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PAN OCEAN OIL LTD.

BONNET PLUME PROJECT

REPORT ON GEOLOGY AND EXPLORATION OF THE BONNET PLUME BASIN YUKON TERRITORY

NTS 106-E

65° 30' N 135° W

COAL EXPLORATION LICENCES

NOS. 72-73 and 77-98

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Pan Ocean Report No. 1-80

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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 initiated 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. Speculative reserves conceivably could increase these reserves to greater than 1 billion tonnes in situ.

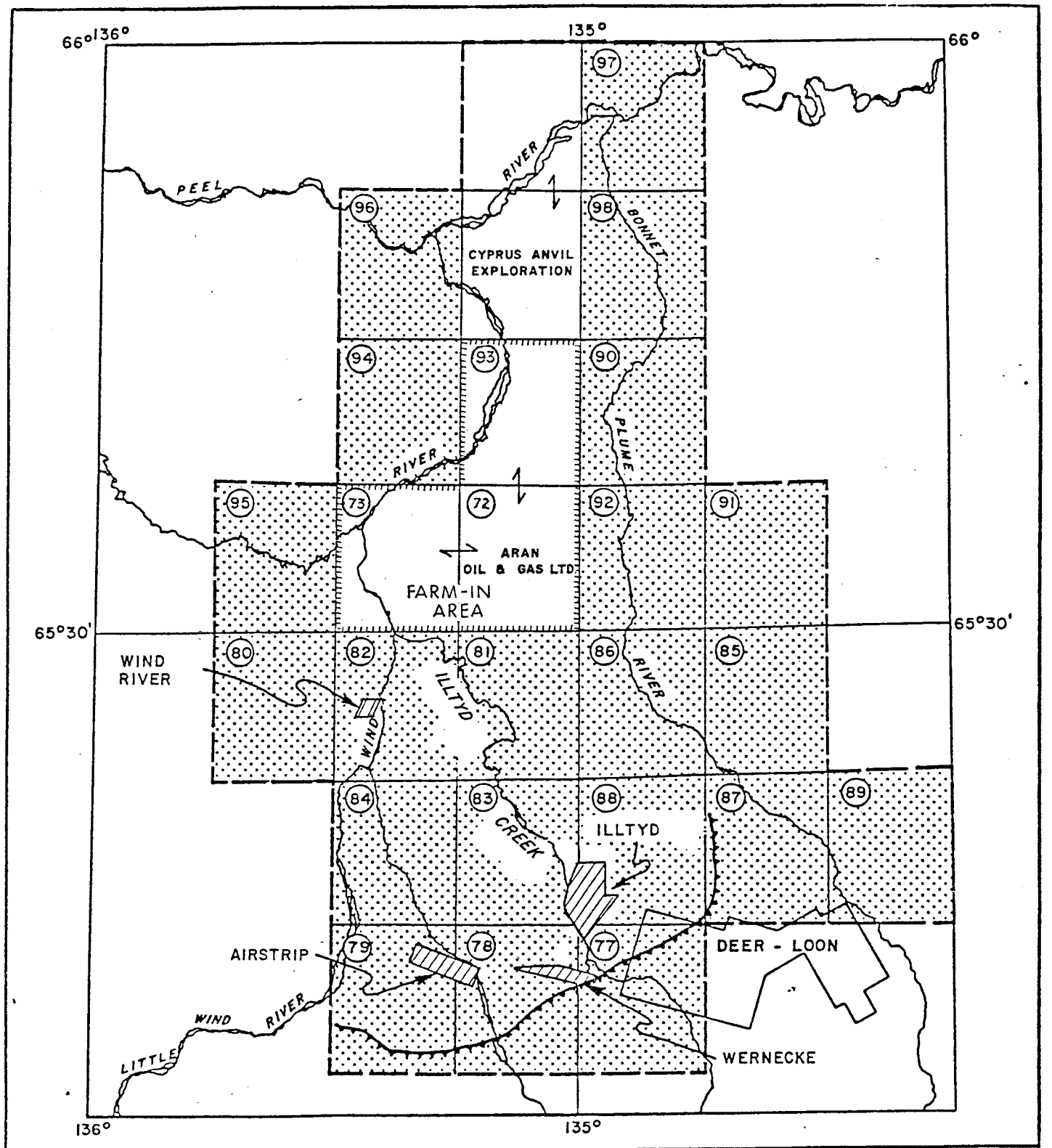
1.0 INTRODUCTION

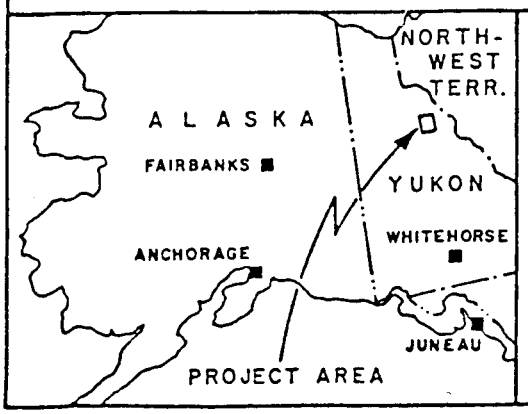
During the summer of 1977 coal was discovered in the Bonnet Plume Basin by personnel of Pan Ocean Oil Ltd. Subsequently Pan Ocean acquired control over 24 coal licences covering a total of 387,308 hectares (957,024 acres) (Figure 1). The licences are underlain by sedimentary rocks of Tertiary age containing lignitic coals (Upper Bonnet Plume Formation) in the north and sedimentary rocks of Cretaceous age containing bituminous coals (Lower Bonnet Plume Formation) in the south. Detailed investigations by Pan Ocean have been restricted to the southern area where the underlying rocks contain bituminous coals.

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 of approximately 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. One of the areas - the Illtyd Creek Deposit - was sufficiently drill tested to establish measured reserves of in excess of 120×10^6 tonnes. Speculative reserves conceivably could increase these reserves to greater than 1 billion tonnes "in situ".

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 as early as 1985. Not only are there sufficient resources for the Yukon's immediate use but the advantage of thermal coal generation is that the power station could be scaled up from a small source to any size required, given sufficient coal reserves. The reserves appear to be in hand at least to support a station size of 2000 megawatts.





LEGEND

- -PAN OCEAN ACREAGE
- (77) -COAL EXPLOR. LICENSE NO.
- AREA OF AIRPHOTO INTERPRETATION
- -THRUST FAULT
- COAL RESERVES

DEER - LOON FAIRCHILD
PROJECT AREA (URANIUM)

FIGURE 1

BONNET PLUME BASIN

COAL PROJECT

YUKON TERRITORY

4 0 4 8 12

MILES

2.0 LOCATION AND ACCESS

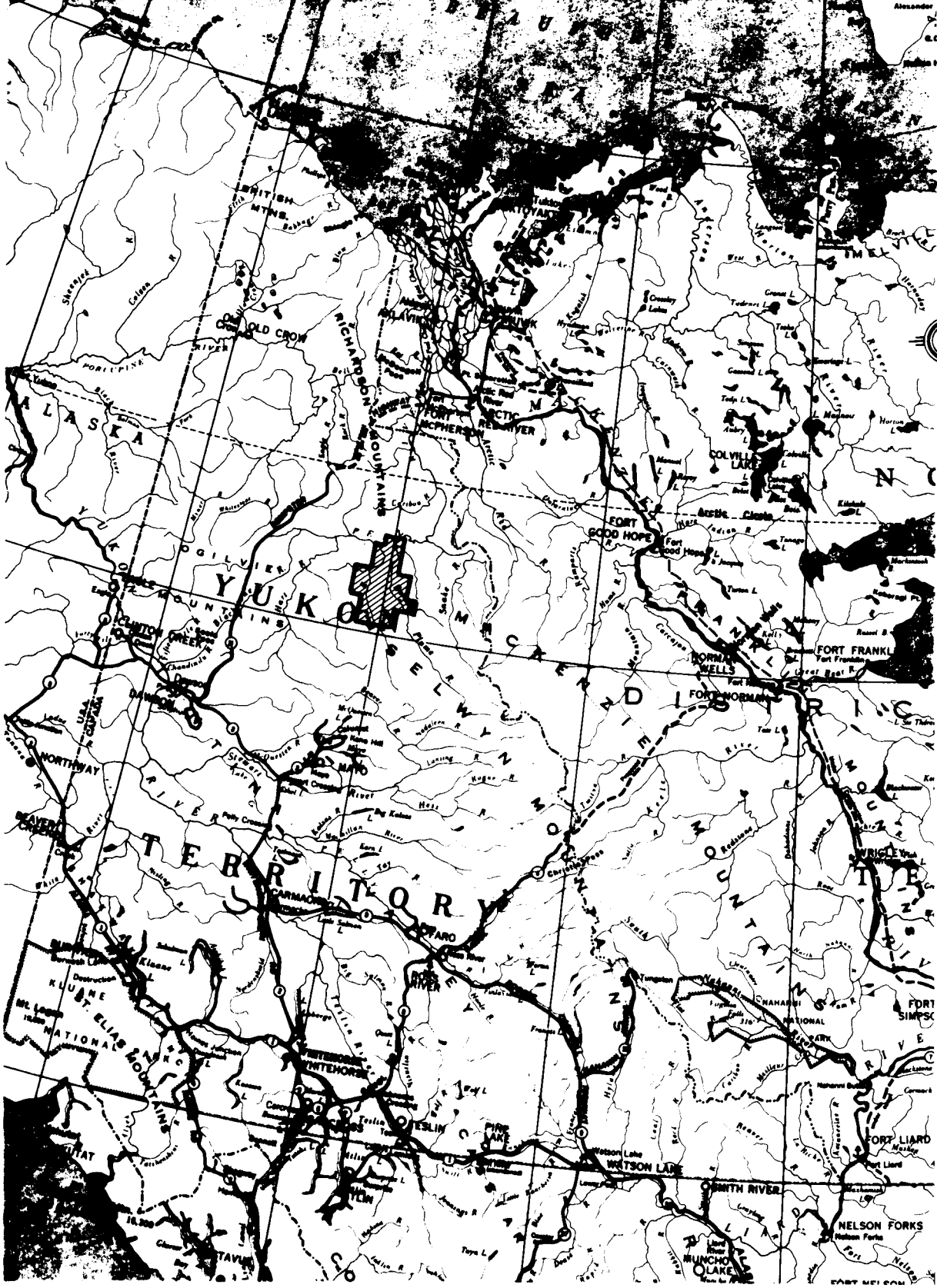
The Bonnet Plume Coal Basin is located in the northern Yukon Territory (Figure 2). It lies entirely within the Wind River map-area (NTS-106E). The centre of the basin is located by:

$65^{o}30'$ N Latitude
$135^{o}00'$ W Longitude

The area is approximately 210km (130 miles) north of Mayo, 240km (150 miles) northeast of Dawson City and 330km (205 miles) south of Inuvik (Plate I). 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.

3.0 PHYSIOGRAPHY

The Bonnet Plume 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 (Plate II). The 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 at the southern end of the coalfield. Much of the area is low-lying marshy terrain supporting stunted black spruce; some larch and birch; an assortment of mosses and grasses; willow and berry bushes. The interior marshy area is virtually devoid of rock outcrops.



TO ACCOMPANY REPORT NO. 1-80 BY O.R.C.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

PROPERTY LOCATION

BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
JAN. 1980	1:1,584,000	106 E	A-0853

miles 25 0 25 miles

Two 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, a major river, which flows from west to east across the northern margin of the basin. Three major tributaries feed the Wind River and are from south to north, the Little Wind River, Illtyd Creek and Hungry Horse Creek. These streams are typically braided and often form valleys in excess of 2km wide.

Most sedimentary rocks of Cretaceous age was observed in outcrop, occur along the Wind River and its trubutaries, forming low relief hills overlooking the river.

4.0 EXPLORATION

4.1 History

The earliest account of exploration in the Bonnet Plume Basin is provided by Edourd de Sainville who travelled up the Peel River to the Bonnet Plume River in 1893. During this excursion he traversed between the Bonnet Plume River and the Wind River and recorded several occurrences of lignite. The earliest geological account of the Bonnet Plume Basin is provided by Camsell (1906) who explored the Wind River area in 1905. Camsell recognized the sedimentary rocks and assigned the rocks to the Cretaceous system.

In 1946 MacKay (1947) visited the known lignite occurrences along the Peel River as part of a larger programme to document the coal resources of Canada and in 1949 Bostock (1950) visited the area to study the coal resources as part of a programme to assess the mineral resource potential of the Yukon Territory.

The geology of part of the Bonnet Plume Basin has been studied by Bostock (1961) Hume 1954, Douglas and MacLean (1963) and Mountjoy (1963); however, the most comprehensive report on the geology of the Bonnet Plume Basin is provided by Norris and Hopkins, Jr. (1977) from mapping carried out in 1962 augmented by visits in succeeding years until 1975. The stratigraphy and sedimentation of the basin has been studied by Mountjoy (1967) and Long (1978) with palynological support

provided by Rouse and Srivastava (1972) and Sweet (1978,1979).

Interest in the area for economic potential commenced during World War II when C. R. Stelck mapped the Bonnet Plume Basin for Imperial Oil; the area was part of the Canol Project to identify possible sources of oil for use by the U.S. military. Since then the area has been explored by several oil companies interested in the oil potential; exploration consisted of geological mapping, gravity surveys and one seismic survey across the width of the Bonnet Plume Basin. No wells have been drilled in the licence area; however, one well was drilled along the Peel River 2000 metres east of the eastern boundary of Coal Licence #97.

Cyprus Anvil acquired two coal exploration licences covering the lignite occurrences along the Peel River and carried out mapping on the licences in 1977. Aran Oil and Gas Ltd. acquired three coal exploration licences in the northwestern central portion of the Basin (C.L. No. 72, 73 and 93); these have since been transferred to Pan Ocean Oil Ltd. Lignite resource estimates are reported to be in excess of 1.5 billion tons.

4.2 Exploration by Pan Ocean Oil Ltd. - 1977 and 1978

4.2.1 - In 1977 coal was discovered in the Bonnet Plume Basin by personnel of Pan Ocean Oil Ltd. Subsequently Pan Ocean acquired 21 coal licences covering 339,144 hectares (838,014 acres).

4.2.2 - In 1978 further reconnaissance mapping established 12 coal areas within the Basin. Two of the areas were drill tested and established indicated and inferred in situ coal resources of greater than 96 million tons. Four diamond drill holes were drilled for a total of 457 metres (1500 feet). In November 1978 three licences held by Aran Oil and Gas were transferred to Pan Ocean Oil Ltd. increasing Pan Ocean's control to 24 licences encompassing 387,308 hectares (957,024 acres).

4.3 Exploration by Pan Ocean Oil Ltd. - 1979

4.3.1 - Introduction: In 1979 a programme of follow-up mapping, further reconnaissance mapping and drill testing of five of the coal areas was carried out. The programme commenced May 22 and was concluded September 20.

4.3.2 - Mobilization: Mobilization of equipment and supplies to the Bonnet Plume Basin was carried out during March and April. E. Caron Diamond Drilling provided a D-6C and a D-7E Caterpillar bulldozers for mobilization and site preparation. The bulldozers and two drills were mobilized to the property along the Mayo-Wind River winter road. A strip on the frozen surface of Kiwi Lake was prepared by the D-7 cat; a Dash-7 aircraft, owned and operated by Ward Air, was utilized for mobilization of fuel and drilling and camp supplies. Following completion of the mobilization the D-6C cat was demobilized to Mayo. The camp was established on the shore of Kiwi Lake as in previous years. Pamicon Development Ltd. of Vancouver organized and supervised the mobilization, running of the camp and was responsible for the logistical support for the entire operation.

4.3.3 - Drilling: Drilling commenced May 27 and was completed September 12. Two drills were used until August 14 at which time one drill was demobilized because of prior committment. The drills used were two super 38 diesel driven skid-mounted drills, equiped to drill with wireline and recover H.Q. and N.Q. core. The drilling contract was awarded to E. Caron Diamond Drilling of Whitehorse. Twenty-three holes were drilled for a total of 4420 metres (14,500 ft).

4.3.4 - On-Site Support: Support for on-site transportation of personnel and supplies and mobilization of drills between sites was provided by a Huges 500 "D" helicopter and a Bell 206 B helicopter. The contract for the supply and operation of the helicopters was awarded to Trans North Turbo Air Ltd. of Whitehorse.

4.3.5 - Camp Support: Transportation of personnel and supplies to camp was provided by Air North operating float-equipped Beavers, Otters and a Husky Fairchild out of their base in Mayo.

4.3.6 - Demobilization: Demobilization of camp equipment, supplies and personnel was under the supervision of Pamicon Development Ltd. and commenced September 15 and was completed September 20. Air North provided a single Otter; however, the bulk of the demobilization was carried out by a Twin Otter contracted from Kenn Borek Air Ltd. based in Inuvik.

5.0 GEOLOGY

5.1 - Introduction: This report covers the geology of the Bonnet Plume Basin as determined from regional mapping, airphoto interpretation and diamond drilling.

5.2 - General: 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 (Norris and Hopkins Jr. 1977).

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 Teritary sediments were deposited under varying and recurring conditions (bog to turbulent) in a continental fluviatile sedimentary environment. The strata unconformably overlie Proterozoic to Permian strata. Local pre-Cretaceous fensters within the basin have been produced by faulting.

The straigraphy 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. Evidence for the hiatus is provided from palynology investigations by Rouse and Srivastava (1972) who tentatively applied an age of Middle to Late Albian for the Lower Bonnet Plume Formation and Maastrichtian to Paleocene for the Upper Bonnet Plume Formation. Recent and on-going detailed palynological investigations by Sweet and Long of the G.S.C. shed new light on age relations of the sediments. Results of their work suggests, tentatively, a Campanian age of the coal seams in the southern half of the basin (Sweet 1979). Further palynological investigations are being conducted in order to arrive at a more detailed model of the age and correlation of the sedimentary rocks within the Basin.

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

5.3 - Upper Bonnet Plume Formation: This unit consists of unconsolidated sandstones, mudstones, conglomerates and lignites of Late Cretaceous age, Maastrichtian, to Tertiary age, Paleocene, (Rouse and Srivastava, 1972) and possibly to Eocene (Sweet, 1979). The area underlain by the Upper Bonnet Plume Formation has not been studied in detail during field investigations carried out by Pan Ocean personnel.

