
100.0	2.9	72.6	16.1	8.4	-	-	0.07
CALC.	1.9	77.5	-	-	-	-	-
2.1	3.9	38.9	23.0	34.2	6416	-	0.29
5.1	2.9	72.6	16.1	8.4	-	-	0.07
7.2	3.1	60.5	18.5	17.5	2383	-	0.13
73.8	6.1	18.4	33.5	42.0	9362	-	0.46
100.0	5.1	33.7	-	-	-	-	-
100.0	7.5	28.5	29.9	34.1	7563	-	0.25
CALC.	5.2	33.4	-	-	-	-	-
70.0	6.1	18.4	33.5	42.0	9362	-	0.46
5.1	7.5	28.5	29.9	34.1	7563	-	0.25
75.1	6.1	19.2	33.2	41.3	9370	-	0.45
83.1	6.9	12.0	33.4	47.7	10163	-	0.42
100.0	6.2	22.3	-	-	-	-	-
100.0	7.5	23.0	30.9	38.6	8499	-	0.38
CALC.	6.3	22.3	-	-	-	-	-
78.4	6.9	12.0	33.4	47.7	10163	-	0.42
5.7	7.5	23.0	30.9	38.6	8499	-	0.38
84.1	6.9	12.8	33.2	47.0	10134	-	0.42

CUMULATIVE SAMPLE VALUES

THICKNESS	YIELD	PROX RM	PROX ASH	PROX VOL	PROX F.C.	BTU	F.S.I.	S
0.53	68.1	5.2	23.1	30.1	41.3	8587		
1.19	33.6	5.0	27.0	28.7	38.8	7938		
4.45	67.3	6.0	15.4	32.3	46.0	9663		
5.24	58.3	5.9	16.2	32.0	45.4	9527		
6.97	62.4	6.0	17.1	32.4	44.2	9480		
2.72	84.1	6.9	12.8	33.2	47.0	10134		

OTHER

LW

LOCATION MAP

TN ↑

SCALE:

COORDINATES: Y X

ELEVATION: BITS USED:

DIP: BEARING: MUD USED:

CORE SIZE: CASING: m LEFT IN HOLE: m

DATE START: FINISH:

DRILLER: OVERALL RECOVERY:

TESTS:

SAMPLED BY: DATE: ANALYZED BY:

BOREHOLE NO. BP-79-22A

PAN OCEAN OIL LTD. PAGE 2

MINING DIVISION – COAL

LOGGED BY: DATE:

SIGNED:

GEOLOGICAL LOG – SCALE: 1:500

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
106.00			CONTINUED FROM SHEET 1
			CONGLOMERATE - MASSIVE, LARGE PEBBLE; CONTAINS THIN INTERVALS OF SANDSTONE AND SHALE NEAR TOP OF UNIT; TYPICAL OF THE THICK CONGLOMERATE ABOVE THE No. 1 SEAM HORIZON
		85.63	
191.63		6.97	No. 1 SEAM HORIZON
198.60		4.70	SHALE - MEDIUM BROWNISH-GRAY TO MEDIUM GRAY, CARBONACEOUS AT TOP, SILTY AT BASE
203.30		1.45	SANDSTONE - MEDIUM GRAY, CROSS-BEDDED
204.75		10.51	CONGLOMERATE - SMALL TO MEDIUM PEBBLE, CHERT AND QUARTZITE, CONTAINS SHORT INTERVALS OF SANDSTONE
215.26		2.82	SANDSTONE - VERY FINE TO FINE GRAINED, CROSS-BEDDED CARBONACEOUS LAMINAE
218.08		3.76	SHALE/SANDSTONE TO CONGLOMERATE GRADATIONAL
221.84		2.72	No. 2 SEAM HORIZON
224.56		9.84	SHALE - MEDIUM GRAY, SILTY AND SANDY SECTIONS THROUGHOUT, CROSS-BEDDING IN UPPER SECTIONS
234.40		3.13	No. 3 SEAM HORIZON
237.53		2.35	SHALE - MEDIUM TO DARK GRAY, CARBONACEOUS TO SILTY BASALLY
239.88		3.52	SANDSTONE - MEDIUM LIGHT GRAY, MEDIUM GRAINED, GRADATIONAL FROM ABOVE UNIT
243.40		5.62	CONGLOMERATE - MEDIUM PEBBLE WITH OCCASIONAL LARGE PEBBLES
249.02			

