This report, Report on Surface on Geologic Activities, 1969 and 1971, prepared by Imperial Oil Enterprises Ltd., is submitted to fulfil the requirements for work done under Departmental Project Numbers 7-1-69-3 and 7-1-71-10, February 9, 1972.

R.O.Grieve
Manager
Northern Exploration District
Imperial Oil Enterprises Ltd.

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ILLUSTRATIONS

IMPERIAL OIL ENTERPRISES LTD.

PRODUCING DEPARTMENT - WESTERN REGION

IMPERIAL OIL LAC DES BOIS PERMITS

REPORT ON SURFACE PARTY ACTIVITIES 1969 and 1971

December 1971

NORTHERN EXPLORATION DISTRICT
EDMONTON, ALBERTA

AREA INVESTIGATED

Three weeks during 1969 and two weeks in July 1971 were devoted to surface geological evaluation of the area between Mackenzie River and the Precambrian Shield. Traverses ranged as far south as the McConnell Range and north to the Little Hornaday River area, beyond 68° North Latitude (Fig. 1).

One week at the end of May, 1969 was devoted to reconnaissance and sampling in the Norman Wells region. Two weeks, beginning August 26, 1969 were spent in the Lac des Bois area investigating structures, mapping surface outcrops and collecting samples.

Further geological information was believed necessary to properly evaluate the Lac des Bois Permits. Since it was also believed desirable to fly-out some of the 1970-71 seismic lines and to examine the terrain over which the 1971-72 seismic lines would cross, an additional two-week surface geological program was organized in July 1971.

ACCESSIBILITY

Commercial airline service operates on a regular schedule between Edmonton, Norman Wells and Inuvik. Float-equipped fixed-wing aircraft are available for charter at Norman Wells and Inuvik. Short-term charter helicopter service is now available from several operators who have established all-weather bases at both of these centers.

FIGURE 1

INDEX MAP

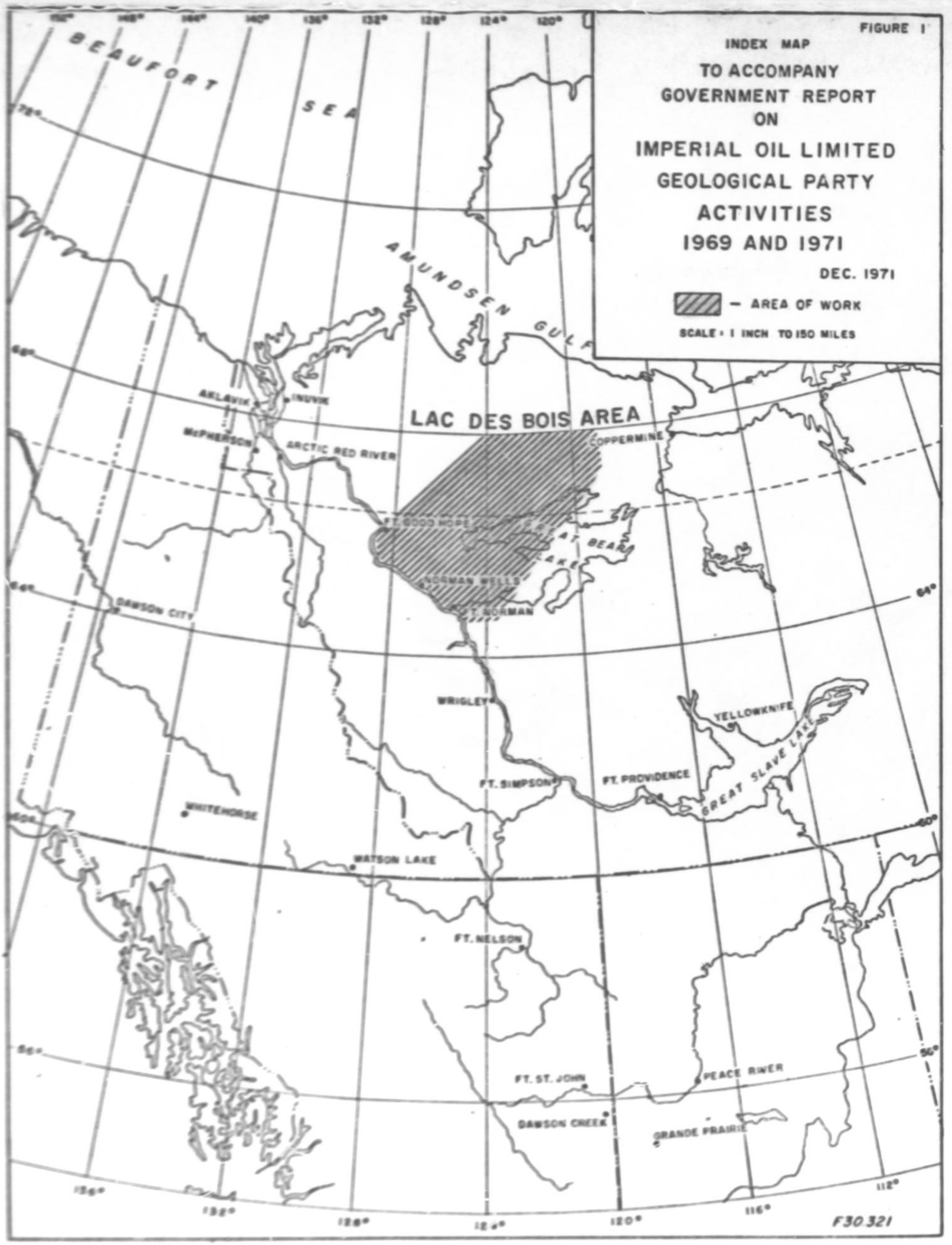
TO ACCOMPANY
GOVERNMENT REPORT
ON

IMPERIAL OIL LIMITED
GEOLOGICAL PARTY
ACTIVITIES
1969 AND 1971

DEC. 1971

▨ — AREA OF WORK

SCALE : 1 INCH TO 150 MILES



Commercial aviation-fuel outlets exist at both Norman Wells and Inuvik. In emergencies, fuel can generally be obtained at Fort Good Hope as well. However, in the past few summers the competition for the available fuel supply has increased to the point where virtually any program involving more than a few flying hours requires much careful advanced planning. If appreciable fuel is required at either Norman Wells or Inuvik during July, for example, it must be ordered before the end of March. Otherwise the user could be faced with a decision between flying it in from Hay River, or cancelling the program.

A small hotel, generally filled to capacity, is available at Norman Wells. For short-term projects anyone of several of the fishing lodges on Great Bear Lake or the lodge on Colville Lake will make an ideal base camp. Fair weather dirt airstrips suitable for aircraft as large as a DC-3 are available at most of these lodges. Float-equipped fixed wing aircraft can of course put down at these locations as well, either to supply a surface party or to transfer materials from supply dumps at these points to the actual area of field operations.

Surface reconnaissance and sampling early in the 1969 season was conducted from Norman Wells. Three Imperial Oil geologists and two Okanagan Helicopters personnel were accommodated in Company quarters at Norman Wells Refinery. A Hiller F-1100 turbine helicopter was able to reach most of the required localities without the necessity of setting out fuel caches or ferrying-back empty fuel drums.

The late summer project in 1969 utilized a Hiller 12-E piston-engine helicopter, also on charter from Okanagan Helicopters. Base camp was established at an outpost cabin operated by Colville Lake Fishing Lodge, and located at the northeast end of Colville Lake. The five-man crew lived comfortably in accommodations adequate for six. Another, larger, cabin has since been constructed on the same site, more than doubling the personnel capacity. Supplies were brought in from Inuvik along with geological equipment and personnel in a company operated float-equipped Dehavilland "Twin-Otter" aircraft. The same aircraft ferried anticipated fuel requirements from Norman Wells to Colville Lake, Estrabrook Lake, Erly Lake and an unnamed lake just above the head of Hornaday Canyon at 68°50'N Latitude and 123°W Longitude.

For the 1971 season a Bell 206-B Jet Ranger turbine-powered helicopter was chartered in advance from Okanagan Helicopters, Vancouver. A machine and crew already in the area at the time of the Party's arrival met Imperial Oil personnel at Norman Wells. Since only the Party Chief and one assistant were initially required, the charter helicopter was used to transport all gear from Norman Wells to the operations base at Great Bear Trophy Lodge on Ford Bay, Great Bear Lake. A fuel dump was flown from Norman Wells to an airstrip at the Lodge a week earlier.

Fuel caches were set out as required, using the helicopter. Personnel changes were also effected part way through the program by means of flights between the Lodge and Norman Wells Airport.

PURPOSE OF STUDY

The objectives of the 1969 stratigraphic work were to obtain fresh samples for paleontological and geochemical analysis as well as to acquaint a new generation of explorationists with the regional geology of an area which Imperial Oil had very briefly reconnoitered many years earlier. The sampling program at the beginning of the season was designed to help our Calgary Research staff with apparent problems in the Norman Wells area where our stratigraphic knowledge was fairly adequate. The results of this work have direct application to the Lower Paleozoic section further to the northeast, in the Lac des Bois area. Work during the latter part of the season was directed at the Lower Paleozoic section and at structural reconnaissance in and around the Lac des Des Bois Permit area.

