

16-1-4-1

REPORT ON  
RECONNAISSANCE FIELD TRIP  
NORTHWEST TERRITORIES & ADJACENT AREAS  
JULY, 1961  
PERMIT NOS. 3020, 3021 & 3022



**RECONNAISSANCE FIELD TRIP, JULY, 1961 - NORTHWEST TERRITORIES AND  
ADJACENT AREAS**

---

**Introduction**

The purpose of this reconnaissance field trip was to visit key outcrop areas to observe some of the features reported in various geological publications. This was necessary so that correlation and porosity problems of the Devonian sequence in the Trout Lake area could be appreciated.

Outcrops were visited on the north and south shores of Great Slave Lake and at Cli and Little Doctor Lakes in the Nahanni range. A flight from Cli Lake to Virginia Falls was made to briefly observe the reported westerly shale-out of Middle Devonian strata. Outcrops were also visited in northeastern British Columbia along the Alaska Highway at Mile 110 creek, milepost 398, and at Muncho Lake at milepost 464. The party consisted of Messers. J. F. Allan and H. H. Teitz of Tenneco, and the pilot, Mr. W. Blake of Gateway Aviation.

**Transportation**

Travel to the key outcrop areas was by float equipped Beaver aircraft. A total of 12 flying hours were logged over the four day period July 15th to July 25th, 1961. An additional 4½ days were spent along the Alaska Highway immediately south of the Northwest Territories boundary. Outcrops here were observed from automobile, with two side trips by foot up creek beds.

**Summary of Results**

**Great Slave Lake Area**

Key outcrop areas were selected from the Geological Survey of Canada, paper 58-11 "Great Slave Lake and Trout River Map Areas, Northwest Territories" by R. J. W. Douglas.

Paleozoic outcrops were examined in four localities: Pine Point, Dawson Landing, and Sulphur Bay along the south shore, and at Horncastle Point on the north shore. This area constitutes the type area for the Slave Point and some of the Middle Devonian formations. The strata are very poorly exposed and are discontinuous along the lake shore (Photo 2). Some idea of the rock type can be observed from changes in character of the shore rubble but thickness of strata cannot be measured in outcrop. At Horncastle Point on the north shore, a fair exposure of a massive dolomite was observed (Photo-3).

NOTE: Due to the poor exposures and the reconnaissance nature of the trip, the structural altitude of the beds was not noted.

Pine Point - scattered low relief outcrops for about  $\frac{1}{2}$  mile along the northeast shore of the point. The outcrop consists of brown to very dark brown, very bituminous, very fossiliferous probably interbedded (not observed) lime silt and lime mud. Predominant fossils are brachiopods, colonial corals of the Coenites type and some horn corals. The rock weathers light grey and gives a petroliferous odor when broken.

Dawson Landing - the most easterly point visited. Outcrops here are very poor to practically non existent. The shore rubble suggests that the rock is a light brown very fine crystalline slightly calcareous dolomite with leached corals and traces of crinoid stems. Some porosity is present as small vugs lined with white, coarse crystalline dolomite. The rock appears to be a dolomitized fine grained lime sand.

Sulphur Point - a 5 foot high outcrop forms a small cliff on the eastern side of the point and extends for about  $\frac{1}{2}$  mile along the shore. The outcrop consists of thin bedded 1" to 3" beds of a yellow-brown lime mud with some beds of yellow-brown fine grained lime sand, predominately a fossil fragment sand but some vague pellets are present. The beds are poorly fossiliferous a few brachiopods noted in the lower beds and some colonial corals noted in the upper beds.

Horncastle Point - an almost continuous low relief outcrop for about 4 miles along the lake shore (Photo-3). The outcrop is a light brownish-grey fine to medium crystalline vuggy dolomite with patches of white coarse crystalline dolomite as drusy lining in vugs which appear to be due to leaching of fossils. The outcrop is massive with no visible bedding and is suggestive of a reef. In various localities along the shore, oil seeps are noted from fractures in the dolomite.

