GEOLOGICAL SURVEY OF CANADA
OPEN FILE 6151

Description of some cores from Triassic strata in the Western Canada Sedimentary Basin: Parts 1 to 5.

J. Dixon

2010

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INTRODUCTION

This report (Parts 1 to 5) contains descriptions of core in Triassic strata from 220 wells in the subsurface of Alberta and 132 in northeast British Columbia Although a significant number, this represents only a small portion of the number of cored wells in Triassic strata. The cores include strata from the Montney, Doig, Halfway, Charlie Lake, and Baldonnel formations, but the bulk of the descriptions are of core from the Doig Halfway and lowermost Charlie Lake interval. This reflects the author's interest in trying to identify and characterize a regional unconformity associated with this interval of strata (Dixon, 2004, 2005). The cores described from this interval that include the Halfway Formation usually contains my interpretation of where this unconformity occurs (usually identified as "possible major erosional surface"). Where this is done the unconformity is interpreted according to Dixon's (2004) criteria (i.e., either at the base of, or within the Halfway Formation), rather than those in his 2005 publication. Where Charlie Lake strata rest directly on Doig beds, the unconformity is at the Charlie Lake-Doig contact. For strata identified as "Halfway Fm" in map-sheet 94H the stratigraphic relationships between "Halfway" and enclosing strata is different than in other parts of the basin and the reader is referred to Young (1997) and Dixon (2002, 2007, 2008) for a more detailed explanation.

The descriptions start from the top of the core and proceed down. This is not a normal stratigraphic procedure, most stratigraphic sections are described from bottom (oldest) to top (youngest). However, the top of the core is the least likely part to have lost material, consequently it is a better fixed depth than starting at the bottom, where core may have been lost. Most of the descriptions are given as core depths, in some instances the core depths have been adjusted to match the log depths (these are identified in the descriptions). The well name, location and amount of recovered core usually were taken directly from the core boxes, however, the operator may have changed over time and the amount of reported recovered core may not correspond with what was measured.

A number of cores are described only briefly, this reflects the author's desire to check on certain features usually related to the unconformity between Middle and Upper Triassic strata, rather than describe the core in detail.

The descriptions of the Alberta cores are arranged first by separating the wells based on their presence within the W5 or W6 meridians. Within the meridians the wells are arranged first by township, then range and finally by lsd. Alberta and part of northeast British Columbia use this location system (Parts 1 to 4). In other areas of British Columbia (Part 5) the wells are identified by NTS map-sheet numbers (e.g., 93P, 94A, etc, Part 5).

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WELLS IN W5

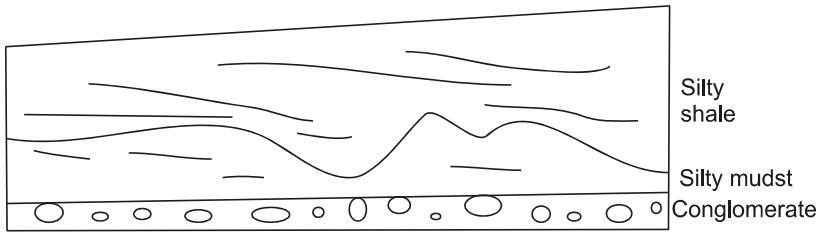
Dome Amoco Kaybob South 11-18-61-21W5
Core 1*:* 7960-8020 ft
Rec. 58 ft. 15 boxes. Full diameter core
Examined 28th September 1998

JURASSIC - NORDEGG

7960-7989 ft. Shale: Black, massive with well spaced parting planes. Scattered throughout are some silt laminae and a few silt-filled sub-horizontal burrows. There is at least one geopetal-filled bivalve near top of core. Fractures along subvertical planes.

7989-7989.25 ft. Conglomerate: Erosional base and abrupt top (base partially destroyed by horizontal saw cut). Clasts up to 12 cm long; subrounded to rounded; in a matrix of fine to granular sand. Clasts mostly of very fine grained sandstone and coarse-grained siltstone.

Sketch of upper contact:



TRIASSIC - MONTNEY FM

7989.25-7991.25 ft. Sandstone: (Not sure if this is Triassic or Nordegg Fm). Very fine grained. Upper 8" of thinly bedded, slightly argillaceous sandstone, with beds 0.5 to 2 cm thick. Contains at least two mm-thick layers of shelly debris located at the base of two beds.
Remainder of unit consists of alternating laminae of very fine sand and clay/silt. Laminae mostly subparallel, with a few low-amplitude ripples. Rhythmic bedding, with 1-3 cm thick beds of sandstone alternating with 0.5 to 1 cm thick silty mudstone beds. The top few mm of some sandstone layers contain slightly coarser grained sand, commonly in a low amplitude ripple form.
Basal contact of interval not preserved but rapid facies change suggests abrupt contact.

7991.25-7991.67 ft. Calcareous dolostone: Light grey, massive. A small bivalve seen on bedding surface. Appears to be a dolarenite. Basal contact irregular and

abrupt, with 1 to 3 cm of relief.

7991.67-7998 ft. Dolostone coquina: Coarse coquina; highly porous (mostly moldic). Best porosity developed in top 2 ft. Highly fragmented bivalve debris arranged subparallel to bedding. A few "floating" dolarenite clasts within the coquina.

7998-7999.5 ft. Dolarenite: Beds 2-4 ins thick. Low porosity. Some styolites. No fragments large enough to identify with hand lens.

7999.5-8000.25 ft. Dolostone coquina: Similar to coquina described above but with far less porosity.

8000.25-8005 ft. Dolarenite: Poorly defined beds. Low porosity. Some styolites.

8005-8014 ft. Dolostone coquina: Porosity not as pronounced as in the uppermost coquina. A 1 cm-thick shale bed at about 8012 ft separates this interval into at least two similar units. Abrupt basal contact.

8014-8018 ft. Interbedded dolomudstone, dolarenite and thin coquina beds: Dolomudstone units tend to be finely laminated; commonly with deformed or microfractured laminae. Coquina beds 2-4 cm thick. Lower 15 ins. contains large clusters of pyrite, up to 15 mm long.

Interpretation of Triassic: coquinas and dolarenites are interpreted as high-energy, marine, storm deposits.

Jurassic-Triassic contact: a high-energy event created the initial conglomerate. Followed abruptly by the development of a lower energy silty deposit with some ripple lamination. There was a period of non-deposition during which the silty unit was eroded/corroded and an irregular erosional surface developed. This was followed by mud deposition interspersed with the deposition of silt laminae.

Apache et al Tony 10-29-61-21W5

Core 1*:* 7702-7756 ft

Rec. 54 ft. 11 boxes. Full diameter core.

Examined 28th September 1998.

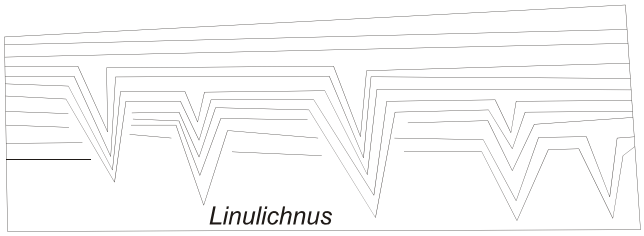
JURASSIC - NORDEGGG

7702- 7711 ft: Shale: Black; massive, with widely spaced parting planes. Abruptly rests on Triassic strata with only a thin (<1cm) basal conglomeratic zone comprised of small (few mm) clasts in a mud matrix. Upper 2 ft. Contains scattered, thin-walled, bivalve debris, and a few mm-thick shelly beds.

TRIASSIC MONTNEY FM

7011-7728 ft. Sandstone: Calcareous; very fine grained; slightly argillaceous; light grey. Massive to load deformed. Some thin argillaceous layers indicate interval is composed of several units. Faint traces of sub-horizontal laminae. Vague hints of trace fossils - both horizontal and vertical forms.

7728-7731.3 ft. Sandstone: Very fine grained; coarse laminae to very thin beds, with intervals containing vertical burrows. Brownish hue.



7731.3-7736 ft.	Sandstone: Very fine grained; light grey. Massive to thinly bedded. Contains sand-balls within top 6 ins. Beds 10-15 cm thick where visible. Beds are uneven, suggestive of some load deformation.
7736-7737 ft.	Sandstone: Very fine grained. Crudely laminated to very thinly bedded. Some beds/laminae are strongly deformed.
7737-7738.2 ft.	Sandstone: Very fine grained; very thinly bedded. Mud-chip conglomerate in lower 2 ins. Banded appearance due to presence of clay/organic laminae.
7738.2-7756 ft.	Sandstone: Coarsely laminated to thinly bedded, very fine grained sandstone. Many beds are load-deformed; a few are intensely deformed. Vertical burrows are common throughout interval.

Interpretation of Triassic: marine, low to moderate energy environment dominated by constant influx of sand as thin beds. Sufficient time between sand deposition to allow some colonisation by burrowing organisms - also many of the organisms were able to keep up with sand influx, although now and again the rate of deposition exceeded the capability of the organisms to survive.

Ashland et al. Kaybob 6-35-62-20W5
Core 2*:* 6687-6730 ft.
?Full recovery. 9 boxes. Full diameter core .
Examined 29th September 1998.

JURASSIC - NORDEGG

6687-6690 ft.	Shale: Typical Nordegg black shale. Thin (<1 cm) coarse sand and granule lag deposit at base of formation. Top of lag deposit is uneven and abruptly overlain by shale.

MONTNEY FM

6690-6707 ft.	Sandstone: Very fine grained. Coarse laminae to thin beds (up to 5 cm) separated by clay partings. Subhorizontal laminae. Extensive development

of short vertical burrows (*Lingulichnus*). A few long vertical burrows.

6707-6707' 4.5" Coquina and sandstone: Two coquinal beds separated by a laminated sandstone. Upper coquina 1-1.5 ins. thick; lower coquina 0.5 ins. thick. Abrupt base/top to coquinas. Upper surface of lower coquina is rippled. Some moldic porosity.

6707' 4.5"-6715 ft. Sandstone: Similar to 6690-6707 ft interval. A 2 ins. interval at about 6711.5 ft. contains abundant lenses of pyrite.

6715-6719 ft. Sandstone: Very fine grained. Massive to vaguely bedded. There is at least one large vertical burrow present about 10 ins. below top of interval. Base/top appears to be gradational. Suspect may contain several beds.

6719-6720.5 ft. Sandy dolomite coquina: Erosional base; top appears to be gradational. Contains some large (up to 5 cm long), tabular clasts in lower 1 ft. Some clasts arranged in low-angle imbricate structure. Some moldic porosity.

6720.5-6722 ft. Sandstone-shale: Thick beds of very fine-grained, massive-appearing to crudely laminated, sandstone separated by 1-2 cm thick shaley beds. Some vertical burrows immediately below the coquina are pyrite-filled. Abrupt base/top for the thicker sandstone beds.

6722-6730 ft. Sandstone: Similar to interval 6690-6707 ft. although slightly shalier. Extensive pyrite at a few horizons.

Interpretation: Low- to moderate-energy marine depositional environment in which burrowing organisms could establish and maintain, interspersed with high-energy storm deposition.

Dome Amoco Kaybob 11-10-62-21W5
Core 2*:* 7107-7166 ft.
?Full recovery. 16 boxes.
Examined 29th September 1998.

JURASSIC - NORDEGG

7107-7122ft. Shale: Black, massive with widely spaced parting planes. Rests abruptly on Triassic with no basal lag deposit.

MONTNEY FM

7122-7122' 10" Dolomite coquina: Slightly calcareous. Abrupt base/top. Extensive moldic porosity. Bivalve debris arranged parallel to subparallel to bedding, both convex- and concave-up, although former more common. A crude fining-upward trend - larger shell fragments tend to be concentrated in lower half of interval.

7122' 10"- 7124' 11" Sandstone: Light grey, very fine-grained. Scattered molds of bivalve shells. Mostly massive in appearance. Appears to be silica cemented. Scattered small clusters of pyrite crystals a few mm in diameter/length.

7124' 11"- 7125' 3" Sandstone: Very fine grained. Contains fine, argillaceous laminae. Deformed bedding.

7125' 3" - 7125' 11" Sandstone: Very fine grained. Massive appearance. Possibly may contain deformed bedding.

7125' 11" - 7146 ft. Sandstone: Contains several fining-up beds of very fine grained sandstone,

varying from 6 to 20 ins. thick. Ideal vertical profile of beds (base-to-top):
Erosional base
Massive or crudely bedded or low angle cross bedded sandstone
Thin interval (< 4 cm.) of bioturbated, crudely laminated argillaceous sandstone.
In at least one bed the uppermost strata grades into a thin (<1.5 cm) mudstone.

7146-7146.5 ft. Sandy dolomite coquina/coquinal sandstone: Crudely bedded. Minor amount of moldic porosity. Styolitic. Top/base appear to be abrupt.

7146.5 - 7146' 8" Sandstone: Very fine grained. Finely laminated. Base not preserved.

7146' 8" - 7166 ft. Sandstone: Very fine grained, argillaceous in parts. Generally massive in appearance in upper 2 ft., with more argillaceous partings/laminae in lower part. Extensive bed slumping and load deformation. Styolites locally present. At about 7154 ft. there is an 8 ins. thick bioclastic sandstone/sandy dolarenite bed. Argillaceous laminae are irregular and commonly anastomosing. Some subvertical fractures that are clay-filled.

Interpretation of The Triassic: sandstone and coquina beds are interpreted to be storm deposits.

Amoco Giroux D-1 7-14-65-22W5
Core 2*:* 6288-6348 ft.
Rec. 59.4 ft. 16 boxes. Slabbed.
Examined 11/12th January 2000

JURASSIC - NORDEGG

6288-6300'6" Shale: black, blocky to fissile. Between 6280.5 and 6282 ft there are several very thin beds of light grey, very coarse grained siltstone to very fine grained sandstone; no apparent internal sedimentary structures; top/bases of beds are abrupt.

6300'6"-6300'9" Sandy-pebbly mudstone: grain size ranges from sand to large sandstone clasts "floating" in a mud matrix. Generally lacking in internal sedimentary structures except for top 1-2 cm where there are fine laminae. Basal contact is erosional and top of Triassic strata is slightly irregular.

MONTNEY FM
Siltstone member

6300'9"-6313'2" Sandstone: six fining-upward units of sandstone grading up into mudstone/sandy mudstone. Very fine grained, brownish-grey sandstone with fine to coarse planar laminae. Small pyrite nodules (few mm) scattered throughout sandstones. Basal contacts of sandstone beds are abrupt. Upward change to mudstone can be either rapidly gradational over a thin (few mm to1 cm) interval or abrupt. Mudstone intervals are medium grey and contain laminae or very thin, laminated beds of coarse silt to very fine sand. Laminae are usually planar, although a few low-amplitude current ripples are present. Lowermost sandstone unit separated from

underlying coquinal bed by a 2-4 mm thick mudstone layer than rests abruptly on the coquina.

Coquinal Dolomite member

6313'2"-6321'2" Coquinal sandstone: light grey; varies from a sandy bioclastic dolostone to a shelly sandstone. Very fine grained sandstone. Interval made up of several units, from top to bottom they are:
6313'2"-6315'7": sandy coquinal dolostone. Rich in small ?bivalve shells in a sand matrix. Extensive moldic porosity. Crude subhorizontal bedding. Erosional basal contact.
6315'7"-6318'1": very fine grained sandstone with scattered molds of ?bivalve clasts. Crude subplanar bedding. Scattered very small pyrite nodules. Basal contact not preserved but rapid lithological change suggests it is abrupt.
6318'1"-6318'11": sandy coquinal dolostone: bivalve clasts in a very fine sand matrix. Moldic porosity. Basal contact not preserved but rapid lithological change indicates an abrupt contact.
6318'11"-6321'2": sandstone - light grey, very fine grained. Appears to consist of several thin beds. Some bed loading at contacts. No bivalve debris. Lacking internal sedimentary structures. Base of interval is abrupt and erosional.

Sandstone member

6321' 2"-6347' 3" Sandstone-mudstone: finely to coarsely interlaminated very fine grained sandstone and mudstone with scattered thin to thick beds of sandstone. Bedding characteristics impart a distinct striped appearance. Predominantly planar laminated with some current-ripple laminae in the thicker beds. Several zones rich in narrow, generally short vertical burrows. There is a tendency for the interval to become sandier up-section. About 2.5 ft above base of core there is an 8 ins-thick mudstone-clast conglomerate consisting of small to large, spherical to elongate mudstone clasts floating in a mud-silt matrix. Within the conglomerate are spherical to irregular patches of white dolomite some of which contain vugs. Base of interval appears to be abrupt.

N.B. Shift in the gamma-ray curve at 6342 ft may correspond to one of the thick sandstone beds present within the Sandstone member.

Interpretation: all strata appear to be marine in origin (bioclasts, burrows, general setting). The Siltstone member has all the attributes of waning-flow storm deposits. The Sandstone member was deposited in a regime of low to moderate depositional energy with sufficient sand supply to prevent extensive colonisation by burrowing organisms. The Coquinal Dolomite member (CDM) is a high-energy deposit probably formed as storm-accumulated bioclast debris. The erosional nature of the CDM's basal contact is consistent with its regional interpretation as a major regional unconformity.

Jordan 102 Ante Creek 2/13-21-65-24W5

Core 1*:* 2153-2165 m
Rec. 11.8 m. 9 boxes. Full diameter core.
Examined 30th September 1998.

MONTNEY FM
Dominant facies consists of thinly interbedded, current-ripple laminated, very fine grained sandstone and shale. Sandstone more prevalent than shale. Sandstone beds a few mm to a few cm thick. Some of thicker sandstone beds have climbing ripple laminae. All sandstone beds have abrupt basal contacts; upper contacts may be abrupt or rapidly transitional over a few mm. Shale beds tend to be thinner than the sandstone beds. No bioturbation features seen.

Scattered throughout core are a few thick sandstone beds, 10-30 cm thick. These beds are erosionally based, generally massive in appearance although the upper few cm may contain fine planar laminae grading up into ripple cross laminae.

Cored interval displays an overall upward increase in sandstone content and beds tend to thicken up-section.

Interpretation: low to moderate-energy deposits interspersed with higher-energy deposits (i.e., storm beds).

Core 2*:* 2177-2184.5 m
Rec. 7.3 m. 6 boxes. Full diameter core.
Examined 30th September 1998

MONTNEY FM
Predominantly consists of 10-30 cm thick beds of very fine grained sandstone separated by either thin (<1 cm) shale layers or with sandstone-on-sandstone erosional contacts.

Sandstone: generally massive with some planar laminae and rare ripple laminae. Disrupted fabrics and some steeply inclined basal contacts indicate some beds are deformed.

Top 65 cm consists of thinly interbedded sandstone and shale. Sandstone beds a few mm to 10 cm thick; shale beds generally <1 cm. Ripple cross laminae common in the sandstone beds.

No bioturbation features.

Interpretation: amalgamated storm deposits and low-to moderate-energy deposits.

Chevron Ante Creek 15-25-65-25W5
Core 1*:* 2160-2160.2 m Rec. 0.2 m 1 box. Slabbed
Core 2*:* 2160.2-2187.8 m Rec. 27.45 m 25 boxes. Slabbed
Examined 11/12th January 2000

JURASSIC - NORDEGG
2160-2162.5 m Shale: black; massive with very thin beds (few mm to1 cm) of siltstone.

Abrupt basal contact. Lower 4 cm consists of silty to sandy mudstone capped by a thin ripple-laminated siltstone.

MONTNEY FM
Siltstone member

2162.5-2187.8 m — Sandstone-mudstone: thin to thick beds of very fine grained sandstone interbedded/intercalated with thin beds/layers of mudstone. Thickest sandstone bed is 90 cm; most beds are <30 cm. Thick sandstone beds generally are abrupt-based and contain fine, planar laminae that grade up into low-angle lamina-sets, in turn grading up into ripple laminated sandstone/mudstone. The low-angle lamina-sets are typical of HCS. Thin beds (2-5 cm) of sandstone tend to be ripple-laminated and commonly contain abundant clay laminae. Some of the thick sandstone beds have contorted laminae and a few of the thin beds have load deformed basal contacts. Oil staining is present in a few of the thick sandstone beds. No signs of bioturbation. There is no apparent trend in the order in which the thick beds occur, they occur every 0.75 to1 m but can be more or less.

Interpretation of the Montney beds: the characteristics of the beds indicate a lower shoreface setting, below fair-weather wave-base. The thick sandstone beds appear to contain HCS suggesting combined/waning-flow deposition during storms. The lack of bioturbation probably indicates a depositional environment either with high rates of sedimentation and/or too energetic for successful colonization.

PanAm A-1 Asplund Creek 4-22-66-23W5
Core 1*:* 6480-6540 ft
Full rec. 13 boxes. Slabbed.
Examined 11/12th January 2000.

MONTNEY FM
Sandstone member

6480-6497'6" — Mudstone-sandstone: laminae to very thin beds of coarse grained siltstone/very fine grained sandstone interbedded with mudstone. Approximately 60% mudstone. Extensively bioturbated. Medium grey colour. *Lingulichnus* is the dominant trace fossil. Bioturbation tends to increase up-section. Basal 5 ins consists of two sandstone beds separated by a thin clay-laminated layer, with the lower of the two beds resting abruptly on the underlying mudstone. For about 2 ft above the basal beds the succession consists of very thin beds with some bioturbation, overlain by a more mudstone dominated interval with extensive burrowing. A gamma-ray "kick" at 6487 ft corresponds to an increase in mudstone content below this depth.

6497'6"-6498'6" — Mudstone: light to medium grey; silty. Load deformed beds in upper third of interval. Abrupt basal contact.

6498'6"-6505'6" — Sandstone-mudstone: predominantly coarsely laminated to very thinly bedded, with a few sandstone beds >1 cm thick. Very fine grained sandstone. Sandstone beds generally <1 cm thick; mudstone beds

	generally <0.5 cm thick and commonly contain fine silt-laminae. Some of the thicker sandstone beds contain ripple laminae. About 60% sandstone. Some scattered horizontal burrows and a few vertical burrows. General appearance is of a "striped" look. Rapidly gradational change from underlying interval.
6505'6"-6514'3"	Sandstone-mudstone: very thin to thin beds of very fine grained sandstone interbedded with coarse laminae to very thin beds of mudstone. Characteristic "banded" appearance. Sandstone beds usually 1-2 cm thick and are finely laminated (planar laminae predominant). Muddier beds contain some burrows, but burrows are not very common. There is an overall slight thinning of beds up-section as the interval rapidly grades up into the overlying succession. The basal bed rests abruptly on the underlying mudstone.
6514'3"-6514'7"	Mudstone: contains laminae of coarse silt.
6514'7"-6514'8"	Sandstone: very fine grained; finely laminated. Abrupt base/top.
6514'8"-6515'2"	Mudstone: contains contorted silt laminae.
6515'2"-6517'10"	Mudstone-sandstone: coarse laminae to very thin beds of very fine grained sandstone intercalated with silt-laminated mudstone. There are a couple of 1 to 4 cm thick sandstone beds. A few scattered occurrences of horizontal burrows. Rapidly gradational change from underlying interval (corresponds to gamma-ray "kick").
6517'10"-6522'7"	Sandstone-mudstone: predominantly very thin (1-2 cm) beds of very fine grained sandstone interbedded with coarse laminae of mudstone. About 70-80% sandstone. Banded appearance.
6522'7"-6524'8"	Sandstone-mudstone: a few 1 cm-thick beds of very fine grained sandstone separated by thicker intervals of coarsely interlaminated sand and clay; imparting a striped appearance. Some scattered occurrences of horizontal burrows. This interval is a transition zone between overlying and underlying beds.
6524'8"-6540'	Mudstone-sandstone: striped appearance due to coarsely interlaminated sandstone and mudstone. A few scattered thicker sandstone beds (1-4 cm). Finely laminated throughout - some small-scale ripple forms present, commonly as lenticular beds. Scattered occurrences of horizontal burrows.

Interpretation: generally low-energy marine deposition in the transition between offshore and lower shoreface. Sufficient sediment supply to inhibit extensive colonization. Sand supply probably mostly by storm action.

Wainoco TP Ante Creek 10-11-66-24W5
Core 1*:* 6959-6989 ft
Rec. 29 ft. 8 boxes. Full diameter.
Examined 1st October 1998.

Log/core depths not compatible. Log character/lithological succession in core would suggest that the core depths should be at least 4 to 6 ft. deeper.
Depths given below are corrected depths

MONTNEY FM

6964-6974 ft.	Sandstone: Very fine grained; light grey. Predominantly massive. Scattered throughout are thin zones of interlaminated clay-sand, suggesting possible presence of several depositional units. At about 6971-72 ft there is an intensively deformed interval. Abrupt basal contact.
6974-6987 ft.	Sandstone: Argillaceous, very fine grained. Intensively deformed with contorted bedding and sand-balls. Upper 1 ins. consists of finely interlaminated clay-sand.
6987-6993 ft.	Sandstone: Very fine grained. Thick (9-20 ins.), massive appearing sandstone beds separated by thin (3-4 ins.) argillaceous sandstone units. Basal 3 ins. of interval contains medium to coarse sand grains with mm-size mudstone clasts and black organic debris. Argillaceous units commonly intensely deformed with some minor deformation in the thicker sandstone beds.

Interpretation: marine, deposits of low- to moderate-energy sedimentation interspersed with high-energy (storm) deposits.

Tenneco Supertest Asplund 6-5-67-23W5
Core 1*:* 6385-6445 ft
17 boxes. Slabbed core .
Core depth and log depths are not equivalent: log depths indicate core depths should be 6389-6449 ft. (Latter used in description in order to equate log character and core)
Examined 28th September 1998

MONTNEY FM
Siltstone member

6389-6395 ft.	Sandstone: Very fine grained. Varies from massive to crudely bedded. Basal contact is deformed into a high-angle surface.
6395-6396.6 ft.	Sandstone: Very fine grained. Varies from massive to crudely bedded. Basal contact is a high-angle shear due to bed deformation.
6396.6-6415 ft.	Sandstone: Very fine grained. Alternating thick beds of partially to highly deformed sandstone and thin units of finely interlaminated clay-sand which have only minor to moderate deformation. Laminated units have subhorizontal or ripple laminae; latter define low-amplitude, small-scale current ripples. Contacts between the thick and thin beds generally abrupt, commonly load-deformed.
6415-6424 ft.	Sandstone-Mudstone: Mostly finely interlaminated clay-sand with some scattered thicker sandstone beds. Basal 6 ins. mostly mudstone with fine silt laminae and isolated sand-balls. Basal mudstone rests abruptly on

underlying bed.

6424-6428 ft. Mudstone-Sandstone: Three units of finely interlaminated clay and sand about 4 ins. thick separating two 6-8 ins. thick, massive sandstone beds. Basal contacts of sandstone beds are abrupt. Minor load deformation in the laminated units. Mudstone unit rests abruptly on underlying coquina.

Coquinal Dolomite member

6428-6429 ft. Dolomite coquina: Large tabular clasts of sandstone in a matrix of sandy dolomite and shell debris. Clasts up to 10 cm long. Basal contact is erosional and is load deformed. Moldic and intergranular porosity.

6429-6434 ft. Sandstone: Predominantly thick beds of massive, very fine grained sandstone, with some finely laminated, deformed, sandstone beds in upper 1 ft. Lowermost beds in interval are severally deformed. Transitional basal contact.

6434-6435 ft. Sandy dolomite coquina to shelly sandstone: Basal contact is erosional, overlain by 1-2 ins. of sandy conglomerate - small tabular clasts up to 1 cm long in a mud/sand matrix, grading up into dolomite coquina/coquinal sandstone with intergranular and moldic porosity, in turn grading up into a shelly sandstone.

Sandstone member

6435-6441.75 ft. Sandstone: About 6 ins. of massive, deformed, very fine grained sandstone grading up into finely laminated sandstone, in turn grading up into interlaminated sand-clay-silt. Minor load deformation in the laminated interval. Basal contact of unit is highly deformed.

6441.75-6443.75 ft. Sandstone: Massive sandstone grading up into laminated sandstone.

6443.75-6448.25 ft. Sandstone: Finely laminated, very fine grained sandstone. Some clay laminae. Minor load deformation.

6448.25-6448' 5" Sandstone: Finely laminated, very fine grained sandstone. Minor load deformation.

6448'5"- 6448' 8.5" Conglomerate to sandstone: About 1.5 ins. of conglomerate grading up into interlaminated sand-clay. Clasts are small (1-2 cm long) and tabular. Erosional base that is slightly load-deformed.

6448' 8.5"- 6448' 10" Sandy dolarenite: Abrupt basal contact. Sand-size carbonate clasts of indeterminate origin. Some moldic and vuggy porosity.

6448' 10"-6449 ft. Sandstone: Very fine grained; laminated; load deformed.

Interpretation: a mixture of low-, moderate-, and high-energy deposits in a relatively unstable environment. Introduction of shelly debris by storm deposition seems likely explanation of their occurrence within a sandstone-dominant interval. Thick sandstone beds probably storm deposits.

Amerada Crown AE 9-8-67-23W5

Core 1*:* 6142-6162 ft

Rec. 20 ft. 4 boxes. Full diameter core with a few slabbed pieces.

Examined 11/12th January 2000.

MONTNEY FM

Siltstone member

Sandstone: Brownish light-grey - brownish tinge could be due to oil staining; rock emits a petroliferous odour.. Very fine grained. A few thin mudstone beds. Difficult to see internal fabric due to roughness of outer core-surface. Appears to contain several zones of deformed sandstone and some fine ripple-laminae. Mostly appears to be massive.

BP et al Ante Creek 11-9-67-23W5
Core 1*:* 6055-6115 ft.
Rec. 59.7 ft. 16 boxes. Slabbed core.
Examined 28th September 1998

JURASSIC - NORDEGG

6055-6068.5 ft. Shale: black shale, although unlike some other cored Nordegg this core has some well defined, thick beds. Brownish hue to some beds (?oil staining or organic-rich). Basal 2 ins. consists of coarse sand to granules floating in a clay matrix. There are a few larger clasts (up to 4 mm). Abrupt, erosional basal contact.

MONTNEY FM

6068.5-6072 ft. Sandstone: Upper 28 ins. finely laminated - few mm to 2 cm thick beds of very fine grained sandstone separated by a few mm of clay/silt laminae. Underlain by about 1 ft. of deformed sandstone. Lower part of interval consists of a massive-appearing very fine-grained sandstone that rapidly grades into underlying coquina.

6072-6073.5 ft. Dolomite coquina: Abrupt erosional base to unit. Remnants of laminated sandstone within the interval suggest that this interval is made up of several coquina beds. Each coquina bed has an erosional surface. There are four, possibly five beds, the uppermost forming the base of the overlying sandstone bed. Vuggy and moldic porosity is widespread.

6073.5-6082 ft. Sandstone: Very fine grained. Finely laminated throughout - similar to interval 6068.5-6072 ft.

6082-6115 ft. Sandstone: Very fine grained. Mostly thinly to thickly bedded, massive or load deformed sandstone with scattered intervals of finely laminated sandstone. At about 6097 ft. there is bioclastic debris present in sand-balls within a sandy bed - the original carbonate bed has not been preserved intact.

Interpretation of Triassic: moderate- to high-energy marine deposition with storm deposition forming the thicker sandstone beds and the coquinas.

Suncor Ante Creek 10-7-67-24W5
Core 1*:* 1879-1897.25 m
Rec. 18.15 m 16 boxes. Slabbed.
Examined 11/12th January 2000.

JURASSIC - NORDEGG

1879-1881.07 m — Shale: black with a slight brownish hue. Massive with scattered silt laminae. Basal 2-3 cm consists of pebbly mudstone: clasts of very fine grained sandstone, up to 2 cm long in a sand-mud matrix. Clasts very similar to underlying sandstone. Abrupt, erosional basal contact.

MONTNEY FM
Siltstone member

1881.07-1890.5 m — Sandstone: very fine grained. Interval consists of a series of fining-upward units that range from a few cm to about 140 cm thick, the majority of beds range between 15 and 30 cm thick. The following vertical sequence is common to the thicker beds: abrupt, erosional base; massive or crudely bedded or fine-planar laminated sandstone; low-angle intersecting laminae (probably HCS); ripple laminae with clay partings; laminated mudstone. No signs of bioturbation. The lowermost bed is the thickest at 140 cm and tends to be massive in appearance, has an abrupt basal contact and contains scattered small pyrite nodules. Base of this interval corresponds to a minor gamma-ray kick.

1890.5- 1897.15 m — Sandstone: very fine grained. Differs from overlying sandstone in that the beds are generally thinner (mostly 1-10 cm, with a few thicker - up to 20 cm - beds) and a greater percentage of mudstone laminae and a few very thin (< 1 cm) mudstone beds. Minor load deformation. A few horizontal burrows. Planar and ripple laminae the prevalent sedimentary structures.

Interpretation of the Montney Fm: lower shoreface, below fair-weather storm-base with deposition of waning/combined-flow storm deposits.

Westar Anten 2/10-36-67-24W5
Core 1*:* 1833-1851 m
Rec. 18 m. 16 boxes. Full diameter with some slabbed pieces.
Examined 11/12th January 2000.

MONTNEY FM
Siltstone member

1833-1835.4 m — Sandstone: very fine grained; light to medium grey with a brownish tint in lower half of interval due to oil staining. Presumably thick-bedded - difficult to detect bedding surfaces. Only the lowest 20 cm has low-angle laminae - seen because of oil residue along bedding planes. Many beds have a mottled appearance. Lowermost bed rests abruptly on and slightly load deformed into underlying strata.

1835.4-1841 m — Sandstone-mudstone: coarse laminae to very thin beds (1-2 cm) of very fine grained sandstone and mudstone with four thick intervals (15-40 cm) of silty-sandy mudstone. Fine, planar and ripple laminae are the most common sedimentary structures. Some load deformed beds. Some lenticular beds. Bedding style imparts a “striped” appearance Bioturbation is uncommon, there are a few possible vertical and horizontal

burrows. Contact with underlying coquinal dolostone is abrupt. The first 5 cm above the basal contact contains contorted interlaminae of sand-mud and a distorted, thin lense of bioclastic debris.

Coquinal Dolomite member

1841-1842.61 m Coquinal dolostone: abundant small ?bivalve clasts in a sand-dolomite matrix. Bioclasts aligned subhorizontally. Abundant moldic porosity. Minor oil staining. Tends to be sandier in top 10 cm and also contains a sand layer about 58 cm above base of interval - the two sandy layers could indicate that there are two sanding-up beds within the interval. Abrupt basal contact - but poorly preserved in broken core.

1842.61-1842.68 m Mudstone: light grey. Rapid transitional basal contact.

1842.68-1844.26 m Sandstone-mudstone: thin to thick beds of very fine grained sandstone separated by very thin (<1 cm) mudstone layers. Fine planar laminae are the prevalent sedimentary features with a thin zone of bioturbated (vertical and horizontal burrows) sandstone about halfway through the interval. Minor load deformation. Basal contact is rapidly transitional.

1844.26-1847.8 m Coquinal dolostone: sandy. At least six "sanding-up" depositional units 10-160 cm thick. Units contain large bioclasts and angular to subrounded mudstone clasts resting on an erosional base, grading up into a dolomitic sandstone (usually <10 cm thick). One unit about mid-way through interval grades up into interbedded sandstone-mudstone. Bioclasts tend to lie convex-up.

Sandstone member

1847.8-1851 m Mudstone grading up into interlaminated sandstone-mudstone: about 95 cm of bioturbated silty mudstone with some remnant patches of silt laminae rapidly grading up into interlaminated sandstone-mudstone that has a characteristic striped to banded appearance. Some lenticular beds. Minor amount of bioturbation - horizontal and vertical burrows. A few load-deformed beds.

Interpretation:
Siltstone member: offshore to lower shoreface, storm. deposits
Coquinal Dolomite member: high-energy storm deposits; middle to upper shoreface.
Sandstone member: proximal offshore to distal lower shoreface deposits.

Jordan Ante Creek North 6-13-67-25W5
Core 1*:* 1902.5-1921 m
Rec. 18.5 m. 13 boxes. Slabbed.
Examined 11/12th January 2000.

MONTNEY FM
Siltstone member
Predominantly beds of very fine grained sandstone intercalated with very thin layers (usually <1 cm thick) of mudstone.

Succession consists of a series of fining-up units a few cm to about 15 cm thick, with a few thicker (up to 30 cm) units in the middle part of the core.

An “ideal” unit consists of:

> abrupt, planar basal contact overlain by massive or planar laminated sandstone, gradationally followed by sandstone with low-angle/diverging laminae (probably HCS), in turn overlain by small-scale current/wave-ripple laminae and finally capped by a thin silty, laminated mudstone.

Not all units contain the full internal succession; some of the thinner units may contain only planar or ripple laminae.

The thick beds in the middle of the core tend to be massive in appearance, or faintly laminated. Several beds have deformed laminae.

No obvious trends in the succession.

Scattered, small (< 2mm) pyrite nodules in the top 25 cm.

Bioturbation is rare; only one vertical burrow noted (box 4) and some possible small diameter horizontal burrows scattered throughout the succession.

Small-scale load deformation common.

Interpretation: lower shoreface, storm deposits.

HB Union Husky Sturgeon Lake South 2/3-23-68-22W5
Core 1*:* 5119-5168 ft.
Full rec. 11 boxes. Full diameter with some slabbed pieces.
Examined 11/12th January 2000.

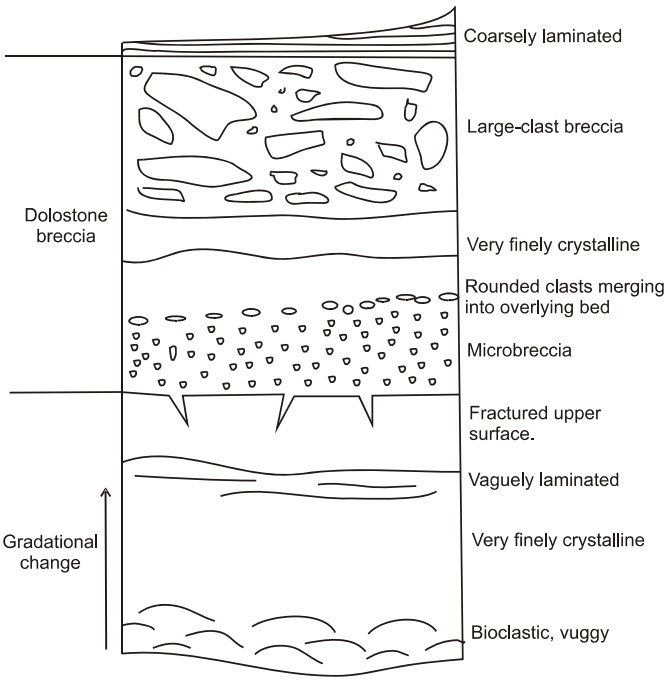
Core depths appear to be deeper by about 2 ft than corresponding log depths (based on Nordegg-Montney contact).

JURASSIC - NORDEGG

5119-5134'8"	Shale: black; massive to finely silt-laminated. Abrupt, planar basal contact.

MONTNEY FM
Coquinal Dolomite member (oil stained throughout)

5134'8"-5135'2"	Dolostone: very finely crystalline; some intercrystalline and vuggy porosity. Massive - no visible fabric/sedimentary structures. Oil stained.
5135'2"-5135'7"	Dolostone: crude, coarse laminae that are highly distorted. Upper contact appears to be rapidly gradational and distorted ; lower contact appears to be abrupt.
5135'7"-5137'4"	Dolostone breccia: complex vertical change in fabric (see sketch). This interval appears to be the result of solution collapse-pedogenesis.



5137'4"-5148'	Coquinal dolostone: abundant vuggy and moldic porosity. At least 5 beds; the lowest being the thickest (7 ft), although it is possible that the lowest 7 ft may consist of more than one bed but it is difficult to see any internal divisions. Each coquinal dolostone grades up into a thin zone of dolomitic very fine grained sandstone or sandy dolostone. The uppermost bed of the interval grades up into very finely crystalline dolostone with coarse, undulose laminae in the top 1 ins (possibly a pedogenesis feature).
5148-5151'	Dolostone: very finely crystalline with scattered, large vugs. A few argillaceous partings or zones rich in clay laminae. Minor styolites. Abundant sub-vertical, brown-stained tubular structures - possibly root casts. Abrupt basal contact.
5151'-5151'3"	Mudstone: medium grey. Coarse, uneven, dolomite or silt laminae.
5151'3"-5151'7"	Dolostone: light yellowish-grey. Very finely crystalline. Unevenly bedded. Slightly argillaceous. Basal contact not preserved but rapid lithological change suggests it is abrupt.
Sandstone member	
5151'7"-5168 ‘	Sandstone: very fine grained, dolomitic. Minor layers/laminae of mudstone, especially in lower 2-3 ft. Possibly oil stained in places - brownish colour. Lower 2-3 ft also contains a few beds with small-scale load deformation features. Some deformed laminae in upper part of interval. Thicker sandstone beds tend to be finely laminated - planar and

low-angle laminae. Interval tends to have beds that thicken up-section.

Interpretation:
Coquinal dolostone member: affected by pedogenesis processes that have destroyed much of the original fabric; although some bioclastic beds retain evidence of their origin. It is unclear if the dolostone breccia and overlying dolostone resulted from latest Triassic/earliest Jurassic exposure or was the result of exposure during CDM deposition. The fact that there are two levels of pedogenesis, separated by marine deposits may indicate that the breccia was part of CDM deposition and not a younger phenomenon.
Sandstone member: lower shoreface deposition.

Triad Sturgeon Lake 5-24-68-22W5
Core 2*:* 5094-5147 ft
Full rec. 12 boxes. Slabbed.
Examined 11/12th January 2000.

JURASSIC - NORDEGG

5094-5098 ft — Shale: black with a slight brownish hue. A few very thin (<1cm) beds and laminae of coarse silt/very fine sand. Basal contact not preserved but presumed to be abrupt.

MONTNEY FM
Coquinal Dolomite member

5098-5110'10" — Coquinal dolostone: Small to medium-size ?bivalve bioclasts in a dolomite-sand matrix. Clasts arranged both convex-and concave-up. Large vugs and molds. Oil stained. Several zones of light grey, very finely crystalline dolostone due to complete dolomitization and loss of original fabric - present in the basal 14" and upper 19" of the interval (one such zone in lowermost 14" where some of the original bioclastic texture remains). Difficult to determine if interval made up of one or several beds. Base of interval abruptly overlies sandstone.

Sandstone member

5110'10"-5141' — Sandstone: light grey to brownish grey; very fine grained. Thin to thick beds (few cm to 25 cm, most <15 cm) separated by thin (<5 mm) mudstone layers. Fine planar laminae prevalent sedimentary structure. Minor bioturbation that tends to be concentrated in the muddier units. Brown colour appears to be due to pervasive carbonate cement (probably dolomite). A thin sandy coquinal bed at 5123'2"-5123'9". Beds below the coquina tend to be thinner than those above and contain more intercalated mudstone.

5141'-5147' — Interbedded sandstone-mudstone: thin (generally <2 cm) beds of very fine grained, possibly dolomitic, sandstone interbedded with mudstone. Fine laminae the prevalent sedimentary structure. Some load deformation. Vertical and horizontal burrows are common.

NB: the Sandstone member has an overall sanding/thickening-upward aspect in the cored

interval.

Jordan et al Sturgeon Lake 15-7-68-24W5
Core 1*:* 1828-1846.3 m
Rec. 18.3 m 13 boxes. Full diameter
Examined 11/12th January 2000

MONTNEY FM
Siltstone member

1828-1833.5 m — Sandstone: very fine grained. Overall tendency for beds to thicken up-section. 1828-1831 m consists of several thick beds (20-35 cm thick) separated by layers of very thinly interbedded and interlaminated sandstone-mudstone. Thicker beds have the following vertical sequence: erosional base, planar laminae, low-angle intersecting laminae (HCS), wave and wave-modified current-ripple laminae (clay and sand laminae). Thinner beds (< 2 cm) are mostly planar or current/wave-ripple laminated.

1833.5-1846.3 m — Sandstone: similar to above but beds tend to be thinner and there are more mudstone interbeds. Change into overlying interval is transitional.
1833.5-1840.3 m: thick sandstone beds separated by mudstone layers (< 5cm thick), or zones of very thinly bedded sandstone. Contains several highly contorted beds.
1840.3-1846.3 m: very thin to thin beds of ripple- and plane-laminated sandstone and mudstone. Beds generally <2 cm thick. Interval has banded appearance.

Interpretation: typical storm deposits of the lower shoreface.

Jordan et al Sturgeon Lake 2/3-9-68-24W5
Core 1*:* 1805-1814.5 m
Rec. 9.4 m. 7 boxes. Full diameter
Core 2*:* 1815-1824.7 m
Rec. 9.5 m. 7 boxes. Full diameter
Examined 11/12th January 2000

MONTNEY FM
Siltstone member

1805-1814.5 m — Sandstone: thin to thick beds; 5 to 80 cm, most <20 cm. Beds of very fine grained sandstone grading up into thin layers (<2 cm) of mudstone. The thicker beds tend to have the following vertical sequence: basal erosional contact; planar laminae, low-angle intersecting laminae (HCS), ripple laminae (wave and current ripples, or wave modified current-ripples), laminated mudstone (this succession is typical of storm deposits). Minor

	load deformation. Tendency for beds to thicken up-section - the uppermost bed is the thickest.
1814.5-1815 m	Not cored
1815-1822 m	Sandstone: similar to interval 1805-1814.5 m.
1822-1824.7 m	Sandstone: very fine to fine grained. Thick to very thick beds. Massive in appearance with some highly deformed beds.

Interpretation: typical storm deposits on the lower shoreface, below fair-weather wave-base.

Summit Sturgeon Lake South 15-22-68-25W5
Core 1*:* 1786-1804.4 m
Rec. 18.4 m 14 boxes. Full diameter.
Examined 11/12th January 2000.

MONTNEY FM
Siltstone member

1786-1804.4 m	Sandstone: very fine grained; thick to very thick beds (15-50 cm) with some thin beds (< 1 cm) of intercalated mudstone or clay-rich, laminated zones. Massive or finely laminated - some low-angle lamina-sets (HCS). Some ripple-laminae in the clay-rich zones. No bioturbation seen. Oil stained. No obvious trends in bed thickness seen.

Interpretation: amalgamated storm-beds of the lower shoreface.

Jordan et al Sturgeon Lake South 5-25-68-25W5
Core 2*:* 1826-1844 m
Rec. 17.35 m. 13 boxes. Full diameter, some slabbed pieces.
Examined 20th January 2000

MONTNEY FM
Siltstone member

1826-1828.26 m	Sandstone-mudstone: very thin to thin beds of finely laminated, very fine grained sandstone, interbedded with very thin mudstone beds. Sandstone beds 1-10 cm thick, although most are <5 cm thick. Mudstone beds usually <1 cm thick, with a few thicker (2-8 cm) beds. Planar and ripple (wave and wave-modified current ripples) laminae are abundant. Load deformation is common. Varies from striped to banded appearance. Burrows are rare - a few very small vertical and horizontal burrows.
1828.26-1828.56 m	Sandstone: fine grained. Abrupt basal contact with small flame structures along base. Massive grading up into fine, low-angle cross-laminae (HCS) and abruptly overlain by a thin mudstone bed.
1828.56-1831.18 m	Sandstone-mudstone: similar to interval 1826-1828.26 m but with more and slightly thicker mudstone beds. Base of interval marked by a 15 cm-thick mudstone bed.

1831.18-1834.08 m Sandstone: thin to thick beds of very fine grained sandstone separated by thin mudstone layers/beds. Sandstone beds 2-40 cm thick, but most are between 10 and 20 cm thick. Mudstone beds usually <1 cm thick. One bed contains sand-balls; most of interval is undeformed. Typical thick bed has the following vertical sequence: abrupt basal contact; planar laminae, low-angle intersecting laminae (HCS); ripple laminae, rapidly grading up into mudstone.

1834.08-1843.35 m Sandstone: very fine grained. Amalgamated thick beds. Most of the lower beds are highly deformed - sand-balls and contorted bedding, whereas the upper beds are undeformed and finely laminated (planar and low-angle cross laminae). No bioturbation seen. Lower 70 cm contains argillaceous sandstone beds.

NOTE: log response and core character suggests core depths are about 1 m deeper than corresponding log depth (e.g., gamma-ray response at 1829-1830 m probably corresponds to core depth 1831.18 m, where there is a change in bed thickness and mudstone content.

Interpretation: typical storm-deposited beds of the lower shoreface.

Decalta et al Sturgeon Lake South 9-4-69-22W5
Core 1*:* 5141-5163 ft
Full rec. 4 boxes. Full diameter.
Examined 20th January 2000.

JURASSIC - NORDEGG

5141-5152.25 ft Shale: black. Massive. An uneven basal contact overlain by 2-3" of conglomeratic mudstone - small (few mm) clasts of sandstone floating in a mud matrix. Underlying Triassic sandstone has large burrows extending down from the unconformity and filled with sandy mudstone.

MONTNEY FM

5152.25-5163 ft Sandstone: very fine grained; brownish grey to light grey. Upper 40 ins is fractured or brecciated with patches of original laminae preserved. Underlying strata is less disrupted and has more fine laminae preserved. Possibly oil stained. Significant amount of vuggy porosity (small, mm-size, vugs) - possibly due to dissolution of carbonate cement/grains.

Interpretation of Montney: almost certainly marine; possibly upper part of the lower shoreface to lower part of the middle shoreface.

Ocelot et al Sturgeon Lake South 14-5-69-24W5
Core 1*:* 1748-1766 m
rec. 17.75 m. 17 boxes. Slabbed.
Examined 20th January 2000.

JURASSIC - NORDEGG

1748-1750.84 m Shale: black, massive. Scattered throughout are mm-thick layers of white carbonate with one prominent layer of prismatic carbonate about 8 cm above underlying unit.

1750.84-1751.22 m Argillaceous sandstone: medium to dark grey. Fine to medium grey. Disrupted fabric. Small (<5 mm) pebbles in basal 2 cm. Uneven, erosional basal surface.

MONTNEY FM
Siltstone member

1751.22-1756.2 m Sandstone: fine grained. Predominantly thick beds, 15-40 cm thick, most <20 cm thick, intercalated with zones of thinly bedded sandstone and mudstone. The uppermost sandstone bed is the thickest and is severely deformed. Less deformation in underlying beds. Thick beds typically have the following vertical sequence: erosional base, planar laminae, ripple laminae, mudstone. Thinner beds commonly are ripple laminated (wave- and wave-modified current-ripples).

1756.2-1765.25 m Sandstone-mudstone: very thin to thin beds with a few scattered thick beds of sandstone. Very fine grained sandstone. Most beds contain planar and/or ripple laminae (wave- and wave-modified current-ripples) Some minor load deformation. Rare horizontal and vertical burrows. Some small-scale flames structures seen. Beds tend to thicken up-section.

NOTE: the change from thinly to thickly bedded at 1756.2 is fairly abrupt - this is reflected in the log response.

Interpretation of Montney: typical storm-deposits of the lower shoreface.

OEI Crestar Sturgeon Lake South 3-23-69-25W5
Core 1*:* 1766-1784 m
Rec. 17.45 m 13 boxes. Slabbed.
Examined 20th January 2000

JURASSIC - NORDEGG

1766-1768.46 m Shale: black with a brownish hue. Massive. Mm-thick streaks, laminae and blebs of white carbonate. Abrupt basal contact.

1768.46-1768.68 m Sandy mudstone: fine to coarse sand grains floating in a mud matrix. A few granule-size grains. Slight tendency to fine-up. Abrupt, planar, basal contact.

MONTNEY FM
Siltstone member

1768.68-1773.43 m Sandstone: very fine grained. Thick, amalgamated beds or separated by thin (few mm) mudstone layers. Beds are erosionally based, contain fine to coarse planar laminae and some beds with ripple laminae, especially where clay partings are common. Some oil staining.

1773.43-1783.45 m Sandstone-mudstone: thin to thick beds (1-20 cm) of laminated sandstone separated by mm to 4 cm-thick mudstone beds. Also present are some amalgamated sandstone beds. Planar and low-angle cross laminae; current and wave ripple laminae. No signs of bioturbation. Scattered pyrite nodules up to 1 cm long are common in the lowest 1 m, less common elsewhere. Several highly deformed beds, especially in the lower 3-4 m of the core.

Interpretation of the Montney: typical storm deposits of the lower shoreface.

Czar et al Sunset 7-16-70-20W5
Core 1*:* 4546-4606 ft.
Rec. 60 ft. 17 boxes. Full diameter core.
Examined 28th September 1998

JURASSIC - NORDEGG
4546-4549.5 ft. Shale: Black, massive shale. Basal contact not preserved.
MONTNEY FM
4549.5-4606 ft. Sandstone: Very fine grained. Coarsely laminated (few mm thick) to thinly bedded (2-3 cm) sandstone, with some thicker sandstone beds in upper part of interval, separated by clay laminae or very thin (<5 mm) shale beds. Lamination/bedding is subhorizontal to horizontal. Several intervals of intensely deformed strata. Laminae defined by clay content. General upward increase in sandstone content and for sandstone beds to become thicker. Pyrite is a common diagenetic mineral in lower part of interval. Only one well defined burrow seen, located about 2.5-3 ft below top of interval.

Interpretation of Triassic: marine, moderate- to high-energy environment with continuous supply of sand and some clay. Lack of bioturbation indicates sediment supply and /or bottom currents too strong to allow colonisation. Log character of interval from which core was taken shows the presence of a coarsening-upward cycle, and the position of the core within the cycle would suggest a lower shoreface environment. See also core from 16-16-70-20W5 (from same interval).

Czar et al Sunset 16-16-70-20W5
Core 1*:* 1384.4-1402.4 m
Rec. 18.2 m. 13 boxes. Full diameter core.
Examined 28th September 1998

JURASSIC - NORDEGG
1384.4-1384.94 m. Shale: Black, massive. Basal 1 cm consists of poorly sorted small-pebble conglomerate resting erosionally on Montney Fm. Upper contact: grades rapidly into shale with an irregular contact.
MONTNEY FM
1384.94-1402.4 m. Sandstone: Very fine grained. Slight greenish hue due to clay content and

clay laminae. Coarsely laminated (few mm) to very thinly bedded (2-3 cm). Beds of sandstone separated by clay laminae or very thin shale beds (<5 mm). Minor load deformation. No indications of bioturbation. No obvious vertical change in lithological character through this interval. Pyrite is common in the lower 2-3 m of interval.

Interpretation of Triassic: marine, moderate- to high-energy environment with continuous supply of sand and some clay. Lack of bioturbation indicates sediment supply and /or bottom currents too strong to allow colonisation. Log character of interval from which core was taken shows the presence of a coarsening-upward cycle, and the position of the core within the cycle would suggest a lower shoreface environment. See also core from 7-16-70-20W5 (from same interval).

Texcan Sunset House 7-22-70-20W5
Core 1*:* 4536-4576 ft.
?Full recovery. 9 boxes. Full diameter core.
Examined 28th September 1998

MONTNEY FM
Predominantly thinly interbedded very fine grained sandstone and shale. Greenish hue due to clay content. Sandstone beds a few mm to 2 cm thick with a few scattered beds up to 40 cm thick. Two thick beds are juxtaposed between about 4544-4546 ft. Thin sandstone beds are finely ripple-laminated and commonly load deformed. Separating the sandstone beds are thin (<1 cm), green shale beds that contain silt laminae.

No bioturbation structures.

There is a general coarsening/thickening-upward aspect to the interval - seen as an upward increase in sandstone content and increasing bed thickness.

Pyrite is a common diagenetic mineral, locally present as blebs, lenses and sheet-like forms.

Interpretation: cf. 7-16 and 16-16-70-20W5 - these are from the same unit and are interpreted in a similar manner as lower shoreface deposits in a moderate- to high-energy depositional environment.

Hudson's Bay Union North Tangent #4 16-5-80-24W5
Cores 6 and 7*:* 2860-2870 ft.
1 ins. diameter core (full diameter).

MONTNEY FM
Sandstone: light grey, very fine grained; porous. Crudely bedded to mottled appearance.

Core 8*:* 2887-2898 ft.
1 ins. diameter core (full diameter).

MONTNEY FM
Sandstone: very fine grained; finely laminated in places. Clay interlaminae.

Cores 9 to 16*:* 2907-2984 ft.
1 ins. diameter core (full diameter).

MONTNEY FM
Sandstone: very fine grained; finely laminated. Scattered clay-rich zones. Log-shift at about 2930 ft. Reflects a minor change from a "cleaner" sandstone below to a sandstone with clay laminae above. Lower 2-3 ft of core tends to have more clay laminae than overlying sandstones.

Hudson's Bay Union North Tangent #5 16-20-80-24W5
Cores 6 to 11*:* 2915-2971 ft
1 ins. diameter core (full diameter). Boxes 4 to 7.

MONTNEY FM
Interbedded sandstone-mudstone.
Sandstone: light grey; very fine grained; 1 to 1.5 m-thick units; finely laminated or massive beds.
Mudstone in units <1 m thick.

WELLS IN W6

Triad Wildhag 9-35-52-2W6
Core 5*:* 2403-2423 ft.
Rec. 20 ft. 4 boxes. Slabbed.
Examined 20th October 1998

MONTNEY FM
Mostly very fine-grained sandstone arranged in a series of fining-upward units ranging up to 48 cm thick, but most are 10-20 cm thick.
Typical vertical succession of a unit is (base-to-top):

- erosional base
- vaguely to well defined planar bedding (this forms the bulk of the unit)
- gradational change into fine, planar laminae (single set)
- gradational change into sets of small-scale current-ripple laminae (clay partings)
- in a few units the uppermost part contains silty mudstone

Comment: units formed from waning-flow conditions.

Core 6*:* 2569-2611 ft.
Rec. 42 ft. 9 boxes.
Examined 20th October 1998

MONTNEY FM
Mudstone containing fine laminae and very thin beds of coarse silt to very fine grained sandstone. Predominantly planar laminae with some ripple-forms in lenticular beds. A pronounced gamma-ray deflection in log at 2600 ft could be due to a 9 cm thick sandy zone resting abruptly on mudstone, similarly a gamma-ray deflection at 2582 ft could be caused by a sandy interval at this depth.

PCP et al. Findley 16-23-57-6W6
Beds have about a 30^{o} dip.
Core 2*:* 7826-7855 ft.
Rec. 28.5 ft. 8 boxes. Slabbed
Examined 15th October 1998

JURASSIC - NORDEGG
7826-7854 ft: Shale: dark grey to black; massive. Laminae to very thin beds of silt. Scattered occurrences of very thin-walled shell debris - occurs as lenses or very thin beds. A thin bed of very fine-grained sandstone at about 7847.5 to 7848 ft.

Core 3*:* 7855-7894 ft.
Rec. 33 ft. 10 boxes. Slabbed.

Nordegg-Charlie Lake contact not preserved.
Examined 15th October 1998.

CHARLIE LAKE FM

7855-7878 ft: Limestone- dolomitic limestone: medium to dark grey; micritic; contains scattered small calcitic clasts (< 1 mm). White specks of calcite scattered throughout interval. Unevenly bedded. Some zones of massive appearing limestone. Gradational change from underlying beds.

7878-7894 ft: Limestone: light to medium grey; micritic. Disrupted fabric is common - apparently due to soft sediment deformation. Contains at least one brecciated carbonate bed about 7.5 m above base of core (box 8). There are zones of fine, uneven laminae.

Core 5*:* 8014-8054 ft.
Rec. 39 ft. 11 boxes. Slabbed
Core 6*:* 8054-8085 ft.
Rec. 31 ft. 9 boxes. Slabbed
Examined 15th October 1998.

CHARLIE LAKE FM

8014-8037 ft: Interbedded calcareous dolomicrite-anhydritic dolomicrite-anhydrite: There is only one well defined bed of anhydrite which occurs near the base of the interval (box 7). Most of the anhydrite occurs as lenses or irregular, coarse laminae. Interval contains a variety of interbedded lithologic units:

1) biomicrite
2) crudely and irregularly bedded carbonate/anhydrite
3) finely, but irregularly, laminated carbonate.

Most of beds have a disrupted fabric. Some beds of nodular carbonate are interpreted to be calcite/dolomite replacement of anhydrite. Some of the finely laminated beds may be stromatolites.

8037-8050 ft: Micritic limestone: dark grey. Fine, planar laminae. Apparently gradational into overlying and underlying beds.

8050-8071 ft: Micritic limestone: dark grey. Massive to crudely bedded. Abundant calcite-filled vugs and fractures. Some beds contain bivalve debris.

8071-8078 ft: Micritic limestone: dark grey. Massive to crudely bedded but unlike overlying interval does not contain the abundance of vugs or fractures. A 6 cm thick nodular limestone ed near base of interval is interpreted to be calcite-replaced anhydrite.

8078-8085 ft: Micritic limestone: dark grey; massive.

Core 7*:* 8135-8164 ft.
Rec. 29 ft. 9 boxes
Core 8*:* 8164-8176 ft.
Rec. 10.5 ft. 3 boxes

All core is slabbed. Examined 20th October 1998

DOIG FM

8135-8143 ft. Mudstone: dark grey to black; generally massive. Scattered throughout are several thin beds (3-4 cm thick) of phosphatic, pelletal mudstone. Base of Doig marked by an 8 cm thick conglomerate. Conglomerate contains granules to large pebbles of siltstone/sandstone in a sandy mud matrix. Poorly sorted, rounded clasts. A general fining-upward trend in the conglomerate. Lower contact of conglomerate is not preserved but rapid lithological change suggests an abrupt contact. Upper contact of conglomerate is abrupt and uneven (possibly due to slight loading).

MONTNEY FM

8143-8176 ft: Sandstone: very fine grained; possibly argillaceous. Predominantly massive in appearance with several zones that are either vaguely bedded or very thinly bedded (latter seen due to presence of clay laminae). Difficult to distinguish individual beds or an overall vertical succession. A few internal scour surfaces are present (e.g. in box 9 of core 7 there is an 8 cm thick mudstone bed with abrupt upper and lower contacts, and in box 8 of core 7 a scour surface separates laminated sandstone from massive sandstone: the latter could be reflected in the gamma-ray deflection at 8160 ft.). These internal scours suggest multiple beds. A gamma-ray log deflection at 8170 ft. does not appear to have a corresponding lithological change. Some vertical and subhorizontal fractures.

Mostly massive above 8160 ft.; below this depth there are a significant number of bedded/laminated zones. Laminae are mostly planar; a few deformed, but not many.

Core 9*:* 8252-8262 ft
Rec. 8.5 ft. 3 boxes. Slabbed
Core 10*:* 8262-8221 ft.
Rec. 19 ft. 6 boxes. Slabbed.
Examined 15th October 1998.

MONTNEY FM

8252-8270 ft: Coarsening-upward cycle: vertical succession (base to top) as follows: deformed silty mudstone - ripple and planar laminated sandstone with thin interbeds of mudstone - convoluted sandstone. Very fine grained sandstone.

8270-8281 ft: Coarsening-upward cycle: lowermost beds are highly deformed mudstone grading up into non-deformed mudstone - ripple laminated sandstone (some beds are deformed) - planar laminated sandstone. Upper contact is not preserved.

Core 11*:* 8680-8706 ft.
Rec. 26 ft. 8 boxes. Slabbed
Examined 20th October 1998

MONTNEY FM

Mudstone: dark grey to black. Abundant silt/very fine sand laminae - mostly planar laminae; a few of the thicker siltstone beds have some minor deformation especially in lower 1 ft. and upper 2 ft. There is a slight increase in silt laminae in upper 50 cm of core but rather variable density of lamination throughout core.

Core 12*:* 8815-8841 ft.
Rec. 24 ft. 8 boxes. Slabbed**.**
Core 13: 8841-8872 ft.
Rec. 29 ft. 9 boxes. Slabbed.
Examined 20th October 1998

MONTNEY FM
Similar to core 11; although some intervals are richer in silt laminae. Mostly planar laminae and some lenticular laminae. Minor bed deformation. Higher concentration of laminae in upper third to half of core.

Amoco et al Big Mountain 6-14-66-6W6
Core 4*:* 3026-3044 m
Rec. 18 m. 16 boxes. Full diameter core.
Examined 30th September 1998.

MONTNEY FM
Cored from near the base of the Triassic succession.
Mudstone: massive, dark grey to black. Difficult to detect if there are any silt/sand laminae, or sedimentary structures.

Imp. Economy 13-5-68-1W6
Core 1*:* 2041-2059.5 m
Rec. 18.5 m. 13 boxes. Slabbed.
Examined 30th September 1998

MONTNEY FM
Siltstone member

2041-2043.5 m	Sandstone: Very fine grained, slightly argillaceous. Severely deformed. Large contorted "balls" of clean sandstone within a darker coloured, argillaceous sandstone.
2043.5-2043.85 m	Sandstone: Very fine grained. Abruptly basal contact. Crudely bedded in lower 18-20 cm; upper part deformed.
2043.85-2044.58 m	Sandstone-mudstone: Thin to thick beds of finely laminated, very fine grained sandstone interbedded with very thin to thick beds of mudstone. Planar and ripple laminae in the sandstone beds; one bed contains convoluted laminae. Sandstone beds have abrupt basal contacts and upper contacts gradational or abrupt.

2044.58-2045.85 m Calcareous to dolomitic sandstone: Very fine grained. Coarse laminae to thinly bedded due to alternation of sandy and shelly layers. Layering appears to be very low-angle cross bedding. Upper contact abrupt, erosionally overlain by mudstone. Lower contact also abrupt and overlies a 1 cm thick shale.

2045.85-2046.09 m Sandy dolomite coquina: Lower part massive in appearance; upper half crudely bedded. Styolites. Abrupt lower and upper contacts.

2046.09-2046.2 m Shelly sandstone: Very fine grained. Vaguely bedded. Bivalve debris seen on some layers. Tabular clasts and coarse bivalve debris in basal part of bed. Clasts 2-3 cm long, 2-3 mm thick, and appear to be siltstone/mudstone. Abrupt basal contact.

2046.2-2046.45 m Sandy coquina - calcareous sandstone: Sandy coquina grading up into calcareous, very fine grained sandstone. Extensive moldic porosity in lower, shelly part of bed. Abrupt basal contact.

2046.45-2046.49 m Sandstone: Very fine grained; finely laminated.

2046.49-2046.5 m Mudstone: Contains blebs of sandstone in lower few mm.

Coquinal Dolomite member

2046.5-2047.1 m Dolomite coquina: Sandy and slightly calcareous. Lower half contains tabular clasts up to 6 cm long and 2 cm thick and appear to be calcareous, very fine grained sandstone. Contacts not preserved but rapid facies change suggest they are abrupt.

Sandstone member

2047.1-2050.47 m Sandstone: Very fine grained. Massive to coarse, subhorizontal bedding planes. Some thin zones where argillaceous partings are common. Upper 25 cm appears to be deformed. Appears to be a single depositional unit with several low-angle crossbed sets (identified on the basis of low-angle dip changes). Abrupt basal contact.

2050.47-2051.45 m Interbedded sandstone-mudstone: Ranges from finely interlaminated to thinly interbedded sandstone and mudstone. Interval contains one thick bed of faintly bedded sandstone (very low-angle cross bedding). Subhorizontal and ripple laminae, with a few isolated ripples in some mudstone layers in the uppermost beds. A few vertical burrows in some mudstone beds.

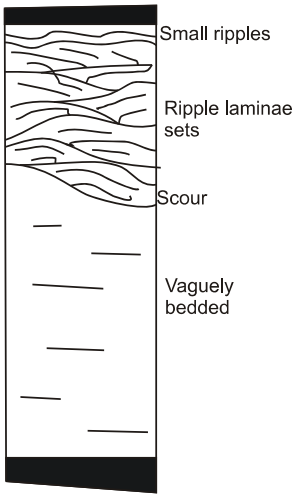
2051.45-2051.96 m Sandstone: Very fine grained. Load deformed basal contact overlain by massive to vaguely bedded sandstone that grades up into laminated sandstone. Latter eroded by a scour surface about midway through interval. Scour surface overlain by 5-6 cm of vaguely bedded sandstone rapidly changing into ripple cross laminated sandstone. Ripples in the upper 8 cm are oriented differently from those immediately underlying, suggesting another depositional unit.