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			No. 3 SEAM HORIZON		
			ROOF - POOR, SHALE - FRAGMENTAL WEATHERING		
234.40		0.14	CARBONACEOUS SHALE		
234.54		0.29			
234.77		0.28	DOMINANTLY COAL, WITH RARE THIN THIN BEDS OF CARBONACEOUS TO COALY SHALE		
235.05		0.66			
235.71		0.69		A0243	1.98
236.40		0.12			
236.52		0.26			
		0.08	CARBONACEOUS SHALE 0.03m LOST CORE	NOT SAMPLED	
		0.32			
237.19		0.04			
237.53		0.34	COAL - DULL TO BRIGHT	A0244	0.34
			FLOOR - SHALE - POOR, BLOCKY FRACTURE		

SIZE		WEIGHT PERCENT									CUMULATIVE WEIGHT PERCENT								CUMULATIVE SAMPLE VALUES									OTHER		
DIA-METER	WT %	SPEC GRAV	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I.	S	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I.	S	THICK-NESS	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I.	S			
				RM	ASH	VOL	F.C.					RM	ASH	VOL	F.C.						RM	ASH	VOL	F.C.						
1/4×28	93.7	-1.90	84.5	5.9	15.9	33.5	44.7	9621	-	-	84.5	5.9	15.9	33.5	44.7	9621	-	-											
+1.90		15.5	1.8	66.0	-	-	-	-	-	-	100.0	5.3	23.7	-	-	-	-	-											
28×0	6.3	RAW	100.0	6.5	23.0	32.6	37.9	8553	-		100.0	6.5	23.0	32.6	37.9	8553	-												
1/4×0	100.0	RAW	100.0	7.0	23.0	31.6	38.4	8482	-	-	CALC.	5.4	23.7	-	-	-	-	-											
1/4×28	93.7	-1.90	84.5	-	-	-	-	-	-	-	79.2	5.9	15.9	33.5	44.7	9621	-												
28×0	6.3	RAW	100.0	-	-	-	-	-	-	-	6.3	6.5	23.0	32.6	37.9	8553	-												
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	85.5	5.9	16.4	33.4	44.1	9628			1.98	85.5	5.9	16.4	33.4	44.1	9628				
		-1.90	67.5	4.1	32.8	27.8	35.3	7524	-		67.5	4.1	32.8	27.8	35.3	7524	-												
1/4×28	94.7	+1.90	32.5	2.2	68.3	-	-	-	-	-	100.0	3.5	44.3	-	-	-	-	-											
28×0	5.3	RAW	100.0	4.8	38.2	26.5	30.5	6615	-		100.0	4.8	38.2	26.5	30.5	6615	-												
1/4×0	100.0	RAW	100.0	3.6	43.7	24.7	28.0	5881	-		CALC.	3.6	44.0	-	-	-	-	-											
1/4×28	94.7	-1.90	67.5	-	-	-	-	-	-	-	63.9	4.1	32.8	27.8	35.3	7524	-												
28×0	5.3	RAW	100.0	-	-	-	-	-	-	-	5.3	4.8	38.2	26.5	30.5	6615	-												
1/4×0	100.0	COMB	-	-	-	-	-	-	-	-	69.2	4.1	33.2	27.6	34.8	7539	-		2.32	83.1	5.6	18.4	32.6	42.9	9373				