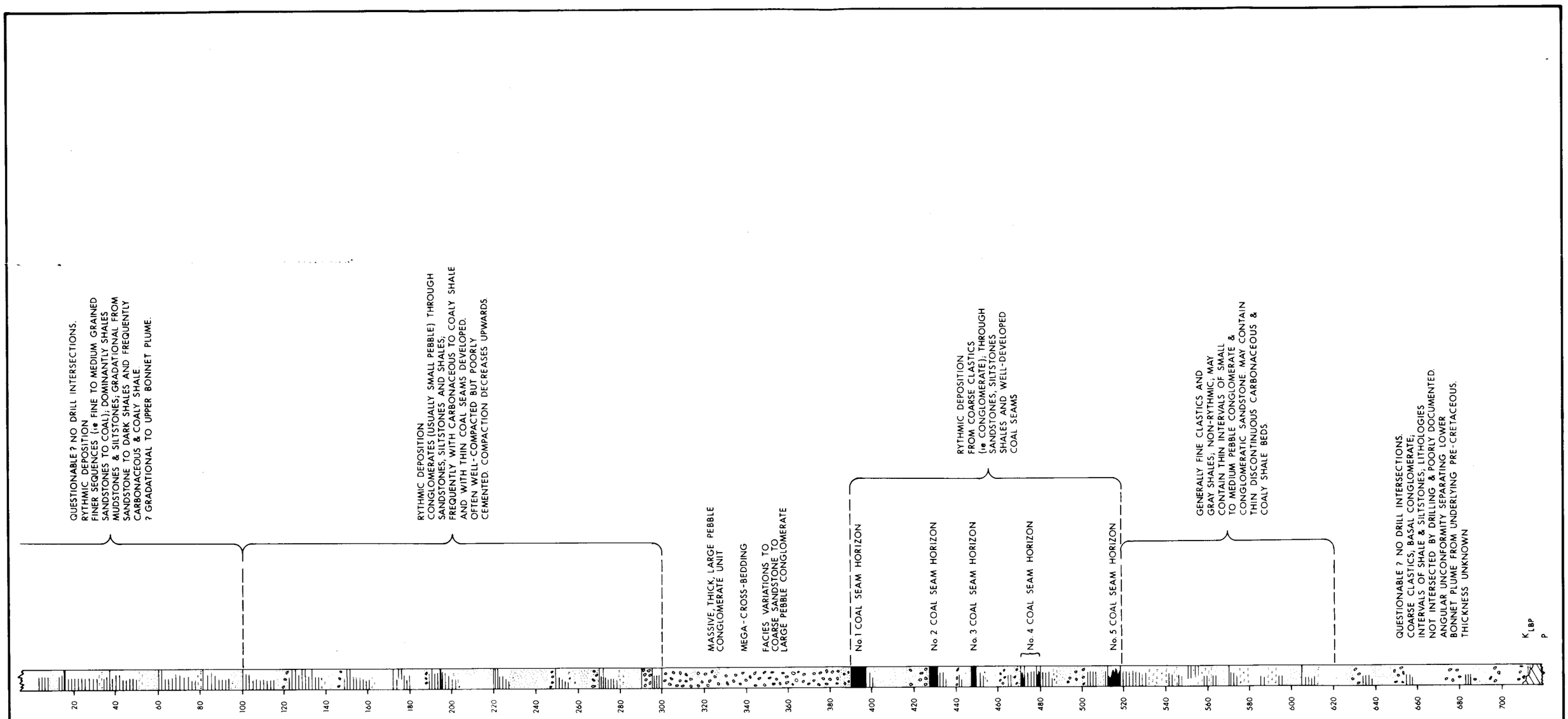
Based on the limited observations made of this unit during reconnaissance mapping it is in part separated from the Lower Bonnet Plume Formation by a structural unconformity and in places is deposited directly on pre-Cretaceous age rocks.

Lignite resources contained in the Upper Bonnet Plume Formation have been assessed by Norris and Hopkins (1977) to be in excess of 1.5×10^9 tons in situ to a depth of 120 metres (400 ft.). Cyprus Anvil hold coal exploration licences covering this area; results of their investigations are unknown to the writer.

5.4 - Lower Bonnet Plume Formation: The Lower Bonnet Plume Formation is composed of conglomerate, sandstone, siltstone, shale and coal seams and has an estimated thickness of 600-700 metres. 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.

From limited stratigraphic information three divisions within part of the Lower Bonnet Plume Formation can be discerned and are graphically illustrated on the generalized stratigraphic column (Figure 3). They are:

1) a lower predominantly fine sequence consisting of shale, mudstone, siltstone and fine grained sandstone with some interbeds of coarse sandstones and conglomeratic sandstones. The unit contains few thin coal seams which in areas investigated to-date do not appear to have economic significance. Greenish and reddish mudstones frequently occur in this unit and rock types often display rusty reddish brown weathering. The Mt. Deslauriers conglomerate of Mazur (78-3) could represent a facies variation within this unit or more likely is in the basal



TO ACCOMPANY REPORT No. 1-80 BY O.R.C

PAN OCEAN OIL LTD.
CALGARY ALBERTA

GENERALIZED STRATIGRAPHIC COLUMN
FOR PART OF THE
LOWER BONNET PLUME FORMATION

BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO
JANUARY, 1980	AS SHOWN	—	B-Q855

unit below. Below this lower unit is an undetermined thickness of sandstones, conglomeratic sandstones and conglomerates with thin intervals of shale and siltstone. This is considered the basal unit and is in unconformable contact with Palaeozoic to Permain strata.

2) a middle unit comprised predominantly of rhythmic sequences of conglomerates to mudstones frequently capped by coal horizons. It is in this unit that coal seams have developed that are the focus of this report. A persistent conglomerate unit 90 to 110 metres thick marks the upper limit of this unit.

3) an upper unit comprised predominantly of rhythmic sequences of sandstones to mudstones frequently capped with carbonaceous to coaly shale rarely containing thin coal seams. Conglomeratic sandstones and thin conglomerates are developed sporadically at the base of the sequences.

In 1977 six coal bearing 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. These showings are described previously in Pan Ocean "Report on the Geology of the Bonnet Plume Basin" (McKinney 79-1) and the description will not be repeated; however, the areas are indicated on the 1:50,000 geology plans of the Basin (Plates III to VIII inclusive). Five of the areas have been drill tested and are discussed in the following.

6.0 ILLTYD CREEK DEPOSIT

6.1 - 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 sub-

crop 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) (Plate IX).

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 (Plates X to XIII 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 north the outcrop along the ridge is intermittent and to the south is nonexistent; 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 predominantly 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

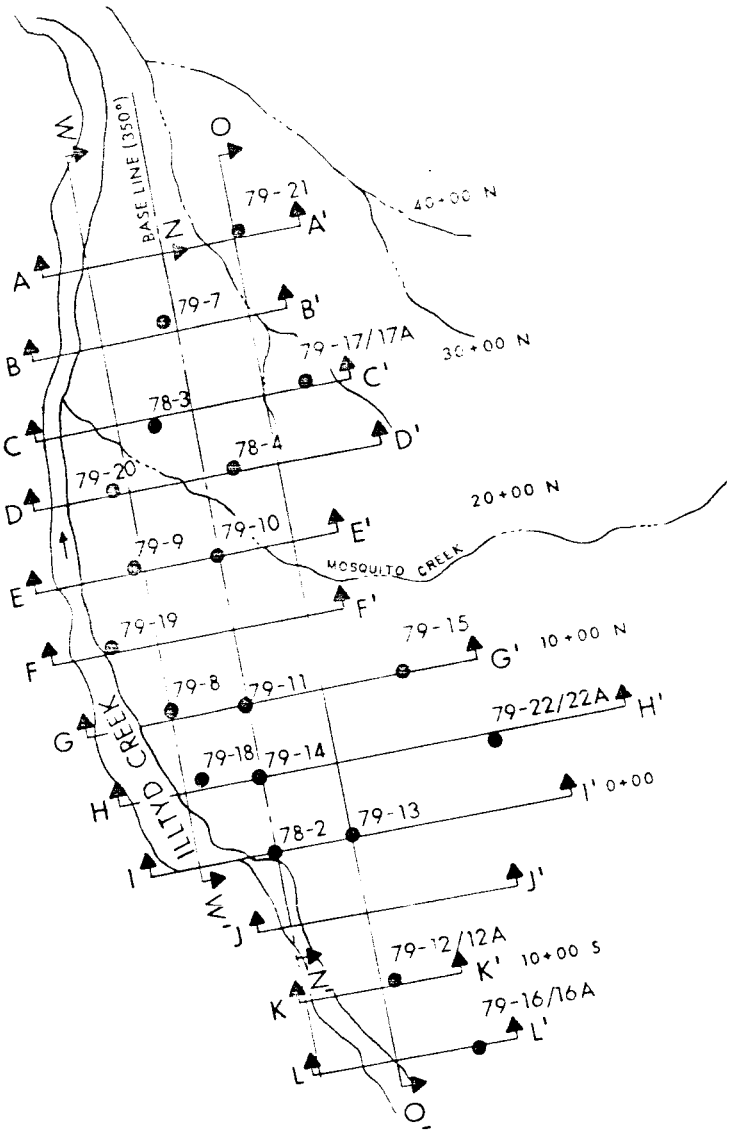
throughout the unit. The conglomerate is persistent throughout the deposit and is 90 to 110m thick.

Outcrops of coal seams along the east bank of 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, for a total of 3462 metres, drilled in the deposit area establish the continuity of three coal horizons and provide adequate geological control in order to establish measured and indicated reserves (Figure 4). A lithofacies fence diagram of the deposit graphically illustrates correlation throughout the deposit (Plate XIV).

On the west side of Illtyd Creek, conglomerate, conglomeratic sandstone, sandstone and few coal seams outcrop. The conglomerates and sandstones typically form ridges 3 to 5 metres high. The basic structure is a continuation of that described for the Illtyd Creek Deposit and the rocks are probably basal of the Lower Bonnet Plume Formation. The rocks are probably in unconformable contact with the Palaeozoic carbonates to the west (Plate XXVIII). Few coal occurrences along the west bank of Illtyd Creek suggest thin seams within carbonaceous shale sequences; however, the area should be drill tested.

6.2 - Coal: Drilling has established the continuity of three coal horizons throughout the Illtyd Creek Deposit. Deeper seams are known from intersection in three holes; however, continuity of these seams has been established only over limited areal extent which precludes them from being used in reserve calculations at this time. All coal seam horizons intersected in drill holes were



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

sampled on the basis of lithology. Analysis of the coal was done by Birtley Coal and Minerals Testing in Calgary. Analytical results of the testing and calculated values for recomposited intervals are recorded on drill hole graphic log forms for each hole. Copies of these have not been incorporated in this report; however, are incorporated in Pan Ocean Report 25-79. Raw coal analysis for each seam intersection is presented adjacent to a graphic log of the seam on Plates XXV to XXVII inclusive.

6.2.1 - No. 1 Seam Horizon: The No. 1 Seam Horizon is generally thick and has an average thickness of 6.85m. Varation in horizon thickness throughout the deposit is depicted on the Coal Horizon Isopach Plan (Plate XV). The No. 1 Seam Horizon is immediately overlain by the thick conglomerate unit capping the middle 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 Horizon illustrates the regular structure of the deposit (Plate XVI).

The seam contains several shale and carbonaceous shale partings which collectively result in an average raw ash content of 40%. Much of the ash content results from adventitious material and is readily separated by gravity. Proximate analysis of the seam for raw coal and for a clean coal[1] product is given below:

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1 Whenever clean coal specifications are given in this report clean coal is a reconstituted sample of the ¼" x 28 mesh fraction at -1.90 S.G. and the 28 mesh x 0 fraction on a raw basis.

	Raw Coal	Clean Coal
Yield	100%	61.45%
Moisture	6.1%	5.0 %
Ash	40.3%	20.4 %
Volatiles	28.5%	32.6 %
Fixed Carbon	17.8%	41.9 %
Calorific Value	N.A.	9,023 BTU's
Sulphur	0.2%	0.35%

6.2.2 - 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 (Plate XVII). 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 (Plate XVIII).

At the south end of the deposit the horizon occurs as two seams, Seam 2A (upper) and Seam 2B (lower). The lower seam shales out rapidly north and west of hole BP-79-14 and east of hole BP-79-13; however, is persistent beyond the most southerly hole BP-79-12A. The persistence of the lower seam to the south is evidenced by the occurrence of two benches in the No. 2 Horizon in hole BP-78-1 drilled in the Wernecke Deposit 4000 metres to the south.

The Seam contains few shale and carbonaceous shale partings which collectively result in an average raw ash content of 23%. The average raw ash can be reduced to 14% by washing the +28M fraction at 1.90 specific gravity. Proximate analysis of the seam for raw coal and for cleaned coal is given below.

	Raw Coal	Clean Coal
Yield	100%	79.8%
Moisture	7.1%	5.3%
Ash	23.9%	13.9%
Volatiles	31.0%	34.3%
Fixed Carbon	37.6%	46.2%
Calorific Value	N.A.	9,923 BTU's
Sulphur	0.26%	0.33%

6.2.3 - 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 throughout the deposit is depicted on the No. 3 Seam Horizon Isopach Plan (Plate XVIX). 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 (Plate XX).

The seam contains several shale and carbonaceous shale partings which collectively result in an average raw ash content of 40%. Much of the ash content results from adventitious material and is readily separated by gravity. Proximate analysis of the seam for raw coal and for a clean coal is given below.

	Raw Coal	Clean Coal
Yield	100%	59.2%
Moisture	5.1%	4.9%
Ash	40.7%	19.7%
Volatiles	25.9%	32.5%
Fixed Carbon	28.2%	42.7%
Calorific Value	N.A.	9,140 BTU's
Sulphur	0.21%	0.35%

6.2.4 - Three holes BP-79-7, BP-79-13 and BP-79-14 were drilled beyond the No. 3 Seam Horizon and intersected a fourth 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.

Proximate analysis of the horizon less the parting, for the raw coal and for a clean coal is given below.

	Raw Coal	Clean Coal
Yield	100%	93.9%
Moisture	7.9%	4.2%
Ash	13.6%	11.2%
Volatiles	33.6%	35.6%
Fixed Carbon	44.9%	48.5%
Calorific Value	9,721 BTU's	10,564 BTU's
Sulphur	0.23%	0.22%

7.0 WERNECKE DEPOSIT

7.1 - 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. 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.

The basic structure of the Wernecke Deposit area is a mono-cline 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 (Plate XXI). Insufficient outcrop and/or topo-graphic 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. The thick conglomerate capping the middle unit of the Lower Bonnet Plume Formation, previously described, is the most prominent exposure and defines the strike length. Coal seams occurring stratigraphically below this conglomerate outcrop 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 Creek Deposit.

7.2 - Coal: Several coal occurrences are mapped on the Wernecke Deposit; three only, occurring in the creek mentioned above, are outcropping seams. The upper two occurrences have been identified as the No. 1 and No. 2 Seam Horizons of the Illtyd Creek Deposit; the third is stratigraphically below the other two and is postulated to be the No. 3 Seam Horizon. The other showings occur as float brought to the surface in frost boils and may indicate underlying coal seams. Attempts were made to hand trench these showings; however, overburden was too thick and the seams remain concealed.

7.2.1 - 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. Proximate analysis of a clean coal product is:

Yield	58.2%
Moisutre	3.9%
Ash	12.9%
Volatiles	36.1%
Fixed Carbon	47.3%

Calorific Value	10,547 BTU's
Sulphur	N.A.

7.2.2 - 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. The horizon occurs in two benches separated by 1.69m of carbonaceous and coaly shale. The two benches are equivalent to Seams 2A and 2B in the southern part of the Illtyd Creek Deposit. Proximate analysis of a clean coal product is:

Yield	73.6%
Moisture	5.0%
Ash	10.3%
Volatiles	36.0%
Fixed Carbon	48.9%
Calorific Value	10,810 BTU's
Sulphur	N.A.

7.2.3 - No. 3 Seam Horizon: Drill hole BP-78-1 was not drilled deep enough to intersect the No. 3 Seam Horizon; however, coal outcropping in the bank of a creek below the No. 2 Seam Horizon discussed above indicates the existence of the horizon. The width of the exposure along the creek suggests the seam to be equivalent in thickness to the No. 1 and No. 2 Seams; however, the occurrence is weathered and partially obscured and a measurement was not made.

8.0 AIRSTRIP DEPOSIT

8.1 - The Airstrip Deposit area is located west of the 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.

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 (Plate XXII). 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.

8.2 - Coal: Three coal seams outcrop along the Wind River and have been correlated to the No. 1, No. 2 and No. 3 Seam Horizons of the Illtyd Creek Deposit.

8.2.1 - 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. Proximate analysis of a clean coal product is:

Yield	65.3%
Moisutre	4.3%
Ash	19.0%
Volatiles	31.9%
Fixed Carbon	44.4%
Calorific Value	9,380 BTU's
Sulphur	0.39%

8.2.2 - 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. Proximate analysis of a clean coal product is:

Yield	74.4%
Moisture	5.1%
Ash	18.8%
Volatiles	30.1%
Fixed Carbon	45.6%
Calorific Value	9,574 BTU's
Sulphur	0.34%

8.2.3 - 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.

9.0 WIND RIVER DEPOSIT

9.1 - 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. 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^{o} to 20^{o} to the north-east. 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 (Plate XXIII). 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.

9.2 - Coal: Several coal outcrops occur along the west bank of the Wind River underlying a persistent conglomeratic sandstone ridge. These occurrences represent a thick seam gently dipping to the northeast and tentatively correlated to the No. 2 Seam Horizon of the Illtyd Creek Deposit. Up the hill from the river coal wash was encountered underlying a medium to large pebble conglomerate ridge. The conglomerate is tentatively correlated to the thick conglomerate unit capping the middle unit of the Lower Bonnet Plume Formation and the wash is derived from an underlying thick seam correlated to the No. 1 Seam Horizon of

of the Illtyd Creek Deposit. A thick coal occurrence in the west bank of the Wind River approximately 400 metres north of the previously mentioned occurrences is also interpreted to be the No. 1 Seam Horizon.

Drill Hole W-79-1 was collared on the conglomerate ridge and intersected both seam horizons. The hole was terminated after intersecting the second seam.

Two coal float occurrences are mapped on the west slope of the hill approximately 1700 metres west of the Wind River. A coal outcrop is located 150 metres west of the Wind River Winter Road west of the above two occurrences. The two float occurrences are probably indicative of No. 5 Seam Horizon intersected in hole W-79-6/6A. Hole W-79-6/6A was collared 1200 metres 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 and No. 3 Seam Horizons of the Illtyd Creek Deposit and the lower two horizons are termed the No. 4 and No. 5 Seam Hoirzons.

Several coal occurrences mapped along the Wind River north of the No. 1 Seam occurrence are probably repeated occurrences of the No. 1 and No. 2 Seam Horizons; however, due to a lack of structural continuity have been precluded from reserve estimates at this time.

9.2.1 - No. 1 Seam Horizon: The No. 1 Seam Hoirzon has a thickness of 8.0m. The horizon is overlain by a pebble conglomerate separated by a 0.15m 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. Proximate analysis of a clean coal product is:

Yield	61.3%
Moisture	4.4%
Ash	18.8%
Volatiles	31.0%
Fixed Carbon	45.6%
Calorific Value	9,743 BTU's
Sulphur	0.53%

9.2.2 - 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. Proximate analysis of a clean coal product is:

Yield	73.82%
Moisture	4.67%
Ash	10.87%
Volatiles	34.13%
Fixed Carbon	50.34%
Calorific Value	10,461 BTU's
Sulphur	0.41%

9.2.3 - 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. Proximate analysis of a clean coal product is:

Yield	89.6%
Moisture	3.2%
Ash	13.1%
Volatiles	33.3%
Fixed Carbon	50.4%
Calorific Value	10,568 BTU's
Sulphur	o.51%

9.2.4 - 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. Proximate analysis of a clean coal product is:

Yield	79.4%
Moisture	2.9%
Ash	12.4%
Volatiles	33.0%
Fixed Carbon	51.7%
Calorific Value	10,630 BTU's
Sulphur	0.48%

9.2.5 - 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. Proximate analysis of a clean coal product is:

Yield	76.30%
Moisture	3.90%
Ash	8.70%
Volatiles	33.60%
Fixed Carbon	53.60%
Calorific Value	11,012 BTU's
Sulphur	0.50%

10.0 EAST WIND RIVER AREA

10.1 - The East Wind River Area is located on the east side of the Wind River opposite the Wind River Deposit. The area is bounded by the Wind River to the west, Illtyd Creek to the north and east and by Cambrian carbonates to the south. The area is divided into two parts, separated by an unnamed west - flowing creek which could represent the surface expression of a fault. South of the creek is coal area 9 and north is coal area 10 (Plate XXIV).

10.2 - The rocks mapped in coal area 9 are typical Lower Bonnet Plume Formation lithologies consisting of conglomerates, sandstones, shales and carbonaceous and coaly shale. A thick coarse pebble conglomerate outcrops along a north-flowing creek along the north edge of the deposit. Stratigraphically below this conglomerate are discontinuous ridges of conglomeratic sandstone and sandstone; occassional outcrops of shale and carbonaceous and coaly shale are locally preserved adjacent to sandstone outcrops. No significant coal outcrops have been found; however, a clinker occurrence near the base of the section was found.