2051.96-2052.15 m Sandstone: Very fine grained. Abrupt basal contact. Subhorizontally laminated with low-angle intersecting lamina-sets. Grades rapidly up into ripple laminated sandstone in upper 2 cm.

2052.15-2052.19 m Sandstone: Ripple laminated sandstone separated by mud layers.

2052.19-2052.96 m Sandstone: Very fine grained. Abrupt basal contact overlain by about 20 cm of vaguely bedded sandstone grading upward into finely laminated

(clay partings) sandstone. At about 2052.37 m there is a scour surface overlain by finely ripple laminated sandstone with multiple internal scour surfaces, in turn overlain by about 2 cm of very small ripple forms.

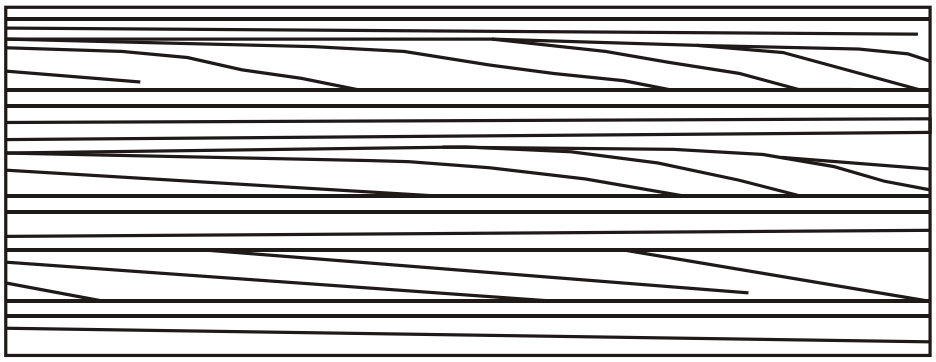


2052.96-2056.43 m Sandstone-mudstone: Very thin to thick beds (few mm to18 cm; most <10 cm). Subhorizontal and current ripple laminations in the sandstone beds. Mudstone beds contain sand laminae. Minor bed load structures in the thinner sandstone beds and a few scattered vertical burrows are present. Very rare horizontal burrows.

2056.43-2057 m Sandstone: Very fine grained. Basal erosional contact overlain by coarsely laminated sandstone grading up into finer laminae that steepen slightly (all laminae are part of a single bed set). Capped by a very thin layer of ripple laminae sets, in turn overlain by about 2 mm of mudstone.

2057-2057.58 m Mudstone-sandstone: Interbedded mudstone and sandstone beds. Sandstone beds are a few mm to 4 cm thick and ripple laminated. Mudstone beds few mm to 16 cm thick and contain silt laminae. Thickest mudstone bed at base of interval.

2057.58-2058 m Sandstone: Erosional base overlain by about 14 cm of pebbly sandstone. Small (few mm) spherical to tabular clasts of siltstone and shell debris floating in a very fine sand matrix. Tabular clasts aligned subhorizontally. Rapid upward transition into cross bedded sandstone (internal scour surface indicates migrating bedform), in turn grading up into ripple cross-laminated sandstone. Upper 2-3 cm consists of deformed, argillaceous sandstone that rapidly grades into a thick mudstone.

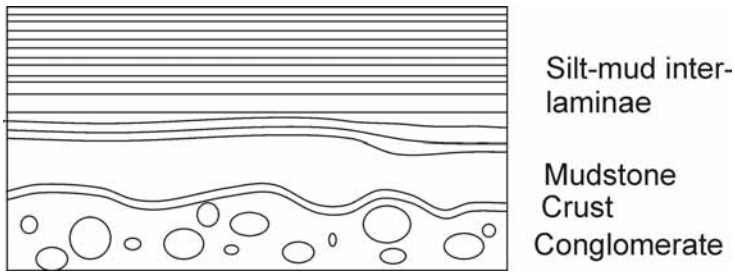


2058-2059.5 m Sandstone-mudstone: Interbeds of ripple and planar laminated sandstone and mudstone. Sandstone is more dominant lithology and occurs in beds a few mm to 12 cm thick. Some bed loading In the more argillaceous sandstone beds.

Interpretation: marine depositional environment whose background sedimentation is that of a mixture of clay and sand forming thinly interbedded units with high-energy events, such as storms, depositing thicker sandstone and coquina beds.

Core 2*:* 2235-2253 m
Rec. 18 m. 12 boxes. Slabbed.
Examined 30th September 1998

MONTNEY FM
2235-2243.06 m (Sketch) Mudstone: Abundant silt laminae. Rests abruptly on underlying beds.



2243.06-2243.44 m Conglomerate: Very small to large rounded pebbles of mudstone in a sand matrix. Large area of the lower part is replaced by light grey coloured finely crystalline dolomite. Basal contact is planar and erosional. Upper surface of conglomerate is uneven and appears to have undergone some dissolution and is coated by a light-coloured crust. The irregular surface is filled with a muddy sediment which tends to smooth out the

microtopography and the succeeding silt-mud laminae are planar.

PERMIAN (Belloy Fm)

2243.44-2253 m Bioclastic limestone.

AEC Gold Creek 2/6-2-68-4W6

Core 1*:* 2355-2373 m.

Rec. 18 m. 17 boxes. Slabbed.

Examined 30th September 1998

MONTNEY FM

2355-2357.1 m Sandstone-mudstone: Interlaminated sandstone-siltstone-mudstone. Planar laminae predominate with scattered occurrences of very thin, lenticular beds of ripple laminated sand/silt. A few thick (up to 4 cm) isolated, ripple laminated, sandstone beds

Interval rests abruptly on underlying beds.

2357.1-2357.3 m Sandstone: Very fine grained. Faintly bedded.

2357.3-2357.56 m Sandstone-mudstone: Ripple laminated sandstone beds, 4-5 cm thick separated by thin layers of mudstone or finely interlaminated sand-mud.

2357.56-2357.81 m Sandstone: Very fine grained. Planar to very low-angle bedding with very low angle truncation surfaces in upper 6-8 cm. Abrupt basal and upper contacts.

2357.81-2358-06 m Sandstone-mudstone: Interlaminated sandstone and mudstone. Planar and current ripple laminae. In the middle of the interval there is a 14 cm thick sandstone bed with thick ripple-laminae sets.

2358.06-2358.28 m Sandstone: Abrupt basal contact with small load features at the base. Fine bedding grading up into very low angle laminae sets. Grades into overlying argillaceous bed.

2358.28-2359.42 m Sandstone: Thin to thick beds of very fine grained sandstone separated by thin layers of mudstone or interlaminated sand-mud. Sandstone beds have abrupt basal contacts and gradational tops. Basal part of sandstone beds generally coarsely bedded, grading up into planar laminae, in turn grading up into ripple laminae.

2359.42-2373 m Sandstone: Thick sandstone beds (8-80 cm; most are 20-45 cm) separated by thin layers of either mudstone or interlaminated mud-sand. Sandstone beds are erosionally based. Thicker units are massive to vaguely bedded, grading up into planar laminae in upper few cm. Many of the thicker beds have no apparent internal structures. Thinner sandstone beds tend to be finely laminated throughout. Upper contacts of beds are abrupt to rapidly gradational into mudstone or mud-sand laminae. Load structures at basal contacts in a few beds.

Mudstone/laminated layers are a few cm thick and contain ripple laminae ranging in scale from a few mm to 1-2 cm.

This interval tends to fine-upward: thinner and fewer sandstone beds up-section.

Core 2: 2373-2382.35 m
Rec. 9.35 m. 9 boxes. Slabbed.
Examined 1st October 1998.

MONTNEY FM

2373-2375.5 m	Sandstone: Similar to immediately overlying strata in core 1.
2375.5-2377.4 m	Mudstone: Abundant silt laminae.
2377.4-2378.5 m	Sandstone: Three beds of very fine grained sandstone separated by two 3-4 cm thick mudstone layers. Sandstone beds have erosional bases and have vague to well defined planar bedding. One bed is deformed.
2378.5-2382.35 m	Mudstone: Abundant silt laminae. Some local, minor bed deformation. A few very small (mm-scale) ripple laminae.

NOTE: the gamma-ray log would suggest a major lithology change at 2381.5 m, but this is not reflected in the core. The major facies shifts in the vertical succession of the core occur at 2377.4 m and 2375.5 m; the latter is reflected in the gamma-ray log, the former is a less pronounced log shift.

Interpretation: thick sandstone beds deposited in waning flow conditions such as a storm deposit or sediment gravity-flow. Mudstone beds with silt laminae are low-energy deposits.

AEC Numac Gold Creek 11-24-68-4W6
Core 1: 2167-2179.8 m.
Rec. 10.85 m. 11 boxes. Slabbed.
Core 2: 2179.8-2196.8 m.
Rec. 16.7 m. 17 boxes. Slabbed.
Examined 20th October 1998

HALFWAY FM

2167-2169.5 m:	Sandstone: fine grained; slightly to moderately calcareous. Generally massive in appearance with some faint traces of bedding. More calcareous in lower 50 cm, where there are small (<1 mm) spherical molds. Basal few cm marked by two layers of small mudstone clasts (few mm in length/thickness). Erosional base to interval. May consist of several depositional units but no evidence to positively identify such units.
2169.5-2171 m:	Calcareous sandstone-argillaceous calcareous sandstone: several erosionally-based beds, some with small mudstone clasts at their bases. Vaguely bedded to undulatory bedding.
2171-2173.5 m:	Calcareous sandstone: several beds separated by argillaceous beds a few cm to 10 cm thick. Massive appearing sandstone. Argillaceous beds are laminated; some of which are deformed.
2173.5-2174 m:	Load deformed mixture of clay, sand and carbonate mud
2174-2179 m:	Sandstone: very fine to fine grained; very calcareous. Scattered throughout interval are zones containing small mudstone clasts that are subangular to subrounded and only a few mm in length/thickness. There

are a few argillaceous units that would suggest interval consists of several depositional units. Some small molds and intergranular porosity in the highly calcareous parts of the interval. Bedding is poorly defined. There is a brecciated 9 cm-thick bed in the lower 1 m of the interval. Abrupt basal contact to interval.

DOIG FM
2179-2196.8 m: Interbedded sandstone-carbonate mud-clay layers: Very fine grained, calcareous sandstone. Upper 50-60 cm consists of 2-5 cm thick calcareous sandstone beds separated by mm-thick clay layers. Sandstone beds have undulose contacts indicating minor bed loading into clay. Below these welled bedded units are severally load deformed to distorted beds. Deformed beds take on several styles: 1) complex intermingling of fine grained sand and calcareous very fine grained sand, 2) brecciated beds due to total bed disruption, 3) complexly deformed beds, 4) sand balls - usually totally enclosed in “host” material. Pyrite is a common diagenetic mineral and in box 6 of core 2 there are distinct nodular or florescent patches of replacement calcite. Some beds below 2186 m are lime mudstones.

Beds below 2189 m are more argillaceous than beds above.; below this depth the interval is mostly mudstone with very thin interbeds and laminae of very fine sand and silt. This lower interval is relatively undisturbed. Basal 2 m is predominantly mudstone with widely spaced silt/sand laminae and very thin beds. There is an overall coarsening-upward aspect from base of the core to 2189 m - seen as an increase in silt/sand content and greater frequency of silt/sand beds. Some dolomite-filled vugs.

Chiefco et al Gold Creek 10-27-68-4W6
Core 1*:* 2106-2124 m.
Rec. 18 m. 17 boxes. Full diameter core.
Core 2: 2124-2142 m.
Rec. 18 m. 17 boxes. Full diameter core.
Examined 21st October 1998.

CHARLIE LAKE FM

2106-2110.5 m: Interbedded and interlaminated sandstone-mudstone: Very fine grained sandstone is the dominant lithology. Minor amounts of calcareous sandstone and sandy limestone located about 60 cm from top of core. Base of interval marked by a mud-rich zone. Internal fabric difficult to see.

2110.5-2115 m: Coarsening-upward succession: Base marked by a 15-17 cm-thick mudstone-rich interval grading up into finely laminated sandstone-argillaceous sandstone that has abundant clay laminae. Basal contact abrupt.

2115-2117.5 m: Calcareous dolostone/dolomitic limestone: Sandy. Fine to coarse laminae consisting of alternating limestone (dark grey) and dolostone (light grey) - imparts a finely banded appearance. Some intergranular and moldic porosity, especially in the limestone laminae. Basal part of interval has contorted bedding. Local bed-scale faulting. An apparent abrupt basal contact.

DOIG FM

2117.5-2123 m: Interbedded and interlaminated sandstone-mudstone: Predominantly very fine grained sandstone. Overall succession coarsens-upward. Basal beds slightly more mudstone-rich than upper beds. Planar and current-ripple laminations. Minor bed loading features - more common in basal beds.

2123-2142 m: Coarsening-upward succession: Predominantly very fine grained sandstone between 2123-2128 m, with increasing amounts of mudstone below 2128 m and below 2130 m mostly mudstone with thin interbeds and laminae of silt/sand. Some bed deformation and bed-faulting below 2130 m. Mudstone interval contains scattered, mm-scale, calcite-filled vugs.

Dome CDA et al Elmworth 6-29-68-6W6
Core 3*:* 2379-2396.8 m.
?Full rec. 16 boxes. Full diameter core.
Core 4*:* 2396.8-2403.2 m.
?Full rec. 16 boxes. Full diameter core.
Core 5*:* 2403.2-2415.6 m.
?Full rec. 12 boxes. Full diameter core.
Examined 21st October 1998

CHARLIE LAKE FM

2379-2382.8 m: Breccia. Light reddish-brown colour. Upper 20 cm consists of light-grey limestone grading up from underlying red-beds. Breccia beds are very calcareous (probably due to abundance of limestone clasts). Clasts range in size from a few mm to about 15 cm. Smaller clasts tend to be subrounded; larger clasts are tabular and subangular. Clasts composed of limestone and red, laminated mudstone. Poorly sorted clasts in a red clay matrix. Some variations in clast size and/or sorting suggest multiple beds. Mudstone clasts appear to have been plastic when brecciated - evident from distorted clasts and irregular shapes. There are zones rich in limestone clasts and mudstone clasts.

2382.8-2383.75 m: Anhydrite: white to light grey; finely crystalline. Internal fabric difficult to see, may be finely laminated. A few deformed laminae present near base of interval. Calcitic in places. Gradational base.

2383.75-2384.5 m: Breccia. Similar to above. Erosional base.

2384.5-2384.8 m: Anhydrite/limestone. Similar to above. Gradational base: gradual upward increase in anhydrite/limestone and decline in amount of mud matrix.

2384.8-2385.98 m: Breccia and mudstone. Breccia similar to above. Unlike overlying breccia intervals this interval contains a significant proportion of in-place, red, laminated mudstone, especially towards base of interval. Interbedded with the mudstone are cm-thick microbreccias. Internal scour surfaces within the bedded mudstone. Erosional base to interval.

2385.98-2390.18 m: Anhydrite-calcareous anhydrite-dolostone. Basal anhydrite bed rests abruptly on underlying braccia. Vertical succession (base-to-top) as follows:
- two, 2-4 cm-thick anhydrite beds separated by a microbrecciated, brownish grey mudstone. Zone is about 12 cm thick.
- 33-35 cm of coarsely laminated to microbrecciated mudstone
- 20-25 cm of dolomudstone. Vaguely laminated.
- 12-15 cm of finely laminated dolomudstone.
- 20-25 cm of massive dolomudstone. Abrupt top/base.
- 12-15 cm of finely laminated dolomudstone (small-scale current ripples). In middle of interval a 3 cm thick structureless dolomudstone.
- 60-65 cm of deformed, coarsely laminated dolomudstone.
- 46-50 cm of coarsely interlaminated dolomite and calcite . Principally planar laminae. Some deformation towards top of interval.
- 50-55 cm of dolostone and limestone. Poorly defined coarse laminae

and very thin beds; some deformation.
- 120-130 cm of vaguely bedded anhydrite-dolostone-limestone

2390.18-2393 m: Breccia-mudstone. Similar to above. Uppermost beds of severely deformed mudstone with a few anhydrite nodules or clasts. Lower 70-75 cm consists of laminated to thinly bedded red mudstone with at least two interbeds of mudstone-clast conglomerate. The conglomerates have erosional bases overlain by mud-chip clasts (rounded clasts are < 5 mm) that grade up into sand-size mud-chips, in turn overlain by erosional base of next unit. The upper 7-9 cm of the bedded mudstone contains bed-scale faults and some brecciation of beds. Strata above the bedded mudstone principally a breccia: poorly sorted, subrounded to subangular clasts of mudstone and limestone in a mud matrix. Clasts tend to "float" in matrix.

2393-2393.2 m: Anhydrite. Light grey; finely crystalline. Upper half contains some irregular calcitic layers. Base marked by a styolite. Upper 1-2 cm appears to be disrupted to brecciated; remainder of interval has no visible fabric.

2392.2-2394.6 m: ?Limestone-dolostone. Light to medium grey. Very finely crystalline. Styolites throughout. Vaguely bedded. Spotted appearance probably due to patchy dolomitization; but they could be rounded clasts. Separated from underlying sandstone by a 3-5 mm thick mudstone layer.

HALFWAY FM

2394.6-2397 m: Sandstone. Light to medium grey; fine grained. Upper 80 cm has distinct alternating light and dark coloured layers due to presence of calcite cement in the lighter coloured layers. Some of the coarse laminae define current-ripples. Bulk of interval is massive to vaguely bedded. Patchy development of calcite cement below the top 80 cm. Basal 16 cm also has irregular layers with calcite cement. Mud-chip clasts up to 1 mm in size present in basal 4 cm. Erosional basal contact.

2397-2397.3 m: Mudstone-siltstone. Irregular thin beds and laminae of siltstone and mudstone. Load deformed. Gradational base. Large horizontal burrow on bedding plane near base of interval.

2397.3-2403.6 m: Sandstone. Very fine to fine grained. Upper 63 cm is very calcareous and has a mottled fabric. The uppermost 20 cm contains blebs and patches (1-2 cm) of limestone (probably an incipient caliche/soil horizon). At base of the upper 63 cm there is a 1-2 cm thick zone with irregular clay laminae within the sandstone. Remainder of interval predominantly consists of massive appearing, mottled sandstone with scattered zones with irregular clay laminae. Mottling due to patchy development of calcite cement. The presence of the clay laminated zones suggests presence of several depositional units.

2403.6-2404.03 m: Sandstone-mudstone. Load deformed to mildly convoluted thin beds and lenses of very fine grained sandstone interbedded with grey mudstone. Interval tends to coarsening-upward. A few vertical and possibly some horizontal burrows in the upper, sandier part of interval. Basal contact appears to be abrupt; upper contact appears to be gradational.

2404.03-2407.25 m: Sandstone. Very fine to fine grained. Mostly massive appearing with a few zones of fine laminae. Mottled appearance due to patchy development

of calcite cement. Apparent gradational basal contact.

DOIG FM

2407.25-2415.6 m: Mudstone-sandstone. Thin interbeds and laminae of very fine grained sandstone and dark grey mudstone. Overall coarsening-upward aspect to interval. Planar and current-ripple laminae in sandstone beds. In uppermost 1 m the sandstone beds are load deformed; lower strata has very little deformation.

Comments: The red-beds to anhydrite/limestone units form cycles that are interpreted to represent increasing evaporative conditions.
The Charlie Lake-Halfway contact is an abrupt lithological change.
The Halfway-Doig contact is arbitrarily chosen where mudstone becomes a significant part of the succession.

NOTE possible major erosion surface at 2397 m

Sulpetro Elmworth 6-20-68-9W6
Core 9: 2860.3-2867 m. Rec. ? 6 boxes. Full diameter
Core 10*:* 2867-2867.9 m. Rec. 0.9 m. 1 box. Full diameter.
Core 11*:* 2867.9-2891.5 m. Rec. ? 16 boxes. Full diameter
Examined 10th November 1998.

Core/log depths may be misaligned - core depth may need to be adjusted downward by about 88 cm to match log depths.

CHARLIE LAKE FM

2860.3-2866.12 m Interbedded/interlaminated mudstone-anhydrite: Yellowish white to cream coloured anhydrite and medium grey mudstone. Thin to thick beds (few cm to 80 cm thick) of anhydrite/mudstone and intervals of finely interlaminated anhydrite and mudstone. Soft sediment deformation very common, especially in the finely laminated intervals. Basal contact is abrupt and uneven, and marked by a 1-2 mm thick layer of clay overlain by a thick anhydrite bed.

HALFWAY FM

2866.12-2871 m Sandstone: fine grained. Top 70 cm consists of dark grey, very calcareous sandstone or a very sandy limestone (difficult to distinguish) underlain by a medium grey, cross bedded calcareous sandstone. Low to medium angled crossbed sets. Mottled in places - due to presence of calcite. Contact with underlying sandstone not preserved but a rapid change is evident.

2871-2881.2 m Sandstone: light grey, very fine to fine grained; some zones of calcite cement, but mostly non-calcareous. Gradual increase in argillaceous content down-section - clay present in wisps and irregular laminae, and presence of discrete, thin mudstone beds below about 2879 m. There may be a few horizontal burrows in the lower, muddier sandstones, but the

features are vague and not definitive. Sedimentary structures not well preserved, although there are hints of soft sediment deformation. Some of this disrupted fabric may be due to intense bioturbation but the vagueness of the features make it difficult to be definitive. Mottled fabric at a few horizons - due to presence of calcite. Local concentrations of 1 mm diameter pyrite nodules. Rapid but gradational change into underlying beds.

DOIG FM

2881.2-2882.3 m — Mudstone: dark grey, silty. Discrete, thin siltstone beds.

2882.3-2882.75 m — Sandstone-mudstone: two finely cross laminated beds of very fine grained sandstone separated by 15-18 cm of mudstone. Sandstone beds have erosional bases and rapidly gradational tops. Mudstone unit contains silt laminae and very thin beds.

2882.75-2891.5 m — Mudstone: dark grey. Very thin beds and laminae of silt throughout interval. Silt beds are mostly planar laminated. There are some lenticular silt beds. Silt beds tend to become thinner down-section. Calcite nodules are common, present either as scattered nodules or concentrated in bands/layers. Most of the latter appear to be re-sedimented nodules (truncated upper surfaces; abrupt basal surfaces to the layers). Nodules range from a few mm up to about 0.75 cm in diameter, but most are <1 cm

NOTE: possible major erosion surface at 2871 m

CanHunter Esso Elmworth 10-35-69-10W6

Core 5*:* 2660.8-2679 m. Rec. ?18.2 m. 15 boxes. Full diameter.

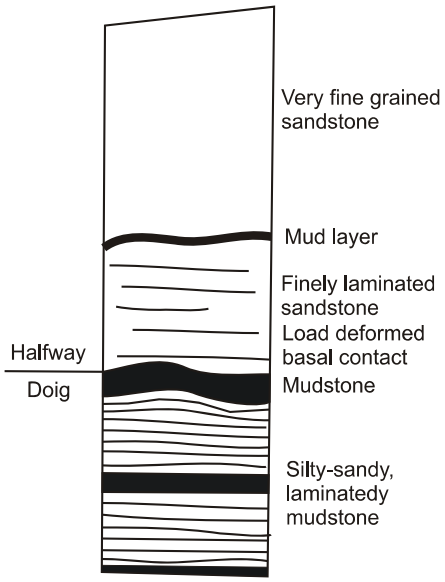
Core-log depths appear not to correspond. Corresponding log depths are 2656-2674.2 m

Log depths used below.

?HALFWAY FM

2156-2167 m — Sandstone: very fine to fine grained. Massive or planar bedded throughout most of interval. A thin (<1 cm) bed at about 2661 m - this appears to correspond approximately to the base of the porous sandstone seen on logs. Some dolomite cement. Some styolites. Minor load deformation. Contact with underlying mudstone is abrupt. Lower 1 to 1.5 m has zones of interlaminated sand-mud within the massive sandstones - this is probably indicative of several beds being present.

Sketch of basal part of interval and contact with underlying beds:



DOIG FM

2667-2674.2 m — Interlaminated/interbedded mudstone-sandstone/siltstone: Dark grey to black. Laminae to thick beds of very fine grained sandstone or coarse grained siltstone. Several intervals rich in sandstone/siltstone (0.75-100 cm thick). Planar and ripple laminae. Many beds are diffuse and irregular. Minor shell hash in a few beds. At 2667.8 m there is a 55 cm thick bed of coarse grained to granular, muddy sandstone rich in shell debris; bed has abrupt base/top. Some load deformation.

CanHunter EL&M Elmworth 6-19-69-12W6

Core 4*:* 3227.8-3242 m. Rec. ? 13 boxes. Full diameter.

Core examined 10th November 1996.

Core-log depths do not correspond. Log depth equivalent is 3226-3240.2 m.

Log depths used below:

HALFWAY FM

3226-3230.5 m — Sandstone-shelly sandstone: fine grained. Basal contact is abrupt, erosional and load deformed. Basal 1 to 1.2 m consists of shelly sandstone with small sandstone clasts; fines upward; some moldic porosity. Overlain abruptly by planar bedded, very fine grained sandstone. Above the basal shelly bed there are several fining-upward, 40-50 cm thick, beds. These beds are mostly very fine grained, massive or planar bedded sandstone grading up into interlaminated sand-mud. In some of the upper beds the sand-mud laminae form current ripples. Some beds contain small mud clasts at their bases. There is one other bed of shelly sandstone that is 50 cm thick and planar bedded.

DOIG FM

3230.5-3240 m Mudstone: dark grey to black. Abundant laminae and thin beds of silt/sand. Planar and current-ripple laminae. Many beds are load deformed. Scattered small pyrite nodules are common. Between 3231-3232.5 m the strata are very sandy.

NOTE: possible major erosion surface at 3230.5 m

CanHunter Texaco Elmworth 7-32-69-12W6
Core 6*:* 3074.4-3079 m
Rec. 4.3 m. 4 boxes. Full diameter core. Lost part of core from upper 30 cm.
Examined 14th October 1998

HALFWAY FM or base of HALFWAY ZONE
Core intersects part of two, small-scale coarsening upward cycles.

3079-3076 m: Mudstone-sandstone: Vertical succession as follows (base-to-top): 1.2 to 1.4 m of mudstone with a few scattered silt-laminated zones grading up into siltstone/very fine grained sandstone - sandstone-dominant interval (argillaceous in lower part grading up into massive-appearing sandstone) - capped by finely laminated sandstone in upper 25-35 cm (planar laminae grading up into current-ripple laminae) - abruptly overlain by mudstone.

3076-3074.1 m: Sandstone-mudstone: Vertical succession: about 23 cm of ripple laminated sandstone interbedded with mudstone, rapidly grading up into coarsely laminated to well bedded very fine grained sandstone. Small-scale fractures in sandstone.

Esso et al Grand Prairie 11-35-70-7W6
Core 1*:* 2168.2-2186.4 m. Rec. 18 m. 16 boxes. Slabbed.
Core 2*:* 2186.4-2204.6 m. Rec. 18.3 m. 16 boxes. Slabbed.
Examined 10th November 1998

CHARLIE LAKE FM
Top 10-20 cm is badly broken and consists of sandy dolostone. Some coarse laminae (possibly stromatolites). Some bioclastic debris. Basal contact not preserved.

HALFWAY FM

?2167-2178.5 m	Sandstone: very fine to fine grained. Generally massive with local indications of planar cross bedding (usually seen where cement follows original bedding or where bioclast-rich layers are present). Mottled in places due to incipient cementation Differences in the angles of the cross beds suggest presence of several units. Basal contact not preserved.
2178.5-2181 m	Sandstone: finely laminated sand with some mud laminae. Planar and ripple laminae. Some local bed loading. Local presence of short vertical burrows. Gradational basal contact.

DOIG FM

2181-2184 m	Interbedded/interlaminated sandstone-mudstone: general coarsening-upward aspect. Planar laminae are dominant sedimentary structure. Basal contact not preserved but rapid lithological change and log character indicates an abrupt change.
2184-2188 m	Sandstone: very fine grained; brownish grey. Calcareous to dolomitic. Upper 20 cm is massive and contains abundant small (few mm) pyrite nodules and a layer of ?calcite/dolomite nodules near base of this interval. Remainder of interval varies from mottled, massive, disrupted to cross laminated. Some beds have a high percentage of sand-size carbonate debris. Trace of vertical burrows.
2188-2197 m	Sandstone: brownish grey, very fine grained. Some local beds of carbonate sand (small to large fragments of bioclastic debris). Massive, mottled or disrupted fabric - the latter two fabrics appear to be due to irregular distribution of carbonate cement. A few, small (1 to 2 cm) calcite nodules present. Lower beds contain remnant patches of planar laminae. Gradual downward increase in argillaceous beds. Individual beds difficult to detect accurately - some indications for the presence of fining-upward beds 20-30 cm thick. Such beds mostly consist of basal massive sandstone capped by a thin laminated interval - some of laminae may be clay.
2197-2201 m	Interbedded/interlaminated argillaceous sandstone and calcareous sandstone: very fine grained. Predominantly planar laminated. Minor bed load deformation. Local pyrite nodules. Small blebs (1- 2 mm) of calcite/dolomite. Rapid transition over a 10 cm interval into underlying mudstone.
2201-2203.5 m	Mudstone: dark grey to black. Silty to sandy. A few thin beds of siltstone/sandstone. Abundant scattered, small calcite/dolomite nodules

(1-5 mm) and one prominent layer of nodules near base of interval.

2203.5-2204.6 m Interlaminated/interbedded mudstone-sandstone: Laminae to thick beds (up to 15 cm) of very fine grained sandstone separated by laminae or thin beds of mudstone. Planar and ripple laminated sandy beds. Some load deformation.

NOTE: velocity variation through the sandstone beds probably reflects the degree of cementation.

Halfway-Doig contact arbitrarily chosen where mudstone becomes a significant part of the sandy succession.

CanHunter Elmworth 10-8-70-9W6
Core 11*:* 2568-2586.3 m
16 boxes. Full diameter core.
Examined 14th October 1998

DOIG FM
Predominantly dark grey to black shale/mudstone with scattered, faint, silt laminae. Abundant dolomite-filled (slightly calcareous in places) sub-vertical and horizontal fractures. Some of sub-vertical fractures have characteristics of tension-gash fractures (i.e., elliptical, en echelon). Horizontal fractures are more abundant than vertical ones. Vertical fractures tend to be thicker than horizontal ones, and visually are more prominent.
.
Gamma-ray log shows at least two high-gamma zones at 2575-2576 m and 2579-2582 m; however, there are no obvious visual differences in the cored shale.

CanHunter Texaco Elmworth 10-18-70-10W6
Cores 4 and 5*:* 2705.2 - 2739 m
14 boxes. Full diameter core.
Core/log depths appear to be mismatched. Core depths about 50-75 cm deeper than log response.
Examined 14th October 1998

DOIG FM

2705.2-2706.8 m: Sandstone: fine to medium grained; massive to crudely bedded through most of interval with upper 30-50 cm well bedded to laminated. Basal contact not preserved.

2705.2-2708.45 m: Sandstone: consists of at least two fining-upward units with the following vertical succession: erosional base - massive to crudely bedded, fine grained sandstone with abundant pyrite (this forms bulk of unit)- 15-20 cm cosets of current-ripple laminae - 2 to 8 cm of mudstone that contains abundant, load-deformed, sand/silt laminae. Basal contact of mudstone interval is abrupt and has minor load structures.

2708.45-2709.65 m: Interbedded sandstone-mudstone: current-ripple and planar laminated siltstone to very fine grained sandstone; minor load structures. Very thin mudstone beds or thick mud laminae separate the sandy beds. Rapid gradation with underlying unit. Upper contact erosional.

2709.65-2710.4 m: Sandstone: fine grained. Vertical succession: erosional base - well bedded sandstone - grading up into slightly deformed, coarsely laminated sandstone - upper 1 cm consists of interlaminated clay and sand.

2710.4-2710.74 m: Mudstone: laminae and very thin interbeds of planar and current-ripple laminated silt. Abrupt basal contact.

2710.74-2711.19 m: Sandstone: grey; fine grained. Massive appearance. Load deformed erosional basal contact.

2711.19-2711.25 m: Mudstone: diffuse to crudely interbedded siltstone. Appears to be deformed.

2711.25-2711.57 m: Sandstone: fine grained; grey. Load deformed, erosional basal contact overlain by horizontally bedded sandstone, gradationally succeeded by coarsely laminated and mildly deformed sandstone with argillaceous laminae. A pyrite-rich horizon about 6-7 cm above base.

2711.57-2712.13 m: Interbedded and interlaminated mudstone-siltstone-sandstone: Planar or low-amplitude current-ripple laminae. Minor deformation. Gradational basal contact.

2712.13-2713.16 m: Sandstone: fine grained; grey. Load deformed, erosional basal contact overlain by well bedded, but deformed, sandstone grading up into finely laminated, undeformed sandstone - upper 1-2 cm consists of interlaminated sand and clay. Possibly a few small vertical burrows. (N.B. this is the first sandstone unit of the sandstone-dominant interval in the core).

2713.16-2714.81 m: Mudstone: dark grey to black. Laminae and very thin beds of silt - planar and current-ripple laminae. Some deformed beds, ranging from mild to intense deformation. Local concentrations of pyrite.

2714.81-2715.15 m: Siltstone/sandstone: Vertical succession as follows:
- erosional base
- 5-6 cm of light grey, very fine grained, crudely laminated sandstone
- 1-2 cm of planar laminated siltstone
- 8-9 cm of current-ripple laminated sandstone (cosets)
- 8-9 cm of planar laminated siltstone
- 8-9 cm of current-ripple laminated siltstone.

Contacts between planar and ripple laminated units appear to be rapidly gradational. Basal contacts of planar laminated units appear to be erosional.

2715.15-2716.55 m: Mudstone: dark grey to black. Interlaminated siltstone. Basal 10-15 cm is essentially silt-free and rests erosionally on underlying bed.

2716.55-2739 m: Mudstone: interbeds and interlaminae of silt. Planar and current-ripple laminae. General upward increase in silt content. Isolated blebs and rare ripple laminated silt in lowermost part of interval.

NOTE: The identification of Halfway Fm is based on the core/log depth mismatch. Core

depths/lithological character would suggest Halfway Fm was intersected.
First appearance of thick sandstone beds at 2713.16 m is very abrupt.

CanHunter Texcan Elmworth 11-36-70-11W6
Core 9*:* 2655.5-2673.5 m. Rec. 18 m. 16 boxes. Full diameter.
Core 10*:* 2674-2692 m. Rec. ? 16 boxes. Full diameter.
Examined 12th November 1998

CHARLIE LAKE FM

2655.5-2657.4 m	Mudstone: maroon red, greenish grey and light grey colours. Two 1.5 cm thick beds of anhydrite in upper 9 cm of core. Lower 83-86 cm consists of maroon red mudstone with a totally disrupted fabric, where soft sediment deformation has brecciated some parts of the mudstone interval. Finely laminated grey, and some red, mudstone overlie the basal red-bed. Laminae are planar or convoluted. Basal contact of interval is abrupt and marked by a 1 mm thick clay layer.
2657.4-2658.88 m	Anhydrite: yellowish white to creamy coloured. Finely laminated to thinly bedded. Convoluted bedding is common. Basal contact not preserved - rapid lithology change suggests abrupt change.
2658.88-2659.9 m	?Mudstone (or is this argillaceous anhydrite?): light grey. Abrupt basal contact.
2659.9-2660.2 m	Anhydrite/mudstone: two beds of yellowish white anhydrite separated by a light grey, finely (but irregular) laminated mudstone (or anhydritic mudstone). Abrupt, irregular basal contact.

HALFWAY FM

2660.2-2668 m	Sandstone: varies from light to medium grey. Very fine to fine grained. Mostly calcareous with some non-calcareous zones. Where extensively calcite cemented the sandstone has a mottled fabric. Interval appears to consist of two depositional units, from top to base, as follows: (2) 2660.2-2664.5 m (approx.): cross bedded, fine grained, dark grey, calcareous sandstone. Low-angle intersecting bedsets present. (1) 2664.5-2668 m: light grey, fine grained, calcareous in part. Cross bedded throughout most of interval with a thin (10-15 cm) interval of irregularly laminated sandstone at top of unit. Contact between units 1 and 2 not preserved. Rests abruptly, and probably erosionally on a thin mudstone bed.

DOIG FM

2668-2670.4 m	Interbedded mudstone-sandstone: Beds range from laminae to beds up to 10 cm thick. Very fine grained sandstone beds are planar or ripple laminated. Bed-load deformation is common. General downward increase in mudstone content, i.e., an overall coarsening-upward aspect.
2670.4-2683 m	Coarsening-upward succession: bulk of interval consists of mudstone with thin interbeds and laminae of very fine grained sandstone or coarse grained siltstone. Calcite nodules a few mm to a few cm in diameter are common in the mudstone, occurring either as isolated nodules or

	concentrated in layers. Many of the layers appear to be re-sedimented nodules. Top 40 cm consists of sandstone, mostly very fine grained, with the upper 18 cm consisting of fine to medium grained sandstone that contains mud clasts in its basal few centimetres and lying erosionally on the lower sandstone beds. Bed-load deformation structures are common.
2683-2684.2 m	Interbedded sandstone-mudstone: severely load deformed, such that many beds are inverted.
2684.2-2692 m	Coarsening-upward succession: mudstone grading up into coarse siltstone. The bulk of the cored part of the coarsening-upward succession is massive appearing, light grey siltstone. Mottled appearance in siltstone due to incipient calcite-nodule development.

NOTE: possible major erosion surface at 2668 m

Canadian Superior et al Grande Prairie 11-6-71-6W6
Core 1: 2121-2132.4 m. Rec. 10.2 m. 10 boxes. Full diameter
Core 2: 2132.4-2141.8 m Rec. 9 m. 8 boxes. Full diameter
Examined 13th February 2002

CHARLIE LAKE FM

2121-2121.4 m	Anhydrite: coarsely laminated. Some thin mudstone interbeds. Minor distortion of laminae. Abrupt basal contact.
2124.4-2124.03 m	Mudstone: brick-red. Lenses and irregular patches of anhydrite scattered throughout. Disrupted fabric. Anhydrite more common in lower 30 cm and two anhydrite beds at 2122.8 and 2123.63 m. Rapidly gradational basal contact.
2124.03-2124.41 m	Dolostone: very finely crystalline. Dull yellow-grey. Some possible clay laminae in basal 1 cm. Abrupt basal contact.
2124.41-2124.47 m	Anhydrite: medium grey. Crystalline. Massive. Abrupt basal contact.
2124.47-2129.57 m	Dolostone: light to medium grey. Variable in character: finely laminated to crudely bedded, to massive. Some intervals appear to be contorted to partially brecciated (due to complete bed disruption). Basal contact is a zone a few cm thick of alternating coarse laminae to very thin beds of sandstone and dolomite.

HALFWAY FM

2129.57-2133.1 m	Sandstone: medium to dark grey. Abundant small patches/blebs of replacement dolomite. Fine grained except in basal few cm where coarse grains of black chert are present. Some cross bedding. Basal contact is poorly defined but abrupt appearance of coarse grains suggests abrupt contact.
2133.1-2133.7 m	Dolostone: sandy, dark grey. Crudely laminated. Abrupt basal contact.
2133.7-2134.64 m	Coquinal dolostone: sandy in places. Varies between coarsely crystalline with abundant moldic porosity to finely crystalline with less porosity. Upper contact underlain by about 8 cm of very finely crystalline dolomite with small vertical burrows extending down from overlying bed - looks

very much like a hardground or firmground. Basal contact is erosional.

DOIG FM

2134.64-2141.8 m — Coarsening-up interval: mudstone with abundant silt/sand laminae, lenses and very thin beds grading up into beds of dolomitic, very fine grained sandstone intercalated with mud laminae. Mudstone interval contains replacement anhydrite nodules. Some lenticular sandy beds in mid-part of interval and a few thin coquina beds in upper, sandy part, of interval. Bioturbation features are lacking.

NOTE: possible major erosion surface at 2133.1 m

GAO et al Wembley 7-15-71-7W6
Core 1*:* 2144-2160.4 m.
Rec. 16.4 m. 12 boxes. Full diameter.
Examined 8th December 1998

HALFWAY FM

2144-2146.3 m — Sandstone: brownish grey. Fine grained except in basal 18-20 cm where granules are present. Slightly to moderately calcareous. Medium angle cross beds. Unable to determine if there is a single set or cosets of cross beds. Basal contact not preserved but lithological contrast with underlying strata suggests it is abrupt.

DOIG FM

2146.3-2147.5 m — Sandstone: fine grained, calcareous. Fine planar laminae; some bed distortion. Some clay laminae and thin beds, especially near top of interval.

2147.5-2152 m — Interbedded mudstone-sandstone: Very fine grained sandstone. Fine, planar laminated sand-silt beds; some ripple cross laminae. Sand-silt beds up to 5 cm thick; sand-silt also occur in fine laminae. There are sandstone-rich and mudstone-rich zones in this interval. Abrupt basal contact; upper contact not preserved.

2152-2160.4 m — Sandstone: very fine grained. Patchy development of calcite cement imparts mottled appearance. A few anhydrite nodules. At least three thin to thick (10 to 35 cm) beds of bioclastic sandstone present (thin-walled bivalve debris). Mostly massive in appearance, with some vague bedding and a few planar laminae. Several planar surfaces suggest multiple beds. Bioclastic beds have erosional bases and grade up into sandstone.

NOTE: possible major erosion surface at 2147.5 m

GAO et al Dinsdale 6-24-71-7W6
Core 1*:* 2104-2109 m.
Rec. 4.65 m. 4 boxes. Full diameter
Core 2*:* 2109-2126 m.

Rec. 16.15 m. 12 boxes. Full diameter
Examined 8th December 1998

DOIG

2104-2104.4 m	Sandstone: very fine grained; calcareous. Abrupt basal contact. Crudely to finely laminated.
2104.4-2104.95 m	Sandy bioclastic limestone: Highly comminuted shell debris in a sandy/calcareous matrix. Erosional base.
2104.95-2108.65 m	Sandstone: very fine to fine grained. Planar bedding and laminae; some ripple cross laminae. Some bioclast-rich beds. Lowermost beds range up to sandy limestone. Beds have abrupt bases; 15 to 30 cm thick. One zone rich in calcite nodules.
2108.65-2109 m	Lost core
2109-2110.12 m	Calcareous dolostone: sandy; bioclastic. Highly comminuted shell debris; a few scattered whole shells. Basal contact not well preserved but appears to be abrupt.
2110.12-2116 m	Coarsening-upward succession: Grades up from very thinly interbedded and interlaminated mudstone-siltstone-sandstone (with a few thicker, 1 to 5 cm, sandstone beds) into interval with more, and thicker, sandstone beds, with the upper 2.5 m predominantly consisting of planar and ripple cross laminated very fine grained sandstone. Minor bed deformation. A few vertical burrows.
2116-2121 m	Coarsening-upward succession: approximately 1.5 m of mudstone with silt laminae grading up into a sandstone-dominant upper 3.7 m. Sandstone is dominated by planar laminae with a few examples of ripple cross laminae.
2121-2126 m	Coarsening-upward succession: mudstone dominant, with about 1.3 m of sandstone-rich strata. Latter is extensively contorted. Mudstone interval contains silt/sand laminae.

Dome Shell Sask Lake 7-31-71-7W6
Core 1:2213-2231 m
Rec. 18 m. 12 boxes. Slabbed.
Core 2: 2231-2248 m
Rec. 16.62 m. 11 boxes. Slabbed.
Core 3: 2249-2267.2 m
Rec. 18. 2 m (measured only 13.2 m). 13 boxes. Slabbed.
Examined 27 July 1999
Core/log depths do not correspond. Core depth about 2.5 to 3 m deeper than logs.

CHARLIE LAKE FM

2213-2215.9 m	Mudstone: reddish brown ("brick-red"). Highly disrupted - brecciated - fabric. A few thin beds of light grey, calcareous mudstone. Anhydritic. A few thin zones with fine laminae preserved. Basal contact is abrupt and marked by microtopography and a 1 mm seam of ?clay (contact may possibly be styolitic).

2215.9-2217.74 m	Anhydrite: light grey with some zones that have a reddish tint. Finely laminated to massive. Very finely crystalline.
2217.4-2217.95 m	Interbedded anhydrite-mudstone: light grey anhydrite beds and reddish-brown mudstone. Upper 23 cm consists of thin (<5 cm) beds and has a predominantly brecciated fabric. Lower interval consists of a basal, 13-14 cm of mudstone overlain by 15 cm of anhydrite; beds generally finely laminated with minor bed-disruption. Bed contacts are abrupt and a few appear to have undergone chemical erosion (i.e., dissolution of anhydrite).
2217.95-2220.55 m	Anhydrite: minor interbeds and patches of reddish-brown mudstone (<6cm thick) that are more common in lower third of interval. Some mudstone appears to fill cavities within the anhydrite. Anhydrite is light grey; coarsely laminated to massive. Basal contact is abrupt and has small-scale load structures.
2220.55-2223.41 m	Mudstone: reddish-brown. Lowermost 15 mm is mudstone with small lenses of anhydrite. Basal 1.6 m is rich in poorly sorted anhydrite clasts, ranging from a few mm up to one that occupies the diameter of the core (possibly a true bed!). Number of clasts declines up-section and upper 1.2 m is predominantly mudstone with only a few anhydrite clasts. However it is rich in anhydrite-filled subhorizontal fractures up to 4 mm thick. Rests abruptly on underlying strata.
2223.41-2223.54 m	Anhydrite: light grey. Faint, coarse laminae and very thin beds. Abrupt basal contact.
2223.54-2224.9 m	Sandstone: greenish-grey; fine grained with medium to coarse grains of chert and quartz in basal 5 cm. Mottled fabric. Possibly dolomitic. Blebs (mm-scale) of anhydrite, especially in upper 50 cm. No discernible sedimentary structures. Abrupt basal contact.
2224.9-2225.18 m	Anhydritic dolostone/dolomitic anhydrite: abrupt basal contact overlain by 2 cm zone that contains coarse-grained, black chert and grey quartz, grading up into 4-5 cm of coarsely laminated beds, in turn grading up into thickly bedded to massive dolostone/anhydrite.
2225.18-2226.72 m	Dolostone: light grey. Varies from finely laminated to thickly bedded. Styolitic throughout. Basal 28 cm contains finely laminated, small domal structures - stromatolites. Basal contact is a styolitic surface.
2226.72-2226.84 m	Dolostone: light grey. Coarse, undulose laminae consisting on alternating light and medium grey layers (probably stromatolites). Basal contact is abrupt and separated from underlying sandstone by 1 mm thick layer of brownish grey clay (?) That drapes a jagged surface of microtopography. The laminae onlap the microtopography.
HALFWAY FM	
2226.84-2229.07 m	Sandstone: predominantly fine-grained; brownish-grey; some light grey mottles (possibly carbonate cement). Appears to be a single set of planar crossbeds. Basal contact abrupt and erosional, overlain by medium grained sandstone with abundant black chert grains. Overall fining-upward bed and upward decline in black chert.
2229.07-2234 m	Sandstone (90%) interbedded with minor mudstone: very fine to fine

	grained; light grey. Extensive bed-load structures and bioturbation, consequently sedimentary structures are rarely preserved. A few zones rich in mudstone but these are commonly mixed intimately with sandstone due to bioturbated. A few vertical burrows preserved.
DOIG FM	
2234-2237.5 m	Interbedded sandstone (60%)-mudstone: mm-thick to 6 cm beds. Very fine grained sandstone. Mostly load-deformed into nodular-looking layers; hence lack of preserved primary sedimentary structures. The basal sandstone beds has fine, planar laminae. A few sand-filled vertical burrows present. Lower 20 cm rich in pyrite.
2237.5-2243.84 m	Interbedded mudstone (60%)-sandstone: Fine laminae to very thin beds of very fine grained sandstone, interbedded with mudstone. Sandstone beds predominantly planar laminated, a few beds of current-ripple laminae. Minor bed-load structures. Basal mudstone-rich zone rests abruptly on underlying strata.

NOTE: 2229.07-2243.84 m is an overall coarsening-upward succession, erosionally overlain by cross bedded sandstone.

2243.84-2248 m	Sandstone: light grey with mottled appearance; very fine to fine grained. Mostly massive. A few of the thinner beds have some planar laminae, and vertical burrows are present in some of the laminated beds. At least 10 beds, a few cm, up to 50 cm thick. Basal contact of beds is erosional. Basal few cm of many beds contain abundant fragments of thin-walled shells and some coarser sand grains. A few beds grade up into argillaceous sandstone. Scattered nodules of anhydrite. Basal bed rests erosionally on underlying strata.
2248-2249 m	Not cored according to operator's core depths but succession looks like it is continuous!
2249-2250.28 m	Sandstone: light grey, mottled appearance. Vaguely bedded. Rapidly gradational into underlying strata.
2250.28-2251.03 m	Sandstone-argillaceous sandstone: mostly alternating fine laminae of sand and mud. Some zones of load deformed sandstone. Mostly planar laminae with a few beds of current-ripple laminae (<1 cm thick). Abrupt, load deformed basal contact.
2251.03-2253.43 m	Sandstone: light to medium grey; mottled appearance. Very fine to fine grained; argillaceous. Massive. Small to large anhydrite nodules, Rapidly gradational into underlying strata.
2253.43-2266 m	Mudstone: dark grey to black. Numerous scattered anhydrite nodules. Fine laminae of silt throughout interval with a few thin beds of silt/very fine sand. A few subhorizontal fractures filled with anhydrite.
2266-2267.17 m	Siltstone: massive. Abrupt base/top.
2267.17-2267.2 m	Mudstone: similar to interval 2253.43-2266 m.

NOTE: Halfway/Doig contact arbitrarily chosen where mudstone becomes a significant

component of the succession.
Possible major erosion surface at 2229.07 m

Dome et al Elmworth 8-17-71-8W6
Core 1: 2291-2309 m Rec.12 m. 9 boxes Full diameter
Core 2: 2309-2312 m Rec. 2.9 m 3 boxes Full diameter
Core 3: 2312-2330 m Rec.18 m 13 boxes Full diameter
Examined 13 February 2002 Re-examined 18th November 2002

CHARLIE LAKE FM

2291-2292.7 m	Dolostone: medium grey. Very fine ly crystalline. Irregular argillaceous partings (almost styolitic). Gradational basal contact.
2292.7-2298 m	Dolostone: medium grey. Argillaceous in places. Some anhydrite. Some intervals with coarse laminae.
2298-2301.5 m	Brecciated dolostone and anhydritic dolostone: gradational basal contact.

HALFWAY FM (based on log response)

2301.5-2309 m	Missing core

DOIG FM

2309-2309.27 m	Mudstone: partially dolomitized, imparting a mottled fabric. Basal contact diffuse due to dolomitization
2309.27-2322.6 m	Sandstone: Overall sanding-up aspect to interval. Extensively dolomitized in upper, sandier part of interval. Argillaceous sandstone with thin muddy interbeds. at base grading up into dolomitic, very fine grained sandstone at top. Finely laminated in top 6 m. Rapidly gradational basal contact.
2322.6-2330 m	Mudstone: dark grey to black. Fine laminae of silt/sand. A few cm-thick silt/very fine sands beds.

Colonial Amoco Wembley 14-28-71-8W6
Core 2: 2288-2306.25 m Rec. 18.25 m 17 boxes Full diameter with a few slabbed pieces
Examined 13 February 2002

CHARLIE LAKE FM

2288-2289.1 m	Dolostone/anhydrite: coarsely interlaminated dolostone and anhydrite. Undulose laminae; some have minor distortion. Fresh surface is light to medium grey. Abrupt basal contact.
2289.1-2289.95 m	Mudstone: brick-red. Dolomitic
2289.95-2292.02 m	Dolostone/anhydritic dolostone: sandy in lower 50-70 cm - seen as lenses and sand-balls. Abrupt basal contact. Separated from underlying

sandstone by a 1 mm-thick clay layer.

HALFWAY FM

2292.01-2293.92 m — Sandstone: fine to medium grained with some coarse. Cross bedded (medium- to high-angle) throughout with fine laminae in upper few cm. Patchily developed dolomitized areas - commonly along bedding planes. Abrupt basal contact.

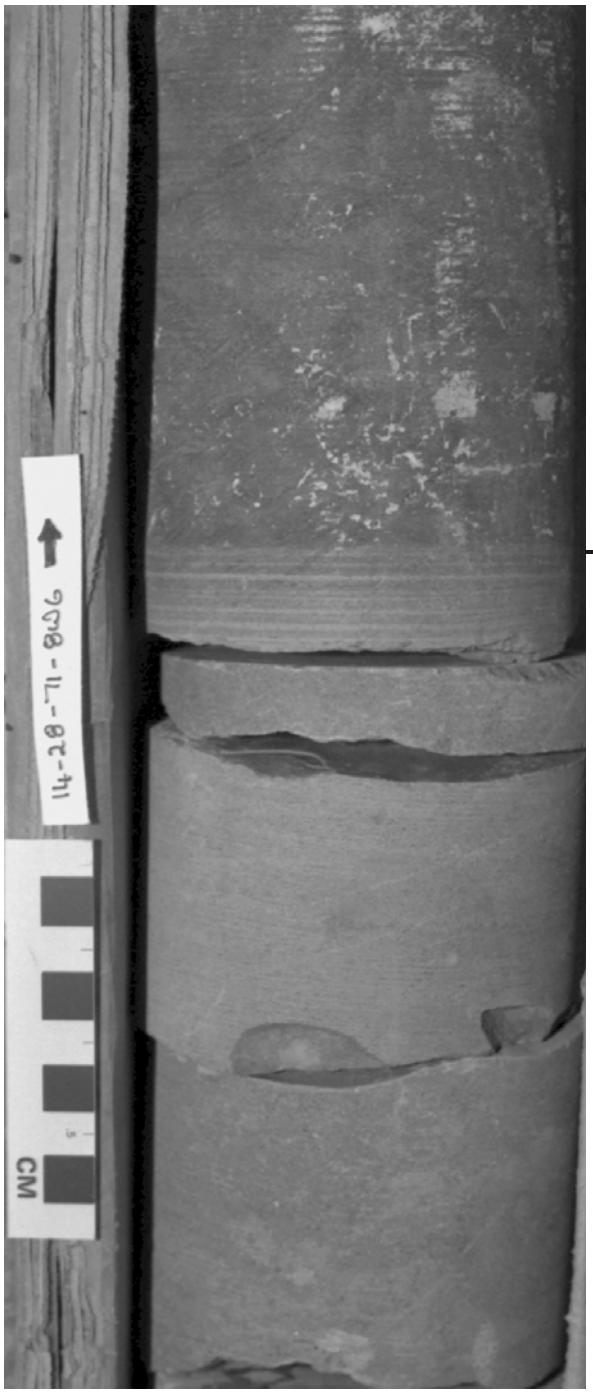
DOIG FM

2293.92-2297 m — Mudstone-sandstone: laminae to very thin beds of mudstone and very fine grained sandstone. Abrupt basal contact.

2297-2306.25 m — Coquinal, dolomitic sandstone: small to large bioclasts and molds of bioclasts in a sandy dolostone to dolomitic sandstone. Series of erosionally based beds. Uppermost 25 cm consists of a dense, very finely crystalline dolostone resting on a styolitic-like surface, below which is the coqiuinal strata. (This is the upper part of what Wittenberg, 1992, 1993, identified as an “anomalously thick sandstone body”)

NOTE: possible major erosion surface at 2293.92 m

14-28-71-8W6

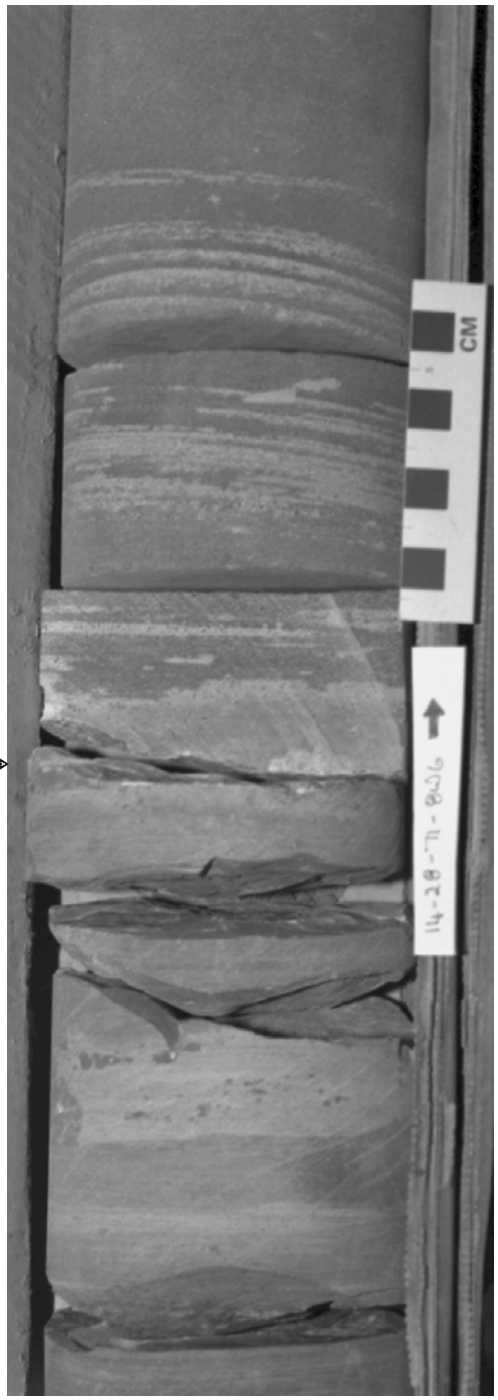


CHARLIE
LAKE FM

2292.02 m

HALFWAY FM

14-28-71-8W6



HALFWAY FM

2293.02 m

DOIG FM

Colonial Amoco Albright 14-12-71-9W6
Core 2: 2390-2408.25 m Rec. 17.5 16 boxes. Full diameter.
Tends to be broken into small core segments
Examined 13 February 2002

CHARLIE LAKE FM

2390-2390.7 m	Dolomitic mudstone/argillaceous dolostone: greenish grey. Small to large subhorizontal fractures filled by anhydrite. Psuedo-breccia appearance. Abrupt basal contact.
2390.7-2390.95 m	Dolomitic mudstone/argillaceous dolostone: complex diagenetic fabric gives a pseudo-breccia appearance. Basal 2-3 cm consists of fine, undulose laminae (?stromatolites) resting abruptly on underlying bed.

HALFWAY FM

2390.95-2391.98 m	Sandstone: fine grained, some medium/coarse grains. Complex dolomitization fabric, especially in lower half of interval. Basal contact not preserved but facies change is abrupt.
2391.98-2394.35 m	Sandstone: similar to above but with less intense dolomitization. Fine grained. Rest abruptly on a mildly deformed 4 mm thick mud layer.
2394.35-2395 m	Sandstone: fining-up, from coarse to fine grained. Minor mottling due to dolomitization. Traces of low-angle cross bedding. Basal contact poorly defined, although there is a distinct grain size change.
2395-2399.6 m	Sandstone: very fine to fine grained. Mostly massive with some fine low-angle laminae in lower 1 m.
2399.6-2402.2 m	Sandstone: very fine grained. Fine planar and some distorted laminae. A few mudstone interbeds. Gradational basal contact.
2402.22-2407.5 m	Coarsening-up interval: grades up from thinly interbedded mudstone-sandstone to thicker beds of very fine grained sandstone separated by laminae to very thin beds of mudstone.

NOTE: possible major erosion surface at 2395 m

Canadian Hunter Texaco Elmworth 11-3-71-11W6
Core 7: 2696.8-2703 m Rec. 6.2 m 7 boxes Full diameter
Core 8: 2703-2721.2 m Rec. 17.55 m 16 boxes Full diameter
Examined 13 February 2002

CHARLIE LAKE FM

2696.8-2699.8 m	Dolostone: Very finely crystalline. Light to medium grey. Contains thin beds of anhydrite. Also anhydrite-filled fractures. Crudely bedded - coarse laminae to very thin beds. Basal contact not preserved.
2699.8-2700.35 m	Dolostone: dark grey. Sandy in places. Coarsely bedded with some bed disruption.

HALFWAY FM

2700.35-2703 m	Sandstone: fine to medium grained. Medium grey. Cross bedded -

	medium to high-angle. Several sets of cross beds (2 possibly 3). Dolomitized in places, especially along bedding planes. Basal contact not preserved.
2703-2709.5 m	Sandstone: very fine to fine grained. Multiple beds containing very low to low angle cross laminae, some intersecting cross lamina-sets. Abundant mud laminae associated with cross bedding. Lowermost sandstone bred rests abruptly on underlying mudstone but is not noticeably erosive. Some dolomitization
DOIG FM	
2709.5-2720.55 m	Mudstone: dark grey. Intercalated with fine laminae to very thin beds of silt/very fine sand. Disrupted bedding. Some beds with vertical burrows, especially in the sandier intervals. A few horizontal burrows.
2720.55-2721.2 m	Missing core

NOTE: possible major erosion surface at 2703 m

Canterra et al. Grand Prairie 8-1-72-5W6
Core 2*:* 1847.6-1853 m
Rec. 4.1 m. 3 boxes. Full diameter core.
Examined 2nd September 1999

CHARLIE LAKE FM	
1847.6-1848.98 m	Dolostone: brownish grey; very fine to finely crystalline. Finely laminated - mostly planar to slightly undulose (probably stromatolites).
1848.98-1849.18 m	Dolostone: dark grey with irregular black patches. Contains a large area of recrystallized, coarsely crystalline calcite about midway through interval. Coarsely laminated to disrupted fabric. Basal contact is abrupt and marked by a 2-4 mm thick seam of clay.
DOIG FM	
1849.18-1851.7 m	Sandstone: very fine to fine grained. Contains argillaceous laminae throughout. Finely laminated - mostly planar with some current ripple laminae. In lower half of interval there are some discrete, thin (<1 cm) mudstone beds. Minor load structures. Scattered anhydrite/calcite nodules throughout and a few, short, calcite-filled vertical fractures.
1851.7-1853 m	Missing core

Canterra et al Grand Prairie 6-2-72-5W6
Core 1*:* 1870-1883 m
Rec. 11.2 m. 11 boxes. Full diameter core.
Examined 2nd September 1999

CHARLIE LAKE FM

1870-1871 m	Dolostone: this part of core is badly broke consequently the accuracy of the thickness measurement is questionable, although it will not be grossly wrong. Creamy grey colour. Fine to coarsely crystalline. Finely laminated with some zones of distorted laminae. Basal contact not preserved but the lithological change to the underlying sandstone/mudstone is rapid, suggesting an abrupt base.
DOIG FM	
1871-1872.09 m	Interbedded sandstone-mudstone: Beds vary in thickness from a few mm up to 10 cm; sandstone beds tend to be thicker than mudstone. Planar laminae throughout. Abrupt basal contact.
1872.09-1881.2 m	Coarsening-upward succession: grades up from silty mudstone into finely laminated, slightly argillaceous, very fine grained sandstone. Predominantly planar laminated throughout most of interval. Minor bed-load structures. Scattered zones rich in anhydrite nodules.
1881.2-1883 m	Missing core

Encor et al Grand Prairie 16-25-72-6W6
Core 1: 1896-1914.2 m Rec.18.2 m 13 boxes. Full diameter
Core 2: 1914.2-1930.2 m Rec. 15.4 m 12 boxes Full diameter
Examined 13 February 2002
Approximately 30-40 degree dip relative to horizontal axis of core. Measurements are vertical - no adjustment for dip.

CHARLIE LAKE FM

1896-1896.97 m	Dolostone: light grey. Very finely crystalline. Abrupt basal contact.
1896.97-1897.27 m	Dolostone: yellowish grey. Base marked by a 4 cm thick earthy brown bed. Abrupt basal contact.
1897.27-1900.47 m	Dolostone/argillaceous dolostone: highly deformed.
1900.47-1901.27 m	Dolsotone: less deformed than overlying dolostone
1901.27-1903.67 m	Dolostone: yellowish grey. Crudely bedded. Minor deformation.
1903.67-1904.62 m	Dolostone- dolomitic mudstone: greenish grey
1904.62-1908.77 m	Dolostone: yellowish grey. Crudely bedded. Some deformed beds. Mottled in places.
1908.77-1911.97 m	Dolostone: light grey with a slight yellowish tint. Uniform appearance.
1911.97-1914.3 m	Dolostone: Finely crystalline. Yellowish colour. Mottled. Rests abruptly on a 5 mm thick mud layer, in turn resting abruptly on underlying strata.
HALFWAY FM	
1914.3-1917.87 m	Sandstone: fine grained, some medium grains. Slightly oil stained. Traces of cross bedding. Some dolomitization along bedding planes.

Abrupt basal contact.

1917.87-1918.37 m Mudstone-sandstone: very thin to thin beds (1-10 cm thick). Very fine grained sandstone.

1918.37-1919.55 m Sandstone: fine grained. Massive. Abrupt basal contact.

1919.55-1919.8 m Sandstone-mudstone: thin sandstone beds separated by very thin mudstone layers. Some bed deformation. Possibly contains a few burrows.

1919.8-1929.6 m Coquinal sandstone: also contains some thin sandstone interbeds and clay laminae. Abundant moldic porosity.

NOTE: possible major erosion surface at 1917.87 m

PCP Wembley 6-3-72-7W6
Core 1*:* 2093-2111 m.
Rec. 16.38 m. 12 boxes. Slabbed.
Examined 8th December 1998

CHARLIE LAKE

2093-2093.1 m Dolomitic mudstone/dolomudstone: medium to dark earthy grey.

2093.1-2093.24 m Dolomitic sandstone: light grey; fine grained with scattered black (?chert) granules and coarse bioclasts. Abrupt basal and upper contacts.

2093.24-2094.04 m Anhydrite: light grey; undulose coarse laminae and very thin beds. Dolomitic. Basal contact appears to be rapidly gradational over a 5 cm interval and consists of interlaminated anhydrite and dolostone.

2094.04-2095.5 m Dolostone: light grey. Thin (1-3 cm), uneven beds of dolomicrite. Scattered throughout are a few anhydrite nodules. A few isolated coarse laminae of anhydrite. Some load deformation. Basal 25 cm consists of coarse laminae and very thin beds of dolostone and anhydrite. Abrupt basal contact with some coarse clasts and sand grains present within first few centimetres.

DOIG FM

2095.5-2102.5 m Sandstone: very fine grained; light grey. Interbedded with mudstone. Mudstone tends to be more common in basal 1 m - imparting an overall coarsening-upward aspect. Sandstone beds are a few cm to 50 cm thick. Sedimentary structures vary from predominantly planar laminae in lower half of interval to cross laminae in upper half. Load deformation is common. Scattered anhydrite nodules. Basal contact is abrupt.

2102.5-2109.5 m Sandstone: very fine grained; light brownish grey. Several thick beds separated by thin (2-4 cm) argillaceous zones (i.e., fining-up beds 15-50 cm thick). Beds in middle part of interval tend to fine-up into argillaceous zones, more so than upper and lower beds. Bioclastic - bioclasts tend to be concentrated in basal few cm of individual beds. Mostly massive in appearance. Several horizons rich in anhydrite nodules (or are they clasts?). Basal bed rests erosionally on underlying unit.

At 2109.5 m there is a thick (40 cm) bed of massive-appearing sandstone resting abruptly on a muddy sandstone and gradationally overlain by laminated sandstone

(see log response). Top of interval marked by a 6-7 cm thick bioclastic sandstone with anhydrite nodules.

2109.5-2111 m Mudstone: medium grey; silty. Abundant planar laminae of silt.