In 1971, further structural reconnaissance and an extension of stratigraphic control into the basal Paleozoic-Proterozoic as well as into the Cretaceous was undertaken.

WEATHER

Surface geological programs during the months of June, July and August are favored by maximum daylight hours and mild daily temperatures. Mean daily temperatures range from above 60° Fahrenheit at Norman Wells to about 50° Fahrenheit at Coppermine. On the barren grounds above tree-line, stiff breezes and the lack of vegetation somewhat alleviate the summer insect problem. In the wooded terrain, however, mosquitoes early in the season and

blackflies later on can cause considerable discomfort unless precautions are taken. Even the most seasoned outdoorsmen are occasionally forced to resort to use of insect repellents or headnets.

All of the water bodies in the report area freeze over in winter. Break-up and freeze-up are the critical factors in personnel, freight and equipment transportation. Break-up for Mackenzie River at Norman Wells begins about May 17th and is normally completed by the end of May. The first summer barge normally arrives a week to ten days after the ice clears Norman Wells.

Freeze-up is unpredictable for Mackenzie River. At Norman Wells it has started as early as the first week in October, but has been known to hold off until December first. November 1st is about normal, give or take a week.

Great Bear Lake, the fourth largest lake in North America and the seventh largest in the world, typically freezes over between late October and mid-November. Break-up occurs between mid-June and mid-July. Break-up dates at Port Radium on the east shore are as late as July 26th. In 1971 much drifting ice was still moving back and forth between Smith and Dease Arms during the first week in July. The float-plane landing at Fort Franklin was not clear until July 10th. Most of the larger lakes in the Colville Hills were clear of ice by July 1st but smaller lakes near Coppermine Arch were still frozen over. During the 1970 field season Fallaize, Biname and Nangayuk Lakes as well as the lake referred

to earlier at the head of Hornaday Canyon were not completely free of ice until the last week of July.

Late spring blizzards have affected the northern part of the region as late as the first week in June. After September 1st slight overnight freezing, unpredictable snow-squalls, raw winds up to 40 m.p.h. lasting for one or two consecutive days, and dense fog banks near any appreciable bodies of water become a major factor in operations planning.

COMMUNICATIONS

During 1969 communications were maintained between the Colville Lake base and Imperial's Inuvik expediting office by means of single-sideband radio. Compact Nicad-battery powered Marconi CP-24's were utilized. Atmospheric conditions were favorable during the entire period and no communications break-downs between ground-to-ground or ground-to-air stations resulted.

Colville Lake Fishing Lodge now has single-sideband communications facilities at the settlement at the southwest-end of Colville Lake. Efforts are being made to establish a Canadian National Telecommunications link between Colville Lake settlement and the Mackenzie trunk-line.

A direct radio-telephone link between Great Bear Trophy Lodge and the outside world was installed at the end of June, 1971.

MEDICAL SERVICES

Imperial Oil retains a competent medical staff at its Norman Wells Refinery. The Infirmary staff is equipped to cope with most accidental injuries, but surgical and follow-up medical services must be obtained in Inuvik, Yellowknife or even Edmonton in severe cases.

The Department of National Health and Welfare has established a Nursing Station at Colville Lake settlement this past year.

PREVIOUS GEOLOGICAL INVESTIGATIONS

The only proven-up oilfield in the Northwest Territories is situated at Norman Wells. Production is from Devonian carbonates. The immediate area surrounding Norman Wells, as well as the regions to the east and west were explored during this field's development by the Canol Project.

Previous surface geological work in the immediate area of Lac des Bois was conducted by Imperial Oil in 1947, 1961, 1964, and 1969. Of these programs only the 1964 and 1969 operations were directed toward the geology of the Lac des Bois area itself.

One well has been drilled in the Lac des Bois area, the Mobil Colville E-15 test. Core holes have been drilled in tar sands at Lac des Bois and at Rond Lake. Dry-holes have been sunk near Carnwath River (Can. South. Carnwath #1) and Manuel Lake (Manuel Lake J-42) as well as numerous dry-holes along both sides

of Mackenzie River from the Arctic Circle to Blackwater Lake. Seven tests have also been drilled between Smith Arm, Great Bear Lake and Blackwater Lake.

Other geological work has been conducted in this area during the last 20 years by numerous oil companies and consulting firms. Open-file reports concerning most of this work are available to the public.

The most recent contributions to the regional and local geology stem from preliminary reports compiled by scientists of the Geological Survey of Canada in conjunction with Operation Norman. Operation Norman is a regional geological study of the lower Mackenzie River region, involving the Institute of Sedimentary and Petroleum Geology and the Division of Quarternary Research and Geomorphology. Now in its final stages, Operation Norman will tie together the geology of an area of about 145,000 square miles, including most of the area between 64° North Latitude and the Arctic Ocean from 119° West to 132° West Longitude.

GEOLOGY

Field Methods-

Recent field studies have utilized the information from Imperial Oil's photogeological interpretations, from purchased consultant's reports, and from published Geological Survey preliminary maps. Reconnaissance by helicopter is best conducted using 1:250,000 (or 1" = 4 mile) base maps. Accordingly, the

geological points of interest were transferred onto 1:250,000 scale geological maps. A complete set of these was carried in the helicopter at all times so that even with unexpected changes in weather reconnaissance could be carried into almost any part of the 95,000 square mile area of investigation.

Field studies during 1969 and 1971 were a continuation of Imperial's bedrock mapping program combined with structural reconnaissance. Local stratigraphy and individual structures were examined on the ground in more detail.

Field correlations between sections relied heavily on physically tracing lithostratigraphic units from the air. In many instances only the recognition on the ground of similar lithologies, lithofacies or vertical successions could be used for correlation. When all else failed the relative structural position above the pre-Cambrian unconformity was used as a criterion.

Correlation problems were encountered as a result of: (1) inability to identify suitable key marker beds across broad-covered intervals in rocks of all ages; (2) scarcity of good outcrop in shaly facies; (3) predominance of unfossiliferous to sparsely fossiliferous strata throughout most of the section.

A total of 24 traverse stations were visited during the 1969 season. In 1971 one section was measured in Silurian strata on Good Hope Bay, and 44 stations were sampled in rocks ranging from Precambrian to Cretaceous in age. Locations of these stations are listed in Table II.

Stratigraphy-

Parts of the stratigraphic sequence were studied at various localities in the outlined area. A composite interpretation of the entire section is listed in Table I. The Good Hope Bay section is on the strip log (Figure 2) following the text.

A regional unconformity separates the Basal Paleozoic sandstone and the Precambrian strata. The Basal sandstone is conformably overlain by the succeeding lower Paleozoic rocks. Devonian or Cretaceous rocks unconformably overlie the Ronning Group and, where present, the Mount Kindle Formation.

The Bear Rock Formation is exposed mainly in the western part of the map-area, where it includes breccias and, rarely, gypsum. Hume and Hare Indian Formations are also confined to the western part of the map-area. The latter is poorly exposed and recessive. The Kee Scarp (Ramparts) Formation occurs locally.

Upper Devonian Canol and Imperial formations have been removed partially to completely in the western part of the area, and are completely absent in the east half.

Cretaceous strata overlie progressively older beds from west to east. Age determinations reported by the Geological Survey of Canada indicate that Lower Cretaceous rocks form the base of the succession in most of the map-area but are locally absent below Upper Cretaceous.

TABLE I

Age	Group or Formation	Lithology	Thickness
QUATERNARY	Unnamed	Unconsolidated surficial deposits (gravel, sand, clay)	0-150'
CRETACEOUS	Unnamed	Marine shales and sandstones	0-500'
UPPER DEVONIAN	Imperial Fm	Shales, siltstones and sandstones	0-500'
	Canol Fm	Black, platy, bituminous shale	0-400'
MIDDLE DEVONIAN	Kee Scarp Fm	Limestone, fossiliferous, locally reefal	0-350'
	Hare Indian Fm	Greenish shales and thin argillaceous limestones	0-800'
	Hume Fm	Nodular, fossiliferous limestones and shales	0-400'
	Bear Rock Fm	Limestone, dolomite, gypsum and anhydrite, in part breccia	0-700'
ORDOVICIAN-SILURIAN	Ronning Group	Dolomite, grey, bedded, partly cherty, locally fossiliferous	0-1200'
CAMBRIAN or ORDOVICIAN	Macdougal Group	Shales, red and green, glauconitic sandstone and siltstone, gypsum, silty dolomite	0-450'
	Basal Paleozoic sandstone	Quartzite and conglomerate	0-200'
PRECAMBRIAN	Coppermine Series	Basalt flows, sediments	Unestimated
	Hornby Bay Gp	Quartzites, dolomites, intrusive dikes	Unestimated

The unconformities indicate periods of uplift, tilting, erosion and overstep or onlap in the stratigraphic sequence. Other structural phenomena include faulted anticlinal ridges and faulted mountain ranges.

