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REPORT ON 1960 SURFACE MAPPING AND 1958-59 AEROMAGNETIC SURVEY COMPLETED IN THE YUKON AND NORTHWEST TERRITORIES

BLACKWATER LAKE, OCHRE RIVER AND GREAT BEAR RIVER PERMITS

SHELL OIL COMPANY OF CANADA, LIMITED

SEPTEMBER, 1961

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GEOLOGICAL & EVALUATION
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REPORT ON 1960 SURFACE MAPPING AND 1958-59 AEROMAGNETIC SURVEY COMPLETED IN THE YUKON AND N.W.T.

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ND- 5N

NE - 5N
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NE - 7N
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NE - 9N
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NE - 10S
NE - 10N
NE - 11N (2)
NE - 11S (2)
NE - 12N
NE - 12S
NE - 13S
NE - 13N (2)
NE - 14N
NE - 15N
NE - 16N

NF - 15N
NF - 16N

NP - 1N
NP - 8N
NP - 8S
NP - 10S
NP - 11S

NQ - 1S (2)
NQ - 1N (2)
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REPORT ON 1960 SURFACE MAPPING AND 1958-59 AEROMAGNETIC SURVEY COMPLETED IN THE YUKON & N.W.T.

BLACKWATER LAKE-Permit #1960-1969 incl., 2142, 2143($E\frac{1}{2}$), 2144($E\frac{1}{2}$) 2145, 2146, 2147($N\frac{1}{2}$)
GREAT BEAR RIVER-Permit ~~#2044-2009~~ inclusive 2004 - 2044
OCHRE RIVER - Permit #1943-1948 inclusive, 1949($N\frac{1}{2}$), 1950-54 incl., 1955($E\frac{1}{2}$), 1956, 1957, 1958($S\frac{1}{2}$), 1959

The following report is in fulfillment of Section 54 of the Canada Oil and Gas Regulations.

54-1-(d) No aerial photographs were taken on the subject permits or surrounding area.

54-1-(e) Location: The area discussed in this report lies between 62° and 66°30' latitude and between 129°20' and 120° longitude along with a very small region centered on 65°30' latitude and 132°30' longitude (see Encl. #1 A-D). J.C. Sproule & Associates completed geological reconnaissance exploration for the team of Amerada, Dome, Shell and Texaco (in a previously submitted report) covering that portion of the main report area north of 66° latitude and east of 127°30' longitude.

Accessibility: The Mackenzie River flows through the main report area from southeast to northwest and, although the area is accessible by both boat and aircraft, the aeroplane is the most satisfactory. Heavy supplies and equipment are brought in from Edmonton via rail to McMurray and by boat down the Athabasca River through Lake Athabasca, Slave River, Great Slave Lake and along the Mackenzie River or by road to Hay River and then by

barge down the Mackenzie. Field personnel and fresh supplies were invariably flown in by commercial or Company-owned DC-3 aircraft. There are alternate air routes from Edmonton, one via Hay River and the other via Grande Prairie and Fort Nelson.

Transportation & Communication: Field personnel and supplies were transported from base camp to their respective areas by Company-owned Otters. Supplies and mail deliveries were generally made weekly and sometimes oftener depending on circumstances. Some reconnaissance work was completed by our Otter and DC-3 aircraft. The Otters were equipped with floats to enable them to land on lakes and rivers as invariably the camps were located near them. Contract G-2 Bell helicopters were used for geologic mapping and section measuring also for making gas caches and fly camps when no landing spot could be found for the Otter aircraft. Each of the four mapping parties operated with a helicopter. On rare occasions a boat was used for transporting field personnel to outcrops along navigable rivers. Fly camps were used only when the flying distance from main camp to a particular mapping area became too great and thus impractical.

Each mapping party was equipped with a 60-watt transreceiver. It was used to communicate with aircraft, helicopters, base camp, fly camps and other Shell parties. Camp radios were powered by 500-watt portable generators. These generators were used only as required to meet the daily schedule or to transmit emergency messages. Wrigley base camp was equipped with two radios.

(1) a marconi 50-watt single band transreceiver providing communications with Edmonton via Peace River and Alberta Government Telephones.

(2) a 60-watt AM Spillsbury and Tindall transreceiver was used to contact party camps, fly camps and company aircraft. Fly camps were provided with crystal controlled battery-powered transister receivers (TR 100) which could also be used in main camp should normal power be shut down.

Rigid schedules, usually twice daily, were adhered to in order that greater working safety could be assured.

Personnel and Camp Equipment: Personnel with the following parties include:

Party #137 - Party chief, senior assistant, assistant, student assistant, helicopter crew (pilot and mechanic) and camp cook.

Party #138 - Party chief, senior assistant, two student assistants, helper (non-technical), helicopter crew (pilot and mechanic)and camp cook.

Party #139 - Party chief, senior assistant, assistant, two student assistants, helicopter crew (pilot and mechanic) and camp cook.

Party #140 - Party chief and senior geologist.

Base Camp - Paleontologist and student assistant.

In all camps, including base camp, [illegible] Catering of Edmonton provided the food and cooking staff.

Base camp is situated in Wrigley with the purpose of supporting the field mapping crews. It is a portable insulated camp consisting of:

5	12' x 24'	4-man sleeping units
1	12' x 24'	2-man combination sleeper-storage unit
1	12' x 24'	Diner seating 24 men
1	12' x 24'	Kitchen unit
1	12' x 24'	Washroom and shower unit
1	16' x 20'	Office unit
1	16' x 24'	Recreation unit
1	6' x 8'	Walk-in freezer
1	15KW	Light plant

The camp was designed to accommodate 22 men but can handle up to 30 for short periods.

Field camps were all equipped with tents. Each party had 3 12'x12'x6' sail silk pyramid tents for cooking, dining and office use. All crew members and contract personnel had individual 9' x 9' umbrella-type sleeping tents.

Topography: The rivers have cut deep steep-sided valleys in the mountain areas and the topography may be classified as late youth. In the flat areas, the river channels throughout much of the area

are deeply incised. Meanders are a common feature of the rivers and larger streams, but in most cases they are incised meanders. In the mountain areas the stream gradients are steep and in the flat areas are much steeper than would be expected from looking at the pattern of the rivers. All of this suggests uplift in late Tertiary or early Quaternary time. Topography in this region is controlled by structure.

Vegetation: Practically all of the lowlands in the area are covered with muskeg. Much of the moss in the muskeg is believed to be sphagnum. It is this muskeg that makes traversing on foot so difficult and strenuous. Many mosquitos and flies are to be found in this north country muskeg. Long weary hours are often spent in pursuit of a single isolated outcrop when the helicopter was unable to find a suitable landing spot. Although the area lies well south of the northernmost tree growth, tree lines can be said to approximate 2500' in the mountain regions. Only scrub brush grows above this elevation. Some areas are reported to be heavily timbered. In marshy areas in the upland is a scrub alder. Spruce is believed the most abundant tree in the report area and may reach 50' in height. Along river courses, birch and occasional populars are found. Other trees observed in the area are tamarach and jack pine.

Animals: Animals commonly observed while mapping include: moose, mountain caribou, Dall sheep, grizzly and black bear. Many smaller

animals were seen while walking streams, making cross-country traverses and doing routine duties about camp. Although some were rare compared to others, the following animals were recognized: weasel, marten, fisher, mink, wolverine, otter, fox, timber wolf, lynx, red squirrel, beaver, muskrat, rabbit and porcupine.

Climate: In general, the climate in the lower Mackenzie River valley is considerably milder than the climate to the east on a corresponding latitude. Temperature may occasionally reach 85° F in the months of June, July or August. However, there is a sudden drop as soon as the sun goes down and the night temperature is seldom above 50°.

Precipitation is slightly higher than in the prairies of Alberta and Saskatchewan, but notnearly so heavy as the precipitation along the Alaska coast. In the Mackenzie region average annual precipitation is reported between 15-20 inches.

The snow disappears completely from the mountain ranges in the report area during the summer months. September is commonly the time when snow begins to fall in the highest mountains.

In the area around Norman Wells perma frost was found throughout the entire report area. Perma frost was reported to extend from 40-65' below the surface.

Bad weather greatly hampered operations during some of the summer season. Rains and high winds frequently grounded the heli-

copters and minimized output of the parties. Only office work could be done in bad weather periods.

Listed below are helicopter logistics for the three regular helicopters in the main report area.

Party # 132

Days under contract		98
Days down - weather	4	
Days down - mechanical	1	
Days down - out of hours	1	
	6	
Total flying days		92

Party # 138

Days under contract		88
Days down - weather	10	
Days down - mechanical	4	
Days down - out of hours	1	
		15
Total flying days		73

Party # 139

Days under contract		94
Days down - weather	18	
Days down - mechanical	1	
Days down - out of hours	0	
		19
Total flying days		75

Settlements: There is very little habitation in the lower Mackenzie River valley. A small percent of the inhabitants are white. It can be said, however, that Norman Wells' population is predominantly white. Indians of different tribes, each with a

different language, are to be found generally along the main water courses in the region. Their distribution is in part controlled by fishing and hunting conditions, but employment with the white man is developing. Some are employed doing odd jobs with oil companies. Settlements in the area include Wrigley, Fort Norman, Fort Franklin, Norman Wells and Fort Good Hope.

PHYSIOGRAPHIC PROVINCES

In the southern part of the main report area there are four main physiographic provinces (Refer to 1:500,000 geological compilation maps). From east to west, these are:

(1) Plains area - an area of relatively flat-lying sedimentary strata with only gentle undulations. Cretaceous and Upper Devonian outcrops are sparse and poorly exposed. Much of the terrain is muskeg-covered and swampy. In the plains glacial lineations, glacial moraine, drumlinoids and occasional eskers are to be found.

(2) Nahanni Camsell Range chain stretches from Camsell Bend on the Mackenzie River to north of Wrigley. Here a west-dipping thrust sheet exposes strata as old as Devonian Bear Rock. On the Camsell Range glacial erratics have been found at elevations of 2500 feet above sea level.

(3) Intermontaine basin - a broad synclinal area between Nahanni Range and the Mackenzie Mountains. Generally with poor Upper Devonian exposures except for uplifts in the south which expose strata as old as Devonian Bear Rock. Dips in the area are usually shallow. Glacial lineations and drumlinoids occur in basin.

(4) Mackenzie Mountains - exposes strata from Ordovician to Upper Devonian. The area is characterized by simple and complex folding and faulting. Dips are generally steep and variable. No

glacial features were observed and most superficial cover is scree. The relief is high and rugged with drainage eastward into the Mackenzie River.

Physiographic provinces in the central part of the main report area are from east to west as follows:

(1) Plains area - an area east of Franklin Mountains with gentle dipping Cretaceous strata and with very poor sparse exposures. Relief is low and gentle. Muskeg and swampy regions are prevalent.

(2) Franklin Mountains - northwest-southeast trending mountain belt immediately east of the Mackenzie River. The eastern boundary is generally defined by a west dipping thrust fault. Dips are usually moderate to steep and folding and faulting are common. Rocks as old as Precambrian are well exposed. Elevations reach 5000' on Mt. Clark and 5500' on Cap Mountain.

(3) Intermontaine basin - is again a broad synclinal belt, widening northward and exposing Tertiary and Cretaceous remnants, and Upper Devonian strata except for minor thrust areas with outcrops as old as Ordovician-Silurian. The lowlands are very poorly drained, swampy, muskeg-covered, with innumerable little lakes while the plateau areas tend to have somewhat better drainage.

(4) Mackenzie Mountains - a structurally complex fold and fault belt exposing Upper Devonian to Precambrian strata. The highest and most rugged ranges in the Mackenzie Mountains are the Third and westward ranges with peaks up to 7,000' but average between 4500-6000'.

To the north of the main report area three physiographic provinces exist:

(1) Franklin Mountain area - an arcuate fold and fault belt broadening northward and following closely to the Mackenzie River on the west, until it finally dies out against the river in the Beavertail Mountain area. Elevations reach 3000' on Discovery Range and considerably less on those ranges to the north. Cretaceous to Ordovician-Silurian strata is exposed. Faulting is dominant over folding and dips are variable, ranging from low to steep.

(2) Intermontaine basin - generally a broad Cretaceous synclinal area with the Imperial anticline exposing Devonian Imperial to Ordovician-Silurian in the extreme northwest part of the basin. Elevations on the Imperial anticline reach 2400'.

(3) Mackenzie Mountains - a continuation of the Mackenzie Mountain belt in the south but exposing considerable Cambrian-Precambrian strata. Structural complexity and, apparent lack of source and reservoir rock warranted only reconnaissance in the area.

The small report area in the extreme northwest (see Encl. # 1), straddles the Peel Plateau-Mackenzie Mountain physiographic boundary. This area too is drained by the large Mackenzie River system via the Peel River.

STRATIGRAPHY

Stratigraphy will be discussed from south to north in the main report area under above-mentioned physiographic provinces where applicable. Beginning in the southern part descriptions are as follows, (see 1:500,000 geological compilation maps):

Cambrian-Precambrian

The only area of presumed Cambrian-Precambrian strata was observed in reconnaissance west of the map area, deep in Mackenzie Mountains. Here a great thickness of light grey to white quartzite and some conglomerate was underlain by some 1,000' of limestone and sandy dolomite. Total thickness in the area is unknown. This rock unit is very resistant and stands up in high relief.

Cambrian(?)

Most of suspected Cambrian strata is recessive, poorly exposed with buff and yellow-orange weathering. It consists of about 1,000' of dolomite, argillaceous limestone, dolomitic and calcareous shales. The sequence was unfossiliferous. This unit was again observed on reconnaissance and lies to the west of the map area.

Ordovician-Cambrian (Franklin Mountain)

The Cambrian(?) is overlain by some 6,000' medium-dark grey, weathering light grey and yellowish grey limestone and dolomite. The Franklin Mountain formation in some areas contains

zones of trilobites and other fossils which support Ordovician age. Where observed the contact with the overlying Silurian-Ordovician (Mt. Kindle) is generally abrupt.

Silurian-Ordovician (Mt. Kindle formation)

The Mt. Kindle formation is underlain by Franklin Mountain formation. It is overlain by Devonian-Silurian strata in the Mackenzie Mountains and by Devonian Bear Rock in Camsell Range area. No complete sections were available in the area and thickness can only be said to be in excess of 2500' in the extreme western part of the report area. Here the Mt. Kindle consists of calcareous shale and argillaceous limestones in the upper part with cherty, light grey to dark grey dolomite in part silty, argillaceous and fossiliferous in the lower part. The lower contact with Franklin Mountain where seen is generally abrupt.

Devonian-Silurian

Consists primarily of platy, argillaceous limestone but with more resistant fossiliferous limestones in the upper part and interbedded argillaceous limestone and calcareous shale in the lower part. It is underlain by Mt. Kindle formation and overlain by Devonian Bear Rock strata. Fossils are to be found only in the upper part and tend to be non-diagnostic. The Devonian-Silurian strata has not been observed east of the Mackenzie Mountains. Contact with the overlying Bear Rock is believed gradational.

Devonian Bear Rock

In the east (Nahanni Range) the Bear Rock is a banded light and dark grey or medium and dark grey dolomite. A basal buff weathering sandstone is present here also. The Bear Rock is underlain by Mt. Kindle formation and overlain by Devonian Hume limestone in the area. Thickness is in the vicinity of 2500'.

To the west the Bear Rock is underlain by Devonian-Silurian strata and overlain by Devonian Hume. The Bear Rock consists of banded dolomites in the upper part and light grey weathering limestone and limestone breccia in the basal portion. In general this rock unit is unfossiliferous, but occasionally contains amphipora and corals. Upper contact where observed may be abrupt or gradational. Thickness in the west is between 4000-5000' and it is always a resistant unit with fair-good outcrop exposures.

Devonian-Hume formation

The Hume formation in the Nahanni-Camsell Range is typically dark grey, finely crystalline, well bedded, fossiliferous, resistant limestone with occasional shale break. Corals, stromatoporoids and brachiopods are common. Contact with the overlying Devonian Fort Creek formation was not observed. Thickness is in the order of 800'.

In the Mackenzie Mountains the Hume formation is medium-dark grey, weathering medium grey-medium brown, microcrystalline, well bedded, very fossiliferous, argillaceous limestone with rare shale breaks. Some intervals are more resistant than others. Thickness

ranges up to about 1500' in the extreme western part of the main report area. The Hume formation is underlain by the Bear Rock and overlain by the Devonian Fort Creek.

Devonian - Fort Creek formation

The Fort Creek formation is overlain by Devonian Imperial and underlain by Devonian Hume formation. In the area great difficulty was experienced in picking an upper contact. Only in areas where the Fort Creek is of distinctly different lithology to the Imperial is the unit mappable. The Fort Creek has been observed as a soft black to hard black fissile shale with yellow efflorescence with a gradational upper contact in the Camsell Bend area. Thickness approximates 300'. It has also been observed as a greenish, grey platy, contorted, hard, silty shale and argillaceous siltstone in upper Root River. Thickness is unknown.

Devonian - Imperial formation

Upper Devonian is a thick sequence of widespread poorly exposed strata. The lower unit over the entire area consists of a thick sequence of grey to greenish grey weathering, non calcareous shales and siltstones. A limestone unit in the order of 500' occurs roughly between 62°30' and 63°30' in a broad synclinal area between Camsell and Mackenzie Mountains. This limestone unit is a resistant and agood scarp former. It is usually very fossiliferous with abundant corals, the lower beds being platy or rubbly and with abundant brachiopods. In the same area, immediately above the limestone unit is a prominent topographic unit of interbedded siltstone, fine grained sandstone and shales. Upper and lower

contact gradational and thickness is variable from 200-400'. A second limestone unit overlies this prominent topographic unit in the same area. It is abundantly fossiliferous, nodular, brownish grey limestone and is of local extent only. Remaining Upper Devonian strata over the entire southern part of the main report area is largely red and green calcareous shale and siltstone with interbedded limestone in the lower part, locally with a prominent limestone unit at the top which in turn is overlain by dark grey fissile shale. An unconformity separates the Upper Devonian from Cretaceous remnants in the plains area.

Cretaceous

Exposures are very poor and sections could not be measured. It consists largely of dark grey shales and some greenish grey fine grained sandstone. Thickness is unknown.

Stratigraphic descriptions for the central part of the main report area.

Cambrian-Precambrian

(1) Franklin Mountains

On Cap Mountain some 7,000' of Cambrian-Precambrian rock is exposed. Here the exposure has an upper unit of about 2,000' of brightly colored shales, some sandstone (quartzite) and siltstone with a lower quartzite unit of 5,000' with some shale, siltstone and rare dolomite. Total thickness in the area is unknown.

(2) Mackenzie Mountains

Approximately 5,000' of Cambrian-Precambrian strata occurs below a limestone unit assumed to be in the Ronning group in the upper Redstone River area. The Cambrian-Precambrian section can be divided into two main units. A basal unit consists of some 4,000' of quartzitic sandstones and rare red shales, and the upper unit of approximately 1,000' of interbedded clastics and dolomites. Total thickness in the area is unknown.

Cambrian

(1) Franklin Mountains

Cambrian strata can generally be divided into two units. The lower unit is a sandstone while the upper unit consists of shale, siltstone, dolomite, limestone, locally gypsiferous. Much of the upper unit is easily eroded and invariably poorly exposed. The sandstone is resistant and tends to be a ridge former. Occasional trilobites were found. Neither the upper or lower contacts were observed.

(2) Mackenzie Mountains

Some bright colored sandstone, siltstone and conglomerate underlying the Ronning group is believed Cambrian. There is no faunal evidence for Cambrian age. Thickness is unknown as only the upper contact was seen. The upper contact is believed conformable. Correlation of the above strata with known Cambrian in the Franklin Mountains is almost impossible as the distance between the rock exposures is so great.

Cambrian-Ordovician-Silurian (Ronning Group)

(1) Franklin Mountains

Exposures of the Ronning Group in the Franklin Mountains are rather poor. Covered intervals are both numerous and sizeable. This group can usually be divided into the Franklin Mountain and Mount Kindle formations.

Franklin Mountain formation:- The Franklin Mountain formation ranges from about 1000-2000' in thickness and is underlain by Cambrian and overlain by Mt. Kindle formation. It is a fine grained dolomite with some sandstone beds. Where observed, it is well bedded and weathers light brown in color. The contact with the underlying Cambrian strata was not seen.

Mount Kindle formation:- The Mt. Kindle formation is overlain by Devonian Bear Rock and underlain by the Franklin Mountain formation. Total thickness ranges from perhaps 500-1500'. This formation consists of a sublithographic to very fine dolomite, in part siliceous, fossiliferous and arenaceous. The basal portion is dark colored and usually highly fossiliferous. The contact with the underlying Franklin Mountain and overlying Bear Rock appear conformable.

(2) Mackenzie Mountains

In the Mackenzie Mountains the Ronning group is underlain by Cambrian and overlain by Devonian-Silurian strata. The Ronning group cannot be broken up into the Franklin Mountain and Mt. Kindle formations as in the Franklin Mountain area. Thickness varies from

some 3000-6000'. It consists mainly of fine grained dark dolomite with abundant chert stringers and nodules. In some localities the upper portion of the Ronning is somewhat lighter in color. The Ronning group is resistant and exposures generally good.

Devonian-Silurian

(1) Mackenzie Mountains

In the Mackenzie Mountains a poorly defined dolomite rock unit of variable thickness occurs between known Devonian and the Ronning Group. This rock unit is easily weathered and poorly exposed and thicknesses are very hard to obtain. In some places the upper part is a fossiliferous limestone and the lower portion a light weathering dolomite. No recognizable equivalent rock unit was observed in the Franklin Mountains. Nature of the contacts above and below are unknown.

Devonian - Bear Rock

The Bear Rock formation in the Mackenzie Mountains is underlain by Devonian-Silurian strata and overlain by Devonian Hume limestone. In the Franklin Mountains the Bear Rock occurs between Mt. Kindle and Devonian Hume formations. Lithology of the Bear Rock is variable. It has been observed as limestone, dolomite and breccia and is usually fine crystalline. In the brecciated portions, the fragments can be either limestone or dolomite and of variable size. Some fragments have been observed up to 50' in length. Massive Bear Rock breccia tends to weather to a very irregular topography. A good weathering break can be

observed between the breccia and the bedded carbonates. The Bear Rock thickens westward from less than 1000' in the Franklin Mountains to 4000-5000' in the Mackenzie Mountains.

Devonian-Hume

The Hume formation in general consists of well bedded, very slightly argillaceous, lithographic to sub-lithographic crystalline, light-medium grey, olive grey and yellow brown, and is frequently quite fossiliferous. It is underlain by Bear Rock and overlain by Fort Creek. Thickness of the Hume is again variable. Total thickness in the Franklin Mountains is unknown but believed to be in the order of 500'. This formation thickens westward to over 1000' in the Mackenzie Mountains. The Hume is a resistant unit and readily recognized. Contact with the underlying Bear Rock is conformable where observed. However, the upper contact with the Fort Creek formation has been observed as gradational in some localities and conformable in others.

Devonian-Fort Creek

The Fort Creek formation separates the Hume and Upper Devonian Imperial formation and consists of black siliceous shale to earthy mudstone and siltstone. It is easily weathered and occurs as a very recessive unit in outcrop. Again the main areas of outcrop were the Franklin and Mackenzie Mountains belts. The upper contact with the Imperial formation was sharp at some localities and possibly gradational in others. Thickness for the unit was in the order of 500'. For mapping purposes, the Fort Creek is mapped with the Imperial in the Franklin Mountains.

Upper Devonian-Imperial

Most of the Imperial formation is a monotonous sequence of interbedded shales and sand except for occasional limestone beds. The limestones are usually finely crystalline with numerous fossils. Argillaceous material is common in the sands. The Imperial outcrop belt commences on the western edge of the Franklins and extends into the Mackenzies on the west. Since the Imperial formation is badly eroded and Cretaceous-covered areas do not lend themselves to complete Imperial sections, the thickness is unknown. An unconformity separates the Imperial and Cretaceous. Contact with the underlying Fort Creek is conformable and possibly gradational.

Cretaceous

Cretaceous outcrop lies in the plains area to the east of the Franklin Mountains except for scattered outcrops of remnants in the intermontaine basin north of 63°30' north. The lithology is frequently dark shales containing ironstone nodules with occasional sandstone interbeds. Again the Cretaceous is badly eroded and any section measured would be a minimum value. Thicknesses up to about 2000' have been observed. The contact with the underlying Imperial is unconformable while the contact with the overlying Tertiary on the north was not seen.

Northern part of the main report area (Refer to Report on Exploration in Norman Wells Area, Permits 782, 795, 797, August, 1960).

Cambrian-Precambrian

Strata consists of mainly shales, sandstones and quartzite and is overlain by Ordovician-Silurian. Exposures are poor to good and the outcrops are to be found only in the extreme western part of the area. Only fossils occur in the upper part of the section and are Cambriani in age. The remaining lower part of the clastic section is unfossiliferous and believed to be Proterozoic.

The upper part of the section contains carbonates, shale and some sandstone and quartzite. Lithology of the very uppermost portion of the sequence is black, platy and flaky petroliferous, in part fossiliferous, shale with a few intercalations of grey limestone and rusty weathering sandstone. Unfossiliferous shales occur below the fossiliferous section, are brown to black and maroon, sometimes calcareous, micaceous and contain some limestone and sandstone beds. Generally the sandstone and quartzite are hare and resistant, weathering yellow brown with some shale intercalations while the limestone is grey resistant and medium to massive bedded.

Thousands of feet of unfossiliferous quartzite and quartzitic sandstone and shales are assumed Proterozoic. All rock types can have variable colors, especially the shales. Many of the shales have been observed with a metamorphosed nature.

Ordovician-Silurian

The Ordovician-Silurian sequence overlies the Cambrian and underlies the Bear Rock. Its lower contact has been observed as disconformable. Lithology may be divided into three arbitrary units. The basal unit consisting of evaporites and associated clastics while the middle unit mainly unfossiliferous, cherty dolomite. A third and uppermost unit is a fossiliferous dolomite.

In the basal unit varying amounts of greyish brown, white and red gypsum, maroon and green shale with a few thin fine grained quartz sandstone and dolomites (oolitic in part) in the upper part are to be found. The shale and sandstone are often ripple marked and containing mud cracks and salt hoppers. The only salt observed was on the Little Bear River. Thickness is believed variable but in the order of 500-1500'. Outcrops are recessive and poor. No fossils were found.

The middle unit is generally only sparsely fossiliferous, thin-medium bedded cherty (grey bedded and nodular), yellowish grey dolomite. Commonly found in the lower beds are salt casts, medium rounded quartz grains, algal structures and thin intercalations of greenish grey shale and flat pebble conglomerate. Locally oolitic dolomite beds are found near the base. To the northeast the dolomite sequence is thin bedded, some of which is irregular and wavy and with intermittent mottling near the top. The dolomite crystallinity varies from fine to medium and shows some algal(?) structure. This unit stands up in high relief as a result of its

very resistant nature. It generally weathers light in color. Thickness varies between 1,000-2,000'.

Lithology of the upper unit is as follows: medium greyish brown, fine-medium crystalline, fossiliferous, thickly bedded (two-four feet) dolomite. Often siliceous fossils, grey chert nodules and quartz filled vugs were found. Fossils indicate Silurian age. A characteristic of the unit is the alternating light greyish brown to darker greyish brown dolomite in intervals up to 100'. In the northeast the dolomites are light grey, yellowish grey weathering, fine-coarse grained with grey and white cherts (stromatolitic in part). Some of these cherts are fossiliferous but unidentifiable. Identifiable siliceous Silurian fossils occur in the upper dolomites. Upper contact with the Bear Rock is abrupt but locally conformable. These units, however, did not lend themselves to mapping and all three were combined.

Devonian-Bear Rock

Devonian Bear Rock formation is overlain by Hume limestone and underlain by Ordovician-Silurian dolomites. It is primarily a carbonate breccia with bedded limestones, dolomites and evaporites in the northeast part of the map area. Over much of the breccia area both limestone and dolomite fragments of variable sizes and shapes are to be found. There seems to be some tendency for the elongate part of fragments to lie parallel to the bedding. No sorting or evidence of abrasion occurs in the fragments. At most places the breccia is dense or fine crystalline and brownish grey

in color. Gradations from bedded carbonates to breccia, both laterally and vertically have been observed. Fossils are absent in the section.

An evaporite facies in the northeastern part of the area consists mainly of gypsum or anhydrite. The gypsum is soft, white to grey and occur in green and rusty brown shales, increases to the north and east from the Bear Rock type locality. In the mountains north of Discovery Range, the percentage of gypsum becomes exceedingly high as was observed at Paige Mountain.

Outcrop topography in the Bear Rock is very irregular and desmoiselles common. Karst topography is to be observed in the evaporitic province where some sink holes reach 150' in diameter with a depth of 100'.

Porosity ranges from small vugs to cavernous dimensions.

Bear Rock sediments thicken southwestward up to approximately 2,000'.

Devonian - Hume

The Hume formation is a light-medium grey, brownish and yellowish grey weathering, thin-thick bedded, in part rubbly and nodular, finely crystalline, very fossiliferous, argillaceous limestone with some calcareous, dark grey, platy shale. Fossils include corals, brachiopods, gastropods, pelecypods, ostracods, etc. and yield a middle Devonian age. Most of the fossils occur in the upper part of the section. It is a cliff forming rock unit and can be seen standing out in high relief over the outcrop area. Thicknesses

for Hume vary between 300-1000', thickening in a southwestward direction. Contact with the overlying Devonian Fort Creek is gradational at some locals and abrupt in others, while the lower contact with the Bear Rock is apparently gradational.

Devonian - Fort Creek

Much of the Fort Creek consists of shales except for local middle reefal carbonate build-up centered roughly around Norman Wells. The lower shale member is dark brownish grey, in part greenish grey, in part calcareous, bituminous and pyritic, fissile to paper thin, occasional ironstone nodules, and containing thin intercalations of argillaceous limestone. The carbonate member of variable thickness can be divided into two parts:

(1) a lower platform type, well bedded limestones

(2) an upper reefal limestone unit, rich in Stromatopora and Auphipora

Above the limestone unit is very hard siliceous, black, pyritic, petroliferous shale with some sulphurous staining and ironstone beds. In the mountains the Fort Creek is a recessive unit (except for the limestone unit) and is often poorly exposed. Total thickness varies from a minimum of 400' to a maximum of over 1,000' in the limestone area. The contact with the underlying Hume can be both gradational and abrupt and contact with the overlying Devonian Imperial is believed gradational. However, good contact exposures are rare.

Devonian - Imperial

Outcrops of Upper Devonian Imperial are restricted to the

intermontane basin and usually poorly exposed. Lithology consists of a thick sequence of soft, grey and greenish grey, in part calcareous shale and dark calcareous argillaceous siltstone and very fine sandstone. Most of the sands and limestones occur in the upper part while shale predominate in the basal portion of the section. A further generality can be made that greenish-grey is characteristic color of the Imperial formation, although light and dark greys are commonly found near the base. In this interbedded sequence, rare fossiliferous limestone beds occur. Fossil determinations indicate an upper Devonian age. Contact with the underlying Devonian Fort Creek is gradational while the upper contact with Cretaceous sediments is unconformable. Thickness in the area ranges up to 3,000'.

Cretaceous

Although the Cretaceous system is thick in the intermontane basin, very few thick sections are exposed. Much of the Cretaceous strata within northern area of the report limits is poorly exposed and lacks good lithologic markers and paleontological control, making correlations most difficult. It is common to see great lateral and vertical lithofacies variations. Fossils of both early and late Cretaceous have been collected from this region. General lithology can be said to be sandstone, yellow grey to green-grey, very fine to coarse grained, in part glauconitic and exhibiting shallow water critera such as ripple marks with shale dark grey to green grey, in part pyritic, bentonitic and carbonaceous. In the Norman Wells area: an upper dark shale unit of

less than 1,000' believed the highest in the stratigraphic sequence is underlain by a sandstone, shale and conglomerate unit with very minor coal which is in the order of 1500'. Stratigraphically below the above 1500' unit is dark shale unit with thin sandstone and siltstone beds, occasional thin bentonite bed with a thickness in the order of 4,000'. The basal sandstone, conglomerate and shale (glauconitic in part) interval may be in the order of 2,000'. Total section is probably less than 8,000'. An unconformity is known to be present at the base while an unconformity is only assumed at the top of the Cretaceous section separating the Cretaceous from the overlying Tertiary clastics.

Cretaceous sediments have not been studied in detail.

Tertiary

Tertiary sediments occur within the northern part of the report limits in a structural basin. Again, as in the Cretaceous, only cursory examination was given the soft rather poorly exposed Tertiary outcrops. Three main divisions can be made in the Tertiary of the Tate Lake area (south of Fort Norman).

A lower unit of mainly red-brown weathering sandstone and poorly consolidated conglomerate with minor shale and a trace of lignite. Thickness is in the order of 5,000'. The middle unit consists of 200' of very carbonaceous shales, scattered lignite beds, diatomaceous earth(?) beds and sandstone. An upper unit consists of approximately 1500' of unconsolidated conglomerate, sandstone and shale with minor diatomaceous earth(?) beds.

Total of Tertiary sediments may approximate 6500'.

Although not observed, an unconformity is assumed to exist at the base of the Tertiary.

Extreme Western Report Area - centered on 65° 30' latitude and 132° 30' longitude.

Cambrian-Precambrian

The Cambrian-Precambrian lithology is primarily sandstone, dark weathering, fine-medium grained, with grey, green and brown shale. Sandstone is predominant in the upper part with minor diorite sills while the lower unit contains considerable shale. Thickness in the area is unknown and upper contact was not observed.