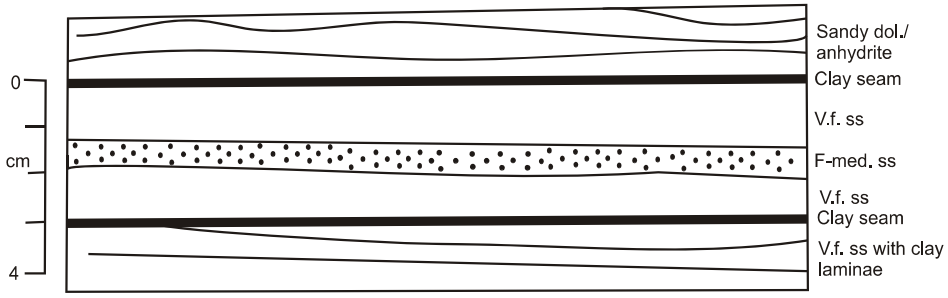
PCP Wembley 10-5-72-7W6
Core 1: 2157-2173 m
Rec. 15.53 m. 14 boxes. Full diameter core. Well preserved.
Examined 19/20 April 1999
Possible mismatch of core/log depths.

CHARLIE LAKE FM

2157-2158.7 m Carbonate breccia: light to medium grey. Poorly sorted angular clasts. A number of large clasts consisting of dolostone with contorted laminae. Clast size ranges from a few mm to 10s of cm. Fabric apparently random. Basal contact appears to be rapidly transitional. Character of bed suggestive of solution-collapse breccia.

2158.7-2161.5 m Anhydrite: undulose coarse laminae to very thin beds. Sandy. Yellowish grey. Contains at least three, 2-3 mm thick clay seams. Contact with underlying strata appears to be abrupt:

[Sketch]



DOIG FM

2161.5-2162.08 m Sandstone: very fine to fine grained; laminae and very thin interbeds of mudstone. Load deformation structures common. Gradational basal contact.

2162.08-2164.2 m Sandstone: fine grained. Blotchy appearance due to incipient carbonate cement. Some zones rich in clay seams Difficult to detect bedding. Gradational basal contact - reflected as increasing mudstone interbeds.

2164.2-2165.78m Interbedded mudstone-sandstone: fine laminae to thick beds of coarse silt/very fine sand within the mudstone. Load deformation structures common in the sandy beds. Dark grey mudstone. Abrupt basal contact.

2165.78-2168.6 m Sandstone: very fine to fine grained some scattered black, medium-sized

	grains of chert. Bivalve, and possibly brachiopod, debris also present scattered throughout interval. Generally an absence of visible sedimentary structures - sandstones tends to look a bit disorganized. An apparent transitional basal contact.
2168.6-2171.6 m	Mudstone: dark grey. Abundant laminae of coarse silt/very fine sand.
2171.6-2171.8 m	Sandstone: fine grained; light grey.
2171.8-2173.5 m	Missing core.

WinCan et al Wembley 6-9-72-7W6
Core 1*:* 2118-2136 m.
Rec. 17.45 m. 16 boxes. Full diameter.
Examined 8th December 1998

DOIG FM

2118-2119.8 m	Coarsening-upward succession: About 55 cm of mudstone with lenses and laminae of coarse silt to very fine sand, rapidly grading up into load deformed, argillaceous to calcareous, very fine grained sandstone beds. Abrupt basal contact.
2119.8-2122.4 m	Sandy bioclastic limestone/bioclastic sandstone: bioclasts of large thin-walled bivalves (some preserved whole) in a sandy/shell-debris matrix. Upper 40-45 cm is argillaceous and contains load deformation structures. Abrupt basal contact. Appears to be a single depositional unit - no internal scours seen.
2122.4-2127 m	Two coarsening-upward successions: 2122.4-2124: mudstone with interlaminae and thin interbeds of very fine grained sandstone and coarse siltstone, grading up into thin to thick beds of sandstone separated by thin (1-2 cm) mudstone beds. Planar and ripple cross laminae in the upper sandstone beds. 2127-2124: mudstone with interlaminae and thin interbeds of very fine grained sandstone and coarse siltstone, grading up into thin (2-5 cm) beds of sandstone separated by thin (1-2 cm) mudstone beds.
2127-2134 m	?Two coarsening-upward successions: abrupt basal/upper contacts to interval. Basal 90 cm is mudstone-dominant; rest of interval sandstone-dominant. The first sandstone bed rests abruptly on mudstone. Sandstones are very fine grained, bioclastic (some with whole shells preserved - usually found in the basal parts of sandstone beds). Sandstone-rich interval consists of a series of fining-up beds, 20-40 cm thick: basal erosion surface overlain by bioclastic sandstone grading up into very fine grained sandstone and, in some beds, grading up into argillaceous sandstone in upper few centimetres of the bed. The two coarsening-upward units are: 2127-2129.5m and 2129.5-2134 m.
2134-2134.9 m	Sandstone: Bioclastic, very fine to fine grained sandstone. Possibly 5 beds, 12-20 cm thick. Bioclasts tend to be concentrated at bases of each bed. Rests abruptly on underlying mudstone-dominant interval.
2134.9-2136 m.	Mudstone: Dark grey, silty to sandy. Progressively less sandy/silty down-

section. Load deformation is common. Abundant yellowish white calcite nodules.

Wincan et al Wembley 8-9-72-7W6
Core 1: 2076.4-2094.4 m Rec. 17.15 m 15 boxes Full diameter
Examined 13 February 2002

CHARLIE LAKE FM

2076.4-2077.53 m Dolostone: light grey with slight yellowish tint. Very finely crystalline. Sandy in upper part. Some clay partings. Some laminae. Abrupt, styolitic basal contact.

HALFWAY FM

2077.53-2085.33 m Sandstone: fine grained. Extensively dolomitized but of varying intensity - in places very widespread, in others only minor - seen as light grey patches, layers and large areas; commonly follows cross bedding. Medium to high-angle cross bed set. Abrupt basal contact..

2085.33-2086.33 m Sandstone: fining-up bed. Abrupt basal contact overlain by fine grained, horizontally bedded sandstone grading up into interlaminated sandstone and mudstone in upper 15 cm.

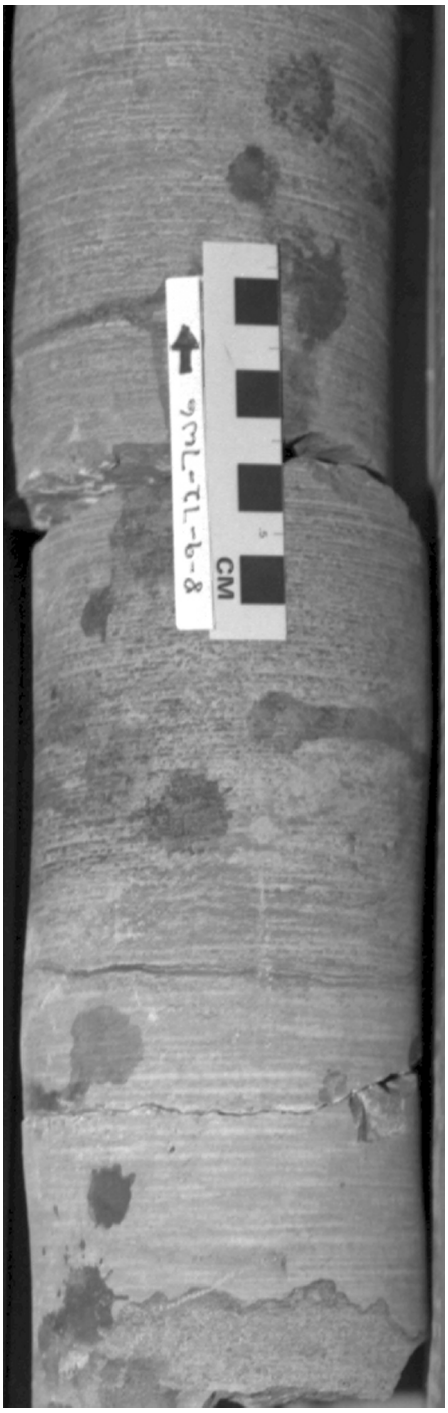
DOIG FM

2086.33-2089.03 m Sandstone-mudstone: Lenticular to very thin beds of very fine grained sandstone intercalated with mudstone. Some vertical and horizontal burrows. Some bed loading structures. Gradational basal contact

2089.03-2093.45 m Coquinal sandstone: consists of several fining-up beds, with argillaceous sandstone capping some beds.

NOTE: possible major erosion surface at 2085.33 m

8-9-72-7W6

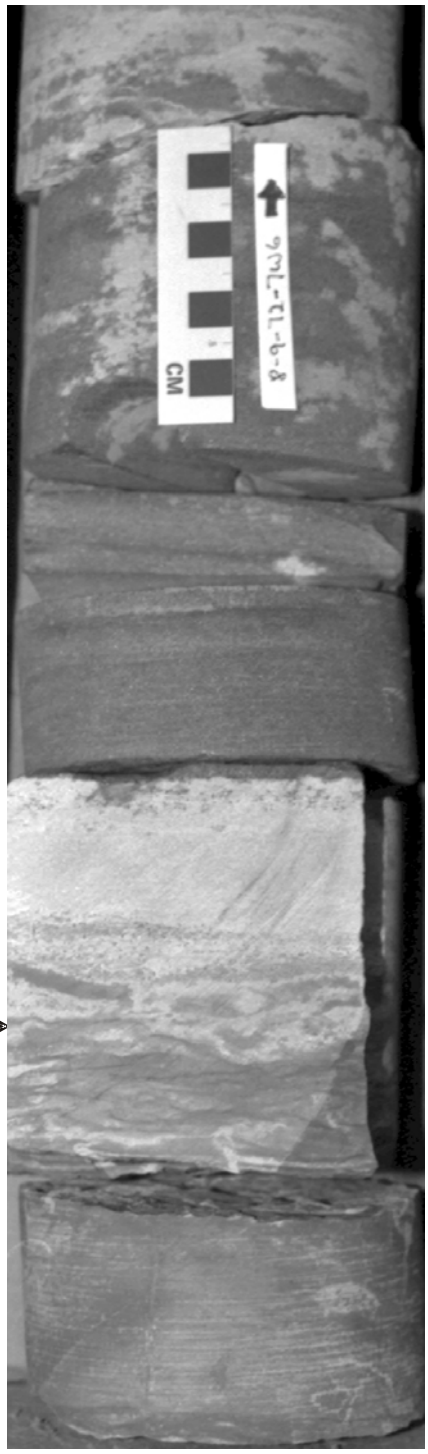


CHARLIE
LAKE FM

2077.53 m

HALFWAY FM

8-9-72-7W6

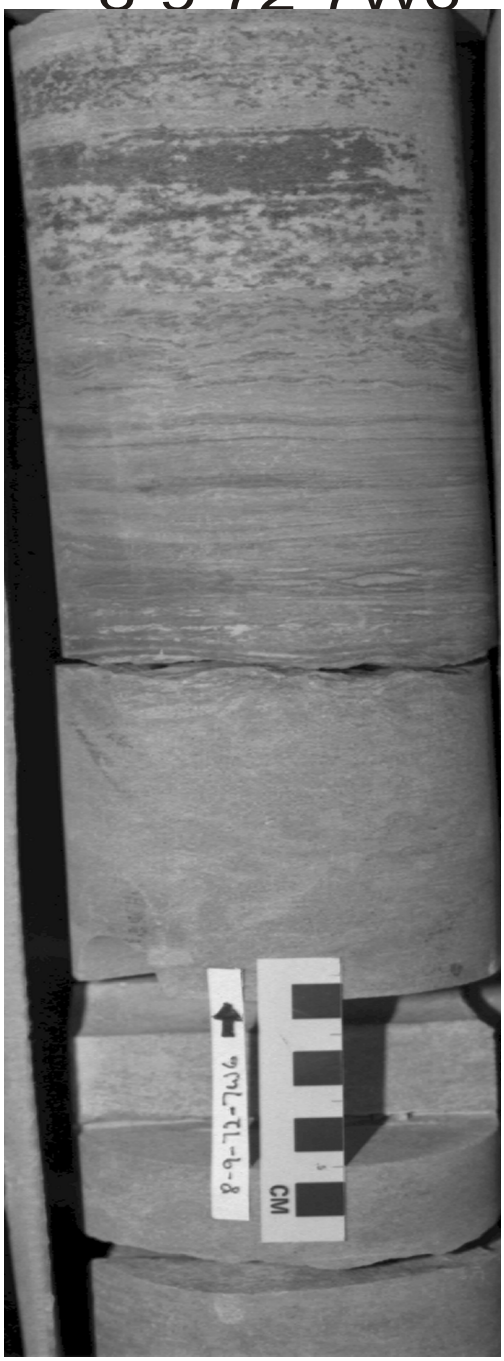


HALFWAY FM

2086.33 m

DOIG FM

8-9-72-7W6



Dolomitized upper Halfway Fm

PCP et al. Dimsdale 16-10-72-7W6
Core 1: 2166.6-2184.9 m
Rec. 18.3 m. 13 boxes. Full diameter.
Beds dip about 30 degrees relative to horizontal axis of core. All measurements are vertical and not adjusted for dip.
Examined 27/28 July 1999

HALFWAY FM

2166.6-2169.5 m	Sandstone: fine to medium grained. Brownish grey. Mottled due to incipient development of carbonate cement. Planar crossbeds. Basal 50 cm rich in coarse grains and well defined planar crossbeds. Rests erosionally on underlying strata.

DOIG FM

2169.5-2172.24 m	Interbedded mudstone-sandstone: Thin to medium beds of very fine grained, silty sandstone and dark grey mudstone. Difficult to see internal sedimentary structures due to un-slabbed nature of core. No bed deformation seen. Appears to be gradational with underlying strata.
2172.4-2179.5 m	Sandstone: very fine grained; brownish grey; dolomitic. Multiple beds, 15-50 cm thick; at least 11 beds possibly more. Base of many beds contain small to large clasts of reddish brown mudstone and/or fragments of thin-walled shells. Beds appear to be erosionally based. Internal sedimentary structures not readily apparent. Lowermost bed rests erosionally on underlying strata.
2179.5-2180.75 m	Interbedded sandstone-mudstone: Dark grey mudstone beds a few mm to 2 cm thick interbedded with 2-8 cm thick beds of very fine grained, planar and current-ripple laminated sandstone. Rapidly gradational with underlying strata.
2180.75-2-2183.02 m	Shelly sandstone: very fine grained; brownish grey. Rich in bivalve debris. Possibly consists of only two beds. Lowest bed about 38 cm thick, the upper 6 cm of which consists of laminated mudstone. Both beds erosionally based.
2183.02-2184.6m	Mudstone: dark grey to black. Massive appearance. At about 2284 m there is a zone rich in anhydrite nodules.

NOTE: possible major erosion surface at 2169.5 m

PCP et al Wembley 6-16-72-7W6
Core 1*:* 2078-2096 m.
Rec. 18 m. 17 boxes. Full diameter.
8th December 1998

CHARLIE LAKE FM

2078-2079.25 m	Anhydrite: light to medium grey. Massive to crudely bedded. Locally brecciated.
2079.25-2080 m	Anhydrite-mudstone: complexly interbedded to brecciated reddish brown mudstone and anhydrite. Some load deformation.
2080-2080.25 m	Anhydrite: finely laminated to brecciated. Upper contact gradational; lower contact is abrupt.

NB: interval 2078-2080.25 m has a distinct "forked" gamma-ray log trace.

2080.25-2082.5 m	Mudstone-anhydrite: reddish brown mudstone; light grey/yellowish grey anhydrite. Mudstone is dominant lithology. Complexly brecciated/disrupted fabric.
2082.5-2083.2 m	Sandstone-mudstone: interbedded to interlaminated. Interval predominantly calcareous, very fine grained sandstone. Load deformed near top of interval. Gradational base and top.
2083.2-2087.2 m	Limestone/Dolomitic limestone: Micritic, sandy. Load deformed. Anhydrite bed present between 2083.9-2084.9 m.
2087.2-2088 m	Limestone: coarse, undulose laminae (?stromatolites)

HALFWAY/DOIG FM

2088-2092 m	Sandstone: medium grey; fine grained. Cross bedded. Some convoluted beds in upper 50 cm. Appears to consist of several beds - based on presence of several abrupt, planar surfaces. Abrupt basal contact.
2092-2096 m	Coarsening-upward succession: grades up from thin sandstone beds and laminae interbedded with thin mudstone beds/layers into thicker bedded sandstone. Latter beds have argillaceous zones at top of each bed. Ripple cross laminae in lower 1 m, planar laminae and load deformation structures in upper part of interval.

NOTE:
Top of Doig Fm, based on log pick, would be at 2094 m, which corresponds approximately to where mudstone interbeds decline in the coarsening upward interval (2092-2096 m) of the core. Possible major erosion surface at 2092 m.

PCP et al Wembley 7-16-72-7W6
Core 1*:* 2084-2099 m. Rec .18 m. 7 boxes. Full diameter.
9th December 1998

DOIG FM

2084-2087 m — Mudstone: Dark grey. Silt laminae and a few 2-15 cm thick beds of very fine grained sandstone. A few calcite nodules. Basal 25 cm marked by several thin (1-5 cm) sandstone beds.

2087-2097.6 m — Sandstone: very fine to fine grained. Basal 20-25 cm transitional with underlying mudstone and consists of interbedded sandstone-mudstone, erosionally overlain by a series of fining-up beds 40-50 cm thick.

Fining-up beds: basal erosion surface overlain by few cm of shelly sandstone or sandstone rich in calcite nodules (?reworked), grading up into massive or finely laminated sandstone. Cosets of low-angle intersecting laminae (probably HCS) A few beds are capped by 2 to 5 cm of argillaceous material. There are at least 8 beds. Uppermost bed has a prominent bioclastic basal zone.

2097.6-2099 m — Mudstone: dark grey. Massive to finely laminated. Upward increase in silt/sand content.

PCP Wembley 8-19-72-7W6
Core 1*:* 2098-2116.2 m. Rec. 15.8 m. 14 boxes. Slabbed.
9th December 1998

CHARLIE LAKE

2098- 2098.23 m — Anhydrite: light grey. Fine to medium laminae. Basal 4 cm has contorted laminae. Abrupt basal contact.

2098.23-2099.1 m — Mudstone: reddish brown , mottled with light grey patches of anhydrite/dolostone. Disrupted fabric. Abrupt, load deformed (small scale features) basal contact.

2099.1-2099.19 m — Anhydrite: light grey. Coarse laminae. Abrupt base and top.

2099.19-2099.32 m — Dolostone: yellowish grey with light grey patches. Vaguely laminated. Mostly appears massive. Micritic. Abrupt base and top.

2099.32-2099.7 m — Anhydrite: light grey with a patch of reddish hued anhydrite in mid-part. Massive. Abrupt base.

2099.7-2099.81 m — Interlaminated dolostone-anhydrite: Coarse laminae. Gradational base.

2099.81-2101.01 m — Dolostone: yellowish grey with patches/lenses of light grey (possibly anhydrite). Appears to be brecciated in upper half (clast-like features). Abrupt base - separated from underlying beds by 2 mm thick argillaceous layer.

2101.01- 2101.91 m — Dolostone: light grey. Contains small to large patches/nodules of anhydrite. Disrupted fabric. Some remnants of crude bedding/laminae. Abrupt basal contact.

2101.91-2102.48 m — Dolostone (possibly anhydrite): coarse undulose laminae (?stromatolites). Scattered throughout are 2 cm thick beds of dolomicrite. Abrupt basal contact.

2102.48-2103.9 m	Dolostone: micritic. Mostly a disrupted fabric with scattered, thin (2-5 cm) beds of dolomicrite. Thin seams and styolites of anhydrite. Abrupt basal contact.
2103.9-2104.15 m	Dolostone: coarse, undulose laminae (?stromatolites). Abrupt basal contact.
HALFWAY FM	
2104.15-2105.15 m	Sandstone: light to medium grey. Very fine grained. Cross bedded - commonly highlighted by incipient calcite cement. Basal contact not preserved but lithological contrast with underlying bed suggests abrupt contact.
2105.15-2106.33 m	Sandstone: light grey. Massive to vaguely cross bedded.. Large (up to 3 cm long) rounded carbonate clasts in lower half. Uppermost bed is argillaceous. Basal contact is abrupt and rests on a thin clay seam.
2106.33-2108.58 m	Sandstone: There are at least five horizons of carbonate-clast-bearing sandstone separated by very fine grained sandstone - this suggests at least 5 depositional units are present although the boundaries between individual beds are difficult to identify. Some anhydrite nodules present near base of interval. Basal contact is erosional.
DOIG FM	
2108.58-2113.86 m	Mudstone: mudstone grading up into interbedded mudstone-sandstone. Planar laminae dominant structure. Some bed loading.
2113.86 - 2116.2 m	Missing core

NOTE: possible major erosion surface at 2108.58 m

PCP et al Wembley 6-21-72-7W6

Core 1: 2037 - 2055.35 m Rec. 18.35 m. 16 boxes Full diameter

Examined 18th November 2002

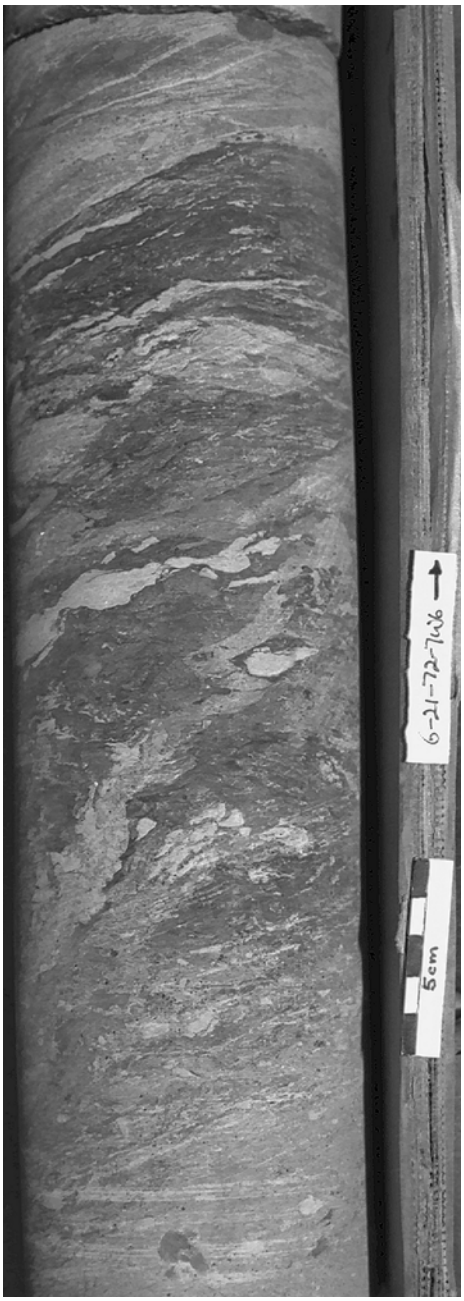
Log/core depths appear to be mismatched by about 1 m. Equivalent log depths are 2038-2056.35 m

CHARLIE LAKE FM	
2037-2037.32 m	Dolostone: light to medium grey. Planar laminae throughout with a few clay laminae, especially common in basal 2 cm. Abrupt basal contact.
2037.32-2037.72 m	Dolostone: light grey. Appears to be brecciated.
2037.72-2037.89 m	Mudstone: brick-red. Dolostone clasts (?) In upper 10 cm. Gradational inot overlying beds. Abrupt, uneven basal contact coated with clay laminae.
2037.89-2038.94 m	Anhydrite: creamy white on outer core surface; light grey on fresh surface. Massive except in basal 15-20 cm where there are fine laminae and contains several coarse laminae of red mudstone. Gradational basal contact.
2038.94-2039.37 m	Mudstone: brick-red. Dolomite mottling. Abrupt basal contact.
2039.37-2039.43 m	Anhydrite: abrupt basal contact.
2039.43-2039.61 m	Brick-red mudstone: abrupt basal contact.

2039.61-2039.69 m	Anhydrite: abrupt basal contact
2039.69-2039.88 m	Mudstone: brick red to pale green. Red colour appears to be replacing green colour. Lenses or clasts of anhydrite. Abrupt basal contact.
2039.88-2040 m	Interbedded anhydrite and brick-red mudstone: abrupt basal contact.
2040-2041.1 m	Mudstone: brick-red. Scattered lenses of dolomite.
2041.1-2041.38 m	Dolostone interbedded with red mudstone: Abrupt basal contact.
2041.38-2043.38 m	Mudstone: brick-red. Dolomite mottling. Short intervals of highly dolomitic mudstone, especially in basal 30 cm. Basal contact appears to be gradational.
2043.38-2043.71 m	Sandy dolostone: Abrupt basal contact.
2043.71-2045.93 m	Dolostone: varies from light to medium grey. Fine to coarse laminae - probably stromatolites. Clay laminae throughout but especially abundant in basal 5 cm. Abrupt basal contact.
HALFWAY FM	
2045.93-2050.55 m	Sandstone: predominantly fine grained with medium to coarse grained, locally granular to small pebbles in lower 50 cm. Consists of a series of fining-up beds; 30+ cm thick. Mostly massive with cross beds in upper1.5 m. Abrupt basal contact.
DOIG FM	
2050.55-2055.35 m	Interlaminated to interbedded sandstone-mudstone: medium to dark grey. Very fine grained sandstone. Beds up to10 cm thick. Fine laminae are common. No signs of bioturbation.

NOTE: possible major erosion surface at 2050.55 m.

6-21-72-7W6



Mottled mudstone in the Charlie Lake Fm

PCP Grand Prairie 6-31-72-7W6
Core 1*:* 2040-2054 m. Rec. ? 10 boxes. Slabbed
Core 2*:* 2054-2064 m. Rec. 10 m. 7 boxes. Slabbed
Corrected to log depths: Core 1: 2035-2050 m Core 2: 2051-2061 m
Examined 9th December 1998

Log depth measurements:

CHARLIE LAKE	
2035- 2037 m	Mudstone: reddish brown. Contains two anhydrite beds, one at top of interval (10 cm thick) with a diffuse basal contact and the second (about 10 cm thick) at about the mid-point with a microfaulted basal contact. Mostly has a disrupted fabric, with some fine laminae preserved locally. Mottled look due to small nodules/patches of dolomite/anhydrite. Base of interval is abrupt.
2037-2037.15 m	Anhydrite: massive in upper two-thirds, coarsely laminated in rest. Abrupt base and top.
2037.15-2039.4 m	Dolostone: some minor anhydrite. Mixture of thinly bedded dolomicrite and finely laminated dolostone. Abrupt basal contact.
HALFWAY FM	
2039.4-2040.3 m	Sandstone: light to medium grey; very fine to fine grained. Cross bedded - low angle. Cross beds highlighted by incipient calcite cement. Erosional base.
2040.3-2050 m	Sandstone: light grey, very fine grained. Rich in bioclastic (i.e., shell debris) sandstone in lower 3 m of interval. A few units contain scattered, small (<1 cm) pebbles. Some beds contain small micritic carbonate clasts. Some moldic porosity in bioclastic sandstone. Commonly difficult to identify individual beds, although in general the interval appears to consist of several fining-up units - some of which grade into argillaceous sandstone. Most beds massive in appearance; a few with faint low-angle cross beds.
DOIG FM	
2050-2051 m	Not cored
2051-2054 m	Mudstone: dark grey. Abundant planar laminae, lenses and very thin (mm-1 cm) beds of silt/very fine sand. Contains a 17 cm thick zone with thicker sandstone beds.
2054-2058.75 m	Sandstone: light grey. Very fine grained. Basal 1.5 m contains beds of bioclastic sandstone and anhydrite nodules. The first bed rests erosionally on underlying strata and is characterized by having small anhydrite nodules in basal 2 cm. Remainder of interval mostly massive or finely laminated, very fine grained sandstone with some calcite/anhydrite nodules scattered throughout. Truncation surfaces and argillaceous zones point to multiple fining-up beds that have the following features (base-to-top): erosion surface, cross laminated sandstone, grading up into mottled argillaceous sandstone.
2058.75-2061 m	Mudstone: dark grey. Laminae of silt and very fine sand. Tendency to become siltier/sandier up-section. A few scattered anhydrite nodules.

PCP Wembley 6-34-72-7W6
Core 1: 1973-1987.8 m Rec. 11.9 m 11 boxes Slabbed
Examined 14 February 2002

CHARLIE LAKE FM

1973-1974.9 m	Dolostone: earthy brown to light tan. Ranges from vaguely disrupted to very thinly bedded. Blotchy appearance in places. Abrupt basal contact - appears to rest on a mm-thick clay layer.
1974.9-1975.4 m	Dolostone-anhydrite: mottled to blotchy appearance. Either dolomite is replacing anhydrite or vice-versa - difficult to tell. Dolostone is similar in colour to overlying bed. Anhydrite is light grey with a slightly glassy appearance. Abrupt basal contact.
1975.4-1975.47 m	Dolostone-sandstone: alternating coarse laminae to very thin beds of dolostone and sandstone. Sandstone beds up to coarse grade. Abrupt basal contact.
1975.47-1976.64 m	Dolostone: light grey. Coarse laminae to very thin beds, with a few thicker beds. Beds commonly separated by clay partings. A 15 cm thick interval of contorted bedding in upper part of unit. Abrupt basal contact.
1976.64-1977.34 m	Anhydrite-dolostone: vaguely bedded anhydrite and dolomitic anhydrite with scattered very thin beds of dolostone (commonly they have a brownish tint).
1977.34-1977.45 m	Dolostone-anhydrite: two beds of brown-coloured dolostone separated by a 1 cm-thick anhydrite bed.
1977.45-1977.63 m	Dololstone: finely laminated to very thinly bedded. Some laminae are undulose or disrupted - could be stromatolites. Transitional basal contact.
1977.63-1979.98 m	Dolomitic mudstone: orange-red colour. Scattered thin beds of anhydrite and dolomitic anhydrite. Highly disrupted fabric. Abrupt basal contact.
1979.98-1984.9 m	Sandy dolostone-dolomitic sandstone: light grey. Fine grained with lenses of coarse grains. Ranges from crudely laminated (?stromatolite) to disrupted bedding.
1984.9-1987.8 m	Missing core

Excel et al Dimsdale 14-36-72-7W6
Core 1: 1971-1989 m
Rec. 18 m 16 boxes Full diameter
Examined 18th November 2002

Cored entirely in the lowermost Charlie Lake Fm

General observations:
1. Bulk of the Charlie Lake beds consist of maroon to brick-red dolomitic mudstone interbedded with units of dolostone (commonly stromatolitic) and one thin bed (5-8 cm thick) of anhydrite.

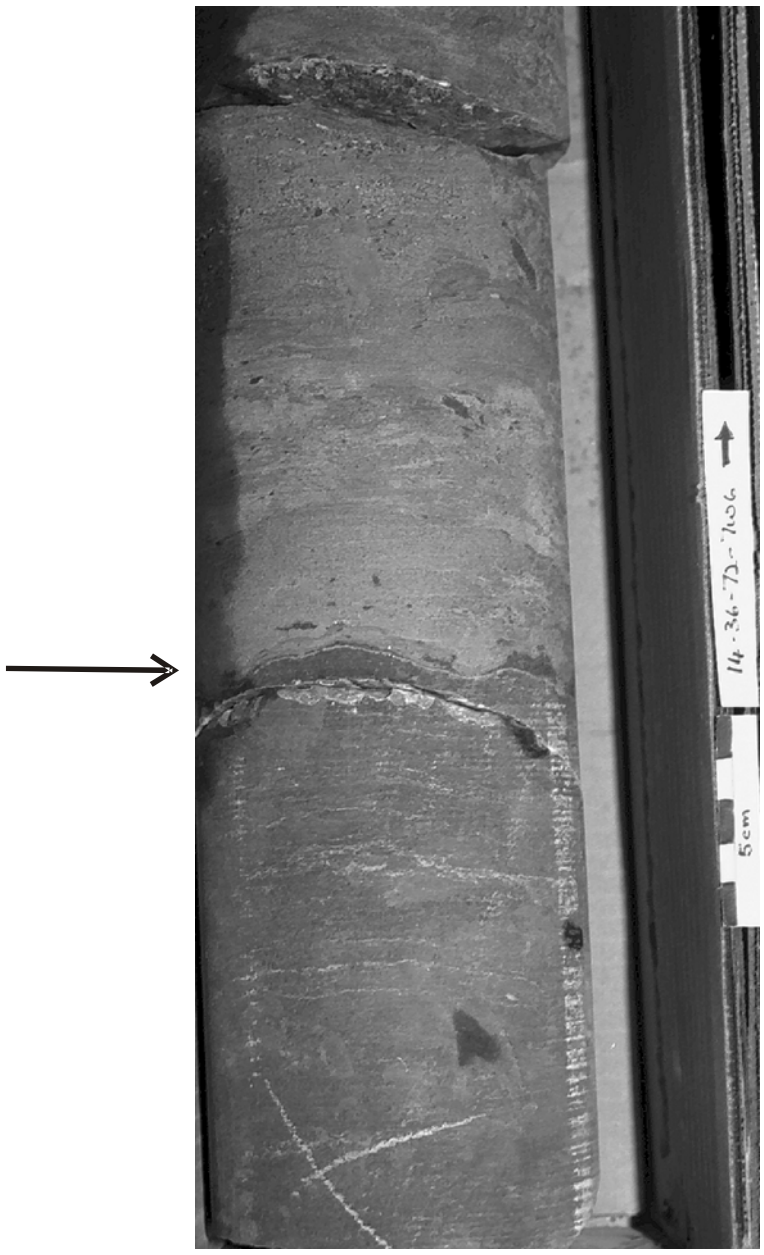
At approximately 1975.85 m there is a bed of red mudstone grading up into fractured/brecciated dolostone and overlain abruptly by stromatolitic dolostone. The brecciation/fracturing appears to be a paleosol-like fabric.

2. The basal unit of the Charlie Lake Fm consists of two facies: i) a lower, brownish grey stromatolitic dolostone, and b) irregularly bedded sandy dolostone resting abruptly on underlying stromatolitic dolostone and abruptly overlain by brownish grey dolomitic mudstone, which grades up into red mudstone.

14-36-72-7W6

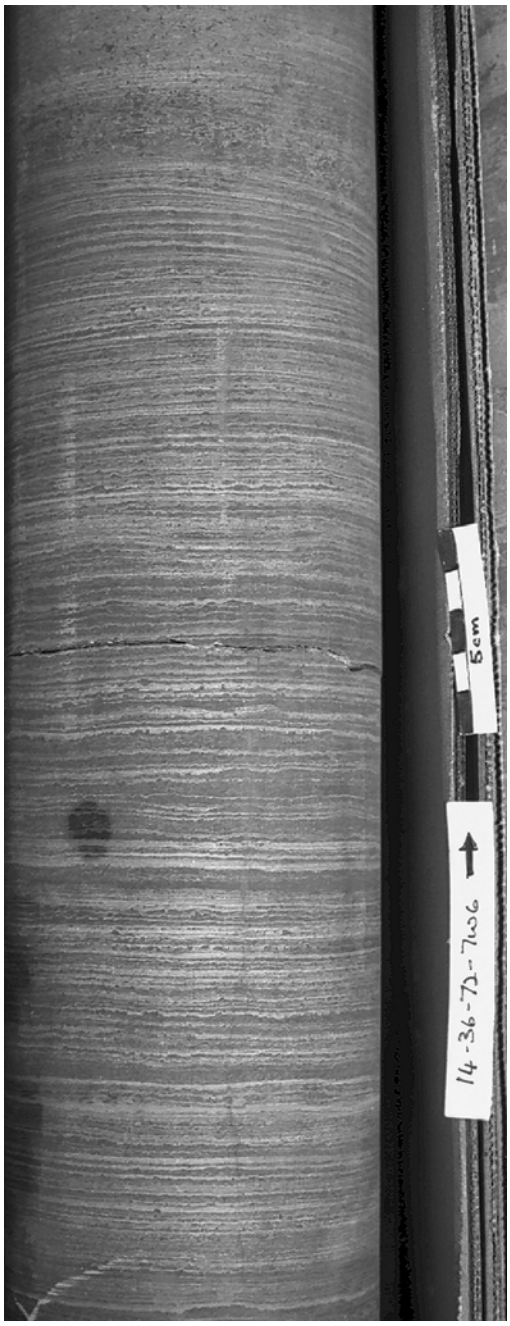
Brecciated mudstone in the Charlie Lake Fm - possibly a paleosol.

14-36-72-7W6



Top of basal unit in the Charlie Lake Fm -

14-36-72-7W6



Stromatolites in the basal of the Charlie Lake Fm -

14-36-72-7W6

Upper part of the basal Charlie Lake unit

Colonial Wembley 6-4-72-8W6
Core 1: 2292.2-2299.6 m
Rec. 7.2 m. 7 boxes. Full diameter core.
Examined 2nd September 1999
Core 2: 2299.6-2317.8 m
Rec. 18.2 m. 16 boxes. Full diameter core
Core 3: 2317.8-2335.5 m
Rec. 17.4 m. 16 boxes. Full diameter
Cores 2 and 3 examined 31st July 2001.
Core 4: 2335.2-2349 m
Rec. 13.8 m. 13 boxes. Full diameter.
Core 5: 2349-2367.2 m
Rec. 18.2 m. 17 boxes. Full diameter
Cores 4 and 5 examined 23rd August 2001

Core depths may be about 1.4 m deeper than log depths.

CHARLIE LAKE FM

2292.2-2293.63 m Anhydrite: brownish grey. Fine to coarse, undulose laminae and a few 1 cm-thick beds. Abrupt basal contact.

2293.63-2297.18 m Breccia: brownish grey in upper part grading down into brick-red colour. Unsorted clasts of mudstone and anhydrite in a red mud matrix. Clasts are unoriented and range in size from a few mm up to at least 10 cm long. There is no internal fabric to indicate if multiple beds are present, therefore could be a single event deposit.

2297.18-2297.45 m Anhydrite-mudstone: brownish grey colour. Thin to medium beds of anhydrite separated by thin argillaceous beds. Uneven bedding planes in lower 10 cm with mildly brecciated beds in upper part - i.e., beds still distinguishable. Abrupt basal contact.

HALFWAY FM

2297.45-2299.67 m Sandstone: fine to coarse grained. Brownish grey. Mottled appearance due to incipient carbonate cement. Multiple beds of planar laminated to low angle, planar cross bedded sandstone. A thin zone of climbing ripples about 50 cm below top of interval. Base of each bed is abrupt and planar - probably erosional (?reactivation surface perhaps). Base of interval not preserved but facies change to underlying unit is abrupt.

DOIG FM

2299.67-2299.89 m Sandstone: very fine to fine grained. Irregular wisps and laminae of clay - especially common in basal 1 cm. Possibly burrow mottled. Basal contact not well preserved.

2299.89-2307 m Coarsening-upward succession:

2299.89-2302.36 m: predominantly very fine to medium grained sandstone. Top 6 cm contains a mudstone-clast-bearing sandstone erosionally overlying the cross laminated sandstones (very low angle cross beds) that dominate this interval. Some small patches of replacement carbonate. Cross bedded sandstone underlain by about 50 cm of bioturbated, fine grained sandstone, in turn underalin by the

basal 20 cm of interlaminated clay-sand
2302.36-2307: Mudstone with silt laminae grading up into finely interlaminated mudstone and sandstone.
Some disruption of fabric by calcite veins/patches; e.g. at about 3304 m.

2307-2311.2 m Coarsening-upward succession:
Predominantly silt-laminated mudstone with a few very thin beds of very fine grained sandstone. Overall upward-increase in sandstone content. Several zones of soft-sediment deformation. Laminae mostly planar with a few wave-modified current ripples. Abrupt basal contact marked by a pebble lag on underlying strata (ISPG photographs 4726-1 to 3; Corel file: /Wembley 0604728W6)

2311.2-2319.4 m Coquinal sandstone: Multiple beds of coarse bivalve debris in a fine sand matrix. Abundant moldic porosity. Many of the beds grade up from a coqinal sandstone into a fine grained sandstone with only scattered bioclasts. Beds have erosional-bases. Beds range up to 1 m thick; most are 30-60 cm thick. Cross bedded. A few beds contain scattered small pebbles. Some replacement carbonate scattered throughout. Upper 40-50 cm is mostly sandstone (ISPG photographs 4726-4 and 5; Corel file /Wembley/0604728W6b). Interval rests erosionally on underlying sandstone.

2319.4-2325.9 m Sandstone: light grey. Fine grained. Quartz arenite. Multiple beds indicated by presence of scattered clay laminae and a few well defined erosional surfaces. However, for the most part difficult to distinguish individual beds. Vaguely defined low-angle cross bedding. In upper 1 m there are scattered coarse sand grains and mm-size mud clasts. Base of interval rests abruptly on underlying strata.

2325.9-2328.4 m Coquinal sandstone: appears to be one bed (!!). Oriented shell debris indicates cross beds. Moldic porosity. Patches of crystalline calcite replacing original constituents. Matrix of fine to medium sand. Rests abruptly on underlying bed.

2328.4-2331.95 m Coarsening-upward succession:
Upper 1.42 m consists of beds of very fine grained sandstone with the basal bed of this interval resting erosionally on mudstone. Basal bed is 98 cm thick, and contains deformed fine laminae; overlain by load deformed very thinly interbedded sandstone and mudstone.
Lower 2.13 m: interlaminated to very thinly interbedded mudstone and sandstone. Sandstone beds tend to become more abundant and thicker up-section. Abundant small-scale load deformation. A few horizontal burrows, especially in basal 50 cm. Basal mudstone rests abruptly on underlying sandstone.

2331.9-2336.9 m Sandstone: very fine to fine grained. Difficult to determine if multiple or single bed. Low angle cross laminae. Slightly more argillaceous in lower 2 m - also present are wispy clay seams and laminae. Scattered nodules of replacement carbonate. Gradational change from underlying interval.

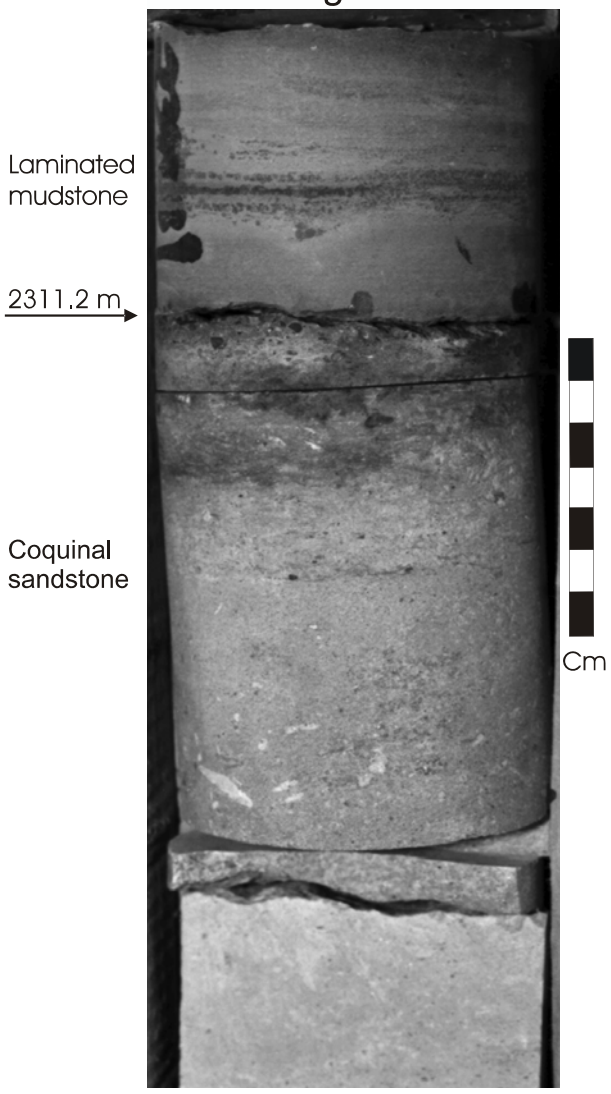
2336.9-2338.85 m Interbedded sandstone-mudstone: Predominantly very fine grained sandstone, especially lowermost 1.2 m which entirely sandstone. Sandstone beds are abrupt-based.

2338.85-2341.7 m Intercalated units of sandstone and sandstone-mudstone. Sandy units

	either single or multiple beds. Sandstone-mudstone intervals consist of very thin beds of very fine grained sandstone separated by mudstone: soft sediment loading of sandstone beds is common. Possibly some burrows in the sandstone-mudstone units.
2341.7-2347 m	Mudstone: with abundant laminae and very thin beds of coarse siltstone-very fine grained sandstone. Interval tends to become sandier up-section. Abundant horizontal burrows and load deformed beds. Rapidly gradational with underlying unit.
2347-2349 m	Sandstone-mudstone: similar to overlying units. Highly load deformed.
2349-2350.2 m	Mudstone: laminae and very thin beds of coarse silt/very fine sand. Abundant load deformation.
2350.2-2354.6 m	Sandstone with mudstone intercalations: cf, units above. Severally deformed beds - some show complete mixing of sandstone/mudstone to give a pseudo-breccia appearance. Horizontal burrows are common. Basal contact rapidly gradational.
2354.6-2361.9 m	Sandstone: very fine grained. Contains abundant, scattered to locally concentrated mudstone clasts. Clasts are rounded, spherical to ellipsoidal, generally less than 2 cm long, although there are a few 2-4 cm in diameter. Bedding is oversteepened. Difficult to distinguish individual beds but the presence of some abrupt bedding surfaces and concentrations of clasts suggests multiple beds. Vaguely cross bedded in places. Photos of mud clasts at about 2355.5-2356 m. Basal contact is abrupt and load deformed (ISPG Photos 4726-40 to 44; Corel file /Wembley/0604728W6c and 0604728W6d)
2361.9-2367.2 m	Mudstone: fine laminae and scattered very thin beds of coarse silt/very fine sand. Beds are undeformed.

NOTE:
Possible major erosion surface at 2299.67 m
ATSB from 2311.2 to 2361.9 m
From about 2330-2345 m this is an overall coarsening upward interval.

6-4-72-8W6
Doig Fm



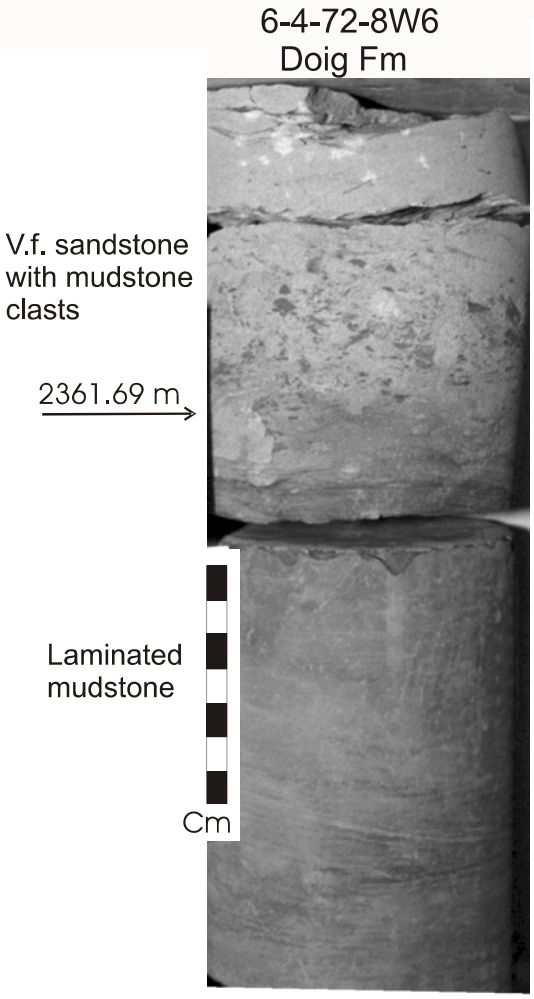
Coquinal sandstone
in the Doig Fm at
about 2317 m

6-4-72-8W6
Doig Fm

Doig Fm: 2355.5 to 2356 m:
v.f. ss with mudstone clasts

6-4-72-8W6
Doig Fm

Doig Fm: 2355.5 to 2356 m:
v.f. ss with mudstone clasts


6-4-72-8W6
Doig Fm
V.f. sandstone
with mudstone
clasts
2361.69 m
Laminated
mudstone
Cm

Colonial Shell Wembley 14-8-72-8W6
Core 2: 2319-2337 m
Rec. 18 m. 17 boxes. Full diameter.
Examined 23rd August 2001.

DOIG FM	
2319-2322.7 m	Mudstone: with abundant fine laminae and very thin beds of coarse silstone/very fine grained sandstone. Plane and ripple laminae. Some lenticular beds. Gradational with underlying beds.
2322.7-2323.5 m	Interbedded sandstone-mudstone: Laminae to very thin beds of coarse silstone/very fine grained sandstone intercalated with mudstone. Plane laminae dominant, some ripple laminae. Minor amount of small-scale load deformation.
2323.5-2324.2 m	Mudstone: cf. Above. Abundant soft sedimentary deformation, especially in middle part of interval. Abrupt basal contact (ISPG Photo 4726-36 and 37; Corel file /Wembley/1408728W6)
2324.2-2324.37 m	Sandstone: very fine to fine grained with mud clasts, especially near base of bed. Clasts only a few mm long. Bioclastic debris in lower 12 cm, grading up into sandier upper part. Basal erosional surface. Upper surface is abrupt and has small vertical burrows extending down from overlying mudstone and filled with mud. (ISPG Photo 4726-36 and 37; Corel file /Wembley/1408728W6).
2324.37-2331.9 m	Sandstone: very fine to fine grained. Multiple beds commonly separated by mud laminae or very thin layers of mudstone. More argillaceous and with more mud laminae in upper 50 cm. Small to large (few mm to10 cm) anhydrite nodules (iron stained on outer core surface) present about 1.3 to 1.7 m above base of interval. Mid-way through interval is a 1.5-2 m thick interval of relatively "clean" sandstone, with little argillaceous material. Sedimentary structures include fine laminae and some hints of very low angle cross laminae. Small-scale bed deformation, especially where mudstone laminae are more abundant. A few beds that contain bivalve debris. At base of interval there is a medium grained sandstone with mm-long mud clasts and rests erosionally on underlying strata. (ISPG Photo 4626-38 and 39; Corel file /Wembley/1408728W6b)
2331.9-2337 m	Mudstone: fine laminae of coarse silt/very fine sand. A few occurrences of lenticular beds. A few horizontal burrows.

14-8-72-8W6
Doig Fm

Colonial Shell Wembley 5-9-72-8W6
Core 1: 2332-2337.6 m
Near full recovery. 5 boxes. Full diameter core. Well preserved.
Core 2: 2337.6-2355 m
Near full recovery. 12 boxes. Full diameter core. Well preserved.
Examined 19/20 April 1999

DOIG FM	
2332-2336.1 m	Sandstone: very fine grained; light grey. Series of amalgamated beds 0.5 to 1.2 m thick. Beds generally grade up from a basal bioclast-rich zone into low-angle cross bedded sandstone.
2336.1-2337.6 m	Sandstone: light to medium grey; very fine grained; finely laminated. Basal contact not preserved.
2337.6-2338 m	Mudstone: black; blocky to partially fissile. Basal contact not preserved.
2338-2355 m	Sandstone: light grey; very fine to fine grained. Series of thick to very thick beds and a few scattered mm-thick mudstone interbeds. Low angle cross beds are common, with some scattered vertical burrows. A few beds grade up into sandstone with wispy clay laminae - suggestive of fining-upward beds. Some minor load deformation. A few scattered molds of small, thin-shelled bivalves.

A5-9-72-8W6 (2/5-9-72-8W6)
Core 1: 2349-2368 m
Rec. 14.9 m. 8 boxes. Full diameter core. Good preservation.
Examined 19/20 April l999

DOIG FM	
2349-2349.35 m	Sandstone: fine to coarse grains with some granules. Crudely bedded. Abrupt, erosional basal contact.
2439.5-2368 m	Sandstone: light to medium grey; very fine to fine grained with some scattered medium to coarse grained sandstone beds. A number of pyrite-rich horizons, some of which appear to be pyrite-filled vertical burrows. Massive to faintly bedded. A few scattered bivalve molds. Appears to be an interval of amalgamated sandstone beds 50 to 100 cm thick and beds appear to be fining-upward units.

NOTE: both cores from cut in an ATSB

Shell Wembley 14-11-72-8W6
Core 1*:* 2180.4-2187.2 m
Rec. 6.8 m. 6 boxes. Slabbed.
2nd September 1999

CHARLIE LAKE FM

2180.4-2180.94 m	Dolostone-anhydritic dolostone: Very sandy in upper 26 cm, grading down into anhydritic dolostone. Coarsely laminated to very thinly bedded in upper 26 cm - mostly contorted. Dolostone part of interval has coarse, undulose laminae - probably stromatolites. Basal contact not preserved but rapid lithological change suggests an abrupt contact.

HALFWAY FM

2180.94-2181.07 m	Sandstone: brownish grey; very fine grained. Basal contact is abrupt and planar, immediately overlain by a 1 cm thick zone containing medium and coarse grains of white and grey chert. Patches of light grey sandstone may be due to incipient calcite cementation. No internal structures seen.
2181.07-2181.49 m	Sandstone: dolomitic to anhydritic - imparts a slight pinkish tint to rock. Coarsely laminated to very thinly bedded - most of interval has contorted beds. Basal contact appears to be abrupt.
2181.49-2185.96 m	Sandstone: brownish grey; very fine to fine grained with some zones of medium and coarse grains. Consists of a series of stacked, abruptly-based (erosional) units, varying from 8 to 35 cm thick, each bed with the following vertical succession: Basal erosional surface. Thin zone (few mm to 1 cm) with medium and coarse grains of white/grey chert. Planar cross bedded, very fine to fine grained sandstone (thinner beds usually only have one cross bed set; thicker beds may have cosets). Some cross beds have coarse grains. Patches of light grey sandstone may be due to incipient carbonate cementation. Apparent abrupt contact with underlying strata.
2185.96-2187.2 m	Sandstone: minor amount of thin interbeds of mudstone/dolomudstone. Beds few mm to several cm thick . Some bed load structures. Fine, planar laminae common; some ripple cross laminae present - lamination is common where clay laminae present in the sandstone.

NOTE: possible major erosion surface at 2181.07 m

Dome et al. Wembley 8-12-72-8W6
Core 1*:* 2215-2233 m
Rec. 17.2 m. 16 boxes. Full diameter core.
Bedding dips about 10-20 degrees relative to horizontal axis of core.
Measurements are vertical, no adjustment for dip.
Examined 19-20th April 1999; re-examined 2nd September 1999

CHARLIE LAKE FM

2215-2215.44 m	Anhydrite: creamy grey on outer core surface, light grey on fresh surface. Very finely crystalline. Undulose coarse laminae to very thin beds. Abrupt, planar, basal contact.
2215.44-2216.61 m	Breccia: brick red. Calcareous. Unsorted clasts of mudstone and anhydrite in a clay matrix. Most of clasts are <2 cm and are matrix supported. About 81 cm below top of interval there are two 1 cm-thick beds of anhydrite separated by 0.5 cm of red mudstone. Lower 30 cm contains a thick, anhydrite-filled, vertical fracture (1-2 cm thick).
2216.61-2216-66 m	Anhydrite: cf. above. A few seams of red mudstone. Calcareous. Abrupt basal contact.
2216.66-2216.75 m	Calcareous mudstone: brick red. Contains very small (few mm) clasts of mudstone and anhydrite. Subhorizontal to inclined, anhydrite-filled fractures, a few mm to 2 cm thick.
2216.75-2217.01 m	Anhydrite: possibly laminated. Basal contact appears to be abrupt.
2217.01-2218.3 m	Sandstone: light to medium grey; fine grained; anhydritic and/or dolomitic. Appears to contain contorted bedding. An apparent abrupt basal contact.
2218.3-2221.53 m	Dolostone/anhydritic dolostone: Contains fine to coarse, slightly undulose and planar laminae (?stromatolites). A 20 cm thick brecciated bed present about 30 cm below top of interval. Abrupt, planar, basal contact.

HALFWAY FM

2221.53-2222.55 m	Sandstone: brownish grey; medium to coarse grained. Low angle planar cross beds and planar beds. Abundant black chert grains. Abrupt basal contact, probably erosional; overlain by thin zone of granular sandstone.
2222.55-2223.3 m	Sandstone: very fine to fine grained; argillaceous. Medium grey. Coarse, deformed laminae. Interval tends to become sandier up-section. Basal contact appears to be abrupt.
2223.3-2223.83 m	Sandstone: very fine to fine grained. Light grey. Contains clay seams and laminae throughout. Bed loading structures and contorted beds. Transitional basal contact.
2223.83-2227 m	Sandstone: fine to medium grained. Brownish grey. Patches of yellow-grey. Massive to faintly laminated. An apparent transitional basal contact.

DOIG FM

2227-2232.2 m	Sandstone interlaminated /interbedded with mudstone: very thin beds (few mm to a few cm thick) of very fine/fine grained sandstone with a few, scattered, thicker beds (up to 25 cm). Planar and current ripple laminae prevalent sedimentary structures. Minor bed load structures. Interval

tends to become richer in sandstone up-section. One prominent 25 cm sandstone bed contains spherical to tabular mudstone clasts overlying its basal erosion surface.

NOTE:
Possible major erosion surface at 2222.55 m.
Doig/Halfway contact chosen where mudstone becomes less prominent.

Total PCP Shell Wembley 6-15-72-8W6
Core 1: 2259-2277 m
Rec. 18.3 m. 13 boxes. Full diameter.
Examined 27/28 July 1999.

DOIG FM

2259-2261.95 m	Sandstone: light grey; fine grained. Multiple, erosionally-based beds. Some mudstone laminae and interbeds. Massive, vaguely bedded, or finely laminated. Minor bed loading. Basal beds rests erosionally on underlying strata.
2261.95-2265.41 m	Interbedded/interlaminated sandstone-mudstone: 60-70% very fine-grained sandstone. Mostly finely inter-laminated sandstone-mudstone. Predominantly planar laminae with a few isolated very thin beds/lenses of current-ripple laminae, commonly load deformed. A few scattered anhydrite nodules usually <1 cm diameter. Basal 34 cm is highly deformed and rests abruptly on underlying strata.
2265.41-2267.31 m	Sandstone: very fine grained; fine laminae to thin beds. Laminae and very thin beds of mudstone. Predominantly planar laminated; some current-ripple laminae. Minor bed loading. A few small (<3 cm) anhydrite nodules.
2267.31-2269.69 m	Interbedded/interlaminated mudstone-sandstone. About 50% of each lithology. Basal 30 cm predominantly black mudstone. Similar to overlying interval but with no deformation.
2269.69-2274 m	Shelly sandstone: very fine to fine grained; light grey. At least seven beds, 7-45 cm thick. Typical vertical succession in each bed is as follows: erosional base - a few cm of shell-rich sandstone - grades up into mottled, massive sandstone with scattered thin-walled shell debris - upper part of bed may contain irregular clay laminae (may not be present). Basal bed rests erosionally on underlying strata.
2274-2274.63 m	Mudstone-siltstone: lenses and thin beds of siltstone interbedded or interlaminated with mudstone. Dark grey to black. Load deformed strata.
2274.63-2276.45 m	Sandstone: argillaceous; very fine grained. Thin to medium sandstone beds separated by thin mudstone beds or laminae. Load deformation structures are common. Possibly may contain a few deformed vertical burrows. Basal bed is load deformed into underlying mudstone.
2276.45-2277 m	Mudstone: dark grey to black. Fine laminae of silt/very fine sand. Minor mm-scale bed loading of silt lenses.

Colonial et al Wembley 7-16-72-8W6
Core 2: 2275-2289.4 m. Rec. 13.4 m. 12 boxes. Full diameter
Core 3: 2289.4-2307.4 m. Rec. 17.5 m. 16 boxes. Full diameter.
Beds have about a 20 degree dip relative to horizontal axis of core.
Examined 1st August 2001.

DOIG FM

2275-2275.68 m:	Coquinal sandstone: small to large bioclasts (mostly bivalves) in a fine to medium sand matrix. Abrupt basal contact. Some sandier layers in upper 30 cm - these plus clast orientation indicate cross bedding is present.
2275.68-2287.18 m	Sandstone: multiple beds of fine to medium grained sandstone, with some beds containing highly comminuted bioclastic material, either as scattered or highly concentrated occurrences (especially in one bed at about 2284.68 m - which is a true coquinal bed 40 cm thick). Minor moldic porosity where bioclasts are present. Some styolites. Estimate beds are 20-30 cm thick, but difficult to distinguish individual beds. Some beds have cross bedding, others are planar laminated. Beds have erosional bases.
2287.18-2287.46 m	Sandstone-mudstone: 1-4 cm thick beds of very fine to fine grained sandstone separated by irregular mud laminae a few mm-tick. Unevenly bedded. No visible sedimentary structures. Base of interval appears to be a rapid transitional change.
2287.46-2301.81 m	Sandstone: fine grained. Multiple beds, 20-50 cm thick commonly separated by either thin laminae and very thin beds (few mm to a few cm thick) of mudstone, or muddy sandstone. Beds vary from massive to finely laminated - latter commonly show intense soft sediment deformation. Scattered nodules of replacement carbonate. Basal contact of interval is a steeply inclined erosional surface .
2301.81-2301.91 m	Sandstone: Burrowed (vertical burrows) very fine grained sandstone. Abrupt basal contact.
2301.91-2301.92 m	Mudstone: irregular thickness.
2301.92-2302.29 m	Sandstone: argillaceous, very fine grained with wispy laminae of clay. Possibly deformed but difficult to see internal structures. Abrupt basal contact.
2302.29-2303.61 m	Sandstone-mudstone: thin beds of very fine/fine grained sandstone separated by laminae and very thin beds of mudstone. About 70% sandstone. Most bed contacts and much of the internal bed fabric has been load deformed. Some possible horizontal burrows in the mudstone beds.
2303.61-2304.31 m	Mudstone: fine laminae (some of which are deformed) of coarse silt/very fine sand.
2304.31-2304.68 m	Interbedded sandstone-mudstone: About 60% very fine grained sandstone in very thin to thin beds. Abundant load deformation structures. Transitional into overlying bed; abrupt basal contact. Some horizontal burrows in the mudstone beds.

2304.68-2305.39 m Sandstone: thin to thick beds of very fine grained sandstone separated by thin mudstone or muddy sandstone layers. Laminae seen in some sandstone beds.

NOTE: comparison with logs from adjacent wells indicates that the base of the "anomalously" thick Doig sandstone (ATSB) is at either log depth 2201m or 2606 m, the within the missing part of the core.

Colonial et al Wembley 10-17-72-8W6
Core 1: 2280-2298 m
Rec. 16.5 m 15 boxes. Full diameter
Core 2: 2298-2316 m
Rec. 18 m. 16 boxes. Full diameter.
Examine 23rd August 2001

Examined boxes 11 to15 of core 1, which is approximately 2291.44 to 2298 m (includes the presumed missing part of core, at base of core).

NOTE: the core depths and log response do not appear to correspond, especially when compared with similar log response and core descriptions from nearby wells, e.g. 14-8-72-8W6, 6-15-72-8W6 and 6-29-72-8W6). Based on core depths the corresponding log depths are 4.5 to 5 too shallow relative to the core depths; e.g. the prominent log change at 2301 m appears to correspond to log depth 2305.5 m
Core depths are given below.

DOIG FM

2291.44-2295 m Interbedded mudstone-sandstone: About 1:1 mudstone/sandstone. Fine laminae to very thin beds (few cm) of coarse siltstone/very fine grained sandstone interbedded with similarly thick beds of mudstone. Plane and ripple laminae are common. Small-scale bed loading is common. Gradational change from underlying interval.

2295-2296.17 m Interbedded sandstone-mudstone: approximately 80% very thin to thin beds of very fine grained sandstone separated by laminae and thin layers of mudstone. Plane and ripple laminae are common. Some soft sediment deformation. Gradational with under/overlying intervals.

2296.17-2296.5 m Mudstone-sandstone: about 1:1 ratio. Cf., as above.

2296.5-2298 m Presumed missing part of core.

2298-2299.23 m Mudstone-sandstone: as above. Some anhydrite nodules with iron stain on outer core surface - present near base and in upper third of interval. Abrupt basal contact marked by about 1-2 cm of phosphatic debris (ISPG Photo 4726-45 and 46; Corel file /Wembley/1017728W6)

2299.23-2305.5 m Sandstone/argillaceous sandstone: Upper 30 cm consists of fine to coarse grained sandstone with scattered small (few mm) mudstone clasts . Bulk of interval consists of argillaceous, very fine grained sandstone with some mudstone interlaminae. Variable amounts of clay content - tends to be

	less argillaceous in top 1-1.5 m. Irregularly and thinly bedded. Abundant small-scale load structures. Internal stratification not readily seen. Scattered anhydrite nodules. Base of interval marked by a 5-7 cm thick bed of medium to coarse-grained sandstone containing small (few mm) mud clasts. This bed also has some replacement anhydrite. Basal contact is abrupt and probably erosional, and is load deformed. (ISPG Photo 4726-47; Corel file /1-17728W6b)
2305.5-2316 m	Mudstone: fine laminae and very thin beds of coarse siltstone/very fine grained sandstone. Approximately 20-30% silt/sand. Some lenticular beds. Scattered to locally concentrated small nodules of .anhydrite. Tendency to become sandier up-section.

Total Wembley 6-21-72-8W6
Core 1: 2205-2223 m. Rec. 17.8 m. 13 boxes. Full diameter
Core 2: 2223-2241 m. Rec. 17.9 m. 13 boxes. Full diameter.
Core 3: 2241-2254 m. Rec. 12.75 m. 9 boxes. Full diameter.
Examined 1st August 2001.

CHARLIE LAKE FM

2205-2205.34 m	Mudstone: brick red colour. Poorly sorted clasts of anhydrite float in mud matrix. Abrupt basal contact.
2205.34-2205.52 m	Anhydrite: light grey. Finely crystalline. Abrupt, load deformed basal contact.
2205.52-2205.69 m	Mudstone: as above but clasts are smaller. Abrupt basal contact.
2205.69-2205.75 m	Anhydrite: light grey. Abrupt basal contact.
2205.75-2206.13 m	Mudstone: similar to otehr mudstones. Abrupt basal contact.
2206.13-2206.17 m	Anhydrite: as above.
2206.17-2206.2 m	Mudstone: two mudstone beds separated by a 0.5 cm thick anhydrite layer. Abrupt basal contact.
2206.2-2206.35 m	Anhydrite: as above.
22-6.35-2206.45 m	Sandstone: fine to medium grained. Finley laminated to poorly bedded. Small mudstone and/or anhydrite clasts near base of bed. Abrupt basal contact.
2206.45-2206.46 m	Silty mudstone and clay laminae. (ISPG photographs 4726-28 and 29; Corel file /Wembley/0621728W6)
2206.46-2206.51 m	Anhydrite: (ISPG photographs 4726-28 and 29; Corel file /Wembley/0621728W6)
2206.51-2206.525 m	Clay laminae with sand lenses. Abrupt top/base. (ISPG photographs 4726-28 and 29; Corel file /Wembley/0621728W6)

HALFWAY FM

2206.525-2208.12 m	Sandstone: light grey to white. Fine grained, with coarse grains in basal 10 cm; mostly quartz with scattered black grains (?chert). Mottled and banded appearance due to incipient carbonate cement. Banding tends to parallel low angle cross beds. Rests erosionally on underlying strata.