TABLE II

[illegible]

SURFACE PARTY NWT-1-69

	Latitude	Longitude	Unit/Grid	N.T.S.
Stn 69-101	65°10'	124°00'	F-72	96F/SE
102	65°10'	124°15'	M-72	96F/SE
103	65°30'	125°45'	K-29	96F/SW
104	65°40'	128°15'	G-18	106P/NE
105	64°50'	124°15'	L-40	96C/NE
106	64°50'	124°30'	C-10	96C/SW
107	64°50'	124°15'	K-31	96C/NE
108	64°30'	124°00'	J-61	96C/SE
109	64°20'	124°15'	O-68	96C/SE
110	64°50'	126°45'	O-27	96D/NE
111	65°00'	127°15'	F-10	96D/NW

SURFACE PARTY NWT-2-69

Stn 69-1	68°30'	121°30'	D-31	97A E/SE
2	68°30'	121°15'	M-3	97A E/SE
3	68°40'	122°15'	F-49	97A W/NW
4	67°40'	124°45'	I-59	96N/NE
5	67°10'	126°45'	I-50	96M/SE
6	66°30'	126°30'	P-26	96L/SE
7	67°10'	126°15'	G-73	96M/SE
8	69°00'	122°30'	I-24	97A W/NW
9	69°20'	123°00'	M-51	97D W/SW
10	67°30'	124°45'	M-2	96N/SE
11	67°10'	124°30'	J-44	96N/SE
12	67°10'	125°00'	L-5	96N/SW
13	67°10'	125°00'	B-17	96N/SW

TABLE III

LAC DES BOIS TRAVERSE STATIONS

SURFACE PARTY NWT-1-71

	Latitude	Longitude	Unit/Grid	N.T.S.
Stn 71-101	66°30'	123°30'	G-78	96J
102	66°40'	123°00'	K-64	96J
103	67°00'	121°45'	C-59	96L
104	67°10'	120°30'	O-42	96P
105	67°10'	120°45'	I-05	96P
106	67°10'	120°00'	E-21	96P
107	67°10'	119°45'	P-49	86M
108	67°20'	119°15'	I-65	86M
109	67°10'	120°30'	M-59	96P
110	67°30'	120°15'	P-59	96P
111	67°40'	119°30'	D-02	86M
112	68°00'	119°30'	F-45	86M
113	67°00'	124°15'	C-41	96K
114	67°00'	125°15'	D-33	96K
115	67°50'	124°30'	N-69	96N
116	67°40'	124°45'	C-48	96N
117	67°10'	120°30'	L-58	96P
118	66°10'	123°00'	M-79	96J
119	67°20'	126°00'	F-56	96M
120	67°00'	126°15'	D-64	96L
121	66°50'	123°00'	C-57	96J
122	67°30'	122°00'	C-10	96O
123	67°40'	120°30'	E-54	96P
124	67°40'	120°00'	I-23	96P
125	67°40'	120°00'	A-43	96P
126	67°50'	120°00'	A-09	96P
127	68°00'	120°30'	P-05	96P
128	68°00'	121°15'	B-20	96P
129	66°40'	126°30'	L-67	96L
130	66°50'	126°30'	P-03	96L
131	67°00'	127°15'	P-30	96L
132	67°00'	127°15'	K-19	96L
133	67°20'	127°30'	K-08	96M
134	67°30'	127°30'	F-74	96M
135	65°40'	124°15'	E-73	96F
136	65°10'	123°30'	M-63	96G
137	65°20'	124°00'	K-22	96F
138	65°20'	124°30'	B-63	96F
139	65°20'	125°30'	N-76	96F
140	66°10'	125°45'	G-27	96K
141	65°20'	126°00'	O-30	96L
142	66°30'			106I
143	66°30'	127°45'	M-23	96L
144	66°20'	127°30'	H-54	96L

1971 HEASURED SECTIONS

Sect. NWT-71-01	66°20'	124°15'	L-67	96K

LOG OF OUTCROP SECTION

STATION NO. NWT-71-01
GOOD HOPE BAY

LOCATION: LSD. SEC. TWP. RGE. W M.
UNIT L ZONE 67 N.T.S 96L
SEC. LAT 66°20' LONG. 124°15'

Description of location:
Section measured across anticlinal ridge on north side of Smith Arm, Great Bear Lake, at Good Hope Bay.

ELEVATION MEASURED
METHOD

FORMATIONS

SILURIAN-ORDOVICIAN 450+

Mt. Kindle Fm. 450+

TO ACCOMPANY REPORT

Imperial Oil Lac des Bois Permits on Surface Party activities 1969 and 1971

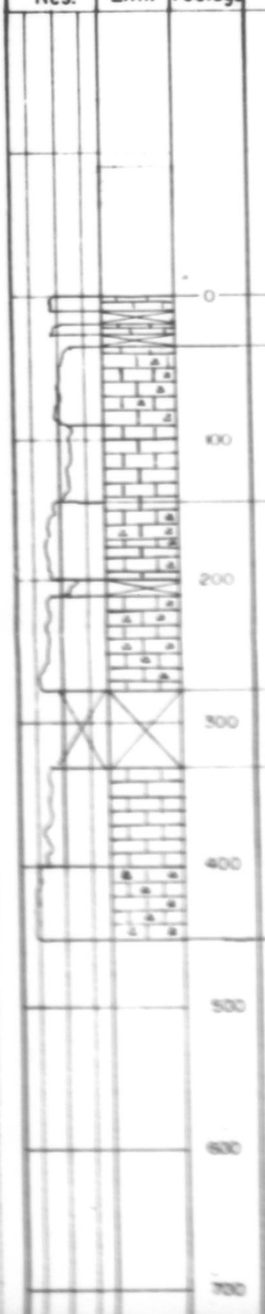
BY:

DATE: July 1971

LEGEND

Coal | Salt | Anhydrite | Dolomite | Limestone | Massive Chert | Conglomerate | Sandstone | Siltstone | Shale

IMPERIAL OIL ENTERPRISE LTD. EXPLORATION DEPARTMENT PEACE RIVER DIVISION



Description

Section begins at top of anticlinal ridge, near south-end of a cluster of lakes.

SILURIAN (?) (450+)

0' - -------Mt. Kindle Fm. ---------
Limestone, light-brown to buff, micritic.

35' - Limestone, light-brown to buff, micritic, petroliferous, cherty in upper part.

145' Limestone, buff to light brown, skeletal, cherty with silicified corals, brachiopods and cephalopods.

275' Covered

330' Limestone, micritic, irregularly bedded, unfossiliferous, cherty near base.

450' Base of section at lake level.