The structure of the deposit area is a monocline with enclosed strata dipping to the northeast at 5 - 15°. The nature of the contact of the Lower Bonnet Plume Formation with the underlying carbonates is this area is not clear; sparse evidence exists to support either an unconformable contact or a fault contact.

Two holes (W-79-2 and W-79-4) for a total of 258 metres were drilled to test this deposit. A carbonaceous to coaly shale horizon was intersected and is the source of the clinker. No economic significance is attached to this intersection.

10.3 - The rocks mapped in coal area 10 consist of conglomerate, sandstone, shale, carbonaceous shale and coal and are considered typical of Lower Bonnet Plume Formation lithologies. Abundant coal wash and float found in two gullies was traced to the surface exposure of a significant coal horizon.

Two drill holes (W-79-3 and W-79-5) for a total of 205 metres were drilled to test this horizon. The horizon is 4.58 metres thick in hole W-79-5 and contains several partings of shale and carbonaceous shale. A proximate analysis of the horizon for a clean coal is given below:

Yield	54.7%
Moisture	3.0%
Ash	15.4%
Volatiles	35.8%
Fixed Carbon	45.9%
Calorific Value	10,426 BTU's
Sulphur	0.69%

The same horizon intersected in hole W-79-3 consisted of carbonaceous and coaly shale and is of no economic importance. The areal extent of the horizon could be local and is therefore precluded from reserve estimates at this time.

The structure of the area is an anticline with the axis trending northwest. Cambrian limestone was intersected in both holes approximately 20 metres below the coal horizon; the contact appeared to be a fault contact.

11.0 COAL RESERVES

11.1 - Coal reserves in the Bonnet Plume Basin were reported in a previous report of November, 1979 (Pan Ocean Report No. 25-79) and will be discussed only briefly.

11.2 - Reserves have been determined for four coal deposit areas to-date. They are:

Illtyd Creek Deposit
Wernecke Deposit
Airstrip Deposit
Wind River Deposit

The four areas are located on Plate II at the back of this report.

In one of the areas - Illtyd Creek Deposit - drilling has established more than sufficient measured reserves to support a mine-mouth development for 30 years. In situ measured reserves in this deposit are in excess of 121 million tonnes.

A "break-down of in situ reserves by area and by category is shown in Table I. Measured, indicated and inferred[1] in situ reserves have been established in excess of 380 million tonnes.

11.3 - Saleable tonnes of coal were calculated for only 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 waste to tonnes of coal).

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 II). This coal has the following specifications:

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

1 The terms measured, indicated and inferred are terms to denote the predision of estimates and are defined in "1976 Assessment of Canada's Coal Resources and Reserves" Report EP 77-5 published by the Department of Energy, Mines and Resources.

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)	IN SITU TONNES (millions)		← AVERAGE COAL SPECIFICATIONS FOR COMPOSITE OF {¼" x 28M @ -1.90 s.g. / 28M x 0 @ RAW					
					YIELD (%)	RESIDUAL MOISTURE %	ASH %	VOLATILES %	FIXED CARBON %	SPECIFIC ENERGY (BTU/lb)
MEASURED										
Illtyd Deposit (Block B)	12.95	720	121		66.22	5.1	18.1	33.2	43.5	9,35[illegible]
Total Measured			121		66.22	5.1	18.1	33.2	43.5	9,35[illegible]
INDICATED										
Illtyd Deposit (Block B)	12.55	178	29		67.65	5.7	17.4	32.7	43.8	9,56[illegible]
Wernecke Deposit (Block A)	15.16	203	40		67.82	4.6	11.1	36.0	48.4	10,2[illegible]
Airstrip Deposit (Block C)	10.39	495	66		70.35	4.8	18.9	30.8	45.1	9,[illegible]
Wind River Deposit (Block D)	25.26	104	34		72.34	4.2	11.2	33.3	51.2	10,[illegible]
Total Indicated			169		69.69	4.8	15.2	32.8	46.9	10,[illegible]
Total Measured & Indicated			289		68.24	4.9	16.4	33.0	45.5	9,75[illegible]
INFERRED										
Wernecke Deposit (Block A)	17.80	180	33		65.43	4.8	13.8	34.9	46.5	10,2[illegible]
Airstrip Deposit (Block C)	2.64	825	28		60.52	5.1	20.0	32.4	42.3	9,[illegible]
Wind River Deposit (Block D)	12.64	186	31		77.15	3.7	9.8	33.5	52.9	10,8[illegible]
Total Inferred			92		67.89	4.5	14.0	33.7	47.8	10,[illegible]
Total Measured, Indicated & Inferred			381		68.15	4.8	15.8	33.2	46.1	9,[illegible]

Table II

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 OP 10:1

	AVERAGE THICKNESS (m)	TOTAL AREA (m^2)	IN-SITU MINEABLE TONNES		RESERVES TO 10:1 CUT-OFF: AREA (m^2)	IN-SITU TONNES	LESS GEOLOGICAL 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		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	39.8	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	13,481,647	530,950	11,655,624	58.4	6,759,346		5.0	19.6	32.5	42.7	9,171
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

For Case b) approximately 35.3 million tonnes of measured saleable coal have been calculated (Table III). 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 mining study designed to determine the most efficient and practicable method(s) of mining.

11.4 - 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 in situ reserves for the basin could be increased to greater than 1 billion tonnes.

NOTE: Average specifications of the coal as presented in the tables are for reconstituted samples of the ¼" x 28 mesh fraction at -1.90 Specific Gravity and the 28 mesh x 0 fraction on a raw basis.

TABLE III

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	YIELD @1.90 s.g.	SALES TONNES	SALES SPECIFICATIONS				
								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	68.7	13,844,433	5.3	16.5	33.9	44.3	9524
No. 2 SEAM	2.89	7,190,298	26,973,452	1,079,101	16,831,329	81.6	13,727,284	5.5	13.3	34.3	46.8	9916
No. 3 SEAM	2.17	7,353,725	20,707,523	1,076,736	12,760,012	62.4	7,960,125	4.9	19.4	32.7	43.0	9146
TOTAL MEASURED	8.59	21,604,944	80,097,372	3,560,166	49,749,185	71.4	35,531,842	5.3	15.9	33.8	45.0	9591
INDICATED												
No. 1 SEAM	3.40	1,917,936	8,469,964	846,996	4,954,929	75.5	3,742,414	5.9	15.0	33.0	45.7	9680
No. 2 SEAM	2.84	1,449,035	5,346,800	534,680	3,127,878	84.0	2,628,629	6.3	13.4	33.5	46.8	9970
No. 3 SEAM	2.17	1,975,629	5,583,523	558,352	3,266,361	68.1	2,224,014	5.8	20.2	32.1	41.8	8995
TOTAL INDICATED	8.41	5,342,600	19,400,287	1,940,028	11,349,168	75.7	8,595,057	6.0	15.9	32.9	45.0	9591
MEASURED & INDICATED												
No. 1 SEAM	3.50	8,978,857	40,886,361	2,251,325	25,112,773	70.0	17,586,847	5.4	16.2	33.8	44.6	9557
No. 2 SEAM	2.88	8,639,333	32,320,252	1,613,781	19,959,207	81.9	16,355,913	5.6	13.3	34.1	46.8	9924
No. 3 SEAM	2.17	9,329,354	26,291,046	1,635,088	16,026,373	63.5	10,184,139	5.1	19.6	32.5	42.7	9113
TOTAL MEASURED & INDICATED	8.55	26,947,544	99,497,659	5,500,194	61,098,353	72.2	44.126,899	5.4	15.9	33.6	45.0	9591
MEASURED												
No. 1 SEAM	3.53	7,060,921	32,416,397	1,404,329	20,157,844	68.7	13,844,433	5.3	16.5	33.9	44.3	9524
No. 2 SEAM	2.89	7,190,298	26,973,452	1,079,101	16,831,329	81.6	13,727,284	5.5	13.3	34.3	46.8	9916
TOTAL MEASURED	6.42	14,251,219	59,389,849	2,483,430	36,989,173	74.5	27,571,717	5.4	14.9	34.1	45.5	9719
INDICATED												
No. 1 SEAM	3.40	1,917,936	8,469,964	846,996	4,954,929	75.5	3,742,414	5.9	15.0	33.0	45.7	9680
No. 2 SEAM	2.84	1,449,035	5,346,800	534,680	3,127,878	84.0	2,628,629	6.3	13.4	33.5	46.8	9970
TOTAL INDICATED	6.24	3,366,971	13,816,764	1,381,676	8,082,807	78.8	6,371,043	6.1	14.3	33.2	46.2	9800
MEASURED & INDICATED												
No. 1 SEAM	3.50	8,978,857	40,886,361	2,251,325	25,112,773	70.0	17,586,847	5.4	16.2	33.8	44.6	9557
No. 2 SEAM	2.88	8,639,333	32,320,252	1,613,781	19,959,207	81.9	16,355,913	5.6	13.3	34.1	46.8	9924
TOTAL MEASURED & INDICATED	6.38	17,618,190	73,206,613	3,865,106	45,071,980	75.3	33,942,760	5.5	14.8	33.9	45.6	7734

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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

HUITIÈME ÉDITION

EIGHTH EDITION

TRANSPORTATION FACILITIES
MOYENS DE TRANSPORT
1974
NORTHWESTERN CANADA
NORD-OUEST DU CANADA

SCALE 1:3,168,000 ÉCHELLE

Miles 25 0 25 50 75 100 125 150 Milles

Kilometres 50 0 50 100 150 200 Kilomètres

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

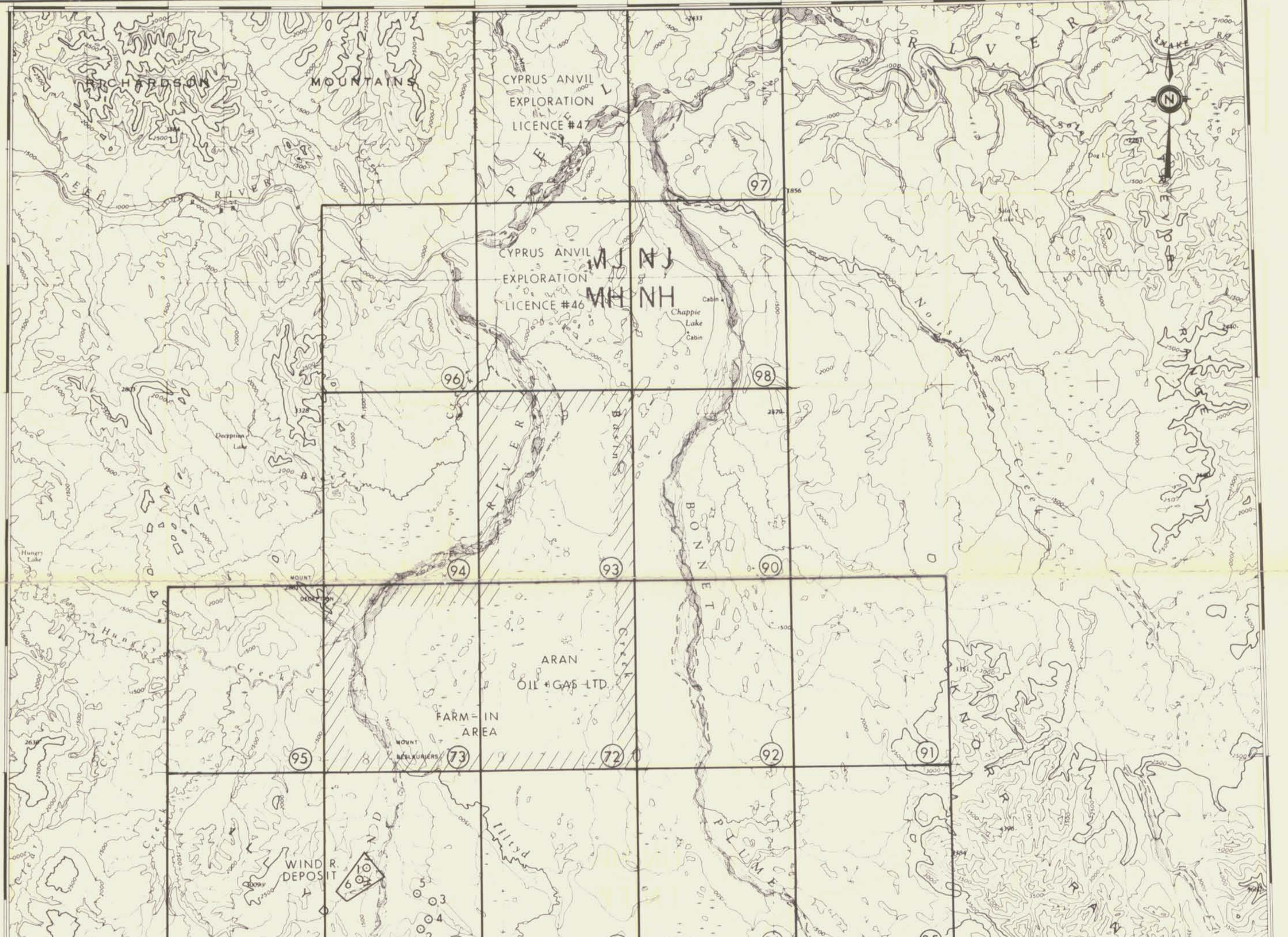
LEGEND - LÉGENDE

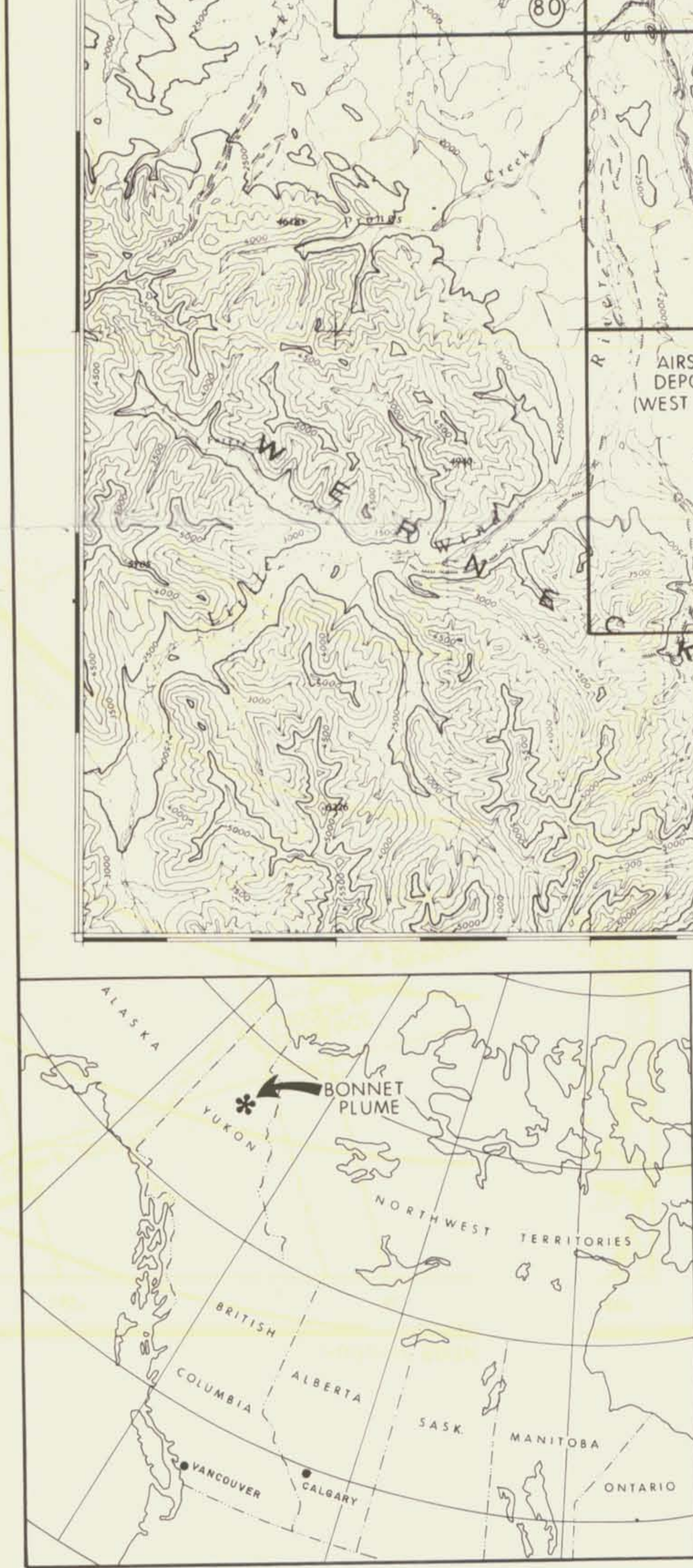
- RAILWAY - CHEMIN DE FER
- MOTOR ROAD - CHEMIN POUR VÉHICULE À MOTEUR
- WINTER ROAD - CHEMIN D'HIVER
- HIGHWAY NUMBER - NUMÉRO DE LA ROUTE (28)
- FERRY - TRAVERSIER Fy
- SHIPPING SERVICE - SERVICE DE MESSAGERIE
- AIRPORT - AÉROPORT
- AIRFIELD - CHAMP D'ATTERRISSAGE
- SEAPLANE ANCHORAGE - MOUILLAGE D'HYDRAVIONS

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		
Fort Smith - Fort Resolution	99	Grande Prairie - Prince George	176
Fort Resolution - Yellowknife	93	Prince George - Smithers	193
Yellowknife - Cambridge Bay	528	Smithers - Terrace	61
		Terrace - Prince Rupert	76

PLATE I





LW

LEGEND

$23_{\odot}$ LOCATION OF DIAMOND DRILL HOLE

km 5 0 5 10 km

TO ACCOMPANY REPORT NO 1-80 BY O.R.C.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

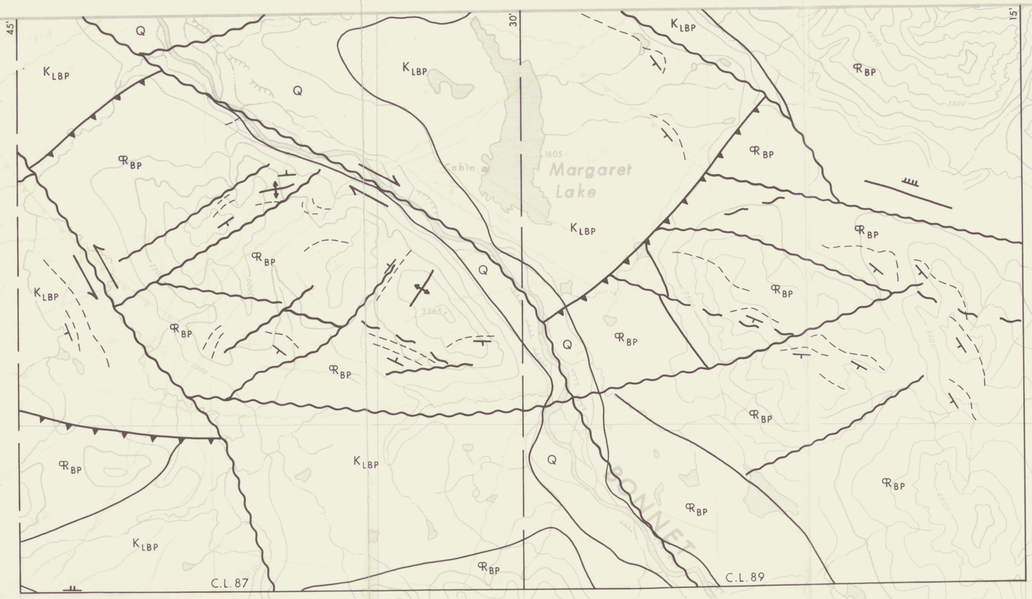
PROPERTY PLAN

BONNET PLUME PROJ[ECT]

PLATE II

DATE	SCALE	NTS	DRAWING NO.
JAN. 1980	1:250,000	106 E	C-0854

E-0856
DRAWING NO.