	(ISPG Photographs 4726-30 and 31 of cross beds; 4726-32 and 33 of the basal contact; Corel files /Wembley/0621728W6b and 0621728W6c).
DOIG FM	
2208.12-2210.73 m	Coarsening-up succession: basal 8cm thick mudstone rests abruptly on underlying unit. Rapidly grades up into sandy mudstone, in turn succeeded by argillaceous very fine to fine grained sandstone. Scattered nodules of replacement carbonate or anhydrite. Some nodules occur in local concentrations. Some remnant patches of fine, plane laminae and ripple laminae but mostly appears to be load deformed and possibly bioturbated.
2210.73-2215.75 m	Coarsening-up succession: Basal 1.1 m is mudstone with fine laminae and small lenses of coarse silt. Contact with underlying unit is diffuse. Upper 3.55 m is sandstone-dominant. Beds range from very thin and separated by mud laminae or very thin beds, up to 35 cm thick. Thicker beds are erosionally based and some contain planar laminae or very low-angle cross laminae. A few beds contain small mud-clasts near base of beds..
2215.75-2221.95 m	Coarsening-up succession: similar to overlying interval but with less, and thinner bedded sandstone. Basal bed of interval is a 4 cm thick silty bed with a basal mud-clast (mm-sized clasts) lag deposit. (ISPG Photographs 4726-34 and 35; Corel file /Wemb;ey/0621728W6d)
2221.95-2223.38 m	Sandstone: uppermost 2-5 cm is silty and argillaceous and highly disrupted; rests on coarser grained sandstone. Bulk of interval consists of light to medium grey becoming dark grey at base, medium grained, cross bedded sandstone. Some mottling due to carbonate replacement. Basal contact masked by diagenetic carbonate but marked contrast with underlying bed suggests an abrupt contact.
2223.38-2248.95 m	Sandstone: brownish grey. Fine grained. Incipient mottling/banding by replacement carbonate. Appears to be finely laminated and cross laminated, especially near base of interval. A few zones with argillaceous partings. Difficult to distinguish individual beds. Bedding becomes over-steepened below about 2238.5 m. Below 2247.95 m there are a few thin (<1 cm) mudstone interbeds.
2248.95-2250 m	Sandstone: thin to thick beds of very fine grained sandstone (4-35 cm) separated by mudstone beds (mm-1 cm thick). Over-steepened bedding. Some load deformation - one example of mudballs encased in sandstone at base of a bed.
2250-2250.08 m	Mudstone:
2250.08-2252.28 m	Sandstone: very fine to fine grained, argillaceous. Some clay laminae/wisps within sandstone beds. Over-steepened and some deformed bedding. Scattered occurrences of very small mud clasts (mm-size).
2252.28-2252.41 m	Mudstone: silt lenses/laminae
2252,41-2252.86 m	Sandstone: very fine grained, argillaceous. Appears to contain scattered mud clasts. Mildly deformed - bedding is less over-steepened than overlying units.
2252.86-2253.12 m	Mudstone: silt laminae and disrupted silty beds -due to load deformation. Little to no over-steepening of beds .Near top of interval is a 3 cm thick

bed of sandstone containing mud clasts - however, the clasts could be due to complete overturning and mixing of mud and sand, rather than being erosional clasts.

2252.12-2254 m Silty mudstone-muddy siltstone: poorly defined bedding due to load deformation. Log response for this interval would imply a "clean" sandstone - obviously in error.

NOTE: Correlations with adjacent wells indicates the base of the "anomalously" thick Doig sandstone is below the base of the cored interval, at 2255.5 m log depth.

Possible major erosion surface at 2208.12 m.

PCP Dome Wembley 6-27-72-8W6
Core 1: 2122-2140 m Rec.18 m 16 boxes Full diameter
Core 2: 2140-2157 m Rec. 16.9 m 15 boxes Full diameter
Examined 14 February 2002

CHARLIE LAKE FM

2122-2122.72 m Mudstone: brick red. Brecciated fabric. A 5 cm-thick dolostone bed near top of unit.

2122.72-2125.32 m Dolostone: slightly anhydritic. Light grey. Fine to coarse, uneven to undulose laminae. Some zones of contorted laminae. Scattered very thin beds of mudstone. Laminae could be stromatolites. Abrupt basal contact.

2125.32-2125.76 m Mudstone: brick red. Brecciated fabric.

2125.76-2125.94 m Dolostone-mudstone: thin dolostone beds separated by layers of red mudstone.

2125.94-2126.31 m Mudstone: brownish grey. Brecciated. Contains one 5 cm-thick dolostone bed and several large patches of replacement dolomite with diffuse borders. Abrupt basal contact.

2126.31-2127.76 m Dolostone: light brownish gery. Massive to poorly bedded. Basal 10 cm contains undulose laminae - probably stromatolites. Abrupt basal contact.

HALFWAY FM

2127.76-2132.76 m Sandstone: light brownish grey with lighter toned patches, layers and blobs of dolomitized sandstone. Cross bedded. Predominantly fine grained. Basal 5-7 cm contains coarse grains and granules. Although basal contact is not well preserved appears to rest abruptly on a thin mudstone bed.

2132.76-2133.74 m Sandstone: fine grained. Mottling due to incipient replacement by dolomite. Bedding is poorly defined. Abrupt basal contact.

DOIG FM

2133.74-2133.83 m Sandstone-mudstone: lenticular beds of very fine grained sandstone separated by clay laminae and very thin beds.

2133.83-2135.98 m Sandstone: fine to medium grained. Several cross bed sets. Abrupt basal contact.

2135.98-2136.28 m	Mudstone: contains lenses and blebs of very fine grained sandstone. Possibly bioturbated.
2136.28-2138.63 m	Sandstone: fine grained. Brownish grey. Mottles and layers of dolomitized sandstone. Cross bedded.
2138.63-2139.58 m	Sandstone-mudstone: very thin to thin beds of very fine grained sandstone separated by clay partings and laminae.
2139.58-2141.58 m	Sandstone: very fine grained. Some patches of replacement dolomite. Vaguely bedded.
2141.58-2142.04 m	Sandstone-mudstone: very thin to thin beds of very fine grained sandstone intercalated with mudstone laminae and very thin beds. Possibly bioturbated in places.
2142.04-2142.59 m	Shelly sandstone: grades up from a shelly sandstone into intercalated very fine grained sandstone and clay laminae/very thin beds.
2142.59-2146.59 m	Sandstone-mudstone: thin to thick beds of very fine grained sandstone separated by thin mudstone layers or units of interlaminated sandstone-mudstone. Some wave ripples present. Minor load deformation and a few burrows.
2146.59-2149.09 m	Shelly sandstone-sandstone: fine grained. Probably made up of several beds but bed contacts not obvious. Basal contact is abrupt and erosional.
DOIG FM	
2149.09-2154.69 m	Interbedded/interlaminated mudstone-sandstone: Some load deformation in lower 1 m. A few horizontal burrows.
2154.69-2156.9 m	Sandstone: very fine grained. Several shelly layers. Argillaceous.

NOTE:
Possible major erosion surface at 2132.76 m.
ATSB top at log depth 2133.5 m (2133.83 m core depth)

6-27-72-8w6

HALFWAY FM

2132.76 m

Erosion surface within the Halfway Fm

Total Wembley 16-28-72-8W6
Core 3: 2171.6-2189.6 m Rec. 18.2 m. 16 boxes. Full diameter core.
Examined 1st August 2001

DOIG FM
ISPG photos 4726-18 and 19; Corel file /Wembley 1628728W6 spans the interval 2180 to 2183 m

2171.6-2181.75 m	Sandstone: fine grained; light to medium grey. Difficult to detect bedding. Some clay seams and some calcite-cemented bedding planes, both of which indicate bedding is deformed/over-steepened in places. Abrupt basal contact. Basal 18 cm contains small mud clasts - uncertain if they are erosionally derived or from bed inversion and disruption. Above the basal 18 cm the beds are highly deformed with some remnants of mudstone intercalations. (ISPG photo 4726-20; Corel file 1628728W6b)
2181.75- 2181.79 m	Mudstone: gradational with underlying bed.
2181.79-2182 m	Sandstone: very fine to fine grained. Vaguely laminated. Mud clasts present in upper half of unit. Clasts appear to be deformed - possibly have been incorporated into sandstone by bed inversion and disruption. Undulose basal contact (i.e., loading feature). (ISPG photo 4726-20; Corel file 1628728W6b)
2182-2182.6 m	Mudstone-sandstone: complexly interlayered and lensing of mudstone and sandstone. Abundant rounded mud clasts throughout unit. Fabric suggests clasts are due to intense load deformation and bedding inversion, rather than erosionally derived. (ISPG photographs 4726-21 and 22; Corel file /Wembley/1628728W6c)
2182.6-2183.5 m	Sandstone: very fine grained. Wisps and laminae of clay. Scattered throughout are mud clasts (not sure if they are erosionally derived or from load deformation). An abrupt, load deformed basal contact that is over-steepened. (ISPG photographs 4726-23 to 27; Corel file /Wembley/1628728W6d and 1628728W6e)
(Base of ATSB)	
2183.5-2186.67 m	Mudstone: silty. Appears to be deformed. Abrupt basal contact.
2186.67-2189.6 m	Coarsening-up succession: grades up from a silt-laminated mudstone (also contains lenses of silt) into interlaminated sandstone-mudstone with ripple laminae, in turn grading up into ripple and planar laminated argillaceous sandstone with some mud laminae. No signs of over-steepened bedding; beds are essentially horizontal.

NOTE: Cored in the lower part of an ATSB and across the basal contact.

Total Wembley 16-29-72-8W6
Core 1: 2145-2163 m. Rec. 17.2 m. 16 boxes. Full diameter
Examined 13 Feb. 2002
Core 2: 2163-2181 m
Rec. 18 m. 16 boxes. Full diameter.
Core 3: 2181-2199 m
Rec. 16.15 m. 15 boxes. Full diameter.
Cores 2 and 3 examined 27/28 July 1999.

Core depth may be about 1 m deeper than equivalent log depth.

CHARLIE LAKE FM

2145-2146.9 m	Dolostone: anhydritic in places. Very finely crystalline. Light grey. Thin to thick beds. Some areas of diagenetic alteration gives a pseudobreaccia appearance or a blotchy appearance. Abrupt basal contact
2146.9-2147.12m	Mudstone: brick-red/maroon. Contains a few thin beds of dolostone that have a disrupted fabric,
2147.12-2147.42 m	Dolomitic mudstone-dolostone: lenticular bedding. Greenish grey colour. Abrupt upper and lower contacts.
2147.42-2151.04 m	Mudstone: brick-red/maroon. Crudely bedded to disrupted fabric. A few beds of dolostone and dolomitic mudstone.
2151.04-2151.6 m	Anhydrite: light yellowish grey. Finely crystalline. Massive. Abrupt basal contact.
2151.6-2152.6 m	Mudstone: brick-red/maroon. Brecciated in upper half. Abrupt basal contact.
2152.6-2155.12 m	Dolostone: light grey. Very finely crystalline. Massive with zones of fine to coarse laminae. Some undulose fine laminae - probably stromatolites. Thin, 1 cm, basal transition zone of interlaminated dolostone-mudstone.
2155.12-2156.26 m	Mudstone: brick-red. Disrupted fabric. Cut by thick (few cm) vertical and horizontal veins of anhydrite. Abrupt basal contact.
2156.26-2156.64 m	Dolostone: clasts of dolostone in a dolomite matrix. Cut by vertical and horizontal veins of light grey, anhydritic dolostone. Abrupt basal contact.
2156.64-2157.54 m	Sandy dolostone: light grey. Some argillaceous layers, laminae. Pyrite is very common. Beds 15-20 cm thick separated by argillaceous dolostone layers up to 1 cm thick. Gradational basal contact.
2157.54-2158.64 m	Dolomitic sandstone: light grey. Some argillaceous laminae. Fine grained. Vaguely cross bedded in places; slightly deformed in others. Deformed basal contact.
2158.64-2159.04 m	Dolostone: light/medium grey. Argillaceous. Vaguely bedded except for lower 7 cm where there are well defined interlaminae of dolostone and mudstone. Base marked by a 1 cm thick mudstone layer resting abruptly on underlying strata.

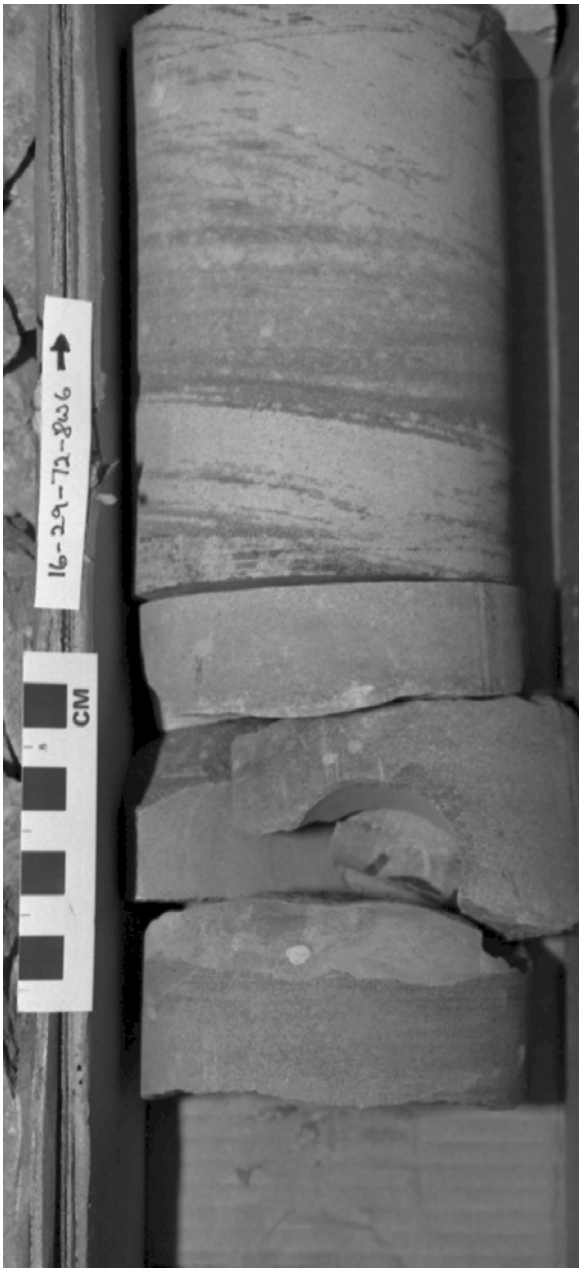
HALFWAY FM

2159.04-2161.24 m	Sandstone: fine to medium grained; scattered coarse grains. Blotchy appearance due to incipient dolomitization. Several beds. Basal bed contains cross beds. Each bed capped by laminated, dolomitic

	sandstone/sandy dolostone (could be stromatolites). Basal contact not preserved but distinct facies change suggest it is abrupt.
2161.24-2162.2 m	Sandstone: argillaceous, very fine grained. Core badly broken.
2162.2-2163 m	Missing core
2163-2165.21 m	Sandstone: light grey; fine grained. At least three beds, 35-60 cm-thick. Each beds is erosionally based; bulk of bed consists of massive to vaguely horizontally bedded sandstone that may grade up into a thin layer of argillaceous sandstone or mudstone.
DOIG FM	
2165.21-2168.55 m	Interbedded sandstone-mudstone: approximately 70% sandstone. Ranges from zones of interlaminated sandstone-mudstone to zones with medium beds of sandstone. Very fine to fine grained sandstone. Planar and current-ripple laminae; many beds are load deformed. Basal bed is a sandstone that rests erosionally on, and load deformed into, underlying mudstone.
2168.55-2170.89 m	Mudstone grading up into muddy sandstone: Basal 12 cm consists of black mudstone resting abruptly on underlying strata and grades up into finely interlaminated mudstone and sandstone, in turn grading up into an interval of laminated and lenticular sand beds and mudstone interlaminae.
2170.89-2180.29 m	Mudstone grading up into mudstone interbedded with sandstone: basal 2.5 cm consist of dark grey to black mudstone with fine silt laminae, grading up into lighter coloured interbedded/interlaminated mudstone and sandstone. Above about 2177.79 m thin to medium beds of planar and current-ripple laminated sandstone become common, interbedded with laminated mudstone - this interval also has load deformed beds. Basal bed rests abruptly on underlying strata.
2180.29-2184.58 m	Shelly sandstone: At least five beds, probably more. Each bed has the following vertical succession: basal erosional surface - shell-rich zone grading up into very fine grained, massive sandstone - in turn may grade up into an argillaceous sandstone or sandy mudstone, usually containing load deformed strata. There are at least two muddy layers in the interval. Lowermost bed rests erosionally on underlying strata. A few anhydrite nodules. Uppermost 35 cm consists of 4 to 8 cm thick sandstone beds separated by 2 to 4 cm thick mudstone beds/layers: this interval has some current-ripple laminae and load deformed beds.
2184.58-2199 m	Mudstone/sandy mudstone: medium to dark grey; finely laminated with a few thin sandstone beds. Planar and current-ripple laminae. Load deformed laminae are common.

NOTE: possible major erosion surface at 2161.24 m

16-29-72-8W6



2161.24 m

Erosion surface within the Halfway fm

16-29-72-8W6

2184.58 m

Base of coquinal sandstone in the Doig Fm

16-29-72-8W6

2180.29 m

Maximum flooding surface at top of an ATSB-bearing unit in the Doig Fm

Total Wembley 16-30-72-8W6
Core 1: 2180-2198 m Rec. 14.8 m 11 boxes Full diameter
Core 2: 2198-2216 m Rec. 18 m 13 boxes. Full diameter

CHARLIE LAKE FM

2180-2180.21 m	Mudstone: brick red. Disrupted fabric.
2180.31-2180.37 m	Dolostone: light grey to white. Possibly anhydritic. Vaguely bedded.
2180.37-2180.42 m	Mudstone: brick red.
2180.42-2180.95 m	Interbedded mudstone-dolostone: brick-red mudstone; grey dolostone. Very thin to thin beds. Some anhydrite. Some solution collapse features.
2180.95-2184.22 m	Dolostone: medium grey with irregularly shapes patches of light yellow-grey replacement dolostone. Abrupt basal contact.
2184.22-2186.72 m	Mudstone: brick-red and greenish grey. Irregular patches of replacement dolomite. Highly disrupted to brecciated fabric. Abrupt basal contact.
2186.72-2188.07 m	Dolostone: light brownish grey. Very finely crystalline. Massive to vaguely bedded. Abrupt basal contact.
2188.07-2188.3 m	Mudstone: brick red with a green mudstone lense in mid-part of unit. Abrupt basal contact.
2188.3-2189.54 m	Dolostone: light grey. Massive with intervals of fine laminae. Basal contact slightly diffuse.
2189.54-2189.76 m	Mudstone: brick red
2189.76-2189.83 m	Dolostone:
2189.83-2189.86 m	Mudstone: brick red
2189.86-2190.22 m	Dolostone: diffuse basal contact.
2190.22-2193.32 m	Mudstone: brick red. A few beds/patches of greenish grey mudstone. Incipient dolomitization imparts mottled appearance.
2193.32-2193.4 m	Dolostone: very finely crystalline. Light grey. Abrupt basal contact.
2193.4-2193.63 m	Mudstone: brick red
2193.63-2194.46 m	Dolostone: light grey. Very finely crystalline. Vaguely bedded to laminated. Abrupt basal contact.'
2194.46-2194.66 m	Dolostone: vague coarse laminae
2194.66-2198 m	Missing core
2198-2198.4 m	Mudstone: brick red
2198.4-2198.7 m	Dolostone: very finely crystalline. Light grey. Abrupt basal contact.
2198.7-2199.17 m	Mudstone: brick red
2199.17-2199.33 m	Dolostone: very finely crystalline. Light grey.
2199.33-2199.85 m	Mudstone: brick red. Light grey clasts or clast-like patches of replacement dolostone in basal third of unit
2199.85-2200.01 m	Dolostone
2200.01-2200.25 m	Mudstone: brick red. Dolostone "clasts" throughout (could be clast-like patches of replacement dolomite)
2200.25-2200.43 m	Dolostone: Light grey. Diffuse basal contact.

HALFWAY FM

2200.43-2201.55 m	Sandstone: brownish grey. Incipient dolomitization imparts mottled appearance. Fine grained with scattered to locally concentrated medium/coarse grains. If colour patterns reflect bedding then some of

interval could be deformed. Abrupt, undulose basal contact.

2201.55-2203.15 m Sandstone: fine grained. Large light grey mottles replacing a medium grey background - probably due to dolomitization. Highly deformed argillaceous interval about 50 cm above base. Base marked by slightly coarser grain size and a few very small pebbles, and presence of dolomite nodules. Latter may be replacement features or reworked into the sediment - difficult to tell. Abrupt basal contact.

DOIG FM

2203.15-2216 m Coarsening-up interval: grades up from mudstone-dominant in the lower beds to sandstone-dominant in upper part. Mudstone interval contains laminae to thin beds of very fine grained sandstone. Planar laminae, ripple lamina and some distorted beds. Upper part has sandstone intercalated with clay laminae and very thin beds mudstone. Extensive pyrite in upper sandy beds.

NOTE: possible major erosion surface at 2201.55 m

Total Wembley 6-33-72-8W6

Core 1: 2131-2149 m Rec. 17.2 m. 16 boxes. Full diameter core.

Core 2: 2149-2166.2 m. Rec. 18 m. 16 boxes. Full diameter core.

(Note there actually is more recovery than depths would indicate therefore the bottom depth should be 2167 m)

Core 3: 2166.2 (2167)-2179 (2180) m Rec. 12.8 m. 12 boxes. Full diameter core.

Examined 1st August 2001.

Core penetrates into the thick Doig sandstone (ATSB) at 2148 m whereas log depth indicates the sandstone begins at about 2149 m.

CHARLIE LAKE FM

2131-2131.15 m Shale: black; fissile. Basal contact not preserved, but major facies change suggests it is abrupt.

2131.15-2131.43 m Dolostone: yellowish grey; very finely crystalline. Three zones of approximate equal thickness: an upper finely laminated; middle coarsely laminated to very thinly bedded, and a lower finely laminated zone. The two finely laminated zones have undulose to small domal laminae suggestive of stromatolites. Basal contact not preserved but marked facies change suggests it is abrupt.

HALFWAY FM

2131.43-2133.28 m Sandstone: fine to medium grained. Mottled to banded by light-coloured replacement carbonate - tend to follow bedding. Planar bedding and very low-angle cross bedding. Erosional basal contact. (ISPG photographs 4726-6 and 7; Corel file /Wembley/0633728W6)

2133.28-2133.91 m Sandstone: coarse grained, salt and pepper appearance. Grades rapidly into an upper 8 cm of muddy, very fine grained sandstone. Upper part of interval contains a 3-4 cm wide sandstone dyke that terminates against overlying bed. Termination is mushroom-shaped (ISPG photographs

4726-6 and 7; Corel file /Wembley/0633728W6). Sandstone is crudely bedded. Basal erosional contact.

2133.9-2134.54 m Sandstone: light brown, fine grained with patches/bands of carbonate cement. Basal 7-8 cm rich in carbonate material uncertain if diagenetic or bioclastic in origin. Basal contact not well preserved.

2134.54-2135.86 m Sandstone: bluish grey; mottled with scattered carbonate blebs. Frequency of occurrence of blebs highly variable - some coalesce to form irregular bands. Lowest 10-15 cm is lighter coloured. Vaguely bedded. Abrupt basal contact.

2135.86-2135.87 m Shale

2135.87-2136.63 m Sandstone: brownish grey. Mottled. Fine grained. No visible sedimentary structures. Basal contact uncertain - probably gradational due to change in sandstone appearance.

2136.63-2137.05 m Sandstone: fine grained. Fine uneven laminae to thin beds. Intercalations of clay laminae. Some mottling. Gradational basal contact over a very short vertical distance (few cm).

2137.05-2138.02 m Sandstone: bioclastic, medium grained, some scattered coarse grains. Some moldic porosity. Some vaguely cross bedded zones in lower part of unit. Bioclasts and carbonate cement more common in basal part of interval. Basal contact not well preserved.

2138.02-2139.82 m Sandstone: very fine to fine grained. Minor mottling. Vaguely laminated. Possibly consists of several beds (?). Basal contact erosional.

DOIG FM

NOTE 2139.82-2148.19 m forms a coarsening-upward succession.

2139.82-2144.57 m Sandstone: very fine to fine grained. Intercalated with numerous mm-thick clay laminae. Planar and ripple cross laminae. Minor bioturbation and minor load deformation. Some mottling.

2144.57-2146.94 m Sandstone-mudstone: finely interlaminated. About 1:1 ration. Coarse silt to very fine sand.

2146.94-2148.19 m Mudstone: dark grey to black. Abundant silt laminae. Abrupt basal contact.

2148.19-2174.53 m Sandstone: Fine grained. Uniform for the most part - difficult to see individual beds and nor obvious sedimentary structures. Some scattered clay seams. Some minor lighter coloured mottling/banding. Top 85 cm contains finely comminuted bioclastic material. Abrupt basal contact. (ISPG photographs 4726-8 and 9; Corel file /Wembley0633728W6b - upper contact).

2174.53-2174.6 m Mudstone: lenses of very fine grained sandstone.

2174.6-2174.67 m Sandstone: very fine grained. Clays seams in upper 2 cm. Rapid transition into overlying mudstone.

2174.67-2174.675 m Mudstone: abrupt base/top. Very small lenses of very fine grained sand.

2174.675-2174.83 m Sandstone: very fine grained. Argillaceous. Wispy seams of clay.

2174.83-2175.56 m Fining-up succession: Very fine to fine grained sandstone grading up into interlaminated sandstone-mudstone. Basal erosional surface overlain by about 16 cm of cross bedded sandstone grading up into sandstone with clay seams, in turn gradationally changing into interlaminated sandstone-

	mudstone in top 2-5 cm. Abundant replacement anhydrite nodules in the cross bedded part.
2175.45-2175.92 m	Interbedded sandstone-mudstone: thin (4-8 cm) beds of very fine grained sandstone separated by thin mudstone layers. Small-scale soft sediment deformation features are common (bed loading and faulting). Some possible horizontal burrows
2175.92-2176.24 m	Sandstone: very fine to fine grained. Abrupt basal contact. Rapidly transitional top - over a 1 cm-thick interval. Vaguely bedded. A possible mud clast near base.
2176.24-2176.25 m	Mudstone
2176.25-2176.42 m	Sandstone: very fine grained with clay laminae near base and top of interval. Some suggestions of ripple cross laminae. Base of unit is load deformed into underlying mudstone.
2176.42-2176.46 m	Mudstone-sandstone: severely load deformed. Abrupt basal contact. Upper contact is diffuse due to load deformation mixing two beds.
2176.46-2176.75 m	Sandstone: very fine grained. Erosional base. Rapidly gradational top. Vaguely laminated in upper part of interval where some clay seams are present.
2176.75-2176.81 m	Mudstone: contains lenses and laminae of coarse silt and very fine sand.
2176.81-2176.83 m	Sandstone: very fine grained. Mudstone clasts. (Photograph). Base and top are load deformed.
2176.83-2177.15 m	Sandstone: very fine to fine grained. Contains several zones with rounded mud clasts (most are <2cm diameter/long axis). At least 3 beds separated by thin (<1 cm) mudstone beds. Clasts tend to be concentrated at base and top of beds, with less scattered occurrences throughout rest of bed. Uppermost bed is about 18 cm thick; lower two 5-6 cm thick. Each bed has an erosional base. (ISPG photographs 4726-12 to 15; Corel file 0633728W6d: unsure if photos are located correctly).
2177.15-2177.65 m	Mudstone: laminae and lenses of coarse silt/very fine sand. Base of interval highly deformed.
2177.65-2177.87 m	Sandstone: very fine grained. Contains mud clasts and lenses. It is possible that the mud clasts/lenses have been incorporated into the sandstone by extreme load deformation, resulting in bed inversions and disruptions, creating a false sedimentary clast-like appearance. Basal contact is erosional and has small-scale load structures.
2177.87-2178.15 m	Mudstone: laminae of coarse silt. Some load deformation.
2178.15-2179.63 m	Sandstone-mudstone: thick sandstone beds separated by mudstone-rich intervals. Severally deformed with oversteepend bed-contacts, microfractures and load structures. (ISPG photographs 4726-16 and 17; Corel file /Wembley/0633728W6e).

NOTE:
Possible major erosion surface at 2133.91 m
ATSB 2148.19 - 2177.15 m

Total PCP Dome Wembley 16-33-72-8W6
Core 1: 2104- 2122 m Rec. 15.45 m 11 boxes. Slabbed
Core 2: 2122 - 2138 m Rec. 16 m. 12 boxes. Slabbed
Core 3: 2138 - 2156 m Rec. 18 m. 12 boxes. Slabbed
Core generally in good condition; a few badly broken intervals.
Logged 29 June 2007.

HALWAY FM

2104 - 2104.34 m	Sandstone*:* medium to coarse grained. Low-angle cross beds. Medium to dark grey colour. Erosional basal contact.
2104.34 - 2104.6 m	Sandstone*:* very fine to fine grained. Yellowish grey. Vague, uneven horizontal bedding. Scattered very small (<2 mm) pyrite nodules). Small, partially amalgamated anhydrite nodules in top 5 cm. Basal contact poorly preserved but contrasting facies suggests it is abrupt.
2104.6 - 2105.29 m	Sandstone*:* fining-up interval. Very fine to fine grained sandstone grading up into thoroughly bioturbated argillaceous sandstone with thin mudstone intercalations - although most of mudstone layers have been mixed with the sandstone due to bioturbation. Approximately 29 cm of sandstone grading up into about 40 cm of bioturbated beds. Lower sandy interval has vague, uneven bedding, becoming bioturbated upwards. Basal contact not preserved but contrasting facies indicates an abrupt change.
2105.29 - 2106.73 m	Sandstone: fining-up interval. Light yellowish grey. Basal 16 cm contains small mudstone clasts (mm-scale) in a sandy bioclastic dolostone, grading up into very fine to fine grained sandstone. Basal 16 cm also contains small (up to 3 cm diameter) anhydrite nodules. Remainder of interval contains scattered granule-size mudstone clasts and very small anhydrite nodules. Sedimentary structures difficult to detect, although there are vague indications of horizontal bedding in places. Patches of anhydrite cement. Top 23 cm contains anastomosing clay laminae. Basal contact not preserved but there is a strong colour contrast with underlying unit.
2106.73 - 2107.67 m	Sandstone: fine to medium grained. Dark grey. Incipient anhydrite cement especially along bedding planes - low to medium angle cross beds. Cross beds visible only in middle part of interval. Top 5 cm consists of medium to coarse grained sandstone with small (mm to 1 cm) mudstone clasts - appears to be gradational with underlying beds. Uncertain if top 5 cm belongs with overlying unit even though there is a strong colour contrast. Contact with overlying unit not preserved.
2107.67 - 2110.26 m	Sandstone: very fine to fine grained. Mottled appearance due to incipient anhydrite/dolomite cement. Cement highlights horizontal bedding and burrows in places. Uncertain if interval is a single unit or multiple beds. Abrupt basal contact.
2110.26 - 2110.87 m	Sandstone to mudstone: fining-up interval. Very fine to fine grained sandstone grading up into sandstone with clay laminae. Vague basal contact. Top10 cm appears to contain disrupted bedding of dolomitic sandstone/sandy dolostone. Latter may contain flame structures.

2110.87 - 2111.64 m Sandstone to mudstone: fining-up interval. Very fine to fine grained sandstone grading up into sandstone with clay laminae. Basal contact not preserved.

2111.64 - 2112.13 m Sandstone to mudstone: Fining-up interval. C.f., as above but top 7 cm is an argillaceous sandstone with some clay laminae. Abrupt basal contact.

DOIG FM

2112.13 - 2117.23 m Mudstone to argillaceous sandstone: overall coarsening-up interval. Very rapidly gradational basal contact overlain by black mudstone with few silt laminae. Silt/sand laminations increase up-section until upper 1.4 m is predominantly very fine grained sandstone intercalated with clay laminae. The upper sandy interval contains local concentrations of small (few mm diameter) anhydrite nodules. The muddier interval contains scattered lenticular beds of ripple laminated silt/sand. Burrows are absent in the muddy interval but are present in the upper sandy interval (mostly horizontal burrows).

(Top of ATSB)

2117.23 - 2118.43 m Sandstone to mudstone: distinct fining-up unit with three lithological intervals:
a) Basal 14 cm of disrupted fine to medium grained sandstone resting on a load deformed basal contract. Contains small (mm-scale) mud clasts.
b) 6 cm of very fine grained sandstone with irregular clay laminae. Gradational base/top. Either mildly deformed or burrowed.
c) Top 15 cm consists of interlaminated to interbedded very fine grained sandstone and mudstone. Laminated intervals interspersed with sand lenses (current ripple laminated). Rapidly gradational lower and upper contacts.

2118.43 - 2118.58 m Bioclastic sandy dolostone grading up into fine to medium grained sandstone: Highly comminuted fossil debris. Some moldic porosity. Mildly load deformed basal contact. Contains small (few mm long) mudstone clasts that appear to be randomly oriented..

2118.58 - 2118.62 m Similar to overlying bed.

2118.62 - 2118.92 m Sandstone: fine to medium grained, possibly contains small mudstone clasts. Scattered granule-size ?mudstone grains. A few clay laminae.

2118.92 - 2122 m Missing core.

2122 - 2122.3 m Sandstone: badly broken core. Very fine to fine grained,

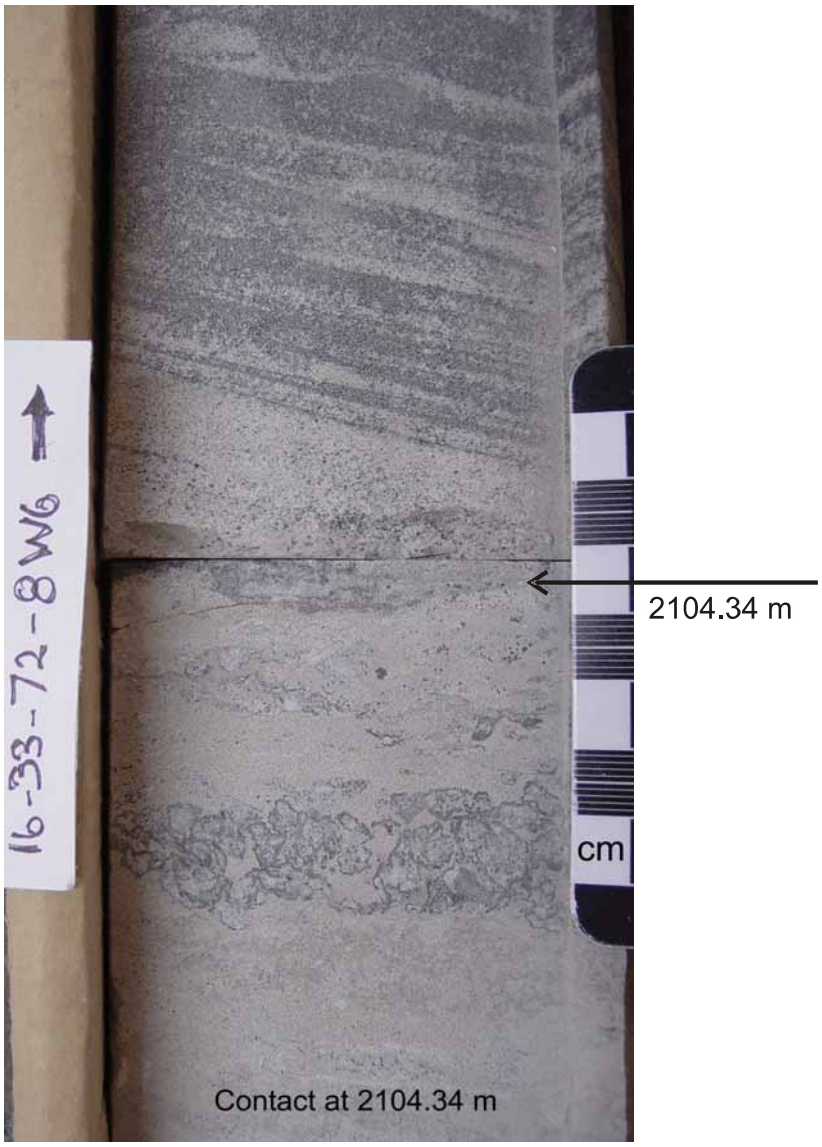
2122.9 - 2127.93 m Sandstone: fine to locally medium grained. Incipient anhydrite cement along bedding planes - highlights both horizontal beds and low- angle cross-beds. Cross beds more prominent in lower 70 - 90 cm. Possibly contains some disrupted bedding. Multiple beds probable as indicated by a few preserved irregular to abrupt surfaces.

2127.9 - 2127.97 m ?Dolomitized interval: Irregular thin beds. Abrupt base/top. (In box 5 core 2)

2127.97 - 2135.33 m Sandstone: Fine grained. Vaguely bedded. Some scattered clay laminae. Most likely made up of multiple beds but not readily seen. Some indications of minor load deformation, especially in lower 60 cm where two bed contacts are well preserved and are deformed. Basal contact

	abrupt, deformed and possibly over-steepened.
2135.33 - 2135.92 m	Sandstone: very fine to fine grained. Contains numerous small (mm to 2 cm), oblate mudstone clasts commonly aligned at a medium angle - possibly over-steepened bedding. Base of interval chosen at a clay laminae below which clay laminae are more abundant (this contact may not have any significance and is an arbitrary division).
2135.92 - 2136.37 m	Sandstone: very fine grained. Contains irregular to anastomosing clay laminae. Scattered small (mm scale) mudstone clasts (not as common or as large as in overlying interval). Clasts are less common in lower part of interval.
2136.36 - 2136.53 m	Sandstone-mudstone: Very fine grained sandstone. Burrow mottled - mostly horizontal burrows. Bedding generally preserved. Mudstone has a "smeared" appearance!!
2136.53 - 2138 m	Missing core
2138 - 2141.9 m	Sandstone: very fine to fine grained. Multiple beds but difficult to identify many bed contacts. Wispy clay laminae in some beds. Bedding appears to be slightly over-steepened. Indications of load deformation in some beds. Some horizontal burrows in a few beds. Basal contact not preserved.
2141.9 - 2141.94 m	Mudstone: contains lenses and laminae of coarse silt/very fine grained sandstone.
2141.94 - 2146.64 m	Sandstone-mudstone: predominantly very fine to fine grained sandstone with variable amounts of clay laminae and thin mudstone interbeds. Sandstone beds contain oblate mudstone clasts - most are <1 cm, with a few larger clasts. Clast alignment suggests beds are slightly over-steepened. Muddier sandstone beds and zones of intercalated mudstone-sandstone tend to be burrowed - mostly horizontal burrows.
2146.64 - 2151.69 m	Sandstone: very fine to fine grained. Abundant oblate to subspherical mudstone clasts. Clasts generally aligned at medium to high angles sggests over-steepened beds. Higher concentration of clasts in basal 7 - 8 cm. Basal contact is abrupt and mildly load deformed. (Note: half of core in box 10 is badly broken).
(Base of ATSB)	
2151.69 - 2154.92 m	Mudstone: dark grey with silt laminae, especially in lower 40 cm. About 34 cm above base of core there is a distinct erosional contact within the mudstone.
2154.92 - 2156 m	Missing core

16-33-72-8W6



HALFWAY FM

16-33-72-8W6

HALFWAY FM

16-33-72-8W6

HALFWAY FM

16-33-72-8W6

HALFWAY FM

16-33-72-8W6

HALFWAY FM

16-33-72-8W6

DOIG FM

16-33-72-8W6

Top of an ATSB in the Doig Fm

16-33-72-8W6

Transgressive beds on top of an ATSB in the Doig Fm

16-33-72-8W6

Transgressive beds on top of an
ATSB in the Doig Fm

16-33-72-8W6

Interpreted transgressive surface of erosion (TSE)
in uppermost beds of an ATSB in the Doig Fm

16-33-72-8W6

Interpreted regressive surface of marine erosion (RSME) in uppermost beds of an ATSB in the Doig Fm

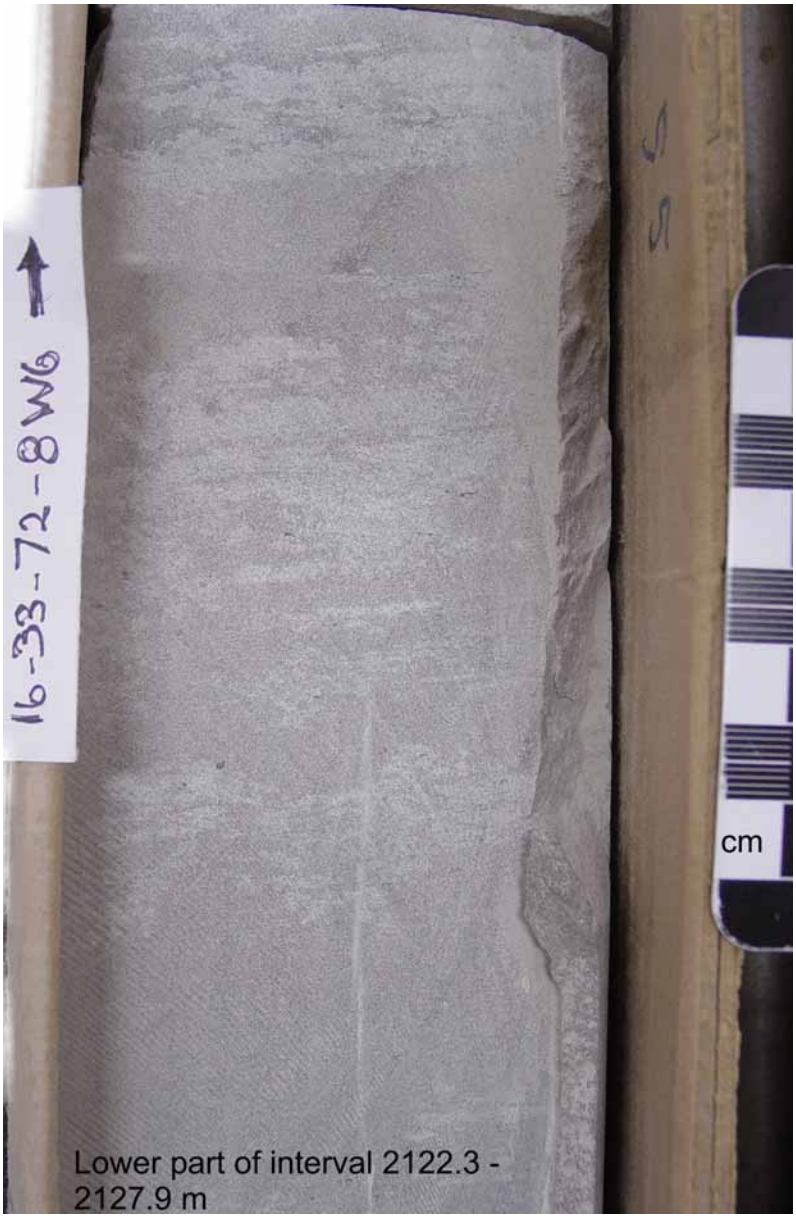
16-33-72-8W6

Upper beds in an ATSB in the Doig Fm

16-33-72-8W6

Upper beds in an ATSB in the Doig Fm

16-33-72-8W6



Upper beds in an ATSB in the Doig Fm

16-33-72-8W6

Mud clasts in an ATSB in the Doig Fm

16-33-72-8W6

Irregular clay laminae in an ATSB in the Doig Fm

16-33-72-8W6

Irregular clay laminae and clay lenses in an ATSB in the Doig Fm

16-33-72-8W6

Irregular clay laminae and clay lenses or clasts in an ATSB in the Doig Fm

16-33-72-8W6

Burrows and over-steepened beds
in an ATSB in the Doig Fm

16-33-72-8W6

Basal contact of an ATSB in the Doig Fm

Union Albright 14-2-72-9W6
Core 1: 2491.8-2510 m
Rec. 16.95 m. 15 boxes. Full diameter core. Well preserved.
19/20 April 1999

CHARLIE LAKE FM

2491.8-2492.33 m	Mudstone: brick-red/maroon with patches and thin to thick beds of brownish-grey anhydrite. Disrupted to brecciated fabric. Calcareous. Abrupt basal contact.
2492.33-2493.6 m	Anhydrite: brownish grey. Coarse laminae to very thin beds. Some bed distortion and disruption. Calcareous. Abrupt basal contact.
2493.6-2493.81 m	Mudstone: similar to mudstone above.
2493.81-2394.04 m	Interbedded mudstone-anhydrite: beds 2 to 7 cm thick. Bed contacts range from abrupt planar to abrupt and load deformed.
2394.04-2395.09 m	Anhydrite: similar to above. Minor interlaminae of red mudstone a few mm thick.
2395.09-2395.46 m	Mudstone: similar to above. Basal contact irregular but abrupt.
2395.46-2397.41 m	Anhydrite: similar to above. Predominantly coarse, undulatory laminae.
2397.41-2399.76 m	Mudstone: brick-red/maroon. Very distinct brecciated fabric. Basal contact a diffuse brecciated zone about 2-3 cm thick. Bulk of clasts are anhydrite. Two un-brecciated anhydrite beds. Degree of brecciation declines up-section.
2499.76-2500.6 m	Anhydrite: thin to thick beds of crystalline anhydrite. A few interbeds of red, anhydritic mudstone. Abrupt basal contact. Immediately underlain by a 5 mm thick black, fissile shale layer.

DOIG FM

2500.6-2506.21 m	Sandstone: very thin to thick beds of very fine to fine grained sandstone, separated by argillaceous zones - these tend to be sandstones with clay laminae or where clay and sand have been mixed due to load deformation. An overall upward trend of bed thickening and decrease in argillaceous content. Sedimentary structures not visible and bed contacts are poorly preserved due largely to moderate load deformation.
2506.21-2508.36 m	Interbedded mudstone-sandstone: laminae to thin beds of very fine grained sandstone and mudstone. Thicker mudstone units usually contain silt/sand laminae and/or lenses. Sandstone beds range up t o14 cm thick. A few thin to thick interbeds of light grey, dolomudstone. Vertical burrows present. Load deformed beds common. Gradational into underlying unit.
2508.36-2508.75 m	Mudstone: dark grey to black. Laminae of silt/very fine sand.
2508.75-2510 m	Missing core

Crestar et al 100 Bulo 13-4-72-10W6
Core 1: 2443-2461 m Rec. 17.25 m 16 boxes Full diameter
Examined 14 February 2002

NOTE: description is abbreviated

CHARLIE LAKE FM
2452-2453.73 m Dolostone: patchy replacive fabric. Abrupt base
2453.73-2453.74 m Mudstone: finely laminated. Abrupt base.
?HALFWAY/DOIG FM
2453.74-2455.3 m Sandstone: blotchy appearance due to incipient dolomitization. Trace of cross beds in lower 25 cm. Erosional basal contact.
2455.3-2460.25 m Sandstone: very fine grained. Some mudstone interbeds. Difficult to distinguish sedimentary features.

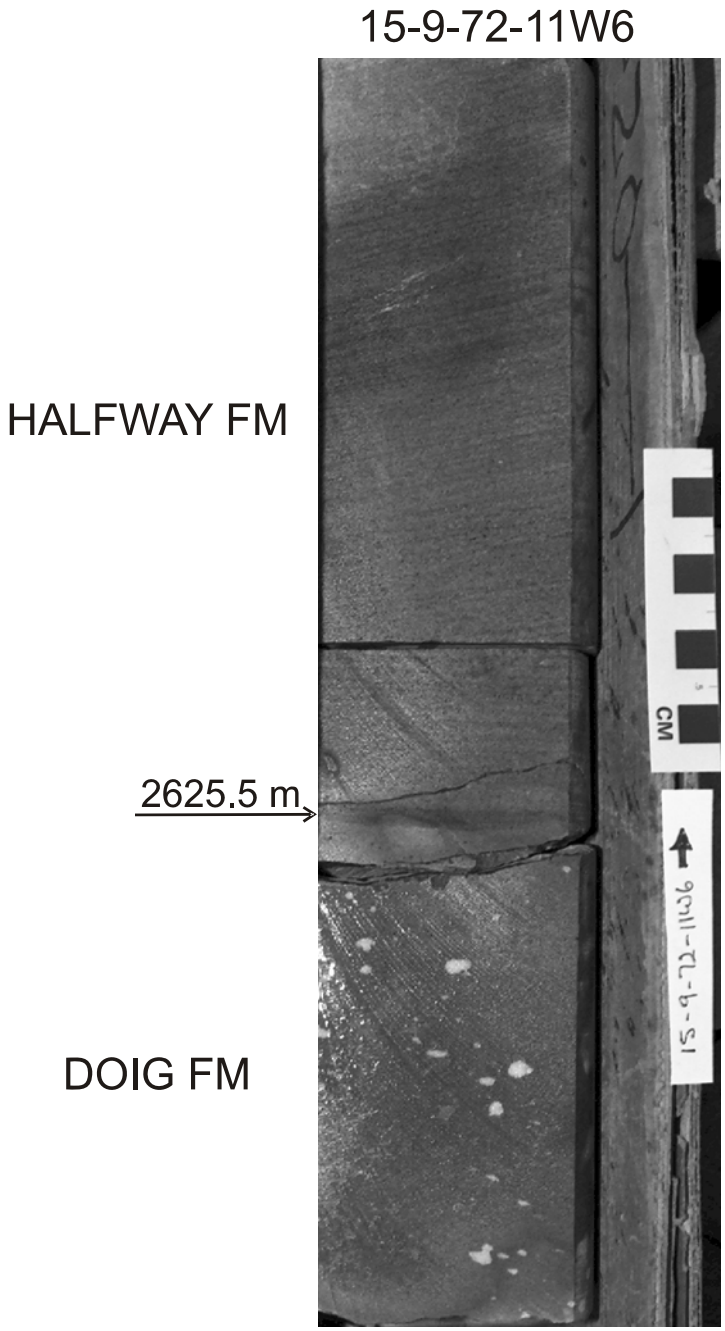
NOTE: possible major erosion surface at 2455.3 m

AEC Sinclair 15-9-72-11W6
Core 1: 2605-2623.2 m Rec. 16 m 15 boxes Slabbed
Core 2: 2623.2-2631.2 m Rec. 6.55 m 7 boxes Slabbed
Examined February 2002.
Equivalent log depth about 1 m shallower than core depths

CHARLIE LAKE FM
2605-2606.35 m Mudstone; brick red. Patches and (?)beds of greenish grey mudstone. Small blebs and streaks of dolomitized mudstone. Abrupt basal contact
2606.35-2610.95 m Dolostone-dolomitic sandstone: medium grey. Crudely bedded to massive. Abrupt basal contact.
2610.95-2612.8 m Dolostone: light grey. Massive to vaguely bedded. Towards base of unit is a zone of closely spaced vertical and horizontal dolomite-filled fractures.
2612.8-2614.3 m Dolostone: brownish grey in upper two-thirds, light grey in lower third. May have some partially replaced anhydrite. Coarse laminae to vague, thin beds. Basal contact is vague due to dolomitization.
HALFWAY FM
2614.3-2615.8 m Sandstone: fine grained. Medium to dark grey. Vaguely bedded near top of interval. Cross bedded in lower part of unit. There is a gradational color change downward.
2615.8-2621 m Sandstone: fine grained. Multiple sets of low to medium angle cross beds. Some of cross beds defined by clay partings. Clay doublets on some laminae - possible tidal influence - but not very common.
2621-2623 m Missing core
2623-2625.5 m Sandstone: similar to 2615.8-2621 m interval. Erosional basal contact.
DOIG FM
2625.5-2629.75 m Interbedded mudstone-sandstone: thin to thick beds of very fine grained

sandstone separated by muddy sandstone or mudstone beds/layers. Overall sanding-up interval.

NOTE: probable major erosion surface at 2625.5 m



Dome Total Beaverlodge 10-33-72-11W6
Core 1: 2481-2493.25 m Rec. ? 12 boxes. Full diameter
Core 2: 2493.25-2494.5 m Rec. ? 1 box. Full diameter
Core 3: 2494.5-2500 m Rec. ? 5 boxes Full diameter
Examined 15th February 2002

CHARLIE LAKE FM

2481-2481.03 m	Shale: black. Fissile - badly broken. Basal contact not preserved.
2481.03-2483.83 m	Mudstone: brick-red. Interbeds (1-15 cm thick) of light grey dolostone and a few thin beds of pink/white anhydrite. A few anhydrite-filled horizontal veins. Disrupted to brecciated fabric. Basal contact abrupt.
2483.83-2484.28 m	Dolostone: light grey. Fine to coarsely laminated, to very thinly bedded. Disrupted fabric. Gradational basal contact.
2484.28-2486.83 m	Mudstone: brick-red. Contains two dolomitic intervals that have diffuse upper/lower contacts. Disrupted to brecciated fabric. Abrupt basal contact marked by a thin (2 cm) zone of greenish-grey mudstone resting on a mm-thick clay seam, in turn resting on underlying dolostone..
2486.83-2488.81 m	Dolostone: light to medium grey. Contains several thin clay seams in lower 30 cm. Massive with a few intervals of fine to coarse undulose laminae - probably stromatolites. Gradational basal contact.
2488.81-2489.61 m	Mudstone: brick-red. Anhydrite-filled fractures. Some patches of grey mudstone.
24289.61-2491.51 m	Dolostone: light to medium grey. Very finely crystalline. Basal 16 cm contains layers/lenses of anhydrite up to 1 cm thick. Also some scattered occurrences of anhydrite. Variable character, ranging from unevenly laminated to very thinly bedded to massive. Some zones with a brecciated appearance - these tend to be more argillaceous and/or anhydritic than other parts of interval. Basal contact not preserved.

HALFWAY FM

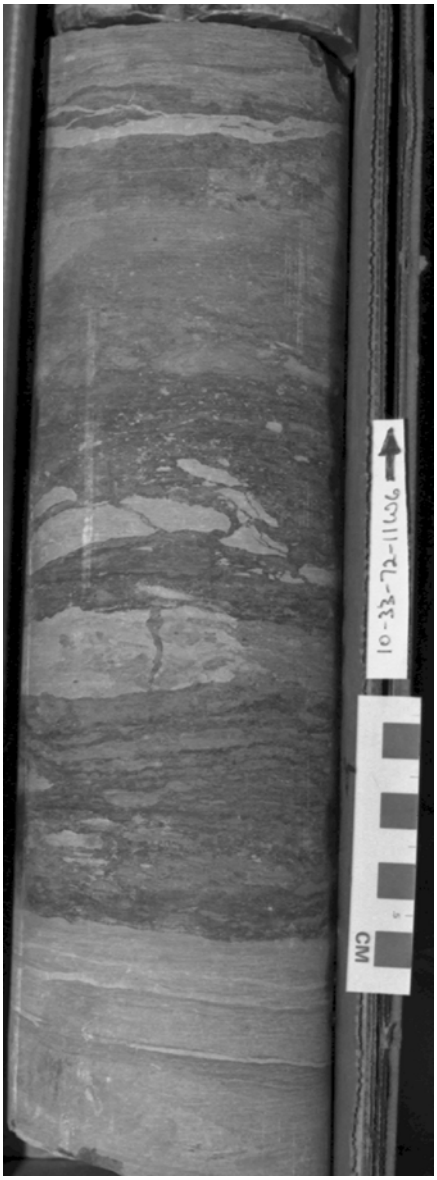
2491.51-2496.1 m	Sandstone: fine to medium grained. Quartz and black chert. Incipient dolomitization. Cross bedded throughout (high angle). Abrupt, erosional basal contact.

DOIG FM

2496.1-2500 m	Mudstone-sandy mudstone: Crudely bedded to disrupted. Numerous small nodules of anhydrite/dolomite. Some dolomitization.

NOTE: possible major erosion surface at 2496.1 m.

10-33-9-72-11W6



Charlie Lake Fm: red mudstone
with dolostone beds/lenses, some brecciated
(interval 2481.03 - 2463.83 m

10-33-9-72-11W6

Charlie Lake Fm: anhydrite-filled fractures in red mudstone
(interval 2488.81 - 2489.61 m)

10-33-9-72-11W6

Halfway Fm.: cross beds highlighted by incipient anhydrite/dolomite cement. (interval 2491.51 - 2496.1 m)

10-33-9-72-11W6

HALFWAY FM

2496.1 m

DOIG FM

Erosional base of the Halfway Fm. at 2496.1 m

Part 2: Alberta, Townships 73 to 82W6

CONTENTS

8-10-78-9W6	1717-1735.2 m
8-21-78-9W6	1695-1708.6 m
6-30-78-9W6	1724-1742 m
14-3-78-10W6	1840-1879.5 m
12-8-78-10W6	1867-1890.75 m
8-34-78-10W6	1742-1754.2 m
14-36-78-10W6	1721-1739 m
6-13-78-11W6	1888-1906 m
15-32-78-11W6	1849-1867.2 m
14-33-78-11W6	1847-1859.2 m
2/14-33-78-11W6	1862-1880.2 m
6-4-78-12W6	1975-1992.6 m
8-8-79-7W6	1379-1395 m
8-9-79-7W6	1354-1372.2 m
14-25-79-8W6	1388-1406 m
8-34-79-9W6	1597.75-1615.75 m
8-1-79-10W6	1723.8-1748.8 m
6-5-79-10W6	1732-1750 m
4-28-79-11W6	1686-1704 m
10-6-79-12W6	1813.2-1839 m
5-23-79-12W6	1707.75-1743.75 m
2-27-79-13W6	1744-1762 m
2-19-80-8W6	1446-1464.4 m
8-4-80-9W6	1584-1602 m
8-2-80-10W6	1654-1672.1 m
9-3-80-11W6	1795-1807.4 m
11-10-80-12W6	5511-5565 ft
14-26-80-12W6	1625.3-1643.1 m
2-14-82-2W6	3335-3372 ft
	3472-3581 ft
	3714-3749 ft

Amoco PCP et al Clair 7-14-73-6W6
Core 1: 1883-1891 m Rec. 8.22 m 6 boxes. Slabbed
Core 2: 1891-1905.5 m Rec. 14.55 m 10 boxes Slabbed
Core examined 15th February 2002
Note: corresponding log response appears to be about 2-2.5 m shallower than core depths

CHARLIE LAKE FM

1883-1885.4 m	Dolostone: argillaceous. Dolomite mottling. Abrupt basal contact.
1885.4-1887.7 m	Dolostone: coarse, crinkly and undulose laminae - ?stromatolites. A few displacive anhydrite nodules. Abrupt basal contact.
1887.7-1890.13 m	Dolostone: yellowish grey. Massive with lenses and irregular patches of darker dolomite. About 48 cm above base there is a 6 cm-thick bed of crudely laminated dolostone. Basal 1 cm is finely laminated and separated from underlying strata by a 1 mm-thick clay seam.
1890.13-1891.28 m	Interbedded laminated and massive dolostone: Units 7-18 c thick. Basal bed is 6 cm thick, has a few fine, crinkly laminae and has an abrupt base top and separated from underlying strata by a 1-2 mm thick clay seam. ISPG photo 4733-59 and 60, basal contact

HALFWAY FM

1891.28-1904.7 m	Coquinal sandy dolostone: Predominantly fining-up beds of sandy coquinal dolostone, with some beds capped by thin zones of very fine grained sandstone. Scattered anhydrite nodules. Abundant moldic porosity. Vaguely bedded. Immediately below overlying bed there is a 5 cm thick dolomitized sandstone, below which is an 11 cm thick interval of very fine grained sandstone. Erosional basal contact.

DOIG FM

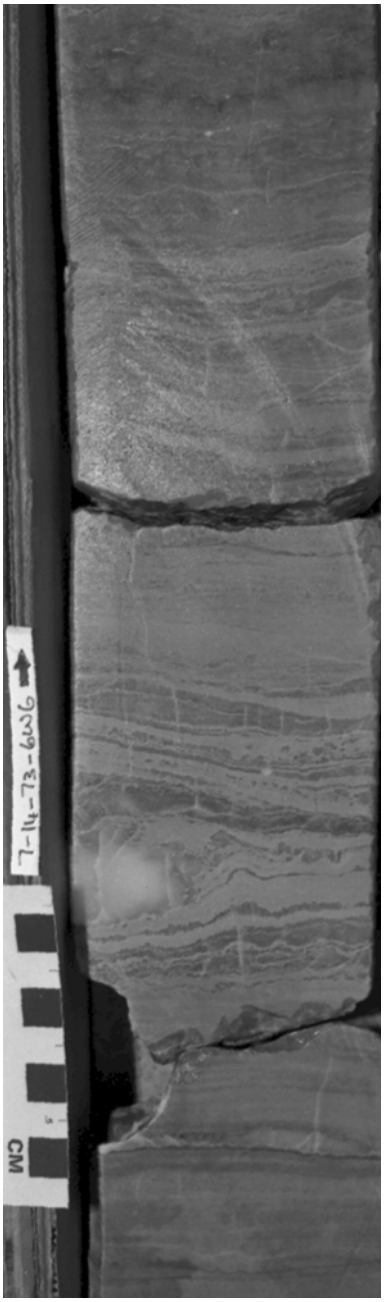
1904.7-1905.5 m	Sandstone-mudstone: predominantly very fine grained sandstone intercalated with mud laminae.

NOTE: possible major erosion surface at 1904.7 m

7-14-73-6W6

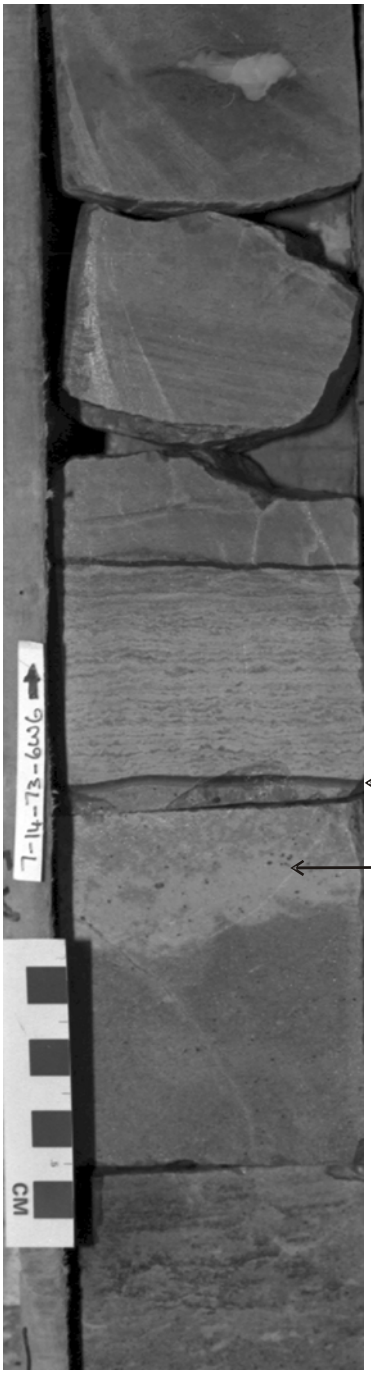
Charlie Lake Fm.: mottled dolostone
(interval1883 - 1885.4 m)

7-14-73-6W6



Charlie Lake Fm.: stromatolitic dolostone
(interval1885.4 - 1887.7 m)

7-14-73-6W6



CHARLIE LAKE FM

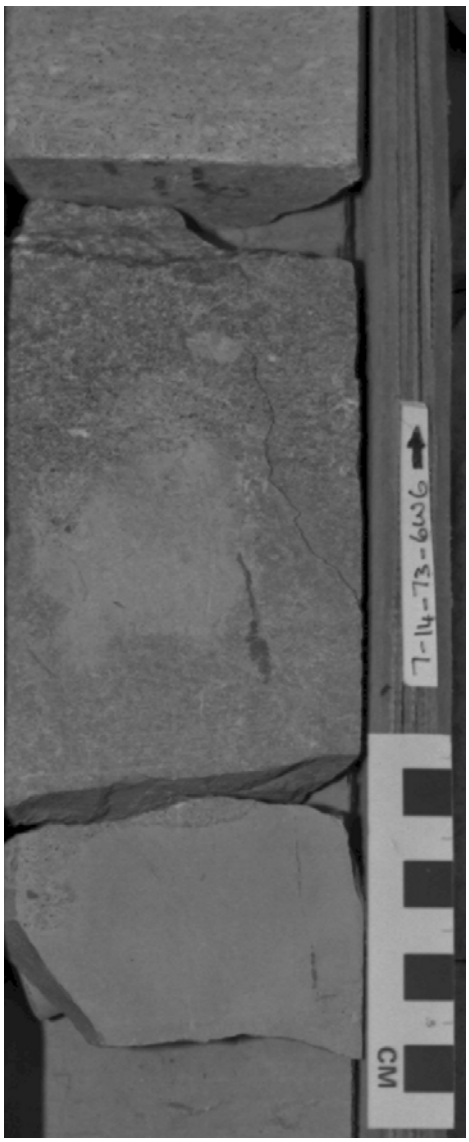
1891.28 m

Dolomitized sandstone

HALFWAY FM

Charlie Lake - Halfway contact at 1891.28 m)

7-14-73-6W6



Erosional Halfway - Doig contact at 1904.7 m)

Mobil GC et al Grand Prairie 14-17-73-6W6
Core 1: 1902-1920 m Rec. 15.95 m 12 boxes. Full diameter
Examined 15th February 2002

CHARLIE LAKE FM

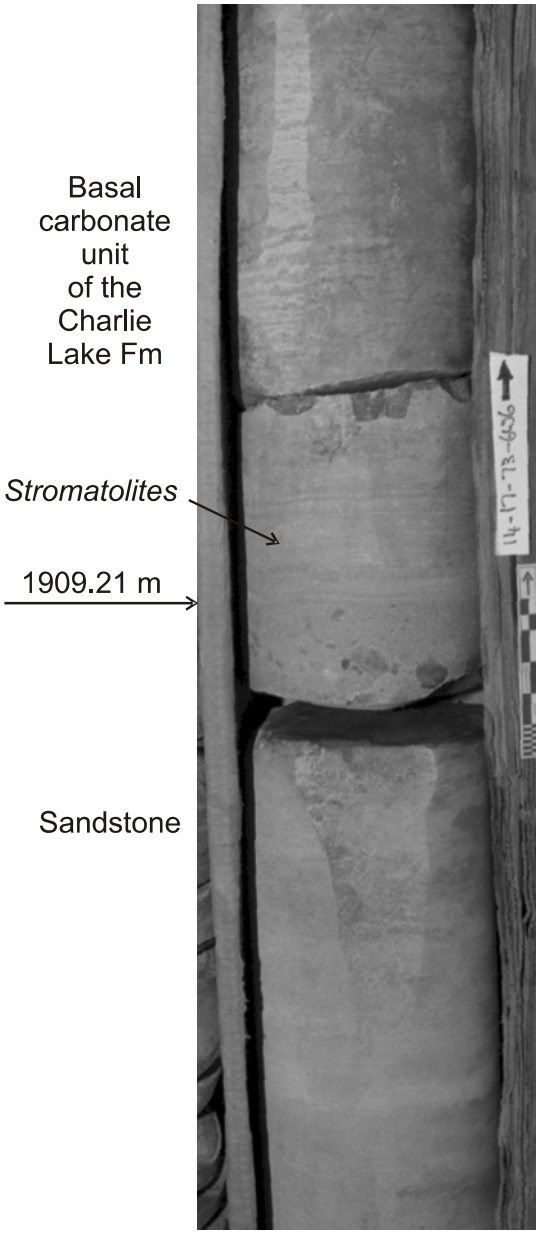
1902-1902.86 m	Mudstone: brick-red. Typical fabric for this facies in the Charlie Lake Fm. Gradational basal contact.
1902.86-1903 m	Mudstone: light greenish grey. Contains small to large, irregularly shaped mud clasts. Abrupt basal contact - irregular and has an "etched" appearance
1903-1904.9 m	Dolostone: light grey to brownish grey. Mostly massive with some scattered, uneven clay partings. Some very thin beds in lower 10 cm. Abrupt basal contact.
1904.9-1908.75 m	Mudstone: Basal 80 cm is green, remainder is red. Two interbeds of anhydrite/anhydritic dolostone. Abrupt basal contact - marked by a 1 mm-thick clay seam.
1908.75-1909.21 m	Dolostone: light to medium grey. Upper 25 cm is sandy - contains scattered coarse, black chert grains. Lower part of interval contains fine to coarse undulose laminae (?stromatolites). Abrupt basal contact.
1909.21-1909.65 m	Sandstone: fine grained. Massive. Upper 5 cm contains scattered granules to small pebbles (?of mudstone). Basal 1 cm also contains granules and a few very small pebbles. Erosional basal contact.