#### Conclusions

The type sections of the Slave Point, Presqu'ile and Pine Point formations are in the Great Slave Lake outcrop area. Nowhere was a complete or even a good outcrop found. It is suggested that to clarify the subsurface correlation in the area, that alternate type sections be selected.

### Cli Lake and Little Doctor Lake Areas of the Nahanni Range

A camp was established on the northwest shore of Cli Lake. A flight was made to Little Doctor Lake where one day was spent in examining the Nahanni formation. One day was spent in examining outcrop on Cli Lake.

#### Little Doctor Lake Area

The lake cuts through the Nahanni Range and good outcrops of the Middle Devonian are visible along the lake shore. These cannot be walked as cliffs exist down to the lake level, a small boat is necessary for detailed measuring of this section. The prime interest in the area was to look at the Nahanni formation which is well exposed on intermittent cliffs on the dip slope of the range. Practically all of the formation was observed except for the lower contact inaccessible except by boat and the upper contact, eroded in section climbed. The Nahanni formation is reported to be 410 feet thick, Douglas, 1960. It consists primarily of grey fine grained variably fossiliferous limestone with horn and colonial corals, some small brachiopods and gastropods, and in some beds stromatoporoids up to 1 foot in diameter. Scattered chert nodules and some 1 to 2 foot black chert beds occur, particularly as the fossil content decreased.

The published thickness of the limestone unit above the Lone Mountain dolomite is 865 feet (Douglas and Norris G.S.C. paper 60-19) or 924 feet (Dann H.B. O. & G. report 3rd October, 1952). All or part of this limestone unit is the Nahanni formation. For a detailed description of the outcrop see Dann, 1952.

#### Cli Lake Area

A hill on the north shore of the lake, immediately east of the main mountain range was traversed. Beds here are mapped as Ordovician or Silurian (Douglas G.S.C. paper 60-19) with overlying quartzose sandstone and silty to sandy dolomite unit. Beds above the sandstone were not looked at. The Ordo-Silurian beds were alternating grey to black weathering, grey fine to microcrystalline dolomite in 1 to 5 foot beds. Some poorly preserved colonial corals were observed. This unit has been measured as 800 + feet in thickness (Douglas 60-19) where the base is not exposed. The overlying sandstone is mapped as 210 feet thick.

#### Cli Lake - Virginia Falls - Nahanni Butte Area

A flight from Cli Lake west to Virginia Falls and east down the South Nahanni River was made to observe the reported facies change from carbonate to shales of the Middle Devonian strata. The region is a highly dissected plateau with very steep 3000 to 4000 foot canyons. Where Middle Devonian is present the canyons are vee-shaped and cut in predominately grey probably calcareous shales with interbedded thin

limestones. Where older Ordo-Silurian beds are incised, the canyons are very steep walled. No lakes are present and it is not possible to land a fixed wing aircraft. The outcrops would be accessible only by helicopter or foot.

Northeastern British Columbia

Middle Devonian strata outcrop along the Alaska Highway northwest of Fort Nelson starting at approximately milepost 350. To obtain information on the Middle Devonian in the western area, a brief look at outcrops along the highway was undertaken. One creek exposure was measured at one-ten mile creek at approximately milepost 396. One other at Muncho Lake, milepost 464 was looked at but not measured.

One-Ten Mile Creek - a good creek exposure of the Middle Devonian sequence. A continuous measurement was not possible as the creek appears to have cut along a fault line particularly near the middle of the section, and some distortion is evident. The amount of thickening of the section is not known. The faulting is suggested by a heavily mineralized zone with many calcite veins with some probable barite or witherite occurrences. Flourite crystals are fairly common in the creek rubble below this zone.

The carbonate sequence is overlain by at least 800 feet of black, slaty shale varying from thin rubbly bedding to beds up to 3 inches. The top of the shale is not exposed.