134°00'

65°15'

LEGEND

Q	RECENT STREAM DEPOSITS
T_{UBP}	UPPER BONNET PLUME FORMATION - UNCONSOLIDATED SANDSTONE, CONGLOMERATES, MUDSTONE AND LIGNITE
K_{LBP}	LOWER BONNET PLUME FORMATION - CONGLOMERATE, SANDSTONE, SHALE, MUDSTONE AND COAL
R_{BP}	PRE-BONNET PLUME FORMATION ROCKS
	DIP LESS THAN 25 DEGREES
	DIP 25-49 DEGREES
	DIP 50-74 DEGREES
	DIP GREATER THAN 75 DEGREES
	ANTICLINE
	SYNCLINE
	THRUST FAULT
	MAJOR FAULT
	MINOR FAULTS AND LINEAMENTS
	ROCK CONTACT
	BEDDING TRACE
87	COAL EXPLORATION LICENCE NUMBER
	INTERNAL AND LIMIT OF C.E.L.'S
C-8	COAL OCCURRENCE AREA AND NUMBER

km 1 0 1 2 3 4 5 km

SHEET INDEX

TO ACCOMPANY REPORT NO. 1-80 BY O.R.C.

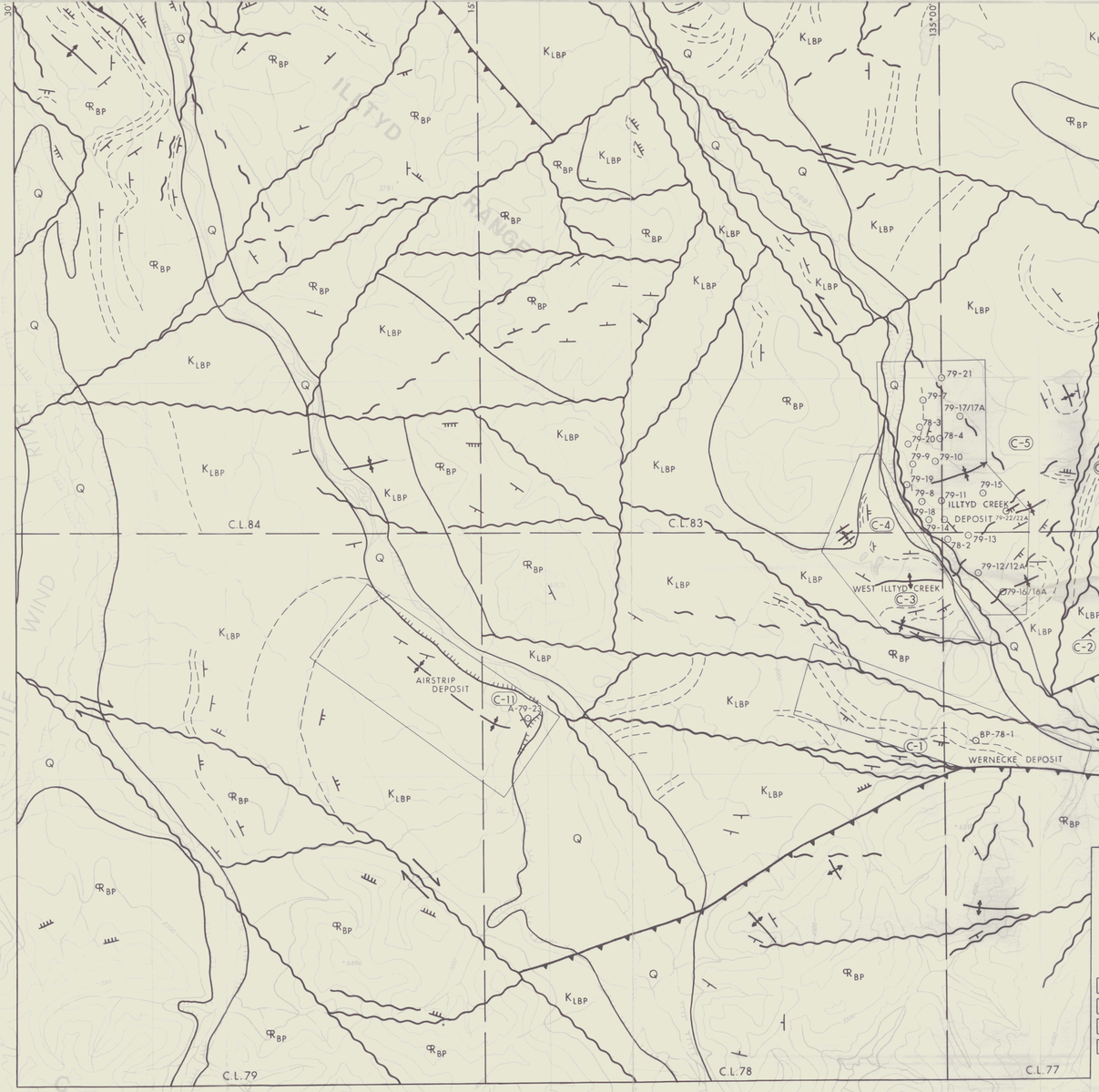
PAN OCEAN OIL LTD.
CALGARY ALBERTA

GEOLOGY OF THE BONNET PLUME BASIN

BONNET PLUME PROJECT

PLATE III

DATE	SCALE	NTS	DRAWING NO.
FEB., 1980	1:50,000	106E	E-0856



LEGEND

- Q — RECENT STREAM DEPOSITS
- T_{UBP} — UPPER BONNET PLUME FORMATION - UNCONSOLIDATED SANDSTONE, CONGLOMERATES, MUDSTONE AND LIGNITE
- K_{LBP} — LOWER BONNET PLUME FORMATION - CONGLOMERATE, SANDSTONE, SHALE, MUDSTONE AND COAL
- R_{BP} — PRE-BONNET PLUME FORMATION ROCKS
- DIP LESS THAN 25 DEGREES
- DIP 25-49 DEGREES
- DIP 50-74 DEGREES
- DIP GREATER THAN 75 DEGREES
- ANTICLINE
- SYNCLINE
- THRUST FAULT
- MAJOR FAULT
- MINOR FAULTS AND LINEAMENTS
- ROCK CONTACT
- BEDDING TRACE
- 87 — COAL EXPLORATION LICENCE NUMBER
- INTERNAL AND LIMIT OF C.E.L.'S
- C-8 — COAL OCCURRENCE AREA AND NUMBER
- 79-21 — SURFACE BORE HOLE AND NUMBER

km 1 0 1 2 3 4 5 km

SHEET INDEX

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GEOLOGY OF THE BONNET PLUME BASIN

BONNET PLUME PROJECT

PLATE IV

DATE	SCALE	NTS	DRAWING NO.
FEB., 1980	1:50,000	106E	E-0857

135°00'

45'

65°30'

C.L.90

C.L.91

C.L.92

C.L.85

C.L.86

C.L.87

C.L.88

PLUME RIVER

KNORR RANGE

Nuisy Creek

Knorr Creek

T_{UBP} K_{LBP} R_{BP} Q

LEGEND

- Q — RECENT STREAM DEPOSITS
- T_{UBP} — UPPER BONNET PLUME FORMATION - UNCONSOLIDATED SANDSTONE, CONGLOMERATES, MUDSTONE AND LIGNITE
- K_{LBP} — LOWER BONNET PLUME FORMATION - CONGLOMERATE, SANDSTONE, SHALE, MUDSTONE AND COAL
- R_{BP} — PRE-BONNET PLUME FORMATION ROCKS
- DIP LESS THAN 25 DEGREES
- DIP 25-49 DEGREES
- DIP 50-74 DEGREES
- DIP GREATER THAN 75 DEGREES
- ANTICLINE
- SYNCLINE
- THRUST FAULT
- MAJOR FAULT
- MINOR FAULTS AND LINEAMENTS
- ROCK CONTACT
- BEDDING TRACE
- 87 — COAL EXPLORATION LICENCE NUMBER
- INTERNAL AND LIMIT OF C.E.L.'S
- C-8 — COAL OCCURRENCE AREA AND NUMBER

km 1 0 1 2 3 4 5 km

SHEET INDEX

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GEOLOGY OF THE BONNET PLUME BASIN

BONNET PLUME PROJECT

PLATE V

DATE	SCALE	UNIT	DRAWING NO.
FEB., 1980	1:50,000	106E	E-0858

E-0859
DRAWING NO

Hungry Lake

Beaver Creek

Clear Creek

Lake

MOUNT DECEPTION

MOUNT DESPAIRERS

WILLYD RANGE

RIVER

C.L. 94

C.L. 93

C.L. 95

C.L. 73

C.L. 72

C.L. 80

C.L. 82

C.L. 81

C.L. 84

C.L. 83

30'

15'

135°00'

65°30'

T_{UBP} K_{LBP} R_{BP} Q

C-8 79-1 79-2 79-3 79-4 79-5 79-6

WIND RIVER DEPOSIT AREA

COAL AREA 10

EAST WIND RIVER AREA

COAL AREA 9

LEGEND

- Q — RECENT STREAM DEPOSITS
- T_{UBP} — UPPER BONNET PLUME FORMATION - UNCONSOLIDATED SANDSTONE, CONGLOMERATES, MUDSTONE AND LIGNITE
- K_{LBP} — LOWER BONNET PLUME FORMATION - CONGLOMERATE, SANDSTONE, SHALE, MUDSTONE AND COAL
- R_{BP} — PRE-BONNET PLUME FORMATION ROCKS
- DIP LESS THAN 25 DEGREES
- DIP 25-49 DEGREES
- DIP 50-74 DEGREES
- DIP GREATER THAN 75 DEGREES
- ANTICLINE
- SYNCLINE
- THRUST FAULT
- MAJOR FAULT
- MINOR FAULTS AND LINEAMENTS
- ROCK CONTACT
- BEDDING TRACE
- 87 — COAL EXPLORATION LICENCE NUMBER
- INTERNAL AND LIMIT OF C.E.L.'S
- (C-8) — COAL OCCURRENCE AREA AND NUMBER

km 1 0 1 2 3 4 5 km

SHEET INDEX

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GEOLOGY OF THE BONNET PLUME BASIN

BONNET PLUME PROJECT

PLATE VI

DATE	SCALE	NTS	DRAWING NO.
FEB.,1980	1:50,000	106 E	E 0859

E-0860
DRAWING NO.

135°00'
45'
30'
15'
134°00'
65°45'

PEEL RIVER
SNAKE RIVER
ONNET
PLUME
RIVER
TREVOR RANGE
Dog Lake
Solo Lake
Solo
Chappie Lake
Cabin
Noisy Creek

R_{BP}
Q
T_{UBP}
K_{LBP}
C.L. 97
C.L. 98
C.L. 90

LEGEND

- Q — RECENT STREAM DEPOSITS
- T_{UBP} — UPPER BONNET PLUME FORMATION - UNCONSOLIDATED SANDSTONE, CONGLOMERATES, MUDSTONE AND LIGNITE
- K_{LBP} — LOWER BONNET PLUME FORMATION - CONGLOMERATE, SANDSTONE, SHALE, MUDSTONE AND COAL
- R_{BP} — PRE-BONNET PLUME FORMATION ROCKS
- DIP LESS THAN 25 DEGREES
- DIP 25-49 DEGREES
- DIP 50-74 DEGREES
- DIP GREATER THAN 75 DEGREES
- ANTICLINE
- SYNCLINE
- THRUST FAULT
- MAJOR FAULT
- MINOR FAULTS AND LINEAMENTS
- ROCK CONTACT
- BEDDING TRACE
- 87 — COAL EXPLORATION LICENCE NUMBER
- INTERNAL AND LIMIT OF C.E.L.'S
- C-8 — COAL OCCURRENCE AREA AND NUMBER

km 1 0 1 2 3 4 5 km

SHEET INDEX

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GEOLOGY OF THE BONNET PLUME BASIN

BONNET PLUME PROJECT — PLATE VII

DATE	SCALE	NTS	DRAWING NO.
FEB., 1980	1:50,000	106E	E-0860

DRAWING NO. E-0861

66°00' 45' 30' 15' 135°00'

RICHARDSON MOUNTAINS

Dall Creek

Mountain Creek

PEEL RIVER

Deception Lake

Beaver

Hungry Lake

45'

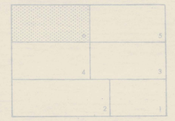
N

LEGEND

- Q — RECENT STREAM DEPOSITS
- T_{UBP} — UPPER BONNET PLUME FORMATION - UNCONSOLIDATED SANDSTONE, CONGLOMERATES, MUDSTONE AND LIGNITE
- K_{LBP} — LOWER BONNET PLUME FORMATION - CONGLOMERATE, SANDSTONE, SHALE, MUDSTONE AND COAL
- R_{BP} — PRE-BONNET PLUME FORMATION ROCKS
- DIP LESS THAN 25 DEGREES
- DIP 25-49 DEGREES
- DIP 50-74 DEGREES
- DIP GREATER THAN 75 DEGREES
- ANTICLINE
- SYNCLINE
- THRUST FAULT
- MAJOR FAULT
- MINOR FAULTS AND LINEAMENTS
- ROCK CONTACT
- BEDDING TRACE
- 87 — COAL EXPLORATION LICENCE NUMBER
- INTERNAL AND LIMIT OF C.E.L.'S
- C-8 — COAL OCCURRENCE AREA AND NUMBER

km 1 0 1 2 3 4 5 km

SHEET INDEX



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GEOLOGY OF THE BONNET PLUME BASIN

BONNET PLUME PROJECT PLATE VIII

DATE	SCALE	NTS	DRAWING NO.
FEB., 1980	1:50,000	106E	E-0861

BP 79-21

GRAVEL PROBABLY WEATHERED CONGLOMERATE

BP 79-7

BP 78-3

BP 79-17/17A

BP 78-4

BP 79-20

APPROXIMATE SUBCROP TRACE NO.3 SEAM HORIZON

APPROXIMATE SUBCROP TRACE NO.2 SEAM HORIZON

APPROXIMATE SUBCROP TRACE NO.1 SEAM HORIZON

BP 79-9

BP 79-10

APPROXIMATE TRACE OF AXIS OF SYNCLINE

APPROXIMATE UPPER CONTACT OF THICK CONGLOMERATE UNIT

BP 79-19

BP 79-15

BP 79-8

BP 79-11

BP 79-22 A

LOCAL ANTICLINE

BP 79-18

BP 79-14

SLUMPED & IN PART SLICKENSIDED

BP 79-13

BP 78-2

BLOCKY OUTCROP

GRAVEL PROBABLY WEATHERED CONGLOMERATE

U

D

APPROXIMATE SUBCROP TRACE NO.1 SEAM HORIZON

APPROXIMATE SUBCROP TRACE NO.2 SEAM HORIZON

APPROXIMATE SUBCROP TRACE NO.3 SEAM HORIZON

BP 79-12A

BP 79-16A

NOTE:

1. TOPOGRAPHICAL FEATURES UNSURVEYED
2. GROUND GRID UNSURVEYED
3. DRILL HOLES SURVEYED RELATIVE TO HOLE BP 78-2

LEGEND

- COAL SEAM HORIZON
- SANDSTONE
- CONGLOMERATIC SANDSTONE
- CONGLOMERATIC
- 350° 20° STRIKE (SHOWING DIRECTION) & DIP (SHOWING ANGLE)
- AREA OF OUTCROP
- × ⊗ COAL: OUTCROP, WASH OR FLOAT
- CONTACT DEFINED, ASSUMED
- FAULT ASSUMED
- ⊙ BP 78-2 DRILL HOLE & NUMBER

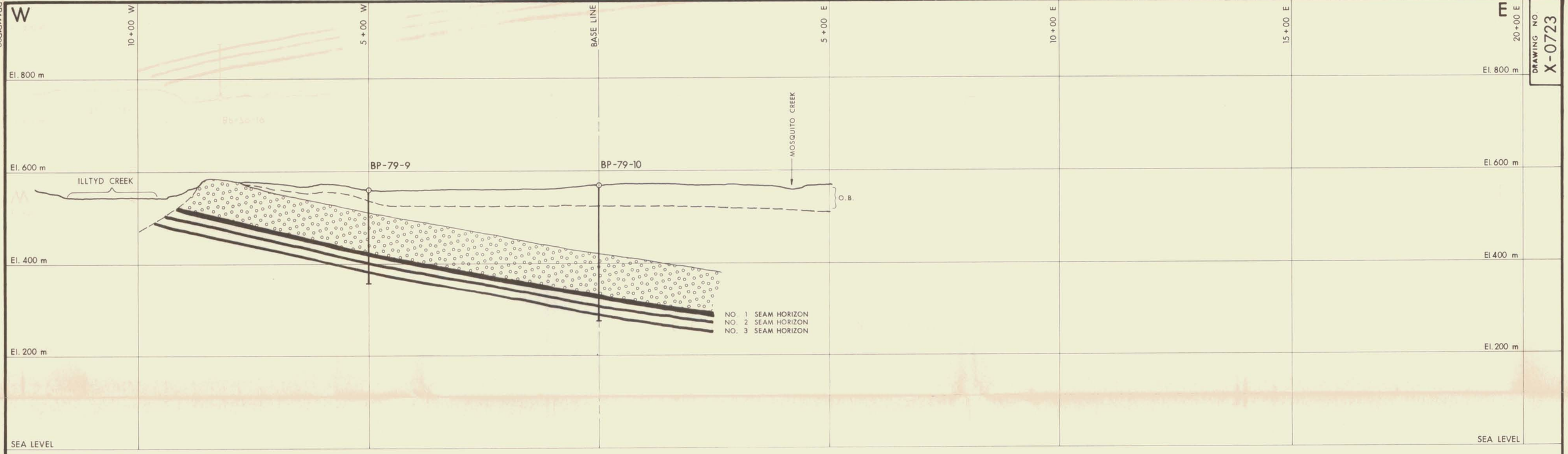
m 100 50 0 100 200 300 400 500 m

TO ACCOMPANY REPORT NO 1-80 BY O.R.C

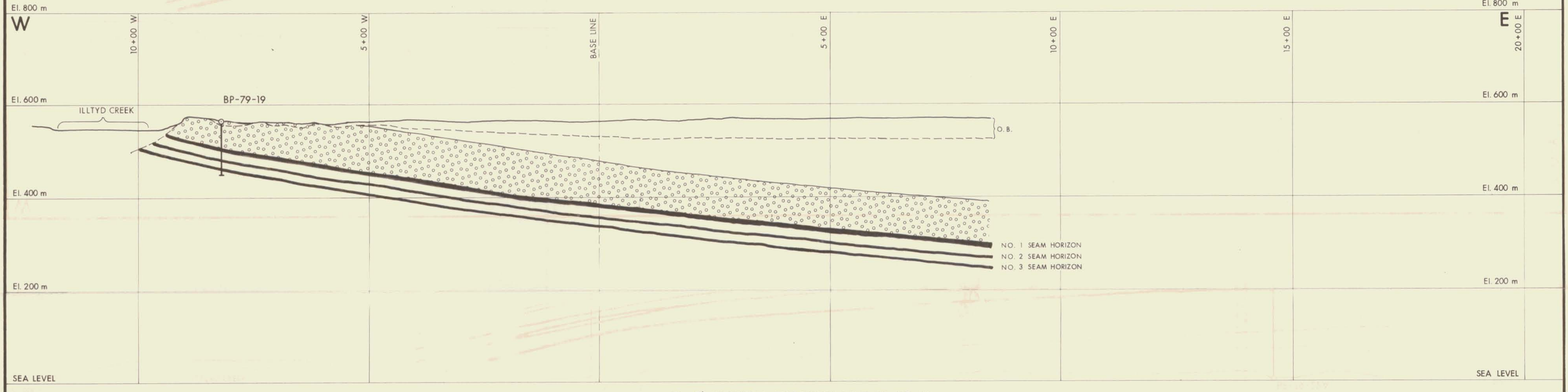
PAN OCEAN OIL LTD.
ALBERTA

GEOLOGY PLAN
ILLTYD CREEK DEPOSIT (BLOCK B)