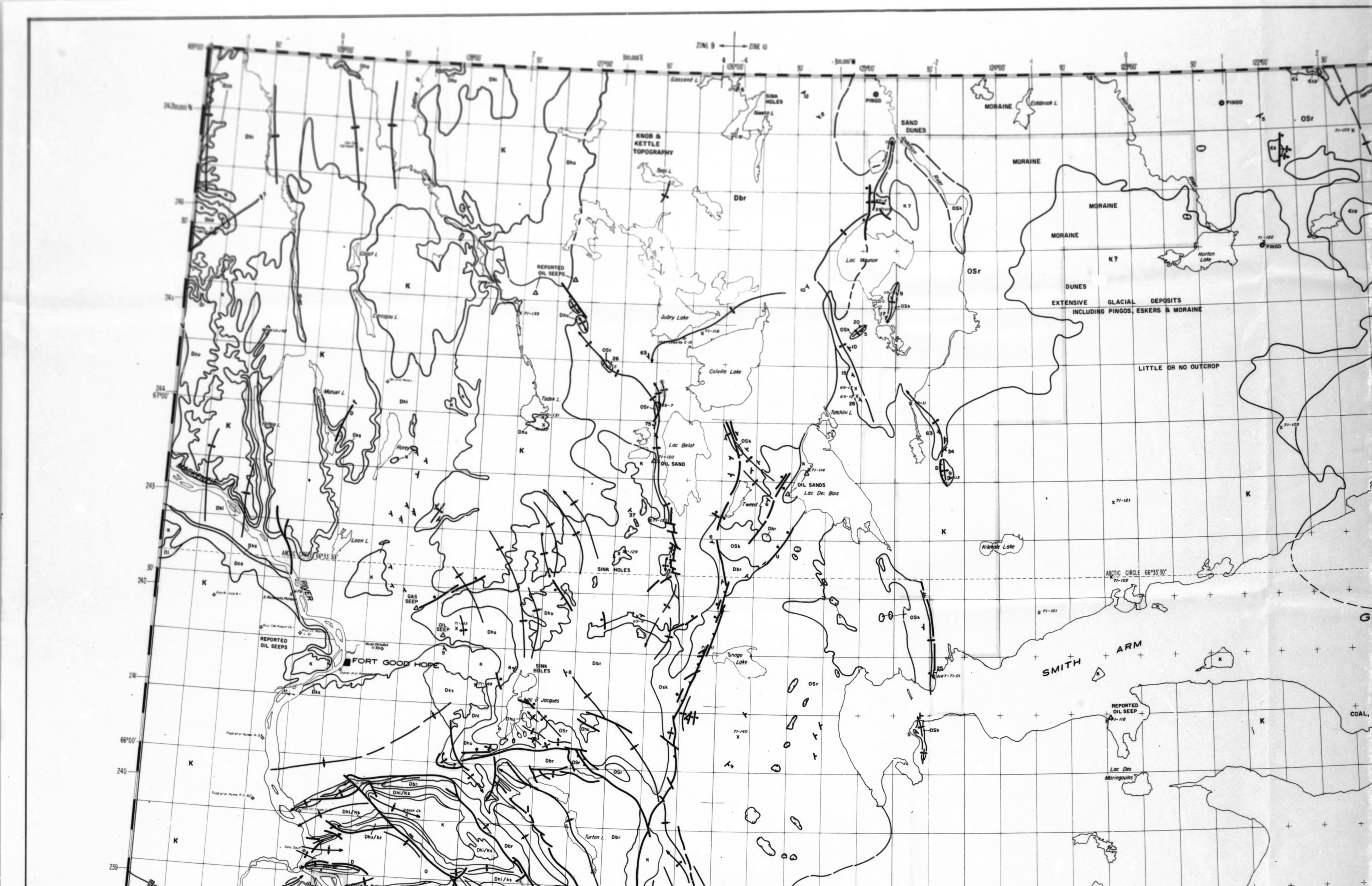


FIGURE 3

SURFACE GEOLOGICAL COMPILATION MAP

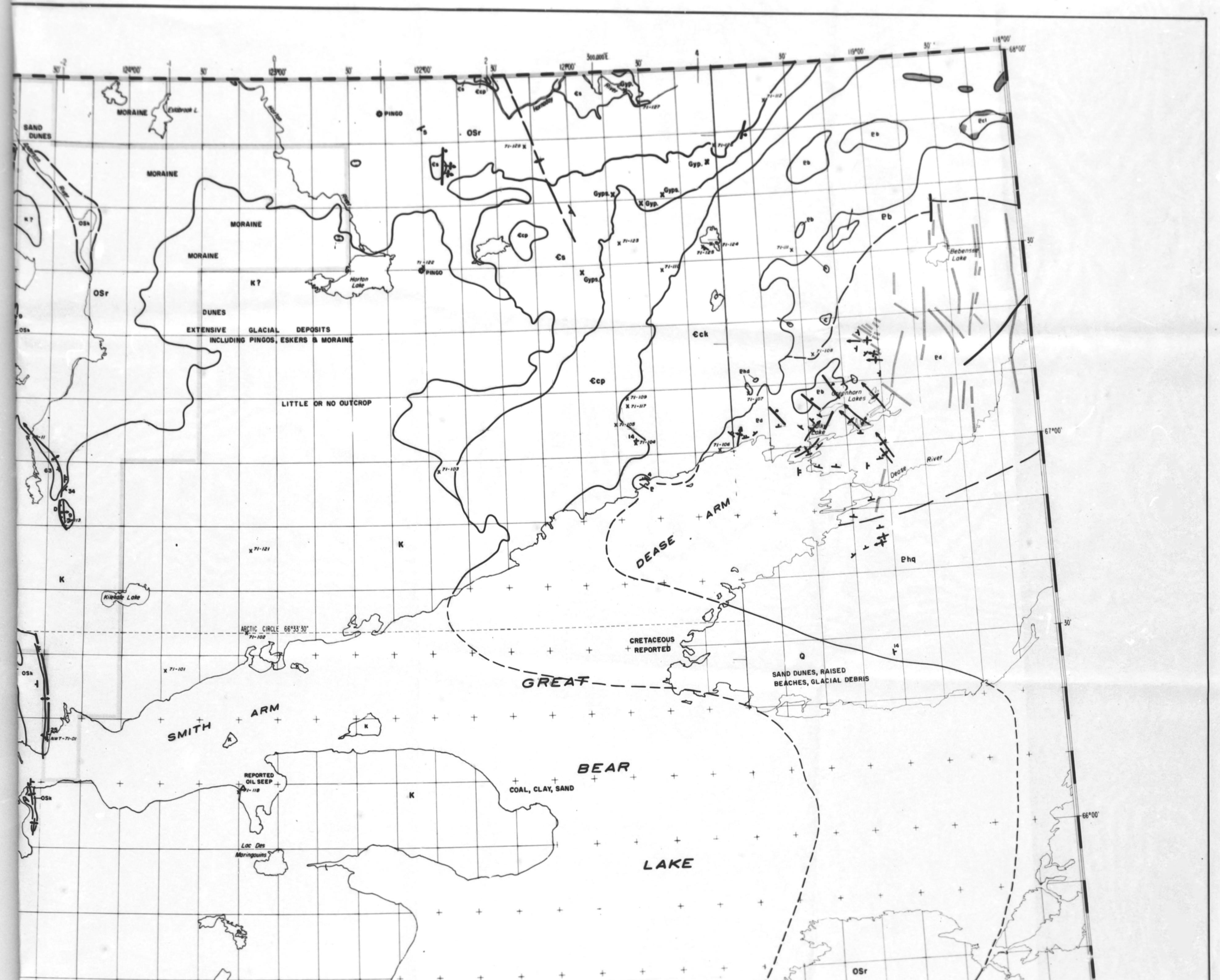
TO ACCOMPANY REPORT

LAC DES BOIS AREA, N.W.T.

DATE: 1971

GEOLOGICAL SYMBOLS

- DIP LESS THAN 15°
- DIP 15° - 45°
- FAULT, NORMAL OR REVERSE
- FAULT, POSITION INDEFINITE
- MAJOR THRUST FAULT, TRIANGLES ON THRUST SHEET
- DIKE
- PINGO
- SINK HOLE AREA
- HYDROCARBON SHOW
- MEASURED SECTION
- OUTCROP VISITED
- ANTICLINE, ARROW DENOTES PLUNGE
- SYNCLINE, ARROW DENOTES PLUNGE
- GENERALIZED CONTACT IN STRUCTURALLY COMPLEX AREA
- IDENTIFIES ISOLATED OR FAULTED SEGMENTS WITH LABELLED AREA


SAND DUNES
MORAINE
MORAINE
MORAINE
DUNES
EXTENSIVE GLACIAL DEPOSITS
INCLUDING PINGOS, ESKERS & MORAINE
LITTLE OR NO OUTCROP
PINGO
PINGO
OSr
K?
K
Cs
Gyp.
Ccp
Cck
Pb
Phq
DEASE ARM
ARCTIC CIRCLE 66°33'30"
CRETACEOUS REPORTED
SAND DUNES, RAISED BEACHES, GLACIAL DEBRIS
Q
GREAT
SMITH ARM
BEAR
COAL, CLAY, SAND
REPORTED OIL SEEP
LAKE
ARM
FORT FRANKLIN
Q QUATERNARY
Alluvium, glacial drift and landslide deposits
T TERTIARY
Coarse clastics
MESOZOIC
K LOWER AND UPPER CRETACEOUS
Undifferentiated shales and sandstones; sandstone, fine to coarse grained, crossbedded, commonly porous, locally oil stained.
PALEOZOIC
MIDDLE and (?) UPPER DEVONIAN
Di IMPERIAL FORMATION: Shales, siltstones and sandstones
Dca CANOL FORMATION: Black, platy, bituminous shale
Dns NIE SCARP FORMATIONS: Limestone, generally well bedded and partly argillaceous below, massive above; commonly fossiliferous
30x
West Canadian Graphic Industries Ltd.