LOCATION MAP

TN

SCALE:

COORDINATES: Y 8,300 m N. X 9,400 m W of S.E corner of CL 78
ELEVATION: APPROX. 570 m BITS USED: J.K. SMIT COMBINATION
DIP: 90° BEARING: MUD USED:
CORE SIZE: HQ & NQ CASING: m LEFT IN HOLE: NIL m

DATE START: SEPT. 9, 79 FINISH: SEPT. 11, 79
DRILLER: E. CARRON DIAMOND DRILLING OVERALL RECOVERY: 97 %
TESTS:
SAMPLED BY: O. CULLINGHAM DATE: OCT. 2, 1979 ANALYZED BY: BIRTLEY COAL & MINERALS TESTING SIGNED:

BOREHOLE NO. A-79-23
PAN OCEAN OIL LTD.
MINING DIVISION – COAL

LOGGED BY: O. CULLINGHAM DATE: SEPT. 11, 79

GEOLOGICAL LOG – SCALE: 1:500

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION
		10.5	OVERBURDEN - COBBLES AND BOULDERS OF SANDSTONE AND CONGLOMERATE IMBEDDED IN CLAY AND SAND
10.5		9.86	CONGLOMERATE - SMALL TO MEDIUM PEBBLE CONGLOMERATE, FINING DOWNWARD CHERT AND QUARTZITE.
20.36		8.34	SHALE - BLOCKY, MEDIUM GRAY, BECOMES DARKER DOWNWARDS AND IN PART CARBONACEOUS.
28.70		5.56	No. 1 SEAM HORIZON
34.26		3.78	SHALE - MEDIUM GRAY, BECOMES SILTY AND SANDY BASALEY - GRADATIONAL WITH SANDSTONE BELOW.
38.04		9.86	SANDSTONE - MEDIUM GRAY, GRADATIONAL FROM VERY FINE GRAINED TO GRANULE CONGLOMERATIC AT BASE. MEDIUM TO THICK TO MASSIVE BEDDED. CROSS-BEDDED.
47.90		0.40	SHALE - MEDIUM GRAY BREAKS WITH BLOCKY FRACTURE.
48.30		0.31	SANDSTONE - MEDIUM LIGHT GRAY, VERY FINE GRAINED
48.61		0.41	SHALE - MEDIUM GRAY, BLOCKY FRACTURE.
49.06		13.41	SANDSTONE - MEDIUM GRAY, THIN TO THICKLY BEDDED, CROSS-BEDDED, VERY FINE TO COARSE TO IN PART SMALL PEBBLE CONGLOMERATIC
62.43		2.37	SHALE - MEDIUM GRAY, BLOCKY, IN PART SILTY.
64.80		21.80	SANDSTONE - CONGLOMERATIC SANDSTONE AND CONGLOMERATE, MEDIUM GRAY, THIN TO MASSIVELY BEDDED. DOMINANTLY MEDIUM TO COARSE GRAINED SANDSTONE. ABUNDANT CARBON TRASH THROUGHOUT IN PARTINGS AND FILAMENTS
86.60		5.47	SHALE - MEDIUM TO MEDIUM DARK GRAY, SILTY AT TOP, BECOMES CARBONACEOUS BASALLY
92.00		4.87	No. 2 SEAM HORIZON
96.89		1.63	SHALE - CARBONACEOUS AT TOP, SILTY TO SANDY BASALLY.
98.52		8.18	SANDSTONE - MEDIUM GRAY, VERY FINE GRAINED AT TOP, GRADATIONAL TO MEDIUM AND IS PART COARSE GRAINED DOWNWARDS. QUARTS AND CHERT GRAINS.
106.70		3.94	CONGLOMERATE - MEDIUM TO LARGE PEBBLE CONGLOMERATE MINOR TAR IN MATRIX
110.64			