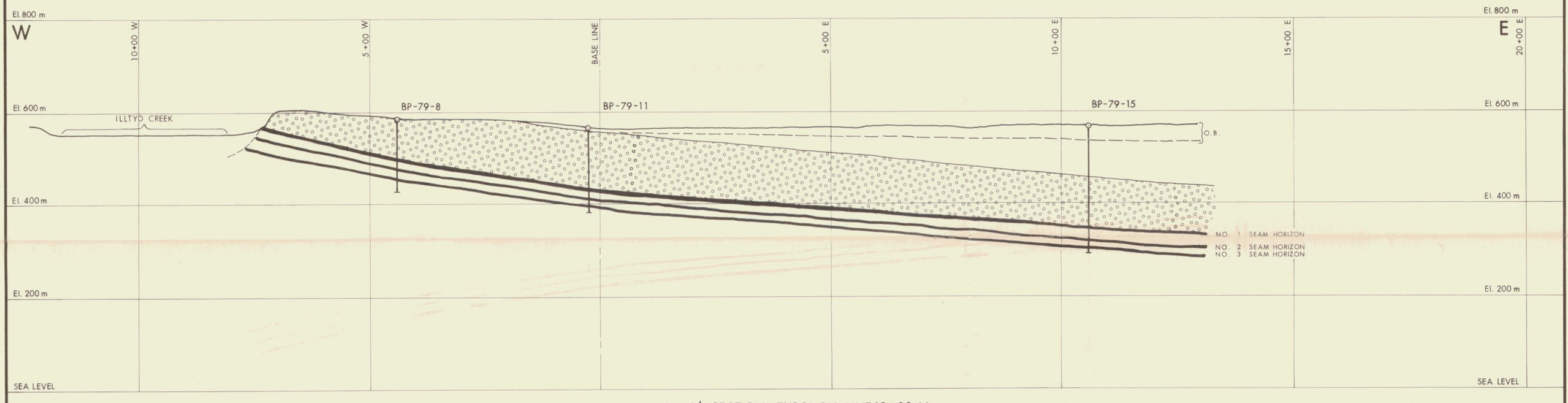
DATE	SCALE	CONTY	PLATE IX DRAWING NO.
JANUARY, 1980	1:5000	1061	E-0862



E-E' SECTION THROUGH LINE 20+00 N



F - F' SECTION THROUGH LINE 15+00 N



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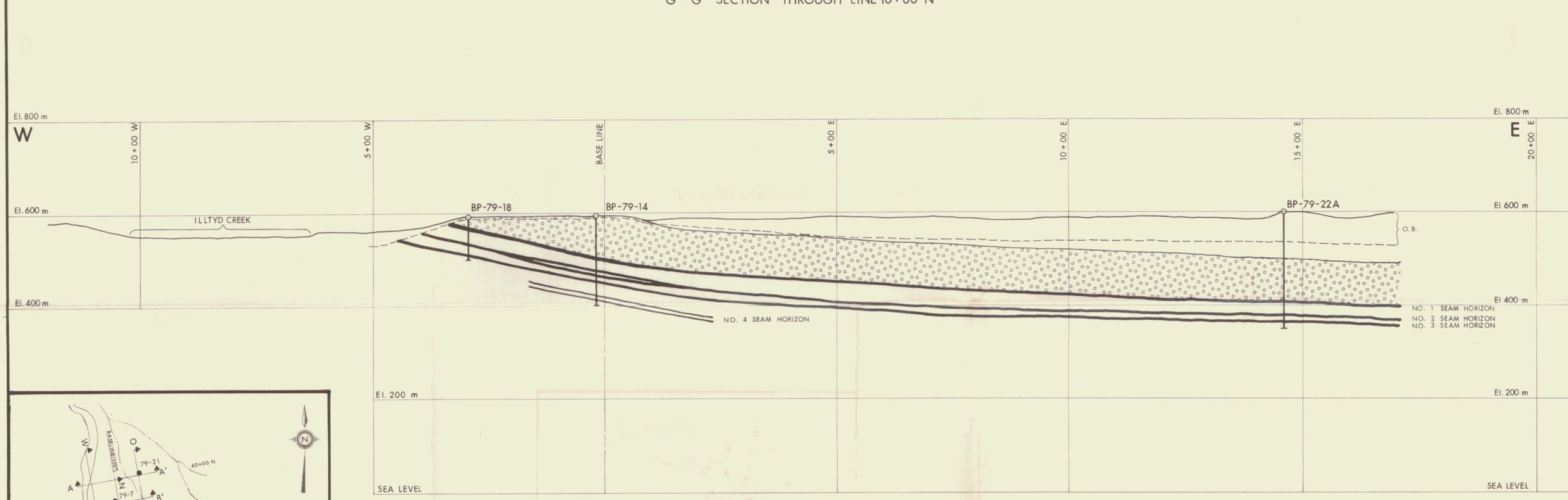
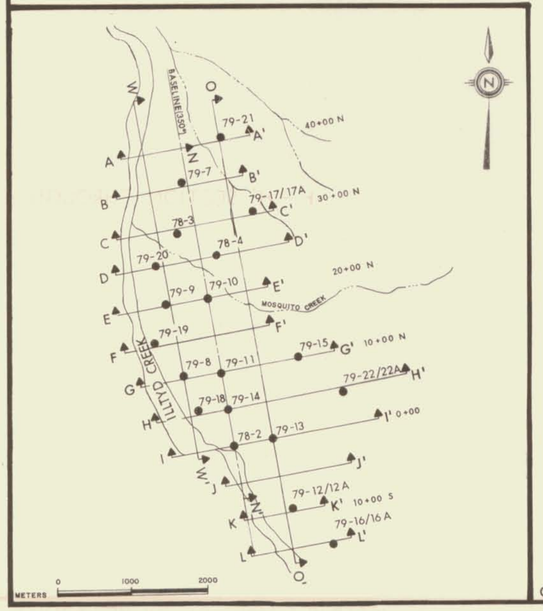


H - H' SECTION THROUGH LINE 5+00 N



CBW

LEGEND

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

100 0 100 200 300 400 500 METERS

TO ACCOMPANY REPORT NO. 25-79 BY O.R.C., D.C.H. 1-80

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ILLTYD CREEK DEPOSIT (BLOCK 'B')

BONNET PLUME PROJECT

PLATE X

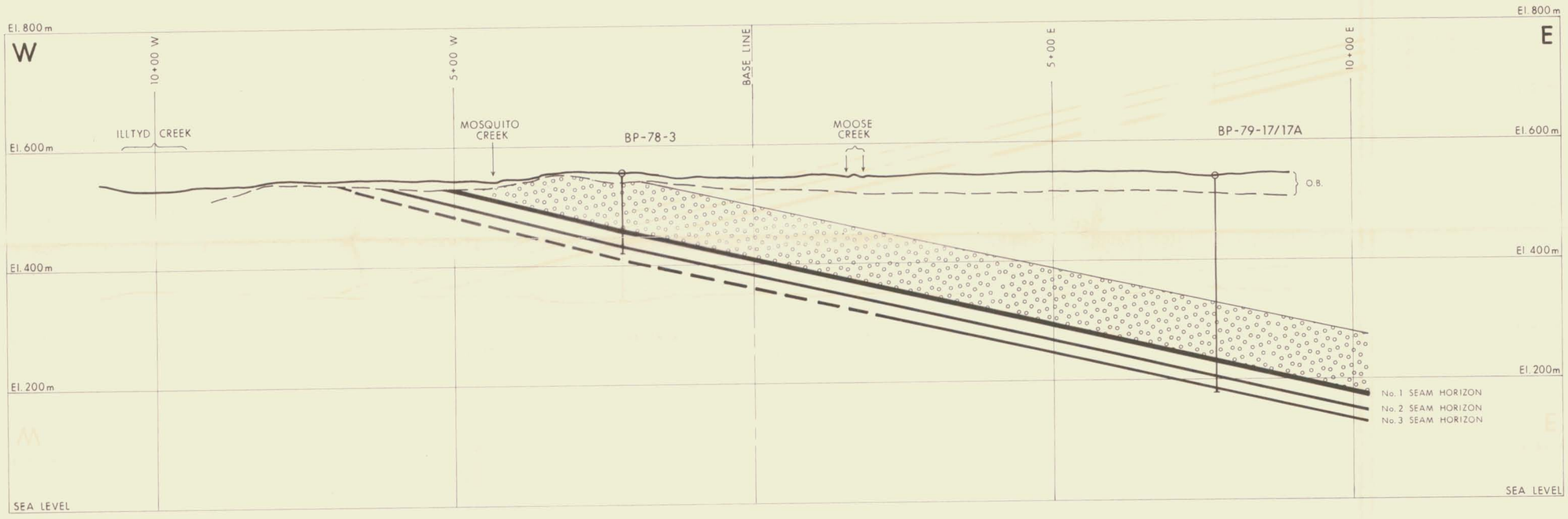
DATE	SCALE	NTS	DRAWING NO.
OCTOBER, 1979	1:5000	106 E	X-0723

DP441BIP00

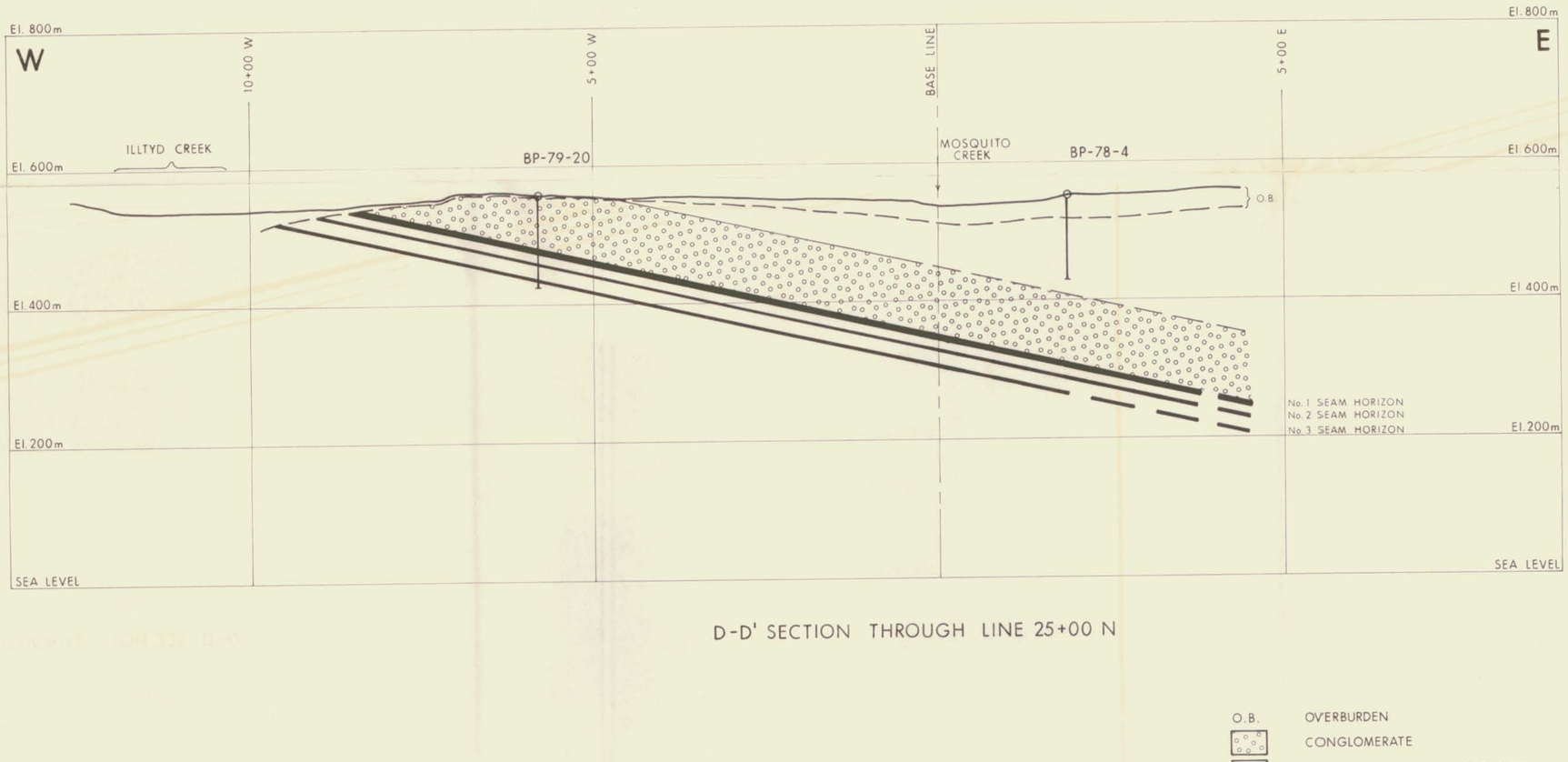
DRAWING NO. X-0724

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

METERS 100 0 100 200 300 400 500

1 - 80

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

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

PLATE XI

DATE	SCALE	NTS	DRAWING NO
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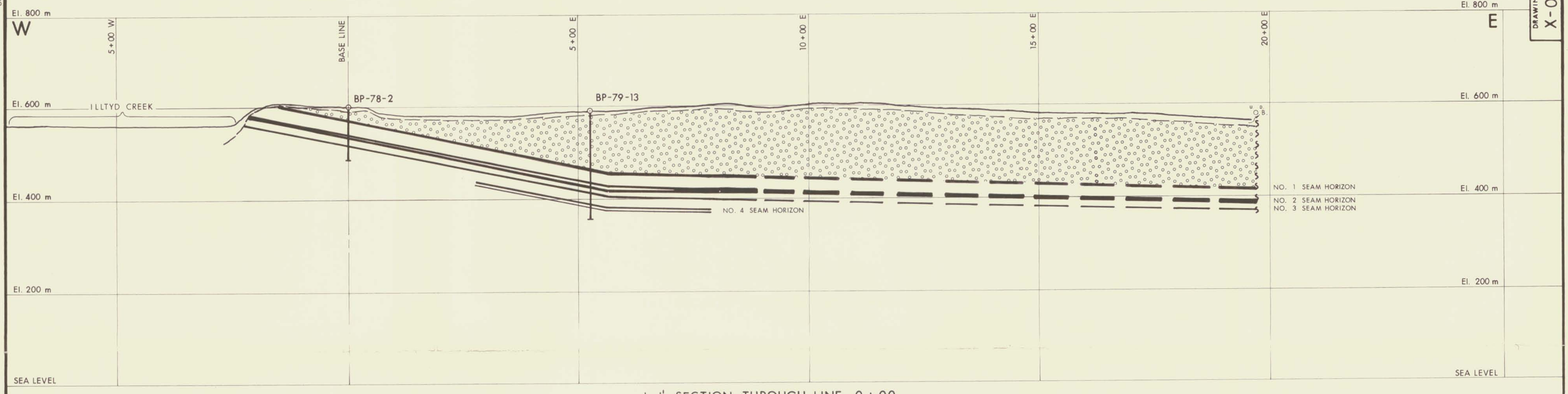
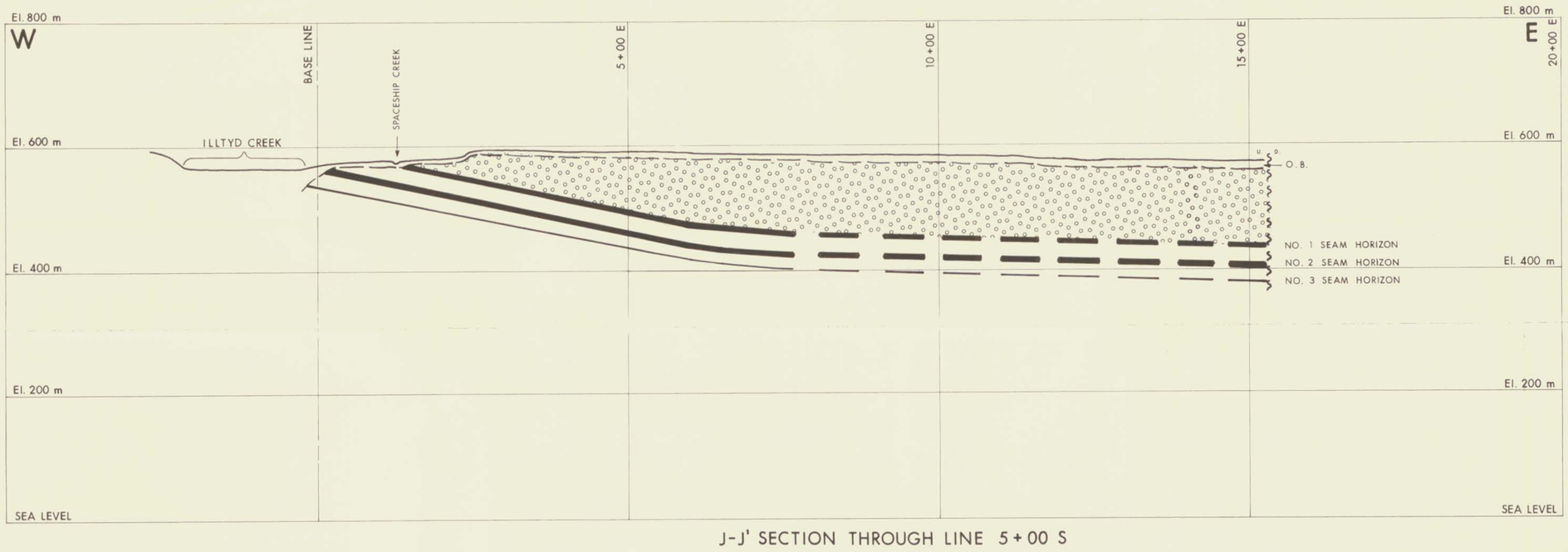
LW