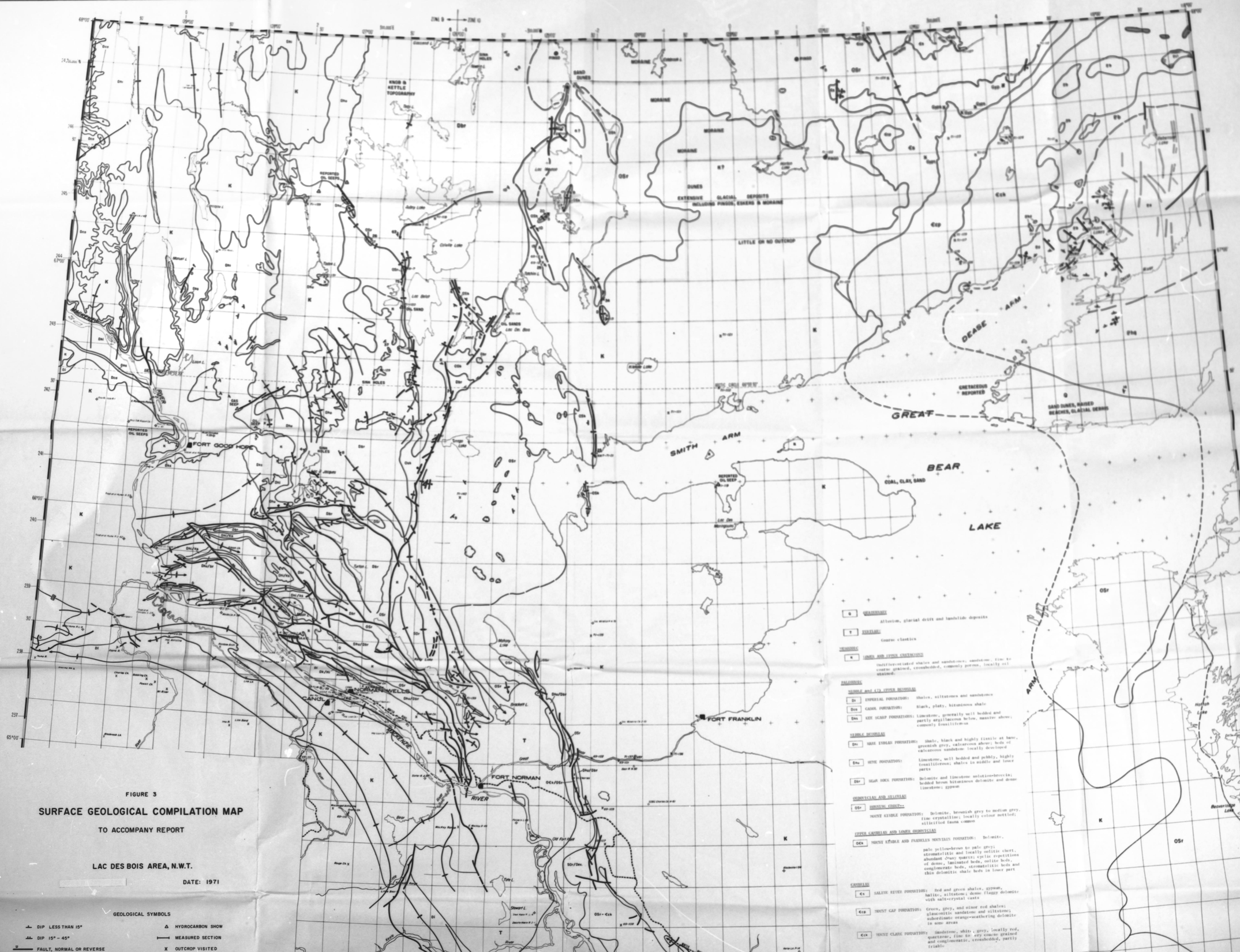

FORT GOOD HOPE
NORMAN WELLS
FORT FRANKLIN
FORT NORMAN
CANOL
MACKENZIE
RIVER
GREAT
BEAR
LAKE
SMITH
ARM
DEASE
ARM
KNOB & KETTLE TOPOGRAPHY
SAND DUNES
MORAINE
DUNES
EXTENSIVE GLACIAL DEPOSITS INCLUDING PINGOS, ESKERS & MORAINE
LITTLE OR NO OUTCROP
REPORTED OIL SEEPS
OIL SANDS
TAR SEEPS
TAR HILLS
CRETACEOUS REPORTED
SAND DUNES, RAISED BEACHES, GLACIAL DEBRIS
COAL, CLAY, SAND
Beaverhill Lake
Grandin Creek
Hume River
Great Bear River
Mountain River
Redstone River
Keele River
Ramparts River
Mackenzie Mountains
Wrigley
Fort Simpson
Fort Liard
Fort Nelson
Fort St. John
Dawson Creek
Grande Prairie
Peace River
Hay River
Yellowknife
Great Slave Lake
Fort Resolution
Fort Smith
Fort Chipewyan
Lake Athabasca
Uranium City
Wollaston Lake
Reindeer Lake
Cree Lake
Athabasca River
Peace River
Slave River
Alberta
Saskatchewan
Manitoba
British Columbia
Yukon Territory
Northwest Territories
ZONE 9
ZONE 10
Q QUATERNARY
Alluvium, glacial drift and landslide deposits
T TERTIARY
Coarse clastics
CRETACEOUS
K LOWER AND UPPER CRETACEOUS
Unit(?)-oriented shales and sandstones; sandstone, fine to coarse grained, crossbedded, commonly porous, locally oil stained.
PALEOZOIC
DEVONIAN and LOWER DEVONIAN
Di IMPERIAL FORMATION: Shales, siltstones and sandstones
Dca CANOL FORMATION: Black, platy, bituminous shale
Dsk KEE SCARP FORMATION: Limestone, generally well bedded and partly argillaceous below, massive above; commonly fossiliferous
SILURIAN DEVONIAN
Dh HARE INDIAN FORMATION: Shale, black and highly fissile at base, greenish grey, calcareous above; beds of calcareous sandstone locally developed
Dhu HUME FORMATION: Limestone, well bedded and pebbly, highly fossiliferous; shales in middle and lower parts
Dbr BEAR ROCK FORMATION: Dolomite and limestone solution-breccia; bedded brown bituminous dolomite and dense limestone; gypsum
ORDOVICIAN AND SILURIAN
OSr ROBINSON GROUP--
MOUNT KINDLE FORMATION: Dolomite, brownish grey to medium grey, fine crystalline, locally colour mottled; silicified fauna common
UPPER CAMBRIAN AND LOWER ORDOVICIAN
OCk MOUNT KINDLE AND FRANKLIN MOUNTAIN FORMATION: Dolomite, pale yellow-brown to pale grey; stromatolitic and locally oolitic chert, abundant fine-grained quartz; cyclic repetitions of dense, laminated beds, oolite beds, conglomeratic beds, stromatolitic beds and thin dolomitic shale beds in lower part
CAMBRIAN
Cs SALINE RIVER FORMATION: Red and green shales, gypsum, halite, siltstone; dense flaggy dolomite with salt-crystal casts
Csp MOUNT CAP FORMATION: Green, grey, and minor red shales; glauconitic sandstone and siltstone; subordinate orange-weathering dolomite in some areas
Csk MOUNT CLARE FORMATION: Sandstone, white, grey, locally red, quartzose, fine to very coarse grained and conglomeratic, crossbedded, partly friable
PROTEROZOIC
D DIABASE: Diabase and gabbro dykes and sills
FIGURE 3
SURFACE GEOLOGICAL COMPILATION MAP
TO ACCOMPANY REPORT
LAC DES BOIS AREA, N.W.T.
DATE: 1971
GEOLOGICAL SYMBOLS
DIP LESS THAN 15°
DIP 15° - 45°
FAULT, NORMAL OR REVERSE
FAULT, POSITION INDEFINITE
HYDROCARBON SHOW
MEASURED SECTION
OUTCROP VISITED
ANTICLINE, ARROW DENOTES PLUNGE
11 OF 2

FIGURE 3

SURFACE GEOLOGICAL COMPILATION MAP

TO ACCOMPANY REPORT

LAC DES BOIS AREA, N.W.T.

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GEOLOGICAL SYMBOLS

- DIP LESS THAN 15°
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- FAULT, POSITION INDEFINITE
- MAJOR THRUST FAULT, TRIANGLES ON THUST SHEET
- DIKE
- PINGO
- SINK HOLE AREA
- HYDROCARBON SHOW
- MEASURED SECTION
- OUTCROP VISITED
- ANTICLINE, ARROW DENOTES PLUNGE
- SYNCLINE, ARROW DENOTES PLUNGE
- GENERALIZED CONTACT IN STRUCTURALLY COMPLEX AREA
- IDENTIFIES ISOLATED OR FAULTED SEGMENTS WITH LABELLED AREA

Q QUATERNARY

Alluvium, glacial drift and landslide deposits

T TERTIARY

Coarse clastics

MESOZOIC

K LOWER AND UPPER CRETACEOUS

Undifferentiated shales and sandstones; sandstone, fine to coarse grained, crossbedded, commonly porous, locally oil stained.

PALEOZOIC

MIDDLE and (?) UPPER DEVONIAN

Dh IMPERIAL FORMATION: Shales, siltstones and sandstones

Dca CANOL FORMATION: Black, platy, bituminous shale

Dhs KEE SCARP FORMATIONS: Limestone, generally well bedded and partly argillaceous below, massive above; commonly fossiliferous

MIDDLE DEVONIAN

Dhi HARE INDIAN FORMATION: Shale, black and highly fissile at base; greenish grey, calcareous above; beds of calcareous sandstone locally developed

Dhu HUME FORMATION: Limestone, well bedded and pebbly, highly fossiliferous; shales in middle and lower parts

Dbr BEAR ROCK FORMATION: Dolomite and limestone solution-breccia; bedded brown bituminous dolomite and dense limestone; gypsum

ORDOVICIAN AND SILURIAN

OSr ROSNEIG GROUP--

MOUNT KINDLE FORMATION: Dolomite, brownish grey to medium grey, fine crystalline; locally colour mottled; silicified fauna common

UPPER CAMBRIAN AND LOWER ORDOVICIAN

OCk MOUNT KINDLE AND FRANKLIN MOUNTAIN FORMATION: Dolomite, pale yellow-brown to pale grey; stromatolitic and locally oolitic chert, abundant drusy quartz; cyclic repetitions of dense, laminated beds, oolitic beds, conglomeratic beds, stromatolitic beds and thin dolomitic shale beds in lower part

CAMBRIAN

Cs SALINE RIVER FORMATION: Red and green shales, gypsum, halite, siltstone, dense flaggy dolomite with salt-crystal casts

Ccp MOUNT CAP FORMATION: Green, grey, and minor red shales; glauconitic sandstone and siltstone; subordinate orange-weathering dolomite in some areas

Cck MOUNT CLARE FORMATION: Sandstone, white, grey, locally red, quartzose, fine to very coarse grained and conglomeratic, crossbedded, partly friable

PROTEROZOIC

Pd Diabase and gabbro dykes and sills

Pb Basaltic flows

Pd Dolomite, partly silicified; many stromatolitic beds

Pq Quartzite, white, pink, purple-mottled with finer clastics

F30.320-4

IMPERIAL OIL LAC DES BOIS PERMITS
REPORT ON SURFACE PARTY ACTIVITIES
1969 and 1971

IMPERIAL OIL ENTERPRISES LTD.
NORTHERN EXPLORATION DISTRICT

February 9, 1972 - Edmonton, Alberta

Abstracted for
Geo-Science Data Index
Date_____

This report, Report on Surface on Geologic Activities, 1969 and 1971, prepared by Imperial Oil Enterprises Ltd., is submitted to fulfil the requirements for work done under Departmental Project Numbers 7-1-69-3 and 7-1-71-10, February 9, 1972.