DETAILS OF COAL SEAMS – SCALE: 1:100

DEPTH	GRAPHIC LOG	THICKNESS	DESCRIPTION	SAMPLE NUMBER	THICKNESS
			No. 1 SEAM HORIZON		
			ROOF - POOR, BLOCKY SHALE		3.04
28.70		0.13			
		0.16	COAL - DOMINANTLY BRIGHT, WITH SOME DULL TO VITREOUS RARE DULL COAL	A0229	
		0.46			
29.57		0.12			
		2.17	0.12 m LOST CORE 0.16 m SHALEY COAL		
31.74		0.43	CARBONACEOUS SHALE, GRADES TO COALY SHALE AND COAL BASALTY	A0230	1.17
32.17		0.20			
		0.33			
32.91		0.15			
		0.26			
		0.08	CARBONACEOUS AND COALY SHALE	A0231	0.93
		0.60			
33.84		0.36	DULL TO BRIGHT COAL		
34.20		0.08	CARBONACEOUS AND COALY SHALE	A0232	
34.26			FLOOR - POOR, SHALE - FRAGMENTAL		0.36
			No. 2 SEAM HORIZON		
			ROOF - POOR, SHALE, BLOCKY		2.13
92.00		0.70	COAL - MOSTLY VITREOUS AND BRIGHT	A0233	
92.70		0.20	SHALEY COAL		
92.90		0.40	COAL - MOSTLY BRIGHT		
93.30		0.27	NO CORE		
93.57		0.43	COAL - VITREOUS TO BRIGHT		
94.00		0.13	SHALEY COAL		1.27
94.13		0.15	CARBONACEOUS SHALE	A0234	
94.26		1.14	COAL - VITREOUS TO BRIGHT WITH THIN BANDS OF DULL SHALEY COAL		
95.40		0.11	SHALE - MEDIUM GRAY		
		0.55	COAL - VITREOUS TO BRIGHT	A0235	0.66
96.06		0.14	COAL / SHALEY COAL		
		0.42	NO CORE		
96.02		0.27	COAL / SHALEY COAL		
96.89			FLOOR - POOR, SHALE, BLOCKY AT TOP, CARBONACEOUS	A0236	0.83