Ordovician

Shale and limestone with some chert forms the uppermost unit. The basal unit consists of limestone and dolomite with quartzite at the base. The total thickness for the area would be in the order of 1500'. Fossils yield an Ordovician age. Outcrops are generally good with the basal unit standing up in highest relief. For mapping purposes, the Ordovician and overlying Silurian are combined.

Silurian

Silurian strata within extreme western report area limits consists of cherty dolomite, dolomite, dolomitic limestone and limestone. It is very fossiliferous in parts and fossils are often silicified but yield a Silurian age. Total thickness is approximately 1500'.

Silurian-Devonian

The Silurian-Devonian is overlain by Lower Devonian and underlain by Silurian. Contacts above and below the Silurian-Devonian appear gradational. It consists of mainly dolomitic limestone with some fossils near the base. Total thickness would approximate 2500' and is included with Siluro-Ordovician for mapping purposes.

Lower Devonian - Bear Rock

This unit consists of some 2,000' of limestone and calcareous shale. Fossils indicate lower Devonian age.

The rock unit is recessive and tends to be poorly exposed as compared to the underlying carbonate strata.

Devonian - Hume

The Hume formation is a grey-grey black, weathering to grey and grey brown, dense to fine crystalline, thin-medium bedded, argillaceous limestone, rubbly, highly fossiliferous, with some shale intercalations. Fossils include crinoids, corals, bryozoa, pelecypods, brachiopods and trilobites and indicate Middle Devonian age. The Hume is a resistant unit with good outcrop. It is overlain by Devonian Fort Creek and underlain by Lower Devonian Bear Rock. Lower contact appears gradational where observed and upper contact is sharp. Stratigraphic thickness of the unit would be in the order of 500'.

Devonian - Fort Creek

In the area, the Fort Creek formation consists mainly of black, flaky to platy., pyritic, locally somewhat silicified shale with sulfurous and ferruginous efflorescence and some large calcareous concretions. Some argillaceous, dolomitic, thin bedded, grey brown and rusty brown weathering siltstone interbeds occur. Upper contact is very poorly defined while the lower contact is believed always sharp. Over part of the area the Fort Creek is mapped with Imperial.

Upper Devonian - Imperial

The Imperial formation consists of an unknown thickness of flaky dark brown-grey shale with calcareous nodules and some grey-greenish grey, in part micaceous, sandstone and siltstone interbeds. Flute casts were often observed. Plant fragments were abundant while animal fossils were extremely rare.

54-1-(f) (i) a gravity survey was not conducted.

(ii) the aeromagnetic survey is discussed in three separate parts (see Plat #1)

JILL CREEK SECTION
BL-22-N60

JILL CREEK
BL-22 - 46-N60

LOCATION: Latitude 63° 48'
Longitude 125° 32'

0'-20'	Shale	medium to dark grey, weathering light to medium grey with rust, flaky to platy - 1/8" beds, silty, very slightly calcareous, very few interbeds of sandstone.
20'-50'	Shale	medium to dark grey, weathering light to medium grey with rust, flaky to platy - 1/8" beds, silty, very slightly calcareous, interbeds of medium grey-grey sandstone, 1/2" beds, weathering rust and medium grey, very slightly calcareous. These interbed every 2"-6" at bottom but rare at top.
50'-86'	Covered	Talus, probably as above.
86'-106'	Shale	dark grey to dark iron grey, non-calcareous, platy, soft, weathers light medium grey with interbeds non-calcareous sandstone, 1/8" thick every 6" approximately, medium grey, laminated, weathers rust brown-grey.
106'-280'	Covered	Probably as above.
280'-305'	Shale	silty, very slightly calcareous, dark grey, platy - 1/8" beds, fractured, weathers light-medium grey with rust. Interbeds of dark grey-dark red grey sandstone, very slightly calcareous, weathers rust, well bedded 1/2"-2" every 6"-1', approximately.
305'-387'	Covered	Probably as above.
387'-602'	Shale	Slump block. Silty, dark grey, very slightly calcareous, weathers light grey with rust, hackly fracture: interbeds of limestone and slightly calcareous sandstone. Limestone is maroon in some bands and medium grey in others.

387'-502' (cont'd)	Shale	Many bioclastic layers in these bands. Bands are up to 3"-4" thick and possibly occur every 3'-8' approximately; ostracods, brachiopods, pelecypods, ammonites, worm casts.
602' - 1467'	Covered	Probably as above.
1467'-1485'	Shale	Dark iron grey to dark grey brown, calcareous, weathering light grey, soft and chunky, ½"-1" beds, crumpled. Interbeds flaggy limestone, extremely fine, medium grey, iron stain, banded.
1485'-1500'	Shale	Dark iron grey to dark grey brown, calcareous, weathering light grey, soft and chunky, ½"-1" beds, crumpled. Interbeds flaggy limestone, extremely fine, medium grey, iron stain, banded. These beds and interbeds harbor abundant brachiopod fauna. 30-60%.
1500'-1520'	Limestone	Very shaly limestone, soft and chunky, weathers light grey rust, platy-flaggy bedded - up to 1".
1520'-1540'	Shale	Shale becoming siltier and shale is now green-grey with numerous 1' bands of medium grey limestone.
1540-1580'	Shale	Medium green grey to iron grey, calcareous, 1-1½" beds and chunky, weathers light grey, tinge green and iron grey.
1580'-1600'	Shale	very dark red to iron grey, calcareous, 1-1½" beds and chunky, weathers light grey, tinge green and iron grey.
1600'-1630'	Shale	medium green grey to iron grey , calcareous, 1-1½" beds and chunky, weathers light grey tinge green and iron grey.

1630'-1660'	Shale	Shale and shaly limestone. 2-3" interbeds of limestone with calcareous shale. Productids, ostracods, crinoid stems.
1660'-1720'	Shale	Silty, medium dark iron grey, calcareous, platy, soft, weathering light grey, some rust. Occastional 1' band calcareous siltstone weathering rust to grey and laminated.
1720'-1750'	Shale	50% covered. Shale, silty, calcareous, medium dark grey, beds $\frac{1}{4}$-$\frac{1}{2}$", fair bedding, but crumpled locally, minor 1" bands rust weathered siltstone, shale weathers light grey.
1750'-1780'	Shale	Silty shale, calcareous, medium dark grey, beds $\frac{1}{4}$-$\frac{1}{2}$", fair bedding, but crumpled locally, minor 1" bands rust weathered siltstone, shale weathers light grey.
1780'-1840'	Shale	Shale, silty, calcareous, medium dark grey, beds $\frac{1}{4}$-$\frac{1}{2}$", fair bedding, but crumpled locally, minor 1" bands rust weathered siltstone, shale weathers light grey.
1840'-1930'	Siltstone	Shaly siltstone, calcareous, medium dark grey, beds $\frac{1}{4}$-$\frac{1}{2}$", fair bedding, but crumpled locally, minor 1" bands rust weathered siltstone, shale weathers light grey.
1930'-1950'	Shale	Silty shale, calcareous, medium dark grey, beds $\frac{1}{4}$-$\frac{1}{2}$", fair bedding but crumpled locally, minor 1" bands rust weathered siltstone, shale weathers light grey.
1950'-1980'	Shale	Shale, silty, calcareous, medium dark grey, beds $\frac{1}{4}$-$\frac{1}{2}$", fair bedding but crumpled locally, minor 1" bands rust weathered siltstone, shale weathers light grey.

1980'-1990'	Shale	Silty shale, calcareous, medium grey, platy, fair bedding, weathers light grey with rust, rare 2" bands very fine grained sandstone, medium grey, calcareous, weathers rust.
1990'-2120'	Siltstone	Shaly siltstone, calcareous, medium grey, platy, fair bedding, weathers light grey with rust, rare 2" bands very fine grained sandstone, medium grey, calcareous, weathers rust.
2120'-2210'	Shale	Silty shale, calcareous, medium grey, platy, fair bedding up to 1" thick, hackly fractures, weathers light grey with rust, rare 2" bands very fine grained sandstone, medium grey, calcareous, weathers rust.
2210'-2240'	Shale	Silty shale, calcareous, medium grey, platy, fair bedding, weathers light grey with rust, rare 2 bands very fine grained sandstone, medium grey, calcareous, weathers rust.
2240'-2272'	Siltstone	Siltstone, shaly, calcareous, medium grey, platy, fair bedding, weathers light grey with rust; rare 2" bands very fine grained sandstone, medium grey, calcareous, weathers rust.
2272'-2405'	Covered	
2405'-2460'	Shale	medium grey, platy, calcareous, weathering light grey in beds 1/8" thick, well bedded, with interbeds calcareous siltstone, medium grey weathering rust grey, varying distance - 1-3', beds are up to 1' thick and laminated.
2460'-2480'	Shale	medium grey, platy, slightly calcareous, weathering light grey in beds 1/8" thick, well bedded, shaly siltstone 1/8-$\frac{1}{2}$" beds, some rust stain.

2480'-2500'	Shale	medium grey, platy, slightly calcareous, weathering light grey, in beds 1/8" thick, well bedded, becoming silty.
2500'-2520'	Shale	medium grey, platy, slightly calcareous, weathering light grey, in beds 1/8" thick, well bedded, with minor 1" bands siltstone, weathering iron grey.
2520'-2540'	Shale	medium grey, platy, slightly calcareous, weathering light grey, in beds 1/8" thick, well bedded.
2540'-2900'	Covered	Probably as above.
2900'-2940'	Shale	with calcareous interbeds of medium grey, fine grained limestone, probably fossiliferous, platy-flaky, weathering light grey, some rust; shale is non-calcareous, green tinge
2940'-2960'	Shale	shale, platy-flaky, weathering light grey, some rust, shale is non-calcareous with green tinge; shaly limestone band, very fossiliferous, flaggy, extremely fine crystalline, medium grey, rubbly
2960'-2980'	Shale	shale, platy-flaky, weathering light grey, some rust, shale is non-calcareous with green tinge; fossiliferous limestone band.
2980'-3000'	Shale	shale, platy-flaky, weathering light grey, some rust, shale is non-calcareous with green tinge; less interbeds
3000'-3034'	Shale	shale with calcareous interbeds of medium grey, fine grained limestone, probably fossiliferous, platy-flaky, weathering light grey, some rust, shale is non-calcareous with green tinge. 50% covered.

3034'-3130'	Covered	
3130'-3150'	Limestone	Shaly limestone and calcareous sandstone, limestone is medium grey, thin-platy bedded, rubbly, weathering light grey-rust, fossiliferous - brachiopods, worm tracks?, raindrop impressions, some rust stain and ?pyrite; sandstone is fine grained, banded and laminated, medium grey-red, some bands bioclastic, calcareous shale partings, flaky and medium grey with green tinge; brachiopods, pelecypods, ostracods.
3150'-3167'	Limestone	Shaly limestone and calcareous sandstone, limestone is medium grey, thin-platy bedded, rubbly, weathering light grey-rust, fossiliferous- brachiopods, worm tracks?, raindrop impressions, some rust stain and?pyrite: sandstone is fine grained, banded and laminated, medium grey-red, some bands bioclastic, calcareous shale partings, flaky and medium grey with green tinge
3167'-3190'	Shale	medium green grey, flaky, calcareous, weathering light grey-green-medium grey, with numerous interbeds of bioclastic ?sandstone and fine grained, medium grey sandstone - approximately every 6"-10", interbedding weathers rust grey.
3190'-3220'	Shale	dark grey-medium grey, green tinge, flaky, very thin bedded, non-calcareous, weathering light medium grey with rust. Interbeds fine grained calcareous sandstone, dark red, weathers dark rust, grey, wavy laminations, platy bedded, some up to 3"-4". Fossil bands lens out into shale-they are not continuous-perhaps up to 30' at least.

3220'-3250'	Shale	dark grey-medium grey, flaky, very thin bedded, non-calcareous, weathering light medium grey with rust; interbeds of fine grained calcareous sandstone, dark red, weathering dark rust, grey, wavy laminations, platy bedded, some up to 3"-4". Fossil interbeds present also.
3250'-3280'	Shale	dark grey-medium grey, flaky, very thin bedded, non-calcareous, weathering light medium grey with rust; interbeds of fine grained red sandstone, some containing abundant brachiopods and/or ostracods and gastropods. Interbed every 6"-10" - they are 1"-3" thick.
3280'-3310'	Shale	dark grey-medium grey, flaky, very thin bedded, non-calcareous, weathering light medium grey with rust; very few interbeds of light maroon sandstone.
3310'-3336'	Shale	dark grey-medium grey, flaky, very thin bedded, non-calcareous, weathering light medium grey with rust; interbeds of fine grained calcareous sandstone, dark red, weathering dark rust grey, wavy laminations, platy bedded, some up to 3"-4".
3336'-3408'	Covered	
3408'-3448'	Shale	Silty shale, dark grey, non-calcareous, platy-flaky, weathers dark rust-medium grey, with minor interbeds of maroon-purple, calcareous fine grained sandstone with wavy laminations.
3448'-3580'	Covered	
3580'-3600'	Siltstone	Shaly siltstone, with minor thin ($\frac{1}{2}$") beds of sandstone at top.

3600'-3630'	Siltstone	Shaly siltstone
3630'-3660'	Siltstone	Shaly siltstone, with fine grained calcareous sandstone interbed, weathering rust grey, laminations-wavy and discontinuous on weathered surface. Sandstone band carries 1-3' band of bioclastic material.
3660'-3690'	Siltstone	Shaly siltstone, frequent interbeds of fine grained calcareous sandstone, weathering rust grey, laminated - wavy and discontinuous on weathered surface.
3690'-3720'	Siltstone	Shaly siltstone, with fine grained calcareous sandstone interbeds, weathering rust grey, laminated - wavy and discontinuous on weathered surface.
3720'-3750'	Shale	flaky, non-calcareous, weathering medium rust grey, fair bedding, hackly
3750'-3780'	Siltstone	Siltstone becoming shalier, dark grey-black, non-calcareous, weathers medium grey-light rust, platy to hackly, thin bedded ($\frac{1}{2}$-$\frac{1}{4}$").
3780'-3820'	Siltstone	Shaly siltstone, dark grey-black, non-calcareous, weathers medium grey-light rust, platy to hackly, thin bedded ($\frac{1}{2}$-$\frac{1}{4}$"). Rare calcareous sandstone interbed with symmetrical ripple marks - probably wave, wave length 3", amplitude $\frac{1}{4}$".
3820'-3840'	Siltstone	Shaly siltstone, dark grey black, non-calcareous, very thin bedded (1/8-$\frac{1}{4}$"), platy, hackly, weathers medium grey. 3' band medium grey, fine grained calcareous sandstone, weathers rust grey - banded.

3840'-3860'	Shale	Less silty
3860'-3930'	Covered across Creek	
3930'-3970'	Siltstone	Shaly siltstone, dark grey-black, non-calcareous, very thin bedded (1/8-¼") platy, hackly, weathers medium grey. Very platy in places with 1" interbeds of "iron sandstone" (every 6').
3970'-3992'	Siltstone	Shaly siltstone, dark grey-black, non-calcareous, very thin bedded (1/8-¼"), platy, hackly, weathers medium grey. Interbeds of calcareous sandstone or very fine grained sandstone, dark grey-black with bluish "lustre" containing abundant brachiopods, cyrtospirifers, pelecypods, ?ostracods. Frequency of these beds 3-5 in 20'-30' intervals. Weather dark rust grey and break easily. Fossils well preserved in these bands.
3992'-4140'	Covered	
4140'-4350'	Shale	Black, flaky, well bedded, slightly calcareous to non-calcareous, slightly silty in places, weathers medium grey, very little rust. Interbeds of very fine grained sandstone, medium to dark grey, frequency very small - 1" band every 10-15' shale. Some rust-stained concretionary layers about every 5-10', about ½" in diameter and parallel to bedding.
4350'-4360'	Covered	
4360'-4400'	Shale	Silty(?), medium grey, non-calcareous, flaky, platy in part, weathers medium grey, some iron stain, well bedded-very thin, laminated faintly. With 2' band dark grey sandstone, laminated, very fine grained, weathers dark rust grey.

4400'-4620'	Shale	Silty(?), medium grey, non-calcareous, flaky, platy in part, weathers medium grey, some iron stain, well bedded - very thin, laminated faintly. Interbeds of very fine grained sandstone, dark grey, laminated and/or bands, IA tr III, weathers dark rust grey, laminations wavy in places. Frequency of interbeds vary - thickness usually about 2-4" and occuring approximately every 3-10'.
4620'-4660'	Shale	Silty shale, platy, dark grey, well bedded, weathers medium grey, non-calcareous, rust stained, laminated. Sandstone or siltstone interbeds are laminated and present approximately every 1½'.
4660'-4690'	Shale	Silty shale, platy, dark grey, well bedded, weathers medium grey, non-calcareous, rust stained, laminated. 3' band, medium green-purple very slightly calcareous sandstone, flaggy.
4690'-4745'	Shale	Silty shale, platy, dark grey, well bedded, weathers medium grey, non-calcareous, rust stained, laminated. Interbeds of silty shale and siltstone. Siltstone beds 1-2" thick, shale is flaky.
4745'-4795'	Shale	Silty shale, platy, dark grey, well bedded, weathers medium grey, non-calcareous, rust stained, laminated.
4795'-5100'	Covered	
5100'-5280'	Shale	Maybe slightly silty, flaky, very thin bedded, non-calcareous, weathers medium grey with rust stains.

5280'-5310'	Shale	Silty shale, non-calcareous, dark grey-black, very thin bedded, flaky-platy, weathers medium grey with rust, no nodules in siltstone interbed.
5310'-5340'	Shale	Silty shale, non-calcareous, dark grey-black, very thin bedded, flaky-platy, weathers medium grey with rust, occasional interbed (6" thick) of dark grey siltstone with nodules as below, weathers dark rust-grey, banded.
5340'-5370'	Siltstone	Medium grey, non-calcareous, laminated, platy, well bedded, fractured, weathers medium grey, 3' massive sandstone, very fine grained, non-calcareous, weathers medium grey, 6' band dark grey, calcareous sandstone with nodules and dark rust-grey weathering.
5370'-5421'	Siltstone	Medium grey, non-calcareous, laminated, platy, well bedded, fractured, weathers medium grey, interbeds of flaggy siltstone approximately 4"-6" to 3-4' of platy siltstone. 50% covered by creek and talus. At 5370 small spiriferoids found in medium grey siltstone in talus.
5421'-5435'	Sandstone	Medium grey, very fine grained, very slightly calcareous, laminated, 3-4", well bedded, interbeds of siltstone, platy-flaky; weathers medium grey. 5' massive sandstone unit at ttop, laminated, very fine grained IA, weathers medium grey - some iron staining.
5435'-5490'	Sandstone	Medium grey, fine grained, lamn - ated, IA, cross-bedded, flaggy-blocky, slightly calcareous, fair bedding, weathers medium grey (some blood-red staining). Few siltstone interbeds and no nodules.

5490'-5520'	Sandstone	Medium grey, fine grained, laminated, IA, cross-bedded, flaggy-blocky, slightly calcareous, fair bedding, weathers medium grey (some blood-red staining). 2' platy siltstone band, occasional 4-6" band with nodules, scattered chert nodules, less than 1%.
5520'-5567'	Sandstone	Silty with 8' blocky medium grey sandstone interbed, no fossils, weathers dark grey, cross-bedded and laminated.
5567'-5590'	Sandstone	Sandstone, medium grey, platy, well bedded, non-calcareous, dark weathering interbeds containing nodules only present in top 10' remainder is platy siltstone or sandstone (very fine grained). 2' sandstone band.
5590'-5620'	Sandstone	Sandstone, medium grey, platy, well bedded, non-calcareous, some flaggy beds of dark grey sandstone, calcareous, weathers dark iron red and several containing nodules. Interbeds of this about every 6' - blood-red stain on weathered surface.
5620'-5655'	Sandstone	Medium grey, platy, well bedded, non-calcareous, rare shaly interbeds, weathers dark grey.
5655'-5672'	Sandstone	medium grey, very slightly calcareous, well bedded, platy at bottom but at top is interbedded with blocky sandstone, laminated, very fine grained. Weathers dark iron-grey. Several 3"-5" bands of dark grey sandstone at top with 40-60% small nodules and fossil fragments. Nodules sub-spherical to sub-elliptical with concentric rings.

5672'-5700'	Sandstone	Medium grey, platy to flaggy, 3-5" dark grey calcareous sandstone with chert nodules, small cup corals and brachiopods.
5700'-5727'	Sandstone	medium grey, very fine grained, laminated faintly, massive, some flaggy bedded, fair bedding, cross-beds rare with less than 2-6° - planar type. Weathering medium brown grey.
5727'-5772'	Sandstone	Medium grey, non-calcareous, flaggy, banded, tabular, well bedded, weathering light brown-medium grey. Lower 20' concealed.
5772'-5810'	Siltstone-Sandstone	Medium grey, slightly calcareous, thin bedded ($\frac{1}{2}$-2"), well bedded, platy, weathering medium grey-light grey, becoming more massive at top. Laminations visible.
5810'-5840'	Siltstone	Medium-dark grey, very thin bedded (1/8-1/16"), well bedded, non-calcareous, platy to flaky, fractured, weathering medium brown grey. No massive sandstone bands and very little flaky shaly siltstone. Mostly siltstone $\frac{1}{2}$" bedding.
5840'-5870'	Siltstone	Medium-dark grey, very thin bedded (1/8-1/16"), well bedded, non-calcareous, platy to flaky, fractured, weathering medium brown grey. 2-2' bands of blocky calcareous sandstone, medium grey, very fine-fine grained, containing rare brach(?) shells - seen in cross-section only; weathers dark brown grey, rusty.

5870'-5933'	Siltstone	Medium-dark grey, very thin bedded (1/8-1/16"), well bedded, non-calcareous, platy to flaky, fractured, weathering medium brown grey, interbeds of denser siltstone ($\frac{1}{2}$-3/4") approximately every 1'. "Worm trails" or the like visible on slabs - 1/8-$\frac{1}{4}$" x 2-3". Minor iron staining. Siltstone may be shaly.
5933'-6725'	Covered	
6725'-6810'	Sandstone	Medium grey, very fine grained, IA, flaggy, breaks into $\frac{1}{2}$" thick plates, non-calcareous, weathers light brown-medium grey, laminated, well bedded, interbedded with siltstone (approximately every 1'), medium grey, platy, non-calcareous, weathers light brown-medium grey, laminated. No crumpling visible.
6810'-6870'	Sandstone	Medium grey, very fine grained, IA, flaggy, breaks into $\frac{1}{2}$" thick plates, non-calcareous, weathers light brown-medium grey, laminated, well bedded, interbedded with siltstone (approximately every 1'), medium grey, platy, non-calcareous, weathers light brown-medium grey, laminated. Minor flaky, silty shale partings.
6870'-6900'	Sandstone	Medium grey, very fine grained, IA, flaggy, breaks into $\frac{1}{2}$" thick plates, non-calcareous, weathers light brown-medium grey, laminated, well bedded, interbedded with siltstone (approximately every 1'), medium grey, platy, non-calcareous, weathers light brown-medium grey, laminated. Beds locally crumpled and fractured. Convulute laminations in siltstone.

Total thickness 6900'

C-D BROOK
BL-20-N60

Latitude: 63° 42' N.
Longitude: 125° 32' W.

0-33'	Shale	medium brown grey, slightly calcareous, hackly and flaky, 3-4' of calcareous flaggy, rubbly ?limestone, weathers light-medium grey brown.
33-190'	Covered	
190-268'	Shale	Medium grey, non-calcareous, hackly, very thin-platy, weathers light-medium grey.
268'-540'	Covered	
540'-570'	Shale	medium grey, non-calcareous, blocky, very thin bedded, some beds up to ½", weathering light-medium grey - some light brown.
570'-745'	Shale	medium grey, very thin, flaky, weathers light-medium grey, non-calcareous.
745'-1030'	Covered	
1030'-1070'	Shale & Siltstone	approximately 5" siltstone and 1' shale, medium-dark grey, non-calcareous.
1070'-1100'	Siltstone	medium-dark grey, very thin bedded, platy, non-calcareous, shaly, weathers medium grey, mostly covered.
1100'-1110'	Sandstone	medium grey, extremely fine, non-calcareous, slabby, with shaly siltstone interbeds (1-4"), weathers medium grey, poor exposure.
1110'-1120'	Siltstone	shaly, medium-dark grey, thin bedded, hackly-platy, laminated, non-calcareous, weathers medium grey, with some rust.

1120'-1140'	Siltstone	shaly, medium-dark grey, thin bedded, hackly-platy, laminated, non-calcareous, weathers medium grey with some rust. A 1' band of fossiliferous calcareous ?sandstone, vuggy weathering surface. Small brachiopods, ?spirifers, gastropods and ?crinoids abundant in this band.
1140'-1165'	Covered	
1165'-1175'	Siltstone	medium grey, IAtrIII, thin-flaggy, platy, thin laminations, non-calcareous, weathering medium brown grey with rust.
1175'-1191'	Covered	
1191'-1200'	Sandstone	light-medium green-grey, very fine to fine, blocky, laminated, non-calcareous, weathers medium grey
1200'-1213'	Shale	with interbeds of sandstone, weathers medium grey and rust, sandstone is laminated, shale is platy-flaky.
1213'-1240'	Sandstone	medium green-grey, very fine to fine, blocky, weathering medium grey, laminated, non-calcareous. Porosity IAtrIII. Minerals in rock - iron, light and dark grains.
1240'-1320'	Sandstone	medium grey, slabby, non-calcareous, very fine grained, with interbeds of shaly siltstone, most of sandstone is laminated and some interbeds of siltstone are slightly calcareous. Accessory-mica?
1320'-1330'	Sandstone	medium grey, slabby, non-calcareous, very fine grained, 1-2" beds of non-calcareous shale, platy, weathers medium rust grey, laminated.

1330'-1393'	Siltstone & Shale	Interbedded siltstone and shale, shale predominant, medium-dark grey, platy, non-calcareous, weathers medium grey.
1393'-1405'	Sandstone	very fine to fine, medium grey, flaggy-slabby, 1-4" interbeds of siltstone: slightly calcareous, chert nodules, elongate ¼" x ½" - some smaller. Weathers medium with some brown.
1405'-1430'	Shale	silty, very thin bedded, medium-dark grey, non-calcareous, hackly fractures, weathers medium grey, laminations - probably mostly siltstone.
1430'-1460'	Siltstone	with interbeds of shale, siltstone is medium-dark grey, flaggy, laminated, non-calcareous, shale is platy, dark grey, weathers medium grey, gently undulating here; hackly fracture.
1460'-1470'	Sandstone	slabby-medium green grey, very fine, trIII, faint laminations and/or banded, weathers medium green grey, with some rust, interbeds of siltstone and shale-minor. At top of this bed - slightly calcareous with ?crinoid ossicles.
1470'-1490'	Siltstone	with interbeds of shale, non-calcareous, weathers medium grey.
1490'-1520'	Shale	silty, interbeds of silty shale and shale approximately every 2-6", with 1' very fine sandstone. Medium grey-dark grey, weathering medium grey-dark red or rust, platy, well bedded.

1520'-1545'	Shale	silty, interbeds of silty shale and shale approximately every 2-6", medium-dark grey, weathers medium grey-dark red or rust, platy, well bedded.
1545'-1565'	Siltstone	medium grey, very fine, IAtrIII, blocky-slabby, minor shaly partings, weathers medium grey with some rusty, very slightly calcareous, less than 1% calcite veins.
1565'-1590'	Shale	dark grey-black, fainly laminated, very thin platy to flaky, weathers medium grey with rust, non-calcareous. With minor interbeds of siltstone (1-3").
1590'-1606'	Shale	dark grey-black, faintly laminated, very thin platy to flaky, weathers medium grey with rust, non-calcareous.
1606'-1620'	Siltstone	medium dark grey, weathers medium grey with some rust, with blocky beds of siltstone, slightly calcareous.
1620'-1640'	Siltstone	medium darkgrey, weathers medium grey with some rust, with flaggy to slabby interbeds of siltstone-sandstone.
1640'-1720'	Siltstone	medium dark grey, weathers medium grey with some rust, shaly interbeds (1-5") every 1-2'.
1720'-1780'	Siltstone	medium dark grey, platy, tabular, non-calcareous, shaly, weathering medium grey with some rust, contorted.
1780'-1820'	Siltstone	shaly, medium dark grey, non-calcareous, very thin to flaggy, weathers light-medium grey, poor bedding, badly fractured, not platy as below but tabular.

1820'-1840'	Shale	medium-dark grey, non calcareous, weathers medium grey, hackly and there are rare siltstone bands - flaggy and weather medium rust grey
1840'-1860'	Shale	medium-dark grey, non-calcareous, very thin bedded, platy, some flaky and hackly, weathers medium grey - may have been silty - poor outcrop.
1860'-1890'	Covered	
1890'-1900'	Siltstone	medium grey, non-calcareous, platy to flaggy (rare), some shale partings, faint thin laminations and cross bed(?), weathers light-medium brown, some rust. Siltstone is almost invariably porous to some extent having trace in all cases.
1900'-1940'	Siltstone	medium grey. becoming much more argillaceous, rock is almost flaky and very platy, some surface vugs but probably from stream erosion, faint thin laminations and cross bed(?), weathers light-medium brown, some rust.
1940'-1980'	Siltstone	medium grey, non-calcareous, platy to flaggy(rare), some shaly partings, faint thin laminations, and cross bed(?), weathers light-medium brown, some rust, badly contorted here.
1980'-2000'	Siltstone	medium grey, porosity trace to poor, very thin bedded and very platy. laminations in part, weathers light-medium grey. Some flaggy beds of siltstone. All contains white, black and rust spots - probably mineral grains. Grains can barely be seen with lens - ?sandstone.

2000'-2020'	Siltstone	medium grey, porosity trace to poor, very thin bedding and very platy, weathers light-medium grey. Some flaggy beds of siltstone. All contains white, black and rust spots - probably mineral grains. Grains can barely be seen with lens - ?sandstone.
2020'-2067'	Shale	silty, medium dark grey, very thin bedded, non-calcareous, weathering medium grey with some rust, some bands with rust, platy to tabular in more silty beds.
2067'-2100'	Covered	
2100'-2250'	Shale	medium-dark grey, platy to flaky, very thin bedded, non-calcareous, weathering medium grey-much iron staining, porosity poor-fair, fractured. Poor outcrop.
2250'-2400'	Shale	medium-dark grey, non-calcareous, hackly, badly fractured, weathers medium grey with some rust.
2400'-2420'	Siltstone	medium grey, non-calcareous, platy becoming thinner and platy near bottom - probably more shaly. weathers light-medium grey, fractured, extremely fine - very fine grained - some light and dark grains visible. III
2420'-2430'	Siltstone	medium grey, non-calcareous, platy, very thin bedded, weathers light-medium grey, fractured, extremely fine-very fine grained, some light and dark grains visible. III.
2430'-2470'	Covered	

2470'-2570'	Shale	medium-dark grey, flaky to hackly, very thin bedded, weathers medium grey, some rust or iron staining. Porosity poor, maybe silty in places.
2570'-2630'	Shale	medium-dark grey, flaky to hackly, very thin bedded, weathers medium grey, some rust or iron staining, porosity poor, non-calcareous
2630'-2750'	Covered	
2750'-2840'	Shale	medium dark grey, non-calcareous, hackly to platy, very thin bedded, occasional beds of medium grey shaly siltstone, weathers medium brown, iron stained in places, fractured, Porosity IA.
2840'-2960'	Shale	medium-dark grey, non-calcareous, hackly, very thin bedded, weathers medium grey, IA. Probably considerable amount platy siltstone beds here. 1"-2" every 2'-3'.
2960'-2990'	Shale	medium-dark grey, non-calcareous, hackly, very thin bedded, weathers medium grey. IA.
2990'-3040'	Siltstone	shaly, medium-dark grey, very thin bedded - platy, weathers medium grey, non-calcareous, IA trIII - much contorted.
3040'-3130'	Shale	dark grey-black, flaky to platy, non-calcareous, very thin bedded, weathers medium grey-medium brown.
3130'-3200'	Siltstone	shaly, platy, medium grey, non-calcareous, weathers medium grey, some rust brown, fractured into plates here.

3200'-3260'	Shale	silty, medium-dark grey, non-calcareous, platy to hackly, very thin bedded, weathers medium grey, minor rust brown.
3260'-3290'	Mostly covered - taken from talus	
3290'-3320'	Shale	Mostly covered, medium-dark grey, very slightly calcareous, hackly, weathers medium grey, fractured, may be silty.
3320'-3350'	Shale	medium-dark grey, very slightly calcareous, hackly, weathers medium grey, fractured, may be silty.
3350'-3360'	Siltstone	medium grey-dark grey, flaggy, some very platy beds, weathers medium grey with some rust, very slightly calcareous, shaly
3360'-3370'	Siltstone	medium grey-dark grey, flaggy, non-calcareous, diseminated metallic mineral accessories, some very platy beds, weathers medium grey with some rust.
3370'-3380'	Shale-Siltstone	medium grey, extremely fine grained shiny mineral accessories very platy, very thinly bedded, weathers medium grey.
3380'-3410'	Shale	medium grey, slightly calcareous, hackly, very thin bedded, weathers medium grey, some rust.
3410'-3440'	Shale-Siltstone	medium grey, platy, very thin bedded, weathers medium grey, patches rust brown, very slightly calcareous, Porosity IAtrIII
3440'-3470'	Shale	medium grey, fractured, hackly, slightly calcareous, weathers medium grey, dark red stain present in places.