DP441B1P00

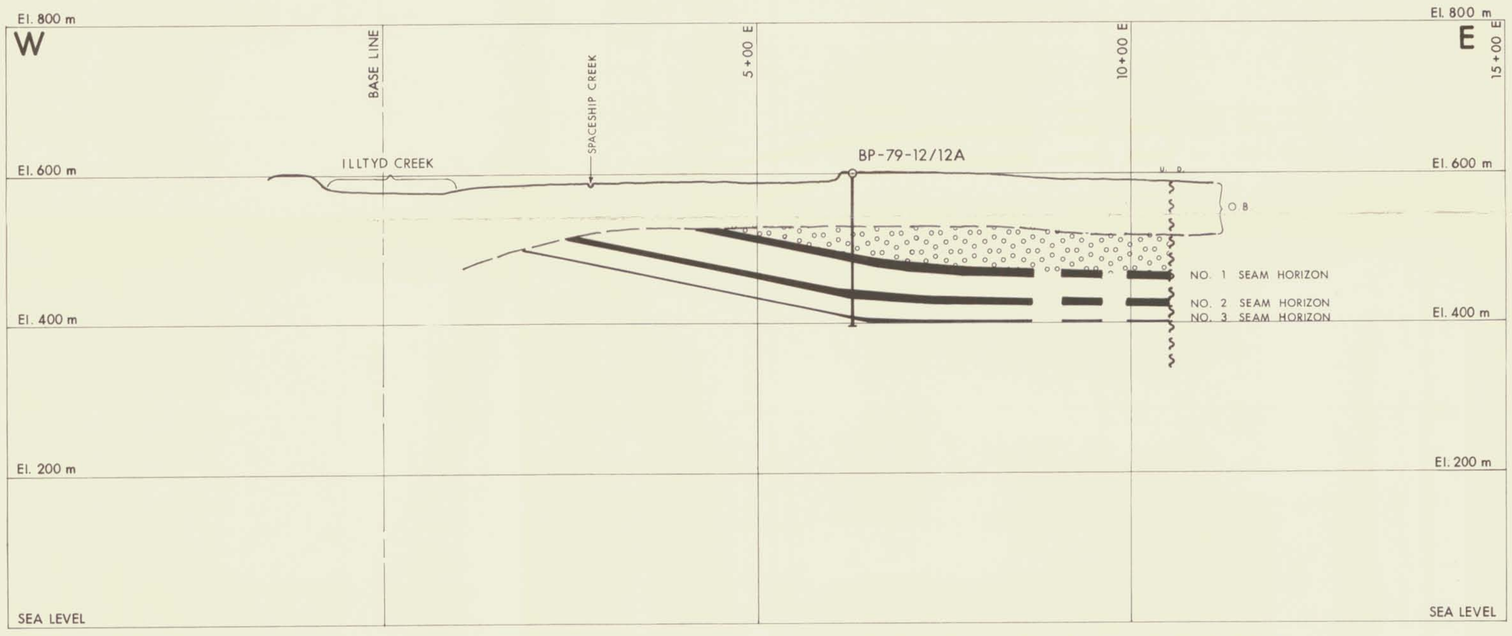
DRAWING NO X-0725



1-1' SECTION THROUGH LINE 0+00



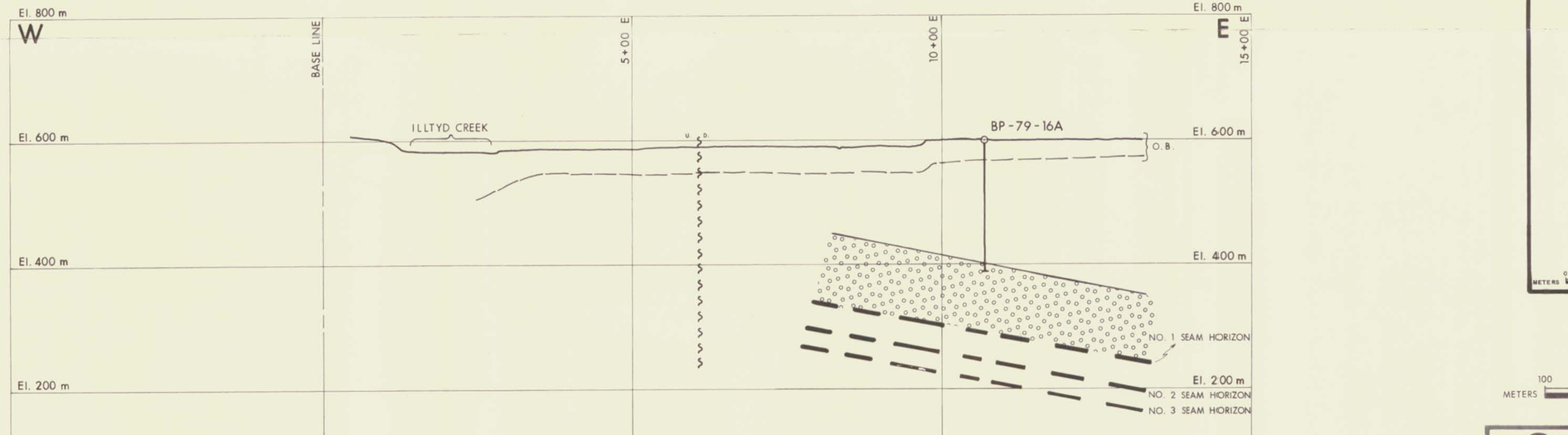
J-J' SECTION THROUGH LINE 5+00 S



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

100 0 100 200 300 400 500
METERS

TO ACCOMPANY REPORT NO. 25-79 / 1-80 BY O.R.C., D.C.H

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ILLTYD CREEK DEPOSIT (BLOCK 'B')

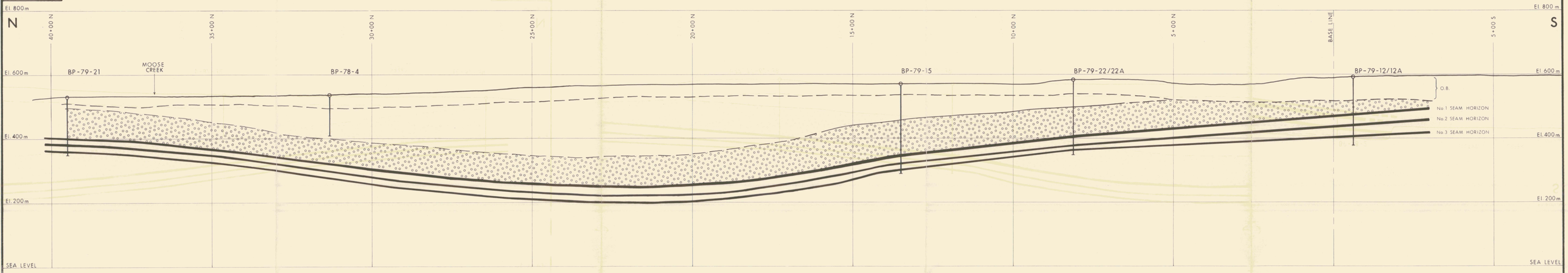
BONNET PLUME PROJECT

PLATE XII

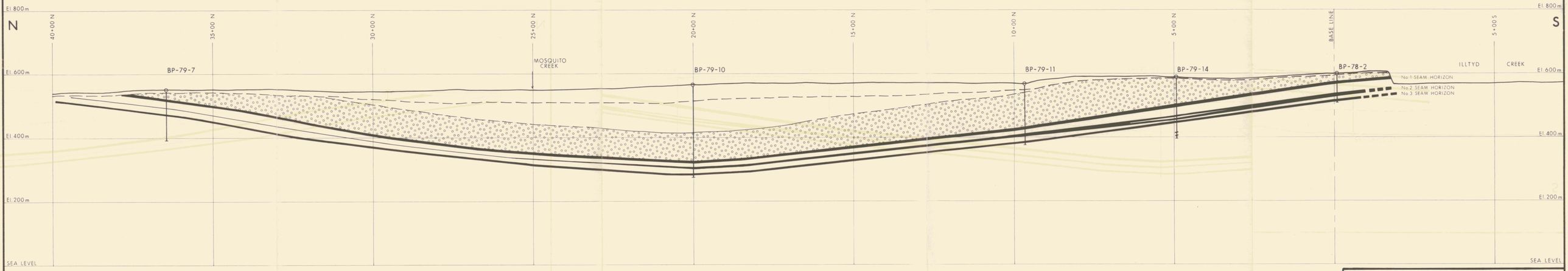
DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:5000	106 E	X-0725

CBW

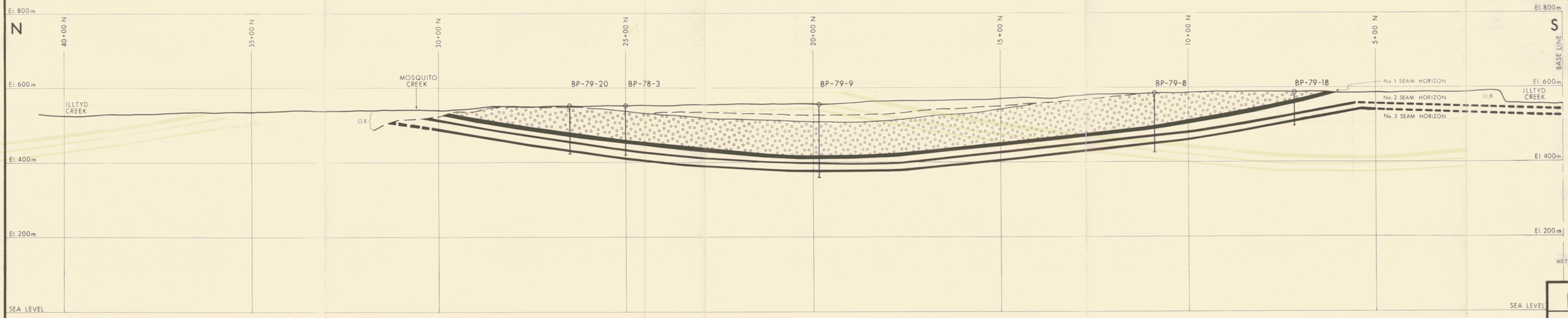
DRAWING NO. X-0726



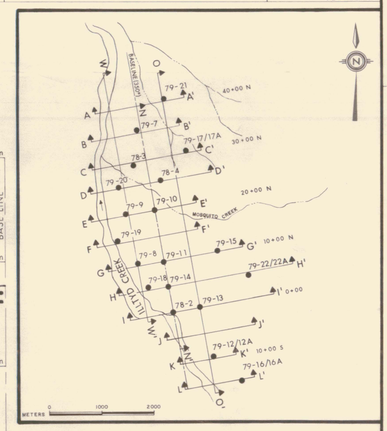
O-O' SECTION THROUGH LINE 5+00 E



N-N' SECTION THROUGH BASELINE



W-W' SECTION THROUGH LINE 5+00 W



LEGEND

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

METERS 100 0 100 200 300 400 500

1:80

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

PLATE XIII

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

LW

DP441B1P00

061966

BP 79-21
BP 79-7
BP 79-17/17A
BP 78-3
BP 78-4
NOT COMPLETED
BP 79-20
BP 79-9
BP 79-10
BP 79-19
BP 79-15
BP 79-8
BP 79-11
BP 79-18
BP 79-14
BP 79-22A
BP 79-13
BP 78-2
BP 79-12A
BP 79-16A
NOT COMPLETED

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
1000 m E

BASE LINE 1350'N

MOOSE CREEK
TWIN LAKES CREEK
MUSHAP CREEK
MOSQUITO CREEK
ILLTYD CREEK

N

HORIZONTAL m: 100 0 100 200 300 400 500 m
VERTICAL: 40 0 40 80 120 160 200
1 : 80
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PAN OCEAN OIL LTD.
CALGARY ALBERTA

LITHOFACIES FENCE DIAGRAM
ILLTYD CREEK (BLOCK B)

BONNET PLUME PROJECT PLATE XIV

DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	HOR. 1:5000 VERT. 1:2000	106 E	E-0767

GEW

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 79-18
10.05m

BP 79-14
8.20m

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
1

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 1m

100 0 100 200 300 400 500

1 - 80
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PAN OCEAN OIL LTD.
CALGARY ALBERTA

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

BONNET'S LAKE PROJECT

DATE	SCALE	NTS	PLATE XV
OCTOBER, 1979	1:5000	106 E	DRAWING NO. E-0740

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-79-15
342.53m

BP-79-8
488.11m

BP-79-11
425.11m

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 300m OVERBURDEN CONTOUR BASE NO. 1 SEAM HORIZON

APPROXIMATE SUBCROP TRACE BASE NO. 1 SEAM HORIZON

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. 1-80

PAN OCEAN OIL LTD.
CALGARY ALBERTA

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

BONNET PLUME PROJECT — PLATE XVI

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

LW

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
4.22m

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. 1-80

PAN OCEAN OIL LTD.
CALGARY ALBERTA

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

BENGAL PLUME PROJECT

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

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

BP-79-21
615.82m

BP-79-7
499.58m

BP-79-17/17A
794.52m

BP-78-3
568.09m

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

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

1-80
TO ACCOMPANY REPORT NO 25-79 BY O.R.C., D.C.H.

STRUCTURE CONTOURS
BASE NO. 2 SEAM HORIZON

ILLTYD CREEK DEPOSIT (BLOCK 'B')

PLATE XVIII

NOVEMBER, 1979

TRACING NO.
E-0729

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 79-11
5.46m

BP 79-8
4.80m

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

ILLTYD CREEK

LEGEND

DEFINED
APPROXIMATE
ASSUMED TRACE BELOW ILLTYD CREEK

NOTE
CONTOUR INTERVAL 1m

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. 3 SEAM HORIZON
ILLTYD CREEK DEPOSIT
(BLOCK 'B')

BONNET PLUME PROJECT

PLATE XIX

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

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

APPROXIMATE 300m OVERBURDEN CONTOUR BASE NO.3 SEAM HORIZON

BP-79-15
298.94 m

BP-79-22/22A
362.94 m

BP-79-19
455.13 m

BP-79-8
447.01 m

BP-79-11
387.13 m

BP-79-18
506.34 m

BP-79-14
447.00 m

APPROXIMATE SUBCROP TRACE BASE NO.3 SEAM HORIZON

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

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 1-80

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

PLATE XX

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

ULTYD CREEK

SUBCROP TRACE 2 SEAM HORIZON
SUBCROP TRACE No. 3 SEAM HORIZON
SUBCROP TRACE No. 2 SEAM HORIZON
SUBCROP TRACE No. 1 SEAM HORIZON

K_{LBP}
€
P

WERNECKE RESERVE AREA (BLOCK A)

BP-78-1

BASE LINE (285°)

WERNECKE THRUST

K_{LBP}

P

BASE LINE

No. 1 SEAM HORIZON
No. 2 SEAM HORIZON
No. 3 SEAM HORIZON
300 m
L 40+00 W

No. 1 SEAM HORIZON
No. 2 SEAM HORIZON
No. 3 SEAM HORIZON
300 m
L 20+00 W

No. 1 SEAM HORIZON
No. 2 SEAM HORIZON
No. 3 SEAM HORIZON
300 m
L 5+00 W

BP-78-1
No. 1 SEAM HORIZON
No. 2 SEAM HORIZON
No. 3 SEAM HORIZON
300 m
0+00

SECTIONS ALONG STRIKE LENGTH

LEGEND

- INDICATED COAL
- INFERRED COAL
- FAULT
- STREAM
- COAL OCCURRENCE OUTCROP, FLOAT OR WASH
- CONGLOMERATE
- CONGLOMERATIC SANDSTONE
- SANDSTONE
- SHALE & CARBONACEOUS SHALE
- BP-78-1 DRILL HOLE
- K_{LBP} CRETACEOUS, LOWER BONNET PLUME FORMATION
- € CAMBRIAN
- P PROTEROZOIC

meters 200 100 0 200 400 meters

1-80 O.R.C.
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

PLATE XXI

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

REVISED JANUARY, 1980

GEW

DRAWING NO
D-0765

WIND RIVER

K_{LBP}

APPROXIMATE SUBCROP TRACE NO.3 SEAM HORIZON

APPROXIMATE SUBCROP TRACE NO.2 SEAM HORIZON

APPROXIMATE SUBCROP TRACE NO.1 SEAM HORIZON

WIND RIVER WINTER ROAD

AIRSTRIP DEPOSIT RESERVE AREA
(BLOCK 'C')

A-79-23

A

A'

LEGEND

- INDICATED CONTACT
- INFERRED CONTACT
- COAL OCCURRENCE OUTCROP, FLOAT OR WASH
- SANDSTONE
- STREAM
- A-79-23 DRILL HOLE
- CONGLOMERATE
- CONGLOMERATIC SANDSTONE
- K_{LBP} CRETACEOUS LOWER BONNET PLUME FORMATION

25 0 25 .5 .75 1
km km

BP-79-23

A — NO.1 SEAM — NO.2 SEAM — NO.3 SEAM — A'

SECTION THROUGH SYNCLINE

1-80 O.R.C.
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

PLATE XXII

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

REVISED JAN. 1980

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

RIVER

N

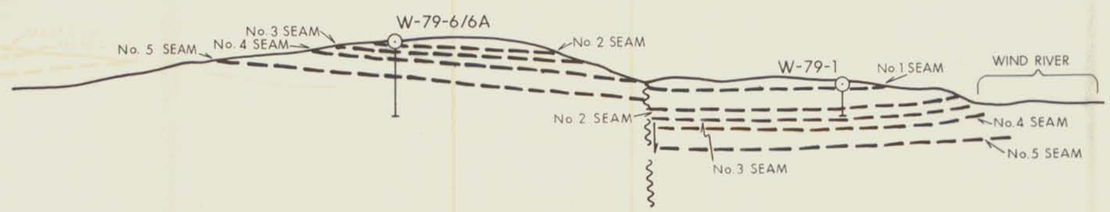
LEGEND

- COAL OCCURRENCE; OUTCROP, FLOAT WASH
- INDICATED COAL
- INFERRED COAL
- CONGLOMERATE
- SANDSTONE
- FAULT
- STREAM

km .5 0 .25 .5km

TO ACCOMPANY REPORT NO. 1-80 25-79 BY O.R.C. O.R.C., D.H.

SECTION A-A'



GEW

REVISED JAN. 1980

PAN OCEAN OIL LTD.
CALGARY ALBERTA

WIND RIVER DEPOSIT RESERVE AREA
(BLOCK 'D')

BONNET PLUME PROJECT

PLATE XXIII

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

DRAWING NO
D-0863

WIND RIVER

EAST CHANNEL WIND RIVER

COAL AREA 10

COAL AREA 9

K_{LBP}

A

A'

W-79-5

W-79-3

24°

24°

15°

POSSIBLE FAULT TRACE

LANDSLIDE AREA

B

B'

W-79-4

W-79-2

15°

14°

13°

12°

LIMESTONE

20°

15°

12°

12°

12°

10°

WEATHERD CONGL

9°

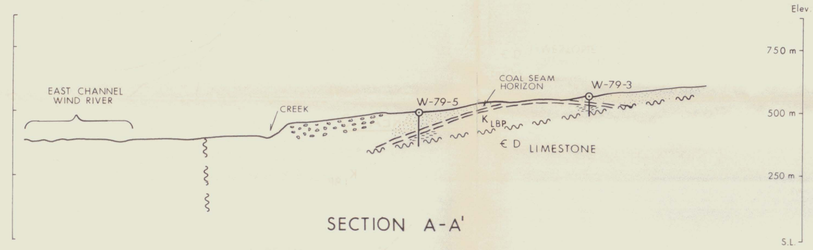
12°

20°

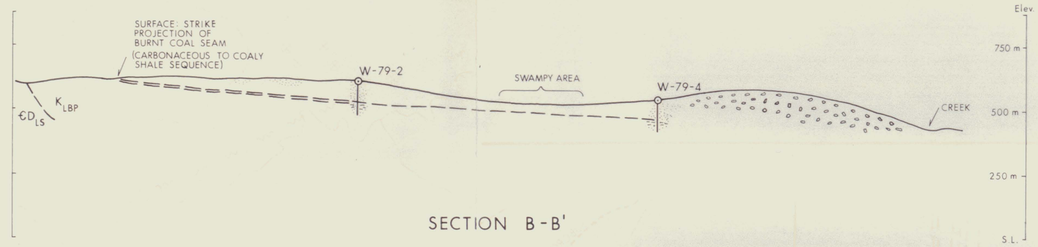
CLINKER
(BURNT COAL SEAM)

K_{LBP}

ϵD
LIMESTONE / DOLOMITE



SECTION A-A'



SECTION B-B'

LEGEND

- CONTACT
- DEFINED, ASSUMED, INFERRED
- FAULT
- CONGLOMERATE
- CONGLOMERATIC SANDSTONE
- SANDSTONE
- SHALE AND/OR CARBONACEOUS SHALE
- COAL OCCURANCES
- OUTCROP, FLOAT OR WASH
- 20° STRIKE, SHOWS DIRECTION & ANGLE OF DIP
- W-79-2 DRILL HOLE
- K_{LBP} CRETACEOUS, LOWER BONNET PLUME
- ϵD CAMBRIAN, DEVONIAN

km .25 0 .25 .5 km

TO ACCOMPANY REPORT NO. 1-80 BY O.R.C.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