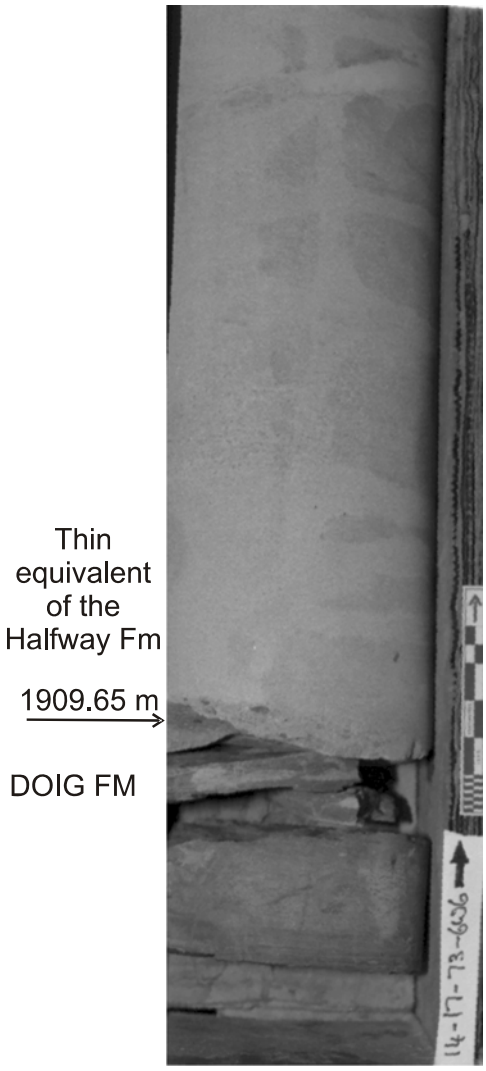
DOIG FM

1909.65-1910.19 m	Mudstone-sandstone: lenses and very thin to thin beds of very fine grained sandstone interbedded with mudstone.
1910.19-1910.89 m	Sandstone_mudstone: thin to thick beds of very fine grained sandstone separated by muddy layers and thin beds.
1910.89-1911.99 m	Sandstone: very fine to fine grained. Massive. Abrupt base/top.
1911.99-1914.19 m	Sandstone-mudstone: predominantly laminae to very thin beds of very fine grained sandstone interbedded with mudstone laminae to thin beds. Horizontal burrows are common. Load deformed beds are common. Fine laminae is the predominant sedimentary structure - commonly as wave and ripple laminae.
1914.19-1917.95 m	Sandy coquina dolostone/shelly sandstone: Sandstone is more abundant in lower 75 cm. Abundant moldic porosity.
1917.95-1920 m	Missing core

NOTE: the thin sandstone at 1909.21 - 1909.65 m is probably equivalent to the Halfway Fm., although too thin to rank as a formation.

14-17-73-6W6


Basal carbonate unit of the Charlie Lake Fm
Stromatolites
1909.21 m
Sandstone


Thin equivalent of the Halfway Fm
1909.65 m
DOIG FM

Huber et al Grande Prairie 6-15-73-7W6
Core 1: 1961-1979 m Rec. 17.9 m 17 boxes Full diameter
Core 2: 1979-1989 m Rec. 9.2 m 8 boxes Full diameter
Examined 15th February 2002
Observations are general in nature except for some specific beds.

CHARLIE LAKE FM

1961-1961.75 m	Mudstone: brick red.
1961.75-1964 m	Dolostone-mudstone: two dolostone beds separated by a mudstone interval (this interval corresponds to a distinct double-peaked gamma-ray response that is a common unit in htis part of the Charlie Lake Fm of the Wembley area). Massive upper dolostone bed. Lower dolsotone contains chicken-wire anhydrite nodules.
1964-1967.5 m	Mudstone: brick red.
1967.5-1968.75 m	Dolostone: possibly anhydritic
1968-75-1972.5 m	Mudstone: brick red.
19712.5-1973 m	Dolostone:
1973-1974 m	Mudstone: brick red. Basal contact has up to 4 cm of relief and has a corroded appearance.
1974-1974.08 m	Dolostone: finely laminated. Abrupt basal contact marked by a 1 mm-thick clay seam.
1974.08-1975.13 m	Dolomitic sandstone: fine grained with scatterd coarse, black chert. Massive.
1975.13-1975.39 m	Dolostone: coarsely laminated to very thinly bedded
1975.39-1975.46 m	Dolomitic sandstone: scattered coarse chert grains.
1975.46-1977.02 m	Dolostone: medium grey. Very thinly bedded. Scattered anhydrite nodules. Horizontal fractures filled with dolomite or anhydrite. A few are partially open (mm-wide)

HALFWAY FM

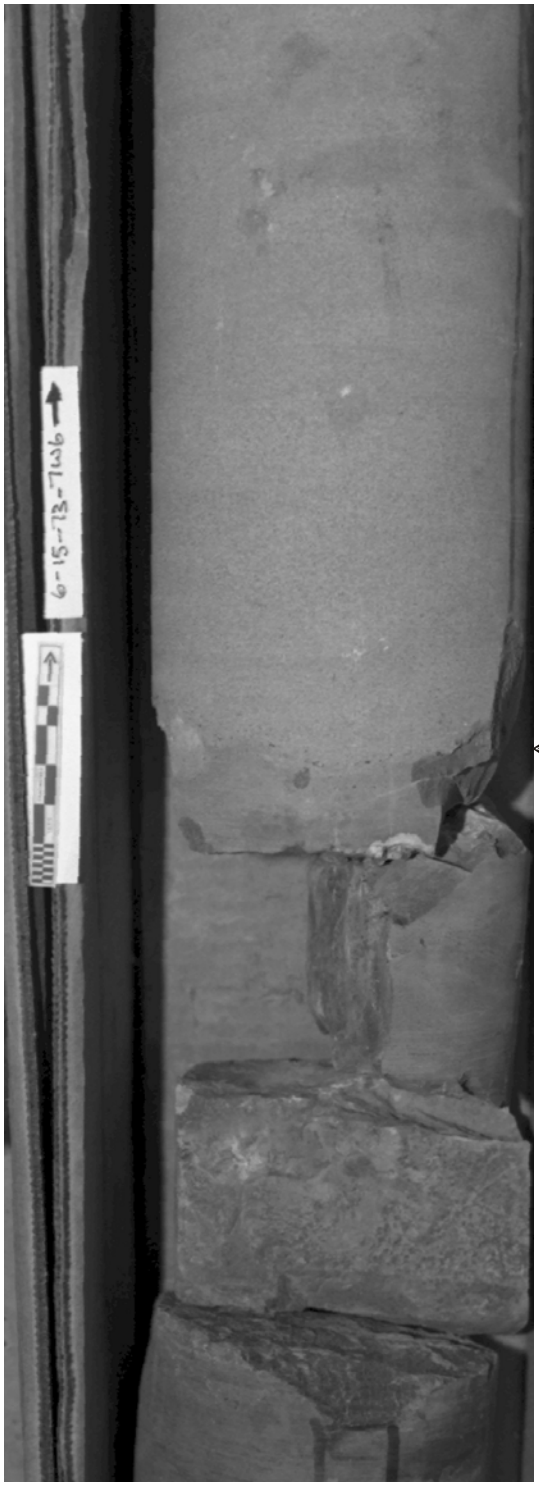
1977.02-1978.52 m	Sandstone: fine grained with some coarse black chert grains at base. Erosional basal contact. ISPG photo 4733-67 and 68, basal contact.

DOIG FM

1978.52-1988.2 m	Mudstone-sandstone: interbedded very fine grained sandstone and mudstone. Lower part of interval forms a coarsening-upward interval
1988.2-1989 m	Missing core

NOTE: possible major erosion surface at 1978.52 m

6-15-73-7W6



PCP Esso Resources Beaverlodge 7-1-73-8W6
Core 1: 2014-2032 m Rec. 12.5 m 11 boxes Slabbed
Examined 21st February 2002

CHARLIE LAKE FM

2014-2015.5 m	Mudstone: brick red. Dolomite mottling. Contains two 8-10 cm thick beds of anhydrite/dolomitic anhydrite; plus several 1-2 cm thick beds of anhydrite in the lower 10 cm. Abrupt basal contact.
2015.5-2015.73 m	Anhydrite: vaguely bedded. Abrupt basal contact marked by a mm-thick clay seam.
2015.73-2015.97 m	Dolostone: argillaceous. Pseudo-breccia fabric due to intense dolomitization and bed disruption. Diffuse basal contact.
2015.97-2017.07 m	Mudstone: brick red. Dolomite mottling. Disrupted basal contact.
2017.07-2017.43 m	Dolostone-anhydritic dolostone: Coarsely laminated to very thinly bedded. Irregular bedding. Load deformed basal contact.
2017.43-2018.18 m	Mudstone: brick red. Dolomitic. Scattered anhydrite nodules and lenses. Contains a highly disrupted bed of dolostone in middle of unit. Abrupt basal contact.
2018.18-2018.38 m	Dolostone: slight reddish tint. Uneven to disrupted bedding.
2018.38-2020 m	Dolostone: light grey. Core broken into small segments. Some fragments contain undulose coarse laminae (?stromatolites). Basal contact not preserved but there is a rapid lithological change.

HALFWAY FM

2020-2026.35 m	Sandstone-coquinal sandstone: multiple beds of coquinal sandstone and very fine grained sandstone. Medium angle cross beds are common. Patchy dolomitization of the coquinal beds. Coquinas are more common in the lower two-thirds of the interval. Basal contact not preserved but there is a rapid lithological change.

DOIG FM

2026.35-2026.5 m	Shale: dark grey. Fissile.
2026.5-2032 m	Missing core.

NOTE: possible major erosion surface at 2026.35 m.

PCP Esso Wembley 6-2-73-8W6
Core 1*:* 2042-2060 m.
Rec. 17.9 m. 13 boxes. Full diameter.
Examined 9th December 1998

CHARLIE LAKE FM

2042-2042.37 m	Mudstone: reddish brown with yellowish grey parches and layers of dolomite/anhydrite. Brecciated/disrupted fabric. Some thin remnant patches of laminated/thinly bedded mudstone. Basal bed is a dolostone resting abruptly, and load deformed, on underlying mudstone.
2042.37-2042.46 m	Mudstone: reddish brown. Brecciated/disrupted fabric.

2042.46-2045 m	Anhydrite-dolostone: generally coarsely interlaminated dolomite-anhydrite. Mostly dolomite. Some contorted laminae. Abrupt basal contact.
HALFWAY FM	
2045-2045.92 m	Sandstone: yellowish to brownish grey. Fine grained. Patchy development of replacement calcite. Cross bedded. Erosional base resting on a deformed bed of mudstone.
2045.92-2046.12 m	Dolomitic sandstone: Mostly fine grained with scattered coarse grains. Mottled due to incipient development of dolomite. Top 15 cm consists of contorted fine laminae of clay (possibly some carbonate). A thin coarse-grained sandstone bed between the contorted beds at the top of interval and the underlying finer grained sandstone.
2046.12-2051.03 m	Sandstone: brownish light to medium grey with mottled texture due to incipient calcite cement. Fine to medium grained. Medium grained sandstone tends to be concentrated in upper 1 to 1.15 m of interval. Sets of low-angle cross beds. Basal contact masked by calcite cement but is associated with a zone of calcite/anhydrite nodules.
DOIG FM	
2051.03-2051.43 m	Mudstone: grades up into very fine grained sandstone. Abrupt basal contact. Sandstone is argillaceous, very fine grained and load deformed. Sandstone may be strongly bioturbated.
2051.43-2054.33m	Coarsening-upward succession: mudstone-dominated lower 25 cm interlaminated and thinly interbedded with planar laminated (commonly contorted), very fine grained sandstone. Lower 25 cm abruptly overlain by a 5-7 cm thick sandstone bed containing tabular mudstone clasts. In turn overlain by interbedded and interlaminated sandstone and mudstone grading up into thoroughly bioturbated and load deformed argillaceous, very fine grained sandstone. About 5 cm above the clast-bearing bed there is a 5 cm thick sandy unit with distinct, horizontal burrows - a circle or ellipse of light grey/white material enclosing a core of darker grey material. Patchy development of calcite in the bioturbated sandstone zones.
2054.33-2059.37 m	Sandstone-shelly sandstone: top and base of interval marked by sandy limestone to shelly sandstone beds. Uppermost bed is 75 cm thick; lowermost bed is 98 cm thick. Both of these beds have erosional bases overlain by a zone a few cm-thick rich in mudstone clasts. Uppermost bed also has clasts scattered throughout and a prominent, 7-8 cm thick, clast-rich zone at top of bed. Both shelly sandstone units appear to be single depositional units. Between the shelly sandstone beds are brownish medium grey beds of fine grained sandstone. Massive or cross bedded. The upper beds contain mudstone clasts. There is at least one vertical burrow in this interval. Multiple beds present but difficult to identify individual beds. 2.5 m of strata immediately above the basal shelly sandstone appear to be a single, cross bedded, depositional unit.
2059.37-2060 m	Mudstone: lenses, laminae and very thin beds of silt/very fine sand.

Minor bed deformation.

N.OTE. There is a very prominent gamma-ray log "kick" at 2056.5 m that does not appear to be reflected in the lithological succession, unless a bed rich in mudstone clasts is affecting the gamma-ray response.

Total PCP Some Wembley 8-4-73-8W6
Core 1: 2101-2119 m Rec. 17.15 12 boxes Slabbed
Examined 21st February 2002

Note: log response does not appear to correspond to core depths. Logs about 1.5 to 2 m deeper than core depths. The log response suggests that the core starts in Charlie Lake facies but a thin unit of dolomitic, cross bedded sandstone occurs at the top of the core. Basal contact of the sandstone not readily interpreted.

Lower 2.5 m consists of fine grained, cross bedded sandstone overlain abruptly by mudstone with silt/sand laminae, in turn grading up into interbedded sandstone-mudstone

Total Dome Wembley 7-5-73-8W6
Core 1: 2111-2129.3 m Rec. 18.3 m 13 boxes Slabbed
Core 2: 2129.3-2146.5 m Rec. 18.2 m 13 boxes Slabbed
Examined February 2002

CHARLIE LAKE FM

2111-2113.25 m	Mudstone: brick red. Dolomite mottling. Highly disrupted fabric. Breccia-like in places. Thin bands of dolostone near base. Abrupt basal contact.
2113.25-2114.85 m	Dolostone-anhydritic dolostone: Coarsely laminated - undulose and some small domes (probably stromatolites). Minor amount of distorted laminae. A few interbeds of red mudstone up to 12 cm thick. Basal contact is a transition zone of interlaminated to thinly interbedded red mudstone and dolostone.
2114.85-2116.5 m	Mudstone: brick red. Partially dolomitized - gives mottled appearance.
2116.5-2118.6 m	Dolostone: Light grey. Coarsely laminated - undulose and a few small domes (stromatolites). A few thin interbeds of red mudstone in upper half. Abrupt basal contact.
2118.6-2120.35 m	Mudstone: brick red. Small to large veins and beds of anhydrite and dolomite. Abrupt, brecciated lower contact.
2120.35-2122.75 m	Dolostone: light grey. Very finely crystalline. Sandy in places. Badly broken core. Basal contact not preserved but lithological change is abrupt.

HALFWAY FM

2122.75-2138.95 m	Sandstone-coquina sandstone: Series of fining-up beds varying from 20 cm t o1.5 m thick. A few beds fine up into very thin muddy intervals (usually <10 cm thick). Fine grained with some medium and coarse grains,

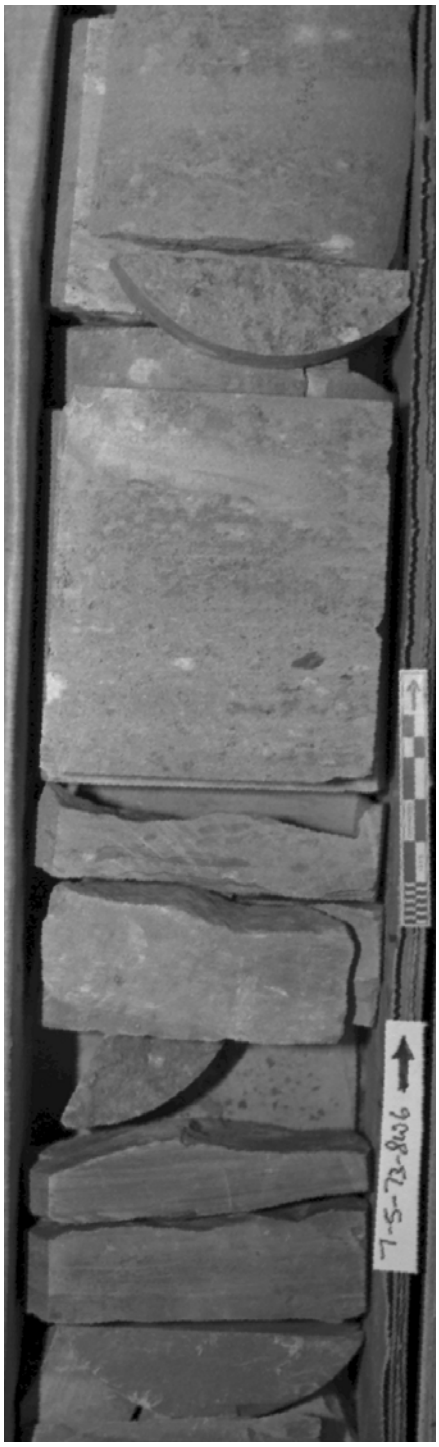
	and granules - coarser grains usually present at base of beds. Cross beds throughout -medium to high angle. Incipient dolomitization. Coquinal parts of beds are very porous - moldic porosity. About mid-way through interval there is a 10 cm band of replacement anhydrite. Basal contact not preserved but lithology changes abruptly.
DOIG FM	
2138.95-2147.5 m	Mudstone: dark grey. Laminae and lenses of silt-very fine grained sand, and a few very thin beds.

NOTE: possible major erosion surface at 2138.95 m

7-5-73-8W6

Stromatolites in the lower
Charlie Lake Fm
(interval 2116.5 - 2118.6 m)

7-5-73-8W6



HALFWAY FM

2138.95 m

DOIG FM

Total PCP Dome Wembley 1-10-73-8W6
Core 1*:* 2053-2069 m.
Rec. 13.15 m. 12 boxes. Boxes 1-8 full diameter; 9-12 slabbed.
Core 2*:* 2069-2073 m.
Rec. 4.05 m. 4 boxes. Slabbed.
Core 3*:* 2073-2090.25 m.
Rec. 18.58 m. 17 boxes.
9th December 1998

CHARLIE LAKE FM

2053-2053.71 m	Mudstone: reddish brown. Interbedded with lighter coloured dolostone. Thin (1-8 cm) laminated beds; some are load deformed - especially in lower 20 cm. Gradational basal contact.
2053.71-2056.03 m	Dolostone: light grey. Mottled to crudely bedded. Very finely crystalline. Gradational basal contact.
2056.03-2057.11 m	Mudstone: reddish brown. Contains zones of coarsely brecciated dolostone and anhydrite. Abrupt basal contact.
2057.11-2057.37 m	Anhydrite: light grey. Gradational basal contact.
2057.37-2059.57 m	Mudstone: reddish brown. Some patches rich in dolostone. Disrupted fabric. Mottled appearance.
2059.57-2061.87 m	Anhydrite: massive to faintly laminated. Abrupt basal contact.
2061.87-2064.13 m	Mudstone: reddish brown. Contains large dolostone clasts. Disrupted-brecciated fabric. Thick (1-2 cm), dolomite/anhydrite-filled subhorizontal and subvertical fractures. Basal 10 cm is finely laminated, grading up into thicker, contorted beds. Lowermost 3 cm contains thin interbeds of anhydrite. Abrupt basal contact.
2064.13-2065.76 m	Dolostone: light grey. Alternating intervals of massive and finely laminated dolostone. Basal 18 cm contains coarse, undulose laminae (?stromatolites). Basal contact is abrupt and marked by a 2 mm thick clay layer.

DOIG FM

2065.76-2066.96 m	Sandstone: light grey. Very fine grained. Thin (<1 cm) interbeds of mudstone. Sandstone beds 10-30 cm thick; mostly massive, or unevenly laminated where clay is present.
2066.96-2069 m	Missing core.
2069-2070.5 m	Sandstone: very fine to fine grained; thin to thick beds separated by argillaceous sandstone or thin mudstone intervals. One bed contains subangular mudstone clasts up to 2 cm long grading up into sandstone with smaller, rounded clasts. Uneven to undulose bedding.
2070.5-2079.25 m	Sandstone: fine grained. Mostly massive; some planar laminae and low angle cross-laminae between 2070.5 and 2075 m. Below 2075 m there is an increase in mudstone interbeds. Sandstone beds below 2075 m are plane bedded and commonly load deformed. At about 2077.62 m there is a bed with rounded mudstone clasts up to 2 cm long.
2079.25-2081.8 m	Mudstone: interlaminated to interbedded (<4 cm thick beds) with very fine

grained sandstone. Also some lenticular beds of sandstone. Planar bedding/laminae; some of thicker sandstone beds are load deformed. Rests abruptly on underlying strata, although contact is not well preserved.

N.B. Interval 2069-2081.8 m part of a coarsening-upward succession.

2081.8-2090.25 m Sandstone: light grey. Very fine grained.
At 2083 m there is a 19-20 cm thick pebbly zone overlain by generally massive appearing very fine grained sandstone (latter may consist of at least two beds). Pebbly sandstone rests abruptly on a 24 cm thick bed of very fine grained, finely laminated sandstone; in turn gradationally overlying about 20 cm of bioclastic sandstone. Bioclastic sandstone is uniform in appearance, light to medium grey, very fine grained with a few scattered, 1-2cm thick clay-rich zones. These features indicate that there a multiple beds.
Basal 9 cm consists of 1-2 cm thick sandstone beds separated by thin clay-rich layers <1cm thick. Sandy beds are load deformed.
Overall coarsening-upward aspect to interval.

Dome et al. La Glace 7-15-73-8W6
Core 1: 2045-2060 m
Rec. 15.38 m (measured more than official recovery!). 11 boxes. Slabbed
Core 2: 2060-2075 m
Rec. 13.43 m. 10 boxes. Slabbed.
Examined 27/28 July 1999.

HALFWAY FM

2045-2045.77 m Sandstone: fine to medium grained. Mottled light to medium grey**;** mottling (patches or parallel to beds) due to incipient carbonate (?) cementation. Planar cross bedded with at least one set of ripple cross laminae climbing up cross beds. Multiple beds. Basal bed rests erosionally on underlying strata.

DOIG FM

1045.77-2046.55 m Interbedded and interlaminated very fine-grained sandstone-mudstone:
Upper part of interval consists of thin to medium beds of load deformed sandstone and mudstone; lower part consists of finely laminated sandstone-mudstone (with small lenses of current-ripple laminated sandstone). Basal contact is abrupt.

2046.55-2049.56 m Sandstone: very fine to fine grained with a few thin beds of coarse grained to granular sandstone in upper 75 cm. Three zones of laminated and deformed mudstone. Most of the lower sandstone beds are load deformed. Upper, coarser grained beds have carbonate cement and there is one three cm-thick zone rich in anhydrite nodules. Basal beds rests abruptly on underlying strata.

2049.56-2053.74 m Sandstone interbedded with mudstone/argillaceous sandstone: very fine to fine grained. Finely laminated, lenticular beds, and many load deformed beds. Gradational change from underlying interval.

2053.74-2057.28 m Mudstone: dark grey to black. Fine laminae and small lenses of silt/very fine sand. Rests abruptly on underlying interval.

2057.28-2058.47 m Sandstone: very fine to fine grained. 7-20 cm-thick beds of massive or finely laminated sandstone. Upper few cm consists of argillaceous sandstone to sandy mudstone that has very low-angle intersecting laminae (?HCS) and some deformed bedding. Basal 3 cm consists of finely laminated mudstone.

2058.47-2059.5 m Sandstone: fine to medium grained with shell-rich zones at the base of individual beds. At least 4 beds, 20-30 cm-thick. Ideal bed has the following vertical succession: erosional base - few cm of bioclastic sandstone - massive or cross bedded sandstone - sandstone with mud laminae. The uppermost, muddy part of a bed may be absent. Base of interval not preserved, but abrupt lithological change from fine grained sandstone below to bioclastic sandstone above suggests abrupt, probably erosional base.

NOTE: interval 2057.28-2059.5 m has an overall fining-upward aspect.

2059.5-2066.5 m Sandstone: very fine grained. "Cleaning-" or coarsening-upward aspect to interval (decreasing mudstone/argillaceous sandstone up-section). Predominantly massive or vaguely bedded sandstone in upper two-thirds; faintly laminated and load deformed in lower third, where there is more interlaminated mudstone. Gradational change from underlying unit.

2066.5-2069.83 m Interbedded sandstone-mudstone: thin to medium beds of mostly load deformed, argillaceous, very fine grained sandstone, interbedded with silty mudstone, also load deformed. Some remnants of fine laminae seen in a few beds.

2069.83-2071.34 m Mudstone: dark grey to black. Silty. Finely laminated, massive, or load deformed.

2071.34-2075 m Missing core.

NOTE possible major erosion surface at 2445.77 m

Dome et al Wembley 6-16-73-8W6
Core 1*:* 2110-2128 m. Rec. 17.55 m. 17 boxes. Full diameter.
Examined 10th December 1998

CHARLIE LAKE FM

2110-2111.25 m	Anhydrite-mudstone: anhydrite is dominant lithology occurring as massive beds or as large clasts within the mudstone. Reddish brown mudstone with breccia-like fabric.
2111.25-2112.35 m	Mudstone: reddish brown. Contains thick ?beds of anhydrite as well as anhydrite clasts. Brecciated/disrupted fabric. Abrupt base and top.
2112.35-2113.1 m	Anhydrite: light grey; ranges from thin beds and coarse laminae to massive.
2113.1-2113.42 m	Mudstone: reddish brown. Brecciated/disrupted fabric. Clasts and irregular patches of dolomite/anhydrite.
2113.42-2114.12 m	Anhydrite: mostly massive with coarse laminae in basal 20 cm. Abrupt base and top.

HALFWAY FM

2114.12-2116.51 m	Sandstone: brownish grey; predominantly fine grained with some coarse grains present at bases of individual beds. Cross bedded. Porous. Incipient calcite cement, especially along cross beds. Base of interval is an erosion surface overlain by a mm-thick zone containing small granules and resting on a thin mudstone layer.
2116.51-2117.32 m	Sandstone: argillaceous, very fine grained. Interval capped by 8-10 cm of finely laminated sandy dolostone. Scattered medium grains. Base of interval marked by a 2 mm thick clay layer resting abruptly on underlying sandstone. Bulk of interval contains undulose clay laminae and a few discrete, thicker (2-4 cm) mudstone beds.
2117.32-2118.96 m	Sandstone: similar to unit 2114.12-2116.51 m. Basal 15 cm marked by abundance of medium to coarse grains. Abrupt basal contact.
2118.96-2119.97 m	Sandstone: very fine grained; argillaceous. Undulose, wispy clay laminae. Clotted appearance. Gradational basal contact.
2119.97-2123.12 m	Sandstone: light grey. Mostly fine grained with scattered coarse grains and granules. Some calcareous zones may contain highly comminuted shell debris. Mostly massive in appearance with traces of cross bedding. Abrupt, erosional basal contact.
2123.12-2123.22 m	Mudstone: medium grey. Lenses of very fine grained sandstone in basal 6 cm. Gradational into underlying beds.
2123.22-2125.02 m	Sandstone: light grey grading into brownish grey. Erosional basal contact. Lower part is fine grained with scattered mudstone clasts, granules and very small pebbles; massive in appearance. Upper half mostly fine grained with some coarser grains on cross beds; a few zones with mudstone or carbonate clasts. Overall fining-upward trend.
2125.02-2125.1 m	Mudstone: dark grey; silty laminae and lenses. Gradational base.
2125.1-2128 m	Sandstone: overall coarsening-upward aspect. Basal 90 cm consists of thinly interbedded and coarse laminae of very fine grained sandstone-siltstone-mudstone with load deformed lenticular beds. Grades up into

thicker beds of argillaceous, very fine grained sandstone - commonly load deformed and a few brecciated beds due to severe bed disruption.

NOTE: possible major erosion surface at 2116.51 m

Dome et al Laglace 11-18-73-8W6
Core 1: 2123-2126.6 m Rec. 3.8 m 4 boxes Full diameter
Core 2: 2126.6-2134.4 m Rec. 7.65 m 8 boxes Full diameter
Examined February 2002.

CHARLIE LAKE FM

2123-2123.33m	Shale: Dark grey to black. Fissile to blocky. Core badly broken.
2123.33-2123.99 m	Dolostone: light grey. Coarsely laminated to crudely bedded. Contains a few very thin beds and lenses of red mudstone. Disrupted fabric in places. Possibly brecciated basal contact.
2123.99-2125.29 m	Mudstone: brick red. Lower part of interval contains clast-like and veins of anhydritic dolostone.
2125.29-2125.69 m	Anhydrite-dolomitic anhydrite: Cut by horizontal and some vertical veins of anhydrite. Abrupt basal contact.
2125.69-2126.6 m	Dolostone: light grey. Very finely crystalline. Upper 15 cm has brecciated appearance (densely packed “clasts”) - possibly diagenetic fabric. Remainder is more uniform in appearance.
2126.6-2126.72 m	Shale: black. Fissile to blocky.
2126.72-2128.22 m	Dolostone: Light grey. Crudely bedded to uniform. Near base of interval are some coarse laminae to very thin beds. A few scattered 2-5 cm-thick mud beds - tend to be mildly deformed. Basal contact is abrupt and marked by a 2 mm-thick clay layer.

?HALFWAY or DOIG FM

2128.22-2134.4 m	Sandstone: argillaceous, very fine to fine grained. Thin to thick beds of sandstone separated by argillaceous partings or thin/thick muddy sandstone. Poorly bedded to massive.

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Dome et al Wembley 6-20-73-8W6
Core 1*:* 2098-2116.4 m. Rec. 16.55m. 12 boxes. Full diameter.
10th December 1998

HALFWAY FM

2098-2104.6 m	Sandstone: fine to medium grained; salt-pepper appearance. Overall brownish grey colour. Cross bed sets. Incipient calcite cement, especially common along bedding planes.
2104.6-2105.22 m	Dolostone/sandy dolostone: light grey; very thinly bedded. Basal 5 cm consists of mudstone. Upper 10 cm consists of argillaceous, very fine grained sandstone.
2105.22-2105.6 m	Sandstone: two sandstone beds separated by mudstone layers. Very fine grained with scattered coarse grains.
2105.6-2108.08 m	Sandstone: fine to medium grained; brownish grey; cross bedded. Incipient calcite cementation gives blotchy appearance. Basal contact appears to be abrupt.
2108.08-2110.16 m	Sandstone: very fine grained; some zones of argillaceous sandstone or zones with clay laminae. Thin undulose beds separated by clay partings. Possibly a few horizontal burrows. Apparent gradational base.
2110.16-2116.4 m	Sandstone: light to whitish grey. Fine to medium grained with scattered coarse and granule-size grains. Small pebbles to large clasts present at several horizons. Several horizons rich in calcite nodules or replacement calcite. Some slay laminae. A few styolites. Lithological features indicate multiple beds but individual beds are difficult to identify.

NOTE: possible major erosion surface at 2104.6 m.

Chiefco et al. La Glace 10-31-73-8W6
Core 2: 2052-2061.4 m
Rec. 5.3 m. 4 boxes. Full diameter.
Core 3: 2061.4-2079.4 m
Rec. 18 m. 13 boxes. Full diameter.
Examined 28/29 July 1999.
Based on log response/core lithology the missing cored interval in core 2 is from both the top and bottom of the core.

DOIG FM

2052-2053.95 m	Missing core
2053.95-2055.3 m	Mudstone: medium to dark grey. Contains very thin beds, lenses and laminae of coarse silt to very fine sand.
2055.3-2055.47 m	Sandstone: very fine grained. Contains lenses and laminae of mudstone. Load deformed very thin to thin beds (few mm to 5 cm thick). Abrupt base/top to interval.
2055.47-2059.53 m	Mudstone: medium to dark grey. Overall upward increase in silt/sand content - occurs as fine laminae and lenses, with a few cm-thick beds.

	Minor load deformation of lenticular beds. Interval tends to be sandy in basal 8 cm.
2059.53-2061.4 m	Missing core
2061.4-2064 m	Sandstone: very fine to fine grained; thin to thick beds separated by very thin mudstone interbeds/layers. Finely laminated sandstone - subhorizontal and current-ripple laminae. Some load deformation structures. Scattered anhydrite nodules with a concentration of nodules in the basal 4 cm. Basal beds rests erosionally on underlying strata.
2064-2068 m	Interlaminated to interbedded mudstone-sandstone/siltstone: Laminae to very thin beds. Overall tendency for sandstone beds to thicken upward. Finely laminated throughout. Scattered or local concentrations of anhydrite nodules. Minor load deformation of some sandstone beds. Gradational change from underlying interval.
2068-2069.77 m	Interbedded sandstone-mudstone: very thin to medium beds of very fine grained sandstone interbedded with very thin to thin beds of mudstone. Approximately 50% of each lithology. Planar and current-ripple laminae. Load deformed sandstone beds common. Gradational change from underlying interval.
2069.77-2071.59 m	Interlaminated to interbedded sandstone-mudstone: About 60% sandstone. Mostly fine laminae with a few very thin beds or lenses of sandstone. Some load deformed beds. A concentration of anhydrite nodules about 8 cm above base of interval. Gradational change from underlying interval.
2071.59-2079.4 m	Mudstone: with laminae, lenses and very thin beds of very fine-grained sandstone/coarse-grained siltstone. Overall coarsening-upward aspect to interval. Scattered small anhydrite nodules. Local load deformation structures, especially in sandier parts.

NOTE:
a) Interval 2079.4-2064 m has a coarsening-, then fining-upward succession , with no apparent sedimentary break (i.e., prominent bed or erosion surface) between the two differing successions.
b) the gamma-ray log suggests the presence of a distinctly sandy interval between 2055-2061 m, yet the core indicates it is a succession of mudstone and sandstone!

AEC ERL Wembley 14-32-73-8W6
Core 1*:* 2036-2053.4 m.
Rec. 17.3 16 boxes. Slabbed
Core 2*:* 2053.4-2071.8 m.
Rec. 18.4 m. 17 boxes. Slabbed
Examined 12th December 1998

DOIG FM (starts in an ATSB)

2036-2037.66 m	Interbedded sandstone-mudstone: Very fine grained, argillaceous sandstone in beds a few cm to 23 cm thick, separated by beds/layers, 1 to 8 cm thick, of mudstone and muddy sandstone. Sandstone beds generally lacking in structures, although a few traces of fine laminae were noted. Base of this interval corresponds to a significant gamma-ray log "kick" yet there is very little in the lithology to indicate such a dramatic response. Appears to be a thin transitional basal contact from sandstone to mudstone.
2037.66-2041 m	Sandstone: series of fining-upward beds, 6 to 20 cm thick. Typical bed consists of: basal erosion surface - sandstone with fine laminae sets with low-angle intersections and diverging laminae (probably HCS) - grading up into mudstone or interlaminated sandstone-mudstone with ripple cross-laminae. Basal 60-80 cm of interval is richer in mudstone and the sandstone beds tend to be massive or faintly laminated. General upward increase in well laminated beds.
2041-2060.8 m	Sandstone: very fine to fine grained. Medium grey. Differs from overlying interval in that the beds are thicker, cross laminae are coarser, mudstone layers are less common, and there are shelly sandstone zones at the base of several units. Individual beds can exceed 1 m in thickness. At about 2056 m there is some bed deformation. Below about 2055 m calcite-filled fractures and vugs are common. In general beds are not deformed or over-steepened, however the base of the interval is an abrupt lithological change and severely deformed and fractured, with calcite filling the fractures. About 20 cm above base there is a 10 cm thick, calcite-filled, horizontal fracture. Difficult to tell if basal contact is a load deformed contact or a structural discontinuity (i.e., slide plane).
Base of ATSB	
2060.8-2063 m	Interbedded sandstone-mudstone: dark grey colour. Very fine grained, argillaceous sandstone in beds 1-10 cm thick although most are 2-5 cm, separated by mudstone layers. Mild bed deformation throughout and some local bed-scale faulting. A few horizons of calcite-filled vugs. Rapidly gradational into underlying interval.
2063-2071.8 m	Mudstone: dark grey; silty to sandy. Bedding is faint. Apparently extensively load deformed. Scattered calcite-filled vugs/nodules.

Dome et al. Hythe 6-13-73-9W6
Core 3: 2177.6-2195.6 m
Rec. 18 m. 13 boxes. Full diameter

Appears that the core/log depths do no correspond. Prominent gamma-ray "kick" at log depth 2181 m probably corresponds to core depth 2183.36m. Core description uses core depths. Examined 4th August 1999

DOIG FM

2177.6-2183.6 m	Interbedded mudstone-sandstone: thin to medium beds of mudstone and sandstone; with a 30 cm thick bed between 2178.26-2178.56 m. Planar laminae dominate. Minor bed-load structures. Scattered anhydrite nodules (<2 cm) - nodules cross-cut laminae indicating post-depositional and post compactional nature of their origin. Rapidly gradational into underlying strata.
2183.6-2184.01 m	Sandstone: very fine grained; argillaceous. Erosional base. Massive appearance.
2184.01-2184.51 m	Interbedded mudstone-sandstone: very thin to medium beds of planar laminated, very fine to fine grained sandstone interbedded with silt-laminated mudstone. Two severely load deformed beds of sandstone.
2184.51-2185.13 m	Sandstone: very fine grained, argillaceous. Erosional base. Fining-upward bed (i.e., becomes more argillaceous upward). No apparent internal sedimentary structures.
2185.13-2192.03 m	Interbedded sandstone-argillaceous sandstone-mudstone: beds a few cm to 5 cm thick. Very fine to fine grained sandstone. Thicker sandy beds tend to have very low-angle cross laminae (?HCS perhaps) and/or current-ripple laminae. Beds usually have erosional base. Lowermost sandstone bed rests erosionally on underlying strata.
2192.03-2195.6 m	Interbedded mudstone-sandstone: Mudstone more prominent than in overlying interval. Overall upward increase in sandstone content. Planar laminae predominant sedimentary structure, with some current-ripple laminae and minor bed-load structures.

NOTE: maximum flooding surface probably at 2183.36 m and the interval 2183.36 to 2185.13 m may be transgressive facies.

Total PCP Hythe 14-16-73-9W6
Core 1: 2230-2248 m Rec. 18 m (measured 19.37m!!) 17 boxes Full diameter
Examined 21st February 2002

CHARLIE LAKE FM

2230-2232.07 m	Mudstone: medium grey. Dolomite mottling - especially intense in lower 30 cm.
2232.07-2233.12 m	Dolostone-anhydritic dolostone: thinly bedded to massive.
2233.12-2233.34 m	Mudstone: medium grey. Dolomite mottling. Abrupt basal contact.
2233.34-2234.12 m	Dolostone-anhydritic dolostone: thinly bedded to massive
2234.12-2238.57 m	Mudstone: brick red in lower half grading up into medium grey. Dolomite mottling. A few very thin beds of dolostone. Abrupt basal contact marked by a mm-thick clay seam.
2238.57-2239.27 m	Dolostone: light grey. Very thinly bedded.
2239.27-2241.77 m	Mudstone: brick red. Contains a dolostone beds in upper third of interval. Dolomite mottling. Abrupt basal contact
2241.77-2243.77 m	Dolostone-anhydritic dolostone: Massive. Very finely crystalline. Several subhorizontal veins of anhydrite.
2243.77-2244.85 m	Mudstone: brick red. Minor dolomite mottling. Contains two 1.5 cm thick horizontal veins of anhydrite. Abrupt basal contact.
2244.85-2246 m	Dolostone: light grey. Massive. Veins of light grey dolomite. Abrupt basal contact marked by a 5 mm thick clay layer.

HALFWAY FM

2246-2248.3 m	Sandstone: brownish grey. Fine grained with medium grains at base of interval. Massive to poorly bedded. Basal contact not preserved.
2248.3-2249.37 m	Argillcaeous sandstone: very fine grained. Very thin, uneven sandstone beds separated by clay partings and thin mudstone layers.

NOTE: possible major erosion surface at 2248.3 m

Total et al Hythe 5-28-73-9W6
Core 1: 2188.5-2206.5 m
Rec. 17.64 m. 13 boxes. Slabbed. Good preservation.
Examined 19/20 April 1999

HALFWAY FM

2188.5-2191.12 m	Sandstone: medium to dark grey. Contains scattered horizons/beds with rounded carbonate clasts ranging from granule size up to 4 cm in diameter, although most are <1 cm. A few of the clast-rich horizons have current ripple laminae. Some beds have blotchy appearance due to incipient carbonate cement. Abrupt basal contact.
2191.12-2205.15 m	Sandstone: yellowish to light grey; mostly very fine grained with the basal zone of some beds containing fine to medium grains. Interval consists stacked, thick to very thick fining-upward units, each unit being abrupt-

based. In the lowermost beds bioclastic sandstone (predominantly bivalve debris) is prevalent - bioclasts become less common up-section. Most beds are massive in appearance with some beds containing crudely defined low-angle cross beds. Some units fine up into thin argillaceous zones, or sandstone with wispy clay laminae. Load deformation present in the argillaceous zones - but minor. Also present in some argillaceous horizons are a few horizontal burrows. The interval has an overall fining-upward character.

2205.15-2206.14 m Sandstone: light to medium grey; very fine grained; some clay seams. Mottled appearance in some beds due to incipient carbonate cement. Traces of laminae.

NOTE: possible major erosion surface at 2191.12 m

Total PCP Hythe 16-14-73-10W6
Core 1: 2248-2266 m Rec. 17.5 m 13 boxes Full diameter
Core 2: 2266-2270 m Rec. 4 m 3 boxes Full diameter
Examined 21st February 2002

CHARLIE LAKE FM

2248-2248.8 m Shale: dark grey to black. Blocky. Basal contact not preserved.

2246.8-2250.75 m Dolostone-anhydrite: very thin to thick beds. Lower 50 cm consists of very thinly bedded dolostone.

2250.75-2251.05 m Dolomitic mudstone: medium grey. Abrupt basal contact.

2251.05-2251.39 m Dolostone: thinly bedded.

2251.39-2255.02 m Mudstone interbedded with dolostone: brick red grading up into medium grey mudstone. Latter tends to contain more dolostone interbeds. Dolomite mottling. Abrupt basal contact - rests on a 2 cm thick anhydrite bed.

2255.02-2256.23 m Mudstone: greenish grey. Large patches and mottles of dolomitized mudstone. Abrupt basal contact.

2256.23-2256.67 m Dolostone: coarsely laminated to very thinly bedded. Abrupt basal contact.

2256.67-2257.1 m Mudstone: greenish grey. Dolomite mottling. Transitional basal contact.

2257.1-2257.62 m Dolostone-argillaceous doostone: coarsely laminated to very thinly bedded. Abrupt basal contact.

2257.62-2259.32 m Mudstone: greenish grey. Dolomitic. Basal 30 cm contains very thin dolostone interbeds. Abrupt basal contact.

2259.32-2259.94 m Dolostone: light grey. Uneven, very thin beds.

2259.94-2261.2 m Mudstone: medium grey. Basal 40 cm has a breccia-like appearance, with very large dolomite “clasts” in a mud matrix.

2261.2-2264.95 m Dolostone: Upper 1 m contains coarse laminae to very thin beds. Lower part of interval consists of thick beds of dolostone separated by argillaceous zones (latter have a pseudo-breccia appearance). Base of unit contains 5 cm thick zone of anhydrite nodules.

HALFWAY FM

2264.94-2266.83 m Sandstone: light to medium grey. Fine grained with shelly debris in lower part of unit. Consists of several beds. Upper 60 cm has a disrupted fabric. Rests erosionally on underlying bed with about 3 cm of relief.

DOIG FM

2266.83-2274 m Sandstone-mudstone: very thin to thick beds of very fine grained and argillaceous sandstone separated by mudstone and muddy sandstone layers. Vertical and horizontal burrows are common. Some local soft sediment deformation.

NOTE: possible major erosion surface at 2266.83 m.

16-14-73-10W6

Total PCP Hythe 3-28-73-10W6
Core 1: 2290-2308 m Rec. 4.3 m. 4 boxes.
Examined 19/20 April 1999

CHARLIE LAKE FM

2290-2291.1 m	Anhydrite: micro-breccia fabric. Abrupt basal contact.
2291.1 m-2291.88 m	Anhydrite: finely laminated to thinly bedded. Some bed distortion. Abrupt basal contact.
2291.88-2292.3 m	Dolostone/anhydrite breccia: Abrupt basal contact
2292.3-2292.75 m	Anhydrite: coarse laminae to thin beds. Distorted bedding.
2292.75-2293.46 m	Anhydrite: thin to thick beds with some brecciated beds containing large clasts.
2293.46-2294.12 m	Anhydrite: massive, crystalline; some enterolithic fabric.
2294.12-2294.48 m	Anhydrite/dolomudstone: mottled to massive fabric.
2294.12-2308 m	Missing core

Forest Esso Knopcik 16-22-73-11W6
Core 1: 2369.8-2387.8 m Rec. 16.7 m. 12 boxes. Full diameter. Well preserved.
Examined 19/20 April 1999

HALFWAY FM

2369.8-2370.68 m	Sandstone: light grey; fine grained; well sorted, well rounded quartz with some scattered black chert. Low-angle cross beds. Base marked by a 2-3 cm interval containing small, thin mud clasts. Basal contact abrupt, erosional and load deformed.
2070.68-2075.42 m	Sandstone: light to medium grey; very fine grained; argillaceous. Interval has overall coarsening/sanding-upward aspect. In detail consists of sandy intervals separated by muddy intervals. Thoroughly bioturbated. Upper half of interval contains scattered calcite-filled nodules. Basal contact is a rapid transition from interbedded mudstone-sandstone into bioturbated, argillaceous sandstone.

DOIG FM

2075.42-2075.84 m	Interbedded mudstone-sandstone: Lenticular beds of very fine grained sandstone interbedded with coarse laminae to thin beds of mudstone. Medium to dark grey. Minor horizontal burrowing. Some load deformation structures. Basal bed is a slightly coarser sandstone that is load deformed and rests abruptly on underlying strata.
2075.84-2081.07 m	Mudstone: dark grey to black. Upper 1 m is thoroughly bioturbated and silty. Lower part of interval mostly mudstone with laminae to very thin beds of coarse silt; minor load deformation. Abrupt basal contact.

N.B. Interval 2381.07-2370.68 is a coarsening-upward succession.

2081.07-2181.24 m	Sandstone: very fine to medium grained; argillaceous. Contains lenses of mudstone. No visible sedimentary structures. Basal contact either abrupt or very rapidly transitional.
2381.24-2382.12 m	Sandstone: light to medium grey; very fine grained, becoming more

argillaceous down-section. Uppermost 50 mm contains small (few mm) pyrite nodules - they appear to outline a small ripple at top of interval (are they diagenetic or reworked pyrite?).

2382.12-2382.69 m Mudstone: medium grey; silty. Burrow mottled. Abrupt basal contact,

N.B. Interval 2382.69-2381.07 is a coarsening-upward succession.

2382.69-2384.08 m Sandstone: light to medium grey; very fine grained; varies from slightly to extensively argillaceous. Mostly bioturbated with at least one 10-12 cm bed containing fine, low-angle cross laminae. Basal contact is abrupt and load-deformed.

2384.08-2387.34 m Mudstone: sandy and silty; medium to dark grey. Thoroughly bioturbated with a few traces of bedding. Gradual downward decrease in sand/silt content. Minor calcite-filled nodules.

NOTE:
Possible major erosion surface at 2370.68 m.

Interval 2387.34-2382.69 m is a coarsening-upward succession.

Last box contains large core fragments of:

1. Laminated, very fine grained sandstone
2. Bioturbated, argillaceous sandstone
3. Silty/sandy, bioturbated mudstone.

The stratigraphic placement of these fragments is uncertain.

Home et al Sinclair 10-22-73-12W6

Core 1: 2507.2-2525.4 m Rec. 10.3 m. 10 boxes. Full diameter core. Well preserved. Examined 19/20 April 1999

CHARLIE LAKE FM

2507.2-2507.81 m Anhydrite: yellow-grey. Thin to thick beds; distorted to completed contorted bedding. Interbeds of dark grey mudstone or anhydrite. Basal 5 cm finely laminated. Abrupt basal contact.

2507.81-2508.56 m Anhydrite: coarse laminae to thin beds; yellow-grey. Some horizons of convoluted bedding. There is at least one high-angle slump/slide plane preserved.

2508.56-2111.16 m Interbedded anhydrite and anhydritic mudstone: medium to dark grey; thin to thick beds of mudstone interbedded with nodular anhydrite layers and thin to thick beds of anhydrite. Anhydrite beds are crudely bedded to highly contorted. Abrupt, load deformed basal contact and rests on a mm-thick black shale bed.

2511.16-2512.11 m Anhydritic mudstone/siltstone: light to medium grey; highly disrupted and deformed beds. Minor amounts of fine grained sandstone. Abrupt basal contact - rests on a 2 mm thick black shale.

HALFWAY/DOIG FM

2512.11-2512.83 m	Sandstone: medium grey; fine grained; low-angle cross beds. Blotchy appearance due to incipient development of carbonate cement. Abrupt, erosional contact.
2512.83-2517.5 m	Interbedded sandstone-mudstone: Thick to very thick beds of light grey, thoroughly bioturbated or massive, very fine grained sandstone interbedded with thinner beds of medium to dark grey, silty, bioturbated mudstone. Traces of laminae in a few beds. Calcite-filled nodules (mostly 1-2 cm diameter, a few up to 5 cm) in a few beds. (Difficult to be totally convinced but this interval appears to consist of sandstone-to-mudstone, fining-up units).

Lowermost preserved piece of core is a light grey, coarse grained to granular sandstone.

NOTE: possible major erosion surface at 2512.83 m

Core 2: 2527.7-2534.8 m
Rec. 1.17 m. 1 box. Full diameter core.

DOIG FM
Mudstone: Medium to dark grey; silty; argillaceous siltstone. Thoroughly bioturbated with at least one thin bed preserving silt laminae.

Core 3: 2534.8-2546.4 m
Rec. ? 5 boxes. Full diameter core. Well preserved.

DOIG FM (ATSB)
Sandstone: very fine grained - possibly coarse silt in places; argillaceous; dark grey. Thin to thick beds; bioturbated, massive or finely laminated. Beds separated by very thin argillaceous sandstone horizons. A few beds containing mm-size mud clasts.

N.B. the log character suggest a coarsening-upward aspect but this is not readily apparent from the cored interval.

Core 4: 2546.4-2551.9 m
Rec. ? 5 boxes. Full diameter core. Well reserved.

DOIG FM (ATSB)
Sandstone: similar to core 3. There are a few discrete 5-10 mm thick mudstone beds.

Core 5: 2552-2570.2 m
Rec. ? 14 boxes. Full diameter core. Well preserved.

DOIG FM (ATSB)
Sandstone: similar to core 3 and 4. Some load deformation associated with the more argillaceous/mudstone layers. Mostly massive sandstone. Basal 1.5 m more argillaceous than upper part of cored interval and contains scattered horizontal burrows

Home et al Sinclair 8-27-73-12W6
Core 1: 2480.3-2498.3 m Rec. 17.5 m 16 boxes
Examined 21st February 2002

CHARLIE LAKE FM

2480.3-2483.73 m	Dolostone: light to medium grey. Finely laminated to very thinly bedded, to massive. Top 60 cm has a brecciated fabric - appears to be due to in situ bed disruption. Abrupt basal contact marked by 1 cm of very finely laminated (?stromatolites) dolostone.

HALFWAY FM

2483.73-2486 m	Sandstone: light to medium grey. Top 5 cm is dolomitized. Fine grained. Vaguely cross bedded to massive in lower half; argillaceous in upper half. Basal contact not preserved.
2486-2487.8 m	Sandstone: series of fining-up beds. Some beds contain mud clasts. Beds fine up into muddy layers. Sandstone becomes more argillaceous towards top of interval.

Remington Sinclair 8-23-73-13W6
Core 1: 2618.9-2632.5 m Rec. 7.25 m. 7 boxes. Full diameter core. Good preservation although core broken into short segments.
Examined 19/20 April 1999

Core depths may be 1 m higher log depths.

HALFWAY FM

2618.9-2620 m	Sandstone: light grey in upper 80 cm, medium grey below this point. Very fine grained, well sorted quartz. Medium grey areas tends to contain more chert. Calcareous. Low-angle cross bedding. Basal contact not preserved but major facies change suggest an abrupt contact.

?DOIG FM

2620-2626.15 m	Sandstone: with some mudstone interbeds. Very fine grained; light to medium grey. Mostly thoroughly bioturbated - resulting in near-complete mixing of argillaceous material into sandstone and seen as blebs, streaks or lenses. Lower part of interval has more argillaceous zones. Some beds are calcareous.

NOTE: possible major erosion surface at 2620 m

Rife Sexsmith 14-3-74-6W6
Core 1: 1860-1878 m Rec. 17.3 m 13 boxes Full diameter
Examined 21st February 2002

This core illustrates the Charlie Lake Fm resting directly on Doig Fm.

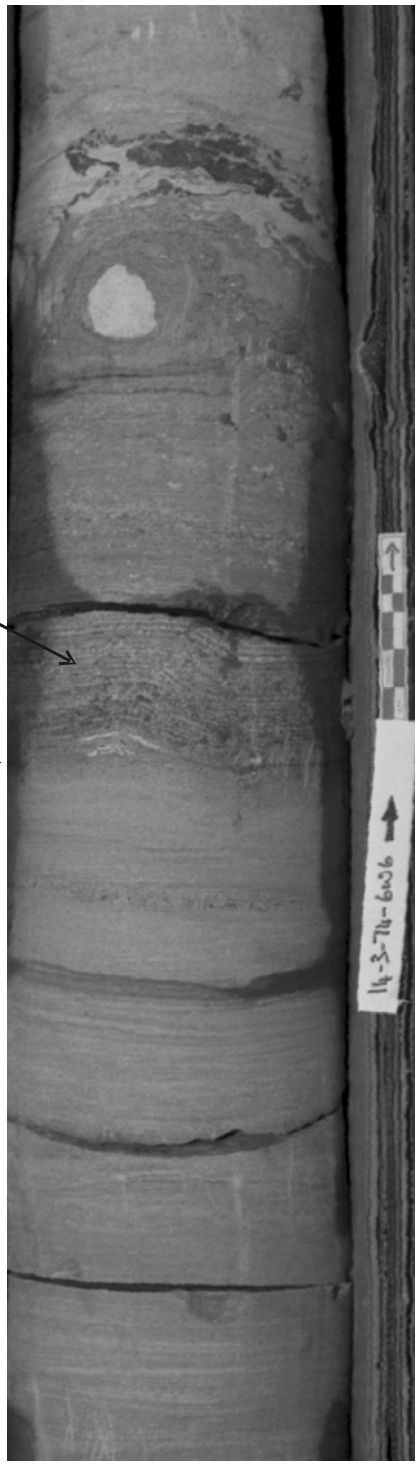
Charlie Lake facies: interbedded dark grey dolomitic mudstone and dolostone. Note the absence of brick-red mudstone, so common in other wells in this general area. Dolostone beds vary in character: mottled dolostone, fine to coarsely laminated dolostone (?stromatolites), massive dolostone, and thinly bedded dolostone.

Anhydrite veins and nodules are present in some dolostone beds, especially in the dolostone immediately overlying the Doig Fm.

Basal Charlie Lake bed is a 16 cm thick, finely to coarsely laminated dolostone (probably stromatolites) with dolomite nodule (replacing anhydrite) near top of bed. The nodule displaces the laminae indicating growth while sediment still unlithified.

Doig facies: typical of the Doig - interlaminated to thinly interbedded mudstone and very fine grained sandstone. Plane, wave and current ripple laminae are common Sandstone beds rarely exceed 20 cm in thickness.

14-3-74-6W6



14-3-74-6W6

Typical facies of the Doig Fm

Huber Grand Prairie 10-6-74-6W6
Core 1: 1900.3-1918.4 m Rec. 17.7 m 13 boxes Full diameter
Core 2: 1918.4-1929.4 m Rec. 8.3 m 7 boxes Full diameter
Approximately 10-15 degree dip relative to horizontal axis of core.
Equivalent log depth about 1 - 2 m shallower than core depths.

CHARLIE LAKE FM

1900.3-1902.9 m	Mudstone: extensive dolomite mottling. Several thin dolostone beds. Upper 75 cm brownish grey, lower part a medium to yellowish grey.
1902.9-1904.37 m	Dolostone: light yellowish grey. Some argillaceous layers and lenses. Gradational basal contact.
1904.37-1906.57 m	Mudstone-dolostone: Beds, bands and irregular patches of light-colored dolostone in a muddy dolostone to dolomitic mudstone. Gradational basal contact.
1906.57-1910.17 m	Dolostone: coarsely laminated to massive. Basal contact a 25-30 cm thick zone of complex mixing of dolostone and sandstone.

HALFWAY FM

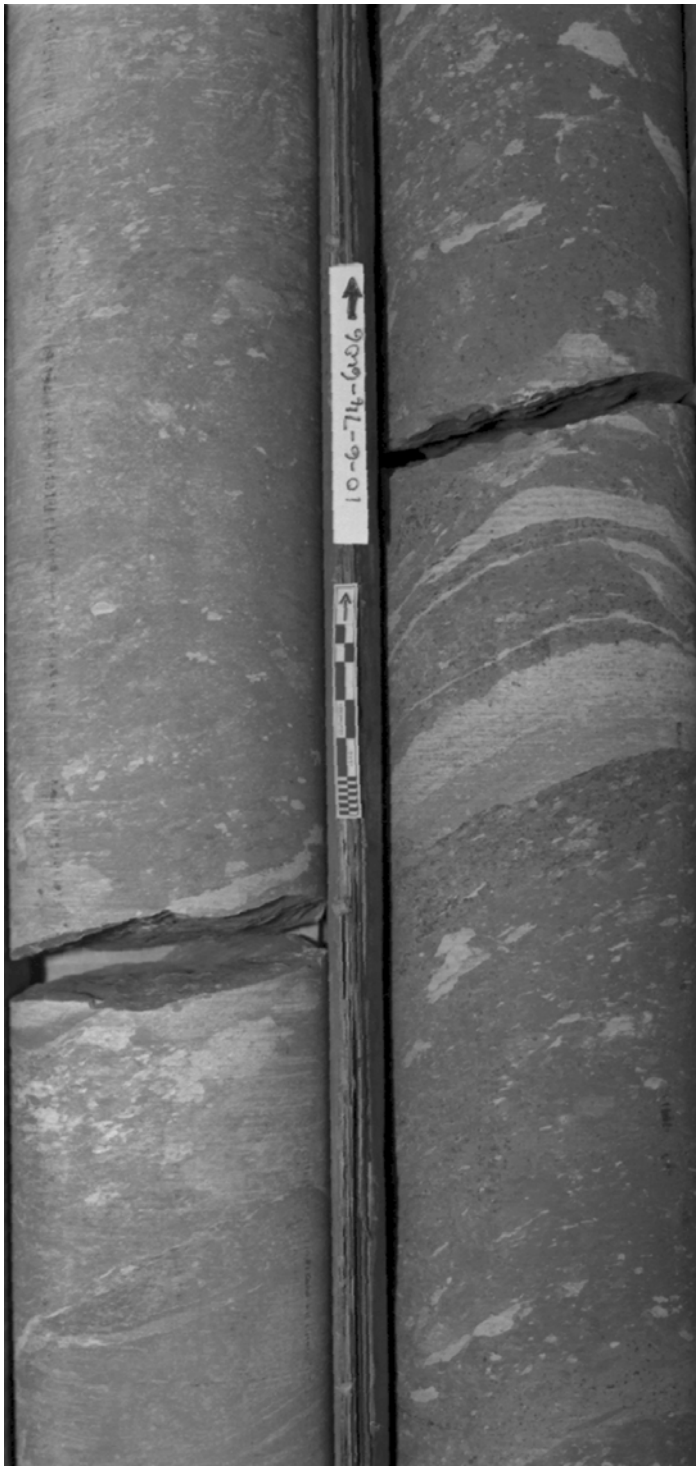
1910.17-1918 m	Sandstone: very fine to fine grained. Brownish grey. Several fining-up beds capped by sandstone with clay partings. Medium to high angle cross beds present in lower part of interval.
1918-1918.4 m	Missing core
1918.4-1918.92 m	Sandstone: very fine to fine grained. Cross bedded. Abrupt basal contact.

DOIG FM

1918.92-1921.12 m	Mudstone-sandstone: overall fining-up aspect. Very sandy in lower half, muddier in upper half. Fine laminae to very thin beds of very fine grained sandstone intercalated with mudstone. Gradational basal change from underlying beds.
1921.12-1925.3 m	Coquinal dolomitic sandstone-sandy coquinal dolostone: Several fining-up beds (coquinal dolostone grading up into shelly sandstone in turn grading into sandstone). Abundant moldic porosity. Severally load deformed basal contact.
1925.3-1926.7 m	Mudstone: medium to dark grey. Laminae to very thin beds of silt/very fine sand.
1926.7-1929.4 m	Missing core

NOTE: possible major erosion surface at 1918.92 m

10-6-74-6W6



Mottled mudstone/dolostone of the lower Charlie Lake Fm (interval 1904.27 - 1906.57 m)

Dome et al Sexsmith 7-19-74-6W6
Core 1: 1864.4-1882.6 m Rec. 18.2 m 13 boxes Full diameter

CHARLIE LAKE FM

1864.4-1866.05 m	Anhydrite: dolomitic. Scattered clay laminae. Coarsely laminated to very thinly bedded. Undulose to irregular laminae/beds. Gradational basal contact - interbedded with red mudstone.
1866.05-1868.4 m	Mudstone: brick red. Scattered thin (1-2 cm) beds and horizontal veins of anhydrite. Dolomite mottling. Abrupt, uneven basal contact.
1868.4-1869.35 m	Dolostone-mudstone: thick beds of dolostone alternating with thin red mudstone layers. Dolostone is reddish grey. Transitional basal contact.
1869.35-1871.8 m	Dolostone: light yellowish grey. Very finely crystalline. Anhydrite scattered throughout. Coarsely laminated in lower two-thirds. Basal contact overprinted by dolomitization.

HALFWAY FM

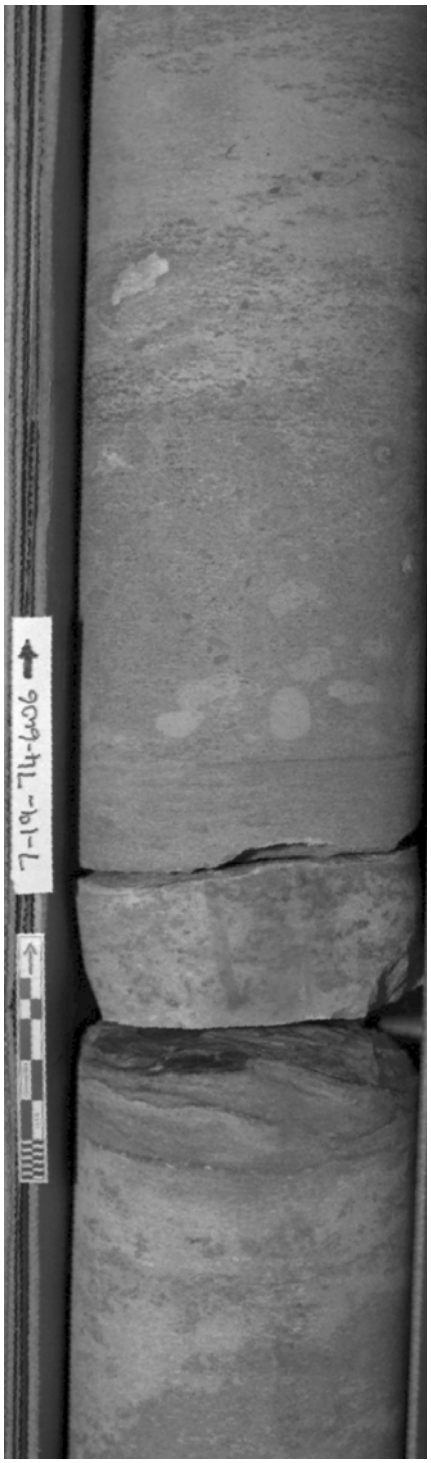
1871.8-1876.7 m	Sandy coquinal dolostone-coquinal dolomitic sandstone: several fining-up beds. Moldic porosity. Abrupt, erosional basal contact.. Basal 5-10 cm contains dolomitized clasts.

DOIG FM

1876.7-1882.6 m	Sandstone-mudstone: laminae to thick beds of very fine grained sandstone intercalated with mudstone. Plane and ripple laminae are common. Minor load deformation. A few vertical and horizontal burrows.