3470'-3500'	Shale	medium grey, fractured, hackly, slightly calcareous, weathers medium grey.
3500'-3560'	Shale	medium grey, platy to flaky, non calcareous, weathers medium grey; rust stained, fractured.
3560'-3680'	Shale	medium-dark grey, very flaky, flaky weathering too, non-calcareous, medium grey weathering with rust stain.
3680'-3710'	Siltstone	medium-dark grey, shaly interbeds more numerous and siltstone is flaggy, very little blocky.
3710'-3770'	Siltstone	medium-dark grey, poor-fair porosity, shaly interbeds are probably siltstone but are very platy.
3770'-3780'	Siltstone	medium-dark grey, IAtrIII, blocky, fair bedding with shaly partings, non-calcareous, jointed.
3780'-3850'	Siltstone	blocky, shaly, medium dark grey, weathers medium rust brown, less than 1% pyrite. Porosity IAtrIII.
3850'-3870'	Shale	black, non-calcareous, flaky, weathers medium grey with some rust, interbeds of siltstone with shale partings
3870'-3911'	Shale	black, non-calcareous, flaky, weathers medium grey with some rust, rare interbeds of flaggy siltstone.
3911'-3925'	Siltstone	medium dark grey, non-calcareous, weathers medium rust grey, blocky, fair bedding with minor shale partings.
3925'-3970'	Shale	black, flaky, non-calcareous, weathers medium-dark grey.

3970'-3990'	Siltstone	black, non-calcareous, weathers medium brown grey with some rust, platy with more interbeds of flaky shale .
3990'-4030'	Siltstone	black, non-calcareous, flaggy, weathers medium brown grey with some rust, some shaly interbeds, locally contorted.
4030'-4090'	Shale	black, non-calcareous, platy and flaky, weathers medium grey brown with minor lens of yellow and orange, well bedded, some chunky interbeds. Stream had orange deposit in bed here.
4090'-4250'	Shale-Siltstone	black, flaggy, chunky, non-calcareous, yellow and rust hues not dominant here. Well bedded, weathers brown, medium-dark grey. Diamond-shaped when broken.
4250'-4270'	Shale	non-calcareous, dark grey, black, well bedded, sometimes flaky, other times chunky, weathers yellow, iron - varied hues of these colors and medium grey brown
4270'-4330'	Shale	dark grey, very thin, platy, hackly fracture (flaky shale), non-calcareous, weathers medium brown with some yellow, some iron staining.
4330'-4350'	Shale	shaly siltstone interbeds; dark grey-black, platy, flaggy very thinly and faintly laminated, calcareous concretions.
4350'-4410'	Shale	dark grey-black, platy, flaggy, large sub-spherical concretions, concretions are calcareous with 10-15% disseminated pyrite in flatter ones.

4410'-4430'	Shale	with shaly siltstone interbeds; dark grey-black, platy, flaggy, very thinly and faintly laminated, slightly calcareous to calcareous, fractures at 60° angle when hit. Rare concretions. Weathers medium-dark grey minor iron and CO_3 stain.
4430'-4460'	Shale	black, calcareous, platy, very thin, medium dark grey, weathering; well bedded, with pellets within shale which look very much like "292 tablets", rust weathering around them.
4460'-4490'	Shale	black, calcareous, platy, very thin, medium dark grey weathering, well bedded, two fracture directions.
4490'-4500'	Limestone	dark grey-black, blocky, rubbly, 1-3% calcite veins, light-medium grey brown weathering.
4500'-4510'	Limestone	dark grey-black, blocky, rubbly, 1-3% calcite veins, light-medium grey brown weathering, colony corals on bedding planes.
4510'-4580'	Limestone	dark grey-black, IA, blocky, rubbly bedded, 10% calcite veining, light grey brown weathering. Fossils - Spinatrypa, Hexagonaria, simple rugose corals

Total thickness - 4580'

MOUNTAIN RIVER SECTION
CM-3001 & 3001A-N60

MOUNTAIN RIVER
CM-3001 & 3001A-N60

Latitude: 65°14.5'-65°15'N
Longitude: 128°36'-128°38'W

0-10'	Sandstone	very fine to fine, dark grey, very slightly calcareous, possible lithic, large percentage of argillaceous material and possibly micaceous. Weathers rusty brown to iron stain, slabby. Contains two four-inch beds of fissile shale at about 4-6 feet in interval 0-10'. Shale fissile, rough and soft - dark grey. No porosity.
10'-18'	Sandstone	very fine to fine, dark grey, very slightly calcareous, possible lithic, large percentage of argillaceous material and possibly micaceous. Weathers rusty brown to iron stain, slabby. Some small 1-2" shaly interbeds. No porosity.
18'-20'	Shale	dark grey, silty, micaceous, fissile, rough, soft, weathers medium grey-brown. No porosity.
20'-31'	Sandstone	medium to dark grey, slightly micaceous, very fine, slabby, interbedded shale (fissile), argillaceous, iron staining, weathers medium rusty brown. No porosity.
31'-131'	Covered interval	
131'-140'	Shale	very dark grey, fissile, slightly calcareous, white, powdery possibly evaporitic substance on weathered surface. Weathers dark grey with heavy rusty stain on bedding planes. Brittle. Trace of flattened - ellipsoidal concretions, silty - siliceous?, slightly calcareous.

140'-152.5'	Shale	dark grey, non-calcareous, more fissile, weathering dark grey with heavy rusty stain on bedding planes, trace of greenish stain, brittle. Contains two 4-5" bands of calcareous shale as above.
152.5'-156'	Shale	fissile, brittle, non-calcareous, dark grey, weathers rusty-greenish-dark grey. Contains anhydritic? powder on surface. Top 2" of interval is an ellipsoidal concretionary zone. Concretions are silty, slightly calcareous with calcite fractures. Weathers rusty. Bottom 10" also concretions up to 2' diameter. Possible some ironstone concretions. Bedding of shale goes around concretions.
156'-167'	Shale	dark grey, non-calcareous, platy under surface but weathers fissile on surface. Heavy iron rust stain on weathered surface, brittle, medium roughness.
167'-177'	Shale	dark grey, non-calcareous, top two feet contain platy shale, possibly more silty and is slightly calcareous.
177'-185'	Shale	dark grey, non-calcareous, platy under surface but weathers fissile on surface. Heavy iron rust stain on weathered surface, brittle, medium roughness. Last 29' of 157-185' interval has at some localities a definite yellow green stain on weathered surface.
185'-210	Shale	dark grey, medium rough, brittle-non-calcareous but contains a few less than 3" bands of platy, slightly calcareous shale. Weathering color dark grey-rusty-yellowish green. Yellowish-green most distinctive in some places. Iron stain.

210'-214.5'	Shale	dark grey, papery fissile, non-calcareous, brittle, weathering dark grey-rusty-greenish-yellow. Top 6" of interval platy, hard shale, possibly some siliceous cement weathers yellow-orange, iron staining.
214.5'-223'	Shale	dark grey, hard, platy, concoidal fractures, smooth, siliceous. Weathers orange-yellow. Bottom 2' papery thin, fissile, non-calcareous shale. Iron staining along bedding planes.
223'-234'	Shale	Top 7" limestone, heavy argillaceous content, slabby, very fine crystalline, no porosity. Remainder shale, dark grey, hard, platy, concoidal fractures, smooth, siliceous. Weathers orange-yellow.
234'-264'	Shale	Top 7" limestone band, heavy argillaceous content, slabby, very fine crystalline, no porosity. Remainder shale, platy, hard, concoidal fractures, dark grey, smooth, weathers orange-yellow, rusty, greenish and dark grey. In general a yellowish green color. Heavily iron stained along bedding plane.
264'-268'	Shale	Top 1½' - limestone, calcareous, slabby, very fine crystalline, no porosity, dark grey, heavily argillaceous, weathers medium grey. Bottom 2½' - shale, fissile, platy, hard, non-calcareous, dark grey, weathers a definite rusty color. Possible a high iron content.

268'-298'	Shale	hard, very dark grey, siliceous, some iron staining, platy, weathers yellowish green, concoidal fracture. Weathering surface has a cubical appearance with cubes up to 1" on a side. One 6" diameter concretion seen.
298'-308'	Shale	hard, very dark grey, siliceous, some iron staining, platy, weathers yellowish green, concoidal fracture. Weathering surface has a cubical appearance. Interbeds of the following: 6" - Limestone band, very fine crystalline, very argillaceous and slabby. 6" - dark grey non-calcareous poker chip, possibly bituminous bed - shale. 6" - shale, fissile, very heavily iron stained, rusty weathering, non-calcareous.
308'-318'	Shale	dark grey, fissile, grading into a platy, poker chip shale, slightly calcareous with iron staining. Weathers dark grey with some rust, medium rough and hardness.
318'-356'	Shale	dark grey, slightly calcareous with interbeds of more or less calcareous concretions, fissile, poker chip platy interbeds, brittle - hard, medium rough, very good iron stain. Weathers rusty-brown with tinges of yellowish green. Contains traces of evaporite-filled fractures and bedding planes (anhydrite?).

356'-360'	Shale	very dark grey to black, soft, fissile to platy, calcareous, anhydritic weathering and in fractures and along bedding planes. Weathering color black. Possibly bituminous? Scattered concretions and iron staining.
360'-377'	Shale	dark grey-black, soft, fissile, good calcareous content, rough, superficial anhydritic substance on surface and in fractures. Weathers black, bituminous?
377'-382'	Shale	dark grey-black, appears platy but weathers fissile, rough, calcareous, superficial anhydrite, rough, bituminous?
382'-392'	Shale	dark grey-black, appears platy but weathers fissile, rough, calcareous, superficial anhydrite, rough, bituminous?, iron staining, scattered concretions.
392'-432'	Shale	dark grey-black, appears platy but weathers fissile, rough, calcareous, superficial anhydrite, rough, bituminous? , trace iron staining, scattered concretions.
432'-442'	Shale	medium grey-dark grey, bituminous?, very calcareous, very soft fissile, trace of superficial anhydrite on surface. This is interbedded with 4-6" bands of limestone every 2-3 feet. Limestone very fine crystalline, medium-dark grey, slabby-platy, no porosity, contains calcite fractures. Weathers medium grey. Beds contain scattered contretions. Limestone very argillaceous.

442'-465'	Shale	medium grey-dark grey, bituminous?, very calcareous, very soft fissile, trace of superficial anhydrite on surface. This is interbedded with 4-6" bands of limestone every 2-3 feet. Limestone very fine crystalline, medium-dark grey, slabby-platy, no porosity, contains calcite fractures. Weathers medium grey. Beds contain scattered concretions. Limestone very argillaceous.
465'-468'	Shale	dark grey to black, fissile-platy, very calcareous, superficial anhydrite on surface, weathers dark grey to black, medium soft, rough, contains brachiopods.
468'-475'	Limestone	medium-dark grey, platy, with 2-3 interbeds of blocky limestone and some interbeds of fissile shaly-lime. Limestone extremely fine to very fine crystalline, no porosity. Fossil brachiopods, weathers medium grey-buff.
475'-511.5'	Shale-Limestone	Interbedded black shale and dark grey limestone. Shale in beds 1-3' thick, fissile/platy, very calcareous, hard, cross fractured, weathers dark grey, splintery or fine chips. Limestone in beds up to 2' thick, hard, tight, fossiliferous, fine crystalline, with trace of pyrite, tight, trace ironstain, fractures filled with calcite. Scattered cigar-shaped concretions parallel to bedding plane. Trace anhydrite? in fractures.
511.5'-597'	Covered interval	

597'-607'	Shale	medium to dark grey, very fissile, micaceous, calcareous, with interbeds of very thin brown weathering, fossiliferous beds of mic aceous, slightly silty, very calcareous shale. Trace limestone beds, medium to dark grey, weathers light grey, very argillaceous, platy, well fractured, tight, fine crystalline.
607'-617'	Shale	medium grey, calcareous, very fissile, weathers white to light grey and rusty. Exposure is well weathered, some of shale may alter to a clay, white weathering material may be anhydrite or gypsum, it lies along fractures and bedding planes.
617'-627'	Shale	medium grey, calcareous, very fissile, weathers white to light grey and rusty. Exposure is well weathered, some of shale may alter to a clay, white weathering material may be anhydrite or gypsum, it lies along fractures and bedding planes. Several streaks less than 3" thick of very calcareous, more resistant, slightly silty? shale (may grade to argillaceous limestone in part), weathers rust, tentaculites.
627'-650.5'	Shale	medium grey, calcareous, very fissile, weathers white to light grey and rusty. Exposure is well weathered, some of shale may alter to a clay, white weathering material may be anhydrite or gypsum, it lies along fractures and bedding planes. Fossiliferous.
650.5'-661	Shale	95% of outcrop, fissile, soft, slightly calcareous with calcareous matrix in fractures, weathers rusty to black with scattered lenses and 2"-4" beds of black - dark grey, argillaceous limestone.

661'-670'	Shale	fissile, soft, slightly calcareous with calcareous matrix in fractures, weathers rusty to black with scattered lenses and concretions in black to dark grey, argillaceous limestone.
670'-678'	Limestone-Shale	Limestone - medium grey, hard, tight, microcrystalline, very fossiliferous with brachiopods and corals; blocky, weathering light grey buff. Shale - hard, very calcareous, medium grey, fissile.
678'-689'	Limestone	dark grey, very fine crystalline, hard, rubbly, slabby, tight, weathers yellowish grey, very fossiliferous with brachiopods and colonial corals.
689'-711'	Covered interval.	
711'-721'	Limestone	microcrystalline to extremely fine crystalline, dark grey, blocky, possibly fracture porosity? many calcite fractures (healed). Weathers medium grey, weathered surface contains non-orientated groves less than $\frac{1}{2}$" which intersect at the highest individual hummocks. Also basin-like features on weathered surface, all this looks like wind erosion. Rubbly bedding planes.
721'-761'	Limestone	microcrystalline to extremely fine crystalline, medium-dark grey brown, blocky, calcite fractures, no porosity, weathers medium grey and surface features as described above.
761'-771'	Limestone	microcrystalline to extremely fine crystalline, medium-dark grey brown, blocky, calcite fractures, no porosity, weathers medium grey and surface features as described above. Solitary corals.

771'-781'	Limestone	microcrystalline to extremely fine crystalline, becoming darker grey, blocky, calcite fractures, no porosity, weathers medium grey and surface features as described above.
781'-804'	Limestone	microcrystalline to extremely fine crystalline, becoming darker grey, blocky, calcite fractures, no porosity, weathers medium grey and surface features as described above. Scattered solitary corals.
804'-1028'	Covered interval.	
1028'-1038'	Limestone	dark grey, extremely fine crystalline, slabby, no porosity, weathers medium grey. Fossils conical but unidentifiable. Interbedded 1-3" fissile limy shale, dark grey.
1038'-1048'	Limestone	dark grey, extremely fine crystalline, very thin-platy, no porosity, trace calcite fractures, weathers medium grey, some shale as above interbeds.
1048'-1056'	Limestone	dark grey, extremely fine to very fine crystalline, thin bedded-slabby, calcite fractures and blebs. Weathers medium grey and very rubbly. No porosity.
1056'-1065'	Limestone	dark grey, extremely fine crystalline, trace of vugs, calcite fractures. Fair petroliferous odor, platy-thin bedded but not rubbly bedding planes as before. Weathers medium to dark grey.
1065'-1070'	Limestone	dark grey, micro to extremely fine crystalline, platy to thin bedded, petroliferous odor, fossil brachiopods, weathers dark grey, no porosity, high percentage argillaceous material?

1070'-1080'	Limestone	medium grey to dark grey, massive, extremely fine crystalline, no porosity, petroliferous odor, calcite fracture, weathers medium-dark grey and in some places buff. The massive beds weather into chunky thin bedded material. Some iron staining, trace of iron-stained styolites.
1080'-1096'	Limestone	medium grey to dark grey, massive, extremely fine crystalline, no porosity, trace petroliferous odor, calcite fracture, weathers medium-dark grey and in some places buff. The massive beds weather into chunky thin-bedded material. Some iron staining, trace of iron-stained styolites.
1096'-1106'	Dolomite	extremely fine to very fine crystalline, medium grey brown, no porosity, massive but weathers and fractures to sharp chunky pieces. Dolomite contains calcite blebs and in some cases along a single bed will change from a dolomite to a dark grey limestone. Possibly they indicate breccia of large size though it is unrecognizable on the surface. Top of interval is thin bedded and grades into massiveness. Weathers buff.
1106'-1117'	Limestone	dark grey, micro to extremely fine crystalline, no porosity, massive but well fractured, weathers buff. Petroliferous odor. Many calcite fractures and calcite-filled vugs.
1117'-1129'	Dolomite	medium grey brown, extremely fine to very fine crystalline, massive-slabby, no porosity, weathers buff, petroliferous odor very good, contains calcite blebs (pin point) and

1117'-1129'	Dolomite	(cont'd) calcite fractures. This unit and the following contains a large 3 x 10' limestone fragment, dark grey. Breccia. Dolomite is well banded.
1129'-1142'	Dolomite	This section appears to be brecciated. What appears to be bedding planes are intersected at many points by large limestone blocks. Otherwise a series of limestone and dolomite blocks intermingled. In general looks like a dolomite with limestone breccia fragments(?). Bedding planes of dolomite pass through, probably by fracturing the limestone fragments. Limestone and dolomite as above as far as lithology is concerned. Bedding planes are very undulating or uneven. Petroliferous odor.
1142'-1152'	Dolomite	medium brown, fine crystalline, slabby. poor vuggy porosity, petroliferous odor, well banded, calcite fractures and lined in vugs. Weathers medium brown.
1152'-1163'	Limestone	medium to dark grey brown, microcrystalline, no porosity, trace petroliferous odor, many calcite fractures, massive.
1163'-1179'	Covered interval	
1179'-1189'	Breccia	limestone and dolomite fragments, dolomite- medium brown, fine to medium crystalline, tight, faint petroliferous odor, calcite filled fractures, slabby, weathers medium grey brown. Limestone - blocks up to 5' diameter, dark grey, microcrystalline, with abundant calcite-filled fractures. One tiny limestone stringer 1" diameter contains abundant very angular dolomite fragments 1/8" diameter.

1189'-1209'	Breccia	as described above, some fragments of dolomite show bedding at right angles to regional bedding.
1209'-1237'	Breccia	as described above, massive with some fragments? of calcite up to 12" long. Dolomite is banded and some fragments are up to 20' long and 2' wide.
1237'-1277'	Limestone	dark grey, slabby, tight, with abundant dolomite fragments up to 1" long. Grades to interbedded limestone and dolomite downward. Dolomite is medium brown, microcrystalline, with trace vuggy porosity, banded, bedding very contorted.
1277'-1287'	Limestone	dark grey, slabby, tight with abundant dolomite fragments up to 1" long. Grades to interbedded limestone and dolomite downward. Dolomite is medium brown, microcrystalline, with trace vuggy porosity, banded, bedding very controted, scattered vugs up to $\frac{1}{2}$" diam. partially filled with calcite. Dolomite has strong petroliferous odor.
1287'-1317'	Dolomite	medium grey to medium brown, laminated or banded, extremely fine to microcrystalline, scattered vugs, lined with calcite crystals, few beds laminated to slabby, bedding slightly contorted, scattered calcite filled fractures, fair petroliferous odor. No limestone fragments visible. Interbeds weather light buff and slightly rubbly.

1317'-1357'	Dolomite	light grey brown, extremely fine crystalline, banded, scattered vugs, slabby bedding, weathering grey buff, in small part rubbly. Trace petroliferous odor. In part fragmental.
1357'-1373'	Covered interval.	
1373'-1383'	Breccia	mainly dolomite matrix with banded dolomite and dark grey limestone fragments at various orientations, up to 8" diam.
1383'-1393'	Breccia	mainly dolomite matrix with banded dolomite and dark grey limestone fragments at various orientations, up to 8" diam., in part with a very rubbly appearance; these zones of rubbly weathering contain abundant shale streaks.
1393'-1403'	Dolomite breccia	fragments vary from less than 1'7" to 5'7". Little limestone present but are some fragments. In general dolomitic fragments and dolomitic matrix. Weathers dark grey-buff. No porosity.
1403'-1418'	Breccia	limestone and dolomite. Limestone matrix with dolomite fragments in most cases. Bedding where seen very contorted. Dolomite fragments banded. Weathers dark grey. No porosity.
1418'-1429'	Dolomite	dark grey, fine crystalline, trace of intergranular porosity, strong petroliferous odor, slabby. Weathers dark grey-brown. No breccia obvious in this interval.

1429'-1439'	Dolomite	medium grey brown, fine to medium crystalline, many calcite fractures, no visable porosity. Thin-bedded - slabby. Thin bedded interbeds more argillaceous. Trace petroliferous odor.
1439'-1449'	Limestone	medium to coarse crystalline, excellent vuggy porosity, medium grey, weathering dark grey. Thin bedded to slabby. In places breccia with dolomite fragments. Beds are very contorted, petroliferous odor.
1449'-1461'	Limestone	breccia in part, dark grey, medium to coarse crystalline, slabby to rubbly, good-excellent vuggy porosity in upper 8'. Dolomitic breccia with limestone matrix next 4'. Slabby, fragments angular, less than ¼", 50% of rock, petroliferous odor, calcite fractures.
1461'-1490'	Dolomite	slabby, medium grey brown, extremely fine to very fine crystalline, paper-thin calcite fractures. Beds slightly contorted. No porosity, petroliferous odor faint. Weathers greyish brown. No breccia noticeable.
1490'-1499'	Dolomite	Limestone 3' - fine to medium crystalline, good vuggy porosity, blocky. Dolomite 2' - fine crystalline, slabby, calcite fractures, no porosity. Dolomite 4' - possible originally lime-mud, extremely fine crystalline, contains high percentage of calcite blebs or calcite-filled vugs and calcite paper-thin fractures. No porosity.

1499'-1510'	Dolomite-Limestone	Dolomite 4' - medium grey brown, fine crystalline, no porosity, slabby, calcite blebs, very small, weathers medium grey-brown. Limestone 7' - extremely fine crystalline, dark grey, massive, many minute calcite fractures, weathers dark grey. No porosity.
1510'-1520'	Limestone-Dolomite	Limestone 2' - blocky, fine-medium crystalline, no porosity, dark grey and weathers dark grey. Dolomite - 8' - thin bedded - slabby, fine to medium crystalline, no porosity, many minute calcite filled fractures, medium grey brown.
1520'-1542'	Dolomite	some interbeds of limestone. Breccia fragments of all sizes up to 8' disrupt bedding laterally and vertically. Sometimes fragments within fragments. A well brecciated zone. Weathers buff, cliff very rubbly looking.
1542'-1596'	Covered interval	
1596'-1622'	Dolomite breccia	limestone matrix, fine to medium crystalline, good vuggy porosity, rubbly, possible remains of interbedded limestone and dolomite.
1622'-1652'	Covered interval	
1652'-1692'	Dolomite	medium grey, medium crystalline, trace calcite-filled fractures. Trace vugs less than $\frac{1}{4}$" and possible trace of fracture porosity. Blocky-massive, weathers dark grey. Trace iron staining along fractures.

1692'-1729'	Dolomite	medium to dark grey, very fine to fine crystalline, no porosity, very slight trace of iron staining, slabby - blocky, weathers dark grey, trace calcite fractures.
1729'-1740'	Dolomite	light grey, very fine to fine crystalline, trace vuggy zones, odd trace of calcite fractures, weathers dark grey, vuggy zone at last foot of interval. Slabby.
1740'-1750'	Dolomite	6" rubbly dolomitic zone, very vuggy to the point where it crumbles. Remaining dolomite extremely fine crystalline, medium grey, slabby to thin bedded, trace vuggy zones. Weathers dark grey, trace calcite fractures.
1750'-1760'	Dolomite	light grey, fine crystalline, slabby, trace argillaceous partings, weathers medium grey, no porosity, trace iron staining.
1760'-1770'	Dolomite	light grey, fine crystalline, some thin beds but in general slabby, trace argillaceous partings, weathers medium grey, no porosity, trace iron staining.
1770'-1782'	Dolomite	light grey, fine crystalline, slabby, trace argillaceous partings, weathers medium grey, no porosity, trace iron staining, some banding and trace of vugs, white siliceous limestone filled vugs up to 3". Possibly some dolomitic content. Trace styolite and calcite fractures.
1782'-1792'	Dolomite	massive, fine crystalline, medium grey, trace vuggy zones, less than $\frac{1}{2}$", trace calcite fractures, weathers dark grey.
1792'-1802'	Dolomite	massive, fine crystalline, medium grey, excellent vugs well distributed and scattered, trace calcite fractures, weathers dark grey

1802'-1812'	Dolomite	massive, fine crystalline, medium grey, very good to excellent vuggy porosity, silica lined vugs less than ½". trace calcite fractures, weathers dark grey.
1812'-1818'	Dolomite	blocky to rubbly, medium grey, 10-20% vuggy porosity, all silica lined. At bottom of interval a large amount of tripolitic chert or disseminated silica. Fine crystalline, weathers buff to dark grey.
1818'-1828'	Dolomite	light to medium grey, fine to medium crystalline, blocky to massive, excellent vuggy porosity, vugs silica lined and probably are fossil molds. Rock is very fossiliferous containing corals. Scree fossils well preserved but poor when found in place.
1828'-1838'	Dolomite	light to medium grey, fine to medium crystalline, blocky to massive, fewer fossils and fair-good vugs.
1838'-1858'	Dolomite	light grey, fine to medium crystalline, with fair to good vuggy porosity in bands up to 2' thick, some vugs partly filled with siliceous material, massive to blocky, weathering orange yellow to dark grey, siliceous?, in part with scattered abundant nodules and blebs of chert? and fossils? If fossils, unrecognizable. Calcite filled fractures, up to 1/8", very hard.
1858'-1868'	Dolomite	light grey, fine to medium crystalline, with scattered vuggy porosity, slabby to blocky, weathers orange yellow to dark grey, beds very hard, possibly siliceous, trace scattered chert nodules and blebs.

1868'-1878'	Dolomite	light grey grading to medium grey, fine to medium crystalline, with scattered vuggy porosity, slabby to blocky, weathers orange yellow to dark grey, beds very hard, possibly siliceous, trace stylolites.
1878'-1908'	Dolomite	light grey grading to medium grey, fine to medium crystalline, with scattered vuggy porosity, well bedded, blocky to massive, weathers orange yellow to dark grey, very hard, possibly siliceous, fossiliferous.
1908'-1948'	Dolomite	medium to dark grey, fine to medium crystalline, fair scattered vuggy porosity in part filled with calcite and silica, blocky to massive, weathering grey buff to dark grey, siliceous, trace chert nodules and blebs, minor banding.
1948'-1958'	Dolomite	medium to dark grey, fine to medium crystalline, fair scattered vuggy porosity in part filled with calcite and silica, blocky to massive, weathering grey buff to dark grey, siliceous, trace chert nodules and blebs, minor banding, with a 3' zone of fossiliferous, silicified and highly recrystallized dolomite, recognized crinoid columnals up to 1/8" thick, possible colonial corals?
1958'-1978'	Dolomite	medium to dark grey, very fine to fine crystalline, mainly tight, hard, siliceous? Trace chert blebs, blocky to massive, weathers in part slabby and dark grey.

1978'-1988'	Dolomite	dark grey, very fine to extremely fine crystalline, mainly tight, hard, siliceous, trace chert blebs, blocky to massive, weathers in part slabby and dark grey.
1988'-1996'	Dolomite	dark grading to light grey, very fine to extremely fine crystalline, tight, slabby, weathers grey buff.
1996'-2006'	Covered interval	
2006'-2016'	Dolomite	medium grey, very fine to fine crystalline, massive, with trace 1' bands fair vugs, hard siliceous?, weathers medium grey, scattered siliceous nodules on bedding planes.
2016'-2034.5'	Dolomite	brownish grey, fine crystalline, massive, flaggy, vuggy porosity on and near and parallel to bedding planes, a 2' porous (vuggy porosity) zone weathers very dark grey. Makes a good marker bed.
2034.5'-2045'	Dolomite	light grey, very fine to extremely fine crystalline, blocky to massive, weathering medium grey, very hard, with white siliceous-filled fractures. Siliceous vugs scattered up to 1" in diameter, mottled.
2045'-2065'	Dolomite	light grey, very fine to extremely fine crystalline, blocky to massive, weathering medium grey, very hard, with a 2' fair vuggy zone at 2050-2052, trace scattered vugs.
2065'-2085'	Dolomite	mottled light grey and medium grey, very fine to fine crystalline, scattered vugs. Trace of calcite-filled vugs but in most cases siliceous-filled-vugs. Rock very hard, possibly siliceous? Weathers medium grey, slabby to blocky.

2085'-2095'	Dolomite	mottled light grey and medium grey, very fine to fine crystalline, scattered vugs, lower 2" of interval contains a vuggy highly siliceous zone. This siliceous material weathers very black on the surface. Possibly a siliceous fossiliferous zone. Some poorly preserved fossils can be seen.
2095'-2125'	Dolomite	blocky, medium grey, scattered vugs and silica-filled vugs, extremely fine to very fine crystalline, high siliceous content, weathers dark grey, lower 5' more rubbly.
2125'-2162'	Dolomite	blocky to massive, very fine to fine crystalline, medium grey, weathers dark grey, scattered poorly preserved corals, scattered vuggy porosity.
2162'-2172'	Dolomite	5' massive, remainder slabby-rubbly, very fine to fine crystalline, medium grey, weathers dark grey, scattered poorly preserved corals, scattered vuggy porosity.
2172'-2181.5'	Dolomite	massive, very fine to fine crystalline, medium grey, weathers dark grey, scattered poorly preserved corals, scattered vuggy porosity.
2181.5'-2191'	Dolomite	blocky, very fine to fine crystalline, medium grey, weathers dark grey, scattered poorly preserved corals, scattered vuggy porosity..
2191'-2201'	Dolomite	massive-blocky, very fine to fine crystalline, medium grey weathers dark grey, scattered poorly preserved corals, scattered vuggy porosity.

2201'- 2211'	Dolomite	massive, very fine to fine crystalline, medium grey, weathers dark grey, scattered poorly preserved corals, scattered vuggy porosity.
2211'-2221'	Dolomite	massive to blocky, very fine to fine crystalline, medium grey, weathers dark grey, scattered poorly preserved corals, scattered vuggy porosity
2221'-2231'	Dolomite	blocky, very fine to fine crystalline, medium grey, weathers dark grey, scattered poorly preserved corals, scattered vuggy porosity.
2231'-2241'	Dolomite	blocky, very fine to fine crystalline, medium grey, weathers dark grey, scattered poorly preserved corals, scattered vuggy porosity
2241'-2286'	Dolomite	light grey, slightly mottled, mottling due possibly to siliceous content, good scattered vuggy porosity, very fine to fine crystalline, massive, scattered fossil corals, sili- and fair to good preservation for this dolomitic formation. Weathers dark to medium grey.
2286'-2320'	Dolomite	light to medium grey, very fine to fine crystalline, no porosity, weathers medium buff brown, slabby to blocky, scattered vugs lined with calcite and siliceous material, trace of siliceous stringers. Some blocky slumping. Weathers in a blocky fashion.
2320'-2332'	Dolomite	light to medium grey, very fine to fine crystalline, no porosity, weathers medium buff brown, slightly banded and thin bedded to slabby. The uppermost 8' of this interval contains abundant chert nodules or pebbles?, ellipsoidal in

2320'-2332'	Dolomite	(cont'd) shape up to 4" long and some 3-4 bands up to 2" thick of white chert beds. The nodules are elongate parallel to bedding and are not of irregular shape as one would expect pebbles to be. Chert is very slightly dolomitic and weathers white and very fractured.
2332'-2341'	Covered interval	
2341'-2361'	Dolomite	light grey, very fine to fine crystalline, very slight trace of siliceous vugs, slabby, weathers light yellow buff, irregular paper thin argillaceous partings and streaks. Minute fracture fillings. No chert bands until 2371 and lower. In general the outcrop weathers light in color and individual beds stand out much better. No slumping, blocky as the overlying beds, traces of iron staining.
2361'-2371'	Dolomite	light grey, very fine to fine crystalline, one foot vuggy cherty zone, slabby, weathers light yellow buff, irregular paper thin argillaceous partings and streaks. Minute fracture fillings.
2371'-2381'	Dolomite	light grey, very fine to fine crystalline, one foot vuggy cherty zone and a siliceous zone, slabby, weathers light yellow buff, irregular paper thin argillaceous partings and streaks. Minute fracture fillings.
2381'-2401'	Dolomite	medium crystalline, light grey, good vuggy porosity, slabby to blocky, weathers medium grey, high percentage of siliceous material. Silica-lined vugs.

2401'-2481'	Dolomite	light grey, fine to medium crystalline, good vuggy porosity, blocky to massive, weathers bright buff and dark grey. High percentage of siliceous material, silica-lined vugs and filled vugs.
2481-2491'	Dolomite	light grey, fine to medium crystalline, good vuggy porosity, 1" vuggy siliceous zone, blocky to massive, weathers bright buff and dark grey.
2491'-2500'	Dolomite	light grey, fine to medium crystalline, scattered siliceous zones with vuggy porosity, blocky to massive, weathers bright buff and dark grey.
2500'-2540'	Dolomite	light grey, fine to medium crystalline, fair vuggy porosity, blocky to massive, weathers bright buff and dark grey. High percentage of siliceous material, silica-lined vugs and filled vugs.
2540'-2552'	Dolomite	light grey, fine to medium crystalline, fair vuggy porosity, blocky to massive, weathers bright buff and dark grey. Zone of a highly silicified or chertified nature. Dolomite is in the minor quantity with the silica dominating, very crumbly, vuggy, light grey dolomite, very fine to fine crystalline, weathers light grey.
2552'-2562'	Dolomite	light grey, medium to coarse crystalline, appears sugary, no visible porosity, blocky to massive, weathers medium grey
2562'-2572'	Dolomite	light grey, medium to coarse crystalline, appears sugary, no visible porosity, blocky to massive, weathers medium grey.