EAST WIND RIVER AREA
GEOLOGY PLAN

BONNET PLUME PROJECT

PLATE XXIV

DATE	SCALE	NTS	DRAWING NO.
FEB., 1980	1:12,500	106 E	D-0863

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 (350°)
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

BP 79-21
123.08
126.21
5.12, 48.77, 24.51, 21.60, 0.19
3.13

BP 79-7
32.18
35.78
6.25, 43.1, 25.4, 25.2, 0.23

BP 79 17/17A
303.88
310.90
3.88, 50.15, 21.62, 24.16, 0.2
7.02

BP 78-3
94.70
100.50
7.6, 44.08, 23.7, 24.6, 0.19
5.80

BP 78-4
NOT DRILLED

BP 79-20
75.55
77.04
98.57
84.50
5.92, 44.59, 24.48, 25.01, 0.30
7.42

BP 79-9
134.82
144.68
5.29, 47.60, 23.04, 24.05, 0.16
9.86

BP 79-10
237.84
24.73
6.83, 36.07, 27.36, 29.74, 0.21
7.89

BP 79-19
NOT SAMPLED FOR ANALYSIS
SAMPLED FOR PETROGRAPHY
AND PALYNOLOGY

BP 79-15
218.05
225.10
4.44, 40.09, 26.56, 28.89, 0.22
7.05

BP 79-8
88.68
96.67
6.65, 39.49, 26.1, 27.7, 0.16
7.99

BP 79-11
133.51
141.66
7.86, 41.33, 25.20, 25.62, 0.21
8.15

BP 79-22A
191.63
198.60
660, 37.40, 26.04, 30.20, 0.21
6.97

BP 79-18
22.38
31.47
5.42, 41.45, 26.42, 26.85, 0.33
8.90

BP 79-14
88.42
94.89
6.33, 36.08, 27.02, 30.55, 0.19
6.47

BP 79-13
125.05
131.61
5.29, 35.62, 27.7, 31.31, 0.16
6.56

BP 78-2
23.47
30.74
6.35, 36.75, 27.27, 29.63, 0.21
7.27

BP 79-12A
110.34
118.27
6.86, 31.64, 29.00, 32.49, 0.18
7.93

BP 79-16A
NOT DRILLED

N

LEGEND

- COAL
- SHALY COAL
- COALY SHALE
- CARBONACEOUS SHALE
- SHALE (DARK GRAY, MEDIUM GRAY, LIGHT GRAY)
- SILTSTONE
- SANDSTONE
- CONGLOMERATE

MOIST(%); ASH(%); VOL(%); F.C.(%); S(%)
Thk(m)

m 100 0 100 200 300 400 500 m

TO ACCOMPANY REPORT NO. 1-80 BY O.R.C.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

RAW COAL ANALYSIS PLAN
MINEABLE SECTION
NO. 1 SEAM

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

DATE	SCALE	NTS	DRAWING NO.
OCTOBER, 1979	1:5000	106 E	E-0865

LW

BP 79-21
144.40
146.41
7.0, 33.9, 26.2, 32.9, 0.25
2.01

BP 79-7
54.22
55.21
7.4, 34.6, 26.4, 31.6, 0.19
1.29

BP 79 17/17A
331.88
334.05
4.7, 30.1, 38.7, 36.5, 0.33
2.17

BP 78-3
119.77
121.65
7.61, 18.21, 25.06, 32.66, 0.22
2.43

BP 78-4
NOT DRILLED

BP 79-20
98.14
100.46
6.7, 29.8, 28.6, 34.9, 0.34
2.32

BP 79-9
115.73
159.20
8.00, 16.57, 32.78, 42.65, 0.25
3.46

BP 79-10
259.69
262.87
7.42, 21.30, 32.44, 39.81, 0.33
3.18

BP 79-19
NOT SAMPLED FOR ANALYSIS
SAMPLED FOR PETROGRAPHY
AND PALYNOLOGY

BP 79-15
249.32
252.57
5.5, 21.7, 32.7, 40.1, 0.41
3.25

BP 79-8
113.83
116.57
8.05, 21.15, 31.06, 39.73, 0.25
2.74

BP 79-11
156.98
161.33
8.44, 26.47, 30.89, 34, 21, 0.31
4.35

BP 79-22A
221.84
.56
7.9, 22.7, 30.1, 39.3, 0.27
2.72

BP 79-18
58.52
61.67
5.15, 30.03, 29.23, 35.58, 0.39
3.66

BP 79-14
116.69
119.83
128.58
131.28
6.90, 25.62, 30.60, 37.60, 0.20
5.84

BP 79-13
158.22
160.98
165.60
168.25
6.54, 24.19, 31.58, 37.69, 0.19
5.41

BP 78-2
61.58
65.07
66.84
70.01
7.32, 22.51, 32.51, 37.66, 0.17
6.60

BP 79-12A
155.03
159.10
160.78
163.37
7.43, 23.32, 30.58, 38.67, 0.21
6.65

BP 79-16A
NOT DRILLED

LEGEND

- COAL
- SHALY COAL
- COALY SHALE
- CARBONACEOUS SHALE
- SHALE (DARK GRAY, MEDIUM GRAY, LIGHT GRAY)
- SILTSTONE
- SANDSTONE
- CONGLOMERATE

MOIST (%); ASH(%); VOL(%); F.C.(%); S(%)
Thk (m)

m 100 0 100 200 300 400 500 m

TO ACCOMPANY REPORT NO 1-80 BY O.R.C.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

RAW COAL ANALYSIS PLAN
MINEABLE SECTION
NO. 2 SEAM
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT
PLATE XXVI

DATE	SCALE	NTS	DRAWING NO.
OCTOBER, 1979	1:5000	106 E	E-0866

LW

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

BASE LINE 135°T

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

BP 79-21
164.52
167.15
5.5; 46.2; 24.3; 24.0; 0.21

BP 79-7
78.00
79.14
3.56; 57.49; 20.51; 18.44; 0.14
2.59

BP 79 17/17A
353.02
356.10
3.71; 42.41; 26.25; 27.63; 0.24
3.08

BP 78-3
NOT DRILLED

BP 78-4
NOT DRILLED

BP 79-20
122.25
125.72
5.72; 46.04; 21.62; 24.89; 0.21
3.83

BP 79-9
178.60
182.18
5.34; 41.91; 25.88; 26.86; 0.18
3.58

BP 79-10
279.79
282.97
5.5; 37.3; 28.0; 29.2; 0.19
3.22

BP 79-19
NOT SAMPLED FOR ANALYSIS
SAMPLED FOR PETROGRAPHY
AND PALYNOLOGY

BP 79-15
265.48
268.80
3.8; 43.3; 26.3; 26.6; 0.23
3.32

BP 79-8
134.42
137.28
4.92; 41.08; 25.63; 28.37; 0.18
3.35

BP 79-11
175.00
178.24
6.49; 40.48; 25.82; 27.21; 0.21
3.24

BP 79-22A
234.54
236.52
7.0; 23.0; 31.6; 38.4; 0.29
1.98

BP 79-18
77.56
81.30
4.73; 36.52; 27.00; 31.74; 0.27
4.43

BP 79-14

BP 79-13
180.44
182.63
4.90; 44.14; 24.29; 26.66; 0.22
2.19

BP 78-2
81.76
83.67
4.02; 21.06; 31.84; 43.08; 0.18
1.30

BP 79-12A
186.78
188.97
4.9; 41.2; 24.8; 29.1; 0.18
2.19

BP 79-16A
NOT DRILLED

LEGEND

- COAL
- SHALY COAL
- COALY SHALE
- CARBONACEOUS SHALE
- SHALE (DARK GRAY, MEDIUM GRAY, LIGHT GRAY)
- SILTSTONE
- SANDSTONE
- CONGLOMERATE

MOIST (%); ASH (%); VOL (%); F.C. (%); S (%)
Thk (m)

m 100 0 100 200 300 400 500 m

TO ACCOMPANY REPORT NO. 1-80 BY O.R.C.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

RAW COAL ANALYSIS PLAN
MINEABLE SECTION
NO. 3 SEAM
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

PLATE XXVII

DATE	SCALE	NTS	DRAWING NO.
OCTOBER, 1979	1:5000	106 E	E-0867

LW

DRAWING NO.
D-0864

ILLTYD CREEK

$\epsilon_{LS/DOL}$

K_{LBP}

N

LEGEND

- SHALE AND/OR CARBONACEOUS SHALE
- SANDSTONE
- CONGLOMERATIC SANDSTONE
- CONGLOMERATE
- ×, ⊗ COAL OCCURRENCE OUTCROP, FLOAT OR WASH
- CONTACTS ASSUMED, INFERRED
- SYNCLINE AXIS
- ANTICLINE AXIS
- AREA OF OUTCROP
- 30/15 STRIKE (SHOWING DIRECTION) DIP (SHOWING ANGLE)
- K_{LBP} CRETACEOUS LOWER BONNET PLUME FORMATION
- $\epsilon_{LS/DOL}$ CAMBRIAN LIMESTONE (DOLOMITE)

km .25 0 .25 .50 .75 km

TO ACCOMPANY REPORT NO 1-80 BY O.R.C

PAN OCEAN OIL LTD.
CALGARY ALBERTA

GEOLOGY PLAN
AREA TO WEST OF ILLTYD DEPOSIT
BONNET PLUME PROJECT

PLATE XXVII

DATE	SCALE	NTS	DRAWING NO.
JAN., 1980	1:12,500	106 E	D-0864

LW

BP 79-21
8,323 BTU/lb

8,500

BP 79-7
9,229 BTU/lb

9,000

9,200

BP 79-17/17A
9,244 BTU/lb

9,100

BP 78-3
9,109 BTU/lb

BP 78-4
NOT INTERSECTED

9,000

BP 79-20
8,786 BTU/lb

8,900

BP 79-9
9,268 BTU/lb

BP 79-10
9,767 BTU/lb

9,700

APPROXIMATE 300 m OVERBURDEN CONTOUR BASE NO.1 SEAM HORIZON

BP 79-19
NOT ANALYSED

9,500

BP 79-15
9,428 BTU/lb

9,400

BP 79-8
9,589 BTU/lb

BP 79-11
9,399 BTU/lb

9,500

BP 79-22A
9,929 BTU/lb

APPROXIMATE SUBCROP TRACE BASE NO.1 SEAM HORIZON

BP 79-18
9,342 BTU/lb

BP 79-14
9,618 BTU/lb

BP 79-13
9,867 BTU/lb

BP 78-2
10,006 BTU/lb

10,000

10,500

U
D

BP 79-12A
10,888 BTU/lb

BP 79-16A
NOT INTERSECTED

ILLTYD CREEK

LEGEND

DEFINED

APPROXIMATE

ASSUMED TRACE BELOW ILLTYD CREEK

NOTE:
CONTOUR INTERVAL 100 BTU/lb

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

ISOTHERM PLAN NO.1 SEAM

BASED ON UNDERGROUND MINEABLE THICKNESS

ILLTYD CREEK DEPOSIT (BLOCK 'B')

BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
OCTOBER, 1979	1:5000	106 E	E-0758

LW

BP 79-21
8318 BTU/lb

8,500

9,000

BP 79-7
9,277 BTU/lb

9,300

9,500

BP 79-17/17A
9,925 BTU/lb

BP 78-3
9,531 BTU/lb

BP 78-4
NOT INTERSECTED

BP 79-20
9,570 BTU/lb

9,600

9,800

BP 79-9
9,905 BTU/lb

BP 79-10
9,899 BTU/lb

APPROXIMATE 300 m OVERBURDEN CONTOUR BASE No. 2 SEAM HORIZON

10,000

BP 79-19
NOT ANALYSED

BP 79-15
10,048 BTU/lb

BP 79-8
9,876 BTU/lb

BP 79-11
10,090 BTU/lb

10,000

BP 79-22 A
10,134 BTU/lb

APPROXIMATE SUBCROP TRACE BASE No. 2 SEAM HORIZON

BP 79-18
10,002 BTU/lb

BP 79-14
10,202 BTU/lb

10,200

10,300

BP 79-13
10,310 BTU/lb

BP 78-2
10,564 BTU/lb

U/D

10,300

BP 79-12A
10,358 BTU/lb

BP 79-16A
NOT INTERSECTED

NOTE:
CONTOUR INTERVAL 100 BTU/lb

LEGEND

DEFINED
APPROXIMATE
ASSUMED TRACE BELOW ILLTYD CREEK

100m 0 100 200 300 400 500m

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

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ISOTHERM PLAN NO.2 SEAM

BASED ON UNDERGROUND MINEABLE THICKNESS

ILLTYD CREEK DEPOSIT (BLOCK 'B')

BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
OCTOBER, 1979	1:5000	106 E	E-0759

BP 79-21
7,752 BTU/lb

8,000

BP 79-7
8,163 BTU/lb

8,500

BP 79-17/17A
9,215 BTU/lb

BP 78-3
NOT INTERSECTED

9,000

BP 78-4
NOT INTERSECTED

BP 79-20
9,195 BTU/lb

9,100

BP 79-10
9,028 BTU/lb

BP 79-9
9,597 BTU/lb

APPROXIMATE 300m OVERBUREN CONTOUR BASE NO. 3 SEAM HORIZON

BP 79-19
NOT ANALYSED

9,500

BP 79-15
9,511 BTU/lb

BP 79-8
9,794 BTU/lb

BP 79-11
9,815 BTU/lb

APPROXIMATE SUBCROP TRACE BASE NO. 3 SEAM HORIZON

9,800

BP 79-22A
9,628 BTU/lb

9,500

BP 79-18
9,945 BTU/lb

BP 79-14

9,500

9,000

BP 79-13
8,826 BTU/lb

BP 78-2
9,856 BTU/lb

U

D

8,500

BP 79-12A
8,350 BTU/lb

BP 79-16A

NOTE:
CONTOUR INTERVAL 100 BTU/lb

LEGEND

DEFINED

APPROXIMATE

ASSUMED TRACE BELOW ILLTYD CREEK

9800

NOTE:
NO.3 SEAM HORIZON
SHALED OUT AT BP-79-14
POLYGON DENOTES AREA OF INFLUENCE

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

ISOTHERM PLAN NO. 3 SEAM
BASE ON UNDERGROUND MINEABLE THICKNESS
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
OCTOBER, 1979	1:5000	106 E	E-0760

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 ⊙ 27.1%
BP 79-7 ⊙ 17.0%
BP 79-17/17A ⊙ 20.1%
BP 78-3 ⊙ 18.7%
BP 78-4 ⊙ NOT INTERSECTED
BP 79-20 ⊙ 21.1%
BP 79-9 ⊙ 18.3%
BP 79-10 ⊙ 14.4%
BP 79-19 ⊙ 17.2% (ESTIMATED)
BP 79-15 ⊙ 18.8%
BP 79-8 ⊙ 16.1%
BP 79-11 ⊙ 16.4%
BP 79-18 ⊙ 19.6%
BP 79-14 ⊙ 17.7%
BP 79-22A ⊙ 13.6%
BP 79-13 ⊙ 15.2%
BP 78-2 ⊙ 12.0%
BP 79-12A ⊘ 8.0%
BP 79-16A ⊙ NOT INTERSECTED

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

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

BASE LINE (330°)
MOOSE CREEK
TWIN LAKES CREEK
MISHAP CREEK
MOSQUITO CREEK
ILLTYD CREEK
SPACESHIP CREEK

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
CONTOUR INTERVAL 1.0%

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

ISOASH PLAN
(BASED ON UNDERGROUND MINING THICKNESS)
No. 1 SEAM HORIZON

ILLTYD CREEK DEPOSIT (BLOCK B)
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:5000	106 E	E-0761

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
0000

MOOSE CREEK
BASE LINE 1350m
TWIN LAKES CREEK
MISHAP CREEK
MOSQUITO CREEK
ILLTYD CREEK
SPACESHIP CREEK

BP 79-21 ⊙ 23.3%
BP 79-7 ⊙ 16.2%
BP 79-17/17A ⊙ 15.3%
BP 78-3 ⊙ 15.0%
BP 78-4 ⊙ NOT INTERSECTED
BP 79-20 ⊙ 14.7%
BP 79-9 ⊙ 12.7%
BP 79-10 ⊙ 12.9%
BP 79-19 ⊙ 11.9% ESTIMATED
BP 79-8 ⊙ 11.2%
BP 79-11 ⊙ 11.5%
BP 79-15 ⊙ 10+00 N 13.3%
BP 79-18 ⊙ 13.4%
BP 79-14 ⊙ 13.1%
BP 79-22A ⊙ 5+00 N 12.8%
BP 79-13 ⊙ 13.2%
BP 78-2 ⊙ 9.2%
BP 79-12A ⊙ 11.8%
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

23% 22% 21% 20% 19% 18% 17% 16% 15% 14% 13% 12% 11% 10%

APPROXIMATE 300m OVERBURDEN CONTOUR BASE NO.2 SEAM HORIZON

APPROXIMATE SUBCROP TRACE BASE NO.2 SEAM HORIZON

N

LEGEND

- DEFINED
- APPROXIMATE
- ASSUMED TRACE BELOW ILLTYD CREEK

NOTE:
CONTOUR INTERVAL 1.0%

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

ISOASH PLAN
(BASED ON UNDERGROUND MINING THICKNESS)
NO. 2 SEAM HORIZON
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:5000	106 E	E-0762

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 (350°)

MOOSE CREEK

TWIN LAKES CREEK

MISHAP CREEK

MOSQUITO CREEK

ILLTYD CREEK

SPACESHIP CREEK

BP 79-21
28.5%

BP 79-7
24.5%

BP 79-17/17A
20.2%

BP 78-3
15.8%
ESTIMATED

BP 78-4
NOT INTERSECTED

BP 79-20
18.6%

BP 79-10
20.2%

BP 79-9
15.5%

BP 79-19
14.6%
ESTIMATED

BP 79-15
18.8%

BP 79-8
13.7%

BP 79-11
14.2%

BP 79-18
13.1%

BP 79-14
N/A

BP 79-22A
16.4%

BP 79-13
22.8%

BP 78-2
16.0%

BP 79-12A
26.2%

BP 79-16A
NOT INTERSECTED

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

28%
27%
26%
25%
24%
23%
22%
21%
20%
19%
18%
17%
16%
15%
14%
13%

APPROXIMATE 300m OVERBURDEN CONTOUR

APPROXIMATE SUBCROP TRACE BASE NO.3 SEAM HORIZON

U
D

LEGEND

DEFINED

APPROXIMATE

ASSUMED TRACE BELOW ILLTYD CREEK

15%

NOTE:
NO. 3 SEAM HORIZON
SHALED OUT AT BP-79-14
POLYGON DENOTES AREA OF INFLUENCE
CONTOUR INTERVAL 1.0%

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

ISOASH PLAN
(BASED ON UNDERGROUND MINING THICKNESS)
NO. 3 SEAM HORIZON
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	1:5000	106 E	E-0763

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

MOOSE CREEK
BASE LINE (390°)
TWIN LAKES CREEK
MUSHAP CREEK
MOSQUITO CREEK
C R E E K
I L L T Y D
BACKSHIP CREEK

BP 79-21
BP 79-7
BP 79-17/17A
BP 78-3
BP 78-4
NOT COMPLETED
BP 79-20
BP 79-9
BP 79-10
BP 79-19
BP 79-15
BP 79-8
BP 79-11
BP 79-14
BP 79-18
BP 79-22A
BP 79-13
BP 78-2
BP 79-12A
BP 79-16A
NOT COMPLETED

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

N

HORIZONTAL m 100 0 100 200 300 400 500 m
VERTICAL m 40 0 40 80 120 160 200
1-80

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

PAN OCEAN OIL LTD.
CALGARY ALBERTA

LITHOFACIES FENCE DIAGRAM
ILLTYD CREEK (BLOCK B)

BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
NOVEMBER, 1979	HOR. 1:5000 VERT. 1:2000	106 E	E-0767

GEW

4000 m N

3000 m N

2000 m N

1000 m N

0000

1000 m W

1000 m E

2000 m E

BASE LINE (350°)

MOOSE CREEK

TWIN LAKES CREEK

MISHAP 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

BP 79-21
123.08
126.21
3.13; 58.7; 6.9; 21.7; 29.7; 35.8; 7,759

BP 79-7
32.18
35.78
3.60; 53.60; 4.9; 17.0; 34.5; 43.4; 9,424

BP 79 17/17A
304.30
308.00
3.70; 53.1; 3.9; 20.1; 29.3; 46.2; 9,244

BP 78-3
97.50
100.50
3.00; 54.9; 7.0; 18.7; 32.8; 41.5; 9,109

BP 78-4
NOT DRILLED

BP 79-20
78.57
82.27
3.70; 57.2; 7.0; 21.1; 31.3; 40.2; 8,786

BP 79-9
138.53
142.23
3.70; 67.0; 5.0; 18.3; 33.9; 42.6; 9,268

BP 79-10
238.36
242.06
3.70; 72.0; 5.0; 14.4; 34.7; 45.7; 9,767

MOSQUITO CREEK

APPROXIMATE 300m OVERBURDEN CONTOUR

BASE NO. 1 SEAM HORIZON

BP 79-19
63.74
66.70
2.96

APPROXIMATE SUBCROP TRACE BASE NO. 1 SEAM HORIZON

BP 79-8
90.96
94.66
3.70; 64.2; 4.2; 16.1; 35.5; 44.1; 9,589

BP 79-11
136.66
140.36
3.70; 74.2; 5.6; 16.4; 34.8; 43.0; 9,399

BP 79-15
220.96
224.66
3.70; 72.4; 4.7; 18.8; 32.8; 42.9; 9,428

BP 79-22A
192.82
196.08
3.26; 79.7; 6.2; 13.6; 32.9; 47.1; 9,929

BP 79-18
26.04
29.04
3.00; 68.6; 3.5; 19.6; 33.4; 43.0; 9,342

BP 79-14
91.19
94.89
3.70; 70.8; 3.6; 17.7; 35.1; 43.0; 9,618

BP 79-13
127.42
131.12
3.70; 76.4; 4.6; 15.2; 34.5; 45.4; 8,867

BP 78-2
25.00
28.70
3.70; 75.8; 6.7; 12.0; 35.0; 46.1; 10,006

ILLTYD CREEK

SPALESHIP CREEK

BP 79-12A
112.13
115.83
3.70; 86.6; 5.4; 8.0; 36.8; 49.4; 10,888

BP 79-16A
NOT DRILLED

LW

LEGEND

- COAL
- SHALY COAL
- COALY SHALE
- CARBONACEOUS SHALE
- SHALE (DARK GRAY / MEDIUM GRAY / LIGHT GRAY)
- SILTSTONE
- SANDSTONE
- CONGLOMERATE

BP 78-2 DRILL HOLE & NUMBER

DEPTH IN METRES: 25.00 – 28.70

THICKNESS (m.)	YIELD (%)	RESIDUAL ASH MOISTURE (%)	VOLATILES (%)	FIXED CARBON (%)	SPECIFIC ENERGY (BTU'S/lb)
3.70	75.8	6.7	12.0	35.0	46.1	10,006

NOTE: ANALYSES DETERMINED FOR: 1/4" × 28m @ 1.90 s.g.
28m × 0 @ RAW BASIS

m 100 0 100 200 300 400 500 m

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

PAN OCEAN OIL LTD.
CALGARY ALBERTA

GRAPHIC LOG AND ANALYTICAL DATA
SELECTED UNDERGROUND MINEABLE INTERVAL
NO. 1 SEAM
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
OCTOBER, 1979	1:5000	106 E	E-0768

BP 79-21
144.40
146.41
2.01, 78.3, 7.4, 23.3, 28.7, 40.4, 8,318

BP 79-7
54.22
55.51
1.29, 4.6, 16.2, 33.1, 46.1, 9,277

BP 79 17/17A
331.88
334.05
2.17, 74.4, 3.6, 15.3, 33.3, 17.6, 9,925

BP 78-3
119.22
121.65
2.43, 74.1, 6.8, 15.0, 33.4, 44.8, 9,531

BP 78-4
NOT DRILLED

BP 79-20
98.14
100.46
2.32, 73.6, 7.8, 14.7, 32.1, 45.2, 9,570

BP 79-9
155.73
159.20
3.47, 90.2, 5.0, 12.7, 34.1
48.1, 9,905

BP 79-10
259.69
262.87
3.18, 83.9, 4.1, 12.9, 35.6, 47.4, 9,899

BP 79-19
84.52
87.01
2.49

BP 79-15
249.52
252.57
3.25, 84.20, 5.9, 13.3, 34.0, 46.7, 10,048

BP 79-8
113.83
116.57
2.74, 80.2, 5.6, 11.2
34.8, 48.4, 9,876

BP 79-11
156.98
160.68
3.70, 76.6, 6.3, 11.5, 36.5, 45.6, 10,090

BP 79-22A
221.84
224.56
2.72, 84.1, 6.9, 12.8, 33.2, 47.0, 10,134

BP 79-18
58.52
61.67
3.15, 72.7
5.3, 13.4
32.3, 48.7
10,002

BP 79-14
116.69
120.31
3.62, 81.5, 3.7, 13.1, 35.3, 47.2, 10,202

BP 79-13
158.22
160.98
2.76, 77.1, 3.8, 13.2, 36.2, 46.3, 10,310

BP 78-2
61.58
65.07
3.49, 82.0, 6.7, 9.1, 35.8, 48.4, 10,564

BP 79-12A
155.03
158.73
3.70, 87.3, 5.5, 11.8, 34.6, 47.6
10,358

BP 79-16A
NOT DRILLED

4000 m N
3000 m N
2000 m N
1000 m N
0000
1000 m S
1000 m W
1000 m E
2000 m E
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
BASE LINE (350°)
TWIN LAKES CREEK
MISHAP CREEK
MOSQUITO CREEK
SPACESHIP CREEK
ILLTYD CREEK
APPROXIMATE 300m OVERBURDEN CONTOUR BASE NO. 2 SEAM HORIZON
APPROXIMATE SUBCROP TRACE BASE NO. 2 SEAM HORIZON

LEGEND

COAL
SHALY COAL
COALY SHALE
CARBONACEOUS SHALE
SHALE (DARK GRAY, MEDIUM GRAY, LIGHT GRAY)
SILTSTONE
SANDSTONE
CONGLOMERATE

BP 78-2 DRILL HOLE & NUMBER

DEPTH IN METRES	THICKNESS (m.)	YIELD (%)	RESIDUAL MOISTURE (%)	ASH (%)	VOLATILES (%)	FIXED CARBON (%)	SPECIFIC ENERGY (BTU'S/lb)
61.58 – 65.07	3.49	82.0	6.7	9.1	35.8	48.4	10,564

NOTE: ANALYSES DETERMINED FOR: 1/4" × 28m @ -1.90 s.g.
28m × 0 @ RAW BASIS

m 100 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

GRAPHIC LOG AND ANALYTICAL DATA
SELECTED UNDERGROUND MINEABLE INTERVAL
NO. 2 SEAM
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
OCTOBER, 1979	1:5000	106 E	E-0769

CBW

BP 79-21
164.52
167.15
2.63, 57.5, 6.6, 28.5, 36.3, 7,752

BP 79-7
78.20
79.14
0.94, 42.9, 7.0, 24.5, 33.2, 35.0, 8,163

BP 79 17/17A
353.45
356.10
2.65, 65.6, 4.1, 20.2, 30.7, 44.8, 9,215

BP 78-3
NOT DRILLED

BP 78-4
NOT DRILLED

BP 79-20
122.25
124.81
2.56, 68.4, 7.2, 18.6, 31.3, 42.8, 9,195

BP 79-9
179.57
182.18
2.61, 65.9, 4.8, 15.5, 34.5, 45.0, 9,597

BP 79-10
279.75
282.97
3.22, 64.7, 3.6, 20.2, 33.6, 42.6, 9,028

BP 79-19
106.33
109.67
3.34

BP 79-15
265.48
268.80
3.32, 52.1, 4.8, 18.8, 32.9, 43.3, 9,511

BP 79-8
134.42
137.28
2.86, 55.9, 5.7, 13.7, 35.0, 45.5, 9,974

BP 79-11
176.00
178.24
2.24, 64.8, 4.5, 14.2, 35.6, 45.5, 9,815

BP 79-22A
234.54
236.52
1.98, 85.5, 5.9, 16.4, 33.4, 44.1, 9,628

BP 79-18
78.29
81.99
3.70, 59.6, 4.9, 13.1, 33.6, 46.4, 9,945

BP 79-14
141.80
144.77
2.97, 32.0, 3.2, 32.9, 28.3, 35.0, 7,162

BP 79-13
180.44
182.63
2.19, 61.1, 4.1, 22.8, 31.5, 41.1, 8,826

BP 78-2
81.76
82.83
1.07, 87.6, 3.9, 16.0, 35.1, 45.0, 9,856

BP 79-12A
186.78
188.97
2.19, 66.2, 3.9, 26.2, 29.5, 40.4, 8,350

BP 79-16A
NOT DRILLED

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

TWIN LAKES CREEK
MISHAP CREEK
MOOSE CREEK
BASE LINE (350°)
MOSQUITO CREEK
SPACESHIP CREEK
ILLTYD CREEK

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

N

LEGEND

- COAL
- SHALY COAL
- COALY SHALE
- CARBONACEOUS SHALE
- SHALE (DARK GRAY, MEDIUM GRAY, LIGHT GRAY)
- SILTSTONE
- SANDSTONE
- CONGLOMERATE

BP 78-2 DRILL HOLE & NUMBER

DEPTH IN METRES	THICKNESS (m)	YIELD (%)	RESIDUAL MOISTURE (%)	ASH (%)	VOLATILES (%)	FIXED CARBON (%)	SPECIFIC ENERGY (BTU's/lb)
81.76 – 82.83	1.07,	87.6,	3.9,	16.0,	35.1,	45.0,	9,856

NOTE: ANALYSIS DETERMINED FOR: 1/4" x 28m @ -1.90 s.g.
28m x 0 @ RAW BASIS

m 100 0 100 200 300 400 500 m

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

PAN OCEAN OIL LTD.
CALGARY ALBERTA

GRAPHIC LOG AND ANALYTICAL DATA
SELECTED UNDERGROUND MINEABLE INTERVAL
NO. 3 SEAM
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
OCTOBER, 1979	1:5000	106 E	E-0770

BP 79-21
7,758 BTU/lb

8,000

8,500

BP 79-7
9,424 BTU/lb

9,000

9,000

BP 79-17/17A
8,892 BTU/lb

8,500

BP 78-3
8,291 BTU/lb

BP 78-4
NOT INTERSECTED

BP 79-20
8,736 BTU/lb

BP 79-10
9,379 BTU/lb

BP 79-9
8,744 BTU/lb

APPROXIMATE 300 m OVERBURDEN CONTOUR BASE No. 1 SEAM HORIZON

9,500

APPROXIMATE SUBCROP TRACE BASE No. 1 SEAM HORIZON

BP 79-19
NOT ANALYSED

9,000

BP 79-15
9,197 BTU/lb

BP 79-8
8,772 BTU/lb

BP 79-11
8,561 BTU/lb

8,500

9,000

BP 79-22A
9,480 BTU/lb

8,000

BP 79-18
8,065 BTU/lb

BP 79-14
9,021 BTU/lb

BP 79-13
9,355 BTU/lb

BP 78-2
9,559 BTU/lb

9,500

10,000

BP 79-12A
10,143 BTU/lb

BP 79-16A
NOT INTERSECTED

LEGEND

DEFINED

APPROXIMATE

ASSUMED TRACE BELOW ILLTYD CREEK

NOTE:
CONTOUR INTERVAL 100 BTU/lb

m 100 0 100 200 300 400 500 m

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

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ISOTHERM PLAN
BASED ON OPEN PIT 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-0771

GEW

BP 79-21
8,318 BTU/lb

8,500

9,000

BP 79-7
9,277 BTU/lb

9,500

BP 79-17/17A
9,925 BTU/lb

BP 78-3
9,044 BTU/lb

9,500

BP 78-4
NOT INTERSECTED

BP 79-20
9,570 BTU/lb

BP 79-9
9,905 BTU/lb

BP 79-10
9,899 BTU/lb

APPROXIMATE 300m OVERBURDEN CONTOUR BASE NO. 2 SEAM HORIZON

BP 79-19
NOT ANALYSED

BP 79-15
10,048 BTU/lb

BP 79-8
9,876 BTU/lb

BP 79-11
9,859 BTU/lb

10,000

APPROXIMATE SUBCROP TRACE BASE NO. 2 SEAM HORIZON

BP 79-22 A
10,134 BTU/lb

BP 79-18
10,002 BTU/lb

BP 79-14
10,103 BTU/lb

BP 79-13
10,044 BTU/lb

BP 78-2
10,441 BTU/lb

10,300

BP 79-12A
10,170 BTU/lb

BP 79-16A
NOT INTERSECTED

LEGEND

DEFINED

APPROXIMATE

ASSUMED TRACE BELOW ILLTYD CREEK

NOTE:
CONTOUR INTERVAL 100 BTU/lb

m 100 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

ISOTHERM PLAN
BASED ON OPEN PIT MINEABLE THICKNESS
NO. 2 SEAM
ILLTYD CREEK DEPOSIT (BLOCK 'B')
BONNET PLUME PROJECT

DATE	SCALE	NTS	DRAWING NO.
OCTOBER, 1979	1:5000	106 E	E-0772

LW

BP 79-21
7,752 BTU/lb

BP 79-7
8,163 BTU/lb

BP 79-17/17A
9,108 BTU/lb

BP 78-3
NOT INTERSECTED

BP 78-4
NOT INTERSECTED

BP 79-20
8,745 BTU/lb

BP 79-10
9,028 BTU/lb

BP 79-9
9,385 BTU/lb

BP 79-19

BP 79-15
9,511 BTU/lb

BP 79-8
9,794 BTU/lb

BP 79-11
9,776 BTU/lb

BP 79-22A
9,628 BTU/lb

BP 79-18
9,882 BTU/lb

BP 79-14
N/A

BP 79-13
8,826 BTU/lb

BP 78-2
9,889 BTU/lb

BP 79-12A
8,350 BTU/lb

BP 79-16A
NOT INTERSECTED

8,000
8,500
9,000
9,500
9,700
9,800

APPROXIMATE 300m OVERBURDEN CONTOUR BASE NO. 3 SEAM HORIZON

APPROXIMATE SUBCROP TRACE BASE NO. 3 SEAM HORIZON

U D

NOTE:
NO. 3 SEAM SHALED OUT AT BP-79-14
POLYGON DENOTES AREA OF influence

LEGEND

DEFINED

APPROXIMATE

ASSUMED TRACE BELOW ILLTYD CREEK

NOTE:
CONTOUR INTERVAL 100 BTU/lb

m 100 0 100 200 300 400 500 m

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

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ISOTHERM PLAN
BASED ON OPEN PIT 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-0773

CBW

BP 79-21
27.4 %

BP 79-7
17.0%

BP 79-17/17A
22.8 %

BP 78-3
25.8 %

BP 78-4
NOT DRILLED

BP 79-20
23.7%

BP 79-9
22.3%

BP 79-10
17.6 %

BP 79-19
NOT SAMPLED FOR ANALYSIS

BP 79-15
20.1 %

BP 79-8
22.0 %

BP 79-11
22.5%

BP 79-22 A
17.1%

BP 79-18
24.6%

BP 79-14
20.8%

BP 79-13
19.1 %

BP 78-2
16.0 %

BP 79-12A
13.4 %

BP 79-16A
NOT DRILLED

APPROXIMATE 300m OVERBURDEN CONTOUR TO BASE OF NO.1 SEAM HORIZON

APPROXIMATE SUBCROP TRACE BASE NO.1 SEAM HORIZON

U

D

LEGEND

DEFINED

APPROXIMATE

ASSUMED TRACE BELOW ILLTYD CREEK

NOTE:

CONTOUR INTERVAL 1.0 %

ASH VALUES DETERMINED FOR COMPOSITE OF; 1/4" × 28 m FRACTION AT - 1.90 sg. 28 m × 0 RAW

m 100 0 100 200 300 400 500 m

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

PAN OCEAN OIL LTD.

ISOASH PLAN

BASED ON OPEN PIT SELECTED SEAM THICKNESS

NO. 1 SEAM

ILLTYD CREEK DEPOSIT (BLOCK B)

JANUARY, 1980

E-0840

GEW

BP 79-21
23.3%

BP 79-7
16.2%

BP 79-17/17A
15.3%

BP 78-3
19.4%

BP 78-4
NOT DRILLED

BP 79-20
14.7%

BP 79-9
12.7%

BP 79-10
12.9%

BP 79-19
NOT SAMPLED FOR ANALYSIS

BP 79-15
13.3%

BP 79-8
11.2%

BP 79-11
13.2%

BP 79-22A
12.8%

BP 79-18
13.4%

BP 79-14
13.9%

BP 79-13
14.9%

BP 78-2
11.2%

BP 79-12A
13.2%

BP 79-16A
NOT DRILLED

APPROXIMATE 300 m OVERBURDEN CONTOUR TO BASE OF 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 1.0%

ASH VALUES DETERMINED FOR COMPOSITE OF; 1/4" × 28 m FRACTION AT -190 s.g.
28 m × 0 RAW

m 100 0 100 200 300 400 500 m

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

PAN OCEAN OIL LTD.

ISOASH PLAN
BASED ON OPEN PIT SELECTED SEAM THICKNESS
NO. 2 SEAM
ILLTYD CREEK DEPOSIT (BLOCK 'B')

JAN; 1980

E-0841

LW

BP 79-21
28.5%

BP 79-7
24.5%

BP 79-17/17A
20.9%

BP 78-3
NOT DRILLED

BP 78-4
NOT DRILLED

BP 79-20
22.1%

BP 79-10
20.2%

BP 79-9
17.0%

APPROXIMATE 300 m OVERBURDEN CONTOUR TO BASE NO. 3 SEAM HORIZON

BP 79-19
NOT SAMPLED FOR ANALYSIS

BP 79-15
18.8%

BP 79-8
13.7%

BP 79-11
14.2%

APPROXIMATE SUBCROP TRACE BASE NO. 3 SEAM HORIZON

BP 79-22A
16.4%

BP 79-18
13.9%

BP 79-14
SEAM SHALED OUT

BP 79-13
22.8%

BP 78-2
21.1% (DETERMINED ON A RAW BASIS)

U
D

BP 79-12A
26.2%

BP 79-16A
NOT DRILLED

BP-79-14

NOTE:
NO. 3 SEAM SHALED OUT AT BP-79-14
POLYGON DENOTES AREA OF INFLUENCE

LEGEND

DEFINED

APPROXIMATE

ASSUMED TRACE BELOW ILLTYD CREEK

NOTE:
CONTOUR INTERVAL 1.0 %

ASH VALUES DETERMINED FOR COMPOSITE OF; 1/4" × 28 m FRACTION AT -190 s.g.
28 m × 0 RAW

m 100 0 100 200 300 400 500 m

TO ACCOMPANY REPORT NO. 28-79 BY O.R.C., D.C.H.

PAN OCEAN OIL LTD.
CALGARY ALBERTA

ISOASH PLAN
BASED ON OPEN PIT SELECTED SEAM THICKNESS
NO. 3 SEAM
ILLTYD CREEK DEPOSIT (BLOCK 'B')

DATE	SCALE	NTS	DRAWING NO.
JAN, 1980	1:5000	106 E	E-0842

LW