The contact of the black shale and underlying limestone is very sharp with no weathered interval present. The contact appears conformable.

The Middle Devonian carbonate commences with a 5 foot bed of grey fine grained fossiliferous limestone with many colonial corals of the Favosites and Hexagonaria types, some minor crinoids and horn corals. The lower contact of the zone is at the base of a 2 foot knobby weathering zone, and is very sharp.

Underlying the coral zone is 848 feet of grey limestone in beds up to 5 feet thick with occasional black chert nodules and black chert beds up to 6 inches thick. The limestone is predominately grey-brown lime mud, in part finely laminated with grey slightly argillaceous lime mud. Occasionally the rock changes to a laminated lime mud-lime silt or sand the latter is a vague pellet type cemented with clear calcite.

Underlying the lime mud is a heavily sheared zone extending for approximately  $\frac{1}{2}$  mile along the creek, here the beds are too distorted for a measurement to be made.

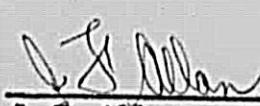
Underlying the shear zone are 1018 feet of dolomite and dolomitic limestone beds. This zone is mainly grey, very fine crystalline dolomite medium bedded in 6 inch to 2 foot beds.

Underlying the dolomite are 126 feet of sandstone beds. This unit can be divided into two parts; the upper a 65 foot bed of grey, calcareous, fine to coarse grained, poorly sorted quartz sandstone, and the lower a 61 foot bed of white coarse grained fairly well sorted massive bedded sandstone.

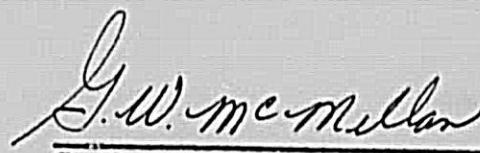
The sandstone unit is underlain by 636 feet of exposed beds of grey, fine grained, silty to sandy dolomite to calcareous dolomite, the sand content decreasing downward. The lower contact is covered.

Muncho Lake Area

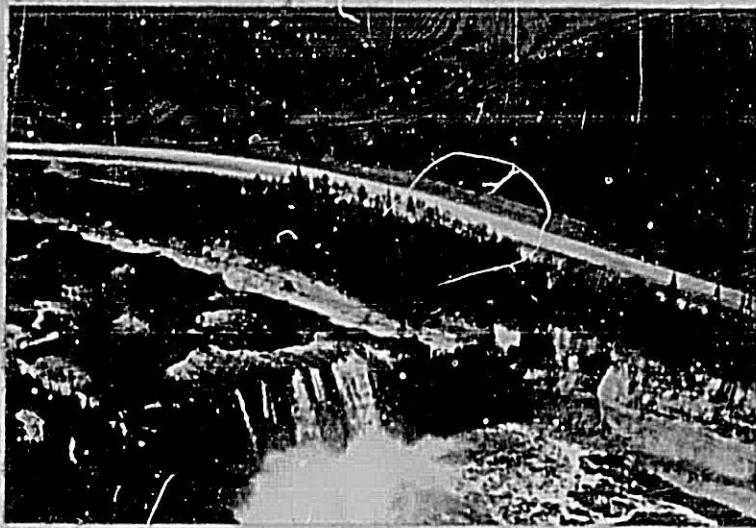
Good outcrops exist along a creek bed at approximately milepost 464, on the east side of the highway. Time did not permit the section to be measured. The outcrop is predominately grey massive very fine to microcrystalline textured dolomite. The age of this dolomite is not known, but is believed to be the Muncho and McConnell formations mentioned in Memoir 259 of the Geological Survey of Canada by F. A. McLearn and E. D. Kindle.