2572'-2591'	Dolomite	light grey, medium to coarse crystalline, appears sugary, no visible porosity, blocky to massive, weathers medium grey, scattered vugs, some vugs silica-lined.
2591'-2625'	Dolomite	5' - siliceous zone, scattered vugs, minor dolomite light grey. 7' - dolomite, coarse crystalline, sucrosic appearance, light grey, high percentage of siliceous material, silica-filled vugs and vuggy porosity, massive, weathers buff to dark grey. Siliceous material and vugs in general form minor zones.
2625'-2631'	Siliceous zone	scattered vugs, minor dolomite, light grey
2631'-2640'	Covered interval	
2640'-2651.5'	Dolomite	3' - coarse crystalline, sucrosic appearance, light grey, high percentage of siliceous material, vuggy porosity, massive, weathers buff to darkgrey. 7' - medium grey, very fine to fine crystalline, scattered vugs, blocky to massive, weathers medium grey and buff.
2651.5'-2660'	Dolomite	light medium grey, medium to coarse crystalline, scattered bands of vugs.
2660'-2670'	Dolomite	interbedded medium to coarse crystalline light grey dolomite and very fine to fine crystalline medium grey dolomite. Interbedded slabby and blocky and thin bedded and rubbly beds, scattered vuggy zones. Weathers medium grey and buff.
2670'-2682'	Dolomite	interbedded medium to coarse crystalline, light grey dolomite and very fine to fine crystalline medium grey dolomite. Interbedded slabby and blocky and thin bedded and rubbly beds, Last 2' contain large baseball size chert filled vugs.

2670'-2682'	Dolomite	(cont'd) Crystalinity of matrix fine to medium crystalline, light grey.
2682'-2702'	Dolomite	medium grey, fine to medium crystalline, thin bedded to blocky interbedded, trace iron staining, some scattered chert-filled (tripolitic) or kaolin-filled vugs. Weathers medium grey.
2702'-2717'	Dolomite	very fine to fine crystalline, massive, no porosity, weathers black. Color medium grey.
2717'-2724'	Covered interval	
2724'-2744'	Dolomite	interbedded medium to coarse crystalline and very fine to fine crystalline, blocky to massive, very slight trace of vugs. Weathers medium to dark grey, trace iron staining, vugs, in some cases silica lined.
2744'-2777.5'	Dolomite	light grey, very fine to fine crystalline, slabby-blocky, very slight, trace of scattered vugs, vugs silica-filled and in part calcite filled. In general they are silica filled. Weathers medium grey to buff.
2777.5'-2783.5'	Covered interval	
2783.5'-2803'	Dolomite	light grey, very fine to fine crystalline, scattered vugs and zoned vugs calcite lined, slabby, blocky and thin bedded.
2803'-2813'	Dolomite	light grey, very fine to fine crystalline, no porosity after 2308, slabby, buff weathering, no filled vugs visible.
2813'-2823'	Dolomite	light grey, very fine to fine crystalline, no porosity, slabby, fine banding beginning at 2318, buff weathering, no filled vugs visible.

2823'-2833'	Dolomite	light grey, very fine to fine crystalline, no porosity, slabby, fine banding, buff weathering, no filled vugs visible.
2833'-2993'	Dolomite	light grey, very fine to fine crystalline, no porosity, slabby, interbedded fine faint banding.
2993'-3026'	Covered interval	
3026'-3036'	Dolomite	medium grey, medium to coarse crystalline, euhedral, sugary in part, scattered vugs, in part filled with iron stained material, blocky to massive, weathers medium grey, vugs in part calcite lined.
3036'-3075'	Dolomite	medium grey, medium to coarse crystalline, euhedral, sugary in part, scattered vugs, in part filled with iron stained material, blocky to massive, weathers medium grey, vugs in part calcite filled.
3075'-3081'	Dolomite	light to medium grey, fine crystalline, tight, banded, thin bedded to slabby, weathers light to dark grey and buff.
3081'-3103'	Dolomite	medium grey, fine to medium crystalline, with abundant scattered minute fractures open to argillaceous, thin bedded to slabby, weathers light grey to buff, banded in irregular lines.
3103'-3106'	Covered interval	
3106'-3113'	Dolomite	light grey to medium grey, medium to coarse crystalline, tight, rubbly weathering, sugary, blocky, weathered medium grey to buff.

3113'-3116'	Covered interval	
3116'-3126'	Dolomite	light grey, fine to medium crystalline, fair vuggy, slabby to blocky, weathers medium grey and buff.
3126'-3133'	Dolomite	light grey to medium grey, medium to coarse crystalline, sugary, scattered vugs, blocky, weathers medium grey.
3133'-3142'	Covered interval	
3142'-3150'	Dolomite	light grey, medium crystalline, with calcite-filled fractures, trace vugs, lower 3' is tight, slabby, weathers grey buff, in part very fractured.
3150'-3186'	Covered interval	
3186'-3190'	Dolomite	light grey, fine crystalline, euhedra, scattered vugs, slabby, weathers medium grey.
3190'-3195.5'	Covered interval	
3195.5'-3206'	Dolomite	medium grey, fine crystalline with abundant calcite filled fractures, slightly mottled, slabby to blocky, weathers medium grey, trace vugs.
3206'-3216'	Dolomite	light grey to medium brown grey, (light grey on bottom 4') fine crystalline, slabby to blocky, tight, weathers yellowish buff to medium grey.
3216'-3222.5'	Dolomite	medium grey, fine crystalline, calcite filled blebs, slabby, weathers light grey to buff, abundant cross fractures.
3222.5'-3229'	Covered interval	

3229'-3265'	Dolomite	light to medium grey, fine to medium grained, trace vugs, minor irregular banding, slabby, uneven bedding planes, weathers light buff to grey.
3265'-3277'	Dolomite	medium grey, very fine crystalline, fair to scattered vugs in bottom 10', slabby to blocky, weathers medium brownish grey, well fractured.
3277'-3287'	Dolomite	light grey, fine cyrstalline, tight, slabby, weathers light grey, in part trace banding.
3287'-3297'	Dolomite	light grey, fine crystalline, with bottom 2' dark grey, weathering dark brown, slabby
3297'-3307'	Dolomite	light to medium brownish grey, fine crystalline, in part mottled, banded with medium and coarse crystallinity, grading downwards to coarsly crystalline. The finer crystalline material is light brownish grey and weathers light brownish grey, the coarsly crystalline material is dark brown grey and weathers dark brown grey, slabby, with scattered vugs, white stain in fractures, possibly evaporite.
3307'-3316'	Dolomite	dark grey, fine crystalline, very hard, in part weathers concretionary (rounded fragments project from cliff), thin bedded to slabby, in part banded, scattered vugs.
3316'-3336'	Dolomite	light grey, fine grained, scattered calcite filled vugs, scattered tiny iron-stained flecks up to 1/8" diam., massive to blocky, weathers grey to buff.

3316'-3346'	Dolomite	medium to dark grey, fine crystalline, platy, rest is slabby to block, one foot fragment zone, weathers medium grey to buff, scattered vugs.
3346'-3366'	Dolomite	light to medium grey, fine crystalline, fair vugs, trace styolites, blocky to slabby, weathers medium buff to medium grey.
3366'-3376'	Dolomite	light to medium grey, fine crystalline, fair vugs, minor medium to dark brown banding, blocky to slabby, weathers medium buff to medium grey.
3376'-3385'	Dolomite	light to medium grey, fine crystalline, fair vugs, minor medium to dark brown banding, blocky to slabby, weathers medium buff to medium grey.
3385'-3392.5'	Covered interval	
3392.5'-3402.5'	Dolomited	medium brown grey, medium to coarse crystalline, sugary, with a fragment zone, fair vugs, massive to blocky, weathers medium buff to medium grey.
3402.5'-3413'	Dolomite	medium brown grey, medium to coarse crystalline, sugary with a fragmental zone, fair vugs, massive to block, weathers medium buff to medium grey, vugs are calcite lined.
3413'-3416'	Covered interval	
3416'-3426'	Dolomite	medium grey, fine crystalline, fair vugs, lined with calcite, slabby, weathers medium grey.
3426'-3446'	Dolomite	medium grey grading to light grey, fine crystalline, fair vugs, lined with calcite, slabby, weathers medium grey.

3446'-3451'	Dolomite	light grey, medium to coarsly crystalline, sugary, trace vugs, slabby, weathers medium grey to buff.
3451'-3461'	Covered interval	
3461'-3481'	Dolomite	light grey, medium to coarsly crystalline, sugary with fair vugs, slabby, weathers medium grey to buff.
3481'-3491'	Dolomite	light grey, becoming finer crystalline, sugary with fair vugs, slabby, weathers medium grey to buff.
3491'-3500'	Dolomite	light grey, medium to coarsly crystalline, scattered vugs, with calcite fillings, slabby to blocky, blocky in bottom, slightly cortorted, banding, weathers light grey buff.
3500'-3506'	Covered interval	
3506'-3522'	Dolomite	light grey, medium crystalline trace vugs, sugary, slabby, weathers medium grey.
3522'-3526'	Covered interval	
3526'-3536'	Dolomite	light grey, fine to medium crystalline, top 8' in medium crystalline, fair vuggy, blocky, the bottom 2' is slabby with no vugs and fine crystalline.
3536'-3546'	Dolomite	top 8' slabby, bottom 2' medium crystalline, vuggy
3546'-3556'	Dolomite	top 2' medium crystalline, next 3' slabby, bottom 5' is light brown grey, fine crystalline, weathers medium brown grey, slabby, tight.
3556'-3566:	Dolomite	light to medium grey brown, fine crystalline, trace vugs, slabby, weathers medium brown.

3566'-3576'	Dolomite	upper 4' light to medium grey brown, fine crystalline, trace vugs, slabby, weathers medium brown. Lower 6' light grey, very fine crystalline, slightly banded, thin bedded, weathers light grey buff.
3576'-3609'	Dolomite	interbedded light grey, slabby, tight, fine crystalline dolomite and light grey, thin bedded dolomite. Bottom 1' dark grey brown dolomite.
3609'-3611'	Dolomite	light grey, fine crystalline, tight, slabby, weathers light grey.
3611'-3614'	Covered interval	
3614'-3624'	Dolomite	medium grey, fine crystalline, slabby to thin bedded, trace vugs, weathers medium grey brown.
3624'-3642'	Dolomite	medium grey, fine crystalline, slabby to thin bedded, trace vugs, weathers medium grey and has slight banding.
3642'-3649'	Dolomite	light grey brown, fine to very fine crystalline, fair to poor vuggy porosity in zones, slabby, platy, weathers medium brown.
3649'-3659'	Dolomite	interbedded light grey, sugary, medium crystalline and very vuggy 1' beds and fine crystalline, light grey, blocky zone, with scattered vugs. Weathers medium grey to buff.
3659'-3669'	Dolomite	dolomite as above but the medium crystalline material has a deep reddish weathering stain in part.
3669'-3677'	Dolomite	light grey, sugary, medium crystalline, weathering has reddish stain in part.

3677'-3696.5'	Covered interval	
3696.5'-3707'	Dolomite	medium grey, very fine crystalline, weathers medium grey brown, with black streaks, resistant material, slabby, tight.
3707'-3712'	Dolomite	light grey, extremely fine crystalline, slabby, streaks of chert, up to 1" thick, with trace of black resistant material?, weathers light grey and banded.
3712'-3722'	Dolomite	medium grey, fine crystalline to very fine crystalline, thin bedded with chert streaks up to ½" diam, tight, weathers medium grey brown.
3722'-3733'	Covered interval	
3733'-3761'	Dolomite	light grey, very fine crystalline trace vugs, slabby, weathers medium grey.
3761'-3769'	Dolomite	medium grey,very fine crystalline, trace vugs, slabby, weathers medium grey, slightly siliceous?, bottom 2' is light grey.
3769'-3778'	Dolomite	light grey, very fine crystalline, weathers very light grey, possibly siliceous.
3778'-3791'	Covered interval	
3791'-3811'	Dolomite	interbeds light grey, extremely fine crystalline, tight,slabby, medium grey weathering dolomite and light brown, very fine crystalline, slabby, tight, weathering medium brown dolomite. One bed 2' thick of very thin bedded, light grey extremely fine crystalline dolomite. Beds are 2-3' thick each. Brown beds have trace porosity.

3811'-3821'	Dolomite	interbeds of light grey and light brown dolomite, beds are 5' thick.
3821'-3834.5'	Dolomite	interbeds of light grey and light brown dolomite, beds vary from 1' to 3' thick.
3834.5'-3837.5'	Covered interval	
3837.5'-3858'	Dolomite	light grey, fine to very fine crystalline, tight, slabby, possibly slightly siliceous, weathers medium grey to buff, trace vugs.
3858'-3868'	Dolomite	interbeds medium brown and light grey dolomite, both are slabby, very fine crystalline, with scattered traces of vugs, beds are 2-3' thick each. Brown dolomite weathers medium brown, medium grey dolomite weathers medium grey.
3868'-3878'	Dolomite	interbeds medium brown and light grey dolomite, beds up to 5' thick.
3878'-3888'	Dolomite	interbeds medium brown and light grey dolomite, beds up to 2' thick.
3888'-3898'	Dolomite	interbeds brown and light grey dolomite, beds up to 2' thick, fair vuggy porosity in one light grey bed.
3898'-3908'	Dolomite	interbeds light brown and light grey dolomite, beds up to 3' thick, light grey dolomite has poor to fair vuggy porosity.
3908'-3937'	Dolomite	interbeds light brown and light grey dolomite, beds up to 3' thick, light grey dolomite has poor to fair vuggy porosity.

3937'-3943'	Covered interval	
3943'-3953'	Dolomite	interbeds medium grey and brown dolomite.
3953'-3963'	Dolomite	mainly medium brown dolomite.
3963'-3973'	Dolomite	light grey, slabby, very fine crystalline, with scattered traces of vugs.
3973'-3982'	Dolomite	interbeds of medium grey and brown dolomite, slabby, very fine crystalline, with scattered traces of vugs.
3982'-3990'	Covered interval	
3990'-4031'	Dolomite	light grey, extremely fine crystalline, slabby, tight, weathering light grey, bottom 2' is a medium brown, resistant, siliceous?, weathers rough and medium brown, tight, with a dark speckled surface, very fine crystalline.
4031'-4038'	Dolomite	light grey, extremely fine crystalline, slabby, tight, weathering light grey, with a 6" band of medium brown dolomite.
4038'-4048'	Dolomite	light grey, extremely fine crystalline to medium crystalline, massive, slabby, tight, weathers medium buff.
4048'-4065'	Dolomite	light grey, extremely fine crystalline to medium crystalline, massive, slabby, tight, weathers medium buff.
4065'-4075'	Dolomite	medium grey, extremely fine to very fine crystalline, 3-8" bedding, no porosity, young weathering color - buff, old weathering color dark grey, very slight trace iron stain.

4075'-4085'	Dolomite	medium grey, extremely fine to very fine crystalline, 3-8" bedding, no porosity, young weathering color buff, old weathering color dark grey, very slight trace iron stain, very slight trace calcite filled vugs.
4085'-4095'	Dolomite	medium grey, extremely fine to very fine crystalline, 3-8" bedding, no porosity, young weathering color buff, old weathering color dark grey, very slight trace iron stain, very slight trace calcite filled vugs, trace medium to dark grey bands of dolomite 1"-5".
4095'-4107'	Dolomite	medium grey, extremely fine to very fine crystalline, 3-8" bedding, no porosity, young weathering color buff, old weathering color dark grey, very slight trace iron stain, very slight trace calcite filled vugs, trace medium to dark grey bands of dolomite, but towards the bottom of this interval rock becomes banded and is a darker grey.
4107'-4118'	Dolomite	medium grey, extremely fine crystalline, no porosity, beds up to 18" thick in upper 5' and grading into beds appearing rubbly in part and are down to ½" thick. Trace of calcite filled vugs and some open vugs in rubbly portion. Good iron staining in rubbly portions. Lower part uneven and irregular bedding planes. Trace nodule-like structures up to 3".

4118'-4122'	Dolomite	Top 2'- dark grey, microcrystalline, 1"-4" beds , in part look platy. Remainder- light grey, microcrystalline, 4-6" beds, some $\frac{1}{4}$" beds more argillaceous, weathers light grey buff.
4122'-4132'	Dolomite	Top $1\frac{1}{2}$' fragmental dolomite, fragments in part irregular and in part irregular and in part pebbles of elipsoidal shape. Next $2\frac{1}{2}$' are well banded, btm 2 feet limestone, medium brown, sub-lithographic, $\frac{1}{2}$" beds, no porosity.
4132'-4142'	Dolomite	interbedded dolomite, fragmental zones, banded zones and limy zones. Banded zones extremely fine crystalline, light medium grey. Limy zones, dark grey, extremely fine crystalline.
4142'-4146.5'	Dolomite	$1\frac{1}{2}$' light grey, sub-lithographic to extremely fine crystalline, 2"-4" beds, calcite fractures common. Next 3' - oolitic over 50%, 1/16" diam, dark grey very fine crystalline. Matrix light grey micro to extremely fine crystalline, oolites found in bands. Matrix type rock between bands.
4146.5'-4152'	Dolomite	Top 1/3 - $\frac{1}{4}$-$\frac{1}{2}$" beds of limy dolomite, extremely fine crystalline, medium brown and weathers medium brown, no porosity.
4152'-		Lower 2/3 - medium grey, extremely fine crystalline grading into dark grey and very fine crystalline. Oolitic zone in center of lower 2/3 of rock, bedding $\frac{1}{2}$"-3/4", some banding, porosity, trace of vugs very scattered.

4152'-4162'	Dolomite	Upper 5' medium brown, micro-crystalline, many calcite fractures between bedding planes, paper thin, less than 1" beds, shaly in part, greenish tinge. Lower 5', dark grey, extremely fine crystalline, porosity zone 2" thick at 4157, otherwise no porosity, 2-4" beds.
4162'-4175'	Dolomite	Top 1" fragmental vuggy, medium brown, chert noduels, calcite fractures. Remainder, medium to dark grey, extremely fine crystalline, no porosity, 4-8" beds, some banding. This is interbedded with shaly limy dolomite beds less than $\frac{1}{4}$" bedding, some fragmental zones.
4175'-4185'	Dolomite	medium to dark grey, extremely fine crystalline, tight, scattered vugs, calcite crystals lining vugs, calcite fractures - some fragmental zones, tight, scattered chert fragments, 6-18" bedding, some banding, weathers buffy grey.
4185'-4207'	Dolomite	medium to dark grey, extremely fine crystalline, tight, scattered vugs, calcite crystals lining vugs, calcite fractures, chert or siliceous bands, scattered vugs up to 2" lined with calcite crystals, fragmental zones through, one scattered oolitic zone in this interval.
4207'-4217'	Dolomite	medium brown, sub-lithographic to extremely fine crystalline, fissile, 1" beds in most part shaly with interbeds of 4-6" dolomitic beds, weathers medium grey brown to buff. No porosity One fragmental dolomitic zone.

4217'-4227'	Dolomite	medium brown, sub-lithographic to extremely fine crystalline, fissile, 1" beds, less shale, oolitic zone.
4227'-4237'	Dolomite-Shale	interbedded banded dolomite, sub-lithographic to extremely fine crystalline, dark grey, no porosity, 2-8" beds with fissile dark grey shale, fairly smooth, very slightly to no dolomite, buffy grey weathering color.
4237'-4252'	Dolomite	interbedded banded dolomite, sub-lithographic to extremely fine crystalline, dark grey, no porosity, less banding but still interbedded less than 50% shale, some fragmental dolomitic zones.
4252'-4272'	Dolomite	medium to dark grey, no porosity, very fine to fine crystalline, scattered fragmental lenses and scattered calcite fractures, weathers medium buff to dark grey, bedding 2-6" top 10' and then 2-18".
4272'-4282'	Dolomite	medium to dark grey, no porosity, very fine to fine crystalline, weathers medium buff to dark grey, trace scattered porosity, pinpoint vugs, some interbeds of slightly greenish shale, some zones of calcite, but few, trace chert nodules.
4282'-92'	Dolomite	medium to dark grey, very fine to fine crystalline, weathers medium buff to dark grey, trace scattered porosity, no chert nodules but slight trace oolites.
4292'-4302'	Dolomite	medium to dark grey, very fine to fine crystalline, weathers medium buff to dark grey, pinpoint porosity, shale in $2\frac{1}{2}$ feet, shale greenish tinge, scattered fragmental zones or lenses, weathers buffy grey.

4302'-4305'	Dolomite	dark grey, no porosity 18" beds, weathers buffy to grey, micro crystalline to extremely fine crystalline.
4305'-4325.5'	Sandstone-Dolomite	1' - sandstone, light grey, dolomitic with calcite fractures, sandstone medium to coarse grain size. 9' - dolomite - light to medium grey, no porosity, silty and sandy, 4-6" beds. 10½' - dolomitic sandstone, calcite fractures.
4325.5'-4673'	Covered interval	
4673'-4700'	Sandstone	light grey, with a very slight greenish cast, quartzose, with scattered red specks, fine to medium grained, dolomite?, fair sorting, few rounded, shows intergranular porosity on weathered surface, trace vuggy zone, with vugs up to 2" diam, weathers pinkish buff, well bedded, with beds 3-8" thick. Interbedded with ½" thick greenish weathering, slightly micaceous, possibly shaly sandstone, shows cross-bedding.
4700'-4709.5'	Sandstone	with minor interbeds of shale, sandstone, red and light grey with rust blebs (probably weathering), hard, probably quartzitic welded - breaks across grains, quartzose, red sandstone is hematitic, with 3 bands of conglomerate fragments up to 1" diam and rounded, fragments of quartz and feldspar, appears tight, trace of beds of shale, fissile, red and traces of green. Some sandstone shows very thin bedding, is dynamically metamorphosed, has slickensides, ripple marks.

4709.5'-4724'	Quartzite	light pinkish grey, medium grained, quartzose, with slight ironstain, very hard, breaks across grains, tight, weathers light grey buff, beds 4-6' thick, well bedded.
4724'-4744'	Quartzite	Inaccessible but same as above.
4744'-4808'	Quartzite	quartzose, with scattered flecks ironstain, in part slightly banded, scattered blebs, light pinkish grey, crystals (not calcite), blebs are hard and do not effervesce.
4808'-4829'	Sandstone	with scattered 1-3' bands of thin bedded ($\frac{1}{2}$"-1") lenticular, greenish weathering, argillaceous? sandstone very highly weathered. Thin beds have assymmetric ripple marks.
4829'-4882'	Quartzite	light grey, medium grained, quartzose, very speckled, with medium brown dots 1/8" diam, well bedded, weathers light grey, tight, well sorted, trace banding, trace lenticular, possibly slightly shaly, greenish weathering bands. The upper 4' has scattered pebbles feldspar and quartz. Outcrop shows some banding and in places, the speckled rock is zoned in lenses of varying sizes.
4882'-4982'	Quartzite	medium pinkish grey, medium grained, quartzose, very speckled, with medium brown dots 1/8" diam, well bedded, weathers light grey, tight, well sorted, trace banding, trace lenticular, possibly slightly shaly, greenish weathering bands. The upper 4' has scattered pebbles feldspar and quartz. Outcrop shows some banding and in places, the speckled rock is zoned in lenses of varying sizes.

4982'-5035'	Sandstone-Quartzite	quartzose sandstone to quartzite, in part very speckled, in part with zones of platy sandstone, greenish weathering, up to 8" thick, in part the speckled material grades to an unspeckled pinkish grey sandstone.
5035'-5048'	Covered interval	
5048'-5075'	Quartzose sandstone-Quartzite	light greyish pink, hard, medium grained, quartzose, fair sorting, rounded, weathering pinkish buff, in beds 2-4' thick, in part slightly speckled, with trace of very thin (1"-¼") beds of sandstone, but appears slightly slickenslided, grades downwards to a very sub-lithographic, micaceous on bedding planes, greenish, fine grained sandstone that is very platy and dirty.
5075'-5115'	Sandstone-Quartzite	interbeds of quartzose sandstone and quartzite. 1-2' thick beds of greenish, dirty, micaceous sandstone. 2-4' thick beds of speckled and unspeckled sandstone.
5115'-5165'	Sandstone-Quartzite	interbeds of quartzose sandstone and quartzite, with a zone of greenish fine grained sandstone with scattered pebbles and fragments and possibly fucoids.
5165'-5215'	Sandstone-Quartzite	interbeds of quartzose sandstone and quartzite, becomming thinner bedded and with more (50-60% of interval) of the 1½"-2" thick bedded bands of greenish grey fine grained, very dirty tight sandstone. Some bedding planes contain rounded concretion-like forms up to 1" diam. The bottom 2' is a very micaceous, medium green, fissile shaly siltstone with large (fine grained) mica flakes on bedding planes.

5215'-5271'	Sandstone	mainly light grey to light green grey, weathers pinkish buff to greenish grey. The light grey, tight sandstone is predominant (55%) of interval, is fine grained, tight, quartzose, 2 zones of conglomerate that has scattered pebbles and trace of green waxy shale fragments. It is speckled in part. The greenish sandstone is fine grained, fair sorted and rounded, slightly micaceous, appears dirty, softer and in beds ¼"-2" thick, in part silty shale, very micaceous and fissile, the light grey sandstone is in beds 1'-3' thick.
5271'-5311'	Sandstone	upper part - fine grained, green, micaceous, dirty, with symmetrical ripple marks. The interval has a trace of maroon micaceous siltstone in thin beds up to ½" thick. The remainder of the interval is light grey sandstone. Matrix is probably siliceous or argillaceous, or both. Trace fucoids in green sandstone.
5311'-5361'	Sandstone	interbeds of light grey and green grey with the light grey sandstone becomming thinner bedded (1"-15") and is nearly all speckled with fine medium brown flecks up to 1/8" diam.
5361'-5379'	Sandstone	as above, possibly cross-bedded, but more likely fractured at a low angle to bedding plane and thus simulating cross-bedding.
5379'-5417'	Sandstone-Shale	light grey to light green grey, sandstone is 20% of interval, other 80% is shale, mainly medium green, very micaceous and fissile, also maroon, micaceous and fissile.

5417'-5467'	Shale	dark maroon, fissile, smooth, slightly dolomitic?, brittle, trace of 1" green fissile shale beds and trace of shaly dolomitic beds 1-2" thick. Some shaly concretions?, possibly in some cases only concentric fracture system of shale, weathers dark maroon.
5467'-5496'	Shale	dark maroon, fissile, smooth, slightly dolomitic?, brittle, last 5' grades into an interbedded green fissile shale and a shaly sandy dolomite.
5496'-5526'	Sandstone	Top 5' - dark grey, possibly argillaceous content? and in part lithic, very fine to fine crystalline. At the top of this interval a heavily iron-stained sandstone with pebbles less than ¼". Remainder of unit - sandstone, light grey, very fine to fine grained, iron stain on weathered surface. Bedding 2" - 18". Last 5' grade into a sandstone with speckled ironstone deposits. No noticeable porosity.
5526'-5599'	Sandstone	Top 5' - argillaceous, light green, very fine to fine crystalline. Remainder sandstone, light grey, ironstone deposits throughout. No noticeable porosity. Very fine to fine. Bedding 2"-2' thick. Weathers light buff to grey. Ripple marks, some interbedded green shale.
5599'-6338'	Inaccessible	
6338'-6388'	Sandstone	light grey, very fine grained, no porosity, bedding 4"-3', weathers light buff, contains scattered ironstone deposits, but less than before, very slight trace of argillaceous or clay deposit less than ¼" diam.

6388'-6438'	Sandstone	very light grey - glassy, very slight trace of iron stone deposits, no porosity, less than ¼" - 2' bedding, silty at top of interval grading to a glassy very fine grained sandstone. More ironstone towards bottom, medium to dark grey at bottom.
6438'-6488'	Sandstone	light to medium grey, very fine to fine grained, beds 2-3' thick, possibly some welding of grains? No porosity, scattered ironstone deposits throughout.
6488'-6538'	Sandstone	light grey, fine grained, no porosity, weathers light buff, beds 6"-3', scattered ironstone deposits.
6538'-6585.5'	Sandstone	light grey, fine grained, no porosity, weathers light buff, an interbed of silty green and maroon shale, very micaceous, 1' interbed of micaceous light green siltstone; ½" beds, one foot of sandstone and then interbedded fissile, smooth, maroon and green silty shale.
6585.5'-6638'	Sandstone	light grey to light grey green, medium green at top 6-7', fine grained with very fine grained near center of interval. No porosity, ironstone specks as above, weathers light buff, beds 2-5' thick, less fracturing.
6638'-6688'	Sandstone	light grey to light green, very fine to fine grained, no porosity, very slight trace to no ironstain, otherwise weathering and bedding as above, bottom 5' becomes medium green in color.
6688'-6738'	Sandstone	light grey to medium olive green, otherwise as above, some welding of grains, 3" green shale band.

6738'-6788'	Sandstone	light to medium green, very fine to fine grained, no porosity, fair ironstone deposits, beds 2-5', weathers light buff.
6788'-6839'	Shale-Sandstone	Top 1' interbedded, maroon and green fissile smooth shale. Remainder sandstone as above.
6839'-6845'	Siltstone	sandy, micaceous, bedding less than ½", thick. light to medium olive green, weathers dark grey to green.
6845'-6873'	Covered interval	
6873'-6889'	Shale-Sandstone	interbedded shale and sandstone, sandstone - light green, fair peppery, ironstone deposits, beds 1-2' thick, very fine to fine grained, no porosity. shale - silty, green, fissile, fairly smooth, beds 1' thick.
6889'-6911'	Covered interval	
6911'-6959'	Shale-Siltstone	interbedded shale and siltstone, siltstone - micaceous, light green, beds 6"-1' totalling 6" to 5' thick between shale beds, no porosity, Assymetric ripple marks with direction of flow west to east, scattered throughout but not obvious on all beds. Weathers light greenish-buff. Trace ironstone specks or deposits. shale - medium green, fissile, smooth, beds 6" to 3' thick.
6959'-7008'	Shale-Siltstone	Shale - top 1', fissile, maroon, smooth Remainder as above, interbedded shale and siltstone, shale-siltstone - 40/60, shale in most part more silt content.
7008'-7061'	Shale-Siltstone	shale-siltstone ration - 20/80 shale - fissile, maroon, smooth siltstone - micaceous, light green, no porosity, weathers light greenish-buff.

7061'-7086'	Shale-Siltstone	shale-siltstone ratio - 10/90. shale - fissile, maroon, smooth siltstone - micaceous, light green, no porosity, weathers light greenish buff.
7086'-7153'	Covered interval	
7153'-7186'	Sandstone	in part an ortho-quartzitic, very fine grained medium grey-glassy, beds 2-4' thick, peppery ironstone deposits, no porosity, weathers reddish dark grey, one silty shale bed.
7186'-7199'	Covered interval	
7199'-7226'	Sandstone	in part an ortho-quartzitic, very fine grained medium grey-glassy, beds 2-4' thick, peppery ironstone deposits, no porosity, weathers reddish dark grey, a few 1' thick siltstone beds, color light grey.
7226'-7258'	Covered interval	
7258'-7292'	Sandstone	light grey to green, very fine grained, beds 1-3' thick, no porosity, good iron stained deposits, weathers light to medium buff.

SECTION ABOVE FALLS ON
CARCAJOU RIVER
BM-87-N60

SECTION ABOVE FALLS ON CARCAJOU RIVER
BM-87-N60

Latitude: 64°34'
Longitude: 127°16'

0-1600'	Sandstone	quartzitic sandstone on dip slope.
1600'-3110'	Sandstone	sandstone and quartzitic sandstone, very pale pinkish grey, medium to thick bedded, locally cross-bedded, medium to coarse grained, sub-rounded, locally conglomeratic, good porosity.
3110'-3348'	Sandstone	Shaly sandstone and platy quartzitic sandstone, mostly maroon color, some yellow-grey-green, medium to fine grained, poor to fair porosity, mud cracks, ripple marks, cross bedding common.
3348'-3583'	Quartzite	Quartzite and quartzitic sandstone, yellow brown to pale grey-white, thin to medium bedded (thicker bedded upward), medium grained, pure , porosity poor, cross bedding, ripple marks.
3583'-3983'	Quartzite	pink, weathering pinkish grey-brown, thick bedded, medium grained, poor porosity, some clay pellet conglomerate.
3983'-4655'	Shale	mudstones, somewhat metamorphosed, maroon, grey-green to medium grey, with interbedded quartzites 1-2' thick, fine to medium grained, poor porosity, mud cracks and ripple marks in float.
4655'-5077'	Shale	shales and slates, phyllitic, yellow-brown to marron, some dark grey to medium grey, platy, silty. Mud cracks, ripple marks. Interbedded with 1'-3' quartzites up upper part.

5077'-5532'	Quartzite	grey to brown speckled with yellow to brown limonite spots, weathering grey-brown, medium thick bedded, medium grained, sub-rounded, silic and cement. Poor porosity. Locally gneissoid. Interbedded with phyllitic and hornfelsic shale or slates. Mud cracks, few thin diabasic sills.
5532'-7192'	Shale-Slate	black, grey and grey-green phyllitic andhornfelsic shale and slate, minor platy and thin bedded sandstone with a few thin diabasic sills. Several 2' to 5' quartzite beds in upper part. Mud cracks.