NOTE: possible major erosion surface at 1876.7 m

7-19-74-6W6



HALFWAY FM

1876.7 m

DOIG FM

Huber Sexsmith 16-19-74-6W6
Core 1: 1852-1870 m Rec. 17.25 m 13 boxes Full diameter
Examined 21st February 2002

CHARLIE LAKE FM

1952-1854.1 m	Dolostone: Very thinly bedded with some planar laminated intervals. Disrupted fabric in places. Contains two, 10-15 cm-thick dark grey argillaceous beds. Abrupt basal contact.
1854.1-1857.35 m	Mudstone: brick red. Dolomite mottling with one zone of near-complete dolomite replacement.. Breccia-like in basal 20 cm. Basal contact not preserved.
1857.35-1859.55 m	Dolostone: argillaceous in places. Finely laminated to brecciated - latter appears to be a solution collapse breccia. Abrupt basal contact.
1859.55-1862.4 m	Mudstone: brick red. Large irregular patches and nodules of dolomite (latter could be replaced anhydrite) - possibly pedogenetic (?). Upper 18 cm is dark-grey mudstone. Gradational basal contact.
1862.4-1865.4 m	Dolostone: light yellowish grey. Fine to coarse laminae (probably stromatolites) throughout much of interval with some highly disrupted zones. Abrupt basal contact marked by a 1 mm-thick clay seam.
HALFWAY FM	
1865.4-1867.8 m	Sandstone-coquinal sandstone: extensively dolomitized. Traces of cross beds. Abrupt, erosional basal contact.
DOIG FM	
1867.8-1869.25 m	Sandstone-mudstone: interlaminated to very thinly interbedded very fine grained sandstone and mudstone. Plane fine laminae are the predominant sedimentary structures.
1869.25-1870 m	Missing core

NOTE: possible major erosion surface at1867.8 m

16-19-74-6W6

Mottled red mudstone, Charlie Lake Fm
(interval 1854.1 - 1857.35 m)

16-19-74-6W6

Brecciated dolostone, Charlie Lake Fm
(interval 1857.35 - 1859.55 m)

16-19-74-6W6

Dolomite nodules (possible pseudomorphs of anhydrite),
Charlie Lake Fm (interval 1859.55 - 1862.4 m)

16-19-74-6W6

HALFWAY FM

1867.8 m

DOIG FM

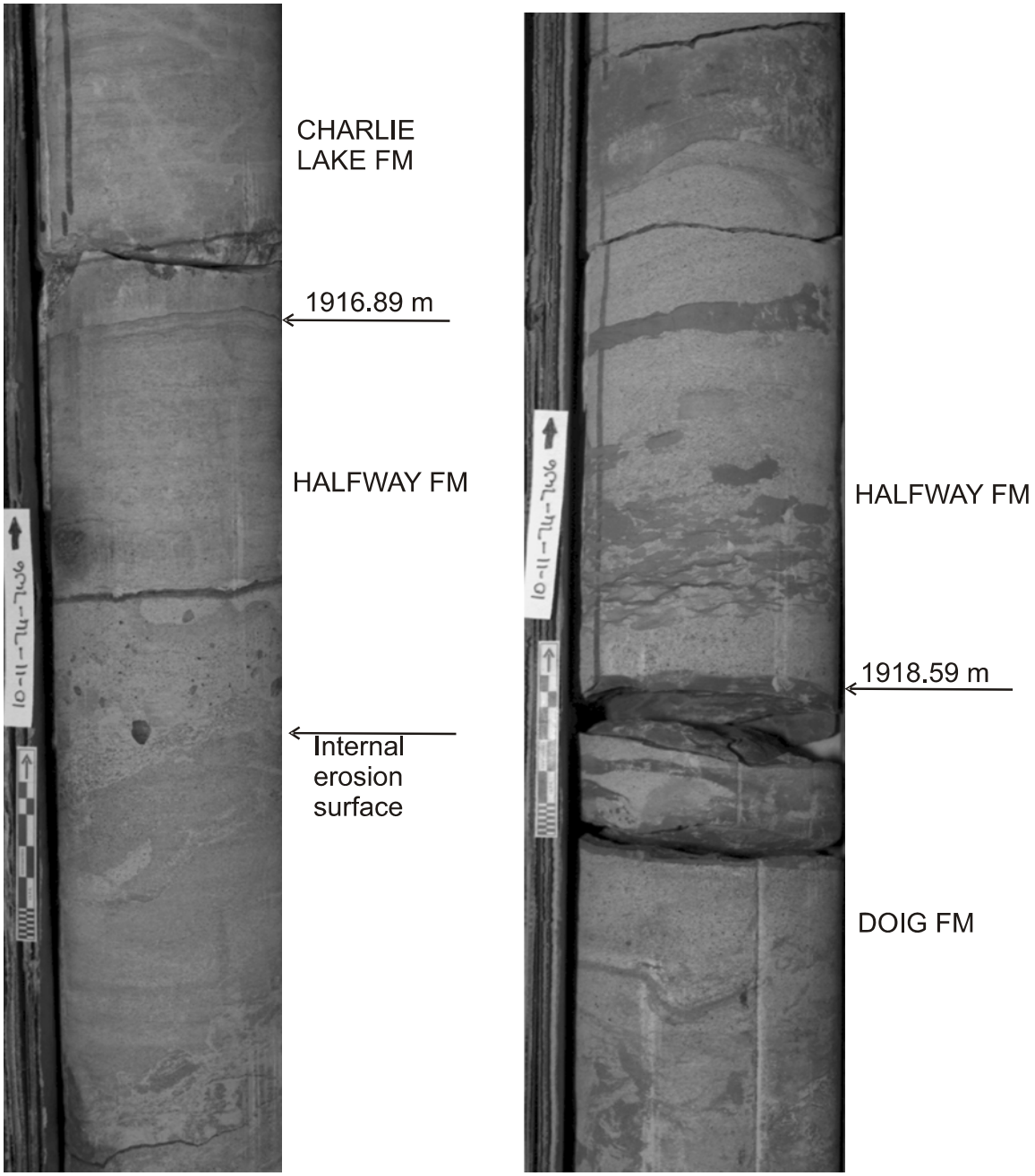
Encor et al Sexsmith 10-11-74-7W6
Core 1: 1907-1925 m Rec. 17.18 m 12 boxes Full diameter
Examined 22nd February 2002
Equivalent log depths are about 2 m deeper than core depths

CHARLIE LAKE FM

1907-1908.5 m	Mudstone: brick red. In middle of interval there are interbeds of dolostone. Fine to coarse laminae in mudstone. Thin beds of small-clast breccia. Transitional basal contact.
1908.5-1909.85 m	Anhydrite-mudstone-dolostone: interbedded. Brick red mudstone. Abrupt basal contact
1909.85-1913.85 m	Mudstone-argillaceous dolostone: brick red mudstone with dolomite mottling. Psuedobreccia appearance. Basal contact not preserved.
1913.85-1916.89 m	Dolostone: light grey. Fine to coarsely crystalline. Large replacement dolomite nodules - possibly after anhydrite. Some clay-filled styolites and clay seams. Abrupt basal contact marked by a 2 mm-thick clay seam. ISPG photo 4733-97 and 98 of basal contact.
HALFWAY FM	
1916.89-1918.59 m	Sandstone: several thin fining-up beds. Mudstone clasts at base of beds, grading up into sandstone, and in some beds in turn grading up into mudstone. Generally fine grained, with some beds containing medium/coarse grains. Immediately underlying the Charlie Lake dolostone the sandstone contains small pebbles. Abrupt basal contact.
DOIG FM	
1918.59-1919.44 m	Sandstone-mudstone: laminae to thin beds of very fine grained sandstone interbedded with mudstone. Most of beds are distorted.
1919.44-1922.04 m	Sandstone: very fine to fine grained. Thick beds separated by muddy layers. Some bed deformation, especially in muddy layers.
1922.04-1922.74 m	Mudstone: contains laminae of silt/very fine sand. Minor bed disruption in upper part.
1922.74-1924.18 m	Sandstone: very fine grained. Some clay partings. Very low angle cross laminae in places.
1924.18-1925 m	Missing core

NOTE: possible major erosions surface at 1918.59 m

10-11-74-7W6


CHARLIE
LAKE FM
1916.89 m
HALFWAY FM
Internal
erosion
surface
HALFWAY FM
1918.59 m
DOIG FM

Enron Sexsmith 8-23-74-7W6
Core 2: 1892-1910.3 m Rec. 17.38 m 13 boxes Full diameter
Examined 22nd February 2002

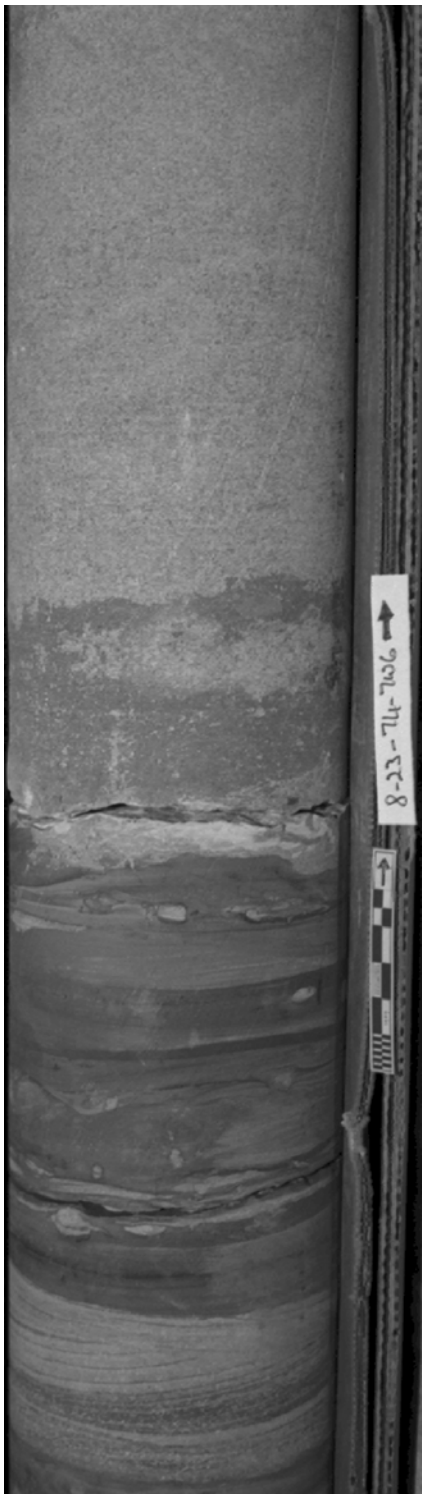
CHARLIE LAKE FM

1892-1892.36 m	Dolostone: at least three abruptly based beds. Light grey with a slight reddish tint. Minor argillaceous dolostone at top of basal bed.. A mm-thick clay seam separates the middle and top beds.
1892.36-1895.21 m	Mudstone: brick red. Dolomite mottling. An anhydrite nodule in upper half of interval. Dolomite filled fracture in middle part of interval. Contains a 12 cm-thick dolostone bed about 20 cm above base of interval. Abrupt basal contact.
1895.21-1899.56 m	Dolostone: light grey. Very finely crystalline. Clay laminae and very thin beds in top 50 cm; only scattered occurrences in lower part of interval where clay is more common along styolites. Abrupt basal contact - a flattened anhydrite nodule lies immediately above the contact.

DOIG FM

1899.56-1904.66 m	Mudstone-sandstone: predominantly silt/sand laminae and very thin beds intercalated with mudstone. Top 75 cm contains some thicker beds of ripple cross laminated very fine grained sandstone.
1904.66-1909.38 m	Sandstone-mudstone: thin to thick beds of very fine grained sandstone interbedded with thin mudstone layers. Fine, very low-angle cross laminae in thicker sandstone beds, ripple laminae in thinner beds. Some horizontal burrows, a few vertical burrows.
1909.38-1910.3 m	Missing core

8-23--74-7W6



CHARLIE
LAKE FM

1899.56 m

DOIG FM

Canwest La Glace 2/6-33-74-7W6
Core 3*:* 2145-2163 m**.** Rec. 16.4 m. 12 boxes. Full diameter core.
Missing part of core appears to be from the base.
Examined 15th October 1998

MONTNEY FM

2145-2148.9 m:	Interlaminated mudstone-siltstone: a few thicker (1-7 cm) beds of very fine grained sandstone. Predominantly planar laminae with some lenses and thin beds of current-ripple laminae. Upward increase in silt/sand content.
2148.9-2149.11 m:	Sandstone: very fine grained. At least three depositional units. Vertical succession as follows: basal erosional surface - 10-11 cm of massive appearing sandstone with some small tabular mud clasts at top of interval - abrupt (?erosional) contact - darker hued, 3-4 cm of massive, argillaceous sandstone - abrupt deformed contact - 5-6 cm of interlaminated mud-silt that is locally highly deformed - capped abruptly by lenses (ripples) of light grey, very fine grained sandstone - overlying unit of mudstone.
2149.11-2151 m:	Interlaminated mudstone-siltstone-sandstone: scattered 1-9 cm-thick beds of very fine grained sandstone. Planar laminae predominate; a few thin beds with current-ripple laminae, and a few beds that are massive appearing. A few examples of minor bed deformation. Sandstone interbeds have abrupt, erosional basal contacts and abrupt to rapidly gradational upper contacts.
2151-2157.25 m:	Sandstone: very fine grained. Contains one, 3-5 cm-thick mudstone interbed, 8 cm below top of interval and it contains abundant load-deformed sand lenses. Most of interval consists of massive appearing sandstone with some vague, weakly deformed bedding surfaces. No obvious indicators of multiple beds. (Note: gamma-ray log "kick" at about 2155 m apparently not reflected in lithology).
2157.25-2161.4 m:	Sandstone: a series of thick sandstone beds each capped by a 1-6 cm-thick mudstone - interval contains at least six such units. Thickness of units varies from 21 cm to 1.75 m. Sandstone beds mostly massive in appearance with a few indications of fine bedding. Change from sandstone to mudstone may be either abrupt or gradational. The thickest mudstone interval caps the thickest sandstone and contains highly deformed lenses and thin beds of very fine grained sandstone. (Note: gamma-ray log "kick" at about 2160.5 m could be due to this thick - 8 cm - mudstone interval).

NOTE: the change from sandstone-dominant to mudstone-dominant at 2148.9 m is very abrupt.

Interpretation: rapidly deposited sandstone units (probably sediment gravity-flow) abruptly succeeded a low-energy deposition of mud/silt.

Dome Shell Laglace 10-3-74-8W6
Core 1: 1964.6-1982.8 m Rec. 11.55 m. 11 boxes. Full diameter core. Well preserved.
Examined 19/20 April 1999

CHARLIE LAKE FM

1964.6-1965.27 m	Mudstone: brick-red/maroon. Silty. Cross cut by thick, anhydrite-filled vertical and sub-horizontal fractures - vertical fractures dominant and up to 6 cm thick with some red mudstone clasts within. Abrupt basal contact.
1965.27-1965.44 m	Anhydrite: white to light grey; massive. Abrupt basal contact.
1965.44-1965.89 m	Mudstone: similar to above. Basal contact rapidly transitional - consisting of interlaminae of anhydrite and mudstone.
1965.89-1969.5 m	Anhydrite: light grey to slightly brownish grey. Very thin to thin, uneven beds. Some styolites. Slightly calcareous to dolomitic. Abrupt basal contact.

HALFWAY FM

1969.5-1969.81 m	Sandstone: light grey; medium to coarse grained. Sub-horizontal bedding. Calcareous. Abrupt, erosional basal contact.
1969.81-1970.48 m	Sandstone: brownish grey; mostly fine grained with a 1-2 cm basal zone containing coarse grains and granules. Incipient carbonate cement imparts blotchy to banded appearance. Sub-horizontal bedding with at least one horizon that appears to indicate presence of wave-ripple-forms. Abrupt, erosional basal contact.

DOIG FM

1970.48-1976.15 m	Mudstone: medium to dark grey; abundant laminae to very thin beds of coarse silt/very fine sand and a few thicker beds of very fine rained sandstone. Minor indications of burrows. Minor load deformation. Thick sandstone beds are light grey, tend to be massive in appearance and have abrupt basal and upper contacts.
1976.15-1982.8 m	Missing core.

NOTE: possible major erosion surface at 1969.81 m

Sulpetro Valhalla 6-8-74-8W6
Core 1*:* 1997-2015.2 m. Rec. 18.2 m. 16 boxes. Full diameter.
Core 2*:* 2015.2-2033m. Rec. 17.8 m. 16 boxes. Full diameter.
Examined 10th December 1998

CHARLIE LAKE

1997-1998.5 m	Anhydrite: yellowish grey. Coarsely laminated to very thinly bedded.
1998.5-1999.45 m	Mudstone: reddish brown. Disrupted fabric - mottled appearance. Lenses and layers of yellowish grey dolomite/anhydrite in basal 25 cm. Breccia occurs immediately above basal contact.
1999.45-1999.95 m	Anhydrite: yellowish grey. Interbeds and irregular patches of reddish brown mudstone.
1999.95-2001.6 m	Dolostone: basal 45 cm is coarsely laminated (?stromatolites) and rests

	abruptly on underlying strata. Some minor relief on basal contact (1-2 cm) with laminae draping the positive relief. Upper part of interval is thinly to thickly bedded with some clay seams scattered throughout.
HALFWAY FM	
2001.6-2002.03 m	Sandstone: light yellowish grey. Fine to medium grained with coarse grains in basal 10 cm. Low angle cross beds in lower part; upper part massive in appearance. Erosional basal contact.
2002.03-2002.3 m	Dolostone: brownish grey. Crudely laminated to very thinly bedded. Abrupt base and top.
2002.3-2002.33 m	Mudstone: dark grey to black. Gradational basal contact over a 1 cm interval.
2002.33-2002.98 m	Sandstone: light grey to white. Salt and pepper appearance. Medium to coarse grained, grading up into fine grained, argillaceous sandstone with irregular clay seams/laminae in upper 25 cm. Basal contact not preserved.
2002.98-2004.44 m	Sandstone: fine to medium grained; brownish grey mottled with lighter, calcite-cemented patches. Traces of low-angle cross beds. Basal contact is erosional and inclined about 20^{o}.
2004.44-2005.15 m	Sandstone: creamy white; very fine to fine grained with scattered medium grains in some zones. Mostly massive, with at least two thin zones (2-4 cm) of finely interlaminated sand and clay. Basal contact is abrupt and severely load deformed with sand balls intruded into underlying strata.
DOIG FM	
2005.15-2006.32 m	Mudstone-sandstone: lower half mostly very thin beds of very fine grained sandstone interlaminated with mudstone. Upper half to one-third mostly mudstone with sand laminae and abundant load deformation structures. Two zones of calcite nodules - one immediately underlying upper contact, the other about mid-point in interval where the sandstone-dominant lower part changes to mudstone-dominant. Gradational basal contact.
2006.32-2006.87 m	Sandstone: yellowish grey; fine grained with scattered coarse grains. Basal contact not preserved but there is a marked lithological contrast with underlying beds, suggestive of an abrupt contact.
2006.87-2009.67 m	Argillaceous sandstone: medium grey; very fine grained. Abundant load deformation structures. Some possible horizontal burrows near top of interval. Gradational basal contact.
2009.67-2011.05 m	Interbedded/interlaminated sandstone-mudstone: very fine grained sandstone in thin (1-2 cm) beds. Load deformation structures are common. Muddy beds tend to contain fine, silt/sand laminae. Rapidly gradational upper/lower contacts.
2011.05-2015.2 m	Mudstone: dark grey; silty. Laminae and lenses of silt/sand. Gradual downward decrease in sand/silt content. Calcite nodules between 2013.45 and 2013.7 m.
2015.2-2015.33 m	Argillaceous sandstone: thin beds of massive or finely laminated, very fine grained, argillaceous sandstone separated by mm-thick clay laminae. Medium to dark grey. Base marked by erosion surface overlain by about 6-8 cm of sandstone containing small (few mm) mudstone clasts and a slightly coarser sand-grade than overlying sandstone.

2015.33-2020 m	Sandstone: very fine grained; medium grained. Beds of finely interlaminated sand/clay and sandstone. Some load deformation structures. Abundant scour surfaces. Some sandstone beds separated by thin mudstone-rich intervals. Some low-angle intersecting cross laminae. Possibly a few isolated horizontal burrows in some of the thinner beds. Lowest sandstone in interval appears to have an erosional base.
2020-2023.28 m	Interbedded mudstone-sandstone: overall coarsening-upward aspect to interval. Very fine grained sand or coarse silt in mudstone. Laminated to very thinly bedded; some load deformation structures. A few calcite-nodule-rich horizons.
2023.28-2024.23 m	Bioclastic sandstone: two, fining-upward beds of shelly sandstone. Basal erosional surfaces. Upper bed grades up into shelly mudstone then into mudstone. Large patches of replacement calcite.
2024.23-2033 m	Mudstone: overall coarsening-upward aspect. Very sandy from 2024.23 to 2025.58 m - an interval with load deformed sandstone beds and a few horizontal burrows. Below 2025.58 m mudstone is dominant with lenses, laminae and very thin beds of coarse siltstone/very fine grained sandstone which show only minor load deformation.

NOTE: possible major erosion surface at 2002.03 m

Dome et al Valhalla 6-31-74-8W6
Core 1: 1982-2000.2 m Rec. 18.2 m 17 boxes Slabbed
Examined February 2002
Equivalent log depths about 1.75-2 m deeper than core depths

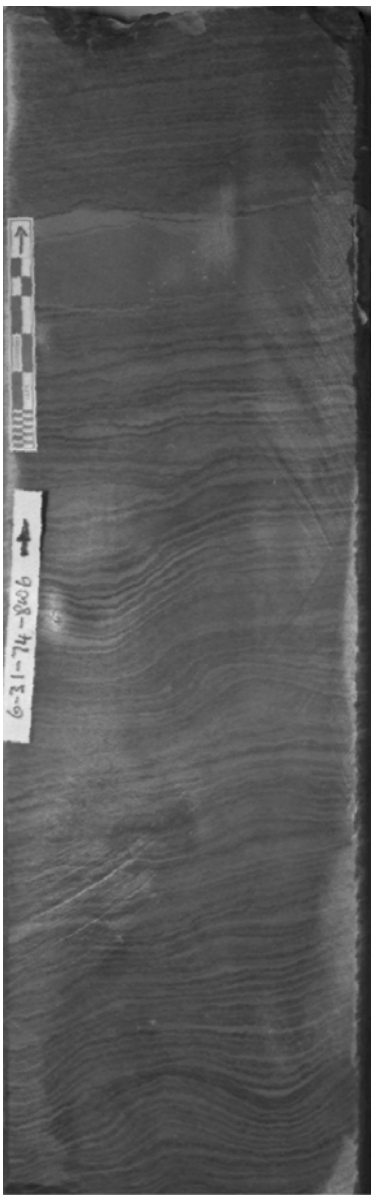
CHARLIE LAKE FM

1982-1983.4 m	Mudstone: brick red. Faint dolomite mottling. Abrupt basal contact.
1983.4-1984.8 m	Dolostone: light grey. Very thin, uneven beds in upper 25 cm and also anhydritic. Bulk of interval contains coarse, uneven laminae, and some domal laminae - probably stromatolites. Abrupt basal contact.
1984.8-1986 m	Mudstone: brick red. Dolomite mottling. Dolomite-filled orthogonal veins in lower part of interval. Rapidly transitional basal contact.
1986-1986.56 m	Anhydrite-dolostone: coarsely interlaminated to very thinly interbedded. Some red mudstone interbeds. Near base of interval there is some chicken-wire anhydrite. Rapidly transitional basal contact of interlaminated dolostone-anhydrite-sandstone.
1986.56-1986.76 m	Sandstone-muddy sandstone: predominantly fine grained with scattered to locally concentrated coarse grains and granules. Slightly distorted bedding. Abrupt, mildly load-deformed basal contact.

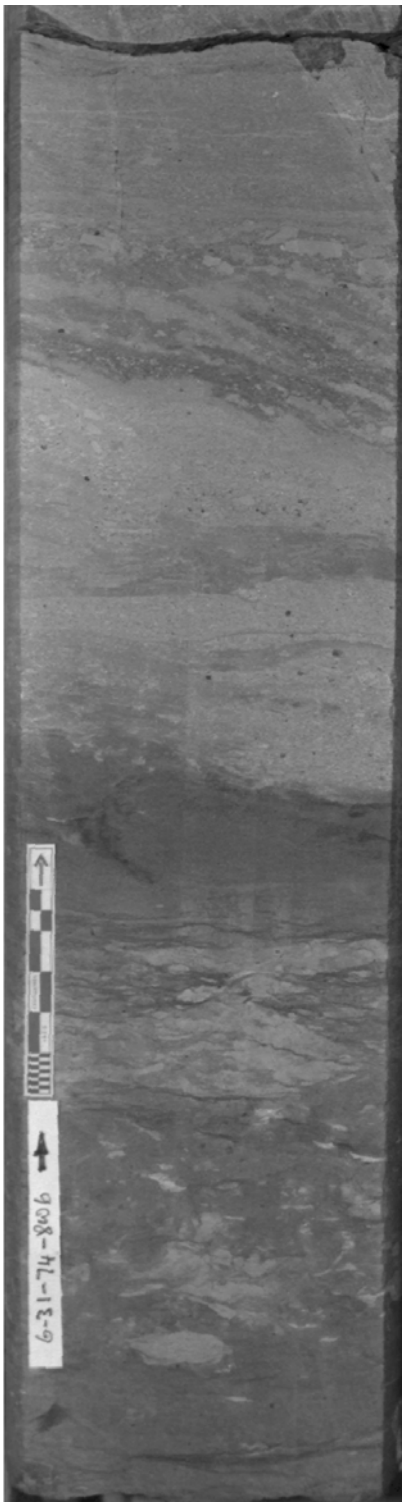
DOIG FM

1986.76-1993.5 m	Sandstone-mudstone: thin to thick beds of very fine grained sandstone separated by very thin mudstone beds.
1993.5-2000.2 m	Sandstone: very fine grained. Very low-angle cross laminae are common. Minor mudstone interbeds.

6-31-74-8W6



Stromatolitic dolostone
Charlie Lake Fm
(interval 1983.4 - 1984.8 m)



CHARLIE
LAKE FM

1986.76 m

DOIG FM

PCI Valhalla 14-32-74-8W6
Core 1: 1968-1970 m Rec. 1.1 m. 1 box. Full diameter.
Core 2: 1970-1988 m Rec. 8.5 m. 6 boxes. Full diameter.
Examined 27/28 July 1999

CHARLIE LAKE FM

1968-1969.1 m	Anhydrite: light grey to creamy white. Massive.
1969.1-1970 m	Missing core: Charlie Lake - Doig contact within this interval

DOIG FM

1970-1972.58 m	Sandstone-mudstone: predominantly sandstone (>70%). Thin to medium beds of fine grained sandstone interbedded with thin (<2 cm) mudstone beds. Sandstone beds generally load deformed with a few that contain undeformed planar and current-ripple laminae. Unit rests abruptly on underlying beds.
1972.58-1974.04 m	Sandstone: light to medium grey; fine to medium grained with coarse grains and small mudstone clasts or bivalve debris in basal few centimetres of each bed. Beds vary from 9 to 60 cm thick. Mid-way through interval one bed contains large mudstone clasts, 4-6 cm long. Each bed has an erosional base and tends to fine upwards to a fine-grained or argillaceous sandstone. Internal sedimentary structures not well preserved. Lowermost bed contains distinct black mud-chip clasts near its base.
1974.04-1977.7 m	Sandstone: creamy white; fine grained. Multiple beds but difficult to distinguish from each other. Internal sedimentary structures vary from massive to very low angle-cross laminae. Some zones rich in scattered, very small fragments of thin-walled bivalve debris. Basal beds rests erosionally on underlying strata and has load deformed basal contact.
1977.7-1978.5 m	Mudstone: contains planar and current-ripple laminae of very fine sand.
1978.5-1988 m	Missing core

Total PCP Valhalla 6-6-74-9W6
Core 1: 2132-2150.2 m Rec. 18 m 13 boxes Full diameter
Core 2: 2150.2-2155.6 m Rec. 5.4 m 4 boxes Full diameter
Core 3: 2155.6-2156.5 m Rec. 1 m 1 box Full diameter
Core 4: 2156.5-2163.6 m Rec. 7 m 5 boxes Full diameter
Core 5: 2163.6-2167.2 m Rec. 3.6 m 3 boxes Full diameter
Examin**ed** 22nd February 2002

Core examined for specific aspects, not logged in detail.

1. 2136-2139 m: The distinct double gamma-peak marker bed(s) present in this part of the Charlie Lake Fm over large parts of the 83M map-sheet
Core 1. Consists of two dolostone units separated by a dark grey dolomitic mudstone.

2. The Halfway-Charlie Lake contact: at about 2150.85 m in core 2. Basal Charlie Lake bed is a

35 cm-thick dolomitic anhydrite to anhydritic dolostone underlain by about 15 cm of black shale, in turn resting on Halfway sandstone. The actual contacts between these lithotypes are not preserved.

Halfway Fm is predominantly very fine to coarse grained sandstone, locally coquinal, arranged as a series of fining-up beds. Some beds contain cross beds.

There is no obvious major erosional surface within the cored Halfway succession.

Rock Eval data:
Sample of shale from top of core has 2.37% organic C
Sample of shale between the Charlie Lake and Halfway formations has 1.7% organic C
Sample of shale from 2156.9 m(within the Halfway Fm) has 1.26% organic C

Dome et al. Valhalla 10-12-74-9W6
Core 3: 2035.6-2053.8 m Rec. 18.2 m. 16 boxes. Full diameter
Examined 4th August 1999

DOIG FM

2035.6-2035.9 m	Mudstone: dark grey to black. Laminae to very thin beds of silt-very fine sand. Abrupt basal contact. Anhydrite nodule near base.
2035.9-2041.54 m	Sandstone with some mudstone interbeds: very fine to fine grained. Beds a few cm to 26 cm thick; most are 5-10 cm thick. Basal bed one of the thickest and rest erosionally on underlying strata. Beds have erosional bases. Thicker beds tend to have very low-angle cross laminae (?HCS); thinner beds either planar laminated or current-ripple laminated. Some local deformation of laminae. A concentration of anhydrite nodules at about 2041.28 m.
2041.54-2053.8 m	Interbedded/interlaminated mudstone-sandstone: interval tends to become sandier up-section. Planar laminae predominate; a few examples of current-ripple laminae. Load deformed beds more common in lower part of interval. Beds range from single laminae to one bed of sandstone that is 38 cm thick; most beds are 1-10 cm thick. Scattered and local concentrations of anhydrite nodules.

NOTE: interpreted flooding surface at 2035.9 m and base of transgressive facies at 2041.54 m.

Dome Sulpetro Laglace 6-13-74-9W6
Core 1: 2011.25-2029.5 m Rec. 17.95 m 16 boxes Slabbed
Examined 22nd February 2002

Not logged in detail only certain aspects examined.

Charlie Lake Fm facies: typical facies - brick-red mudstone interbedded with dolostone. Dolostone between 2015.8-2017.5 m is coarsely laminated - probably stromatolites - similar to correlative dolostone in this area.. Basal Charlie Lake dolostone unit rests abruptly on Halfway sandstone.

Halfway Fm: light brownish grey, fine grained sandstone. Dolomite mottling. Cross bedded. There is a thin (5cm) bed of coarse grained sandstone in box 14 but it is not associated with any significant surface. There is no unambiguous evidence to place a significant erosional surface within the Halfway succession in this well.

Turbo et al Knopcik 13-1-74-11W6
Core 1: 2341-2353.2 m Rec. 11.95 m 9 boxes Full diameter
Examined 22nd February 2002

CHARLIE LAKE FM

2341-2343.55 m	Dolostone: base marked by presence of 10 cm-thick mosaic anhydrite (i.e., amalgamated nodules). Lower 75 cm consists of very sandy dolostone.
2343.55-2344.53 m	Sandstone: fine grained. Planar bedding surfaces. Abrupt basal contact.
DOIG FM	
2344.53-2352.95 m	Sandstone-mudstone: predominantly very fine grained sandstone with thin mudstone interbeds.
2352.95-2353.2 m	Missing core

Chevron Gulf Knopcik 7-25-74-11W6
Core 2: 2267-2283 m Rec. ?16 m 14 boxes Full diameter
Examined 22nd February 2002

CHARLIE LAKE FM

2267-2267.92 m	Mudstone: brownish grey to light reddish brown. Dolomite mottling. Abrupt basal contact.
2267.92-2269.92 m	Dolostone: Coarsely laminated (?stromatolites) to thinly bedded. Interbeds of anhydrite and some muddy beds. Abrupt basal contact.
2269.92-2270.6 m	Mudstone: brownish grey. Dolomite mottling. Abrupt basal contact.
2270.6-2271.16 m	Dolostone: very finely crystalline. Interbeds of brownish grey mudstone (up to 2 cm-thick beds). Basal 20 cm has a chicken-wire fabric - probably dolomite has replaced anhydrite. Abrupt basal contact.
2271.16-2272.96 m	Dolostone-mudstone: interbedded. Brownish grey mudstone. Abrupt basal contact marked by a mm-thick clay seam.

HALFWAY FM (may be too thin to identify as a formation - not readily discerned on logs)

2272.96-2273.81 m Sandstone: fine grained. Very low-angle cross beds, highlighted by dolomitization along bedding planes. Abrupt basal contact.

DOIG FM

2273.81-2283 m Mudstone-sandstone: very thin to thick beds of very fine grained sandstone interbedded with mudstone. A few beds contain coarse grains and granules.

NOTE: possible major erosion surface at 2273.81 m

7-25-74-11W6

HALFWAY FM

2273.81 m

DOIG FM

Dome Total Sinclair 13-9-74-12W6
Core 2: 2416.3-2434.2 m Rec. 18.2 m 13 boxes Slabbed
Core 3: 2434.2-2452.2 m Rec. 18.3 m 13 boxes Slabbed
Core 4: 2452.2-2470.4 m Rec. 17.1 m 13 boxes Slabbed
Core 5: 2470.4-2476 m Rec. 5.35 m 4 boxes Slabbed
Examined 22nd February 2002
Equivalent log depths are 1 to1.5 m deeper than core depths.

Not logged in detail only certain aspects of strata examined.

Charlie Lake-Halfway contact: Charlie Lake dolostone rests abruptly on Halfway sandstone. Separated by a mm-thick clay seam. Contact at core depth 2456.5 m.

Halfway Fm consists of very fine grained, porous sandstone.

At about core depth 2457.4 m there is a slight variation in the sandstone: above there are scattered coarse grains, below there are none. However, there is little evidence in the succession identified as Halfway Fm to suggest a significant erosion surface.

13-9-74-12W6

Texaco et al Woking 6-15-75-5W6
Core 2: 1712-1730.25 m Rec. 18.25 m. 13 boxes. Full diameter
Examined 31st September 2002

CHARLIE LAKE FM

1712-1715.3 m	Dolostone/argillaceous dolostone/anhydritic dolostone: Coarsely bedded in places but much is overprinted by a complex diagenetic fabric.
1715.3-1715.6 m	Anhydrite/dolomitic anhydrite: Massive. Crystalline.
1715.6-1716.7 m	Dolostone/anhydritic dolostone/argillaceous dolostone: Complex diagenetic fabric.
1716.7-1717.23 m	Anhydrite/dolomitic anhydrite
1717.23-1721.4 m	Dolostone/anhydritic dolostone: as above
1721.4-1722.7 m	Anhydrite/dolomitic anhydrite
1722.7-1729.95 m	Dolostone: contains scattered 1-2 cm diameter anhydrite nodules and at least one 7 cm thick anhydrite bed 3.48 m above base. Bedding not very visible but scattered throughout are mm- to 1 cm-thick clay seams that are highly distorted - almost styolitic. Contains at least 6 bands of light grey dolostone 6-10 cm thick that have moldic porosity and appear to be coquinal. The uppermost part of interval is light grey, with coarse laminae and contains anhydrite nodules and irregular patches of replacement anhydrite - this upper unit could be stromatolitic. Basal contact is abrupt and overlain by 5 mm to 1 cm of fine to medium grained sandstone. Basal contact underlain by a 2-4 mm layer of partially pyritized clay.

DOIG FM

1729.95-1730.25 m	Mudstone: medium grey. Partially dolomitized. Rich in pyrite - as large patches or single crystals.

6-15-75-5W6

Conwest La Glace 7-6-75-7W6
Core 1: 1924-1941.7 m Rec. 17.7 m. 17 boxes. Full diameter.
Examined 31st September 2002
Core/log depths mismatched. Equivalent log depths are 1923-1940.7 m

CHARLIE LAKE FM

1924-1926.45 m	Mudstone: maroon coloured. Contains beds, nodules and veins of anhydrite, anhydritic dolomite and dolomite - the latter being a replacement of anhydrite. Abrupt basal contact.
1926.45-1926.51 m	Anhydrite: dolomitic. Yellowish brown on outer core surface; light to medium grey on fresh surface. Abrupt basal contact underlain by a 1 mm thick clay layer.
1926.51-1926.61 m	Dolostone: interlaminated with clay. Light grey. Abrupt basal contact underlain by a 2 mm thick clay layer.
1926.61-1927.47 m	Anhydrite-dolomitic anhydrite: crude, uneven bedding. Yellow brown colour on outer core surface; light to medium grey on fresh surface. Abrupt basal contact underlain by 1 mm thick clay layer.

HALFWAY FM (may be too thin to identify as a formation)

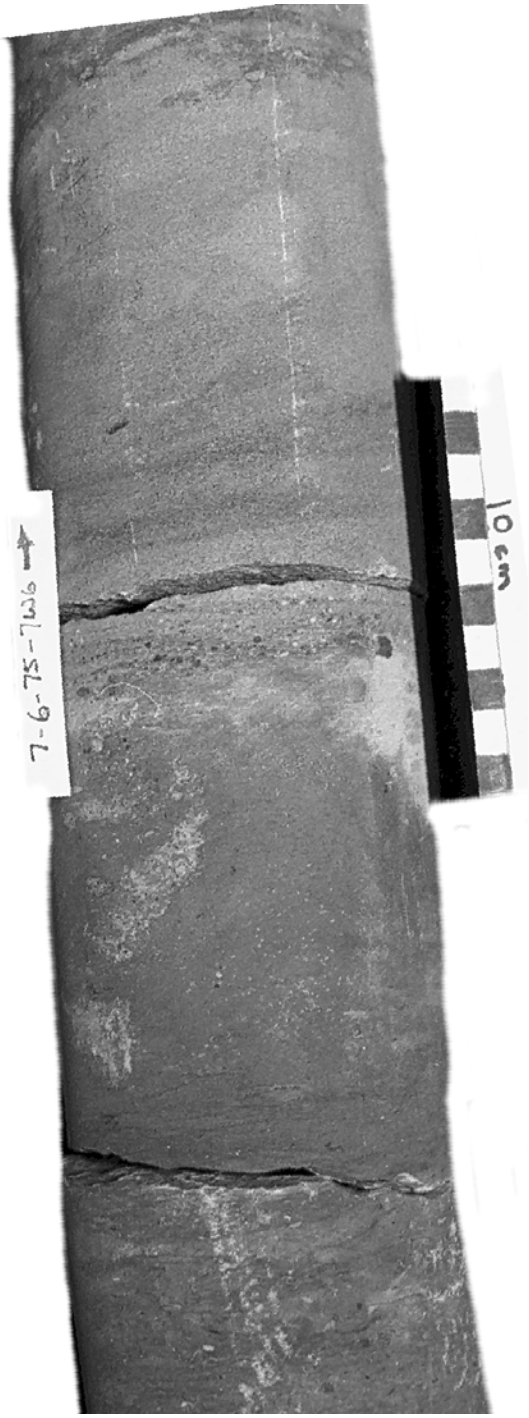
1927.47-1928.6 m	Sandstone: fine grained with coarse grains and granules, and a few very small pebbles in basal 2 cm. Cross bedded. Dolomite mottles and some dolomite replacement along bedding planes. Erosional basal contact.

DOIG FM

1928.6-1928.95 m	Mudstone: medium grey. Silty to sandy. Abrupt basal contact.
1928.95-1932.04 m	Sandstone: argillaceous very fine grained sandstone in lower third/half grading up into cleaner cross-bedded fine grained sandstone.
1932.04-1932.73 m	Interbedded sandstone-mudstone: vague traces of ripple laminae. Burrows present in lower 10-15 cm; possibly burrowed in upper beds. Abrupt basal contact.
1932.73-1935.99 m	Sandstone: very fine to fine grained. Finely to coarsely laminated. Argillaceous in lower third, less in remainder. Gradational from underlying beds.
1935.99-1941.7 m	Mudstone: silt/sands laminae throughout. In lower 50-70 cm there are abundant scattered dolomite nodules (probably replacement of anhydrite).

NOTE: possible major erosion surface at 1928.6 m

7-6-75-7W6



PEX La Glace 14-5-75-8W6

Core 1: 1954-1972 m Rec. ? 17 boxes. Slabbed in Charlie Lake beds, full diameter in Doig strata.

Examined 31st September 2002

Core/log depths mismatched. Equivalent log depths are 1955-1973 m

CHARLIE LAKE FM

1954-1954.23 m	Mudstone: maroon. Dolomitic. Some lighter colored lenses and very thin beds of dolomitic mudstone. Diffuse basal contact.
1954.23-1954.51 m	Anhydrite-dolostone: Patches of anhydrite being replaced by dolomite. Diffuse basal contact.
1954.51-1956.61 m	Mudstone: maroon to brick-red. Scattered very thin to thin beds of dolomitic anhydrite and/or dolostone. Complex mottled fabric in parts of interval. Abrupt basal contact.
1956.61-1958.08 m	Interlaminated to very thinly interbedded dolostone-anhydrite and argillaceous dolostone: Uneven to irregular, coarse laminae - probably stromatolites. One thin interbed of red mudstone about 38 cm below top of interval. Diffuse basal contact.
1958.08-1959.56 m	Mudstone: brick-red. Mottled fabric. Thin veins of dolomite in upper 20 cm (possibly replacement after anhydrite). Lower 50 cm contains a thin interbed of dolostone. Abrupt basal contact.
1959.56-1961.56 m	Dolostone: light grey, very finely crystalline. Fine to coarse laminae and a few scattered thin beds. Laminae are planar, with some crinkly laminae (possibly stromatolites). Abrupt basal contact.

HALFWAY FM (may be too thin to identify as a formation)

1961.56-1963.14 m	Sandstone: fine to coarse grained. Low angle cross beds in upper 80 cm. 1961.56 and 1961.76 m sandstone is fine to medium grained with scattered to locally concentrated (along cross beds) coarse grains. Abrupt basal contact with a burrow extending into underlying sandstone. 1961.76-1962.34 m - fine grained with scattered coarse grains in lower 20 cm. Basal contact apparently abrupt. 1962.34-1963.14 m - very fine to fine grained; argillaceous in basal 10 cm.

DOIG FM

1963.14-1965.34 m	Interlaminated to very thinly interbedded mudstone-sandstone: very fine grained sandstone. Abundant ripple laminae. *Planolite*s burrows are common. Some vertical burrows. Transitional with underlying beds.
1965.34-1967.24 m	Sandstone/argillaceous sandstone: very fine grained with one bed of medium to coarse grained sandstone about mid-way through interval. Finely laminated to bioturbated. Transitional with underlying beds
1967.24-1972 m	Coarsening-up interval: grades up from mudstone with laminae and very thin beds of siltstone/very fine sandstone into thin to thick beds of very fine grained sandstone intercalated with mudstone. Fine laminae in sandstone bed. Bioturbation structures are common.

NOTE:

The interpretation of major erosional surfaces is ambiguous in this core, there are two possible candidates, at 1961.76 and 1962.34 m. The surface at 1961.76 m is more prominent.

Sulpetro et al Valhalla 2/8-17-75-8W6
Core 1: 1938-1955.25 m Rec. 17.25 m 13 boxes. Full diameter.
Examined 31st September 2002

CHARLIE LAKE FM

1938-1938.04 m	Mudstone: medium grey.
1938.04-1938.82 m	Dolomitic mudstone: brick-red. Cut by sub-horizontal to moderately inclined veins of dolomite (yellowish white in colour), a few mm to 3 cm wide. Abrupt basal contact.
1938.82-1940.32 m	Dolostone: anhydritic. Basal 30 cm consists of a dolomitic anhydrite bed. Coarsely laminated to massive. Abrupt basal contact with a 2 mm clay layer separating the anhydrite from underlying sandstone.

HALFWAY FM

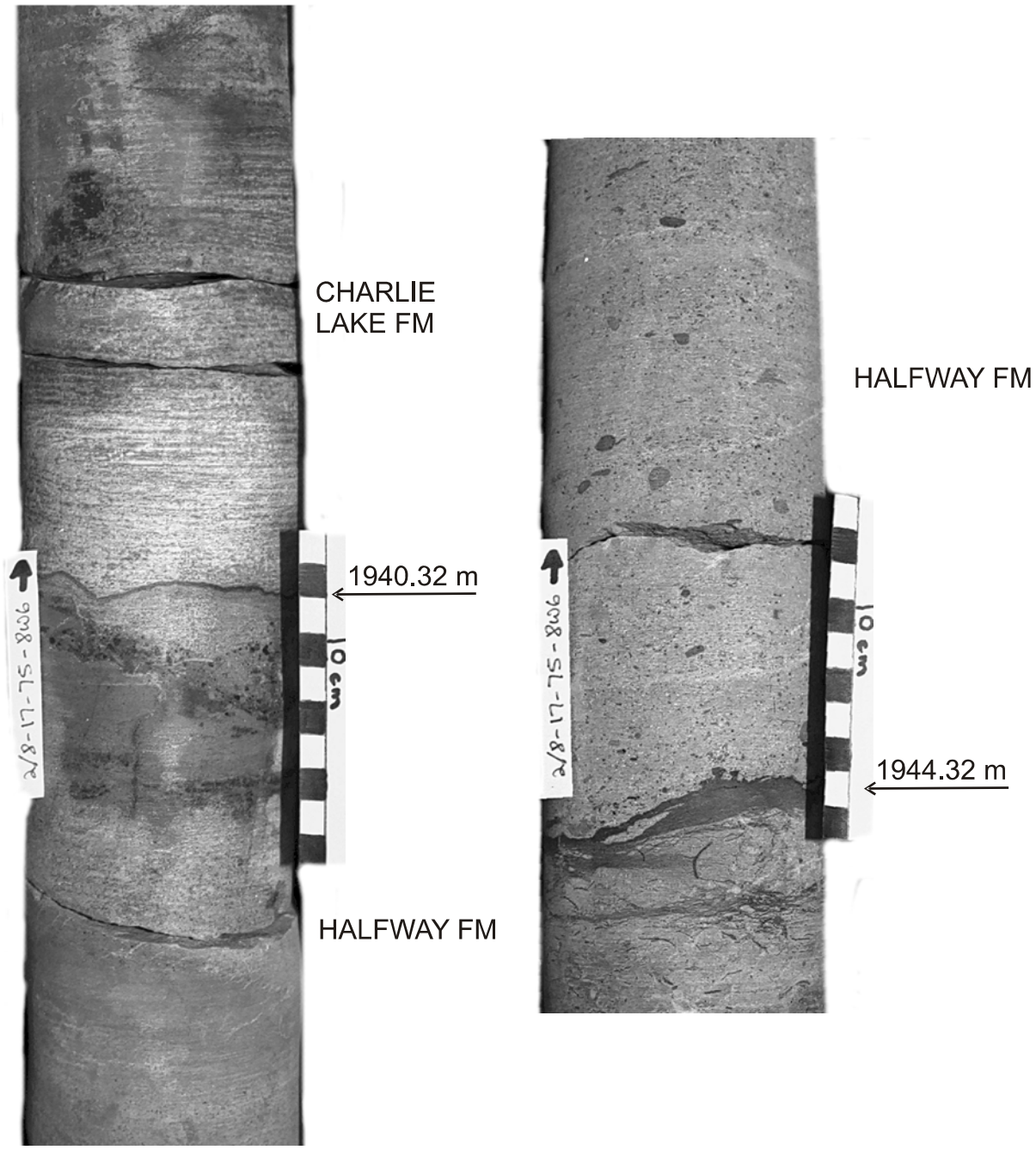
1940.32-1944.32 m	Sandstone: fine to coarse grained with scattered granules and very small pebbles, the latter mostly in the lower 70 cm. Crudely cross bedded, especially noticeable in lower 2 m where granules are aligned along bedding. Erosional basal contact resting on a thin mudstone layer.
1944.32-1944.4 m	Mudstone-argillaceous dolostone: Upper 1 cm is mudstone underlain by argillaceous dolostone that contains a few bivalve molds, in turn underlain by a very thin (2-4 mm) mudstone layer. Dolostone contains irregular laminae and seams of clay. Abrupt basal contact.
1944.4-1944.88 m	Sandstone: Upper 25 cm consists of fine grained sandstone with scattered coarse grains and granules. Lower part of interval consists of very fine to fine grained sandstone
1944.88-1944.95 m	Interlaminated to very thinly interbedded mudstone-sandstone: Finely laminated. Some horizontal burrows in upper part of interval. Beds up to 1 cm thick. Abrupt basal contact.
1944.95-1947.33 m	Sandstone: fine to medium grained with scattered granules and very small pebbles of black mudstone. Lower 20 cm is partially dolomitized. Appears to consist of several 20-30 cm thick, fining-up beds. Basal contact poorly preserved but appears to be abrupt.
1947.33-1953.45 m	Sandstone: mostly very fine to fine grained, argillaceous in places. Some fine mud laminae. Basal bed is mildly load deformed.

DOIG FM

1953.45-1955.25 m	Mudstone: laminae of silt/very fine sand are abundant.. A few thin beds of very fine grained sandstone.

NOTE: although there are several surfaces potentially correlative to a major regional erosion surface the one with the greatest facies change across it is at 1947.33 m The surface at 1944.32 is a possible alternative candidate.

2/8-17-75-8W6


CHARLIE
LAKE FM
1940.32 m
10 cm
HALFWAY FM
HALFWAY FM
1944.32 m
10 cm

Dome et al Valhalla 2/14-20-75-8W6
Core 1: 1960-1978 m Rec. 18 m. 16 boxes. Full diameter.
Examined 31 September 2002
NOTE: core/log depths appear not to correspond. Core depths may be about 1 m deeper than corresponding log response.

CHARLIE LAKE FM

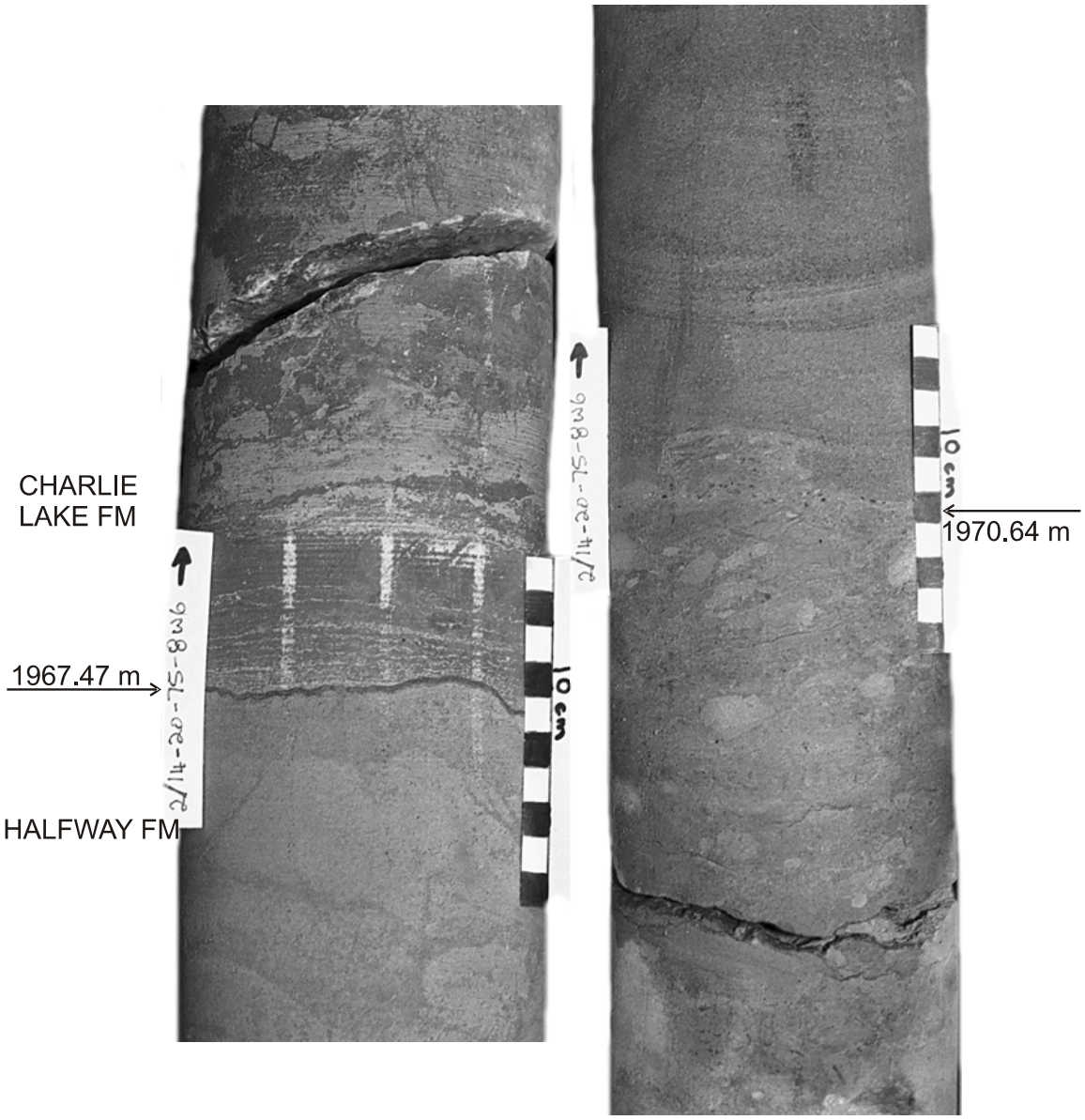
1960-1963.15 m	Dolomitic mudstone: varies from finely laminated to complexly mottled, with latter more prevalent. Slight brownish tint to general grey color.
1963.15-1964.6 m	Dolomitic anhydrite-anhydritic dolostone: Crude, uneven bedding/lamination. A few thin mudstone laminae/very thin beds that are usually slightly load deformed. Diffuse upper and lower contacts - possibly masked by diagenesis.
1964.6-1966.15 m	Mudstone-dolomitic mudstone: brick-red with patches of grey. Complex diagenetic fabric imparts a pseudo-breccia appearance. Some indications for soft-sediment deformation. Abrupt, load-deformed basal contact underlain by a 5-8 mm thick clay layer.
1966.15-1967.47 m	Dolostone: slightly anhydritic. Brown to light grey on outer core surface; light grey on cut surface. Finely to coarsely laminated with some breccia-like layers in lower 30 cm - latter appears to be a diagenetic fabric. Abrupt basal contact underlain by a 2 mm thick clay layer resting on an undulating surface.

HALFWAY FM

1967.47-1970.64 m	Sandstone: fine to medium grained. Predominantly massive in appearance with some medium angle cross beds in lower 75-100 cm. Erosional, load deformed basal contact.
1970.64-1978 m	Sandstone: very fine to fine grained. Uppermost 50 cm has a slight pinkish tint. Massive with zones of fine laminae. Scattered throughout interval are fine mud laminae. Basal 67 cm consists of coquinal sandstone.

NOTE: possible major erosion surface at 1970.64 m

2/14-20-75-8W6



PEX Valhalla 6-1-75-9W6
Core2: 2012-2030.25 m Rec. 16.5 m. 14 boxes. Full diameter.
Core and log depths seem to be mismatched; core depths appear to be about 1 m higher than log response depths. Description uses core depths.
Examined 4th August 1999

DOIG FM

2012-2013.75 m	Interbedded sandstone-argillaceous sandstone-mudstone: very fine to fine grained sandstone. Medium grey colour. Appears to be thoroughly bioturbated, mixing the various lithotypes and destroying most beds - a few beds of laminated sandstone preserved. Rapidly gradational into underlying strata. Scattered, large anhydrite nodules in upper 25 cm (largest up to 8 cm long).
2013.75-2015.18 m	Sandstone: very fine grained, argillaceous - clays impart slight greenish hue to otherwise light grey rock. Thoroughly bioturbated with no relict primary sedimentary structures. Base of unit is abrupt and load deformed.
2015.18-2018 m	Mudstone grading up into sandy mudstone: basal 1 m is dark grey to black mudstone with minor silt laminae. Upward increase in sand/silt content and rock becomes lighter coloured. The sandier part of interval consists of interlaminated to thinly interbedded mudstone and sandstone with a thoroughly bioturbated uppermost 50 cm. Rests abruptly on underlying strata.
2018-2019.58 m	Sandstone: very fine to fine grained. Brownish-grey. Consists of at least four beds with the following ideal vertical succession: erosional surface - shelly debris in sandstone - massive sandstone - current-ripple laminated sandstone - bioturbated sandstone to argillaceous sandstone. In some beds the massive or ripple laminated sandstone may be absent. Basal bed rests erosionally on underlying strata.
2019.58-2020.21 m	Sandstone: very fine grained; interlaminae of mud. Medium to dark grey. Fine planar laminae throughout. Current-ripple laminae in several beds.
2020.21-2020.55 m	Sandstone/argillaceous sandstone: very fine grained. Severely deformed.
2020.55-2022.8 m	Argillaceous sandstone/sandy mudstone: fine planar laminae and bioturbated zones. Rests abruptly on underlying strata.
2022.8-2023.67 m	Sandstone: very fine grained. At least two, possibly three beds. Fine, very low-angle cross laminae (?HCS). Erosional base.
2023.67-2025.19 m	Interbedded sandstone-mudstone: fine cross laminae (?HCS) in medium to thick (6-22 cm) beds of very fine grained sandstone. 1-2 cm thick mudstone layers/beds. One 7 cm thick sandstone bed located about mid-way through interval contains shelly debris. Minor deformation of laminae in a few beds. Possibly 10 beds.
2025.19-2027 m	Interbedded mudstone-sandstone: 1-5 cm thick beds. Very fine grained, argillaceous sandstone. In upper part of interval the sandstone beds are planar laminated with only minor bed loading. In lower part of interval the sandstone beds are extensively load deformed and internal sedimentary structures are rarely preserved - beds are uneven with undulose contacts due to loading.

2027-2028.5 m	Argillaceous sandstone: very fine grained. Mostly massive in appearance with some fine laminae in the lowermost 20 cm. A few scattered anhydrite nodules.

NOTE: transgressive facies interpreted for interval 2018-2019.58 m with flooding surface at top of this interval.

Dome Valhalla 6-9-75-9W6
Core 1: 2032-2050 m Rec. 14.2 m. 13 boxes. Full diameter
Examined 31 September 2002

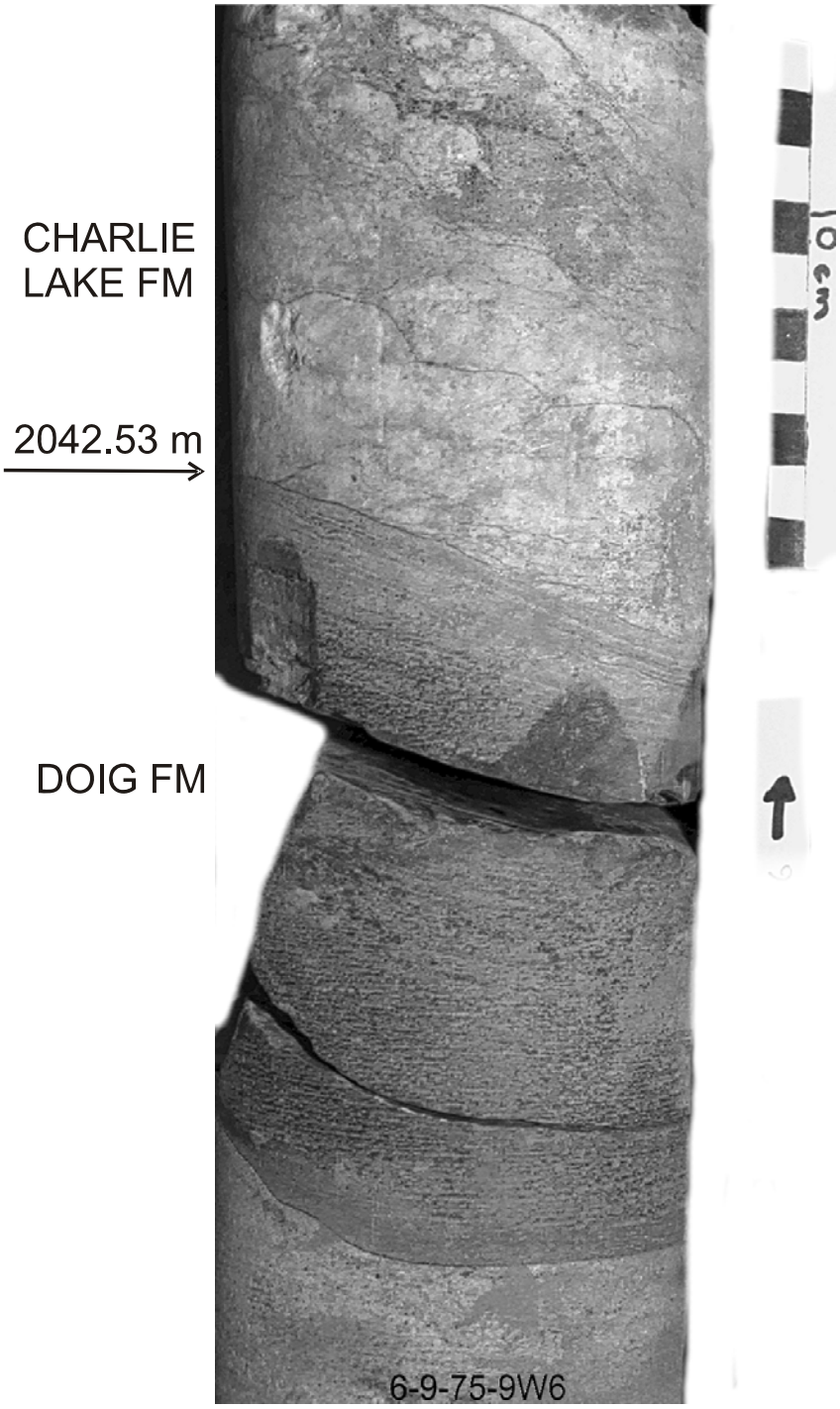
CHARLIE LAKE FM

2032-2032.14 m	Dolostone: light grey. Rapidly transitional from underlying mudstone.
2032.14-2032.29 m	Mudstone: medium grey. Dolomitic. Mottled fabric. Abrupt basal contact.
20320.29-2032.38	Anhydrite-dolostone: grades up from argillaceous dolostone into anhydrite. Abundant irregular laminae and seams of clay in basal transitional contact.
2032.38-2038.7 m	Mudstone: predominantly brick-red with light grey colors in upper 2 m. Complex mottled fabric throughout - dolomitization. One 10 cm-thick bed of light grey dolostone about 2.5 m above base. Abrupt basal contact.
2038.7-2040.15 m	Anhydritic dolostone-dolomitic anhydrite: crystalline. No indications of bedding. Abrupt basal contact underlain by a few mm-thick clay bed.
2040.15-2041.15 m	Mudstone: brick-red. Dolomite mottling. Abrupt basal contact.
2041.15-2041.48 m	Dolomitic anhydrite: Massive, crystalline. Abrupt basal contact.
2041.48-2041.6 m	Mudstone: brick-red; mottled. Some irregular fine laminae of dolomite.
2041.6-2042.53 m	Dolostone: thinly bedded. Abundant load deformation structures. Anhydrite nodule in basal 15 cm - probably replacing dolomite. Abrupt basal contact.

DOIG FM

2042.53-2042.66 m	Mudstone: dark grey to black.
2042.66-2042.77 m	Sadnstone: fine to medium grained. Abrupt base and top.
2042.77-2046.2 m	Mudstone: interlaminated to thinly interbedded with siltstone/very fine grained sandstone. Some intervals are highly disrupted. A few horizontal burrows.

6-9-75-9W6



Dome et al Valhalla 14-11-75-9W
Core 2: 2035-2053.2 m Rec. 18.35 m 16 boxes Slabbed
Examined 2nd Oct. 2002

CHARLIE LAKE FM

2035-2035.53 m	Mudstone: brick-red. Mottled fabric of contrasting dark and light red color. Scattered small patches of dolomite.
2035.53-2035.56 m	Anhydrite: light grey. Abrupt base and top.
2035.56-2036.99 m	Mudstone: as above. Some remnant laminae. Abrupt basal contact.
2036.99-2038.19 m	Anhydrite/dolomitic anhydrite: light grey. Fine to coarse laminae - contorted in places. Some of the coarse laminae are disrupted but not totally brecciated.
2038.19-2038.75 m	Mudstone: as above. Has a disrupted fabric in places. Abrupt basal contact.
2038.75-2039.05 m	Anhydrite/dolomitic anhydrite: as above. Contains a disrupted bed of red mudstone in upper 10 cm. Abrupt basal contact.
2039.05-2039.45 m	Mudstone: as above with lenses and irregular patches of light grey dolomite. Abrupt basal contact.
2039.45-2039.7 m	Dolostone/anhydritic dolostone: massive with vague indications of bedding.
2039.7-2039.95 m	Mudstone: brick-red. Brecciated appearance. Dolomite nodules near base of interval - may be pseudomorphs after anhydrite. Abrupt basal contact.
2039.95-2040.75 m	Dolostone: anhydritic in top 7 cm; sandy in middle 30 cm; dense, very finely crystalline in lower part. Vaguely bedded. Brecciated appearance in sandy part. Abrupt basal contact.

HALFWAY FM

2040.75-2045.87 m	Sandstone: fine to medium grained with concentrations of coarse grains along cross beds Granules present in basal 15 cm.. Patchy dolomitization, with some concentrated along bedding planes. Oil stained. Abrupt, erosional basal contact.
2045.87-2046.73 m	Sandstone: interbedded mudstone in upper 30 cm. Very fine grained. Argillaceous. Basal 40 cm may be burrow mottled. Basal contact poorly preserved but facies change is rapid suggesting an abrupt contact.
2046.73-2048.9 m	Sandstone: fine to medium grained, locally coarse grained especially near base and along some bedding planes. Cross bedded. Basal contact poorly preserved but facies change is rapid suggesting an abrupt contact.

DOIG FM

2048.9-2053.2 m	Coarsening-up interval: interbedded/interlaminated mudstone-siltstone-very fine grained sandstone in basal 1 grading up into argillaceous very fine grained sandstone with irregular laminae, lenses and very thin beds of mudstone. Some beds are burrow mottled. Lenticular bedding present in places.

NOTE: erosion surfaces at 2045.87 m and 2048.9 m - not sure which is of regional significance

Ladd et al Valhalla 6-28-75-9W6
Core 1: 2004-2013 m Rec. ?9 m 9 boxes Full diameter
Examined 1st Oct. 2002

CHARLIE LAKE FM

2004-2007.1 m	Mudstone: light brick-red color. Dolomitic. Mottled fabric. Minor veins of anhydrite. Some remnant laminae scattered throughout interval. Abrupt basal contact.
2007.1-2008.4 m	Dolomitic anhydrite/anhydritic dolostone: Light grey. Coarse laminae to very thin beds - uneven to undulose bedding, with some distorted intervals. Abrupt basal contact.
2008.4-2009.6 m	Mudstone: brick-red. Contains 4 thin (3-10 mm) interbeds of dolostone/anhydrite in lower 20 cm. Mottled mudstone. Abrupt basal contact.
2009.6-2009.8 m	Anhydrite: light grey; dolomitic. Vaguely bedded. Load deformed, basal contact.
HALFWAY FM	
2009.8-2011.5 m	Sandstone: fine to medium grained, locally coarse. Grades up into silty mudstone in top 10 cm. Low angle cross beds. Patchy dolomitization. Abrupt, severely load deformed basal contact.
DOIG FM	
2011.5-2013 m	Sandstone-mudstone: very fine grained sandstone and sandy mudstone. Highly deformed with some remnants of original bedding. Dolomitized in places.

NOTE: possible major erosion surface at 2011.5 m.

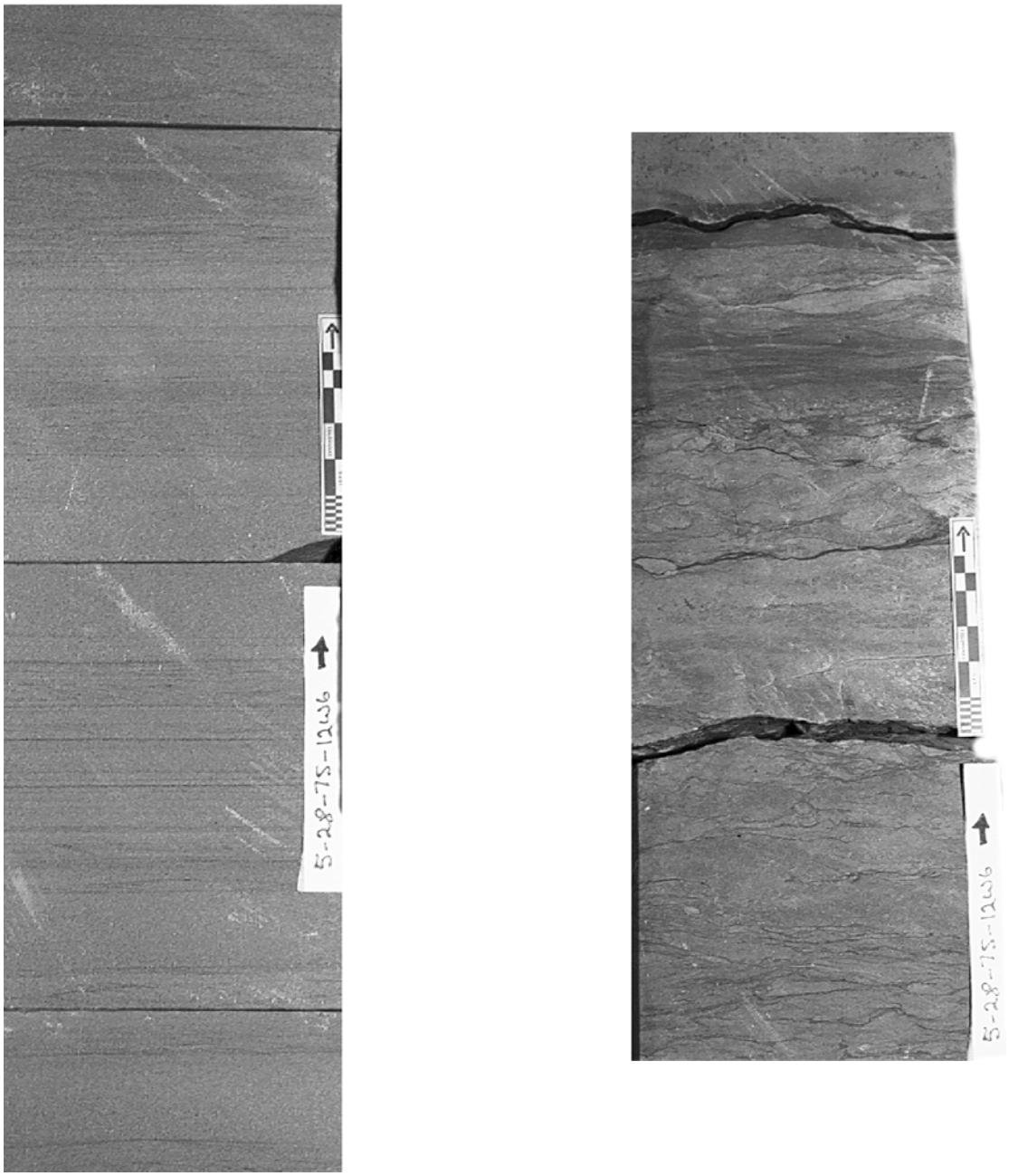
AEC Sinclair 5-28-75-12W6
Core 1: 2306.8-2324 m Rec. 17.9 m 17 boxes Slabbed
Examined 1st Oct. 2002

HALFWAY FM

2306.8-2315.9 m	Sandstone: 4 thick fining-up intervals, each consists of: a) erosional base b) cross bedded fine grained sandstone c) thin interbeds of argillaceous sandstone, sandstone and mudstone. Many of the sandstone beds contain clay laminae/streaks. Some of the fining-up intervals contain burrows. Lowermost interval rests erosionally on underlying Doig FM and contains at least one flattened pebble near its base
DOIG FM	
2315.9-2324 m	Mudstone: dark grey to black. Very silty/sandy. Overall coarsening-up aspect (upward increase in silt/sand). Laminae, lenses and very thin beds of silt/sand. Burrows and burrow mottling common, as are soft sediment deformation features.