  
J. F. Allan

Sr. Geologist

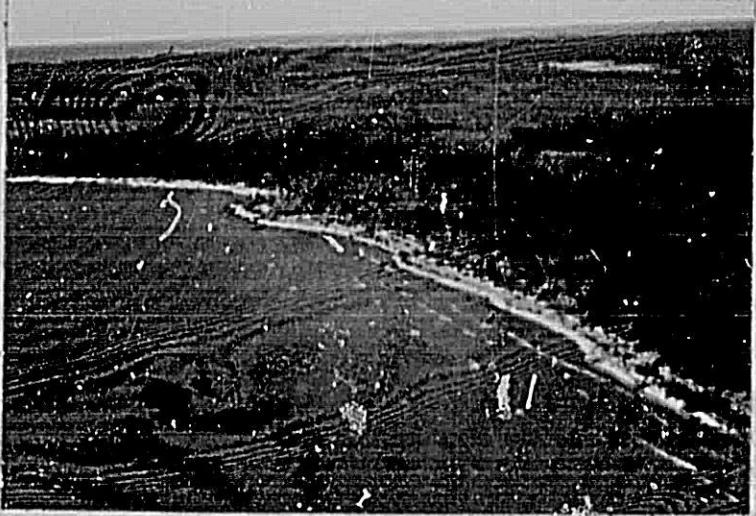
  
G. W. McMillan

G. W. McMillan  
P. Geologist



ALEXANDRA FALLS HAY RIVER, N.W.T.

UPPER DEVONIAN LIMESTONE



SOUTH SHORE OF GREAT SLAVE LAKE, N.W.T.

PINE POINT AREA, SHOWING TYPICAL  
EXPOSURES ON LAKE SHORE



PINE POINT LIMESTONE

DARK BROWN BITUMINOUS, FOSSILIFEROUS LIMESTONE  
SOUTH SHORE GREAT SLAVE LAKE



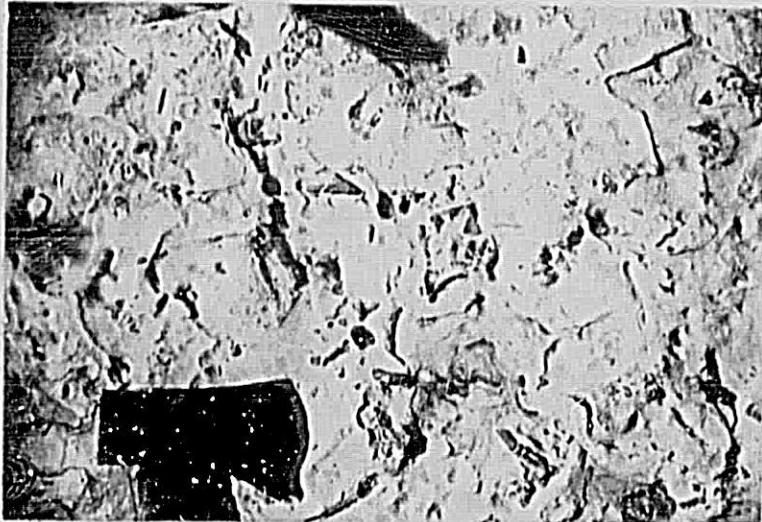
OIL SEEP, PRESQU'ILE DOLOMITE

HORNCASTLE POINT  
NORTH SHORE GREAT SLAVE LAKE



ALEXANDRA FALLS HAY RIVER, N.W.T.