Base of section

NORTH NAHANNI SECTION
QT-305-N60

Latitude: 62°20'40"N
Longitude: 123°44'W

0-50'	Limestone	very light grey, weathering very light brown, thin to medium bedded ($\frac{1}{2}$"-4"), micro crystalline, very shaly and silty, shows cross-bedding and ripple marking, fossiliferous with some very calcareous shale partings between limestone beds.
50'-125'	Covered interval	
125'-235'	Siltstone	Siltstone, medium to dark grey, weathering light brown to rusty, calcareous, limy, thin bedded ($\frac{1}{4}$"-2"), micaceous, with medium brown, weathering light brown shale, very slightly silty shale interval.
235'-265'	Siltstone	medium to dark grey, weathering light brown to rusty, calcareous, limy, thin bedded ($\frac{1}{4}$"-2"), micaceous, with medium brown, weathering light brown shale, very slightly silty shale interval.
265'-370'	Shale	interbedded shale and siltstone, shale siltstone ratio 4 or 5:1
370'-401'	Siltstone	slightly calcareous, medium to light grey, weathering maroon and rusty, $\frac{1}{4}$"-1" thick with shale interbeds up to 2" thick, shale is maroon, fissile, ratio siltstone shale is 2:1.
401'-452'	Shale	maroon, very slightly calcareous, very slightly silty, fissile, weathering maroon and sometimes maroon and light green grey, with siltstone, slightly calcareous, $\frac{1}{4}$"-1" at rare intervals siltstone = 10% of outcrop , recessive.

452'-490'	Siltstone	medium to light grey, weathers rusty and maroon, cross bedding, calcareous, with maroon shale intercalations. Outcrop is 90% siltstone, resistant and cliff forming.
490'-650'	Shale	interbedded shale, maroon to medium brown, weathers maroon, very slightly calcareous, very slightly silty and siltstone, light grey, weathers maroon and rusty, calcareous, with beds ¼"-1", well bedded with ratio of siltstone shale 1:4. At 509 a 1' siltstone band, thin bedded, fossiliferous, medium grey, weathering rusty, calcareous.
650'-656'	Shale-Siltstone	interbedded shale and siltstone with siltstone making up 30-35% of outcrop.
656'-679'	Shale	medium brown, weathering light grey brown and rusty, fissile, calcareous, interbedded with siltstone, medium-light grey, weathering rusty, calcareous, ¼"-1" thick making up 10-20% of exposure. Recessive.
679'-679.5'	Limestone	micro-crystalline, light to medium grey, weathering rusty, very fossiliferous with crinoids. All crinoids and brachiopods have maroon hematite coating.
679.5'-700'	Shale	medium brown, fissile to platy, calcareous, very slightly silty, slightly micaceous, weathers medium grey to rusty, interbeds of siltstone, medium to light grey, weathering light grey and rusty, calcareous and is 30% of outcrop, which forms a small cliff.

700'-721'	Shale	medium brown, fissile to platy, calcareous, very slightly silty, slightly micaceous, weathering medium grey to rusty, with interbeds of siltstone ¼"-2". Siltstone medium to light grey, weathering light grey and rusty, calcareous and is 10% of outcrop.
721'-722'	Limestone	4"-6" bed of limestone, micro-crystalline, medium grey, weathering rusty, crinoids, very fossiliferous, recessive.
722'-950'	Shale	medium brown, fissile, calcareous, very slightly silty, micaceous, weathering medium grey and rusty, rare siltstone bands ¼-½" appear, are medium grey brown, calcareous.
950'-1050'	Covered interval	
1050'-1080'	Shale-Siltstone	shale, maroon, weathers dark grey to deep wine, fissile to platy, calcareous, slightly micaceous, non-silty, with siltstone bands ¼-1", calcareous, light to medium grey, weathering rusty, micaceous.
1080'-1110'	Covered interval	
1110'-1128'	Shale-Siltstone	shale, maroon, weathers dark grey to deep wine, fissile to platy, calcareous, slightly micaceous, non-silty, with siltstone bands ¼"-1", calcareous, light to medium grey, weathers rusty, micaceous.
1128'-1148'	Covered interval	
1148'-1150'	Shale	green, weathering dark grey to deep green, fissile to chunky, calcareous, slightly micaceous.

1150'-1254'	Covered interval	
1254'-1259'	Shale	medium grey to medium dark brown, weathrs medium to dark brown, and rusty, very calcareous, fissile to platy, soft, slightly silty.
1259'-1265'	Covered interval	
1265'-1268'	Shale	medium grey to medium dark brown, weathers medium to dark brown and rusty, very calcareous, fissile to platy, soft, slightly silty.
1268'-1285'	Covered interval	
1285'-1405'	Shale	medium grey to medium dark brown, weathers medium to dark brown and rusty, very calcareous, fissile to platy, soft, slightly silty.
1405'-1490'	Shale	medium brown, weathering light to medium brown, very calcareous, very soft, fissile, micaceous, with thin ($\frac{1}{4}$-3/4") bands of limestone, very shaly, light grey, weathering light grey, microcrystalline. Limestone bands occur at 2"-1' intervals becoming further apart upwards. Top 15' has many thin ($\frac{1}{4}$-$\frac{1}{2}$") limestone bands.
1490'-1535'	Limestone	interbedded limestone, light grey, shaly, weathering light grey, thin bedded ($\frac{1}{4}$"-1"), microcrystalline and shale, medium grey brown, weathering medium grey, very calcareous, very soft, laminated, micaceous.
1535'-1597'	Limestone	microcrystalline, shaly, light grey, weathering light grey brown, thin bedded ($\frac{1}{2}$"-1") with intercalations of very calcareous, micaceous shale, between limestone beds.

1535'-1597'	Limestone	(Cont'd) Limestone is lenticular to nodular bedded, resistant, cliff forming. Limestone= 65-70%, shale = 30-35%. Bedding is due to varying amounts of shale in limestone. In limestone at top are pyrite nodules 1/8"-¼" in diameter.
1597'-1609'	Shale	interbedded limestone and shale. Limestone - slightly shaly to shaly, extremely fine to micro-crystalline, light grey to light brown grey, weathering light grey, limestone is lenticular to nodular bedded. Resistant. Shale - very calcareous, silty, medium grey brown, weathering light grey brown, platy to wafery and indistinct. Shale limestone ratio 2:1. Limestone beds ¼"-1", with shale ½"-2". Recessive.
1609'-1647'	Limestone	slightly shaly to shaly, extremely fine to microcrystalline, light grey to light brown grey, weathering light grey, thin bedded with intercalations of very calcareous shale between limestone beds. Limestone is lenticular to nodular bedded. Resistant.
1647'-1654'	Shale	very calcareous, silty, medium grey brown, weathering light grey brown, platy to wafery and indistinct.
1654-1658'	Siltstone	very calcareous, light grey brown, weathering very light grey brown, limy, shaly, resistant.
1658'-1661'	Shale	light grey brown, silty, calcareous, platy.

1661-1662.5'	Siltstone	very calcareous, light grey brown, weathering very light grey brown, limy, shaly, resistant.
1662.5'-1666.5'	Limestone	microcrystalline, shaly, undulating bedding, medium to thin bedded, medium grey to grey brown, weathering light grey brown with very thin calcareous shale intercalations.
1666.5'-1668'	Limestone	microcrystalline, silty, medium to light grey, weathering light grey brown, fossiliferous, resistant.
1668'-1676'	Shale	medium grey, fissile, calcareous.
1676'-1686'	Siltstone	light grey green, weathering light green grey, slightly calcareous, fossiliferous with some very calcareous beds, very fossiliferous, with ripple marks and cross beds.
1686'-1704'	Shale	medium grey, fissile, weathering medium grey, non-calcareous, with many siltstone bands (1") in bottom 3'.
1704'-1707'	Sandstone	very fine to fine grained, maroon, weathers maroon (hematite?), very calcareous, fossiliferous, appears banded in places.
1707'-1733'	Shale	medium grey, fissile, weathers medium grey, non-calcareous with very thin siltstone bands at 3' intervals, fossiliferous.
1733'-1734'	Siltstone	very dirty, medium to dark grey, weathering medium grey brown, one very thin coal stringer (1/8"), brachiopods, ripple marks.
1734'-1738'	Shale	medium grey, fissile, weathers medium grey, non-calcareous.

1738'-1742'	Siltstone	calcareous, cliff forming, massive, light to medium grey, fossiliferous, weathers light grey to medium rusty brown, limy.
1742'-1775'	Shale	medium grey, weathers medium grey, silty, with interbedded siltstone medium grey, weathering light grey and rusty, calcareous and fossiliferous. Amount of siltstone increases from 25% at base to approximately 95% at 1750'.
1775'-1789'	Siltstone	interbedded siltstone, slightly calcareous to non-calcareous, light grey green, weathering light grey, very hard, thin to medium bedded, resistant. Shale - silty, non-calcareous, platy to fissile. This unit is very fossiliferous and siltstone becomes very calcareous in top 6-8'. Siltstone shows ripple marks.
1789'-1797'	Shale	fissile to platy, silty, medium grey, weathering medium grey and rusty with siltstone bands, light grey, weathering medium grey, 1-2". At top is a 6" coquina of limestone slightly silty.
1797'-1799'	Siltstone	light grey green, weathering light grey, very hard, thin to medium bedded, resistant, slightly calcareous.
1799'-1803'	Shale	medium grey, fissile,non-calcareous, weathers light grey.
1803'-1810'	Sandstone	quartz, clean, fine grained, massive, sub-rounded, light grey to light grey brown, non-calcareous, fossiliferous, limy, with scattered black fine chert grains. Resistant.
1810'-1814'	Shale	medium grey, fissile, non-calcareous, weathers light grey.

1814'-1830'	Sandstone	very fine to fine grained, well sorted, light grey green to light green, weathers light grey green, medium bedded, with 2-4" beds (rare) near top of sandstone, fine grained, quartz, clean, very calcareous, with abundant ostracods and brachiopods.
1830'-1837'	Shale	medium grey, weathers medium grey, fissile to platy and chunky, micaceous, silty.
1837'-1849'	Sandstone	quartz, clean, fine grained, massive, sub-rounded, light grey to light brown grey, non-calcareous, fossiliferous, limy, well scattered, black, fine, chert grains.
1849'-1854'	Sandstone	very fine grained, light grey green, weathers light grey green, thin wavy bedding, micaceous, carbonaceous, non-calcareous, shaly, evidence for shale strictly in weathering.
1854'-1906'	Sandstone	very fine grained, light grey green, weathers light grey green and dark rusty brown, thin to medium bedded, micaceous, carbonaceous, non-calcareous, very small ($\frac{1}{4}$") cross bedding, resistant.
1906'-1920'	Sandstone	medium to light brown to medium green grey, weathers very light green grey to light brown dark rusty brown, very fine grained, micaceous, carbonaceous, limy, slightly calcareous, fossiliferous, medium bedded to massive, blocky, poor to fair porosity. At the top sandstone becomes very limy. Resistant.

1920'-1922'	siltstone	light grey green, weathers medium grey, thin to medium bedded, micaceous, carbonaceous. This is a gradational zone from shale to sandstone. Resistant.
1922'-1925'	Shale	medium grey, fissile, weathers medium grey, micaceous, recessive.
1925'-1934'	Siltstone	light grey green to medium grey green, weathering medium grey, thin bedded to medium bedded, non-calcareous, micaceous, becoming light grey and limy at bottom. At bottom is 4" bed of sandstone, very calcareous, fine grained, medium grey green, weathers dark rusty brown, fossiliferous.
1934'-1950'	Siltstone	interbedded siltstone, medium to dark grey, weathers medium grey and rusty, thin bedded, shaly, with shale, medium grey, very slightly silty to silty, fissile to platy depending on silt content. Silt shale ratio 3:2. Amount of siltstone increases downward.

Total section 1950'

GOBI NORFORD CREEKS
OT-307-N60

GOBI-NORFORD CREEKS
OT-307-N60

Latitude: 62°45'30"N-62°38'n
Longitude: 125°10'-125°11' W

0-16'	Limestone	IA, cryptocrystalline, very slight trace black argillaceous material or bituminous material, cross-fractures (white spar). In general extremely fine fragments. Circular fossils with central canals, styolites.
16'-26'	Limestone	IA, cryptocrystalline, possible spines, very slight trace black argillaceous material, trace of silt, styolites, calcite fractures, fossils; gastropods, brachiopods, ostracods, crinoids and corals.
26'-36'	Limestone	IA, cryptocrystalline, very slight trace black argillaceous material , trace of silt, fossils - gastropods, ostracods, brachiopods, crinoids, corals, weak cut fluorescence.
36'-46'	Limestone	IA, cryptocrystalline, very slight trace black argillaceous material, silty, calcite fractures, fossils-corals, crinoids, brachiopods and ostracods.
46'-56'	Limestone	IA, cryptocrystalline, trace of silt, possible spines and trilobites? very slight trace of black argillaceous material, calcite fractures, weak cut fluorescence. Fossils: corals, crinoids, gastropods, ostracods and brachiopods.
56'-66'	Limestone	IA, microcrystalline, trace of silt and black argillaceous content, weak cut fluorescence.
66'-76'	Limestone	IA, cryptocrystalline, white spar fractures, some cross-fracturing, patches of secondary dolomite crystals, dolomite rhombs. Trace of silt and black argillaceous material, styolites, weak cut fluorescence. Fossils: crinoids and brachiopods.

76'-86'	Limestone	IA, cryptocrystalline, trace extremely fine dolomite rhombs, trace silt and black argillaceous content, thin-bedded, weak cut fluorescence, fossils: corals, brachiopods, crinoids, ostracods.
86'-96'	Limestone	IA, cryptocrystalline, black, trace extremely fine dolomite rhombs, very slight trace silt and black argillaceous material, weak cut fluorescence, thin bedded.
96'-106'	Limestone	IA, cryptocrystalline, dark grey-black, thin bedded, trace extremely fine dolomite rhombs, trace silt and black argillaceous material, weak cut fluorescence, calcite fractures, weathers medium to dark grey, fossils: crinoids, brachiopods, gastropods, ostracods.
106'-116'	Limestone	IA, cryptocrystalline, dark grey to black, thin bedded, weathers medium to dark grey, trace of silt and black argillaceous material, trace calcite fractures, weak cut fluorescence, fossils:crinoids, brachiopods, gastropods.
116'-126'	Limestone	IA, cryptocrystalline, dark grey to black, thin bedded, weathers medium to dark grey, trace calcite fractures, weak cut fluorescence, very slight trace of black argillaceous or bituminous content, trace micro enchelon fractures, fossils: gastropods.
126'-136'	Limestone	IA, cryptocrystalline, medium to dark grey, thin bedded, weathers medium to dark grey, silty, black argillaceous material, trace pyrite, weak cut fluorescence, fossils; ostracods, gastropods.
136'-146'	Limestone	IA', cryptocrystalline, black to dark brown-grey, thin bedded, weathers medium to dark grey, extremely fine dolomite rhombs, trace silt, calcite fractures, weak cut fluorescence, fossils: crinoids.

146'-156'	Limestone	IA, cryptocrystalline, black, thin bedded, weathers medium to dark grey, very slight trace argillaceous content, irregular and cross-fracturing, calcite fractures, weak cut fluorescence, fossils: crinoids, brachiopods and ostracods.
156'-166'	Limestone	IA, cryptocrystalline, black, thin bedded, weathers medium to dark grey, very slight trace argillaceous content, calcite fractures, weak cut fluorescence, fossils: brachiopods, ostracods.
166'-176'	Limestone	IA, cryptocrystalline, trace silt and medium grey argillaceous content, dark grey to black grading to dark brown-grey, thin bedded, weathers medium to dark grey, weak cut fluorescence, fossils: gastropods, crinoids, brachiopods, corals.
176'-186'	Limestone	IA, cryptocrystalline, black, thin bedded, weathers medium to dark grey, trace silt and black argillaceous material, trace calcite fractures, fetid odor, weak cut fluorescence, fossils: brachiopods, crinoids, gastropods.
186'-196'	Limestone	IA, cryptocrystalline, black, thin bedded, weathers medium to dark grey, trace silt and black argillaceous material, trace extremely fine rhombs, weak cut fluorescence, fossils: crinoids, ostracods.
196'-208'	Covered	
208'-226'	Limestone	IA, cryptocrystalline, dark grey to black grading to dark brown grey, thin bedded, weathers medium dark grey, black argillaceous content, extremely fine dolomite rhombs, weak cut fluorescence, fossils: ostracods?, crinoids.

226'-236'	Limestone	IA, cryptocrystalline, black, thin bedded, weathers medium to dark grey, black argillaceous content, weak cut fluorescence, fossils: brachiopods, crinoids, gastropods
236'-246'	Limestone	IA, microcrystalline, black, thin bedded, weathers medium to dark grey, trace pyrite, trace black argillaceous content to conodonts, weak cut fluorescence, fossils: brachiopods, crinoids, corals.
246'-256'	Limestone	IA, microcrystalline, black, thin bedded, weathers medium to dark grey, black argillaceous content, weak cut fluorescence, trace pyrite, fossils: corals, crinoids, gastropods and brachiopods.
256'-266'	Limestone	IA, cryptocrystalline, black, thin bedded, weathers medium to dark grey, trace silt, black argillaceous content, trace pyrite, weak cut fluorescence, fossils: conodonts?, corals, gastropods, crinoids, brachiopods and ostracods.
266'-276'	Limestone	IA, cryptocrystalline, black, thin bedded, weathers medium to dark grey, trace silt, black argillaceous content, trace pyrite, weak cut fluorescence, fossils: gastropods, corals?, brachiopods, crinoids.
276'-286'	Limestone	IA, cryptocrystalline, black, thin bedded, weathers medium to dark grey, trace silt, black argillaceous content, trace pyrite, weak cut fluorescence, fossils: conodonts?, corals, crinoids, brachiopods andostracods.
286'-293'	Limestone	IA, cryptocrystalline, black, thin bedded, weathers medium to dark grey, trace silt, black argillaceous content, trace pyrite, weak cut fluorescence, trace fossils.

293'-302'	Covered	
302'-306'	Limestone	IA, cryptocrystalline, black, thin bedded and rubbly, weathers light to medium grey, trace silt, black argillaceous content, weak cut fluorescence, fossils; brachiopods, crinoids, corals.
306'-316'	Limestone	IA, cryptocrystalline, black, thin bedded and rubbly, weathers light to medium grey, trace of silt, large percentage black argillaceous content. Some shale interbeds, weak cut fluorescence, fossils: brachiopods and shell fragments, 5% pyrite.
316'-323'	Limestone	IA, cryptocrystalline, black, thin bedded and rubbly, weathers light to medium grey, black argillaceous content, weak cut fluorescence, fossils: crinoids and brachiopods.
323'-341'	Covered	
341'-346'	Limestone	IA, cryptocrystalline, dark grey, thin to medium bedded and rubbly, weathers medium grey and buff, silty and some black argillaceous material.
346'-356'	Limestone	IA, cryptocrystalline, black, thin to medium bedded and rubbly, weathers medium grey and buff, trace black argillaceous content, trace pyrite, secondary dolomite rhombs, irregular argillaceous banding, clear calcite, birdeye, lineated along argillaceous banding.
356'-366'	Limestone	IA, cryptocrystalline, black, thin to medium bedded and rubbly, weathers medium grey and buff, black argillaceous content, trace pyrite, weak cut fluorescence, fossils: corals.

366-376'	Limestone	IA, cryptocrystalline, black, thin to medium bedded and rubbly, weathers medium grey to buff, black argillaceous material, trace pyrite, weak cut fluorescence, fossils, shell fragments and crinoids, possible ostracod?
376'-386'	Limestone	IA, cryptocrystalline, black, thin to medium bedded and rubbly, weathers medium grey to buff, trace silt and black argillaceous content, weak cut fluorescence, fossils: gastropods and crinoids.
386'-396'	Limestone	IA, cryptocrystalline, black, thin to medium bedded and rubbly, weathers medium grey to buff, trace silt and black argillaceous content, calcite fractures, weak cut fluorescence, fossils: corals?, brachiopods, crinoids and many shell fragments.
396'-406'	Limestone	IA, cryptocrystalline, black, thin to medium bedded, weathers medium grey to buff, trace silt, black argillaceous content, weak cut fluorescence, fossils: corals, brachiopods, bryozoans, crinoids, gastropods and ostracods.
406'-416'	Limestone	IA, cryptocrystalline, black, thin to medium bedded, weathers medium grey-buff, trace silt and black argillaceous content, trace calcite fractures. Fossils: corals, gastropods and crinoids.
416'-426'	Limestone	IA, cryptocrystalline, black, thin to medium bedded and rubbly, weathers medium grey to buff, black argillaceous content. Fossils: crinoids ostracods, brachiopods, gastropods and pelecypods.
426'-436'	Limestone	IA, cryptocrystalline, black, thin to medium bedded and rubbly, medium grey to buff, black argillaceous content, trace calcite fractures, fossils - crinoids, gastropods.

436'-446'	Limestone	IA, cryptocrystalline, black, thin to medium bedded and rubbly, medium grey and buff weathering, black argillaceous content, trace pyrite, fetid odor, weak fluorescence cut, fossils - brachiopods, crinoids, gastropods and corals.
446'-456'	Limestone	IA, cryptocrystalline, black, thin to medium bedded and rubbly, medium grey and buff, weathering, black argillaceous content, calcite fractures, extremely fine dolomite rhombs, fetid odor, weak cut fluorescence, trace pyrite, fossils - crinoids, brachiopods, gastropods and corals.
456'-468'	Shale	black, thin to medium bedded, weathers medium grey and buff, trace pyrite, rubbly, calcareous, weak cut fluorescence, fossils - gastropods, brachiopods, ostracods?, crinoids and corals.
468'-481'	Covered	
481'-486'	Shale	interbedded black and dark grey, calcareous, thin to medium bedded, weathers medium to dark grey, trace pyrite, weak cut fluorescence and crinoids and brachiopods in black shale.
486'-491'	Covered	
491'-493'	Shale	black, thin to medium bedded, weathers medium to dark grey, calcareous, weak cut fluorescence
493'-496'	Shale	dark grey to balck, thin to medium bedded, weathers medium to dark grey, calcareous, weak cut fluorescence, fossils - brachiopods and crinoids.
496'-506'	Shale	black, thin to medium bedded, weathers medium to dark grey, very calcareous, trace calcite fractures, fossils - brachiopods, crinoids and ostracods?

506'-516'	Shale	black, thin to medium bedded, weathers medium to dark grey, calcareous and silty, fossils - crinoids, brachiopods, gastropods, and corals.
516'-526'	Limestone	IA, cryptocrystalline, black, thin to medium bedded, weathers medium to dark grey, trace black argillaceous content, patches of secondary dolomite rhombs, fossils - crinoids.
526'-531'	Limestone	IA, cryptocrystalline, black, thin to medium bedded, weathers medium to dark grey, black, argillaceous content, trace calcite fractures, trace pyrite, rubbly appearance, fossils - crinoids.
531'-534'	Covered	
534'-545'	Limestone	IA, cryptocrystalline, black, thin bedded rubbly, black argillaceous content, weathers light grey, trace calcite fractures, trace pyrite, fossils - brachiopods, crinoids, gastropod? and corals, open fracturing due to weathering.
545'-565'	Covered	
565'-568'	Limestone	IA, cryptocrystalline, black, thin bedded to rubbly, weathers light grey, black argillaceous content, trace oil bubbles on residue, trace of fossils.
568'-583'	Covered	
583'-596'	Limestone	IA, cryptocrystalline, black, medium to thin bedded, weathers light to medium grey, trace black argillaceous content, fossils - crinoids.
596'-606'	Limestone	IA, cryptocrystalline, black, medium to thin bedded, slightly rubbly, weathers light to medium grey, trace black, argillaceous content, trace calcite fractures, fossils - crinoids and undeterminable fossils.

606'-616'	Limestone	IA, cryptocrystalline, dark grey, medium to thin bedded, weathers light to medium grey, medium grey argillaceous content, calcite fractures, trace pyrite; secondary dolomite rhombs, concretionary in patches, fossils - crinoids.
616'-626'	limestone	IA, cryptocrystalline, dark grey, thin to medium bedded, weathers light to medium grey, trace silt, medium grey argillaceous content, trace styolites and iron stained fracture, fossils - ostracods, brachiopods, crinoids.
626'-629'	Covered	
629'-635'	Limestone	IA, cryptocrystalline, dark grey, thin to medium bedded, weathers light yellow to brown,medium grey, argillaceous content, trace calcite fractures, rubbly, hematitic stained, fossils - brachiopods, ostracods, corals, crinoids and brachiopod shell fragments.
635'-640'	Covered	
640'-645'	Shale	dark grey, thin bedded, weathers light brown grey, calcareous, pyrite, fossils - ostracods, shell fragments and crinoids, rubbly.
645'-678'	Covered	
678'-686'	Shale	medium to dark grey, medium to thin bedded, weathers light brown grey, calcareous, birdseye appears to be originally fossil displaced, rubbly.
686'-695'	Shale	dark grey, medium to thin bedded, weathers medium to dark grey, calcareous, hematitic stain, rubbly, fossils - crinoid, ostracod, brachiopods, gastropods and shell fragments.

695'-698'	Shale	dark grey, thin bedded, weathers medium to dark grey, calcareous.
698'-701'	Limestone	IA, dark grey, thin bedded, weathers medium to dark grey, silty, medium grey argillaceous content, trace pyrite, fossils - brachiopods, ostracods, crinoids, shell fragments.
701'-741'	Covered	Possibly this may be a shale interval.
741'-756'	Shale	medium to dark grey, thin to medium bedded, rubbly, weathers light to medium grey, calcareous, pyrite, fossils - brachiopods.
756'-766'	Shale	medium to dark grey, thin to medium bedded, rubbly, weathers light to medium grey, calcareous, pyrite.
766'-771'	Limestone	IA, cryptocrystalline, dark grey to black, thin to medium bedded, rubbly, weathers light to medium grey, trace silt, black argillaceous content, platy, pyrite.
771'-776'	Limestone	IA, cryptocrystalline, dark grey, thin to medium bedded, weathers light to medium grey, medium grey argillaceous content, calcite birdseyes, large pyrite cubes, fossils - brachiopods.
776'-781'	Limestone	IA, cryptocrystalline, dark grey to black, thin to medium bedded, rubbly, weathers light to medium grey, trace silt, black argillaceous content, platy, 5% pyrite.
781'-786'	Limestone	IA, cryptocrystalline, dark grey to black, thin to medium bedded, rubbly, weathers light to medium grey, trace silt content or grey argillaceous content, trace pyrite, fossils - corals.

786'-796'	Limestone	IA, cryptocrystalline, black, thin to medium bedded, rubbly, weathers light to medium grey, black argillaceous content, trace calcite fractures, trace pyrite, some undeterminable fossils.
796'-806'	Limestone	IA, cryptocrystalline, medium grey, thin to medium bedded, weathers light to medium grey, trace black argillaceous content, white dolomite and clear limestone birdseyes, shell fragments - ostracod?
806'-816'	Limestone	IA, cryptocrystalline, dark grey to black, thin to medium bedded, rubbly, weathers light to medium grey, black argillaceous content, irregular hair-like fractures, fossils - corals, brachiopods?, ostracods.
816'-826'	Limestone	IA, cryptocrystalline, dark grey, thin to medium bedded, weathers light to medium grey, trace black argillaceous content, trace calcite fractures, trace oil bubbles on residue; trace fossils
826'-832'	Limestone	IA, cryptocrystalline, dark grey, thin to medium bedded, rubbly, weathers light to medium grey, trace black argillaceous content, trace oil bubbles on residue, fossils - brachiopods.
832'-844'	No sample	
844'-856'	Limestone	IA, cryptocrystalline, medium grey, thin to medium bedded, weathers light to medium grey, calcite fractures and birdseye, light iron stained styolites, fossils - ostracods, corals, shell fragments.

856'-866'	Limestone	IA, cryptocrystalline, dark grey, thin to medium bedded, weathers light to medium grey, trace calcite fractures, trace iron stain, trace oil bubbles on residue, trace styolites, weak cut fluorescence.
866'-876'	No sample	
876'-886'	Dolomite	IA, medium crystalline, white to medium grey, thin to medium bedded, weathers light to medium grey, trace calcite fractures, slight trace black argillaceous material included in veining (possibly dead oil).
886'-896'	Limestone	IA, cryptocrystalline, dark grey to black to dark olive green grey, thin to medium bedded, weathers light to medium grey, trace calcite fractures, slight trace black argillaceous material, fossils - ostracods.
896'-916'	No sample	
916'-926'	Limestone	IA, cryptocrystalline, dark grey to dark olive green-grey, thin to medium bedded; light to medium grey weathering, trace dark grey argillaceous content, trace calcite fracture and birdseye, trace iron stain, fractures filled with white calcite, trace styolites, some authegenic quartz.
926'-936'	Limestone	IA, cryptocrystalline, dark grey to dark olive green grey, thin to medium bedded; weathers light to medium grey, trace black argillaceous content, trace authigenic quartz and trace of pyrite, fossils - ostracods, shell fragments.
936'-946'	Limestone	IA, cryptocrystalline, medium grey, thin to medium bedded, weathers light to medium grey, trace silt, trace black argillaceous content, small hair-size styolites, fossils-ostracods.

946'-956'	Limestone	IA, cryptocrystalline, dark olive green grey, thin to medium bedded, weathers light to medium grey, trace black argillaceous content, trace limestone birdseyes, trace styolites, mudstone, trace iron stain, trace dolomite crystals, fossils - ostracods.
956'-957'	Limestone	IA, very fine crystalline, dark brown to grey, thin to medium bedded, weathers light to medium grey, trace medium grey argillaceous content, calcite fractures and birdseyes, trace iron stain, trace dolomite crystals.
957'-958'	Limestone	IA, cryptocrystalline, dark brown to grey, thin to medium bedded, weathers light to medium grey, medium grey argillaceous content, rubbly appearance on bedding planes.
958'-967'	Dolomite	III/IA, medium crystalline, dark grey to black, medium bedded, weathers light to medium grey, very slight trace black argillaceous content, dolomite birdseyes.
967'-976'	Dolomite	IIIB15Dtr, extremely fine crystalline, dark grey to black, medium bedded, weathers light to medium grey, dolomite fractures, black argillaceous content, trace vuggy porosity, fair intercrystalline porosity.
976'-986'	Dolomite	IA, extremely fine to extremely coarse intra-formational breccia, in a white medium crystalline dolomite matrix, white and black, trace of black argillaceous content, medium bedded, weathers light to medium grey, dolomite fractures.

986'-996'	Dolomite	IA, medium crystalline, white and black, medium bedded, weathers light to medium grey, trace black argillaceous content, dolomite fractures, trace calcite content in dolomite veining, very faint fluorescent ring.
996'-1006'	Dolomite	IC5, fine to medium crystalline, medium grey, medium bedded, weathers light to medium grey, dolomite fractures, pinpoint vugs and some intercrystalline porosity, very slight trace argillaceous material.
1006'-1016'	Dolomite	IDtr, medium crystalline, white to medium grey, medium bedded, weathers light to medium grey, white secondary dolomite veining, possibly fragmental material, secondary dolomite appears laminated, trace vuggy porosity.
1016'-1026'	Dolomite	IDtr, medium crystalline, white to medium grey, medium bedded, light to medium grey weathering, medium size fragmental base rock material, scattered in patches, secondary dolomite veining, extremely coarse crystalline with laminated appearance.
1026'-1036'	Dolomite	ICtrDtr, medium to coarse crystalline, dark grey, medium bedded, weathers light to medium grey, slight trace black argillaceous material, scum on residue, porosity confined in general to spar.
1036'-1046'	Dolomite	ICtrDtr, medium crystalline, white to dark grey, medium bedded, weathers light to medium grey, white dolomite spar veining and patches trace vuggy and intercrystalline porosity.

1046'-1056'	Dolomite	ICxC7Dtr, fine to very coarse fragmental, dark grey to white, medium bedded, weathers light to medium grey. Porosity due to incomplete recrystallization of white spar, fossils - crinoids.
1056'-1066'	Dolomite	IMA, fine to very coarse fragmental, dark grey to black to white, medium bedded, weathers light to medium grey, sparry dolomite patches or vug fillings, slight trace black argillaceous material
1066'-1076'	Dolomite	ICtrD6, medium crystalline, medium grey to white, medium bedded, weathers light to medium grey, calcite and dolomite birdseyes, very slight trace argillaceous or bituminous material, trace inter-crystalline porosity, fair vuggy porosity.
1076'-1086'	Dolomite	IC5, very coarse crystalline, medium grey, medium bedded, weathers light to medium grey, poor intercrystalline porosity, fossils - crinoids, trace dolomite fractures.
1086'-1096'	Dolomite	ICtr, medium crystalline, dark grey to white, medium bedded, light to medium grey weathering, calcite fractures, trace vuggy porosity, fossils - crinoids.
1096-1116'	Dolomite	IC7, medium to very coarse fragmental, medium grey, medium bedded, light to medium grey weathering, trace black argillaceous scum, dolomite spar, fossils - crinoids, good vuggy porosity.
1116'-1126'	Dolomite	ICtr, medium to very coarse fragmental, light to medium grey, trace calcite fractures, dolomite spar, trace fracture porosity.

1126'-1136'	Dolomite	IC7, medium to very coarse fragmental, medium grey, medium bedded, weathers light to medium grey, good vuggy porosity.
1136'-1146'	Dolomite	ICtr, medium crystalline, light to medium grey, medium bedded, weathers light to medium grey, dolomite spar, trace black spots, trace intercrystalline porosity.
1146'-1156'	Dolomite	IA, medium crystalline, dark grey, medium bedded, weathers light to medium grey, 5% dead oil stain, very slight fluorescent ring.
1156'-1166'	Dolomite	IA, medium to very coarse fragments, dark grey, medium bedded, weathers light to medium grey, very slight trace dark argillaceous content, fossils - crinoids, weak fluorescent cut.
1166'-1176'	Dolomite	IC7, medium to very fragmental and fine crystalline, dark grey, medium bedded, weathers light to medium grey, pinpoint vugs and intercrystalline porosity. Fossils - crinoids, weak fluorescent cut.
1176'-1186'	Dolomite	IC1, fine to medium crystalline, dark grey, medium bedded, light to medium grey, trace dolomite fractures, slight trace black argillaceous material, weak cut fluorescence, trace intercrystalline porosity, fossils - crinoids.
1186'-1196'	Dolomite	IC5, medium crystalline, dark grey, medium bedded, weathers light to medium grey, trace dolomite fractures, slight trace black argillaceous content, weak cut fluorescence, trace intercrystalline porosity.