R.O.Grieve
Manager
Northern Exploration District
Imperial Oil Enterprises Ltd.

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ILLUSTRATIONS

IMPERIAL OIL ENTERPRISES LTD.

PRODUCING DEPARTMENT - WESTERN REGION

IMPERIAL OIL LAC DES BOIS PERMITS

REPORT ON SURFACE PARTY ACTIVITIES 1969 and 1971

December 1971

NORTHERN EXPLORATION DISTRICT
EDMONTON, ALBERTA

AREA INVESTIGATED

Three weeks during 1969 and two weeks in July 1971 were devoted to surface geological evaluation of the area between Mackenzie River and the Precambrian Shield. Traverses ranged as far south as the McConnell Range and north to the Little Hornaday River area, beyond 68° North Latitude (Fig. 1).

One week at the end of May, 1969 was devoted to reconnaissance and sampling in the Norman Wells region. Two weeks, beginning August 24, 1969 were spent in the Lac des Bois area investigating structures, mapping surface outcrops and collecting samples.

Further geological information was believed necessary to properly evaluate the Lac des Bois Permits. Since it was also believed desirable to fly-out some of the 1970-71 seismic lines and to examine the terrain over which the 1971-72 seismic lines would cross, an additional two-week surface geological program was organized in July 1971.

ACCESSIBILITY

Commercial airline service operates on a regular schedule between Edmonton, Norman Wells and Inuvik. Float-equipped fixed-wing aircraft are available for charter at Norman Wells and Inuvik. Short-term charter helicopter service is now available from several operators who have established all-weather bases at both of these centers.

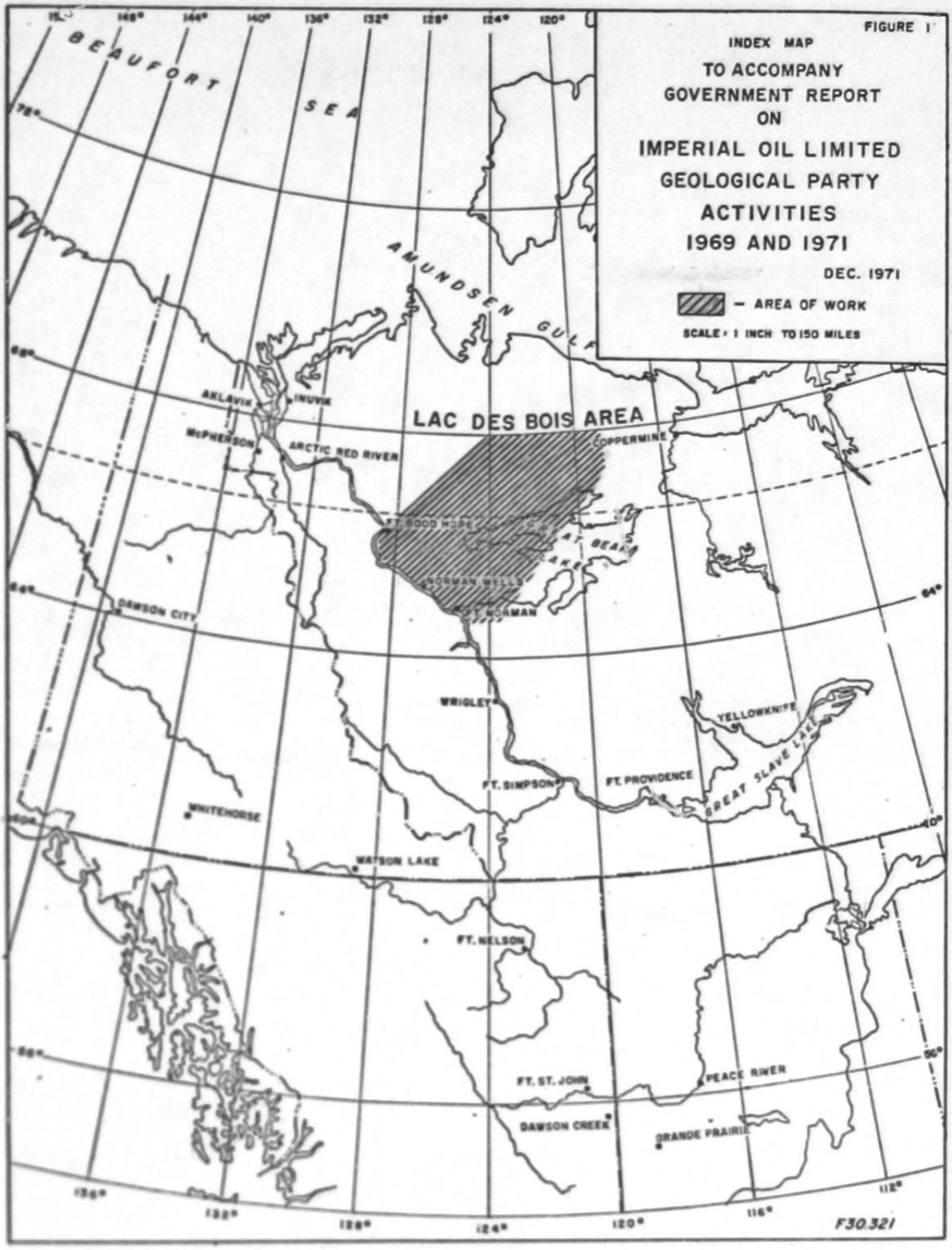
FIGURE 1
INDEX MAP
TO ACCOMPANY
GOVERNMENT REPORT
ON
IMPERIAL OIL LIMITED
GEOLOGICAL PARTY
ACTIVITIES
1969 AND 1971
DEC. 1971
— AREA OF WORK
SCALE: 1 INCH TO 150 MILES
BEAUFORT SEA
AMUNDSEN GULF
LAC DES BOIS AREA
AKLAVIK
INUVIK
McPHERSON
ARCTIC RED RIVER
COPPERMINE
FT. GOOD HOPE
GREAT BEAR LAKE
NORMAN WELLS
ST. NORMAN
DAWSON CITY
WRIGLEY
YELLOWKNIFE
GREAT SLAVE LAKE
FT. SIMPSON
FT. PROVIDENCE
WHITEHORSE
WATSON LAKE
FT. NELSON
FT. ST. JOHN
PEACE RIVER
DAWSON CREEK
GRANDE PRAIRIE
F30321

Commercial aviation-fuel outlets exist at both Norman Wells and Inuvik. In emergencies, fuel can generally be obtained at Fort Good Hope as well. However, in the past few summers the competition for the available fuel supply has increased to the point where virtually any program involving more than a few flying hours requires much careful advanced planning. If appreciable fuel is required at either Norman Wells or Inuvik during July, for example, it must be ordered before the end of March. Otherwise the user could be faced with a decision between flying it in from Hay River, or cancelling the program.

A small hotel, generally filled to capacity, is available at Norman Wells. For short-term projects anyone of several of the fishing lodges on Great Bear Lake or the lodge on Colville Lake will make an ideal base camp. Fair weather dirt airstrips suitable for aircraft as large as a DC-3 are available at most of these lodges. Float-equipped fixed wing aircraft can of course put down at these locations as well, either to supply a surface party or to transfer materials from supply dumps at these points to the actual area of field operations.

Surface reconnaissance and sampling early in the 1969 season was conducted from Norman Wells. Three Imperial Oil geologists and two Okanagan Helicopters personnel were accommodated in Company quarters at Norman Wells Refinery. A Hiller F-1100 turbine helicopter was able to reach most of the required localities without the necessity of setting out fuel caches or ferrying-back empty fuel drums.

The late summer project in 1969 utilized a Hiller 12-E piston-engine helicopter, also on charter from Okanagan Helicopters. Base camp was established at an outpost cabin operated by Colville Lake Fishing Lodge, and located at the northeast end of Colville Lake. The five-man crew lived comfortably in accommodations adequate for six. Another, larger, cabin has since been constructed on the same site, more than doubling the personnel capacity. Supplies were brought in from Inuvik along with geological equipment and personnel in a company operated float-equipped Dehavilland "Twin-Otter" aircraft. The same aircraft ferried anticipated fuel requirements from Norman Wells to Colville Lake, Estrabrook Lake, Erly Lake and an unnamed lake just above the head of Hornaday Canyon at 68°50'N. Latitude and 123°W Longitude.

For the 1971 season a Bell 206-B Jet Ranger turbine-powered helicopter was chartered in advance from Okanagan Helicopters, Vancouver. A machine and crew already in the area at the time of the Party's arrival met Imperial Oil personnel at Norman Wells. Since only the Party Chief and one assistant were initially required, the charter helicopter was used to transport all gear from Norman Wells to the operations base at Great Bear Trophy Lodge on Ford Bay, Great Bear Lake. A fuel dump was flown from Norman Wells to an airstrip at the Lodge a week earlier.