UPPER DEVONIAN LIMESTONE



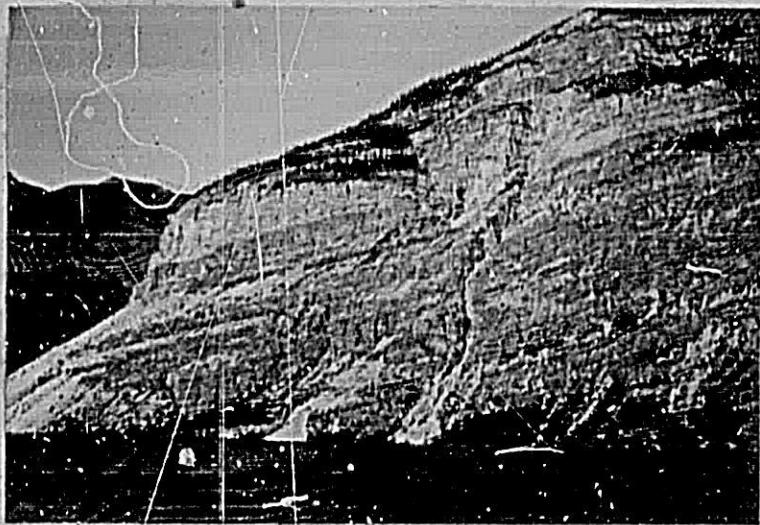
PINE POINT LIMESTONE  
DARK BROWN BITUMINOUS, FOSSILIFEROUS LIMESTONE  
SOUTH SHORE GREAT SLAVE LAKE



SOUTH SHORE OF GREAT SLAVE LAKE, N.W.T.  
PINE POINT AREA, SHOWING TYPICAL  
EXPOSURES ON LAKE SHORE



OIL SEEP, PRESQU'ILE DOLOMITE  
HORNCastle POINT  
NORTH SHORE GREAT SLAVE LAKE



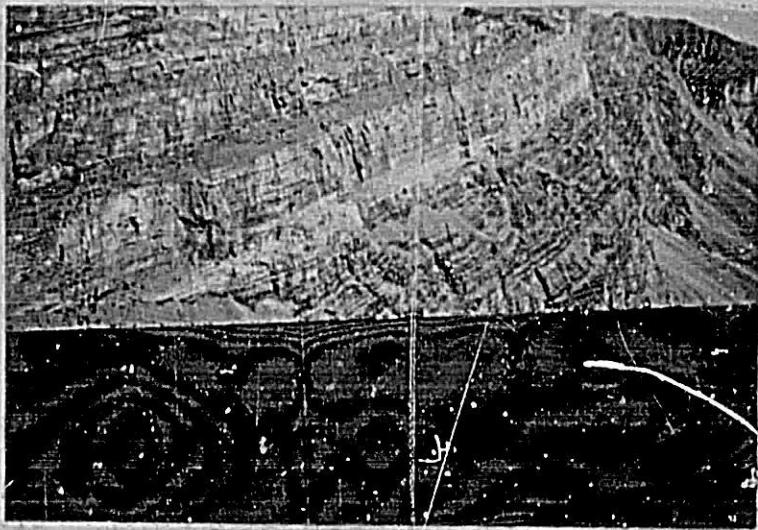
LONE MOUNTAIN DOLOMITE

NORTH SHORE LITTLE DOCTOR LAKE, N.W.T.



LITTLE DOCTOR LAKE, N.W.T.