1196'-1206'	Dolomite	IC10, medium crystalline, dark grey medium bedded, weathers light medium grey, slight trace black argillaceous or bituminous content?, fair intercrystalline porosity, weak cut fluorescence.
1206'-1216'	Dolomite	ICtr, fine to medium crystalline, dark grey, medium bedded, weathers light to medium grey, trace vuggy porosity, fossils - crinoids.
1216'-1226'	Dolomite	IC5D3, fine crystalline, dark grey, medium bedded, weathers light to medium grey, slight trace black argillaceous content, fair intercrystalline porosity and good vuggy porosity, fossils - crinoids
1226'-1229'	Dolomite	IDtr, fine crystalline, dark grey, medium bedded, weathers light grey, slight trace black argillaceous content, trace vuggy porosity.
1229'-1236'	Dolomite	IDtr, medium to coarse fragments, light to dark grey, medium bedded, weathers light grey, dolomite spar, fossils - brachiopods?
1236'-1246'	Dolomite	IDtr, medium to coarse fragments, light to dark grey, medium bedded, weathers light grey, sparry dolomite matrix and dolomite vug or fracture filling, weak cut fluorescence, trace vuggy porosity.
1246'-1256'	Dolomite	IA, fine crystalline, dark grey, medium bedded, weathers light grey, weak cut fluorescence, fossils - crinoids.
1256'-1266'	Dolomite	IA, medium to coarse crystalline, dark grey, medium bedded, weathers light to medium grey, weak cut fluorescence, fossils - crinoids.

1266'-1276'	Dolomite	IC, D3, medium crystalline, dark grey, medium bedded, weathers light to medium grey, weak cut fluorescence, fair vuggy porosity.
1276'-1286'	Dolomite	IC10D15, fine crystalline, dark grey, medium bedded, weathers medium grey, very slight trace black argillaceous material, fair intercrystalline, porosity, and good vuggy porosity, weak cut fluorescence, fossils - crinoids
1286'-1296'	Dolomite	IB5C15D10, medium crystalline, dark grey, medium bedded, weathers medium grey, fetid odor, weak fluorescence, poor intercrystalline porosity, good vuggy porosity.
1296'-1306'	Dolomite	ID2, medium to coarse crystalline, light to medium grey, medium bedded, medium grey weathering, white spar matrix, poor vuggy porosity, fossisl - crinoids
1306'-1316'	Dolomite	IC10-15D1, fine crystalline, dark grey, medium bedded, weathers medium grey, intercystalline, and vuggy porosity, extremely coarse crystals filling vugs, dolomite birdseyes, weak cut fluorescence.
1316'-1326'	Dolomite	IC5D5, fine to medium crystalline, dark grey, medium bedded, weathers medium grey, very good vuggy porosity, weak cut fluorescence, fossils - crinoids
1326'-1336'	Dolomite	IA, medium crystalline, dark grey, medium bedded, weathers medium grey, trace hair fractures (healed)
1336'-1346'	Dolomite	IC2, fine to medium crystalline, dark grey, medium bedded, weathers medium grey, poor intercrystalline porosity, weak cut fluorescence.

1346'-1356'	Dolomite	ID5, fine to medium crystalline, medium grey to black, medium bedded, weathers medium grey, mottling of less contrast, slight trace black argillaceous or bituminous material, dolomite rhombs lining vugs, fair vuggy porosity, weak cut fluorescence, fossils - corals.
1356'-1366'	Dolomite	ID10, medium crystalline, medium grey, black, mottled, weathers medium grey, approaching a fracture dolomite breccia, white spar filled vugs and fractures , druzzy dolomite rhombs vug lining, slight trace black argillaceous or bituminous material, weak cut fluorescence, good vuggy porosity, fossils - crinoids
1366'-1376'	Dolomite	IA, fine to medium crystalline, dark grey, medium bedded, weathers medium grey, trace fracture and birdseye, fossils - crinoids
1376'-1386'	Dolomite	IA, fine to medium crystalline, dark grey, medium bedded, weathers medium grey, white dolomite spar, some mottling, fossils - crinoids.
1386'-1396'	Dolomite	IB2C3D1, medium crystalline, dark grey, medium bedded, weathers medium grey, blocky, fossils obliterated by dolomitization, intercrystalline and vuggy porosity.
1396'-1405'	Dolomite	light to medium grey,weathering medium grey, fine crystalline, trace limy stringers, massive bedded, blocky, trace intergranular porosity, trace fossil fragments, some well developed white dolomite crystals.
1405'-1434'	Dolomite	dark grey, weathers dark medium grey, cryptocrystalline to extremely fine crystalline, massive, slightly blocky, abundant white dolomite and some white calcite filling vugs and replacing fossils, trace vuggy porosity,

1405'-1434'	Dolomite (cont'd)	fossils are very poor and seem to be corals.
1434'-1518'	Dolomite	dark grey, weathering dark to medium grey, very fine to extremely fine crystalline, some white dolomite crystals, trace calcite crystals lining small vugs. Band of pure dolomite with no crinoids.
1518'-1583'	Covered	
1583'-1592'	Dolomite	dark grey, weathers dark to medium grey, very fine to cryptocrystalline massive bedded, blocky, abundant white dolomite crystals filling veins, trace calcite veining, crinoids
1592'-1601'	Covered	
1601'-1696'	Dolomite	dark grey, weathers dark to medium grey, very fine to cryptocrystalline massive bedded, blocky, abundant white dolomite crystals filling veins, at bottom of interval trace calcite veining, and dolomite gets a trace calcareous, bedding grades thin to medium upward and crystal size is predominantly very fine, trace crinoid ossicles at the top.
1696'-1934'	Dolomite	slightly limy, dark grey, weathers medium dark grey, extremely fine to very fine crystalline, massive bedded, blocky, some white calcite along fractures, abundant with dolomite crystals in vugs and veins.
1934'-1956'	Limestone	dark grey, weathers medium to dark grey, slightly dolomitic, extremely fine to lithic grain size, abundant calcite crystals filling vugs and veins, massive, slightly blocky, extremely fine grain size predominates.

1956'-2161'	Limestone	dark grey, weathering medium dark grey, lithic to extremely fine grained, medium bedded, abundant white calcite crystals filling vugs and along fractures, trace breccia along pointing plane, crinoid ossicles.
2161'-2188'	Dolomite	trace calcite, dark grey, weathers medium to dark grey, slightly to extremely fine crystalline, medium bedded, rare stringers of limestone.
2188'-2409'	Limestone	medium dark grey, weathers medium to dark grey, extremely fine to lithic grained, medium to thin bedded, streak limy dolomite, from here down we have some large calcite crystals filling crevices, abundant calcite limestone gets coarser grained to fine, bands of dolomitic limestone and stringers of limy dolomite.
2409'-2471'	Dolomite	trace calcite, dark grey, weathers medium dark grey, lithic to extremely fine crystalline, some white dolomite crystals, medium bedded, trace calcite along fissures.
2471'-2574'	Limestone	slightly dolomitic, medium to dark grey, weathers light to dark grey, lithic grained, thin to medium bedded, slight amount of calcite in vugs and along fissures, trace of extremely fine grains, abundant small vugs.
2574'-2726'	Dolomite	very limy, medium to dark grey, weathers light to dark grey, lithic to very fine crystalline, thin medium bedded, grading into dolomitic limestone approximately 45% of the time.
2726'-2761'	Limestone	dolomitic, poorly exposed, lithic grain size, medium to dark grey limestone weathers medium to light grey, thin to medium bedded, slight color banding from medium to light grey, grading to limy dolomite about 25% of the time.

2761'-2786'	Dolomite	very limy, medium to dark grey, weathers light to dark grey, lithic to very fine crystalline, thin medium bedded, grades into dolomitic limestone in places
2786'-2894'	Limestone	dolomitic, well exposed, lithic grain size, medium to dark grey limestone, weathers medium to light grey, thin to medium bedded, slight color banding from medium to light grey,about 5% of time limestone grades into a limy dolomite, trace of intergranular porosity.
2894'-2916'	Covered	
2916'-3066'	Limestone	dolomitic, poorly exposed interval, lithic grain size, medium to dark grey limestone, weathers medium to light grey, thin to medium bedded, slight color banding from medium to light grey, about 5% of time limestone grades into a limy dolomite.
3066'-3576'	Limestone	slightly dolomitic, dark to medium grey,weathers dark medium grey, sub-lithographic to lithic grain size, patchy dolomite white crystals, medium bedded, some calcite veining, some extremely fine grains, isolated cases exhibit banding, along fresh surface this is not visible.Odd band of light grey, sub-lithographic dolomitic limestone. Some beds more dolomitic than others and tend to be more limy dolomite (5%).
3576'-3696'	Limestone	dark grey, weathers dark to medium grey, sublithographic to extremely fine grain size, calcite veins, medium bedded, limestone is slightly dolomitic, there is some color banding in the beds ranging from medium to dark grey. At bottom of interval limestone becomes pure, increase in calcite veining, veins up to 5" across.

3696'-3765'	Limestone	medium grey, weathers light to medium grey, sub-lithographic, massive, dolomite crystals in veins, also some well developed calcite crystals, limestone seems to be slightly dolomitic.
3765'-3779'	Dolomite	dark grey, weathers dark to medium grey, lithic to extremely fine crystalline, a few buff to white streaks of dolomite crystals in veins, massive, slightly blocky, slight calcite dolomite and some calcite lining fissures.
3779'-3786'	Limestone	medium grey, weathers medium to dark grey, sub-lithographic to extremely fine grained, medium bedded, slightly fractured, some buff weathering on surface.
3786'-3806'	Covered	
3806'-3844'	Limestone	medium to dark grey, weathers dark grey, sub-lithographic to extremely fine grained, medium bedded, poorly exposed at top of interval, a few angular pebble size fragments in limestone.
3844'-3876'	Covered	
3876-3920'	Limestone	light grey, weathers medium grey, sub-lithographic, bedding indistinct, slightly fractured, slight calcite veining, limestone grades to medium dark grey on fresh and weathered surfaces, outcrop poorly exposed.
3920'-3942'	Covered	
3942'-3948'	Breccia	light to medium grey, weathers medium grey, matrix is extremely fine to sub-lithographic, pebbles are sub-lithographic and about the same color as matrix, matrix and pebbles are limestone.

3948'-3960'	Limestone	white, weathers light grey to light buff, sub-lithographic, a lot of limestone is slightly translucent, bedding is indistinct.
3960'-3971'	Dolomite	white-light grey, weathers medium dark grey with patches buff, made up of sub-lithographic translucent dolomite, indistinct bedding, poorly exposed.
3971'-3988'	Limestone	light grey, weathering light to medium grey, with patches of buff, sub-lithographic to extremely fine in grain size, a very small percent of floating pebbles in above matrix, outcrop is poorly exposed in this section.
3988'-4149'	Limestone	light grey to light medium grey, weathers the same, sub-lithographic to very fine fragments with slight dominate bedding indistinct, becomes darker grey with streaks dark-red grey limestone, slight trace of breccia in streaks in the limestone.
4149'-4444'	Limestone	light grey, weathering light to medium grey with rare orange brown blotches, sub-lithographic to fragments, appears to be slightly banded, medium bedded, limestone alternating with wide bands of breccia, pebble to cobble in size with limestone making up the fragments, fragments are mostly light to medium grey, but some of the matrix in the breccia is light orange, weathers medium grey to light orange brown, fragments are sub-rounded to angular, grain size ranges from sub-lithographic to fine with sub-lithographic predominating in the fragments and in the breccia matrix, most of the bedding is indistinct, but some of it is well defined and very thin, moderate amount of calcite veining.

4444'-4486'	Breccia	pebble to cobble in size with limestone making up the fragments, fragments are mostly light to medium grey, but some of the matrix in the breccia is light orange, weathers medium grey to light orange brown, fragments are sub-rounded to angular, grain size ranges from sub-lithographic to fine with sub-lithographic predominating in the fragments and in the breccia matrix, most of the bedding is indistinct, but some of it is well defined and very thin, moderate amount of calcite veining.
4486'-4496'	Limestone	light grey, weathering light to medium grey with rare orange brown patches, sub-lithographic to fragments, appears to be slightly banded, medium bedded.
4496'-4511'	Breccia	pebble to cobble in size with limestone making up the fragments, fragments are mostly light to medium grey, but getting more reddish, some thin bedding, weathers medium grey to light orange brown, fragments are sub-rounded to angular, grain size ranges from sub-lithographic to fine with sub-lithographic predominating in the fragments and in the breccia matrix, most of the bedding is indistinct, but some of it is well defined and very thin, moderate amount of calcite veining.
4511'-4526'	Limestone	light grey, weathering light to medium grey with rare orange brown blotches, sub-lithographic to fragments, appears to be slightly banded, medium bedded.
4526'-4626'	Limestone	light grey, weathering light to medium grey with rare orange brown blotches, sub-lithographic to fragments, appears to be slightly banded, medium bedded, at the bottom of interval a few reddish bands, and a few streaks

4526'-4626' (cont'd)	Limestone	of breccia in limestone, also takes on a slight reddish tinge on fresh surface
4626'-4706'	Breccia	pebble to cobble in size with limestone making up the fragments, fragments are mostly light to medium grey, but some of the matrix in the breccia is light orange, weathers medium grey to light orange brown, fragments are sub-rounded to angular, grain size ranges from sub-lithographic to fine with sub-lithographic predominating in the fragments and in the breccia matrix, most of the bedding is indistinct, but some of it is well defined and very thin, some beds are contorted near the top of interval, moderate amount of calcite veining, and some grading out of breccia into a sub-lithographic limestone, color starts to get predominantly medium grey instead of orange.
4706'-4759'	Limestone	light grey, weathers light to medium grey with rare orange brown blotches, sub-lithographic fragments, thin to medium bedded, slightly fractured, some pebble size fragments near joints, calcite veining, a few stringers of orange material earthy, fine to sub-lithographic fragments, limestone seems to get a little blocky and highly contorted near the top.
4759'-4769'	Limestone	light yellow grey, weathers buff and light to medium grey, fine to sub-lithographic fragments, very thin bedded, contorted, abundant calcite veining, slight earthy appearance.
4769'-4776'	Limestone	light grey,weathering light to medium grey with rare orange brown blotches, sub-lithographic fragments, appears to be slightly banded, medium bedded.

4776'-4816'	Breccia	pebble to cobble size, made up of limestone fragments, fragments range from light to medium grey, weather buff and dark grey, fragments lithic to fine, some calcite in veins. At top of interval earthy zones appear.
4816'-4941'	Limestone	light to medium grey, weathering light to medium grey with patches of buff coloring, lithic to extremely fine grain size with sub-lithographic predominate, medium bedded, midway limestone is medium grained, some limestone pitted on surface like it would be coarse grained, but it is lithic, some massive bedding.
4941'-4959'	Breccia	pebble to cobble size, made up of limestone fragments, fragments range from light to medium grey, weather buff and dark grey, beds slightly contorted, indistinct, fragments nearly all lithicin size, some of the surface rock has earthy appearance, medium fracturing, thin platy at top of interval, trace calcite veining.
4959'-4994'	Limestone	medium to dark grey, weathers medium to dark grey with blotches of buff coloring, very fine to sub-lithographic in grain size, massive bedded, bed slightly brecciated.
4994'-5006'	Breccia	pebble to cobble size, made up of limestone fragments, fragments range from light to medium grey, weather buff and dark grey, beds slightly contorted, indistinct, fragments are nearly all lithic in size, some of the surface of the rock has an earthy appearance and medium fracturing, thin platy limestone at top of interval.

5006'-5101'	Limestone	light grey, weathers light to medium grey and buff, size range is from lithic to fine fragments, bedding massive becoming a little more distinct, grading out of breccia, slightly contorted beds.
5101'-5156'	Limestone	limestone fragments, ranging in size from pebble to boulder, medium to lithic grained, light grey,weathering light to medium grey, light orange brown, bedding is massive and indistinct, beds are standing almost verticle, beds are resistant to weathering, are contorted in places, and range from highly to slightly fractured.
5156'-5181'	Breccia	light orange brown, light grey, weathering light orange, buff and medium grey, It is made up of limestone fragments ranging in size from pebble to boulder. Some of this limestone has a distinct bedded appearance and can easily be picked out in the breccia. It is thin bedded and from fine to lithic in size. The remainder of the breccia is from lithic to an indistinct fine fragment, the rock appears to be slightly earthy and so the grain size doesn't stand out very well. . The banded limestone fragments in the breccia tend toward a light to medium grey color while the remainder ranges from light grey to the brighter color mentioned above. The bedding is massive and indistinct, the beds are standing almost verticle but a good surface for a strike and dip is not available. Beds are resistant to weathering. Beds are contorted in places and range from highly to slightly fractured, yet there doesn't seem to be any calcite veining visible to the naked eye. Matrix in breccia is lithic in size.

5181'-5231'	Breccia	limestone, pebble-boulder, fragments range in size from ¼" and smaller to boulders 6' x 4' x 4', unit is oxidized bright orange and yellow, pebbles and boulders are of two kinds, limestone, light to medium grey, weathering medium to light grey, microcrystalline and shale, very light yellow brown, weathering light yellow brown, very calcareous. The medium grey lithology predominates forming 95% of the larger fragments. The matrix material is also of two types - medium grey gouge and the light yellow brown type. Where the pebbles are mainly of the grey material the gouge is of the yellow brown type. The entire unit is poorly exposed, but in places a limestone, light to medium grey, microcrystalline, well bedded, blocky, occurs and appears to be only slightly contorted. A platy-wafery calcareous shale also occurs in some intervals. These two rock types are quite similar to the lithologies in the breccia and probably make it up, the platy calcareous shale making the majority of the matrix and the blocky limestone making up the pebbles and boulders. The unit is badly weathered and the breccia forms hoodoos in places. Breccia = 25% of exposure.
5231'-5316'	Covered	
5316'-5346'	Breccia	limestone, pebble to boulder, fragments range in size from ¼" and smaller to boulders 6' x 4' x 4', unit is oxidized bright orange and yellow, pebbles and boulders are two kinds, limestone, light to medium grey, weathering medium to light grey, microcrystalline and, shale, very light yellow brown, weathering light yellow brown, very calcareous. The medium grey lithology predominants forming 95% of the larger fragments.

5316'-5346'	Breccia (cont'd)	The matrix material is also of two types - medium grey gouge and the light yellow brown type. Where the pebbles are mainly of the grey material the gouge is of the yellow brown type. The entire unit is poorly exposed, but in places a limestone, light to medium grey, microcrystalline, well bedded, blocky, occurs and appears to be only slightly contorted. A platy-wafery calcareous shale also occurs in some intervals. These two rock types are quite similar to the lithologies in the breccia and probably make it up, the platy calcareous shale making the majority of the matrix and the blocky limestone making up the pebbles and boulders. The unit is badly weathered and the breccia forms hoodoos in places. Brecia = 25% of exposure.
5346'-5366'	Shale	platy, light yellow brown, weathering light yellow brown, very calcareous.
5366'-5431'	Breccia	poorly exposed, limestone, pebble-boulder, fragments range in size from ¼" and smaller to boulders 6' x 4' x 4', unit is oxidized bright orange and yellow, pebbles and boulders are of two kinds, limestone, light to medium grey, weathering medium to light grey, microcrystalline and shale, very light yellow brown, weathering light yellow brown, very calcareous. The medium grey lithology predominates forming 95% of the larger fragments. The matrix material is also of two types - medium grey gouge and the light yellow brown type. Where the pebbles are mainly of the grey material the

5366'-5431'	Breccia (cont'd)	gouge is of the yellow brown type. The entire unit is poorly exposed, but in places a limestone, light to medium grey, microcrystalline, well bedded, blocky, occurs and appears to be only slightly contorted. A platy-wafery calcareous shale also occurs in some intervals. These two rock types are quite similar to the lithologies in the breccia and probably make it up, the platy calcareous shale making the majority of the matrix and the blocky limestone making up the pebbles and boulders. The unit is badly weathered and the breccia forms hoodoos in places. Breccia = 25% of exposure.
5431'-5511'	Covered	
5511'-5516'	Breccia	limestone, pebble-boulder, fragments range in size from ¼" and smaller to boulders 6' x 4' x 4', unit is oxidized bright orange and yellow, pebbles and boulders are of two kinds, limestone, light to medium grey, weathering medium to light grey, microcrystalline and shale, very light yellow brown, weathering light yellow brown, very calcareous. The medium grey lithology predominates forming 95% of the larger fragments. The matrix material is also of two types - medium grey gouge and the light yellow brown type. Where the pebbles are mainly of the grey material the gouge is of the yellow brown type. The entire unit is poorly exposed, but in places a limestone, light to medium grey, microcrystalline, well bedded, blocky, occurs and appears to be only slightly contorted. A platy-wafery calcareous shale also occurs in some

5511'-5516' (cont'd)		intervals. These two rock types are quite similar to the lithologies in the breccia and probably make it up, the platy calcareous shale making the majority of the matrix and the blocky limestone making up the pebbles and boulders. The unit is badly weathered and the breccia forms hoodoos in places. Breccia = 25% of exposure.
5516'-5526'	Covered	
5526'-5571'	Breccia	limestone, pebble to boulder, unit is oxidized bright orange and yellow, pebbles and boulders are of two kinds, limestone, light to medium grey, weathering medium to light grey, microcrystalline and, shale, very light yellow brown, weathering light yellow brown, very calcareous. The medium grey lithology predominates, forming 95% of the larger fragments. The matrix material is also of two types - medium grey gouge and the light yellow brown type. Where the pebbles are mainly of the grey material the gouge is of the yellow brown type. The entire unit is poorly exposed, but in places a limestone, light to medium grey, microcrystalline, well bedded, blocky, occurs and appears to be only slightly contorted. A platy-wafery calcareous shale also occurs in some intervals. These two rock types are quite similar to the lithologies in the breccia and probably make it up, the platy calcareous shale making the majority of the matrix and the blocky limestone making up the pebbles and boulders. The unit is badly weathered and the breccia forms hoodoos in places. Breccia = 25% of exposure.

5571'-5576'	Limestone	well bedded, light to medium grey, blocky, weathering light grey to light orange brown, microcrystalline
5576'-5606'	Covered	
5606'-5646'	Breccia	limestone, pebble-boulder, fragments range in size from $\frac{1}{4}$" and smaller to boulders 6' x 4' x 4', unit is oxidized bright orange and yellow, pebbles and boulders are of two kinds, limestone, light to medium grey, weathering medium to light grey, microcrystalline and shale, very light yellow brown, weathering light yellow brown, very calcareous. The medium grey lithology predominates forming 95% of the larger fragments. The matrix material is also of two types - medium grey gouge and the light yellow brown type. Where the pebbles are mainly of the grey material the gouge is of the yellow brown type. The entire unit is poorly exposed, but in places a limestone light to medium grey, microcrystalline, well bedded, blocky, occurs and appear to be only slightly contorted. A platy-wafery calcareous shale also occurs in some intervals. These two rock types are quite similar to the lithologies in the breccia and probably make it up, the platy calcareous shale making the majority of the matrix and the blocky limestone making up the pebbles and boulders. The unit is badly weathered and the breccia forms hoodoosin places. Brecia = 25% of exposure.
5646'-5686'	Covered	
5686'-5801'	Breccia	limestone, pebble - boulder, fragments range in size from $\frac{1}{4}$" and smaller to boulders 6' x 4' x 4', unit is oxidized bright orange and yellow, pebbles and

5686'-5801' (cont'd)		boulders are of two kinds, Lime-stone, light to medium grey weathering medium to light grey, weathering medium to light grey, microcrystalline and shale, very light yellow brown, weathering light yellow brown, very calcareous. The medium grey lithology predominates forming 95% of the larger fragments. The matrix material is also of two types - medium grey gouge and the light yellow brown type. Where the pebbles are mainly of the grey material the gouge is of the yellow brown type. The entire unit is poorly exposed, but in places a limestone, light to medium grey, microcrystalline, well bedded, blocky,occurs and appears to be only slightly contorted. A platy-wafery calcareous shale also occurs in some intervals. These two rock types are quite similar to the lithologiesin the breccia and probably make it up, the platy calcareous shale making the majority of the matrix and the blocky limestone making up the pebbles and boulders. The unit is badly weathered and the breccia forms hoodoos in places. Breccia = 25% of exposure.
5801'-5841'	Covered	
5841'-5860'	Limestone	laminated, medium grey to medium grey brown, microcrystalline, silty and shaly, platy to blocky.
5860'-5861'	Limestone	mottled, light blue grey with dark brown linear "patches" almost laminated in nature, platy, weathering light yellow brown, micro-cryptocrystalline.
5861'-5872'	Limestone	light grey to white, weathering very light yellow brown to very light yellow grey, platy to blocky, shale and silty, limy, poorly exposed.

5872'-5881'	Limestone	microcrystalline, medium grey to blue grey, mottled, weathering very light yellow brown to very light grey, massive, blocky, poorly exposed, silty.
5881'-5882'	Dolomite	calcareous, light brown, weathering light yellow brown, silty, laminated, platy to wafery, very fine to microcrystalline.
5882'-5891'	Limestone	medium to light grey, mottled and banded (grey, brown and medium grey) microcrystalline, weathering light yellow brown, massive.
5891'-5892'	Limestone	platy, yellow brown, weathering light yellow brown, shaly, micro-xlln, poorly exposed.
5892'- 5894'	Limestone	light to medium grey, weathering light yellow brown, microcrystalline, medium bedded and platy, shaly
5894'-5896'	Dolomite	laminated, light to medium grey, brown, microcrystalline, weathering medium yellow brown, medium bedded, blocky.
5896'-5897'	Limestone	medium to light grey, weathering light yellow brown, microcrystalline, thin to medium bedded (1/8"-3") limonitic, shaly and silty.
5897'-5904'	Limestone	dark grey, weathering light yellow brown to light grey, shaly and silty, medium bedded.
5904'-5906'	Limestone	medium grey, weathering light grey, microcrystalline, medium bedded (4"), mottled on fresh surface.
5906'-5907'	Limestone	slightly shaly, light grey, wafery-platy, weathering light yellow brown, micro-cryptocrystalline.
5907'-5914'	Limestone	dark grey, weathering light yellow brown and medium grey, microcrystalline, medium bedded (4").

5914'-5916'	Limestone	very light grey, weathering very light yellow brown, blocky, medium thin bedded (2"-12"), microcrystalline.
5916'-5920'	Limestone	medium and light grey, laminated, weathering mottled light grey and very light yellow brown, microcrystalline, thin bedded ($\frac{1}{2}$-2") platy.
5920'-5926'	Limestone	medium to dark grey, cryptocrystalline, some very thin light grey bands give laminated appearance, weathering light yellow brown.
5926'-5941'	Covered	
5941'-5946'	Limestone	black, cryptocrystalline, weathering light grey, medium bedded, blocky.
5946'-6011'	Covered	
6011'-6108'	Limestone	microcrystalline, medium grey, weathering medium grey, nodular massive with intercalations of shale, medium-light grey, weathering light yellow brown to very light grey, calcareous, every 2-6".
6108'-6176'	Covered	
6176'-6211'	Limestone	microcrystalline, medium grey, weathering medium grey, nodular massive with intercalations of shale, medium to light grey, weathering light yellow brown to very light grey, calcareous, every 2-6".
6211'-6226'	Limestone	microcrystalline, medium grey, weathering medium grey, nodular, massive.
6226'-6265'	Limestone	microcrystalline, medium grey, weathering medium grey, nodular massive, with intercalations of shale, calcareous, fossiliferous, two lithologies impart wavy, uneven, undulations, banded or striped appearance.

6265'-6273'	Limestone	interbedded limestone and shale with limestone predominating and increasing downward, microcrystalline, medium grey, weathering medium grey, fossiliferous and shale, calcareous, fossiliferous, medium to light grey, weathering light yellow brown, two lithologies impart wavy, uneven, undulating banded or striped appearance.
6273'-6301'	Limestone	interbedded limestone and shale with a ratio of shale: limestone of 1:1, limestone microcrystalline, medium grey, weathering medium grey, fossiliferous, and shale, calcareous, fossiliferous, medium to light grey, weathering light yellow brown, two lithologies impart wavy, uneven, undulating banded or striped appearance.
6301'-6311'	Limestone	interbedded limestone and shale with a ratio of shale: limestone of limestone 65%, shale 35%.
6311'-6326'	Limestone	interbedded limestone, microcrystalline, medium grey, weathering medium grey, fossiliferous and shale, calcareous, fossiliferous medium to light grey, weathering light yellow brown. Two lithogies impart wavy, uneven, undulating banded or striped appearance.
6326'-6366'	Covered	
6366'-6416'	Limestone	light grey, weathers medium grey to light grey, microcrystalline, massive, fossiliferous, with intercalations of shale, very calcareous, medium to light grey, weathering very light grey and very light yellow brown, two lithologies impart wavy, uneven banding to exposure.

6416'-6426'	Covered	
6426'-6477'	Limestone	medium grey, weathers medium grey, microcrystalline, fossiliferous, massive.
6477'-6486'	Dolomite	very light grey, microcrystalline, weathers medium orange, brown, platy, becoming calcareous upward, laminated
6486'-6496'	Covered	
6496'-6501'	Limestone	medium grey, weathers medium to light grey, microcrystalline, shaly, massive, very fossiliferous (bryozoans, colonial, corals, gastropods in individual beds), unit very recessive.
6501'-6514'	Limestone	dark grey, weathering medium grey, micro to cryptocrystalline, massive, fossiliferous with intercalations of shale, light grey, weathering light yellow brown, very calcareous, recessive. This unit also is banded and bedding planes are uneven and wavy. Unit is massive, nodular and rubbly, cliff forming
6514'-6566'	Limestone	interbedded, medium grey, weathering medium grey, very fine to microcrystalline, fossiliferous (brachiopods) and shale, light grey, weathering light yellow brown, very calcareous, silty, recessive, interbedding imparts a banded appearance, banding is wavy, uneven, nodular, ¼-2" wide. Unit is recessive.
6566'-6763'	Covered	
6763'-6771'	Limestone	microcrystalline, medium grey, weathering light to medium grey, fossiliferous, slightly shaly and shale, calcareous, medium grey, weathering light yellow brown and and silty, laminated, fossiliferous, interbedding gives unit a wavy, undulating nodular, banded apperance. Calcareous shale bands

6763-6771' (cont'd)		weather slightly recessive. Bands are ¼"-2" wide. Unit is massive.
6771'-6786'	Limestone	interbedded limestone, very fine to microcrystalline, medium grey weathers light to medium grey with some medium fine crystalline matrix and shale, very calcareous, light grey, weathering very light grey and light yellow brown, silty, weathering recessive, unit is massive and has undulating banded apperance. Calcareous shale = 50% of unit.
6786'-6805'	Limestone	very fine to microcrystalline, medium grey, weathers medium grey, massive, some medium to fine crystalline material floating in matrix, with intercalations of calcareous shale giving banded appearance. Calcareous shale is 10 of unit.
6805'-6811'	Limestone	interbedded limestone, very fine to microcrystalline, medium grey, weathering light to medium grey with some medium to fine crystalline matrix and shale, very calcareous light grey, weathering very light grey and light yellow brown, silty, weathring recessive. Unit is massive and has undulating banded appearance. Calcareous shale = 50% of unit.
6811'-6816'	Covered	
6816'-6819'	Limestone	medium to dark grey, weathering medium grey, microcrystalline, nodular, massive.
6819'-6838'	Limestone	interbedded, microcrystalline, medium grey, weathers light to medium grey, fossiliferous, slightly shaly and shale, calcareous, medium grey, weathering light yellow brown and silty, laminated fossiliferous. Interbedding gives unit a wavy, undulating, nodualr, banded appearance. Calcareous shale bands weather slightly recessive.

6838'-6874'	Covered	
6874'-6919'	Limestone	interbedded limestone, micro-crystalline, medium grey, weathering medium to light grey, with some fine crystalline material floating, fossiliferous and shale, calcareous, medium grey, weathering light yellow brown, laminated, silty, recessive. Rock has banded appearance and bands are uneven, wavy and $\frac{1}{2}$"-2" wide. At 1-2' intervals is a bed of limestone 2-3" wide fragments, medium to coarse crystalline, light grey, weathering light grey, fossiliferous, crinoids, very slightly shaly.
6919'-6943'	Limestone	very shaly, silty, medium to light grey, weathers very light yellow brown, microcrystalline, filled with bryozoan material ($\frac{1}{4}$-$\frac{1}{2}$" long and 1/64" diam.)
6943'-6949'	Limestone	interbedded limestone, light to medium grey, weathering medium to light grey, fine-microcrystalline, fossiliferous, slightly shaly and shale, medium light grey, weathering light yellow brown, laminated, calcareous and silty, slightly recessive. Unit is massive, but shows alternate yellow brown and medium grey, wavy, uneven banding, surface of outcrop is pitted and shaly limestone weathers recessive.
6949'-6961'	Limestone	massive, fragmental, fine to medium crystalline, light to medium grey, weathers light grey, uneven, wavy bedding surfaces, very fossiliferous (brachiopods, almost a coquina) with calcareous shale partings, weathering recessive.
6961'-6966'	Limestone	medium grey, microcrystalline, weathering medium grey, massive, bedding planes wavy, uneven and nodualr with calcareous shale intercalations, poorly exposed.