SIZE		WEIGHT PERCENT									CUMULATIVE WEIGHT PERCENT							CUMULATIVE SAMPLE VALUES								OTHER		
DIAMETER	WT %	SPEC GRAV	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I.	S	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I.	S	THICKNESS	YIELD	PROXIMATE ANALYSIS				BTU	F.S.I.	S			
				RM	ASH	VOL	F.C.					RM	ASH	VOL	F.C.						RM	ASH	VOL	F.C.						
1/4×28	92.5	-1.90	87.9	4.5	12.5	34.1	48.9	10406	-	0.41	87.9	4.5	12.5	34.1	48.9	10406	-	0.41											
		+1.90	12.1	1.7	77.9	-	-	-	-	-	100.0	4.2	20.4	-	-	-	-	-											
28×0	7.5	RAW	100.0	6.6	27.7	29.3	36.4	7901	-	0.33	100.0	6.6	27.7	29.3	36.4	7901	-	0.33											
1/4×0	100.0	RAW	100.0	7.6	20.5	31.3	40.6	8967	-	0.29	CALC.	4.4	20.9	-	-	-	-	-											
1/4×28	92.5	-1.90	87.9	-	-	-	-	-	-	-	81.3	4.5	12.5	34.1	48.9	10406	-	0.41											
28×0	7.5	RAW	100.0	-	-	-	-	-	-	-	7.5	6.6	27.7	29.3	36.4	7901	-	0.33											
1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	88.8	4.6	14.3	33.5	47.4	10202	-	0.40	3.04	88.8	4.6	14.3	33.5	47.4	10202				
1/4×28	90.7	-1.90	24.9	3.1	30.3	28.8	37.8	8248	-	0.40	24.9	3.1	30.3	28.8	37.8	8248	-	0.40											
		+1.90	75.1	1.7	78.4	-	-	-	-	-	100.0	1.9	74.0	-	-	-	-	-											
28×0	9.3	RAW	100.0	3.8	57.5	18.7	20.0	-	-	0.23	100.0	3.8	57.5	18.7	20.0	-	-	0.23											
1/4×0	100.0	RAW	100.0	3.4	65.1	16.8	14.7	-	-	0.18	CALC.	2.1	72.4	-	-	-	-	-											
1/4×28	90.7	-1.90	24.9	-	-	-	-	-	-	-	22.6	3.1	30.3	28.8	37.8	8248	-	0.40											
28×0	9.3	RAW	100.0	-	-	-	-	-	-	-	9.3	3.8	57.5	18.7	20.0	-	-	0.23											
1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	31.9	3.3	39.4	25.4	31.8	5579	-	0.35	4.21	72.9	4.4	17.3	32.5	45.5	9640				
1/4×28	91.8	-1.90	15.4	3.9	31.9	27.1	37.1	7605	-	0.36	15.4	3.9	31.9	27.1	37.1	7605	-	0.36											
		+1.90	84.6	1.6	81.7	-	-	-	-	-	100.0	1.9	74.0	-	-	-	-	-											
28×0	8.2	RAW	100.0	3.5	65.6	15.3	15.6	-	-	0.22	100.0	3.5	65.6	15.3	15.6	-	-	0.22											
1/4×0	100.0	RAW	100.0	2.8	73.1	12.8	11.3	-	-	0.14	CALC.	2.0	73.3	-	-	-	-	-											
1/4×28	91.8	-1.90	15.4	-	-	-	-	-	-	-	14.1	3.9	31.9	27.1	37.1	7605	-	0.36											
28×0	8.2	RAW	100.0	-	-	-	-	-	-	-	8.2	3.5	65.6	15.3	15.6	-	-	0.22											
1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	22.3	3.7	43.4	23.0	29.7	5093	-	0.31	5.14	63.8	4.3	19.0	31.9	44.5	9352				
1/4×28	92.6	-1.90	86.0	3.7	19.4	32.5	44.4	9670	-	0.36	86.0	3.7	19.4	32.5	44.4	9670	-	0.36											
		+1.90	14.0	2.0	66.9	-	-	-	-	-	100.0	3.5	26.1	-	-	-	-	-											
28×0	7.4	RAW	100.0	6.2	20.6	31.9	41.3	8974	-	0.32	100.0	6.2	20.6	31.9	41.3	8974	-	0.32											
1/4×0	100.0	RAW	100.0	4.0	25.5	30.8	39.7	8560	-	0.33	CALC.	3.7	25.7	-	-	-	-	-											
1/4×28	92.6	-1.90	86.0	-	-	-	-	-	-	-	79.6	3.7	19.4	32.5	44.4	9670	-	0.36											