Fuel caches were set out as required, using the helicopter. Personnel changes were also effected part way through the program by means of flights between the Lodge and Norman Wells Airport.

PURPOSE OF STUDY

The objectives of the 1969 stratigraphic work were to obtain fresh samples for paleontological and geochemical analysis as well as to acquaint a new generation of explorationists with the regional geology of an area which Imperial Oil had very briefly reconnoitered many years earlier. The sampling program at the beginning of the season was designed to help our Calgary Research staff with apparent problems in the Norman Wells area where our stratigraphic knowledge was fairly adequate. The results of this work have direct application to the Lower Paleozoic section further to the northeast, in the Lac des Bois area. Work during the latter part of the season was directed at the Lower Paleozoic section and at structural reconnaissance in and around the Lac des Des Bois Permit area.

In 1971, further structural reconnaissance and an extension of stratigraphic control into the basal Paleozoic-Proterozoic as well as into the Cretaceous was undertaken.

WEATHER

Surface geological programs during the months of June, July and August are favored by maximum daylight hours and mild daily temperatures. Mean daily temperatures range from above 60° Fahrenheit at Norman Wells to about 50° Fahrenheit at Coppermine. On the barren grounds above tree-line, stiff breezes and the lack of vegetation somewhat alleviate the summer insect problem. In the wooded terrain, however, mosquitoes early in the season and

blackflies later on can cause considerable discomfort unless precautions are taken. Even the most seasoned outdoorsmen are occasionally forced to resort to use of insect repellents or headnets.

All of the water bodies in the report area freeze over in winter. Break-up and freeze-up are the critical factors in personnel, freight and equipment transportation. Break-up for Mackenzie River at Norman Wells begins about May 17th and is normally completed by the end of May. The first summer barge normally arrives a week to ten days after the ice clears Norman Wells.

Freeze-up is unpredictable for Mackenzie River. At Norman Wells it has started as early as the first week in October, but has been known to hold off until December first. November 1st is about normal, give or take a week.

Great Bear Lake, the fourth largest lake in North America and the seventh largest in the world, typically freezes over between late October and mid-November. Break-up occurs between mid-June and mid-July. Break-up dates at Port Radium on the east shore are as late as July 26th. In 1971 much drifting ice was still moving back and forth between Smith and Dease Arms during the first week in July. The float-plane landing at Fort Franklin was not clear until July 10th. Most of the larger lakes in the Colville Hills were clear of ice by July 1st but smaller lakes near Coppermine Arch were still frozen over. During the 1970 field season Fallaize, Biname and Nangayuk Lakes as well as the lake referred

to earlier at the head of Hornaday Canyon were not completely free of ice until the last week of July.

Late spring blizzards have affected the northern part of the region as late as the first week in June. After September 1st slight overnight freezing, unpredictable snow-squalls, raw winds up to 40 m.p.h. lasting for one or two consecutive days, and dense fog banks near any appreciable bodies of water become a major factor in operations planning.

COMMUNICATIONS

During 1969 communications were maintained between the Colville Lake base and Imperial's Inuvik expediting office by means of single-sideband radio. Compact Nicad-battery powered Marconi CP-24's were utilized. Atmospheric conditions were favorable during the entire period and no communications break-downs between ground-to-ground or ground-to-air stations resulted.

Colville Lake Fishing Lodge now has single-sideband communications facilities at the settlement at the southwest-end of Colville Lake. Efforts are being made to establish a Canadian National Telecommunications link between Colville Lake settlement and the Mackenzie trunk-line.

A direct radio-telephone link between Great Bear Trophy Lodge and the outside world was installed at the end of June, 1971.

MEDICAL SERVICES

Imperial Oil retains a competent medical staff at its Norman Wells Refinery. The Infirmary staff is equipped to cope with most accidental injuries, but surgical and follow-up medical services must be obtained in Inuvik, Yellowknife or even Edmonton in severe cases.

The Department of National Health and Welfare has established a Nursing Station at Colville Lake settlement this past year.

PREVIOUS GEOLOGICAL INVESTIGATIONS

The only proven-up oilfield in the Northwest Territories is situated at Norman Wells. Production is from Devonian carbonates. The immediate area surrounding Norman Wells, as well as the regions to the east and west were explored during this field's development by the Canol Project.

Previous surface geological work in the immediate area of Lac des Bois was conducted by Imperial Oil in 1947, 1961, 1964, and 1969. Of these programs only the 1964 and 1969 operations were directed toward the geology of the Lac des Bois area itself.

One well has been drilled in the Lac des Bois area, the Mobil Colville E-15 test. Core holes have been drilled in tar sands at Lac des Bois and at Rond Lake. Dry-holes have been sunk near Carnwath River (Can. South. Carnwath #1) and Manuel Lake (Manuel Lake J-42) as well as numerous dry-holes along both sides

of Mackenzie River from the Arctic Circle to Blackwater Lake. Seven tests have also been drilled between Smith Arm, Great Bear Lake and Blackwater Lake.

Other geological work has been conducted in this area during the last 20 years by numerous oil companies and consulting firms. Open-file reports concerning most of this work are available to the public.

The most recent contributions to the regional and local geology stem from preliminary reports compiled by scientists of the Geological Survey of Canada in conjunction with Operation Norman. Operation Norman is a regional geological study of the lower Mackenzie River region, involving the Institute of Sedimentary and Petroleum Geology and the Division of Quarternary Research and Geomorphology. Now in its final stages, Operation Norman will tie together the geology of an area of about 145,000 square miles, including most of the area between 64° North Latitude and the Arctic Ocean from 119° West to 132° West Longitude.

GEOLOGY

Field Methods-

Recent field studies have utilized the information from Imperial Oil's photogeological interpretations, from purchased consultant's reports, and from published Geological Survey preliminary maps. Reconnaissance by helicopter is best conducted using 1:250,000 (or 1" = 4 mile) base maps. Accordingly, the

geological points of interest were transferred onto 1:250,000 scale geological maps. A complete set of these was carried in the helicopter at all times so that even with unexpected changes in weather reconnaissance could be carried into almost any part of the 95,000 square mile area of investigation.

Field studies during 1969 and 1971 were a continuation of Imperial's bedrock mapping program combined with structural reconnaissance. Local stratigraphy and individual structures were examined on the ground in more detail.

Field correlations between sections relied heavily on physically tracing lithostratigraphic units from the air. In many instances only the recognition on the ground of similar lithologies, lithofacies or vertical successions could be used for correlation. When all else failed the relative structural position above the pre-Cambrian unconformity was used as a criterion.

Correlation problems were encountered as a result of: (1) Inability to identify suitable key marker beds across broad-covered intervals in rocks of all ages; (2) scarcity of good outcrop in shaly facies; (3) predominance of unfossiliferous to sparsely fossiliferous strata throughout most of the section.

A total of 24 traverse stations were visited during the 1969 season. In 1971 one section was measured in Silurian strata on Good Hope Bay, and 44 stations were sampled in rocks ranging from Precambrian to Cretaceous in age. Locations of these stations are listed in Table II.

Stratigraphy-

Parts of the stratigraphic sequence were studied at various localities in the outlined area. A composite interpretation of the entire section is listed in Table I. The Good Hope Bay section is on the strip log (Figure 2) following the text.

A regional unconformity separates the Basal Paleozoic sandstone and the Precambrian strata. The Basal sandstone is conformably overlain by the succeeding lower Paleozoic rocks. Devonian or Cretaceous rocks unconformably overlie the Ronning Group and, where present, the Mount Kindle Formation.

The Bear Rock Formation is exposed mainly in the western part of the map-area, where it includes breccias and, rarely, gypsum. Hume and Hare Indian Formations are also confined to the western part of the map-area. The latter is poorly exposed and recessive. The Kee Scarp (Ramparts) Formation occurs locally.

Upper Devonian Canol and Imperial formations have been removed partially to completely in the western part of the area, and are completely absent in the east half.

Cretaceous strata overlie progressively older beds from west to east. Age determinations reported by the Geological Survey of Canada indicate that Lower Cretaceous rocks form the base of the succession in most of the map-area but are locally absent below Upper Cretaceous.

TABLE I

Age	Group or Formation	Lithology	Thickness
QUATERNARY	Unnamed	Unconsolidated surficial deposits (gravel, sand, clay)	0-150'
CRETACEOUS	Unnamed	Marine shales and sandstones	0-500'
UPPER DEVONIAN	Imperial Fm	Shales, siltstones and sandstones	0-500'
	Canol Fm	Black, platy, bituminous shale	0-400'
MIDDLE DEVONIAN	Kee Scarp Fm	Limestone, fossiliferous, locally reefal	0-350'
	Hare Indian Fm	Greenish shales and thin argillaceous limestones	0-800'
	Hume Fm	Nodular, fossiliferous limestones and shales	0-400'
	Bear Rock Fm	Limestone, dolomite, gypsum and anhydrite, in part breccia	0-700'
ORDOVICIAN-SILURIAN	Ronning Group	Dolomite, grey, bedded, partly cherty, locally fossiliferous	0-1200'
CAMBRIAN or ORDOVICIAN	Macdougal Group	Shales, red and green, glauconitic sandstone and siltstone, gypsum, silty dolomite	0-450'
	Basal Paleozoic sandstone	Quartzite and conglomerate	0-200'
PRECAMBRIAN	Coppermine Series	Basalt flows, sediments	Unestimated
	Hornby Bay Gp	Quartzites, dolomites, intrusive dikes	Unestimated

The unconformities indicate periods of uplift, tilting, erosion and recovery or onlap in the stratigraphic sequence. Other structural phenomena include faulted anticlinal ridges and faulted mountain ranges.