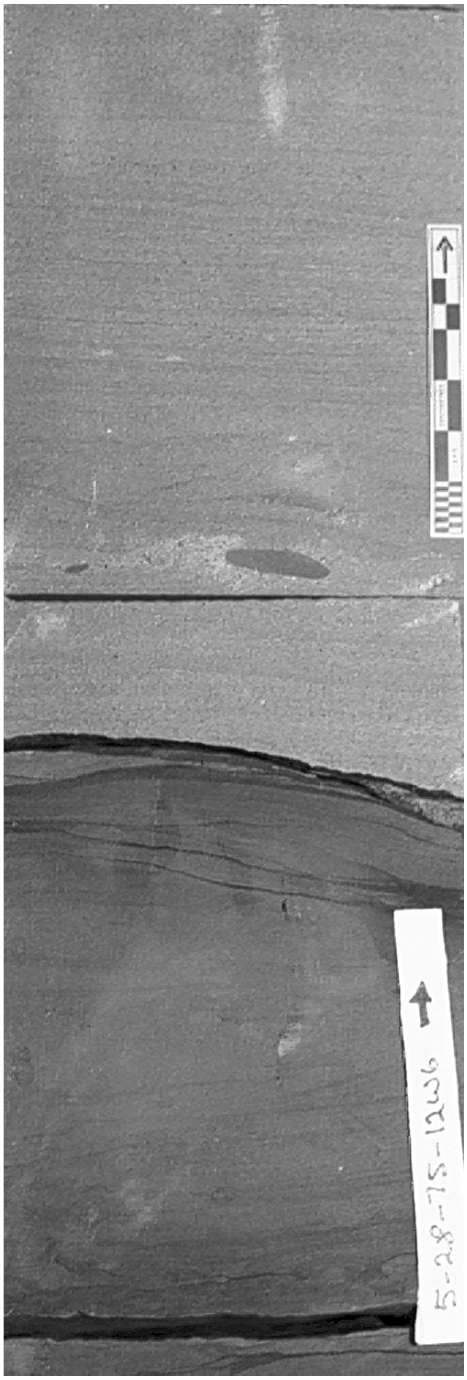
NOTE: possible major erosion surface at 2315.9 m.

5-28-75-12W6



Halfway Fm: facies within a fining-up unit - low angle cross bedded (left) sandstone grading up into argillaceous sandstone and sandy mudstone (right)

5-28-75-12W6



HALFWAY FM

2315.9 m

DOIG FM

Roxy et al Rycroft 6-9-76-4W6
Core 1: 1546-1563 m Rec. 17 m 12 boxes Full diameter
Examined 1st Oct. 2002
Core/log depths do not match - log depths about 1 m deeper than core depths

JURASSIC - NORDEGG
1546-1549.5 m Shale: black. Silty to sandy in basal 50 cm
CHARLIE LAKE FM
1549.5-1554 m Dolostone: light grey; very finely crystalline. Slightly argillaceous. Some mottling. Abrupt basal contact.
HALFWAY FM
1554-1556.5 m Coquinal dolostone: Dense very finely crystalline dolostone with some coquinal layers in lower 75 cm, whereas the remainder is highly porous, moldic coquinal dolostone. Slightly sandy near base. Basal contact not preserved but major facies change suggests it is abrupt.
DOIG FM
1556.5-1563 m Mudstone: laminae and very thin beds of siltstone/very fine grained sandstone. Dark grey to black except in upper 1 m where it is greenish grey, and where there is more silt/sand content. Fine, planar laminae and some lenticular beds. Minor load deformation and only a few burrows.

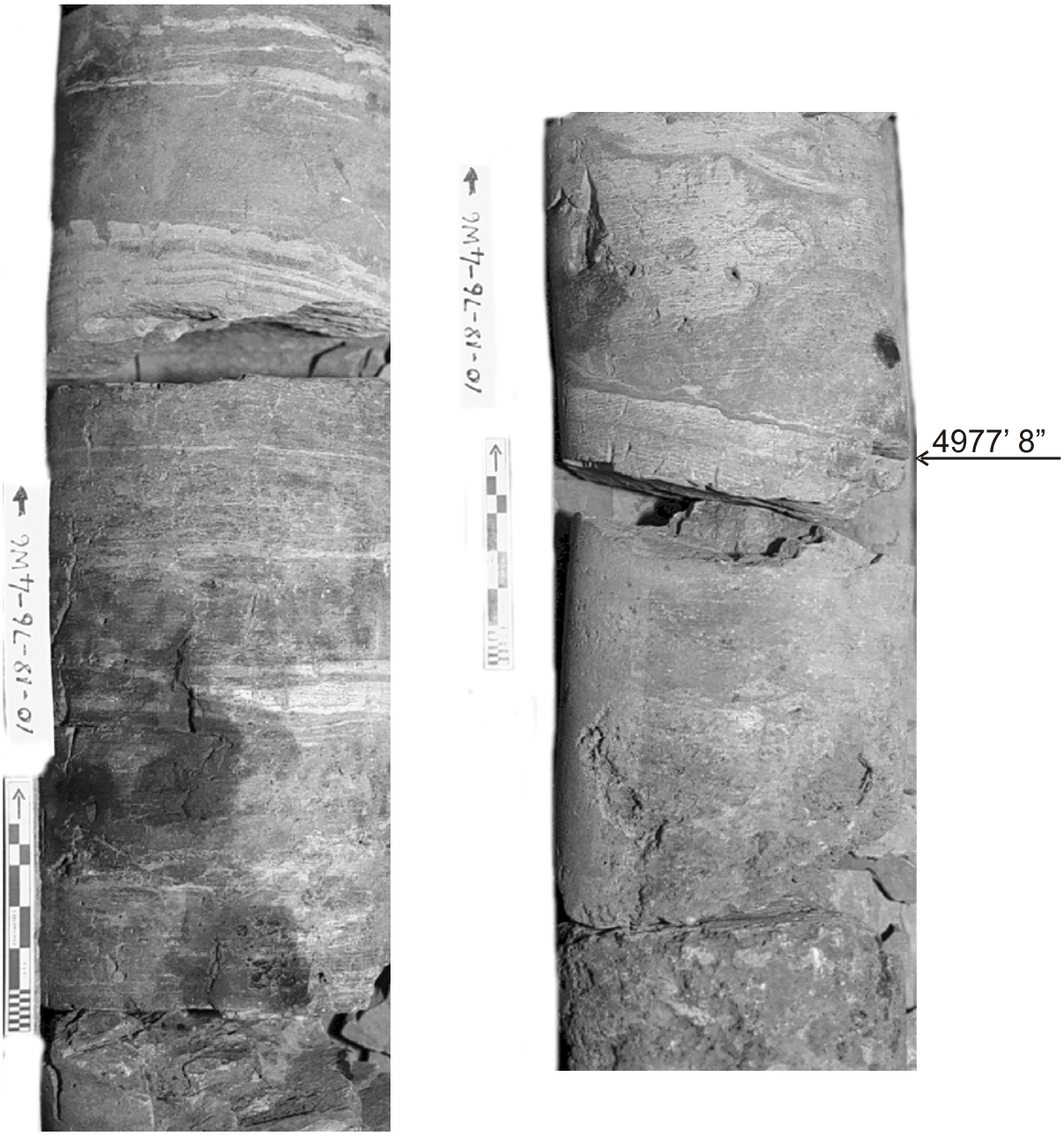
NOTE: possible major erosion surface at 1556.5 m.

Ashland Woking 10-18-76-4W6
Core 1: 4973-5003 ft Rec. 30.5 ft 8 boxes Full diameter
Examined 1 Oct. 2002

CHARLIE LAKE FM
4972-4973'8" Dolomudstone: light greenish grey. Vaguely mottled - either diagenetic or burrowing. Abrupt basal contact.
4973'8"-4974'1" Dolomudstone: light grey with large dolomite nodules (possibly pseudomorphs after anhydrite). Abrupt basal contact
4974'1"-4975 ‘ Argillaceous dolostone-dolomudstone: highly disrupted fabric - possibly due to extensive bioturbation.. Basal contact not preserved but facies change is abrupt.
4975-4977'8" Dolostone: brownish grey to light yellowish grey laminae to thin bands alternating with thicker bands of brownish grey dolostone. Some microfractures and vugs. Abrupt basal contact overlain by a few mm of undulose, very fine laminae draping the contact. Similar laminae occur 3" above contact. The fine laminae could be stromatolites.
4977'8"-4982'10" Coquinal dolostone: moldic porosity throughout. Oil stained. Basal contact is abrupt and erosional. Lowermost 2" contains rounded clasts similar to underlying dolomitized mudstone. Clasts are mostly <1 cm in diameter, although there are a few larger clasts. Clasts are spherical to

	elliptical.
4982'10"-4983'	Dolostone: very finely crystalline. Light grey. Microfractures aligned horizontally to low angle; a few are vertical. This interval has some attributes of a pedogenic surface. Abrupt basal contact, but poorly preserved.
DOIG FM	
4983'-5003'	Coarsening-up interval: lower beds are argillaceous very fine grained sandstone with abundant mud laminae and very thin beds, grading up into argillaceous very fine grained, bioturbated sandstone with fewer discrete mudstone laminae/beds, in turn grading up into about 3 ft of horizontally bedded very fine grained sandstone. Latter has some dolomitized beds.

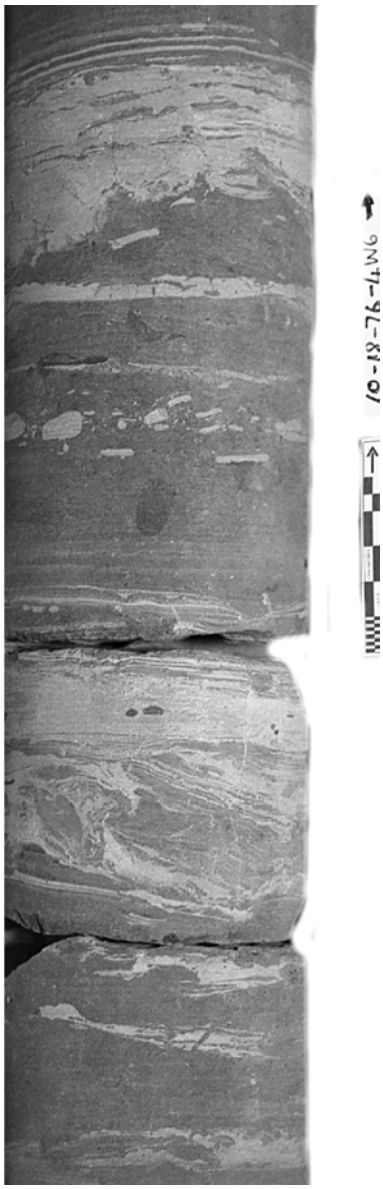
10-18-76-4W6



Charlie Lake Fm: interval 4975’ -4977’ 8”; laminated to thinly bedded dolostone.

10-18-76-4W6

Charlie Lake Fm: base of coquinal dolostone at 4982’ 10”



Doig Fm

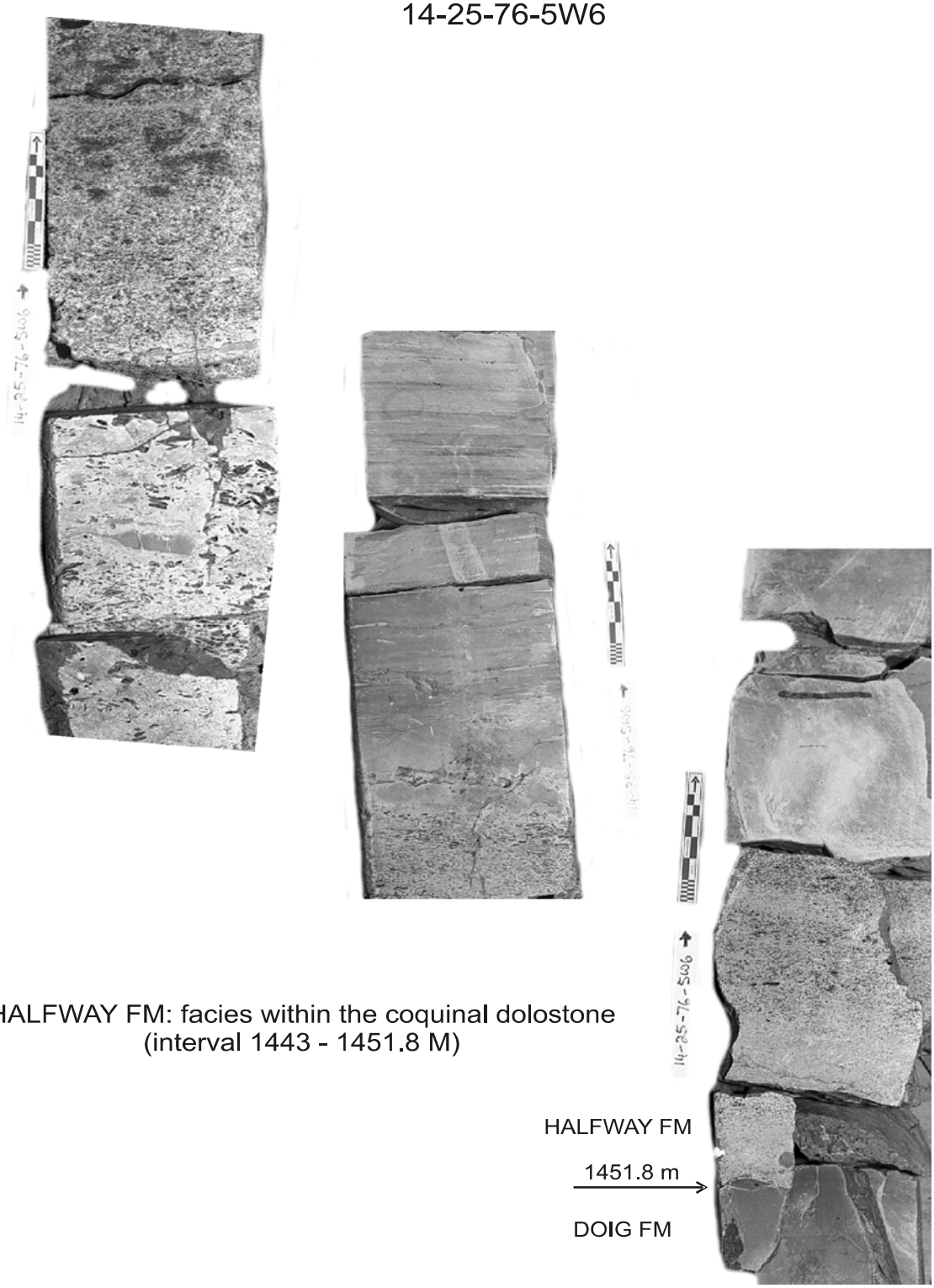
Norcen at al Rycroft 14-25-76-5W6
Core 1: 1443-1461 m Rec. 16.93 m 15 boxes. Slabbed
Examined 1 Oct. 2002

HALFWAY FM

1443-1451.8 m	Coquinal dolostone: Basal 5-6 cm contains thin beds of coquina separated by intervals of very finely crystalline, finely laminated to very thinly bedded dolomudstone. Upper 3 m is entirely highly porous, moldic coquinal dolostone, with a few indicators to suggest multiple beds. Each identifiable coquinal bed rests on an erosional surface. Coquinas are very porous due to abundance of moldic porosity. The lower 1-1.5 m contains thinner, less porous coquinas and they are interbedded with thin intervals of dolomudstone. Basal contact is abrupt and rests on a thin dolomitized mudstone (core is badly broken at this level).
DOIG FM	
1451.8-1459.43 m	Mudstone: dark grey to black; light grey in upper 60-70 cm due to incipient dolomitization. Silt laminae are common. Pyrite is abundant. Basal 2.5 m contains very thin to thin interbeds of siltstone to very fine grained sandstone which have minor load deformation and some horizontal burrows.
1459.43-1461 m	Missing core

NOTE: possible major erosion surface at 1451.8 m.

14-25-76-5W6



HALFWAY FM: facies within the coquinal dolostone
(interval 1443 - 1451.8 M)

Richland Rycroft 4-34-76-5W6
Core 1: 1427-1445.25 m Rec. 17.95 m 13 boxes. Full diameter
Examined 1 Oct.. 2002
Log/core depths may nor match; suspect log depth about 1 to 1.5 m higher than corresponding core depth

CHARLIE LAKE FM
Coplin Member

1427-1427.44 m	Dolostone: light grey with lenticular patches of yellowish grey dolostone, aligned subparallel to presumed bedding. Abrupt basal contact.
1427.44-1430.29 m	Mudstone: very silty/sandy. Laminae and very small lenses of silt/very fine sand in a dark grey mudstone. Abrupt basal contact.
1430.9-1430.99 m	Argillaceous to dolomitic very fine grained sandstone: Yellowish grey color. Difficult to detect any sedimentary structures. Transitional with underlying beds.
1430.99-1432.74 m	Sandstone: dolomitic, very fine to fine grained. Horizontally bedded. Scattered vugs. Dark brownish grey color. Scattered zones of oil staining. Base of interval chosen at a colour change, where a darker colour is underlain by a lighter coloured sandstone.

?base of Coplin Mbr

1432.74-1434.47 m	Argillaceous, dolomitic sandstone: Very fine to fine grained. Disrupted fabric- possibly bioturbated. Fine to coarse dolomitized laminae in lower 50 cm. Steeply inclined abrupt contact with underlying bed - probably slumped.

HALFWAY FM

1434.47-1434.61 m	Sandy dolostone/dolomitic sandstone: Appears to contain rounded clasts at base of interval. Lowermost 1-2 cm consists of very finely crystalline, yellowish white dolostone resting on underlying coquina.
1434.61-1434.71 m	Coquina: sandy dolostone. Moldic porosity
1434.71-1437.31 m	Sandstone: dolomitic with some zones of complete dolomite replacement. Fine grained. Porous with some dead oil in pores. Dark grey; dolomitized areas yellowish grey. Horizontal bedding.
1434.71-1438.16 m	Sandy coquinal dolostone: Some moldic and vuggy porosity. Large part of interval is dense, non-porous dolomite.
1438.16-1441.66 m	Sandstone-dolostone: thin to thick beds of dolomitic sandstone and sandy dolostone separated by thin muddy zones. Muddy zones tend to be laminated (planar and ripple). A few burrows in basal 20 cm. Scattered bivalve molds. Some local concentrations of pyrite.
1441.66-1444.81 m	Coquinal dolostone: sandy. Small to large bivalve molds. Highly porous. Abrupt basal contact.

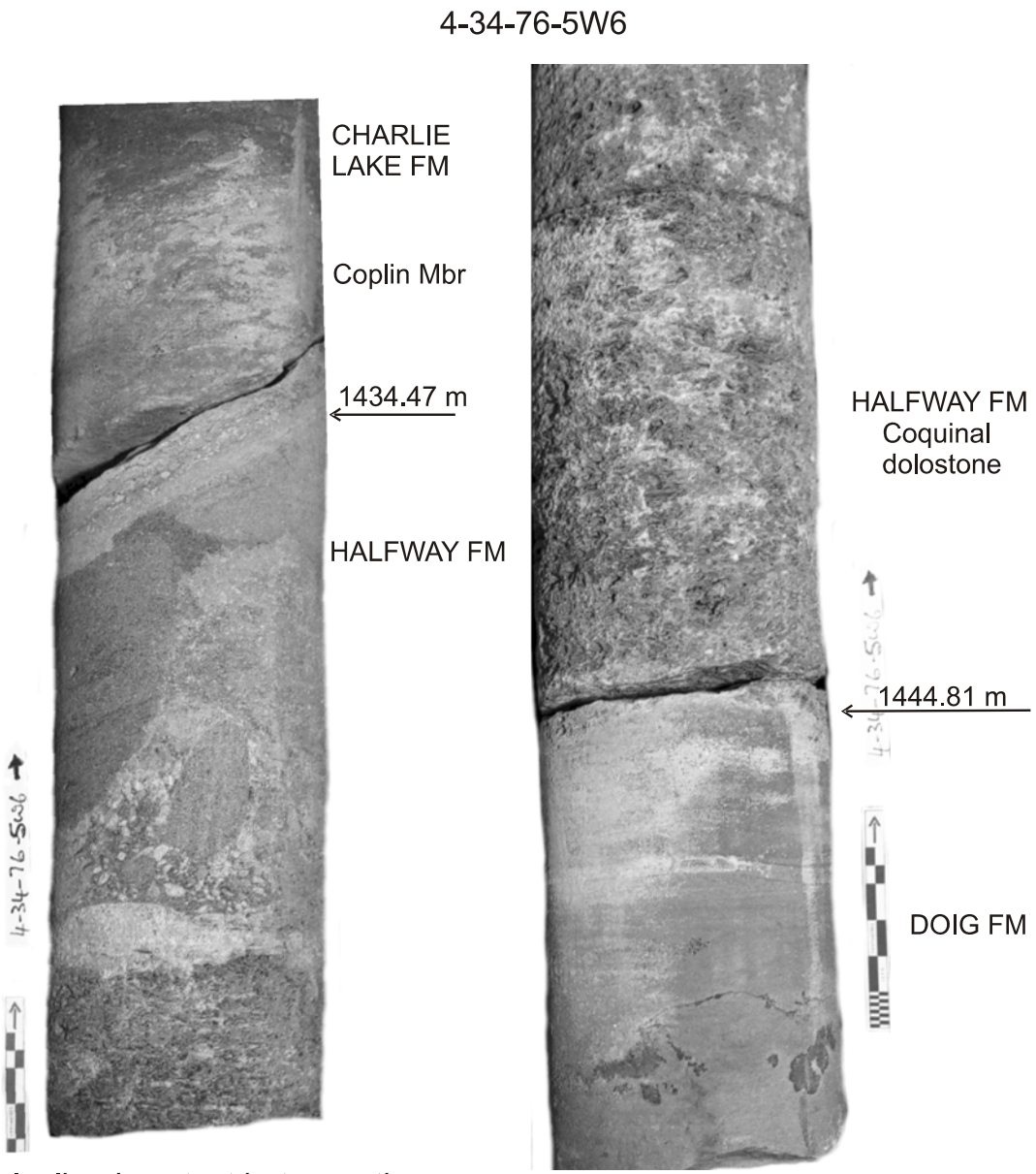
?DOIG FM

1444.81-1444.95 m	Sandstone: fine grained, dolomitic. Contains pyrite nodules 1-2 cm in diameter.
1444.95-1445.25 m	Missing core

NOTE:

Difficult to relate lithological succession to gamma-ray log response.

Possible major erosion surface at 1444.81 m.



Inclined contact between the Coplin Mbr and Halfway Fm

Anadarko Saddle Hills 2/16-6-76-7W6
Core 1: 1788-1806 m Rec. 17.7 m 13 boxes Full diameter with a few core segments slabbed.
Examined 2nd Oct. 2002

CHARLIE LAKE FM

1788-1790.8 m	Mudstone: brick-red. Mottled to disrupted fabric. A few zones rich in dolomite nodules and patches of replacement dolomite. Some remnants of fine lamination. Lower half of interval lacking in the mottled/disrupted fabric.
1790.8-1791.28 m	Mudstone-anhydrite: brick-red mudstone . White/light grey anhydrite filling sub-horizontal fractures, but some could be true beds. Basal contact not preserved.
1791.28-1792.2 m	Dolostone/sandy dolostone/dolomitic sandstone: light brownish grey. Scattered black granules (?chert). Highly deformed/disrupted fabric. Rests abruptly on an uneven, slightly corroded surface.
1792.2-1794.97 m	Dolostone: light yellowish grey. Stromatolitic - fine to coarse, undulose and crinkly laminae, with at least one short interval of small domal forms. Abrupt basal contact.

HALFWAY FM

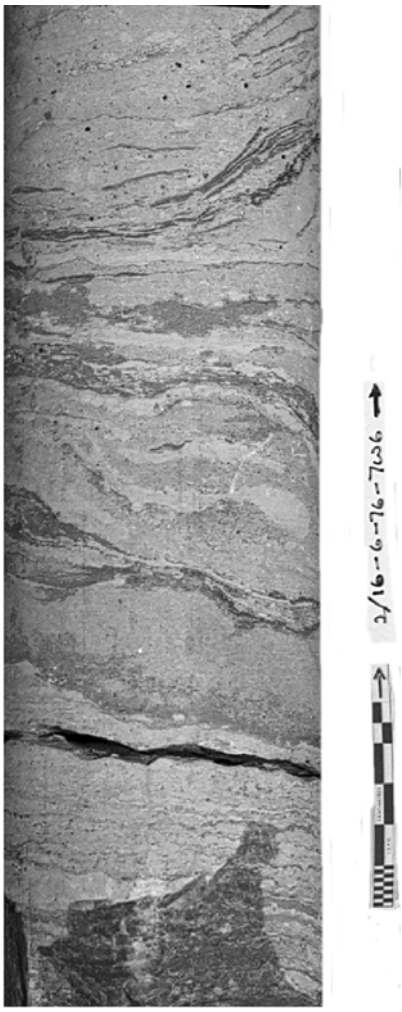
1794.97-1795.07 m	Pebbly sandstone: large granules to very small pebbles in a dolomitic, fine grained sandstone. Pebbles are black (?chert) and "float" in the sandstone. Highly disrupted fabric. Base of bed has severe load deformation - signs of bed inversion seen.

DOIG FM

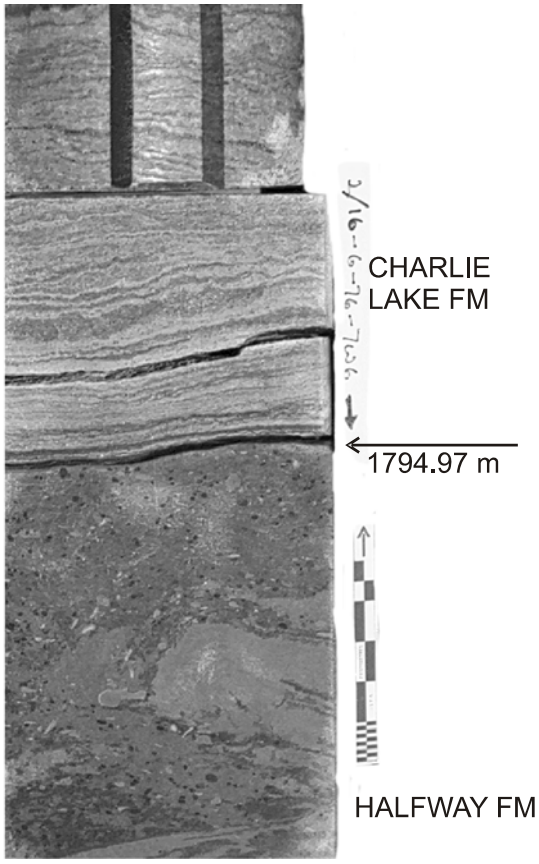
1795.07-1796.14 m	Dolomitic sandstone: very fine to fine grained. Areas of incipient to complete dolomitization. Scattered dolomite nodules. Fine, highly distorted laminae through unit. Basal contact not preserved.
1796.14-1801.68 m	Sandstone: very fine grained. Partially dolomitic. Scattered dolomite nodules. Ranges from interlaminated sandstone-mudstone to very thin beds of sandstone separated by muddy beds. Lenticular bedding is common in the muddy zones. Thin sandstone beds tend to be planar and/or ripple laminated. Some minor bed deformation. Burrowed in places. Lower 1 m tends to be more argillaceous. Abrupt basal contact.
1810.68-1805.7 m	Mudstone: dark grey to black. Fine laminae of silt/sand throughout interval. Lacks bioturbation structures.

NOTE:
Possible major erosions surface at 1795.07 m.
Sandstone identified as Halfway Fm may be too thin to classify as a formation

2/16-6-76-7W6
CHARLIE LAKE FM



Interval 1791.28 - 1792.2 m



Stromatolitic dolostone resting
on Halfway sandstone.

2/16-6-76-7W6

Doig facies within interval 1796.14 - 180.68 m

Dome et al Saddle Hills 4-6-76-8W6
Core 1: 1939.6-1954.3 m Rec. 14.7 m 13 boxes Full diameter
Examined 2nd Oct. 2002

CHARLIE LAKE FM

1939.6-1942.2 m	Dolomitic mudstone/very argillaceous dolostone: Reddish brown. Mottled, disrupted fabric.
1942.2-1943.9 m	Dolostone/anhydritic dolostone: Coarse laminae to very thin beds - undulose to mildly convoluted. Upper and lower thirds contain red mudstone filling in cavities and solution cracks. Basal contact not preserved.
1943.9-1945.13 m	Mudstone: brick-red. Dolomite mottling, ranging from small patches to nodular, to large areas of replacement. Some of the nodular forms of dolomite appear to be pseudomorphs after anhydrite.
1945.13-1946.23 m	Dolostone: light grey. Coarse, planar to crinkly laminae - probably stromatolites. Upper 50 cm contains medium to coarse sand-filled subhorizontal fractures and vugs.

HALFWAY FM

1946.13-1946.63 m	Sandstone: light grey. Fine grained with some coarse grains and small granules along bedding planes. Cross bedded. Basal contact is severely load deformed, creating sand balls in underlying thin unit of sandy mudstone.
1946.63-1949.23 m	Sandstone: fine grained. Brownish grey. Incipient dolomitization, either as small patches or parallel to bedding. Massive to faintly planar bedded. Porous. A thin sandy mudstone at top of interval. Basal contact is vague.
1949.23-1950.13 m	Dolomitic sandstone: light grey with a slight pinkish tint. Fine to medium grained with some coarse grains Dolomite present as cement and as small (<3 cm) nodules/patches. Some faint traces of shell debris. Non-porous. Abrupt basal contact.

DOIG FM

1950.13-1954.3 m	Interbedded/interlamianted mudstone-sandstone: Very thin to thin beds of very fine grained sandstone intercalated with zones of interlaminated mud-sand.. Finely laminated (planar and ripple); minor load deformation; horizontal burrows are common in the muddy intervals; vertical burrows not as common.

NOTE: possible major erosion surface at 1950.13m

4-6-76-8W6

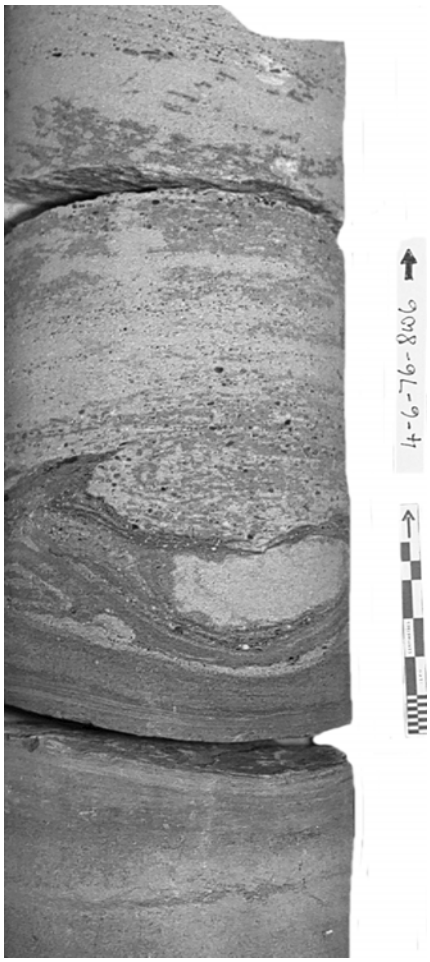
CHARLIE LAKE FM

Interval 1939.6 - 1942.4 m

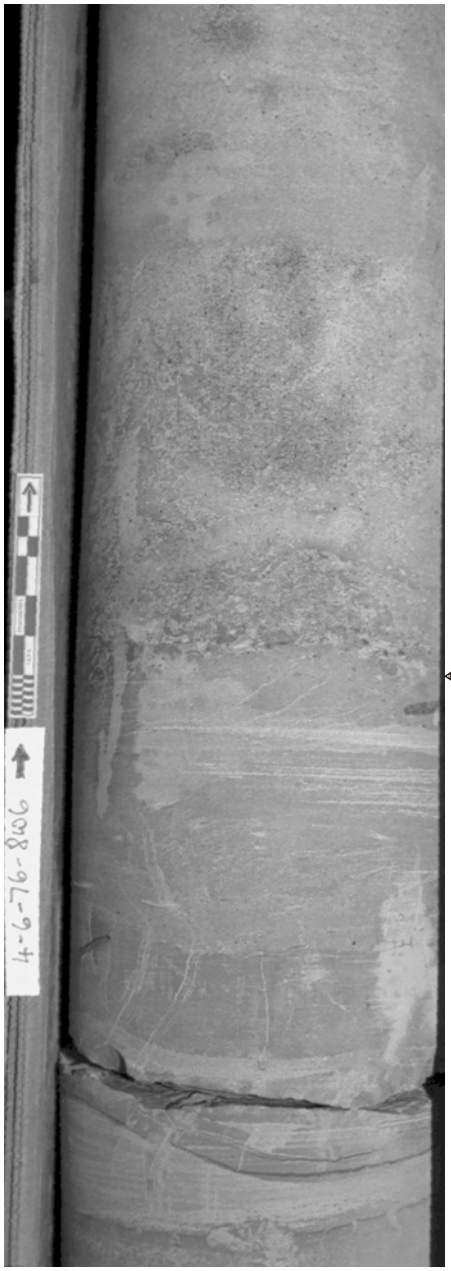
Interval 1942.2 - 1943.9 m

Interval 1943.9 - 1945.13 m

4-6-76-8W6



Ball structure in the
Halfway Fm at 1946.63 m



Dome Sulpetro Valhalla 6-5-76-10W6
Core 2: 2094.2-2112.4 m Rec. 17.35 m 16 boxes Full diameter
Examined 2nd Oct. 2002
Examined only the top 4 boxes in core 2

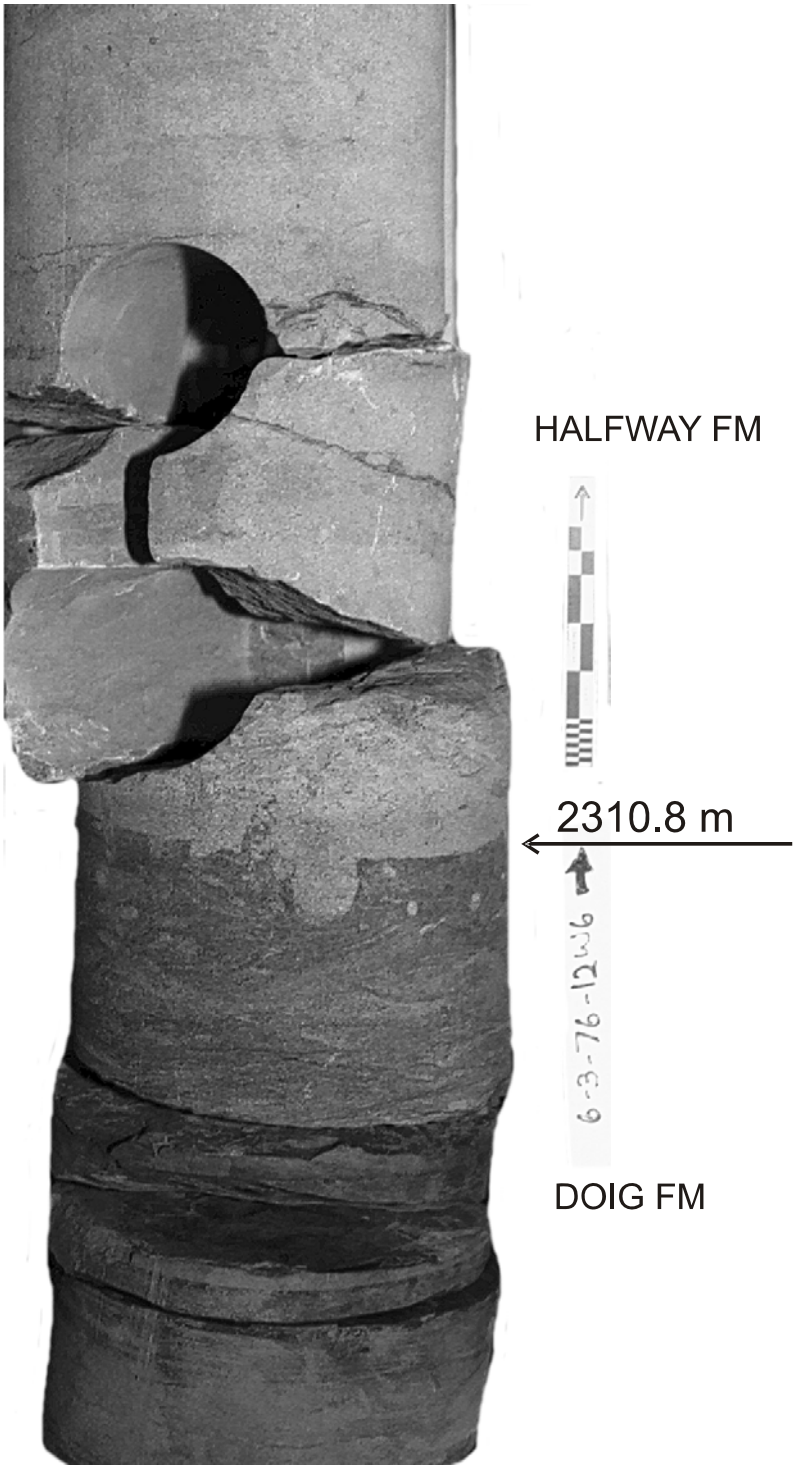
General Comments:
Charlie Lake Fm: typical facies for this area. Interbedded brick-red mudstone, dolostone and anhydritic dolostone. A dolostone/anhydritic dolostone rests abruptly on Doig Fm.
Doig Fm: (upper 2m) very fine grained, brownish grey sandstone with minor mudstone intercalations. Planar bedding and fine laminae. Patchy dolomitization, with extensive dolomitization in uppermost 10-20 cm, immediately below contact with Charlie Lake Fm.

Dome CDA Sulpetro Glacier 6-3-76-12W6
Core 1: 2296-2314.2 m Rec. 18.2 m 17 boxes Full diameter
Examined 2nd Oct. 2002
Log depth about 1.5 to 2 m shallower than corresponding core depth

CHARLIE LAKE FM

2296-2298.4 m	Dolostone-argillaceous dolostone- anhydritic dolostone: thick subvertical veins of anhydrite in mid part of interval. Distorted bedding . Stromatolitic in upper 50 cm. Abrupt, styolitic basal contact.
HALFWAY FM	
2298.4-2310. 8 m	Sandstone: fine grained. Upper 2 m is medium to dark grey, rest of sandstone is light grey. Massive to vaguely cross bedded, with better defined beds in darker colored sandstone. Some dolomitization in darker sandstone. A few internal erosion surfaces indicate presence of multiple units. Lower 85 cm is very argillaceous with some burrow mottling overlain by less argillaceous sandstone - contact between the two facies is vague. Lowermost bed in interval rests on a burrowed mudstone with sand from the Halfway bed filling the burrows.
DOIG FM	
2310.8-2314.2 m	Mudstone: abundant silt/very fine sand laminae and some very thin beds. Some soft sediment deformation and a few burrows.

6-3-76-12W6



Sulpetro et al Glacier 6-21-76-13W6
Core 1: 2228-2234.2 m Rec. 3.4 m 4 boxes Full diameter
Examined 2nd Oct. 2002
Missing part of core covers the interval with the probable regional unconformity.

Core 2: 2234.2-2250.2 m
Rec. 16 m Full diameter
Core and log depths do not correspond. Corresponding log depths appear to be 1.5 m deeper than core depths. (Top of core 2 on the logs should be at 2235.6 m)

Core 2 intersects the upper part of a thick Doig sandstone
Bulk of the Doig sandstone in core 2 consists of very fine grained massive to vaguely bedded sandstone. There are argillaceous intervals in the upper 4-5 m. Argillaceous interval overlain by black, silty mudstone with silt laminae and lenses, and commonly occurring burrows. Erosionally overlain by a 15 cm bed of argillaceous sandstone that contains numerous scattered coarse sand grains. Gradationally overlain by mudstone. The 15 cm bed is interpreted to be a transgressivve sandstone capping the regressive underlying beds.

Thom-Jenn et al Rycroft 8-6-77-5W6
Core 1: 1455-1473 m Rec. 17.4 m 13 boxes Full diameter
Examined 2nd Oct. 1002
Log depth about 1.0 to1.5 m shallower than core depth

CHARLIE LAKE FM

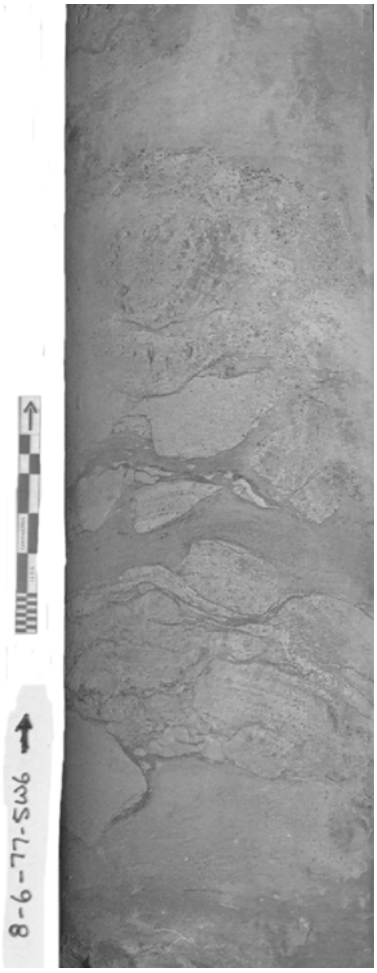
1455-1456.53 m	Interbedded dolostone-mudstone: thin interbeds. Load structures and convoluted beds are common. A few beds are disrupted. Apparent gradational basal contact.
1456.53-1457.98 m	Dolostone: oil stained. Thinly bedded. Some disrupted and deformed beds. Transitional base.
1457.98-1459.72 m	Dolomitic mudstone: some mottling. Transitional base
1559.72-1460.5 m	Dolostone/argillaceous dolostone: disrupted fabric. Slightly oil stained.
1460.5-1462.51 m	Dolomitic mudstone/very argillaceous dolostone: lenticular fabric. Abrupt basal contact.
1462.51-1463.33 m	Dolostone: scattered 1- 2 mm crystals/nodules of pyrite. Transitional base.
1463.33-1466.33 m	Dolomitic mudstone/very argillaceous dolostone: lenticular fabric. Some thin breccia-like intervals. Abrupt basal contact.
1466.33-1468.66 m	Dololstone: contains irregular laminae and stringers of mud. Some laminated intervals. Highly contorted and disrupted. Abrupt basal contact.
1468.66-1468.7 m	Mudstone: abrupt base.
1468.7-1468.97 m	Dolostone: some scattered small vugs. Abrupt basal contact.
1468.97-1469.65 m	Mudstone: dolomitic. Contains some load deformed dolostone beds, some of which are completely disrupted.

HALFWAY FM

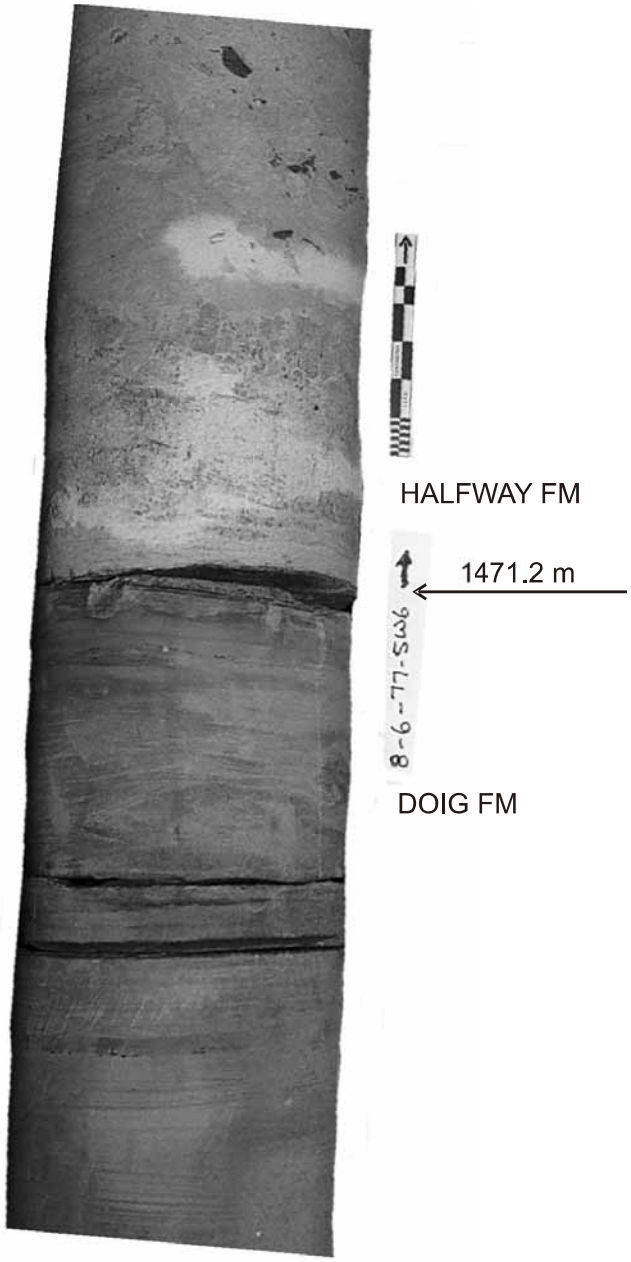
1469.65-1470.62 m	Sandstone: fine grained with scattered black (?chert) coarse grains and small granules. No visible sedimentary structures. Abrupt basal contact.
1470.62-1470.89 m	Anhydrite: creamy white. Massive, crystalline. Some vague laminae. Abrupt basal contact.
1470.89-1471.2 m	Sandstone: fine grained with scattered very small mudstone clasts. Abrupt basal contact.
DOIG FM	
1471.2-1472.4 m	Interlaminated mudstone-siltstone sandstone: Planar and ripple laminae. Some lenticular beds. Lacking in burrows.

NOTE: possible major erosion surface at 1471.2 m.

8-6-77-5W6



Load deformed dolomitic mudstone, Charlie Lake Fm (interval 1468.97 - 1469.65 m)



PCP et al Rycroft 6-18-77-5W6
Core 1: 1386 - 1396 m Rec. 10 m. 7 boxes. Slabbed. Well preserved.
Nordegg and Charlie Lake formations.
Examined 5th December 2000

JURASSIC - NORDEGG

1386-1391 m Shale: dark grey to black. Fine laminae to very thin beds. Scattered, small flecks of white carbonate. Top 6 cm contains an irregular bed of medium crystalline carbonate and calcareous shale. Basal 20 cm consists of a conglomerate grading up into argillaceous, very fine grained sandstone. Conglomerate clasts are concentrated in the lower 9 cm and consist of elongate, rounded carbonate clasts (appear to be identical to underlying Charlie Lake facies) in a mud-sand matrix. Clast-size fines-up. Conglomerate rests erosionally on Charlie Lake Fm.

CHARLIE LAKE FM

1391-1391.16 m Dolostone: light brownish grey. Faint to well defined, slightly undulose laminae - possibly stromatolites. Abrupt basal contact.

1391.16-1396 m Dolostone: alternating thick units of medium grey and brownish grey dolostone. Some of the lighter coloured units are porous. Massive to "blotchy" appearance. Some units are vaguely bedded. Very finely crystalline. Some unit contacts preserved and tend to be abrupt.

Core 2: 1411-1416 m Rec. 4.8 m. Slabbed. Lower half of core broken into small fragments.
Core 3: 1416-1429 m Rec. 13 m. Slabbed. Well preserved.
Charlie Lake, Halfway, Doig formations.
Examined 5th December 2000

CHARLIE LAKE FM (Coplin Member)

1411-1411.9 m Dolostone-sandy dolostone: light grey lenses encased in dark grey dolostone. Lenses of light grey dolostone tend to be small (few cm long) in lower part, becoming larger up-section. Abrupt to rapidly transitional basal contact.

1411.9-1412.7 m Sandstone: very fine grained; dolomitic. Mostly medium grey except for upper 8 cm which is light grey. Appears to be oil stained. Abrupt basal contact.

1412.7-1413.23 m Dolostone: light grey. Small to large lenses of very finely crystalline dolostone encased in darker grey, irregular laminae of argillaceous dolostone. Abrupt basal contact marked by a thin argillaceous layer.

1413.23-1413.245 m Dolostone: light grey, very finely crystalline. Uniform appearance. Abrupt basal contact. ISPG photos 4711-5 and 6.

HALFWAY FM

1413.245-1415.8m Sandy bioclastic dolostone (coquina): Core is badly broken except for upper 43 cm. Abundant vuggy and moldic porosity. Bivalve debris in a sand-dolomite matrix. Cross bedded. Small to large, thin-shelled

	bivalves. A few thin bands of very finely crystalline dolomite (1-2 cm) intercalated with coquina - possibly diagenetic in origin. Upper 43 cm appears to have been diagentically altered into a brecciated dolostone with little bioclastic material preserved. Consists of small, sub-angular clasts (up to 1 cm) in a dark grey dolomite matrix. Some vuggy porosity. Clasts become smaller up-section and porosity declines. This breccia is interpreted to be the result of incipient pedogenesis at the sub-Coplin unconformity.
1415.8-1416 m	Lost core
1416-1417.5 m	Sandy bioclastic dolostone to dolomitic bioclastic sandstone (coquina): Cross beds. Bivalve debris in a sand-dolomite matrix. Vuggy and moldic porosity. Multiple beds - determined by variable amounts of bioclasts. Erosional basal contact overlain by thin layer containing rounded, small (<5 mm) clasts. ISPG photos 4711-1 to 4.
DOIG FM	
1417.5-1418.1 m	Sandstone: very fine grained. Medium to dark grey. Vaguely bedded.
1418.1-1418.3 m	Thinly interbedded shale-sandstone-shale Sandstone bed is 7 cm thick. Abrupt basal contact.
1418.3-1419.55 m	Dolomitic bioclastic sandstone (coquina): Bivalve clasts/molds in a sand-dolomite matrix. Scattered dolostone clasts. Upper 5 cm appears to be diagenetically altered - consists of dolostone clasts and irregular layers of dolomite. Erosional basal contact.
1419.55-1420.95 m	Sandstone-shale: Very fine grained. Multiple thin beds. Light grey. Shale intercalations also contain lenticular and thin beds of sandstone. A few small vertical burrows in the shaly units.
1420.95-1422 m	Sandy bioclastic dolostone: Bivalve debris in a sand-dolomite matrix. Dense, very finely crystalline dolomite with a few scattered vugs and molds. Vaguely bedded. Contacts not preserved.
1422-1429 m	Interbedded sandstone-shale: thin to thick beds of light grey, very fine grained sandstone interlaminated to interbedded with shale. Sandstone-dominant interval. Fine, sub-horizontal and ripple laminae. Some of thicker sandstone beds have cross laminae. A few scattered vertical and horizontal burrows. Minor soft sediment deformation in intervals of thinly interbedded shale-sandstone. There is one 8 cm-thick bed of sandy, bioclastic dolostone about mid-way through interval.

NOTE: possible major erosion surface at 1417.5 m

PCP et al Rycroft 16-30-77-5W6
Core 1: 1382-1400.2 m Rec. 15.95 m. 15 boxes. Slabbed. Well preserved.
Examined 5th December 2000.
Charlie Lake and Doig formations.

CHARLIE LAKE FM

1382-1286.4 m	Dolostone: light grey lenses, patches and streaks of very finely crystalline dolomite in a darker grey matrix of argillaceous dolomite. Poorly defined bedding. Basal 2-3 cm consists of dark grey argillaceous dolostone resting abruptly on a 3-4 mm thick bed of finely laminated dolostone (?stromatolites).
Coplin Member	
1384-1386.4 m	Dolomitic sandstone: very fine grained. Extensive load deformation. Basal 60 cm brecciated due to extreme deformation - small to large angular clasts. Basal contact is not preserved but there is a major facies change between the Coplin and underlying Doig Fm. ISPG photos 4711-7 and 8.
DOIG FM	
1386.4-1391 m	Dolomitic sandstone: yellow grey and light grey intervals of highly deformed to brecciated units. Light grey units are more dolomitic than yellow-grey units. Some small vugs and molds present. Scattered very small pyrite nodules. Abrupt basal contact.
1391-1400.2 m	Interlaminated to interbedded sandstone-shale: predominantly very fine grained sandstone in very thin to thin beds (up to 10 cm). Fine, horizontal and ripple laminae. Minor load deformation. Several zones rich in pyrite nodules. Overall sanding/thickening-upward trend. ISPG photos 4711-9 and 10.

NOTE: major unconformable relationship between the Coplin Mbr and the Doig Fm.

PCP et al Rycroft 6-11-77-6W6
Core 1: 1446-1464 m Rec. 16.7 m. 15 boxes. Slabbed. Well preserved.
Examined 5th December 2000.

JURASSIC - NORDEGG

1446-1448.3 m	Shale: dark, brownish grey, Finely laminated to very thinly bedded. Scattered thin-walled bivalve debris. Basal 4 cm consists of large, flat, tabular (<1 cm thick, up to 8 cm long) clasts in a matrix of smaller clasts and mud. Clasts are comparable to immediately underlying dolostone facies.
CHARLIE LAKE FM	
1448.3-1449.6 m	Dolostone: very finely crystalline, light grey. Highly brecciated.
1449.6-1451.15 m	Dolostone: oil stained in part. Light to medium grey. Fine to coarse undulose laminae (probably stromatolites). Laminae tend to be fine in lower 10 cm. Variable amounts of vuggy porosity.

1451.15-1452.65 m Dolostone/argillaceous dolostone: medium and light grey, with some yellowish grey bands. Very finely crystalline. Appears to be highly load deformed -total disruption of bedding.

1452.65-1452.68 m Dolostone: yellowish grey. Very finely crystalline. Abrupt base/top. No obvious internal structure.

1452.68-1455.33 m Dolostone/argillaceous dolostone: cf. Interval 1451.15-1452.65. Basal contact not preserved.

1455.33-1456.19 m Dolostone: yellowish grey. Very finely crystalline. Small (few mm) calcite nodules scattered throughout interval. Argillaceous in lower 8 cm. Rapidly transitional basal contact - over a few mm. ISPG photos 4711-11 and 12.

1456.19-1460.99 m Dolostone: light grey with hint of yellow. Mottled fabric (typical fabric of Charlie Lake dolostones seen in northeast B.C.) Transitional basal contact.

1460.99-1462.7 m Argillaceous dolostone: mottled to lenticular fabric; some vague bedding.

PCP Rycroft 6-24-77-6W6

Core 2: 1415-1433.4 m Rec. 18.4 m. 14 boxes. Slabbed. Well preserved.

Core 3: 1433.4-1451.4 m Rec. 17.95 m. 13 boxes. Slabbed. Well preserved.

Examined 5th December 2000.

NOTE: core and log depths mismatched, core depths about 1 m deeper than logs.

CHARLIE LAKE FM

Coplin Member

1415-1415.25 m Dolostone/argillaceous dolostone: medium to dark grey argillaceous dolostone at base grading up into lenses of light grey dolostone encased in dark grey argillaceous dolostone. Abrupt basal contact. ISPG photos 4711-13 and 14.

1415.25-1419.29 m Dolostone: series of erosionally based beds. Each erosion surface overlain by a few cm of small-clast breccia in a dolomite matrix with a few sand grains and granules. The basal breccia is rapidly overlain by what appears to be complexly load deformed dolostone/argillaceous dolostone and some beds grade up into the "mottled dolostone" fabric typical of many Charlie Lake dolostone units. Beds are 1 to1.2 m thick and lowest bed rests abruptly on underlying sandstone. ISPG photos 4711-15 and 16.

1419.29-1419.99 m Sandstone: very fine grained with dolomite cement. Light, yellowish grey. Some porosity. Upper 20 cm appears to be deformed; lower part has no obvious sedimentary structures. Lower contact poorly defined.

1419.99-1420.72 m Dolostone: similar to interval 1415.25-1419.29 m but beds are thinner. Only 2 beds recognized, separated by a thin sandy dolostone. Gradational basal contact.

1420.72-1421.57 m Sandstone: dolomitic, very fine grained. Light, yellowish grey. Vaguely bedded in places, especially the basal 30 cm. Basal 30 cm also contains some small vugs and/or molds (of bivalves) and is more dolomitic than

rest of interval. Abrupt, probably erosional, basal contact. ISPG photos 4711-17 and 18.

Base of Coplin Member

1421.57-1423.8 m — Argillaceous dolostone: medium grey. Mottled to lenticular appearance - possibly due to intense load deformation and/or diagenesis. In lower 40 cm there are irregularly shaped "clasts" up to 5 cm long isolated in an argillaceous dolomite matrix - brecciated could be due to intense load deformation. At the very top of the bed there are small anhydrite nodules (1-2 cm long, 1 cm high). Upper 18 cm contains thin beds of yellowish grey dolostone and at least one thin (<1 cm) zone bearing coarse to small granule size sand grains. Basal contact not preserved but the facies change is significant.

1423.8-1424.43 m — Dolostone breccia: light yellowish grey. Small to large dolostone clasts in a sand-dolomite matrix. Disorganized fabric. Base of unit marked by a 5 mm thick granular sand, overlain by 2 mm of finely laminated dolostone. Scattered small (mm-scale) pyrite nodules. ISPG photos 4711-19 and 20.

HALFWAY FM

1424.43-1427.65 m — Dolomitic sandstone: light yellowish grey. Very fine to fine grained. Some lighter coloured bands/zones of dolomite replacement - many are deformed. Basal 34 cm is slightly coarser grained. About 20 cm above base there is 15 cm band containing small (up to 4 cm) tabular clasts of dolomudstone. Some scattered small, and a few large, vugs in upper 50 cm. Erosional basal contact. ISPG photos 4711-21 and 22.

DOIG FM

1427.65-1451.35 m — Coarsening-upward shale-sandstone succession: overall coarsening-upward trend with subsidiary, smaller scale (2-3 m) coarsening-upward successions. Lower two-thirds of interval mostly mudstone interbedded with laminae and very thin beds of very fine grained sandstone (latter are mostly horizontally laminated with some beds containing ripple laminae and low-angle cross laminae). As the sandstone beds thicken up-section the amount of shale decreases and the sandstone beds have more low angle cross laminae and ripple laminae. A few beds with minor load deformation. In the upper 4 m there are thin beds of dolostone (4 to18 cm thick) with some moldic (bivalves) porosity - bed contacts are commonly diffuse suggesting a probable diagenetic origin (probably dolomite replacement of bivalve-rich sandstone). Scattered and locally concentrated small (<1 mm) pyrite nodules. ISPG photos 4711-23 to 27.

NOTE: possible major erosion surface at 1427.65 m.

PCP et al Rycroft 8-24-77-6W6
Core 1: 1379-1397.2 m Rec. 18 m. 16 boxes. Slabbed. Well preserved.
Core 2: 1397.2-1415.4 m Rec. 17.5 m. 16 boxes. Slabbed. Well preserved.

JURASSIC - NORDEGG

1379-1385 m Shale: dark brownish grey. Smell of hydrocarbons. Fine laminae to very thin beds. Some scattered thin-walled bivalve debris with a few very thin beds of concentrated bioclasts. Basal contact is erosional and overlain by about 7 cm of very small dolostone clasts in a mud matrix.

CHARLIE LAKE FM

1385-1386 m Dolostone: fine to coarse undulose to slightly domal laminae - stromatolites - interspersed with thin zones of dolostone with a disrupted fabric. Fenestral fabric - some open as vugs. Abrupt basal contact.

1386-1390.4 m Argillaceous dolostone: light to medium grey. Lenses and patches of light dolostone in a darker matrix of argillaceous dolostone. Basal contact is diffuse and appears to be diagenetically altered.

1390.4-1391.5 m Sandy dolostone/dolomitic sandstone: very fine grained. Light yellowish grey. Mottled fabric due to diagenetic replacement of sandstone by dolomite - resulting in a diffuse base/top.

1391.5-1394.35 m Dolostone: light and medium grey. Cf. Interval 1386-1390.4 m

1394.35-1397.35 m Sandy dolostone/dolomitic sandstone: light yellowish grey. Very fine grained. Diffuse upper/lower contact due to diagenesis. Mottled to structureless. Mottling more common in upper 20 cm.

11397.35-1401.82 m Dolostone: light and medium grey. Lenticular to ribbon-like light grey dolostone separated by medium grey or yellowish grey dolostone. Appears to be a partially original texture and partially a diagenetic texture. Argillaceous in lower 1.5 m. Abrupt basal contact.

1401.82-1405.82 m Dolostone: lower part consist of alternating light and medium grey dolostone grading up into predominantly light grey dolostone. Medium grey dolostone probably slightly argillaceous. Similar to overlying interval. Base marked by 5 mm to1 cm thick bed of clast-rich dolostone resting abruptly on underlying bed.

1405.82-1408.28 m Sandstone-mudstone: alternating intervals of light grey very fine grained sandstone and medium grey, argillaceous , very fine grained sandstone. Intervals 20-60 cm thick. Internal bedding extensively disrupted by load deformation, although a few beds are preserved.

Coplin Member

1408.28-1409.93 m Dolostone: yellow grey. Vertical succession as follows: basal contact has been cut but appears to be abrupt - overlain by 3 cm of dense, very finely crystalline dolostone - 4 cm of load deformed argillaceous dolostone - 5 cm of yellowish grey load deformed very finely crystalline dolostone - 74 cm of dolostone breccia - remainder of interval consists of argillaceous dolostone with lenses and patches of yellow-grey dolomite in a darker dolomite matrix (fabric could be due to load deformation). ISPG photos 4711-28 and 29.

HALFWAY FM

1409.93-1411.28 m Sandy bioclastic dolostone/dolomitic bioclastic sandstone (coquina): Core is badly broken in this interval. Fine grained. Molds of thin-walled bivalves in a dolomite/sand matrix. Shell alignment indicates horizontal bedding. Upper 13 cm disrupted fabric possibly due to diagenetic replacement by dolomite. There are a few thin dolomite bands within the coquina. Basal contact not preserved.

DOIG FM

1411.28-1412.36 m Sandstone: fine to medium grained. Varies from yellowish grey to medium grey. Low-angle cross laminae. A few zones rich in small (< 1 mm) pyrite nodules. Abrupt basal contact. ISPG photos 4711-30 and 31.

1412.36-1414.17 m Sandstone-mudstone: thin to thick beds of very fine to coarse grained, mostly fine grained, sandstone intercalated with thin beds of silty/sandy mudstone. Most bedding is disrupted due to load deformation, although there are some remnants of original bedding. Scattered zones rich in small (< 2 mm) pyrite nodules.

NOTE: possible major erosions surface at 1411.28 m

PCP et al Rycroft 14-24-77-6W6

Core 1: 1403-1421 m Rec. 9.8 m. 7 boxes. Slabbed. Upper 4 boxes contains well preserved core; in the lower three the core is broken into small fragments.
Examined 6th December 2000

CHARLIE LAKE FM

1403-1405.6 m Argillaceous dolostone/dolomitic mudstone: medium grey. Very finely crystalline. Irregular beds, lenses, and patches of lighter grey dolostone in a medium grey argillaceous dolostone/dolomitic mudstone. There is one bed contact preserved at abut 1405.3 m - it is abrupt.

Coplin Member

1405.6-1406.4 m Sandstone: light grey. Fine grained. Dolomitic. Lenticular to nodular fabric: light grey lenses in a background of medium grey sandstone/argillaceous sandstone. Transitional base/top.

1406.4-1406.86 m Argillaceous dolostone/dolomitic mudstone: medium grey. Similar to 1403-1405.6 m. Basal contact abrupt.

1406.86-1407.84 m Sandstone: fine grained. Light grey. Appears to be load deformed. Basal contact not preserved.

Base of Coplin Member

1407.84-1408.21 m Mudstone-sandstone: irregular lenses and patches of very fine grained sandstone in a mud matrix (load deformation fabric). Base/top contacts not preserved.

1408.21-1408.96 m Breccia: irregular clasts of bedded dolostone in a mud /dolomite matrix. Clast size ranges from very small to large. Appears to be a solution collapse breccia and not a sedimentary breccia.

1408.96-1409.08 m Dolostone: light yellowish grey. Complex fabric. Capped by a thin (1

cm) finely laminated dolostone. Base/top not preserved.

HALFWAY FM

1409.08-1410.4 m	Sandstone: core broken into small fragments. Fine to medium grained. Locally very dolomitic. Medium grey to yellowish grey. Molds of bivalve debris - commonly found concentrated in several beds. Sub-horizontal bedding. Abrupt basal contact.
1410.4-1411.1 m	Dolostone/sandy dolostone: fractured/brecciated. Sand from overlying bed fills fractures and cavities. Abrupt basal contact. Some small pyrite nodules.
1411.1-1411.5 m	Sandstone: very fine to fine grained. Light yellowish brown. Sub-horizontal bedding. There is a band of dolomite near the base. Basal contact not preserved.
1411.5-1411.7 m	Shale: medium grey with laminae and very small lenses of silt.
1411.7-1412.1 m	Dolostone/sandy dolostone: Irregular lenses of mudstone. Fracture brecciated (?diagenetic). Abrupt basal contact.
1412.1-1412.8 m	Sandstone: brownish grey. Very fine grained with streaks of white dolomite.
1412.8-1421 m	Missing core.

NOTE: possible major erosion surface at 1410.4 m.

Norcen Rycroft 6-29-77-6W6

Core 2: 1536-1554.5 m Rec. 17.88 m. 13 boxes. Full diameter. Well preserved.
Core placed wrong-side up in the boxes - take note of notation on box sides.
Difficult to do describe in detail due to lack of visible features on full diameter core.

CHARLIE LAKE FM

1536-1542.42 m	Mudstone: brick-red colour. Contains thin beds, irregular lenses and streaks of lighter coloured dolostone. Between 1538.87-1539.33 m there is a bed of yellowish white dolostone. The base and top of which are abrupt. Base of interval marked by a rapid colour change
1542.42-1543.74 m	Dolostone/sandy dolostone: light yellowish grey. Some zones of argillaceous dolostone.. Possibly anhydritic in places. Irregular thin to thick beds. Very finely crystalline. Abrupt basal contact.

HALFWAY FM

1543.74-1544.49 m	Sandstone: dolomitic, fine grained. With scattered medium and coarse grains. Yellowish grey. Unevenly bedded.
1544.49-1548.92 m	Dolostone: very finely crystalline. Light yellowish brown. Unable to see any fabric. Basal 76 cm has yellow discoloration and may be anhydritic.