LOOKING EAST

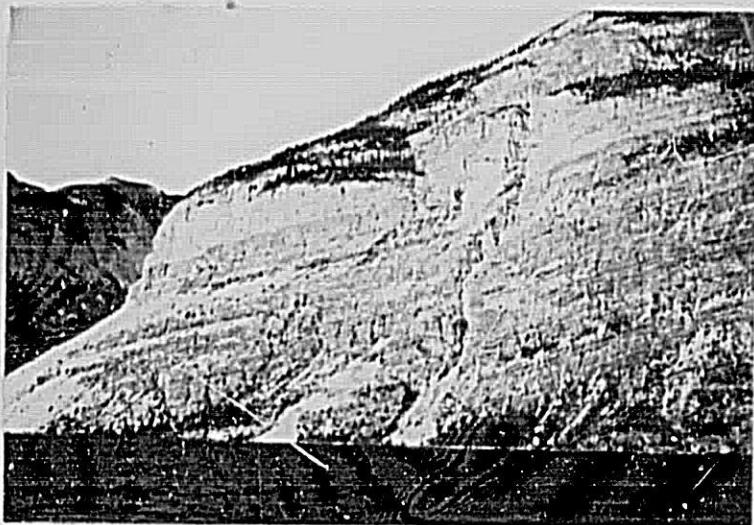


LONE MOUNTAIN DOLOMITE

NORTH SHORE LITTLE DOCTOR LAKE, N.W.T.  
SHOWING THE CYCLIC BEDDING OF THE DOLOMITE

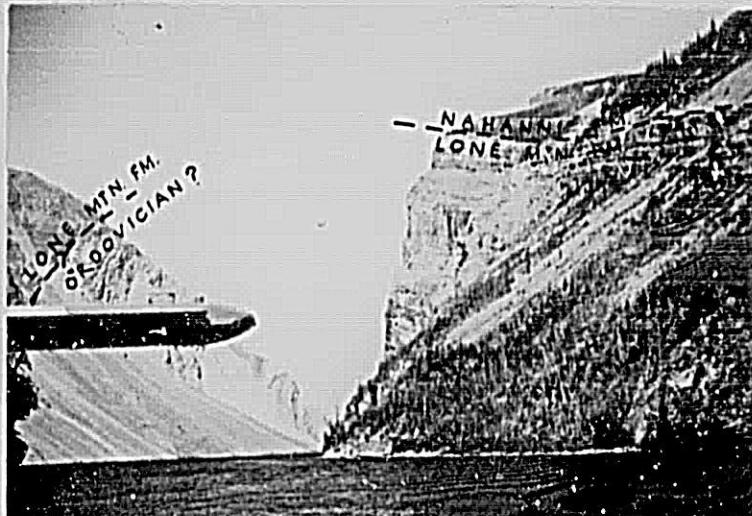


NAHANNI FORMATION  
TOP OF MOUNTAIN IN SOUTH SHORE  
LITTLE DOCTOR LAKE, N.W.T.



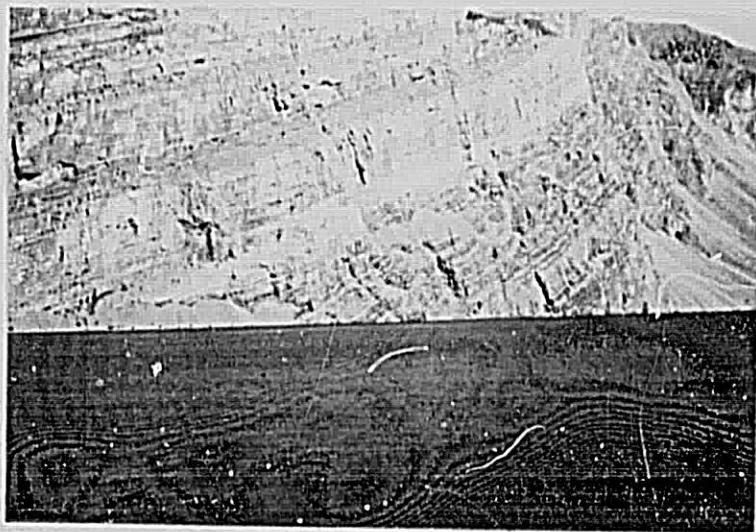
LONE MOUNTAIN DOLOMITE

NORTH SHORE LITTLE DOCTOR LAKE, N.W.T.



LITTLE DOCTOR LAKE, N.W.T.

LOOKING EAST



LONE MOUNTAIN DOLOMITE

NORTH SHORE LITTLE DOCTOR LAKE, N.W.T.  
SHOWING THE CYCLIC BEDDING OF THE DOLOMITE



NAHANNI FORMATION  
TOP OF MOUNTAIN IN SOUTH SHORE  
LITTLE DOCTOR LAKE, N.W.T.