6966'-7002'	Limestone	medium grey, weathering light to medium grey, microcrystalline, massive, nodualr.
7002'-7006'	Covered	
7006'-7011'	Limestone	medium grey, weathering light to medium grey, microcrystalline, massive, nodular.
7011'-7016'	Covered	
7016'-7021'	Limestone	medium grey, weathering light to medium grey, microcrystalline, massive, nodular.
7021'-7037'	Limestone	interbedded limestone, medium grey, weathering light grey, microcrystalline with somefine to medium crystalline material floating in matrix and limestone, silty and shaly, medium grey, weathering mediumyellow-orange brown, microcrystalline, bands are ½-2" while light grey weathering bands are ½-3/4". Shaly limestone = 70% of exposure.
7037'-7041'	Limestone	medium grey, microcrystalline with some medium to fine crystalline miterial floating in matrix, fossiliferous, weathering medium to light grey, nodular.
7041'-7054'	Limestone	dark grey, microcrystalline, weathering medium grey, fossiliferous (bryozoans), poorly exposed.
7054'-7091'	Limestone	interbedded limestone, medium grey, weathering light to medium grey, very microcrystalline, fossiliferous nodular, and limestone shaly, cross-bedded, medium to light grey, weathering light yellow brown, microcrystalline, nodular, interbedding is uneven giving wavy nodular, banded appearance. Amount of shaly limestone increases downward. Unit is massive with interbeds ½"-2" wide, at top fossiliferous limestone = 80% of unit, at bottom, fossiliferous limestone = 60-65% of unit. Shale-limestone is recessive.

7091'-7104'	Limestone	interbedded fossiliferous limestone and shaly limestone, with shaly limestone = 60% of unit imparting a light yellow brown weathering color to entire unit.
7104'-7133'	Limestone	interbedded limestone, medium grey, weathering light to medium grey, very fine microstyalline, fossiliferous, nodular and limestone, shaly, cross-bedded, medium to light grey, weathering light yellow brown, laminated, microcrystalline, nodular, interbedding is wavy, nodualr, banded; amount of shaly limestone increases downward, unit is massive with interbeds ½"-2" wide. At top fossiliferous limestone = 80% of unit, at bottom fossiliferous limestone = 60-65% of unit. Shale-limestone is recessive.
7133'-7179'	Limestone	medium grey, weathering medium grey, microcrystalline, massive, fossiliferous, shaly, very nodular surfacial appearance, bedding planes are very uneven and wavy and have calcareous, shale partings between them.
7179'-7196'	Interbedded Limestone	light grey weathering light grey, fossiliferous, microcrystalline and limestone, light grey, microcrystalline, shaly and silty, weathering light yellow brown, banding is wavy and unit is massive.
7196'-7203'	Limestone	fine to microcrystalline, medium grey, weathering medium grey, massive, shaly, very fossiliferous with abundant bryozoan material in top 3', shaly partings give banded appearance, banding is wavy, uneven and ½"-2", giving nodular appearance to surface.

7203'-7223'	Limestone	interbedded, microcrystalline, laminated, very shaly and silty, medium and light grey, weathering light yellow brown with some bryozoan material and limestone medium grey, weathering medium to light grey, microcrystalline, very fossiliferous, slightly shaly, entire unit is massive and filled with very small black bryozoan material ($\frac{1}{4}$-$\frac{1}{2}$" long and 1/64" in diameter).
7223'-7238'	Limestone	fragmental, medium to coarse crystalline, medium grey weathering light grey, crinoids, very fossiliferous, shaly.
7238'-7244'	Limestone	microcrystalline, medium grey, weathering light grey, massive, fossiliferous (colonial corals), medium-coarse crystalline.
7244'-7246'	Limestone	microcrystalline, very shaly, medium grey, weathering medium grey, recessive, appears biostromal, filled with colonial corals. May be good marker bed.
7246'-7261'	Limestone	interbedded limestone, medium to fine crystalline, fragmental, medium to light grey, fossiliferous, weathering light grey and limestone, silty and shaly, laminated, microcrystalline, medium grey, weathering mottled light grey and medium yellow brown. Interbedding gives rock banded appearance, bands are wavy and uneven . Banding alternates every 2-3". Entire unit is massive.
7261'-7273'	Limestone	interbedded limestone, very fine to microcrystalline, medium to light grey, weathers light grey, very fossiliferous, shaly and limestone, very fine to microcrystalline, medium to light grey, weathering light yellow brown, laminated, cross bedded. Some of

7261'-7273' (cont'd)		the light grey weathering bands containing fossils are medium to coarse crystalline.
7273'-7314'	Limestone	very shaly, massive, laminated, light to medium grey, very fine to microcrystalline, weathering light yellow brown and light grey, wavy and uneven banding appearance, banding due to grey and brown weathering color which is due to varying amounts of shale.
7314'-7326'	Limestone	shaly microcrystalline, mottled medium brown and medium to light grey due to shale "patches" in the limestone, dolomite, medium bedded, (4m 2') with nodular and uneven bedding surfaces, weathering medium yellow brown and medium grey giving banded appearance, calcareous shale partings between limestone bands. Amount of shale increases downward.
7326'-7426'	Limestone	very shaly, dark grey, dolomite, weathering light to medium yellow, brown, rubbly, chunky, microcrystalline, badly fractured, massive, blocky, becomes lighter downward.
7426'-7876'	Limestone	dark grey, weathering medium grey and light yellow brown, very shaly, silty, dolomite?, laminated, cross-bedded, platy to wafery, poorly exposed in last 20'.
7876'-7926'	Limestone, dark	grey, weathering medium yellow brown, microcrystalline, shaly and silty, dolomite, massive, blocky, ripple marks.
7926'-7946'	Limestone	dark grey, weathering medium yellow brown, microcrystalline, shaly and silty, dolomite, massive, blocky, ripple marks.

7946'-7996'	Limestone	dark grey, microcrystalline, weathering medium yellow brown, laminated, very shaly, cross-bedded, silty, platy and massive, badly fractured, dolomitic, fossiliferous (pelecypods).
7996'-8084'	Limestone	dark grey-black, microcrystalline, platy and massive, very shaly and silty, cross-bedded, laminated, weathering light to medium yellow brown rubbly, jointed and fractured, dolomitic.
8084'-8316'	Limestone	dark grey, weathering medium grey and light to medium yellow brown, very shaly, silty, cross bedded, laminated, platy to rubbly to massive, dolomite?, yellow brown weathering distinct in this and following units. At bottom of interval bedding becomes massive and unit is badly contorted with many joints and fractures.
8316'-8499'	Limestone	black, platy-rubbly and blocky, very shaly and silty, laminated, disseminated pyrite, weathering dark grey, microcrystalline, bedding indistinct in places. A band (1') of brecciated sheared limestone with calcite veining, slickensides and carbonaceous material. Limestone above and below not affected.
8499'-8521'	Shale	interbedded shale, very dark grey to black, platy to wafery, laminated, silty, very calcareous, weathering medium to dark grey and limestone, medium to dark grey, microcrystalline, shaly, weathering light grey, fossiliferous, medium bedded (3"-10").
8521'-8734'	Limestone	black, weathering dark grey, laminated, very shaly, silty, platy-rubbly, microcrystalline, disseminated pyrite, with laminations of sandstone, very fine grained, very light grey.

8734'-8739'	Limestone	medium grey, massive, weathering light to medium grey, very fine to microcrystalline, shaly, crinoidal, fossiliferous, with many coarse to medium crystals floating in matrix.
8739'-8906'	Limestone	black, very shaly and silty, platy to chunky, hard, weathering medium to dark grey, pyrite with limestone lenses and lenticular 1-2' beds at rare intervals. Limestone is black, medium bedded, pyrite, microcrystalline, weathers medium grey and very hard. Platy limestone is 90% of exposure. Near bottom a 3" bed of shale with large numbers of spherical concretions filled with pryite. Concretions are $\frac{1}{4}$-$1\frac{1}{2}$" in diameter and surrounded by a thin limestone shell. Concretionary bed overlies 18" bed of limestone. Unit well bedded.
8906'-8931'	Limestone	interbedded limestone, laminated, black, micro-cryptocrystalline, medium bedded (6"-15"), weathers medium grey and very light yellow brown, pyrite, shaly and shale, platy to chunky, black, weathers medium to dark grey, very calcareous in units 2-6" thick. Limestone makes up 70% of outcrop.
8931'-9021'	Shale	very calcareous, platy to chunky, black to dark grey, weathers medium to dark grey.
9021'-9022'	Dolomite	medium to dark grey, weathers rusty brown, slightly calcareous, with pyrite cubes at bottom of bed, blocky, hard.
9022'-9076'	Shale	black, fissile, weathering black, calcareous, two 2' beds of shale, calcareous, silty, platy and resistant.
9076'-9101'	Covered	

9101'-9151'	Shale	black, weathering medium grey and light yellow brown, very calcareous, platy, blocky.
9151'-9161'	Limestone	black, shaly, thin to medium bedded ($\frac{1}{2}$-3") microcryptocrystalline, weathers dark grey, badly contorted.
9161'-9236'	Shale	black, very calcareous, platy to chunky, weathers medium grey to medium grey brown, limestone nodules with pyrite. Two 1' beds of limestone, black, hard, microcrystalline, weathers light to medium grey.
9236'-9286'	Limestone	interbedded limestone, medium to dark grey, microcrystalline, laminated, platy to rubbly, shaly, hard, weathers medium grey and shale, black, soft, wafery to platy, very calcareous, weathers medium to dark grey, ratio of shale:limestone is 1:5
9286'-9308'	Dolomite	interbedded dolomite, medium to dark grey, laminated, microcrystalline, platy to blocky, shaly, hard, weathers medium grey, very light grey brown and limestone, dark grey, laminated, platy, very shaly, weathers medium grey. Bedding planes of both have large ripple marks.
9308'-9326'	Shale	black, wafery to platy and chunky in places, weathers very light yellow brown and medium to dark grey, very calcareous, soft.
9326'-9341'	Limestone	interbedded dolomite and limestone. Limestone, black, weathering medium grey, laminated, microcrystalline, platy, shaly and silty, fossiliferous, well bedded, fossils occur in thin bands ($\frac{1}{2}$-2") interbedded with dolomite, laminated, very slightly calcareous, weathers medium grey to dull rusty brown, shaly and silty, platy, hard. Ratio of limestone: dolomite 1:1

9341'-9361'	Shale	black, soft, wafery to platy, very calcareous, weathers medium grey.
9361'-9431'	Limestone	black, weathers medium grey, laminated, microcrystalline, platy, shaly and silty, fossiliferous, well bedded, fossils occur in thin bands ($\frac{1}{2}$-2"), interbedded with dolomite, laminated, very slightly calcareous, weathers medium grey to dull rusty brwon, shaly and silty, platy, hard, ratio of limestone: dolomite-1:1
9431'-9501'	Limestone	dark grey to black, weathers medium grey, blocky, microcrystalline, thin to medium bedded ($\frac{1}{4}$"-2'), fossiliferous, with some 1-2" shale, very calcareous, black, platy, interbeds. Unit is 90% limestone.
9501'-9551'	Shale	black, very calcareous, weathers medium to dark grey, platy-fissile, soft, recessive.
9551'-9590'	Shale	black, very calcareous, weathers medium to dark grey, platy, hard, resistant.
9590'-9613'	Limestone	interbedded limestone, shaly, 3-8" beds, medium to dark grey, weathers light grey to very light grey brown, color banded, blocky, with current ripple marks and shale, very calcareous, very dark grey to black, fissile to platy, weathers medium grey, in 2-3" beds between limestone beds. Unit is resistant.
9613'-9632'	Shale	black, very calcareous, weathers medium to dark grey, poorly exposed.
9632'-9732'	Shale	interbedded shale, black, very calcareous, platy, weathering light brown grey to medium grey, resistant and shale, soft, black, very calcareous, fissile, weathers medium grey, recessive, platy shale: fissile shale - 4:1

9732'-9756'	Limestone	very dark grey to black, shaly, weathering medium to dark grey, 6 -1' bedding, microcrystalline, with white, limestone inclusions containing pyrite. Inclusions are size and shape of rice grains. Interbeds of shale, blacks, platy, very calcareous, makes up 20% of unit.
9756'-9796'-	Shale	very calcareous, black, platy, weathers medium to light grey, poorly exposed with interbeds of limestone every 6-10'. Limestone is black, microcrystalline, weathers medium brown grey, and limestone beds are 6 -1'. Amount of limestone increases downward from 10-30%.
9796'-9816'	Covered	
9816'-9836'	Shale	black, platy, very calcareous, weathers dark grey.
9836'-9861'	Shale	very calcareous, platy, black, weathers medium grey, grading downward into a limestone, dark grey, microcrystalline, shaly, medium bedded (4-18"), weathers medium and dark grey in alternating bands, with dark grey predominating, interbedded with shale, wafery-platy, black, very calcareous, shale units 2-6". Ration of shale: limestone - 1:3 or 4.
9861'-9906'	Shale	black, very calcareous with medium grey, fissile - wafery, poorly exposed, recessive
9906'-9925'	Covered	
9925'-9926'	Shale	dark grey, very calcareous, weathers medium grey, platy, hairlike light grey laminations, silty.

9926'-9935'	Covered	
9935'-9956'	Shale	dark grey, very calcareous, weathers medium grey, platy, hairlike light grey laminations, silty.
9956'-10,056'	Shale	very dark grey to black, weathers medium grey, very calcareous, silty, platy to wafery, well bedded, with graptolites. Bands of limestone, shaly, medium grey, microcrystalline with finely disseminated pyrite throughout, weathering light grey.
10,056'-10,096'	Shale	dark grey, weathers medium grey, very calcareous, thin bedded, block bedded, cliff former, beds become platy toward bottom.
10,096'-10,101'	Covered	talus indicates a very platy and fissile calcareous silty shale.
10,101'-10,102'	Limestone	medium grey, weathering light medium grey, crptocrystalline, massive.
10,102'-10,131'	Limestone	dark grey, weathering light to medium grey, micro to cryptocrystalline, shaly, few $\frac{1}{4}$" beds of crinoidal limestone, rare chert beds ($\frac{1}{4}$").
10,131'-10,137'	Limestone	dark grey, medium grey weathering shaly, microcrystalline, thin bedded, interbeds $\frac{1}{2}$" beds of very crinoidal limestone (almost an enerinite), platy, fossiliferous.
10,137'-10,146'	Shale	dark grey, weathering black, very calcareous with wavy and nodular bands of limestone, dark grey, weathering black, cryptocrystalline, pyrite mineralization (mostly weathered out or to limonite). Crinoidal limestone bed.
10,146'-10,159'	Shale	black to dark grey, weathers dark grey, very calcareous, thin bedded and laminated, rare shale: limestone bed (2")

10,159'-10,181'	Limestone	dark grey, weathering dark grey to buff, cryptocrystalline, medium bedded (1"-3") to thin bedded strata, ¼" calcareous shale interbeds.
10,181'-10,206'	Shale	dark grey, weathers dark grey, calcareous, thin bedded, fissile, calcite stringers, pyrite mineralization (¼" wide 6" long).
10,206'-10,246'	Limestone	dark grey, weathers dark grey, shaly, thin to medium bedded (¼"-8"), microcrystalline, shale interbeds, platy, graptolites and the bedding is wavy, limestone is hard, blocky cliff former, calcite stringers at right angles to bedding.
10,246'-10,286'	Limestone	dark grey, buff weathering, shaly, microcrystalline, faint laminations thin to medium bedding, calcareous shale beds, interbedded (¼").
10,286'-10,441'	Limestone	dark grey, light grey weathering, shaly, microcrystalline, wavy thin beds to straight. Graptolites (few), massive beds (few).
10,441'-10,450'	Covered	
10,450'-10,511'	Limestone	medium grey, medium grey weathering, microcrystalline, thin bedded, platy, shaly, with calcareous shale intercalations, graptolites, wavy bedding and knobby bedding planes.
10,511'-10,521'	Shale	black to dark grey, weathering dark grey to buff, calcareous, 18" shaly limestone bed, thin bedded shaly limestone concretion above 18" shale limestone bed. Pyrite mineralization prominant, platy.
10,521'-10,536'	Limestone	medium to dark grey, light to medium grey weathering, micro to fine crystalline, shaly and silty. Calcareous silty shale beds - prominent regularity of 3/4" bands.

10,536'-10,581'	Limestone	medium to dark grey, light to medium grey weathering, micro to fine crystalline, shaly and silty, interbedded with shale, black, weathering medium grey, calcareous, graptolites, thin bedded, rare pyrite mineralization. Limestone is shaly, limestone concretions. Nodular and wavy bedding.
10,581'-10,588'	Covered	
10,588'- 10,610'	Limestone	medium to dark grey, light to medium grey weathering, micro to fine crystalline, shaly and silty. Numerous calcareous silty shale beds - less prominent as you go down in interval, thin bedded.
10,610'-10,621'	Covered	except for 1' of shale across creek, dark grey, medium grey weathering, silty, calcareous, platy, thin bedded, outcrop in lower part of covered interval.
10,621'-10,637'	Dolomite	dark grey, medium to dark grey, weathering, medium to coarse crystalline, crinoid ossicles fragmented, thin to medium bedded, some in silty shale beds (dolomitic) chert nodules, thin bedded, dolomite veins and stringers.
10,637'-10,641'	Limestone	dark grey, light to medium grey weathering, micro to crypto crystalline, shaly, thin to medium bedded.
10,641'-10,657'	Dolomite	chert nodules, concretions of chert with silty dolomite stringers 6" diameter. Dolomite veinlets as in previous outcrops. Dolomite, black, weathers black, light grey weathering where water has not flowed, silty, hard and well indurated, very fine crystalline, interbedded with blue shale, very slightly silty.

10,657'-10,662'	Limestone	dark grey, light to medium grey weathering, micro to crypto-crystalline, shaly, thin to medium bedded.
10,662'-10,672'	Dolomite	black, weathers black, light grey weathering where water has not flowed, silty, hard and well indurated, very fine crystalline interbedded with blue shale, very slightly silty, thin to medium bedded. cliff former.
10,672'-10,679'	Covered	
10,679'-10,706'	Limestone	dark grey, light to medium grey weathering, micro to crypto crystalline, shaly, thin to medium bedded.
10,706'-10,720'	Dolomite	black, light to medium grey weathering, microcrystalline, thin to medium bedded ($\frac{1}{4}$-3"), blocky, cliff former.
10,720'-10,729'	Limestone	medium to dark grey, weathering light to medium grey, micro-crystalline, shaly and silty (difference marked by different colored weathered surface), thin to medium bedded, platy recessive.
10,729'-10,733'	Covered Dolomite	medium grey, weathers medium grey microcrystalline, with few undulating chert blocky surface.
10,733'-10,740'	Covered	
10,740'-10,745'	Dolomite	medium to light grey, light grey weathering, silty, microcrystalline, hard, $\frac{1}{4}$"-3" beds, no shale, one bed of medium to coarse crystalline dolomite, medium grey, weathering medium grey, fossil fragments.
10,745'-10,757'	Dolomite	medium grey, weathers light to medium grey, silty, hard and laminated, interbedded with chert beds, very fine to fine crystalline, interbedded with shale, silty, calcareous, Dolomite forms 90% of

10,745'-10,757' (cont'd)		outcrop, medium bedded dolomite, calcite vugs with pyrite.
10,757'-10,792'	Covered	
10,792'-10,798'	Dolomite	medium grey, weathering light to medium grey, silty, hard and laminated, interbedded with black chert, rare intercalations of black calcareous shale, medium bedding with a nodular and a lenticular appearance.
10,798'-10,807'	Dolomite	medium grey, weathering light to medium grey, silty, hard and laminated, interbedded with chert beds, very fine to fine crystalline.
10,807'-10,811'	Chert	chert beds, $\frac{1}{4}$"-1$\frac{1}{2}$" beds, black fresh and weathered surface.
10,811'-10,833'	Dolomite	dark grey, weathers medium grey, microcrystalline, silty, well indurated and hard platy, crinoidal.
10,833'-10,878'	Covered	
10,878'-10,981'	Dolomite	medium dusty grey, weathering buff, shaly, micro to fine crystalline, medium bedded, blocky cliff former, small calcite veinlets on joint planes. Chert nodules, silicified colonial coral at bottom of unit, micro-vugular porosity on both sides of dolomite bed. Crinoid ossicles occur at interbeds in bottom half of section.
10,981'-11,016'	Shale	dark grey, weathers buff, silty, interbedded with 3" dolomite beds, silty, micro to fine crystalline, dark grey, weathering buff, shale-50%, dolomite 50%, very regular bedding, numerous dolomite veinlets throughout. Nodular and wavy-like beds. Gradational to dolomite with thin shale partings. Few chert nodules in the dolomite.

11,016'-11,020'	Shale	dark grey, weathers buff, silty, dolomitic, platy, ¼"-2" beds.
11,020'-11,034'	Covered	
11,034'-11,042'	Shale	dark grey, weathers buff, silty, with interbeds of shaly and silty dolomite, platy, ¼"-3" beds.
11,042'-11,112'	Covered	
11,112'-11,119'	Dolomite	dark grey, weathers medium grey, very fine to microcrystalline, silty and shaly, dolomite stringers and veins with very minor amount of copper mineral, in some of the veins, chert nodules, indistinct bedding.
11,119'-11,164'	Covered	
11,164'-11,170'	Dolomite	very shaly, dark grey, weathers medium grey to light grey brown, nodules, nodular bedded, chert, fractured and fractures filled with white dolomite.
11,170'-11,188'	Covered	
11,188'-11,206'	Dolomite	very shaly, dark grey, weathers medium grey to light grey brown, nodular bedded, cherty, fractured and fractures filled with white dolomite.
11,206'-11,296'	Covered	
11,296'-11,361'	Dolomite	medium grey, weathers medium to light grey, microcrystalline, shaly, with abundant black chert lenses and nodules, bedding is very wavy and nodular with beds 1-3" thick. Badly jointed and fractured with white dolomite filling the larger fractures.
11,361'-11,384'	Covered	
11,384'-11,394'	Dolomite	light grey, microcrystalline with many medium to coarse crystals which may be crinoidal fragments, weathers light grey, indeterminate bedding and poorly exposed.

11,394'-11,411'	Covered	
11,411'-11,433'	Dolomite	medium grey, microcrystalline, weathers light grey, thin to medium bedded (1"-4"), with bedding very nodular and uneven, very cherty with abundant black chert lenses, nodules (1-2" by 1-8").
11,433'-11,446'	Covered	
11,446'-11,472'	Dolomite	medium grey, weathers medium grey, microcrystalline, thin to medium bedded (1-3"), with abundant black chert, also bedding planes very wavy, uneven and nodular. The larger fractures and joints have white, weathering rusty dolomite. Midway a yellow weathering 10" bed of white dolomite parallel to the bedding and is probably due to faulting along the bedding planes.
11,472'-11,501'	Dolomite	dark grey, weathering medium to dark grey, microcrystalline, thin to medium bedded (1-3"), abundant black chert, wavy to nodualr bedding, fractures and joints perpendicular to bedding are filled with dolomite. Faults appear to be bedding plane and minor.
11,501'-11,516	Covered	
11,516'-11,531'	Shale	silty and dolomitic, medium brown grey to dark brown grey, weathers light brown grey, platy to bbcky.
11,531'-11,541'	Covered	
11,541'-11,556'	Shale	very dark brown grey, weathers very dark grey to light grey, very dolomitic and very silty, with abundant black chert lenses, and nodules, platy to blocky.
11,556'-11,566'	Dolomite	very shaly and silty, microcrystalline, medium brown grey, weathers light to medium grey, thin bedded (3") with abundant black chert

11,556'-11,566' (cont'd)		lenses and wavy, nodular bedding planes.
11,566'-11,571'	Dolomite	light grey, very fine to micro crystalline, medium bedded (2-8") weathers medium grey with many coarse to medium crystals floating in matrix.
11,571',11,613'	Dolomite	very shaly or silty, medium brown grey, weathers medium grey, micro crystalline, with abundant black chert nodules ($\frac{1}{2}$-1" x 1-6"), very badly fractured and jointed, with some fractures filled with white crystalline dolomite. Bedding is 1-3" and very wavy, a number of faults, but all minor.
11,613'-11,648'	Dolomite	dark grey, weathering light to medium grey and light rusty brown, microcrystalline, abundant, black chert nodules (1" x 2-5") and many fractures and stringers ($\frac{1}{4}$-6"), filled with white crystalline dolomite. Bedding is medium to thin and wavy and nodular.
11,648'-11,671'	Dolomite	light to medium grey, medium to thick (2"-2') bedded, weathers medium grey and rusty, micro crystalline with a lot (25%) of medium crystalline limestone.
11,671'-11,691'	Dolomite	very shaly, very light grey brown weathers very light grey brown, microcrystalline with black chert nodules.
11,691'-11,763'	Dolomite	medium grey, microcrystalline, weathers very dark grey, slightly calcareous, very shaly, with many black chert nodules (1"x1" - 2" x 6"), parallel to bedding which is 1-4", wavy, uneven and nodular.
11,763'-11,838'	Covered	

11,838'-11,841'	Dolomite	dark grey, weathers medium grey to light brown grey, very fine crystalline, very shaly with black chert nodules, crinoids, fossiliferous, poorly exposed, massive to thick bedded.
11,841'-11,871'	Covered	
11,871'-11,881'	Dolomite	dark grey, weathering medium grey to light brown grey, very fine crystalline, very shaly, with black chert nodules, crinoids, fossiliferous, poorly exposed, massive to thick bedded.
11,881'-11,896'	Covered	
11,896'-11,967'	Dolomite	very dark grey to black, very fine to microcrystalline, very shaly, weathers very dark grey to black, massive, fossiliferous, crinoids with floating medium to coarse dolomite crystals and numerous black chert nodules.
11,967'-11,971'	Dolomite	very shaly, very fine to microcrystalline, medium grey, massive to thick bedded, weathers light grey brown, crinoids, fossiliferous, with black chert nodules ($1\frac{1}{2}$" x 5") and floating coarse crystals, black chert nodules.
11,971'-11,975'	Dolomite	very dark grey to black, very shaly, weathers dark grey, massive, fossiliferous, crinoids, with floating crystals, black chert nodules.
11,975'-11,991'	Dolomite	very shaly, very fine to microcrystalline, medium grey, massive to thick bedded, weathers light grey brown, crinoids, fossiliferous, with black chert nodules ($1\frac{1}{2}$" x 5") and floating coarse crystals of dolomite.

11,991'-12,028'	Dolomite	very shaly, very fine to microcrystalline, dark grey, weathers medium grey, pyrite, massive, fossiliferous, crinoids, with black chert nodules (1" x 1" to 1" x 6") parallel to bedding planes. Amount of chert increases downward.
12,028'-12,051'	Limestone	medium to dark grey, very fine to microcrystalline, massive, very shaly becoming dolomitic with chert nodules toward the bottom. Many medium to coarse crystals floating in limestone, may be crinoid fragments.
12,051'-12,074'	Limestone	medium grey, fine to microcrystalline, well bedded (1"-3"), shaly, crinoids, fossiliferous (brachs and corals), badly jointed and fractured, with some fractures filled with white crystalline calcite. Becomes medium bedded (2"-10) midway. Many medium crystals floating in matrix. These crystals may be crinoidal fragments.
12,074'-12,100'	Limestone	shaly, medium to dark grey, very fine to microcrystalline with many medium to coarse crystals floating in matrix, weathers medium grey, bedding thin to medium ($\frac{1}{2}$-4") becoming rubbly and nodular in places, fossiliferous, very crinoidal, pyrite.
12,100'-12,191'	Limestone	dark grey, weathers light grey to light grey brown, with rubbly and nodular appearance, bedding 1"-1', wavy and uneven, very shaly, very crinoidal, very fossiliferous (colonial corals). Limestone has coarse crystals floating in matrix. (These crystals may be crinoid fragments).

12,191'-12,196'	Limestone	light to medium grey, weathers light to medium grey and slightly rusty, indistinct bedding (appears medium to thick), very fine to microcrystalline, with some coarse crystals floating in matrix. Coarse crystalline material may be crinoid fragments. Limestone is fragmental and fossiliferous.

PHOTOGRAPHS

Photo 1. Cretaceous silty shale outcrop in background.

Photo 2. Looking south along Snake River with Cretaceous clastics exposed along river.

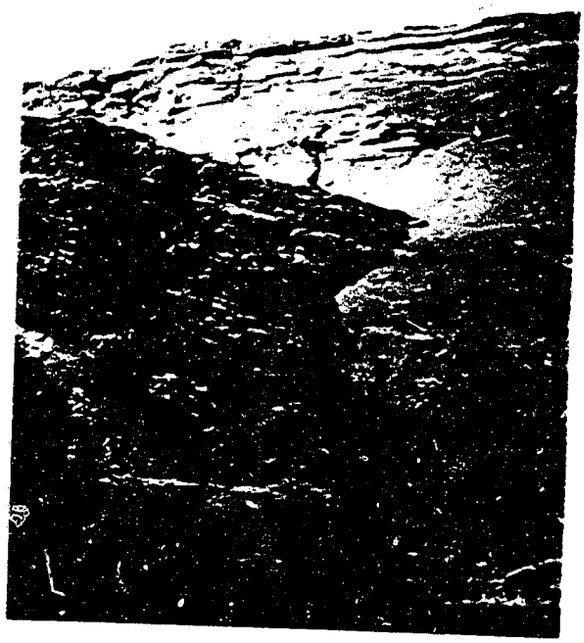


Photo 3. Looking North on Dryas Creek, Devonian limestones in foreground and argillaceous limestones in background.

Photo 4. Looking south on Dryas Creek, Devonian limestone exposed along creek.

Photo 5. Dead of night on Taylor Lake in mid-July.

Photo 6. Measuring Cambrian section at Mountain River.

Photo 7. Camp at Chick Lake with eastern extension of Beavertail Mountain in background.

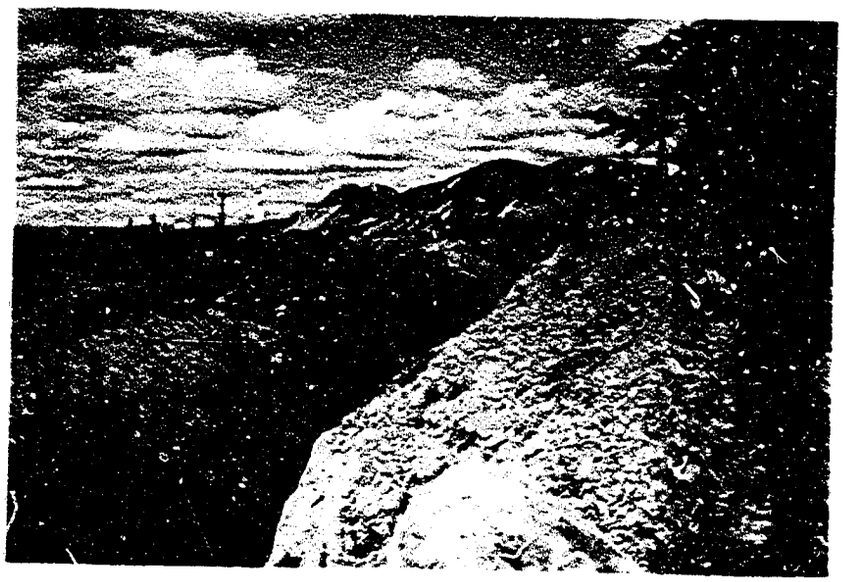


Photo 8. Looking NW from south side of Paige Mtn.

Photo 9. Typical Devonian Home limestone exposure.

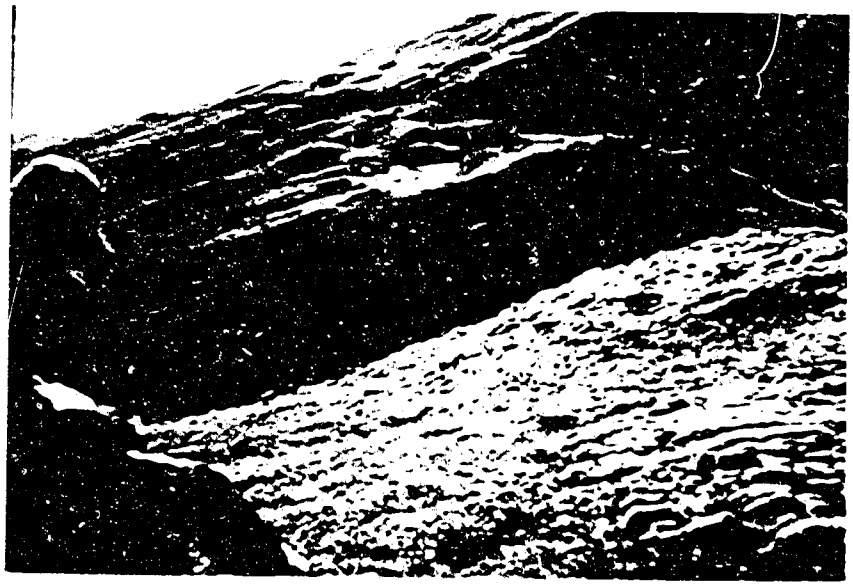


Photo 10. Fly camp on Norman Range in Franklin Mountains.

Photo 11. Helicopter parked on knoll of Devonian Bear Rock breccia. Near Turton Lake in northern extension of Franklin Mountains.