TABLE II

LAC DES BOIS TRAVERSE STATIONS

SURFACE PARTY NWT-1-69

	Latitude	Longitude	Unit/Grid	N.T.S.
Stn 69-101	65°10'	124°00'	F-72	96F/SE
102	65°10'	124°15'	M-72	96F/SE
103	65°30'	125°45'	K-29	96F/SW
104	65°40'	128°15'	G-18	106H/NE
105	64°50'	124°15'	L-40	96C/NE
106	64°50'	124°30'	C-10	96C/SW
107	64°50'	124°15'	K-31	96C/NE
108	64°30'	124°00'	J-61	96C/SE
109	64°20'	124°15'	O-68	96C/SE
110	64°50'	126°45'	O-27	96D/NE
111	65°00'	127°15'	F-10	96D/NW

SURFACE PARTY NWT-2-69

Stn 69-1	68°30'	121°30'	D-31	97A E/SE
2	68°30'	121°15'	M-3	97A E/SE
3	68°40'	122°15'	F-49	97A W/NW
4	67°40'	124°45'	I-59	96N/NE
5	67°10'	126°45'	I-50	96M/SE
6	66°30'	126°30'	P-26	96L/SE
7	67°10'	126°15'	G-73	96M/SE
8	69°00'	122°30'	I-24	97A W/NW
9	69°20'	123°00'	M-51	97D W/SW
10	67°30'	124°45'	M-2	96N/SE
11	67°10'	124°30'	J-44	96N/SE
12	67°10'	125°00'	L-5	96N/SW
13	67°10'	125°00'	B-17	96N/SW

TABLE III

LAC DES BOIS TRAVERSE STATIONS

SURFACE PARTY NWT-1-71

	Latitude	Longitude	Unit/Grid	N.T.S.
Stn 71-101	66°30'	123°30'	G-78	96J
102	66°40'	123°00'	K-64	96J
103	67°00'	121°45'	C-59	96L
104	67°10'	120°30'	O-42	96P
105	67°10'	120°45'	I-05	96P
106	67°10'	120°00'	E-21	96P
107	67°10'	119°45'	P-49	86M
108	67°20'	119°15'	I-65	86M
109	67°10'	120°30'	M-59	96P
110	67°30'	120°15'	P-59	96P
111	67°40'	119°30'	D-02	86M
112	68°00'	119°30'	F-45	86M
113	67°00'	124°15'	C-41	96K
114	67°00'	125°15'	D-33	96K
115	67°50'	124°30'	N-69	96N
116	67°40'	124°45'	C-48	96N
117	67°10'	120°30'	L-58	96P
118	66°10'	123°00'	M-79	96J
119	67°20'	126°00'	F-56	96M
120	67°00'	126°15'	D-64	96L
121	66°50'	123°00'	C-57	96J
122	67°30'	122°00'	C-10	96O
123	67°40'	120°30'	E-54	96P
124	67°40'	120°00'	I-23	96P
125	67°40'	120°00'	A-43	96P
126	67°50'	120°00'	A-09	96P
127	68°00'	120°30'	P-05	96P
128	68°00'	121°15'	B-20	96P
129	66°40'	126°30'	L-67	96L
130	66°50'	126°30'	P-03	96L
131	67°00'	127°15'	P-30	96L
132	67°00'	127°15'	K-19	96L
133	67°20'	127°30'	K-08	96M
134	67°30'	127°30'	F-74	96M
135	65°40'	124°15'	E-73	96F
136	65°10'	123°30'	M-63	96G
137	65°20'	124°00'	K-22	96F
138	65°20'	124°30'	B-63	96F
139	65°20'	125°30'	N-76	96F
140	66°10'	125°45'	G-27	96K
141	65°20'	126°00'	O-30	96L
142	66°30'			106I
143	66°30'	127°45'	M-23	96L
144	66°20'	127°30'	H-54	96L

1971 MEASURED SECTIONS

Sect. NWT-71-01	66°20'	124°15'	L-67	96K

LOG OF OUTCROP SECTION

STATION NO. NWT-71-01
GOOD HOPE BAY

LOCATION: LSD.. SEC. TWP. RGE. W M.
UNIT L ZONE 67 N.T.S 96L
SEC. LAT 66°20' LONG. 124°15'

Description of location:

Section measured across anticlinal ridge on north side of Smith Arm, Great Bear Lake, at Good Hope Bay.

ELEVATION MEASURED
METHOD

FORMATIONS

SILURIAN-ORDOVICIAN 450+

Mt. Kindle Fm. 450+

TO ACCOMPANY REPORT

Imperial Oil Lac des Bois Permits on Surface Party activities 1969 and 1971

BY:

DATE: July 1971

LEGEND

Coal | Salt | Anhydrite | Dolomite | Limestone | Massive Chert | Conglomerate | Sandstone | Siltstone | Shale

IMPERIAL OIL ENTERPRISE LTD. EXPLORATION DEPARTMENT PEACE RIVER DIVISION

1 of

Res.	Lith.	Footage	Description
			Section begins at top of anticlinal ridge, near south-end of a cluster of lakes.
			SILURIAN (?) (450+)
		0	0' - -------Mt. Kindle Fm. --------- Limestone, light-brown to buff, micritic.
			35' - Limestone, light-brown to buff, micritic, petroliferous, cherty in upper part.
		100	145' Limestone, buff to light brown, skeletal, cherty with silicified corals, brachiopods and cephalopods.
		200	275' Covered
		300	330' Limestone, micritic, irregularly bedded, unfossiliferous, cherty near base.
		400	

320 16W
330 5W
330 6W

SILURIAN-ORDOVICIAN 450+

Mt. Kindle Fm. 450+

Imperial Oil Ltd des Bois Permits on Bistcho
Party activities 1969 and 1971

BY :

DATE : July 1971

LEGEND

Coal | Salt | Anhydrite | Dolomite | Limestone | Massive Chert | Conglomerate | Sandstone | Siltstone | Shale

IMPERIAL OIL ENTERPRISE LTD. EXPLORATION DEPARTMENT PEACE RIVER DIVISION

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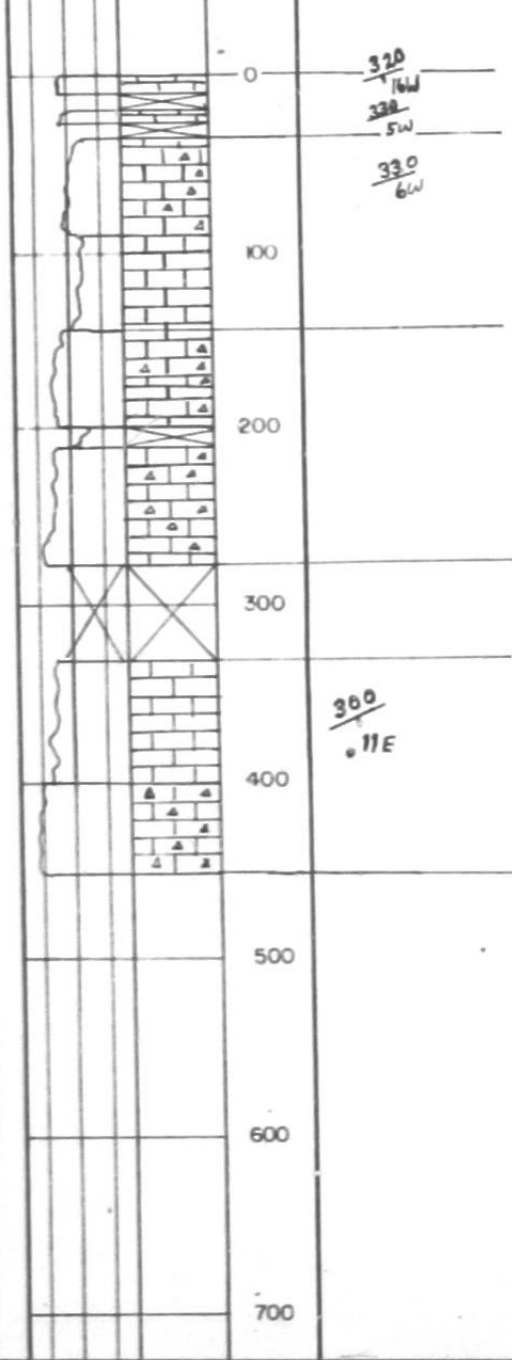
		145'	Limestone, buff to light brown, skeletal, cherty with silicified corals, brachiopods and cephalopods.
		275'	Covered
		330'	Limestone, micritic, irregularly bedded, unfossiliferous, cherty near base.
		450'	Base of section at lake level.



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