28×0	7.4	RAW	100.0	-	-	-	-	-	-	-	7.4	6.2	20.6	31.9	41.3	8974	-	0.32											
1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	87.0	3.9	19.4	32.4	43.9	9672	-	0.36	5.50	65.3	4.3	19.0	31.9	44.4	9380				
1/4×28	93.3	-1.90	76.3	5.6	19.2	30.8	44.4	9420	-	0.36	76.3	5.6	19.2	30.8	44.4	9420	-	0.36											
		+1.90	23.7	2.0	69.3	-	-	-	-	-	100.0	4.7	31.0	-	-	-	-	-											
28×0	6.7	RAW	100.0	6.2	30.3	27.1	36.4	7699	-	0.23	100.0	6.2	30.3	27.1	36.4	7699	-	0.23											
1/4×0	100.0	RAW	100.0	6.5	30.2	26.4	36.9	7686	-	0.25	CALC.	4.8	30.9	-	-	-	-	-											
1/4×28	93.3	-1.90	76.3	-	-	-	-	-	-	-	71.2	5.6	19.2	30.8	44.4	9420	-	0.36											
28×0	6.7	RAW	100.0	-	-	-	-	-	-	-	6.7	6.2	30.3	27.1	36.4	7699	-	0.23											
1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	77.9	5.6	20.2	30.4	43.6	9351	-	0.36	2.13	77.9	5.6	20.2	30.4	43.6	9351				
1/4×28	93.2	-1.90	79.1	5.4	10.6	31.2	52.8	10536	-	0.36	79.1	5.4	10.6	31.2	52.8	10536	-	0.36											
		+1.90	20.9	0.8	81.3	-	-	-	-	-	100.0	4.4	25.4	-	-	-	-	-											
28×0	6.8	RAW	100.0	6.7	23.2	28.5	41.6	8534	-	0.23	100.0	6.7	23.2	28.5	41.6	8534	-	0.23											
1/4×0	100.0	RAW	100.0	7.1	24.9	28.2	39.8	8274	-	0.15	CALC.	4.6	25.2	-	-	-	-	-											
1/4×28	93.2	-1.90	79.1	-	-	-	-	-	-	-	73.7	5.4	10.6	31.2	52.8	10536	-	0.36											
28×0	6.8	RAW	100.0	-	-	-	-	-	-	-	6.8	6.7	23.2	28.5	41.6	8534	-	0.23											
1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	80.5	5.5	11.8	30.9	51.6	10424	-	0.35	3.40	78.8	5.5	17.0	30.5	46.6	9760				
1/4×28	93.8	-1.90	71.0	4.7	14.8	30.9	49.6	10075	-	0.35	71.0	4.7	14.8	30.9	49.6	10075	-	0.35											
		+1.90	29.0	1.0	80.0	-	-	-	-	-	100.0	3.6	33.7	-	-	-	-	-											
28×0	6.2	RAW	100.0	4.8	35.1	26.0	34.1	6905	-	0.15	100.0	4.8	35.1	26.0	34.1	6905	-	0.15											
1/4×0	100.0	RAW	100.0	3.9	33.7	26.5	35.9	7329	-	0.24	CALC.	3.7	33.8	-	-	-	-	-											
1/4×28	93.8	-1.90	71.0	-	-	-	-	-	-	-	66.6	4.7	14.8	30.9	49.6	10075	-	0.35											
28×0	6.2	RAW	100.0	-	-	-	-	-	-	-	6.2	4.8	35.1	26.0	34.1	6905	-	0.15											
1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	72.8	4.7	16.5	30.4	48.2	9895	-	0.33	4.06	77.8	5.4	16.9	30.5	46.8	9780				
1/4×28	92.7	-1.90	54.3	3.6	30.5	28.4	37.5	8336	-	0.28	54.3	3.6	30.5	28.4	37.5	8336	-	0.28											
		+1.90	45.7	1.9	72.5	-	-	-	-	-	100.0	2.8	49.7	-	-	-	-	-											
28×0	7.3	RAW	100.0	3.8	38.6	21.9	35.7	6660	-	0.27	100.0	3.8	38.6	21.9	35.7	6660	-	0.27											
1/4×0	100.0	RAW	100.0	3.1	49.4	20.8	26.7	5122	-	0.20	CALC.	2.9	48.9	-	-	-	-	-											
1/4×28	92.7	-1.90	54.3	-	-	-	-	-	-	-	50.3	3.6	30.5	28.4	37.5	8336	-	0.28											
28×0	7.3	RAW	100.0	-	-	-	-	-	-	-	7.3	3.8	38.6	21.9	35.7	6660	-	0.27											
1/4×0	100.0	COMB.	-	-	-	-	-	-	-	-	57.6	3.6	31.5	27.5	37.2	8209	-	0.28	4.89	74.4	5.1	18.8	30.1	45.6	9574				