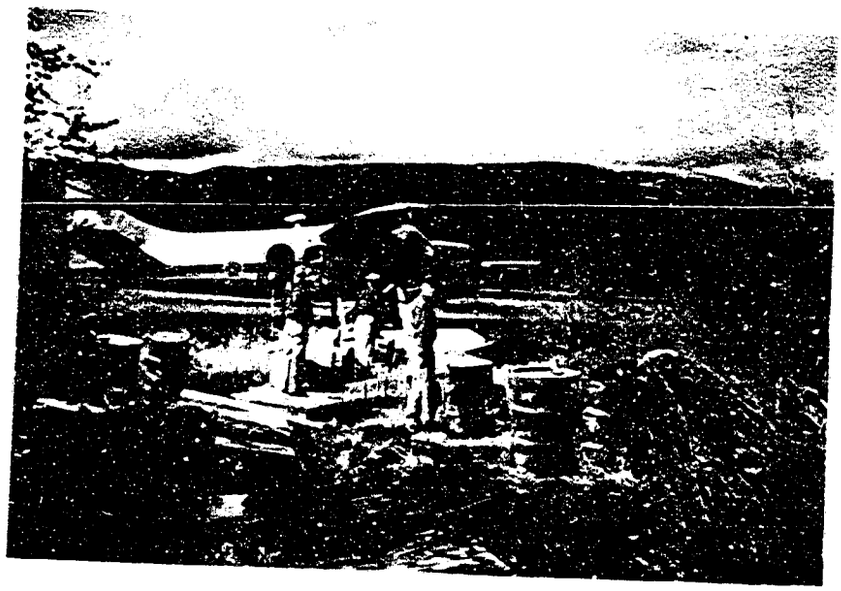


Photo 12. Loading Otter on Transmitter Lake, Norman Wells in preparation of move to first camp. Docking facilities not available on River in spring - makes it necessary to trans-ship gear by truck from airport to nearby lake.

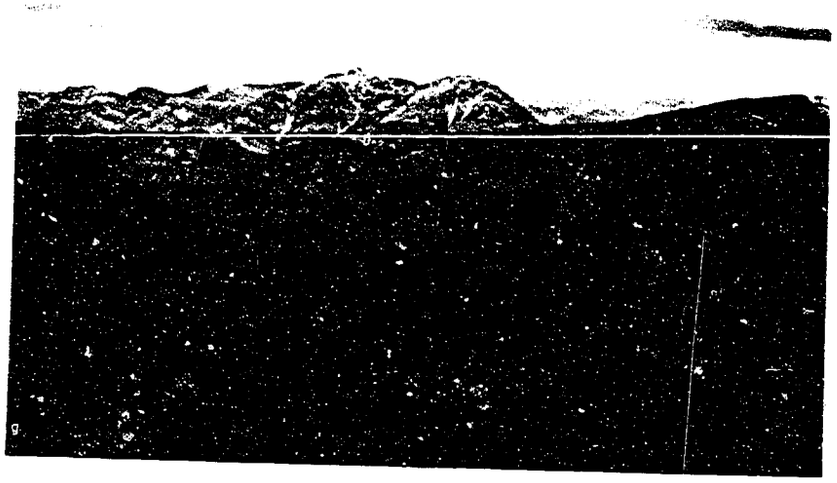


Photo 13. Looking south at head of Keele River, thick Cambrian - Pre-Cambrian strata.

Photo 14. Looking SE in Lower Paleozoic (Canol Road, Plain of Abraham-MacKenzie Mtns.)

Photo 15. First stream west of Katherin Creek, fault zone Siluro-Ordovician.

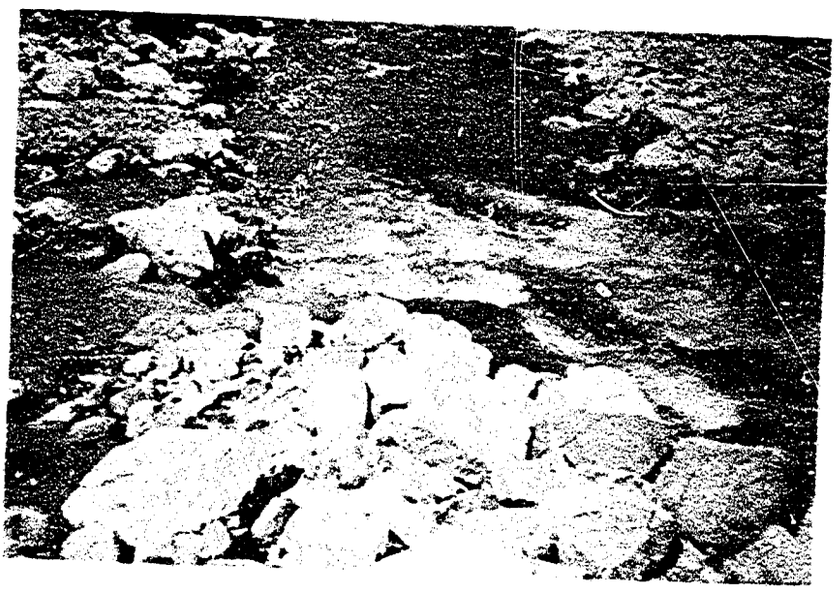


Photo 16. First stream west of Katherine Creek, tributary on left has pink water as it runs over Silurian-Ordovician pink gypsiferous shale. Greenish water in stream on right due to glacier milk and green shale content.

Photo 17. Well bedded Hume limestone overlying Bear Rock breccia at Mountain front.

Photo 18. Flash flood in small dry wash near Mirror Lake camp.

Photo 19. Looking NW from lake zone at head of Grotto Creek through gap into Rouge Mountain River. Example of stream capture.

Photo 20. Rock salt exposure in Little Bear River - Two miles back of mountain front.

Photo 21. Point where Little Bear River emerges from mountain front. Fort Creek black shale with oxidized red zone at top believed due to forest fires.

Photo 22. North end Gambill Mountains - looking south - strata are Bear Rock.

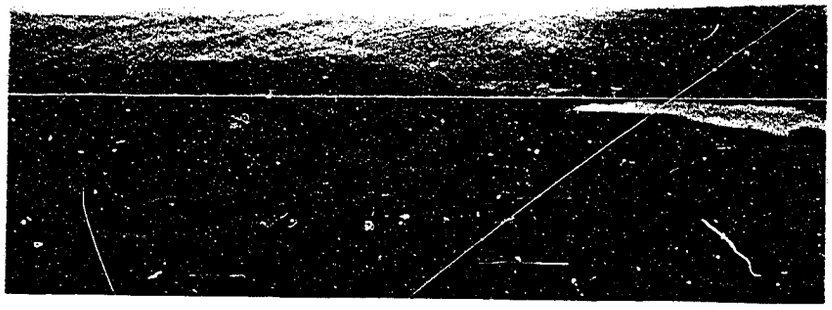


Photo 23. Looking from south end of Mackay Mountains to Tertiary badlands.

Photo 24. Looking north to Mt. St. Charles from point three miles to south Mt. St. Charles sequence dips west.

Photo 25. Middle Cambrian strata exposed north of Mt. Clarke.

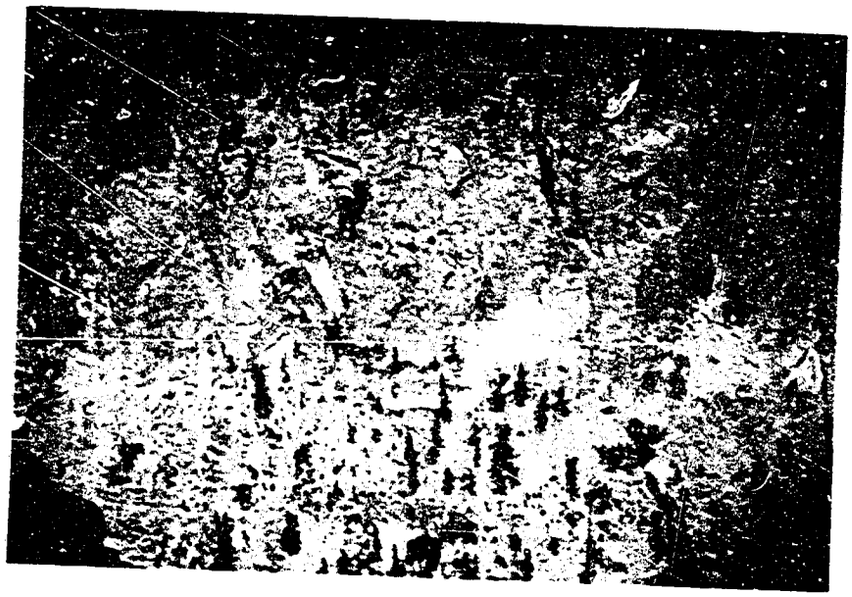


Photo 26. Weathering break within Bear Rock formation, directly south of Mt. Clarke and near Mackenzie River.

Photo 27. Fume-Bear Rock outcrop in Franklin Mountains.

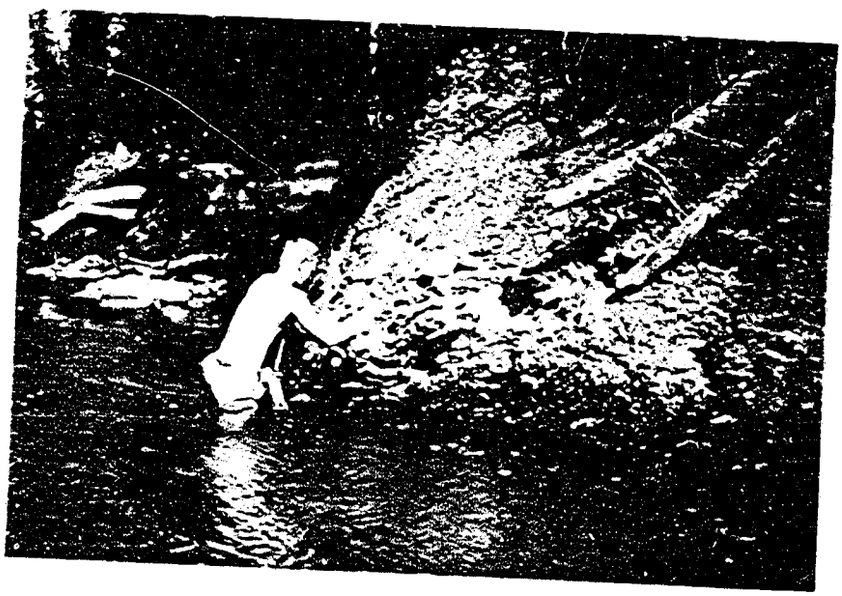


Photo 28. Obtaining lithology and fossil samples from limestone bed in Imperial formation located on Jill Creek in Upper Redstone River area.

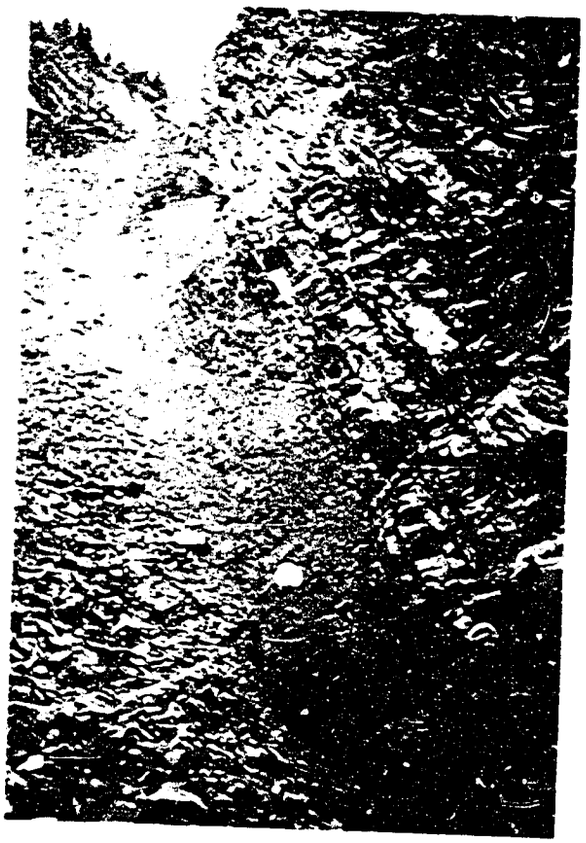


Photo 29. Fort Creek and Imperial siltstone contact in Redstone River.

Photo 30. Typical Bear Rock breccia of Mackenzie Mountains.

Photo 31. Hume-Bear Rock contact on Root River tributary.

Photo 32. Shell Oil Base camp at Wrigley.

Photo 33. Looking west toward Mackenzie River, ridge showing Bear Rock. Note black bear in centre of picture.

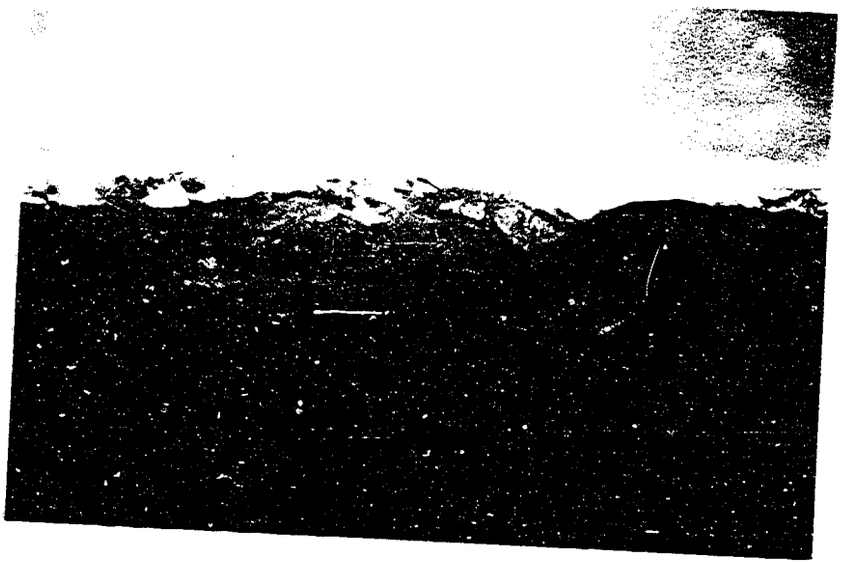


Photo 34. Upper South Nahanni River. Granitic intrusion through gap and Paleozoic strata in foreground.

Photo 35. Gobi Range showing complicated structure in core of range.

Photo 36. Mt. Findle and Bear Rock formations as exposed WNW of Carlson Lake.

Photo 37. Bear Rock formation as exposed WNW of Carlson Lake.

Photo 38. Hume-Franklin Mountain strata on Perry Range west of Carlson Lake.

Photo 39. Iverson Range (west side looking south), exposure of Bear Rock and Ram River shale.

Photo 40. Carlson Lake camp with Imperial formation in background.

Photo 41. North Mahanni River, Upper Devonian type section.

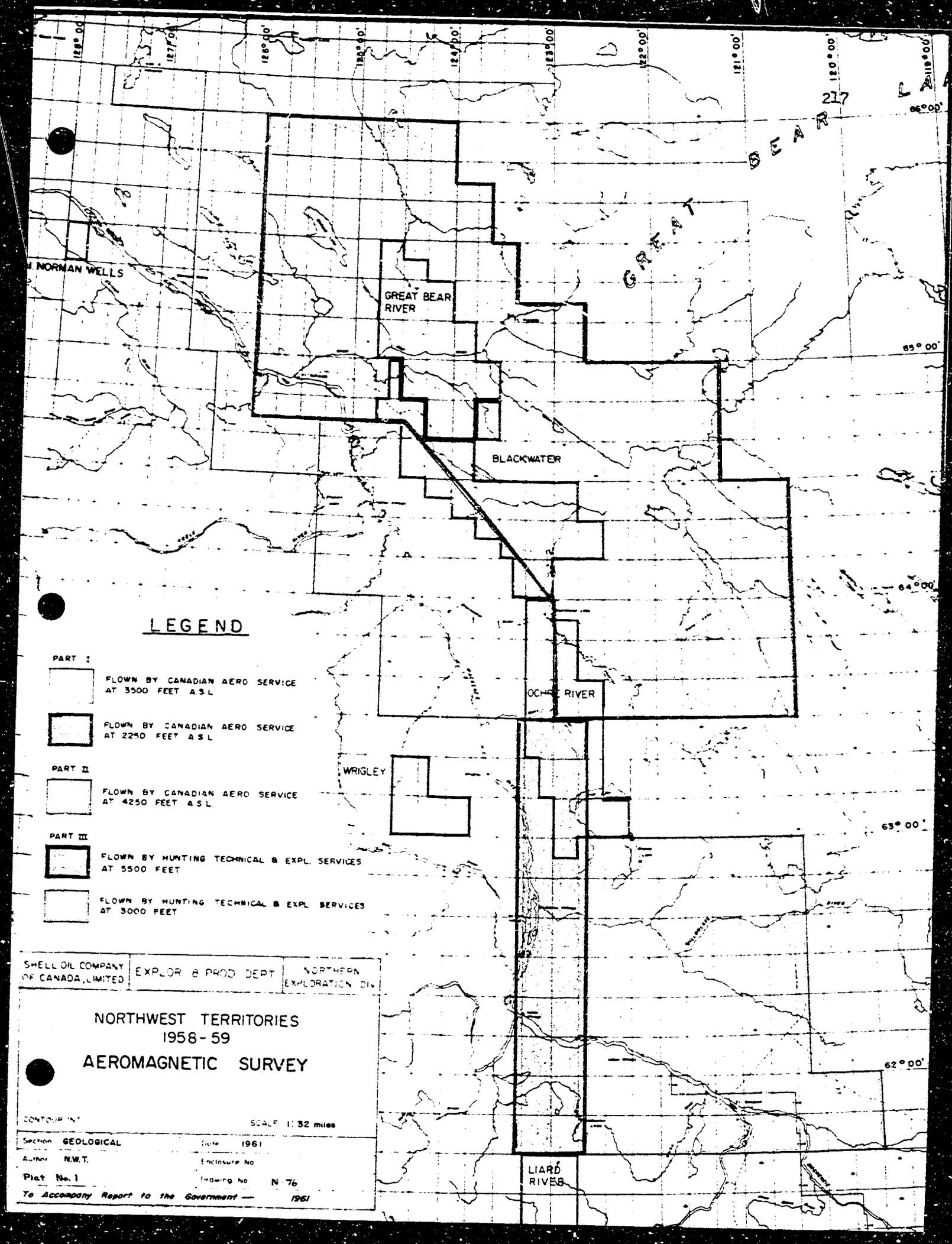
AEROMAGNETIC SURVEY
N.W.T. - 1958-59

NORTHWEST TERRITORIES 1958-59 AEROMAGNETIC SURVEY

PART I

Aeromagnetic Survey Completed by

CANADIAN AERO SERVICE LIMITED
Ottawa, Canada


217
GREAT BEAR
GREAT BEAR RIVER
NORMAN WELLS
BLACKWATER
OCHRE RIVER
WRIGLEY
LIARD RIVER
LEGEND
PART I
FLOWN BY CANADIAN AERO SERVICE AT 3500 FEET A.S.L.
FLOWN BY CANADIAN AERO SERVICE AT 2250 FEET A.S.L.
PART II
FLOWN BY CANADIAN AERO SERVICE AT 4250 FEET A.S.L.
PART III
FLOWN BY HUNTING TECHNICAL & EXPL. SERVICES AT 5500 FEET
FLOWN BY HUNTING TECHNICAL & EXPL. SERVICES AT 3000 FEET
SHELL OIL COMPANY OF CANADA, LIMITED
EXPLOR & PROD DEPT
NORTHERN EXPLORATION DIV
NORTHWEST TERRITORIES
1958-59
AEROMAGNETIC SURVEY
CONTOUR INT
SCALE 1:32 miles
Section GEOLOGICAL
Date 1961
Author N.W.T.
Enclosure No
Plat No. 1
Drawing No N-76
To Accompany Report to the Government — 1961

INTRODUCTION

This report covers the results of an airborne magnetometer survey in the Northwest Territories. The survey was begun in 1958, but adverse conditions prevented its completion in that year, and much of the data obtained could not be compiled because the necessary control lines had not been flown. However, maps covering a large area were compiled and interpreted, and as a result, the program was slightly revised. Flying recommenced in 1959, but once again, the survey could not be completed because the magnetic diurnal conditions were very poor. It was decided not to complete this survey in 1960 but to finalize the interpretation of data flown in 1958 and 1959.

Isomagnetic maps have been prepared and interpreted over the greater part of the survey area flown in overlapping blocks at altitudes of 2250 and 3500 feet (see Plat #1). Systematic coverage of the south-western part was not obtained, and the results from this area, flown at 4250 feet, are not discussed in the report.

The isomagnetic maps were drawn on a scale of 1 inch = 4,000 feet.

SURVEY PROCEDURES

The survey was laid out with traverses one and a half miles apart and perpendicular tie lines 6 miles apart. Through most of the area the traverses run east-west, but in the northwestern part they run north-south because of the changed geological strike. Control loops were flown around blocks averaging 36 by 36 miles.

Each block was flown at a constant barometric altitude with an APN-1 radio altimeter recording the height above the ground. The different altitudes were selected to give a terrain clearance of between 500 and 1000 feet, but such a clearance was compromised to avoid having many small blocks over the mountainous terrain. The altitudes selected were 2250 feet for the bulk of the survey, 3500 for the northwestern part and 4250 for the southwestern part. A three mile overlap zone was provided at the edges of the altitude blocks.

The position of the aircraft was recorded by photographing the ground beneath it with a continuous strip 35 mm. camera. Fiducial marks were automatically put on all records so that they could be keyed together.

The total intensity of the earth's magnetic field was continuously recorded by a Gulf Research and Development Model III Airborne Magnetometer. This instrument has a core of high magnetic permeability, wound with two coils in series opposition, which are used to drive the core cyclically to saturation. If there is no external magnetic field, the output pulses from the two coils are of equal amplitude, but if there is an external field the output pulses do not balance. By means of a compensating coil, the output pulses are continuously balanced, and the current flowing through this compensating coil measures the earth's magnetic field. The measuring element of the magnetometer is automatically aligned in the direction of the earth's field by two similar elements mounted so that all three are mutually perpendicular.

These two elements orient the platform by setting themselves to give a zero reading through servo-mechanisms.

The fluctuations of the earth's magnetic field were monitored by Gulf Research and Development Magnetic Storm monitors. During 1958 operations a monitor was set up at Norman Wells. A second monitor was set up at the southern base of operations, Wrigley. In 1959 a single monitor was used, set up at the base. This was at Norman Wells for a short time and at Wrigley for the remainder of the season. At the start of the project, the diurnal limits were set at 1.5 gammas per minute for long smooth pulses.

This was relaxed to 3 gammas per minute for traverses, but not control lines, when it was realized that production would be severely cut by the erratic diurnal variations in the area. When the monitors recorded variations exceeding these limits, any data obtained in the disturbed periods was discarded and, if possible, reflown.

COMPILATION PROCEDURES

The base maps used for compiling the data were planimetric maps previously made for Shell Oil Company of Canada by Canadian Aero Service, or in areas not covered by these, the best maps obtainable from the Government of Canada. These maps were quite satisfactory, except in one area, discussed below.

The tie between Sheets NQ-2N and NQ-3N was poor.

The flight path of the aircraft was recovered by identifying points on the trip film with corresponding points on the photographs or maps of the area. Line intersections were found and plotted into the magnetometer records. The measured differences of the magnetic level between these points were analyzed and adjusted, so that base lines could be established. These base lines incorporated a regional correction obtained from published maps and tables. Finally the records were transcribed into the maps, locating contour intersections, maxima, minima and other critical points, and the maps were contoured using an interval of 10 gammas.

INTERPRETATION THEORY

The magnetic field of the earth is roughly that of a dipole with its axis along the line joining the north and south magnetic poles. This field, acting on magnetic minerals in the crust of the earth induces a secondary field which reflects the distribution of these minerals. The primary field varies slowly from one place to another, but the secondary field varies much more rapidly, since any magnetic field is an inverse function of the distance from the magnetic sources. The airborne magnetometer records these variations in the total magnetic field along continuous profiles. The regional correction removes the greater part of primary field of the earth, so that the local variations of the secondary field are emphasized.

The study of magnetic anomalies and the rocks which cause them shows that the main cause of the anomalies is the varying magnetite content of the rocks. Magnetite is found as an accessory mineral in igneous rocks, and usually basic rocks contain more magnetite than acidic rocks. Sediments, with the exception of iron formations, are relatively non-magnetic. In addition to this induced magnetic field, the rocks may have acquired remanent magnetism, in other words, they may act as permanent magnets. We have no reason to suppose that this effect is large except in certain cases.

In magnetometer surveys for petroleum it follows that the profiles will normally reflect only changes in the basement rocks. These rocks will cause anomalies, the strength of which depends on the distance between the rocks and the point of observation, the size and shape of the rock mass, and the magnetite content of the rock.

Magnetic anomalies caused by two general types of basement features are of importance in petroleum exploration. The first has been called the supra-basement feature, which has structural relief on the basement surface, and will not usually cause magnetic anomalies greater than 50 gammas. The second has been called the intra-basement feature, caused by changes in composition of the basement rocks, and the corresponding magnetic anomaly may have an amplitude up to 1000 gammas or more. The two types of features may form various combinations.

Suitable intra-basement features can be used to calculate the depth to the upper surface of the rock causing them, which is normally the basement surface.

PART II

Aeromagnetic Survey Completed by

CANADIAN AERO SERVICE LIMITED
Ottawa, Canada

INTRODUCTION

This report covers the results of part of an airborne magnetometer survey in the Northwest Territories (see Plat #1). The survey was flown in 1958 and 1959 and involved three main blocks, each flown at a different altitude. The survey was not completed, because of adverse conditions, but two of the main blocks were covered systematically, and a report on the results obtained was submitted in March, 1960.

Many lines had been flown over the remaining block, at an altitude of 4250 feet, but a large part of them had been discarded. This was because they were flown in periods when the ground monitor stations recorded changes in the magnetic field exceeding the prescribed limits of three gammas per minute for traverses and one and a half gammas per minute for control lines.

Nevertheless, these lines contained useful information, and a preliminary compilation showed that they could be tied together in a fairly regular way. Accordingly, all possible data in this block was compiled and interpreted. The results are presented in this report and the accompanying maps.

This report should be treated as a supplement to that of March, 1960 on the other parts of the survey. The sections giving the background of survey, compilation and interpretation procedures are not repeated here. In some palces the new results have caused minor revisions of the previous interpretation.

CONTROL ANALYSIS

The ground monitors record the changes in intensity of the earth's magnetic field, but they do not necessarily give a true picture of the changes occuring at the airborne magnetometer. The two may be separated by many miles horizontally, and several thousand feet vertically. A check on the changes at the aircraft is obtained by studying the results of the control analysis, noting the adjustments in magnetic level that have been made to tie the lines together. Small and regular adjustments imply minor effects from diurnal changes; large or irregular adjustments indicate conditions which might prejudice the interpretation. An indication of the difference between large and small can be obtained by combining the specification of three gammas per minute with the speed of the aircraft, 120 or 150 m.p.h. This would give a change of 9 or 7 gammas along the six miles flown between adjacent tie lines.

In fact the adjustments made along such six miles segments show the following distribution:

0 gammas	20%
1 "	33%
2 "	13%
3 "	15%
4 "	5%
5 "	4%
6 "	0%
7 "	3%
8 to 12 "	7%
Total	100%

This implies that most of the lines can be considered reliable, but those with adjustments of 7 gammas or more should betreated with some caution. These are Traverses 121, 129, 137, 156, 167, 168 and 173. Of the control and tie lines only CL-18 and DCL-18 on the northeast side of the block, required adjustments of more than one gammas per mile and a half.

PART III

Aeromagnetic Survey Completed by

HUNTING TECHNICAL & EXPLORATION SERVICES LIMITED

GENERAL

The survey was delayed by severe magnetic storms. The aircraft was grounded 27 days out of 118 and in addition roughly 10,000 line-miles of profile were "washed out" and had to be reflown.

AREA

The report area is bounded between 63°30' and 61°40' latitude and 123°20' and 120°00' longitude (see Plat #1).

Topographically the terrain changes from typical Precambrian lowlands in the northeast, through a wide, mainly flat area of grassland, swamps and rivers flowing westward to the Mackenzie River, to the sharply uplifted areas of the Franklin Mountains in the west. The area east of the Mackenzie River contains only two regions of high relief. These are the Franklin Mountains of which Cap Mountain reaches an elevation of more than 5500 feet above sea-level and the mesa-like Horn Mountains which locally reach 2500 feet above sea-level.

It was decided to break the area into two altitude blocks east and west of 122°40'W, just east of the Franklin Mountains, with a 3-mile overlap east of this longitude. The west block was flown at a constant barometric altitude of 5500 feet above sea-level, the east at 3000 feet above sea-level.

The predominant magnetic "grain" being roughly north-south, the lines were flown east-west. A spacing of $1\frac{1}{2}$ miles was chosen, this being considered to be roughly an average for the area of the total distance from the plane to the Precambrian basement.

Mapping was done on 1 inch to 4000 feet base maps drawn by the Photographic Survey Corporation from data supplied partly by the Shell Oil Company and partly by the Federal Government.

During the survey the aircraft, a twin-engined Lockheed 14, registration CF-TCO, was based at both Yellowknife and Fort Simpson. Wrigley was used occasionally as a refuelling stop.

POSITIONING

Vertical control was provided by a Kollsman barometric altimeter which was adjusted upon take-off and landing. A radio-altimeter was used also to provide checks on altitude over places of known elevation and to supply topographic information to the interpreter. This was the standard U.S. military APN-1 instrument. The results from this were simultaneously displayed to the pilot on the instrument panel and continuously recorded on a curvilinear Esterline-Angus chart through a Texas Instruments recorder.

Horizontal control was provided in flight by visual observation of land-marks on 1 inch to 4,000 foot topographic maps. The actual flight path of the aircraft was recorded by continuous vertical photography exposed during flight. For this a Canadian Applied Research Limited Mark 8, 35 mm. aerial camera was employed, utilizing a wide-angle 18 mm. lens.

Very exact flying and plotting of the control network was achieved by the use of photo-mosaics. At all intersections identical photo frames were matches with the photo-mosaic, providing accurate control of the survey and hence the magnetic grid.

MAGNETIC CONTROL

Magnetic control was provided by a network of control loops and control lines.

Control loops 36 miles square were flown with an overlap of a few miles at the beginning and end. The magnetic "drift" during this flight, which normally lasted slightly under one hour, was obtained by comparing magnetic levels at corresponding points on the overlapping portion of the loop. The drift was distributed linearly with time around the loop. Adjoining control loops were flown repeating the common side. Data were compared at loop corners and magnetic drift was distributed around three sides. The fourth side provided a check on the linearity of the drift.

Control lines were flown 6 miles apart in a north-south direction over the entire area except along the sides of the control loops. Magnetic data on these lines were corrected to the control loops at every intersection. The survey flight lines were corrected to the control lines in the same way.

The control network was flown only during periods of extremely low diurnal variation. A Gulf Magnetic Storm Monitor, Model 1-1, with Esterline-Angus curvilinear recording was used throughout the survey to record continuously the diurnal variation. The instrument was stationed in a disturbance-free location at Fort Simpson. Full-scale sensitivity of this instrument was 250 gammas. A normal diurnal tolerance of 3 gammas departure from linearity per 3 minutes was used. For the control network this was reduced to about 1 gamma, and only periods of small actual change were used.

The actual magnetic drift over control loops averaged about 15 gammas. A maximum drift of 30 gammas was tolerated. Closure on the control lines between control loops was generally small and was not allowed to exceed 10 gammas. The overall drift on the control lines was quite uniform, no rapid changes or reversals being evident from one control loop to the next.

The closure at the intersections of flight lines and control lines was very small. The strict diurnal tolerance is probably responsible for this. The datum line drawn on the magnetic records, which also adjusts for magnetic drift, consists very largely of the "normal" variation. This variation is applied as a correction to the magnetic data to partly remove the terrestial or global magnetic effect. In this area the effect was calculated on the basis of Dominion Observatory information from four ground control points. An overall north-south variation of 0.85 gammas/mile and an overall east-west variation of -3.05 gammas/mile were calculated in the following way:

At 65°N 120°W the magnetic value is 59,800 gammas
At 65°N 125°W the magnetic value is 59,400 gammas
At 60°N 120°W the magnetic value is 60,200 gammas
At 60°N 125°W the magnetic value is 59,600 gammas

The north-south variation along longitude 120° is 1.14 gammas/mile.
The north-south variation along longitude 125° is 0.57 gammas/mile.
The average north-south variation is 0.85 gammas/mile.

The east-west variation along latitude 60° is -3.41 gammas/mile.
The east-west variation along latitude 65° is -2.70 gammas/mile.
The average east-west variation is -3.05 gammas/mile.

The corrections, which are the negatives of these variations, were applied to the control loops only. Suitable adjustments of control lines and flight lines were made by the normal procedure of drawing the datum lines.

AIRBORNE MAGNETOMETER

The survey was carried out using a Gulf Research and Development Company Mark III magnetometer, recording variations in total field intensity. The magnetometer head was mounted in a "bird" carried on 100 feet of cable below and behind the aircraft.

The resolution of the instrument is such that variations of 1 ½ gammas are readable. Noise-level is less than 1 gamma.

The sensitivity of the magnetometer was set at 600 gammas full-scale, with a 500 gamma step interval. A tape speed of 3 inches per minute was used.

REMARKS

Some of the area was flown and compiled during the period of June to December, 1957, however, we were not billed by the contractor until after September, 1958 and thus is being included in this report.

Prepared by Northwest Territories District
Staff, D.H. Shouldice, District Geologist
under the supervision of B.M. Veilleux,
Northern Division Exploration Manager,
Shell Oil Company of Canada, Limited

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