DOIG FM

1548.92-1553.88 m	Interlaminated to interbedded mudstone-sandstone: fine laminae to thick beds of very fine grained sandstone in a predominantly mudstone interval.

NOTE:
The Halfway facies is very different from others examined in the Rycroft/Spirit River area -

lacks bioclastic dolostone/sandstone and has a thick dolostone in its lower part.

Possible major erosions surface at 1548.92 m.

Tripet et al Spirit River 16-32-77-6W6
Core 1: 1457-1475 m Rec. 16.6 m. 16 boxes. Full diameter. Well preserved.
Examined 6th December 2000.
Details difficult to see.

CHARLIE LAKE FM

1457-1459.85 m	Dolomudstone: greenish grey to light grey. At least one anhydrite bed. Irregular, uneven, thin beds - commonly disrupted.
1459.85-1460.47 m	Dolostone: light grey.
1460.47-1461.67 m	Dolostone: cf. 1457-1459.85 m
11461.67-1462.67 m	Dolostone: light grey.
1462.67-1466.5 m	Dolostone: light grey to greenish grey. Argillaceous. Highly disturbed bedding. Some anhydrite nodules.
1466.5-1469.6 m	Dolomitic mudstone: brick-red colour. Highly disrupted fabric. Some brecciated zones due to intense deformation. Some thick, lighter coloured beds near base of interval. Scattered anhydrite nodules.
1469.6-1471.58 m	Dolostone/sandy dolostone: thin to thick beds; light to medium grey. Complex fabric and disrupted beds.
1471.58-1472.58 m	Dolostone-anhydrite-anhydritic dolostone: light grey colour
1472.58-1473.6 m	Dolstone with anhydrite: highly deformed and in places brecciated.
1473.6-1475 m	Missing core.

Norcen Spirit River 8-33-77-6W6
Core 1: 1458-1476.25 m Rec. 18.1 m 13 boxes Full diameter
Examined 2nd Oct. 2002
Core/log depths do not correspond, core about 1 m deeper than corresponding log depths.

CHARLIE LAKE FM

1458-1465.9 m	Dolomitic mudstone: light to medium grey. Mottled. Abrupt basal contact.
1465.9-1467 m	Sandy dolostone: scattered granules and very small black pebbles. Highly deformed. Abrupt basal contact underlain by a mm-thick clay layer.
1467-1468.2 m	Dolostone: very finely crystalline. Yellowish-grey. No obvious internal features. Abrupt uneven basal contact underlain by a 3 mm clay layer.
1468.2-1469.33 m	Anhydrite: massive, finely laminated near base. Basal contact not preserved.

HALFWAY FM

1469.33-1472.86 m	Sandstone: interbedded fine and medium grained beds. Some mud laminae in finer grained beds. Some deformation. Basal bed is severely

load deformed into underlying mudstone.

DOIG FM

1472.86-1476.15 m Mudstone-sandstone: interlaminated mud and very fine grained sand. Planar and ripple laminae - some deformed. Bivalve clasts present in some beds near base of interval.

NOTE: possible major erosions surface at 1472.86 m.

8-33-77-6W6

HALFWAY FM

1472.86 m

DOIG FM

Wincan et al Spirit River 8-34-77-6W6
Core 1: 1442-1454 m Rec. 11.55 m 8 boxes Full diameter
Core 2: 1454-1459 m Rec. 5 m 4 boxes Full diameter
Examined 18th Nov. 2002.

CHARLIE LAKE FM

1442-1443.2 m	Sandstone: very fine grained, dolomitic.
1443.2-1445.5 m	Dolostone: argillaceous in part. Scattered vugs. Mottled fabric.
1445.5-1446.1 m	Dolomitic mudstone: medium grey. Vague, irregular, very thin beds.
1446.1-1449.1 m	Dolostone: some thin interbeds of mudstone and some sandy dolostone. Basal 60 cm appears to be stromatolitic. Gradational basal contact..
1449.1-1449.4 m	Mudstone-siltstone: irregular and uneven, very thin beds to coarse laminae of mudstone and siltstone. Light to medium grey. Abrupt basal contact.

HALFWAY FM

1449.4-1457 m	Coqinal dolostone: multiple fining-up beds consisting of a basal coarse coquina overlain by dolomitic sandstone. Some beds contain dolomitixed mudstone clasts at their base. Abundant vuggy porosity. Abrupt bassal contact.

DOIG FM

1457-1459 m	Sandstone: very fine grained. Thin to thick beds. Immediately underlying the Halfway coquina is about 30 cm of finely interlaminated mudstone and siltstone.

NOTE: possible major erosions surface at 1457 m.

Homestead et al Progress 8-2-77-8W6
Core 1: 1766-1784 m Rec. 18.61 m Full diameter. 17 boxes
Examined 8th Oct. 2002
Log depths appear to be about 0.5 - 1 m deeper than equivalent core depths.

CHARLIE LAKE FM

1766-1766.26 m	Stromatolitic dolostone: coarse, planar laminae. Medium to dark grey. Abrupt basal contact.
1766.26-1766.9 m	Anhydrite-dolomitic anhydrite: ranges from crudely bedded to chicken-wire nodules. Basal 9 cm is more dolomitic than most of interval and is coarsely laminated with very thin lenses and uneven interbeds of anhydrite. Uneven basal contact.
1766.9-1769.33 m	Mudstone: brick-red. Dolomite mottling. Some dolomite nodules that may be pseudomorphs after anhydrite. Diffuse basal contact.
1769.33-1770.73 m	Anhydrite and dolostone: details of interval are: 1789.33-1769.75 m Coarsely laminated to very thinly bedded dolomicrite. Abrupt basal contact 1769.75-1770 m Large anhydrite nodules in a dolomitic matrix. Vague, transitional basal contact. 1770-1770.27 m Coarsely laminated to very thinly bedded dolostone.

	1770.27-177.73 m Anhydrite nodules in a dolomitic matrix. Dolomite-filled fractures are common. Abrupt basal contact.
1770.73-1772.09 m	Dolostone-anhydrite: Predominantly dolostone with lenses, layers and small nodules of anhydrite. Anhydrite is more common in upper third of interval. Dolostone is coarsely laminated to very thinly bedded. Minor fracturing. Transitional basal contact.
1772.09-1775.19 m	Mudstone: brick-red. Mottled. Scattered layers, lenses and nodules of dolostone, anhydritic dolostone, and anhydrite. Abrupt basal contact.
1775.19-1775.9 m	Anhydritic dolostone: coarsely laminated to very thinly bedded. Scattered anhydrite nodules. Abrupt basal contact.
1775.9-1778.445 m	Mudstone: brick-red. Mottled. Several 10-20 cm thick dolostone beds. Abrupt basal contact.
1778.45-1778.62 m	Anhydrite: Massive, crystalline. Abrupt basal contact.
1778.62-1779.05 m	Sandy to argillaceous dolostone: Light grey. Medium and coarse sand grains. Disrupted fabric imparts a pseudobreccia appearance. Possibly bioturbated. Abrupt basal contact.
1779.05-1779.32 m	Sandy dolostone: scattered to local concentrations of medium to coarse sand grains in a vaguely and unevenly bedded dolostone. Abrupt basal contact.
1779.32-1780.67 m	Dolostone: Light grey. Fine planar laminae in basal third with gradually upward increase in crinkly and undulose laminae. The crinkly and unduolose laminae are stromatolitic; planar laminae mat be sedimentary or stromatolitic. Transitional basal contact.
1780.67-1781.79 m	Dolostone: dolomicrite. Light grey. Very thin to thin beds. Some minor bed disruption. Scattered lenses and nodules of anhydrite. Transitional basal contact.
1781.79-1781.95 m	Finely interlaminated dolostone-argillaceous dolostone: Possibly burrowed in places. A thicker layer within looks like dolomite replacement of a gypsum crystal-mat. Basal contact not preserved but facies change is abrupt.
DOIG FM	
1781.95-1782.61 m	Sandstone-mudstone: finely interlaminated to thinly interbedded. Typical Doig facies.

Shell Progress 6-17-77-9W6
Core 1: 1900-1918.65 m Rec. 18.65 m Slabbed. 16 boxes
Examined 8th Oct. 2002

CHARLIE LAKE FM

1900-1900.98 m	Dolostone: brownish grey. Complex mottled to disrupted fabric. Abrupt basal contact - uneven, corroded surface covered by a 1 mm thick clay layer.
1900.98 -1902.05 m	Anhydrite: deformed thin beds and layers separated by argillaceous dolomite laminae. Transitional basal contact.
1902.5-1903.21 m	Dolostone: brownish grey. Dolomicrite. Scattered nodules and layers of pink anhydrite. Faintly mottled fabric. Base marked by a 3 cm-thick layer of pink anhydrite inclined at a steep angle and resting abruptly on underlying strata.
1903.21-1904.81 m	Anhydritic dolostone: yellowish brown. Contains lenses, layers and nodules of light grey anhydrite. Massive to faintly mottled dolostone. Anhydritic areas have a complex disrupted fabric with some areas of fine laminae. Basal 12 cm is coarsely laminated and could be stromatolitic. Abrupt basal contact.

HALFWAY FM

1904.81-1904.87 m	Sandstone: light brownish grey. Partially dolomitized. Very fine to fine grained. No visible sedimentary structures. Abrupt basal contact.
1904.87-1904.95 m	Conglomerate: spherical to elliptical pebbles in a fine to coarse sand matrix. Elliptical pebbles aligned parallel to bedding. Abrupt basal contact.
1904.95-1906.29 m	Sandstone: medium grey. Fine grained. Light colored areas, generally parallel to bedding, due to incipient dolomitization. Horizontal bedding. Basal contact not preserved.

DOIG FM

1906.29-1906.69 m	Interlaminated to very thinly interbedded sandstone-mudstone: very fine grained sandstone is the prevalent lithology. Some scattered medium-coarse grains near base of interval. Lowest bed is a highly deformed sandstone-mudstone mix resting abruptly on underlying beds.
1906.69-1907.84 m	Sandstone: light yellowish grey. Fine grained. Horizontally bedded.
1907.84-1909.84 m	Sandy coquinal dolostone: small molds of shelly material. Erosional basal contact.
1909.84-1911.27 m	Sandstone: light yellowish grey. Very fine to fine grained. Massive to faintly bedded. Abrupt basal contact.
1911.27-1912.82 m	Interlaminated to very thinly interbedded sandstone-mudstone: mm-thick laminae to 15 cm-thick sandstone beds; however most beds are <5 cm. Minor bed deformation. Some horizontal burrows. Basal mudstone beds rests abruptly on underlying strata.
1912.82-1912.96 m	Sandy coquinal dolostone: minor moldic porosity. Very small bivalve clasts. Basal contact not preserved.
1912.96-1915.21 m	Sandstone: light yellowish grey. Very fine to fine grained. Generally massive with some faintly bedded areas. Apparently a transitional basal

contact.

1915.21-1916.42 m Coquinal dolostone: sandy in places. Some moldic porosity. Dolomicritic in middle part of interval - faintly laminated to highly disrupted fabric. Abrupt basal contact.

1916.42-1918.5 m Coquinal dolostone-sandstone: sandy coquinal dolostone in basal 50 cm grading up into very fine grained sandstone. Moldic porosity in the coquina.

1918.5-1918.65 m Sandstone: very fine grained

NOTE: possible major erosion surface at 1904.95 m

Shell Braeburn 4-27-77-10W6
Core 3: 1867-1885.5 m Rec. 18.5. Slabbed. 16 boxes.
Examined 8th Oct. 2002

CHARLIE LAKE FM

1867-1867.57 m Dolostone-argillaceous dolostone: finely laminated to very thinly bedded. Minor bed deformation. Patchy to bed-parrallel replacement of argillaceous dolostone by lighter colored dolomite. Transitional basal contact.

1867.57-1870.62 m Dolomitic mudstone: complex mottled fabric. Crudely bedded in places. Dark grey to brownish grey. Transitional basal contact.

1870.62-1872.32 m Mudstone: brick-red. Mottled fabric. Abrupt basal contact.

1872.32-1873.56 m Anhydrite-dolostone: coarsely interlaminated to very thinly interbedded. Coarse laminae tend to be crinkly to undulose - suggestive of stromatolites. Abrupt basal contact underlain by a 1 mm black clay layer.

1873.56-1874.11 m Dolostone-anhydrite: top 14 cm consists of light reddish to yellowish grey dolomicrite underlain by light grey and yellowish grey interlaminated anhydrite and dolomite.. There are a few thick layers and irregular nodules of anhydrite. Abrupt, mildly deformed, basal contact.

HALFWAY FM

1874.11-1877.69 m Sandstone: fine to medium grained, locally coarse grained. Horizontal beds to very low angle cross beds. Incipient dolomitization gives rise to patches and bed-parallel light-grey areas. Abrupt basal contact.

1877.69-1877.72 m Interlaminated sandstone-mudstone: some burrows. Transitional basal contact.

1877.72-1878.76 m Sandstone: fine to medium grained with concentrations along bedding planes of coarse grains. Light colored patches of dolomitized sandstone. Some fine mud laminae near basal contact. Abrupt basal contact.

1878.76-1878.8 m Mudstone: silty to sandy. Some silt lenses and laminae.

1878.8-1879.51 m Sandstone: fine grained. Light grey. Appears to have a highly disrupted fabric.

1879.51-1885.5 m Sandstone: fine grained. Patchy dolomitization. Massive with some indications of multiple beds. A thin (1 cm) mudstone bed at base of core.

NOTE: possible major erosion surface at 1877.69 m.

Shell Braeburn 8-13-77-11W6
Core 1: 1843-1852.5 m Rec. 9.5 m Slabbed. 8 boxes
Core 2: 1952.5-1859.2 m Rec. 6.8 m Slabbed 5 boxes
Examined 8th Oct. 2002

CHARLIE LAKE FM

1843-1844.05 m Interbedded dolostone-anhydrite: yellowish grey dolostone and light grey anhydrite. Dolostone more dominant lithology - especially in upper 34 cm where it is almost exclusively dolostone. Abrupt basal contact.

HALFWAY FM

1844.05-1848.31 m. Series of fining-up beds: typical beds consists of:
A) basal erosion surface
B) interval of medium to coarse grained sandstone. Two of the beds contain coquinal sandstone above the basal erosional surface. Vaguely bedded. Some of the beds contain anhydrite nodules.
C) Grading up into fine grained sandstone with very low angle cross beds.
D) one of the beds is capped by a thin (3 cm) interval of interlaminated sand and mud.
Base of interval not preserved but significant facies change (coquinal sandstone overlying very fine grained sandstone) suggests it is abrupt.

1848.31-1853.56 m Sandstone: very fine to fine grained. Massive to vaguely bedded, with scattered occurrences of mud laminae. Abrupt basal contact.

DOIG FM

1853.56-1853.87 m Interlaminated to very thinly interbedded sandstone-mudstone: Sandstone is prevalent. Minor load deformation. Horizontal burrows are common.

1853.87-1854.2 m Sandstone: very fine to fine grained. Very thin beds. Some mud laminae in basal 10 cm. Abrupt basal contact.

1854.2-1854.21 m Interlaminated to very thinly interbedded mudstone-sandstone: Mudstone is more prevalent. Some load deformed sandstone lenses. Vertical burrows present, fewer horizontal burrows. Lowest sandstone bed load deformed into underlying unit.

11854.21-1857.36 m Mudstone: dark grey. Fine laminae of sand/silt throughout interval. A few very thin beds of very fine grained sandstone and/or siltstone. Scattered occurrences of vertical and horizontal burrows. Minor load deformation in sandy zones. Scattered dolomite nodules (possibly replacement of anhydrite). Transitional basal contact.

1857.36-1859.2 m Argillaceous sandstone: very fine grained. A few zones with mud laminae. Appears to contain several 20-30 cm thick beds. Scattered vertical and horizontal burrows. Some possible bivalve debris.

NOTE: possible major erosion surface at 1848.31 m

Dome et al Pouce Coupes 6-14-77-11W6
Core 1*:* 2188-2206 m Rec. 17.9 m. 13 boxes. Slabbed.
Examined 30th September 1998

MONTNEY FM

2188-2193.5 m	Mudstone: Contains abundant, fine silt laminae - mostly planar with a few very small-scale ripples. At about 2192.3-2192.5m there is an interval of a sandier facies with several beds of current ripple laminae.
2193.5-2198.5 m	Sandstone: Thick beds of very fine grained sandstone separated by thin mudstone layers. Sandstone beds: erosionally based, upper contact abrupt to rapidly transitional. Bulk of each bed is planar bedded grading up into planar laminae. The lowermost sandstone bed is ripple laminated in its upper part. Deformation structures seen in one bed. Beds 25 to 100 cm thick; some of the thicker units may be an amalgamation of several beds (at least one such unit contains at least one scour surface).
2198.5-2200.75 m	Mudstone-sandstone: Contains at least three 24-26 cm thick sandstone beds separated by equally thick to thicker mudstone units. A 56 cm thick mudstone separates this interval from the overlying interval. Sandstone beds similar in character to those in overlying interval. The middle sandstone unit may be an amalgamation of 2 or 3 beds.
2200.75-2206 m	Mudstone: Similar to 2188-2193.5 m. Some minor bed deformation.

NOTE: Interval 2193.5 - 2198.5 m probably is comprised of sediment gravity-flow beds (turbidites)

Encor et al Pouce Coupe 14-34-77-11W6
Core 1: 1879.2-1897.2 m Rec. 17.6 m Full diameter 13 boxes
Examined 8th Oct. 2002

CHARLIE LAKE FM

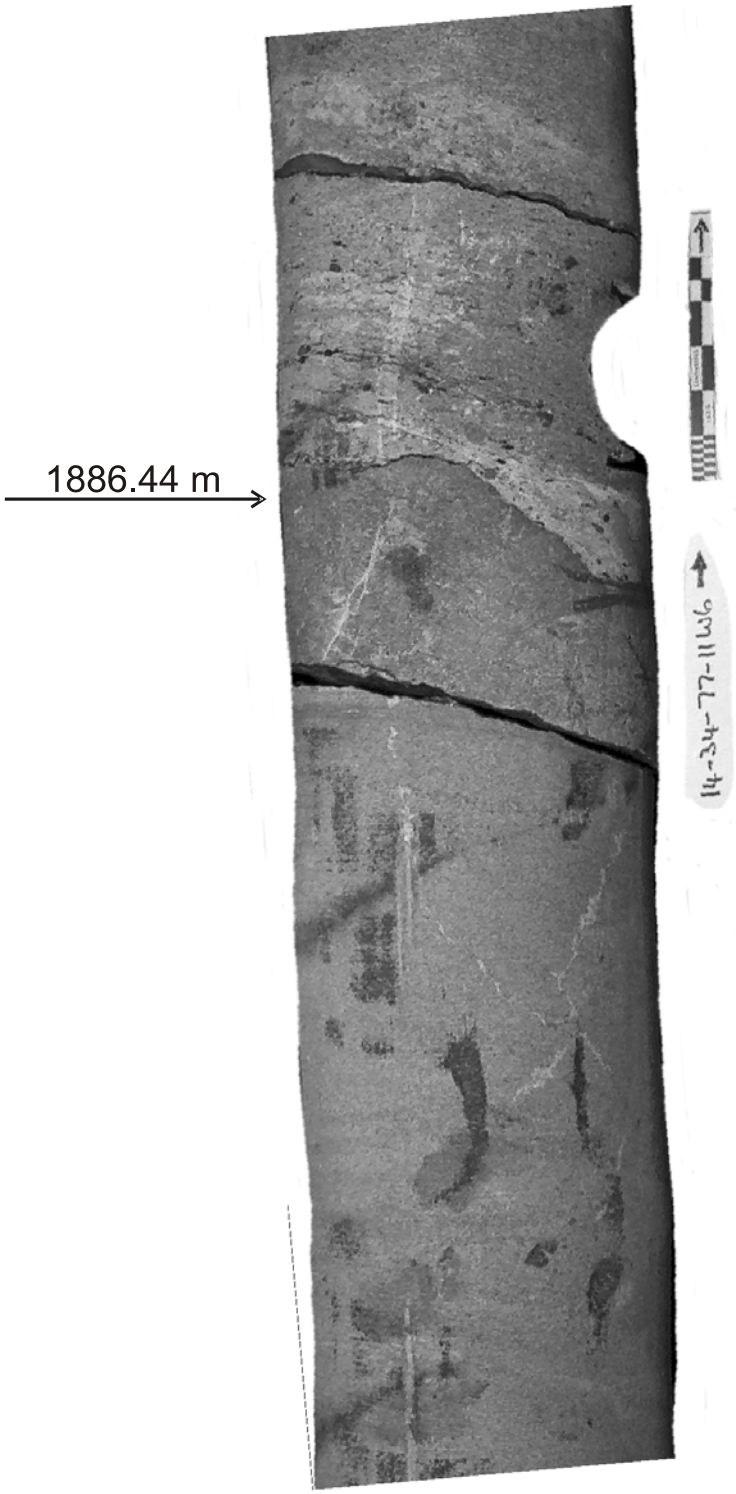
1879.2-1881.2 m	Mudstone: brick-red with lighter patches. Dolomitic. Mottled fabric. Some fine laminae preserved in places. Abrupt, uneven basal contact, with a 2 mm clay layer.
1881.2-1882.37 m	Argillaceous dolostone-dolostone: light grey. Finely laminated. Minor load deformation in basal 10 cm. Transitional basal contact.
1882.37-1883.4 m	Mudstone: maroon. Mottled (but not as much as mudstone above). Abrupt basal contact.
1883.4-1883.71 m	Argillaceous dolostone-dolostone: yellowish brown argillaceous dolostone intercalated with light grey dolostone beds. Minor bed deformation. Abrupt basal contact.
1883.71-1884.16 m	Dolostone: light grey. Disrupted bedding. Basal 5-6 cm is laminated. Abrupt basal contact with a 2-3 mm clay layer.

HALFWAY FM

1884.16-1886.44 m	Sandstone: fine to coarse grained with small pebbles (<5 mm) in basal 10 cm. Incipient dolomitization. Some mud laminae in upper 50 cm. Vaguely cross bedded. Irregular erosional basal contact.
1886.44-1896.8 m	Sandstone: fine grained. Thin to thick beds. Planar bedding. Scattered muddy intervals.
1896.8-1897.2 m	Missing core

NOTE: possible major erosion surface at 1886.44m

14-34-77-11W6



Tripet et al Spirit River 12-2-78-6W6
Core 1: 1409.3-1427.3 m Rec. 17.7 m Full diameter 16 boxes
Examined 8th Oct. 2002

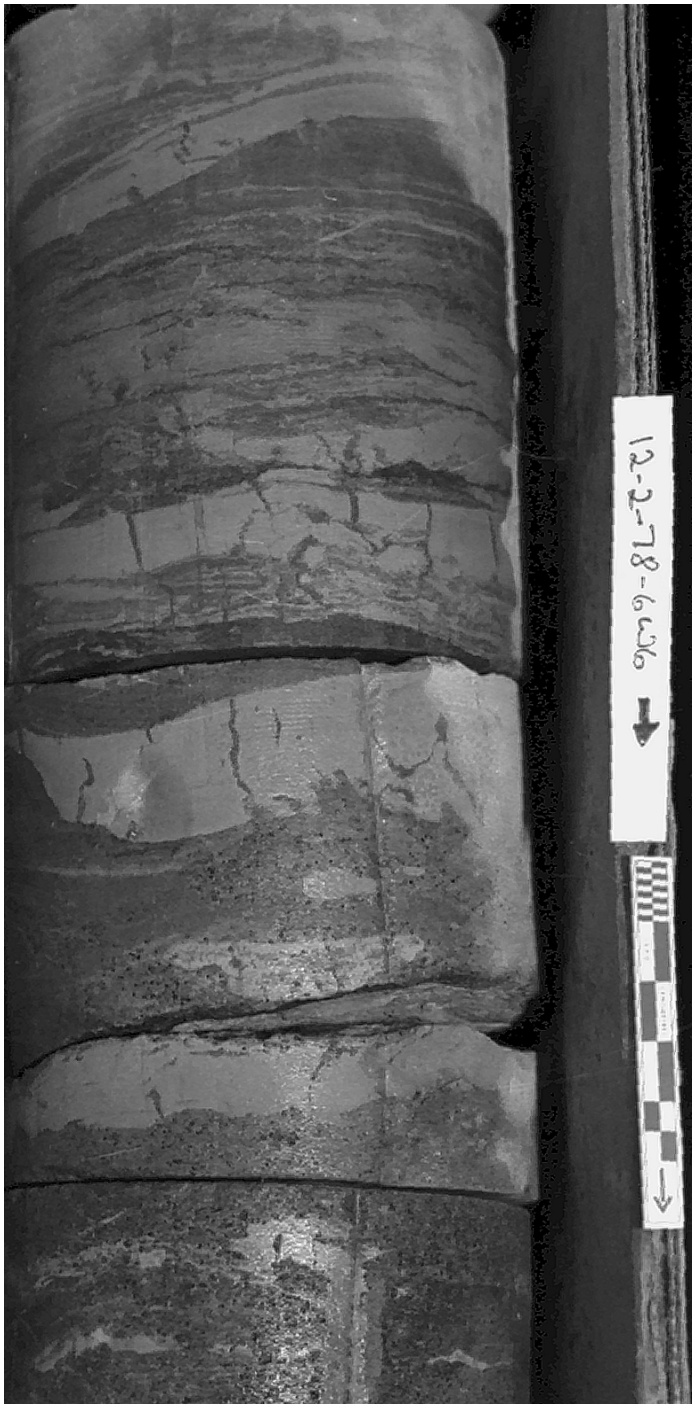
CHARLIE LAKE FM

1409.3-1410.35 m	Argillaceous dolostone: vaguely bedded to disrupted. Inclined, load-deformed basal contact.
1410.35-1411.65 m	Dolostone: light yellowish grey. Scattered small vugs. Apparently massive. Transitional basal contact.
1411.65-1412.76 m	Mudstone: silty-dolomitic. Medium grey. Bedding is vague to deformed. Possibly burrow mottled. Abrupt basal contact.
1412.76-1415.36 m	Coquinal dolostone: sandy in places. At least three beds with the following vertical succession - a) erosional base, b) basal coquina rapidly grading up into dense dolomicrite. Moldic porosity in coquina. Basal contact is erosional.
1415.36-1415.46 m	Dolostone: 2 beds of dolomicrite separated by a silty-sandy dolostone. Dolomicrite beds are irregular and contain mudcracks. Sandy bed has two units, a lower cross laminated fine grained sandstone overlain by a medium to coarse grained unit that is load deformed into the laminated sandstone.

DOIG FM

1414.46-1427 m	Coarsening upward interval: grades up from finely laminated mudstone, through interlaminated to very thinly interbedded mudstone and sandstone, into sandstone with minor mudstone intercalations. Minor bed deformation. Burrows are uncommon.

12-2-78-6W6



Charlie Lake Fm: mudcracks in interval 1415.36 - 1415.46 m

Tripet et al Spirit River 16-3-78-6W6
Core 1: 1406-1424 m Rec. 17.5 m. 15 boxes. Full diameter. Moderately well preserved - lower two-thirds of core is broken into small segments.
Examined 6th December 2000.

CHARLIE LAKE FM

1406-1408.46 m	Dolomudstone: light to medium grey. Irregular thin beds, commonly disrupted to deformed. Some diagenetic overprinting by dolomitization. Basal contact is abrupt or very rapidly transitional. ISPG photos 4711-32 and 33.
1408.46-1408.72 m	Sandy bioclastic dolostone: light yellowish grey. Molds of small bivalves in a sand/dolomite matrix. Erosional basal contact. Bands of dolomite within interval indicate some wholesale replacement of original fabric.
1408.72-1409.47 m	Sandy dolostone/dolomitic sandstone: very fine grained. Massive to vaguely bedded. More dolomitic in upper few cm. Capped by 2-4 cm of mildly deformed, finely laminated dolostone. Basal contact not preserved.
1409.47-1410.37 m	Dolomudstone/mudstone: medium grey. Lenses, irregularly shaped patches and discontinuous laminae of light grey dolomite and/or silt. Contains two (1 and 10 cm thick) beds of very fine grained sandstone - the thicker bed also contains scattered coarse grains and has a load deformed base.
1410.37-1411.23 m	?Dolostone: silty to sandy; very finely crystalline. Light yellowish grey. No visible sedimentary structures. Upper/lower contacts not well preserved.
1411.23-1411.86 m	Mudstone/dolomudstone: silty. Irregular, probably mildly deformed beds.
1411.86-1412.02 m	Dolomitic sandstone: medium grey. Very fine to fine grained with scattered coarse grains and small granules. No visible sedimentary structures. Transitional upper contact; abrupt basal contact.
1412.02-1412.82 m	Dolostone: yellowish brown to earthy light brown. Very finely laminated with a few thicker unstructured bands. Laminae are possibly stromatolites. Possibly oil stained. Abrupt basal contact.
1412.82-1413.21 m	Silty mudstone: medium grey. Fine laminae to very thin beds of silty mudstone in mudstone. Many beds are disrupted to mildly deformed.
1413.21-1414.34 m	Dolostone: yellow-brown to yellowish grey. Vuggy (up to 1 cm). Some molds of bivalve shells. Zones of dense, very finely crystalline dolomite indicate there has been extensive dolomite replacement. Some oil staining. Basal few cm has a breccia - clasts match underlying bed; in fact the character of the contact suggests an almost in situ weathering of underlying bed and incorporation of resulting clasts into overlying strata with minimal transport. Erosional base.
1414.34-1414.37 m	Dolostone: light grey. Dense, very finely crystalline. Fractured - fractures extend down from upper surface and are filled with material from above. These characteristics suggest the fractures are dessication cracks. Abrupt, slightly load deformed basal contact. ISPG photos 4711-34 and 35.

1414.37-1414.45 m Shale: fissile. Abrupt top/base.
1414.45-1414.6 m Thinly interbedded mudstone-dolostone-sandstone: lenticular to very thin, mildly deformed beds.

HALFWAY FM

1414.6-1422 m Coquinal sandstone/sandy coquinal dolostone: Variations in bioclast content and dolomite/sand concentrations indicate multiple beds. Vertical succession is:
1414.6-1417.56 m: at least 3 fining-up beds of coquinal sandstone/dolostone. Each bed has coarse bioclasts in lower part grading up into a clast-poor, commonly with mudstone intercalations, upper part. Vaguely cross bedded in lower part of beds. Moldic and vuggy porosity; some large vugs filled with sparry dolomite. Beds are 50-100 cm thick.
1417.56-1419.36 m: predominantly dolomitic, very fine grained sandstone with a few thin zones of bioclastic coarser grained sandstone. Some intervals with irregular clay laminae.
1419.36-1422 m: coquinal dolomitic sandstone. Fine to medium grained; dolomite cement. Abundant vugs and molds. At least two bands of dolomitic sandstone suggests that the beds may be fining-up.
Halfway interval rests erosionally on Doig beds. ISPG photos 4711-36 to 38.

DOIG FM

1422-1423.5 m Interbedded sandstone-mudstone: laminae to thick beds of very fine grained sandstone interbedded with mudstone. Fine subhorizontal laminae are dominant; some ripple cross-laminae. Minor bed deformation.
1423.5-1424 m Missing core

NOTE: possible major erosion surface at 1422 m.

Tripet et al Spirit River 8-4-78-6W6
Core 1: 1420-1438 m Rec. 17.2 m Full diameter. 16 boxes
Examined 9th Oct. 2002
Log depths about 1 m deeper than corresponding core depth.

CHARLIE LAKE FM

1420-1420.66 m Mudstone: light-medium grey. Dolomitic. Complex lenticular fabric. Very small dolostone clasts in basal 1 cm Abrupt, uneven basal contact,
1420.66-1421.06 m Dolostone: brownish grey. Very finely crystalline. Finely laminated to very thinly bedded. Basal contact not preserved.
1421.06-1422.81 m Mudstone: light-medium grey. Dolomitic and silty. Complex lenticular fabric. Burrow mottled in places. Basal contact not preserved but facies change is abrupt.
1422.81-1424.01 m Dolostone: brownish grey. Massive in lower 55 cm abruptly overlain by very thinly bedded and finely laminated dolostone in upper part of interval. In the bedded interval there are short vertical fractures that may be synaeresis cracks. Basal contact not preserved.

1424.01-1424.45 m Mudstone: light-medium grey. Irregular laminae, lenses and streaks of silt and/or dolomite. Abrupt basal contact.

HALFWAY FM

1424.45-1436.45 m Coquinal dolostone-sandstone: Multiple fining-up units that consist of : a) basal erosion surface; b) basal coquina grading up into c) fine grained, commonly planar bedded, sandstone, and one unit grades up into d) interlaminated sand-mud (latter occurs about 5 m below top of interval). Moldic porosity in coquina.. Sandy parts of beds contain dolomitized layers. Lowest unit is a medium grained sandstone with no coquina. Basal contact is erosional.

DOIG FM

1436.45-1437.2 m Interlaminated to very thinly interbedded sandstone-mudstone: Fine laminae. Minor bed deformation. Some burrows in the muddy beds.

NOTE: possible major erosions surface at 1436.45 m.

Propetro et al Spirit River 14-4-78-6W6

Core 1: 1418-1435.75 m Rec. 17.75 m. 16 boxes. Full diameter. Well preserved. Examined 6th December 2000.

CHARLIE LAKE FM

1418-1419.78 m Siltstone-mudstone: dolomitic. Light yellowish grey. Predominantly siltstone. Disrupted to deformed beds. Interval contains at least 4 coarsening-up successions, each begin with a thin mudstone-rich basal zone, a few cm to 20 cm thick, rapidly grading up into a thick (30-60 cm) siltstone zone. Each cycle rests abruptly on preceding cycle. Interval rests abruptly on underlying sandstone.

1419.78-1421.25 m Coarsening-up succession: mudstone to sandstone:
1419.78-1420.78 m dolomitic, very fine grained sandstone. Yellowish grey. Gradational from underlying mudstone.
1420.78-1421.52 m: lenses, very thin beds of siltstone and very fine grained sandstone interbedded with mudstone. A 1 cm thick bed of coarse grained sandstone near base of interval.

1421.25-1422.98 m Sandstone: light grey; very fine grained, dolomitic. Some shale intercalations near base of interval; less common in rest of interval.

HALFWAY FM

1422.98-1426.04 m Coquinal dolomitic sandstone: Fine grained. Vugs and molds are abundant. Near base of interval there is one large (3 cm), rounded mudstone clast within a coquinal bed. Subhorizontal bedding. Interval probably consists of several beds but difficult to identify and count. Irregular bands and lenses of dense dolomite indicate extensive dolomitization - especially in upper part of interval.

1426.04-1429.17 m Sandstone:. Contains several thin coquinal sandstone zones. Basal 14 cm consists of lenticular sandstone beds interbedded with mudstone. Basal 14 cm rapidly succeeded by thick beds of very fine grained, dolomitic

	sandstone. Vaguely to well bedded. Interval rests abruptly on underlying strata. Overall coarsening-up aspect to interval.
1429.17-1433.95 m	Coquinal sandstone and clast-rich sandstone: very fine to fine grained. Multiple beds. Mudstone clasts in many sandstone beds. Clasts are angular, tabular, ranging from a few mm to over 10 cm long and in some beds they define low-angle cross beds, in others they are aligned horizontally. Interval contains a thin zone of thinly interbedded mudstone and sandstone - the mudstone is similar to the clasts within the sandstone beds, suggesting a very local source for the clasts. Erosional basal contact with clasts from underlying bed. ISPG photos 4711-39 to 44.
DOIG FM	
1433.95-1435.75 m	Interbedded sandstone-mudstone: mostly very thin to thin beds of very fine to fine grained sandstone, interbedded with mudstone laminae. Horizontal laminae, ripple laminae and flaser-like bedding. Minor load deformation. Bed immediately underlying the Halfway Fm is fractured and dolomitized and may be a pedogenic product.

NOTE: possible major erosion surface at 1433.95 m

Tripet et al Spirit River 6-10-78-6W6
Core 1: 1391-1409.2 m Rec. 18.2 m. 17 boxes. Full diameter. Well preserved.
Examined 6th December 2000.

Not measured - examined more to determine the nature of the Charlie Lake-Doig contact, especially as this well has no Halfway Fm, or only a very thin representation of the latter unit, unlike other wells in the Spirit River-Rycroft area.

Charlie Lake-Doig contact chosen at 1400.25 m where a thin band of yellowish grey, dolomitic sandstone rests abruptly (and with minor load deformation of the sandstone base) on light grey, argillaceous, very fine grained sandstone. This contact separates two distinct facies assemblages, that above the contact typical of the Charlie Lake Fm and that below typical of the Doig Fm.

Charlie Lake Fm: dolomitic, argillaceous sandstone and siltstone with a thin interval of stromatolitic dolostone near top of core.

Doig Fm: series of coarsening-up successions of varying thicknesses. Each cycle consists of a basal mudstone-rich interval grading up into sandstone-rich beds. Beds also thicken-up in each cycle, grading up from laminae to thin beds. Ripple laminae are common and beds have undergone minor load deformation. There is a lack of bioturbation.

Forest et al Spirit River 6-23-78-7W6
Core 1: 1455-1473 m Rec. 17.15 m 12 boxes Full diameter
Examined 9th October 2002

CHARLIE LAKE FM

1455-1457.4 m	Dolostone: brownish light grey. Mostly massive except in basal 15 cm where there are fine to coarse laminae. Scattered throughout are styolites and vague, small fractures
1457.4-1458.26 m	Anhydrite: crystalline. Massive. Slightly dolomitic. Uneven, irregular, abrupt basal contact.
1458.26-1459.26 m	Dolostone: finely laminated throughout (probably stromatolites), with deformed laminae in upper 50 cm, less deformed in lower 50 cm. Basal contact not preserved but facies change is abrupt.

DOIG FM

1459.26-1466.13 m	Coarsening-up interval: Basal 30-40 cm consists of black mudstone with fine laminae of silt, grading up into laminated, argillaceous very fine grained sandstone with scattered intercalations of mudstone, in turn gradationally overlain by coquinal sandstone beds. Basal contact is a rapid transition consisting of about 1 cm of finely interlaminated sand and mud.
1466.13-1472.15 m	Coarsening-up interval: lower 4 cm consists of mudstone with fine laminae, lenticular beds and very thin beds of coarse siltstone to very fine grained sandstone with some burrows. Gradationally overlain by planar bedded, partially dolomitized, very fine grained sandstone.

Tripet et al Spirit River 6-36-78-7W6
Core 1: 1356.3-1379.5 m Rec. 17.65 m Full diameter. 16 boxes
Examined 8th Oct. 2002

CHARLIE LAKE FM

1350.3-1357.03 m	Argillaceous dolostone-dolomitic mudstone: contains a large sandy dolostone ball at base of interval. Transitional basal contact.
1357.03-1358.26 m	Sandy dolostone-dolomitic sandstone: light yellowish grey. Disrupted fabric. Transitional basal contact.
1358.26-1359.06 m	Dolomitic mudstone: Grey. Scattered fine laminae. Abrupt basal contact.
1359.06-1359.46 m	Dolostone: yellowish grey. Very sandy, especially in lower half of interval. Vaguely bedded. Transitional basal contact.
1359.46-1359.73 m	Dolomitic mudstone: Medium grey. Mottled. Transitional basal contact.
1359.73-1361.43 m	Dolostone-argillaceous dolostone: some dolomitic mudstone beds. Yellowish grey. Complex mottled fabric. Transitional basal contact.
1361.43-1363.35 m	Dolomitic mudstone: complex mottling. Transitional basal contact.
1363.35-1363.87 m	Interbedded dolostone-mudstone: laminated to very thinly bedded. Irregular, uneven bedding. Abrupt basal contact.

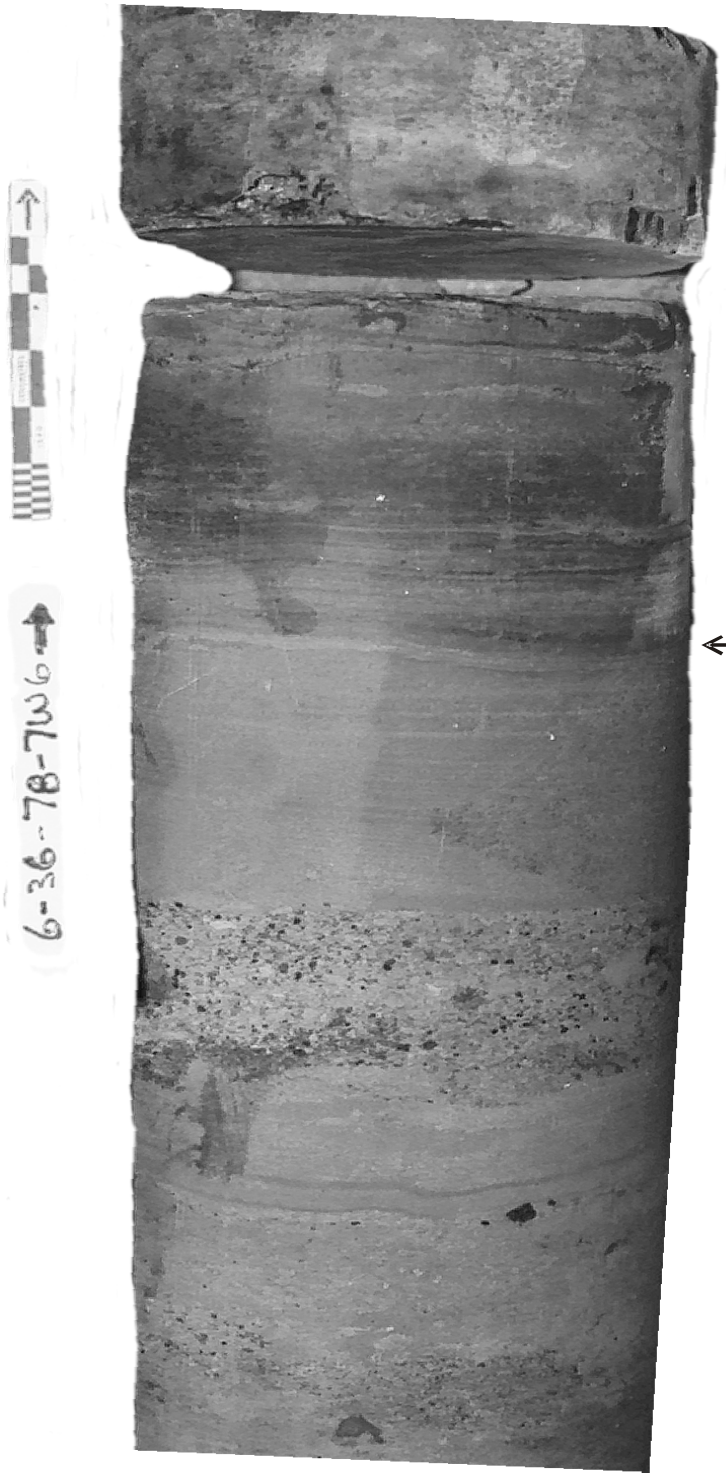
DOIG FM

1363.87-1364.28 m	Sandstone: fine grained, dolomitic. Scattered coarse grains and one 3 cm-thick bed of coarse grained sandstone 5 cm below top of interval. Character of basal contact not obvious.
1354.28-1379.5 m	Sandstone: very fine to fine grained. Intercalations of sandy mudstone. There is at least one sandstone bed with bivalve debris. Massive to finely

laminated - latter common in muddy zones.

NOTE: interval 1363.87 - 1364.28 m may be equivalent to the Halfway Fm and a probable unconformity at the base of this unit. However, it is so thin that to identify it as Halfway Fm may not be practical.

6-36-78-7W6



PPCL et al Progress 8-7-78-9W6
Core 1: 1752-1770 m Rec. 12.64 m 9 boxes Full diameter
Examined 9th Oct. 2002

CHARLIE LAKE FM

1752-1753.68 m	Mudstone: brick-red. Upper 50-60 cm complexly mottled; below this the mottling is less intense. Scattered irregularly shaped dolomite nodules. Lower 50 cm is mostly massive with a few nodules/patches of dolomite. Transitional basal contact.
1753.68-1754.58 m	Dolostone: Contains a 7 cm thick bed of red mudstone 28 cm below top of interval. Upper 6 cm of dolostone consists of irregular layers of intercalated red mudstone and dolostone (the dolomite may be a replacement fabric within the mudstone). Rest of dolostone is finely to medium crystalline, massive. Basal contact not preserved.

HALFWAY FM

1754.58-1755.68 m	Coarsening-up interval: finely interlaminated mud and sand (plane and ripple laminae; a few short vertical burrows) in lower 50 cm resting abruptly on underlying strata and rapidly grading up into argillaceous, very fine grained, thinly bedded sandstone.
1755.68-1755.94 m	Sandstone: very fine grained, partially to completely dolomitized. Upper 7 cm appears to be completely dolomitized and contains short, vertical fractures (?synaeresis cracks). Lowest 5 cm has a blotchy appearance and is overlain by 4-5 cm of finely, ripple laminated sandstone. Transitional basal contact.
1755.94-1764.44 m	Sandstone: very fine to fine grained. Incipient dolomitization - seen as lighter colored spots, irregular patches or bedding-parallel zones.
1764.44-1770 m	Missing core - this is probably a critical interval that could have contained evidence for an unconformity

NOTE: an unconformity may be at base of the Charlie Lake Fm and the sandstone identified as Halfway may in fact be chronostratigraphically related more to Doig deposition.

8-7-78-9W6

Halfway Fm: upper part of
interval 1755.68 - 1755.94 m

Total Suncor Progress 8-10-78-9W6
Core 1: 1717-1735.2 m Rec. 18.2 m 17 boxes Slabbed
Examined 9th Oct. 2002

CHARLIE LAKE FM

1717-1719.6 m	Mudstone: brick-red. Scattered throughout are nodules, irregular nodules and subvertical, thick veins of anhydrite. Some dolomite mottling. Base of interval consists of 10 cm of grey, with a reddish tint, mudstone that contains dolostone/mudstone clasts up to 15 mm long, but most are <5 mm. Basal contact not preserved but facies change is abrupt.
1719.6-1719.95 m	Anhydrite-dolomitic anhydrite: crude thin beds, with fine laminae in basal 2-3 cm. Transitional basal contact.
1719.95-1721.55 m	Dolostone: light grey with a pinkish hue in places. Finely laminated throughout - ranging from planar to crinkly and some small domes - stromatolitic. Abrupt basal contact.

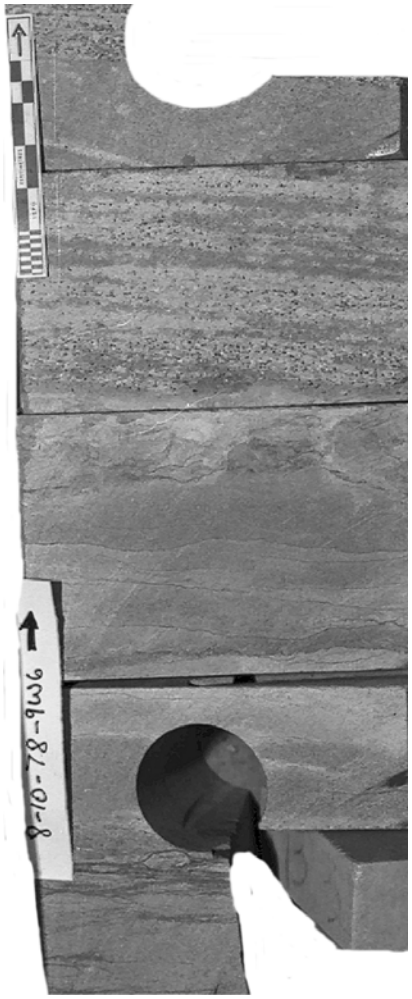
HALFWAY FM

1721.55-1724.85 m	Sandstone: light grey; medium to coarse grained in lower 2-2.5 m grading up into fine to medium grained sandstone. Uppermost 20 cm has patches of dolomitized sandstone. Incipient dolomitization in rest of interval. Low angle cross beds throughout interval. Two, possibly three, sedimentary units. Abrupt, mildly load deformed basal contact.
1724.85-1735.2 m	Sandstone: very fine to fine grained. Mostly argillaceous with some intercalation of mud laminae. Less argillaceous intervals have very low-angle cross beds. Cross bedded intervals are porous and have incipient dolomitization paralleling bedding planes. Argillaceous sandstones are vaguely bedded and where mud is common burrows are present. Near base of interval there is a thin sandy coquina.

NOTE: possible major erosion surface at 1724.85 m.

8-10-78-9W6

Charlie Lake Fm: stromatolites
in interval 1719.95 - 1721.55 m



1724.85 m

Major erosion surface within
the lithostratigraphic Halfway Fm

Encor et al Progress 8-21-78-9W6
Core 1: 1695-1708.6 m Rec. 13 m 10 boxes Full diameter
Examined 9th Oct. 2002

CHARLIE LAKE FM

1695-1699.95 m	Mudstone: maroon. Small to large patches of dolomite. Brecciated in places - especially in lower 2 m (possibly due to slumping). One 3 cm thick anhydrite bed within the lower brecciated interval. Abrupt basal contact marked by a 3 mm thick clay layer.
1699.95-1701.51 m	Dolostone: light grey. Crinkly to undulose stromatolite laminae. Uneven, abrupt basal contact marked by a 2 mm clay layer.

HALFWAY FM

1701.51-1705.6 m	Sandstone: fine to coarse grained beds. Several fining-up beds. Beds commonly capped by a muddy zone 5-10 cm thick. Basal contact appears to be diffuse - probably due to severe load deformation.
1705.6-1708 m	Sandstone: very fine to fine grained, argillaceous. Scattered throughout are muddy beds usually <1 cm thick.

NOTE: position of a possible unconformity surface is not obvious - the significant grain size change at 1705.6 m would be consistent with the known regional character change across the unconformity, but the basal contact of these beds is not a well defined erosional contact. Alternatively, the sandstone succession is part of an overall coarsening-upward Doig succession and the unconformity is at the base of the Charlie Lake beds.

Chiefco et al Gordondale 6-30-78-9W6
Core 2: 1724-1742 m Rec. 18 m 16 boxes Full diameter
Examined 9th Oct. 2002

CHARLIE LAKE FM

1724-1725.8 m	Mudstone: brick-red. Patches and mottles of dolomite. No obvious sedimentary structures. Abrupt basal contact.
1725.8-1726.43 m	Interbedded red mudstone-anhydrite-dolomitic anhydrite: Uppermost 12 cm has brecciated appearance. Abrupt basal contact.
11726.43-1727.43 m	Dolostone: light grey. Replacement anhydrite and anhydrite nodules in upper 20 cm underlain by finely to coarsely laminated (crinkly to undulose) stromatolitic dolostone. Basal contact not preserved but facies change is abrupt.
1727.43-1728.38 m	Sandstone: brownish light grey. Dolomitic. Fine grained. Low angle cross beds. Abrupt basal contact.
1728.38-1728.49 m	Dolostone: fine, crinkly stromatolite laminae. Uneven, abrupt basal contact marked by a 1 mm clay layer.

HALFWAY FM

1728.49-1733 m	Sandstone-coquinal sandstone: light grey. Some small bivalve molds. Several beds consisting of a basal coquina grading up into fine grained, commonly cross bedded sandstone with scattered bivalve debris. Basal

	coquinal beds contains small mudstone clasts and rest abruptly on underlying sandstone.
1733-1742 m	Intercalated sandstone-mudstone: sandstone is the more dominant lithology, with some coquinal beds in lower 3 m.

NOTE: possible major erosion surface at 1733 m.

Shell Progress 14-3-78-10W6
Core 1: 1840-1858.25 m Rec. 14.05 m 10 boxes. Slabbed
Core 2: 1858.25-1864.5 m Rec. 5.65 m 4 boxes Slabbed
Core 3: 1864.5-1879.5 m Rec. 14 m 10 boxes Slabbed
Examined 16th October 2002
Major discrepancy between core/log depths. Equivalent log depths are about 1835-1874.5 m

CHARLIE LAKE FM

1840-1841.1 m	Mudstone: brick-red. Scattered patches of replacement dolomite. Upper 50 cm appears to be deformed. Basal 3-4 cm is lighter colored, possibly anhydritic, and has an abrupt top/base. Basal contact is abrupt, very irregular and coated by a 1 mm clay layer.
1841.1-1842.17 m	Anhydrite: light grey. Crystalline. Very thin undulose beds with some nodular layers. Contains a red mud-filled fracture/vein about 50 cm below top. Also some very thin red mudstone beds/lenses 80-85 cm below top. Basal 20 cm finely to coarsely laminated. Abrupt basal contact.
1842.17-1843.57 m	Mudstone: brick-red. Layers/beds of dolomite 17-24 cm below top. Scattered dolomite nodules, lenses and one layer in basal 33 cm. Faintly mottled to bedded in remainder. Abrupt basal contact.
1843.57-1843.82 m	Dolostone/anhydritic dolostone: coarsely laminated to very thinly bedded. Some minor bed disruption. Abrupt basal contact coated with a 1 mm clay layer.
1843.82-1844.92 m	Mudstone: brick-red. Uppermost 6 cm very thinly bedded with probable dessication cracks that are filled with clay (similar to clay coating upper contact). Disrupted and brecciated fabric in rest of interval. Basal 8 cm is finely laminated with lenses of dolomite. Abrupt basal contact.
1844.92-1845.4 m	Dolomitic anhydrite/anhydritic dolostone: top 15 cm of anhydrite with lenses of red mudstone. Remainder consists of crudely laminated dolostone with nodular anhydrite in upper10 cm. Highly deformed. Basal contact is severely load deformed.

HALFWAY FM

1845.4-1845.49 m	Sandstone: coarse grained. Black chert and quartz. Abrupt basal contact.
1845.49-1848.19 m	Sandstone: fine grained with some medium/coarse grains along bedding planes and in the lower 50 cm. Light brown with layers, lenses and patches of light grey, presumably, dolomitized sandstone. Medium to high angle cross bed sets throughout. Abrupt basal contact.
1848.19-1849.33 m	Sandstone: argillaceous, dolomitic, very fine grained. Severely deformed in upper 15 cm. Lenticular-like bedding. A few possible bivalves.

1849.33-1858.25 m	Missing core
1858.25-1858.95 m	Sandstone: fine grained. Cross bedded. Abrupt, slightly load deformed basal contact.
1858.95-1859.35 m	Sandstone: argillaceous, very fine grained, coquinal. A fining-up interval. Abrupt basal contact.
DOIG FM	
1859.35-1861.61 m	Interbedded sandstone-mudstone: very thin to thick beds of argillaceous very fine grained sandstone separated by mm-thick to 4 cm thick silty mudstone beds that are finely laminated with silt/sand grading up into interlaminated sand/mud in upper 30 cm. Minor load deformation. Scattered bivalve debris in some sandstone beds. Scattered dolomite nodules (possibly pseudomorphs after anhydrite).
1861.61-1864.21 m	Sandstone: very fine to fine grained. Light grey. Plane bedded. Scattered mud laminae. Transitional base of interlaminated mud-sand with some ripple laminae.
1864.21-1865.4 m	Sandstone with mud laminae: Upper 20 cm is thoroughly bioturbated. Minor load deformation. Some discrete vertical and horizontal burrows. Transitional basal contact.
1865.4-1868.1 m	Interlaminated mudstone-sandstone: About 70% sandstone. Finely laminated to very thinly bedded. Laminae more common in upper half of interval, thin beds more common in lower half. Lenticular ripple laminae in places. A few scattered vertical and horizontal burrows. Some load deformation in thinly bedded part. Transitional basal contact.
1868.1-1870.6 m	Sandstone: very fine grained, argillaceous. Scattered dolomite nodules. Scattered lenses and laminae of mud. Scattered mud clasts. Interval may be deformed in places. Transitional basal contact.
1870.6-1878 m	Interbedded to interlaminated-sandstone-mudstone: dark grey. Mostly very thin beds of very fine grained sandstone separated by mud laminae with a few thin intervals of mudstone with sand laminae. Minor bed deformation. Scattered vertical and horizontal burrows.

NOTE: possible major erosion surface at 1858.95 m.

Hamilton Dome Braeburn 12-8-78-10W6
Core 1: 1867-1872.5 m Rec. 5.5 m 5 boxes Full diameter
Core 2: 1872.5-1890.75 m Rec. 16.5 m 13 boxes Full diameter
Examined 9th Oct. 2002

CHARLIE LAKE FM

1867-1867.84 m	Mudstone: brick-red to maroon. Scattered lenses of light grey dolomite. Abrupt basal contact marked by a 1 mm clay layer.
1867.84-1868.06 m	Anhydrite-dolomitic anhydrite: light to medium grey. Finely to coarsely laminated. Abrupt basal contact.
1868.06-1868.08 m	Mudstone: black.

HALFWAY FM

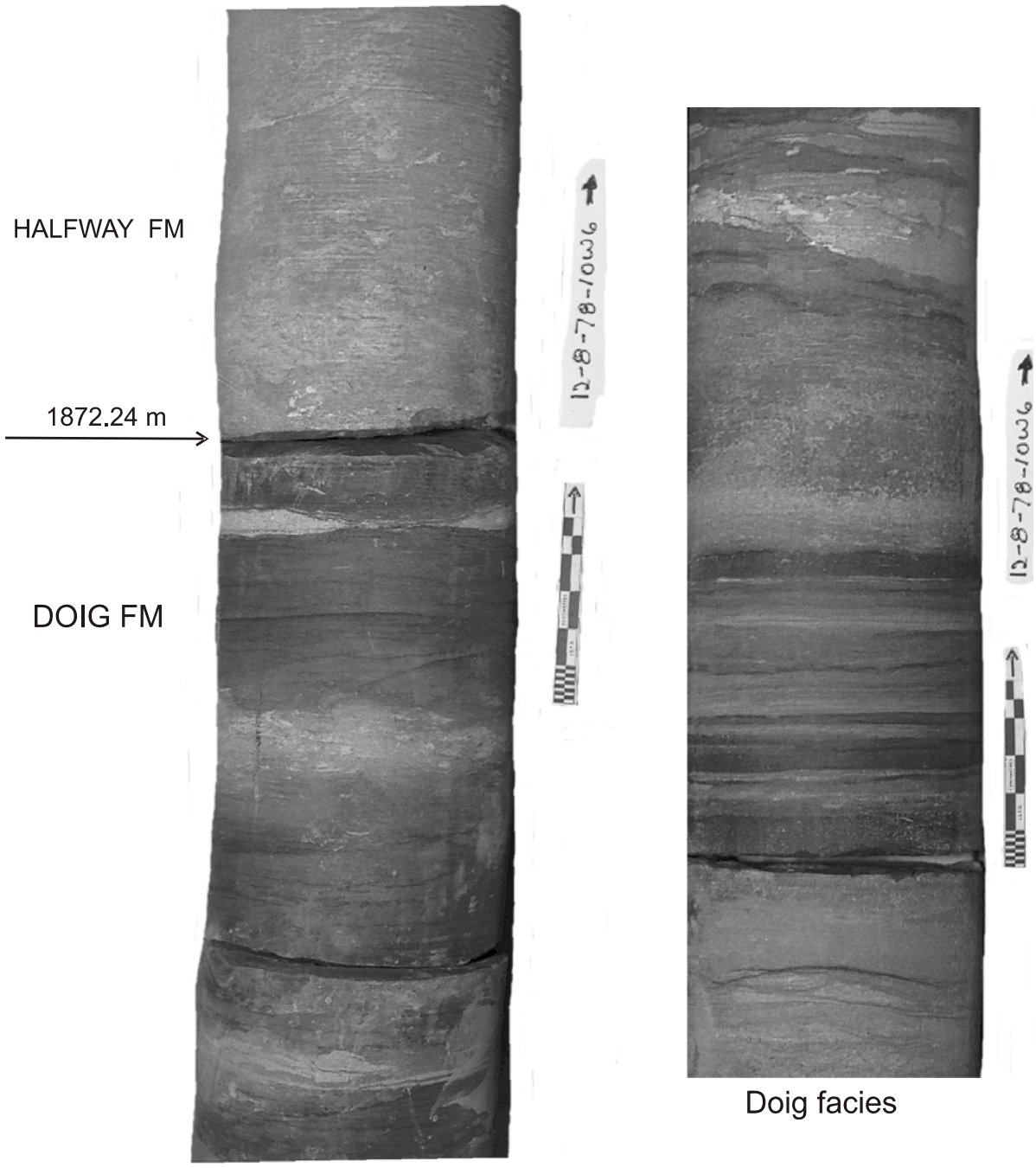
1868.08-1868.1 m	Sandstone: argillaceous, very fine grained. Rest abruptly on and uneven clay-coated surface.
1868.1-1872.24 m	Sandstone: light grey. Fine to coarse grained. Probably consists of several beds. Contains one horizon with bivalve debris. Some intervals with low-angle cross beds. Rest abruptly on underlying beds.

DOIG FM

1872-1890.75 m	Series of coarsening-up successions: silt/sand laminated mudstone is the dominant lithology. Plane and ripple laminae in the muddier parts. Sandy parts tend to be faintly bedded.

NOTE: possible major erosion surface at 1872.24 m.

12-8-78-10W6



Doig facies

Texaco Progress 8-34-78-10W6
Core 1: 1742-1754.2 m Rec. 12 m 9 boxes Full diameter
Examined 16th October 2002

CHARLIE LAKE FM

1742-1746.17 m	Mudstone: brick-red to maroon. A few thin interbeds of dolostone and anhydritic dolostone. Varies from very thinly bedded in upper 50 cm to disrupted in remainder of interval. Small patches and veins of dolomite, and some dolomite-filled fractures in middle part of interval. Mottled in places. Abrupt basal contact.
1746.17-1746.4 m	Anhydrite: light grey. Coarsely laminated to very thinly bedded. Abrupt basal contact coated with a 1-2 mm thick clay layer.
1746.4-1746.74 m	Mudstone: brick-red. Highly disrupted fabric imparting a breccia-like appearance. In upper 15 cm. Partially dolomitized. Basal 1 cm contains laminae of black clay.
1746.74-1746.76 m	Anhydrite: pinkish hue. Crystalline. Abrupt basal contact.

HALFWAY FM

1746.76-1748.54 m	Sandstone: light grey. Fine to coarse grained - latter most common in basal 10 cm. Possibly several cross bedded units. Abrupt basal contact
1748.54-1748.77 m	Sandstone: fine grained, slightly argillaceous. Transitional basal contact.
1748.77-1749.14 m	Interlaminated/interbedded sandstone-mudstone: laminae and very thin beds of very fine grained sandstone and/or coarse siltstone intercalated with mudstone. Minor load deformation. A few possible vertical burrows. Transitional basal contact.
1749.14-1752.68 m	Sandstone: light grey. Fine to coarse grained. Interval probably consists of several units. Vaguely cross bedded. Transitional basal contact.
1752.68-1754 m	Interbedded mudstone-sandstone: very thin beds of very fine grained sandstone and argillaceous sandstone intercalated with mudstone. Some lenticular sand beds. Minor bioturbation.

NOTE: possible major erosions surface at 1748.54 m.

PPCL et al Progress 14-36-78-10W6
Core 1: 1721-1739 m Rec 17.54 m 13 boxes Full diameter
Examined 16th October 2002

CHARLIE LAKE FM

1721-1723.71 m	Mudstone: brick-red. Mottled to disrupted fabric. Scattered lenses, layers and patches of dolomite. Abrupt, uneven basal contact with about 5 cm of relief and coated with a 1-2 mm thick clay layer.
1723.71-1723.79 m	Dolostone: brownish grey. Mud laminae in places. Abrupt basal contact coated with a 1 mm thick clay layer.
1723.79-1723.83 m	Dolostone: finely to coarsely laminated - probably stromatolites. Abrupt, uneven basal contact.

HALFWAY FM

1723.83-1723.85 m Sandstone: coarse grained with small to large dolomite clasts. Most clasts are <1 cm; largest is 5 cm. Clasts have a slight pinkish hue

1723.85-1729.25 m Sandstone: brownish grey with lighter colored patches of dolomitized sandstone. Fine to medium grained. Massive to cross bedded. Basal contact not preserved.

1729.25-1738.5 m Sandstone: Very fine grained. Light grey. Coquinal in places, especially in lower 1-2 m. Some sandstone beds are completely dolomitized. Some moldic porosity in coquinal sandstones. Mudstone beds and laminae scattered throughout. Vaguely bedded to massive sandstone units.

NOTE: possible major erosion surface either at 1729.25 m or 1723.85 m.

Shell Pouce Coupe 6-13-78-11W6
Core 1: 1888-1906 m Rec. 18 m 17 boxes Slabbed
Examined 16th October 2002

CHARLIE LAKE FM

1888-1888.23 m Dolomitic anhydrite: beds, layers and lenses of anhydrite in a dolomite matrix. Deformed beds, especially in basal 8 cm, where bedding is disrupted into clast-like fragments. Basal contact load deformed.

HALFWAY FM

1888.23-1889.03 m Sandstone: fine to coarse grained. Black coarse grains of chert are scattered throughout interval. Bed appears to be highly deformed. Abrupt, uneven basal contact coated with a clay layer.

1889.03-1892.73 m Sandstone: light grey. Fine grained with a few horizons containing coarse grains. Scattered throughout are short (1-10 cm) intervals of laminated and lenticular bedded mudstone, some of which contain horizontal burrows. A few dolomite nodules and some patches of dolomitization. Transitional basal contact.

DOIG FM

1892.73-1897.79 m Mudstone: dark grey.. Finely laminated throughout. Scattered dolomite nodules. Lack of bioturbation features. Vague basal contact.

1897.79-1899.94 m Sandstone: very fine to fine grained with some medium/coarse gains in basal 30 cm. Argillaceous in part. A concentration of dolomite nodules in upper 20 cm. Bivalve debris in basal 30 cm. Some scattered fine mud laminae. Massive to planar bedded. Abrupt basal contact.

1899.94-1901.24 m Mudstone: dark grey. Finely laminated with burrow mottling in lower 20 cm. Transitional basal contact.

1901.24-1906 m Coarsening-up interval: interlaminated to very thinly interbedded mudstone-sandstone in basal 1 m grading up into very thin to thin bedded sandstone separated by mud laminae. Minor load deformation. Burrows are common.

NOTE: possible major erosion surface at 1889.03 m.

Dome et al Gordondale 15-32-78-11W6
Core 1: 1849-1867.2 m Rec. 18.2 m 13 boxes Slabbed
Examined 16th October 2002

CHARLIE LAKE FM

1849-1849.15 m	Mudstone: brick-red with irregular patches of greenish hued mudstone. Dolomitic. Abrupt basal contact.
1849.15-1850.06 m	Dolostone/anhydritic dolostone: coarsely laminated to very thinly bedded. Irregular, uneven beds. Abrupt basal contact coated with a 1 mm thick clay layer.
1850.06-1852.32 m	Mudstone: brick-red. Cf above. Abrupt basal contact.
1852.32-1853.14 m	Interbedded anhydrite-dolostone: coarse laminae to very thin beds - irregular and uneven bedding. Anhydrite more common in basal 30 cm. Abrupt basal contact.

HALFWAY FM

1853.14-1853.8m	Sandstone: fine grained with scattered to locally concentrated coarse grains (many of coarse grains are black chert). Appears to have a disrupted fabric. Abrupt basal contact.
1853.8-1853.83 m	Sandstone: very fine grained with fine mud laminae. Abrupt basal contact.
1853.83-1853.85 m	Sandstone: coarse grained. Load deformed basal contact.
11853.85-1854.07 m	Sandstone: two beds of very fine grained sandstone separated by a thin (1 cm) muddy zone. Separated from underlying interval by a muddy zone.
1854.07-1857.12 m	Sandstone: very fine to fine grained. Light grey. Low angle cross beds throughout. A few very thin intervals (few cm) of irregular mud laminae (indicating multiple fining-up beds). Abrupt basal contact.
1857.12-1858.42 m	Sandstone: very fine grained. Light grey. Massive to planar bedded. Several beds separated by laminated and burrowed, thin (<1 cm) muddy zones. Abrupt basal contact.
1858.42-1858.71 m	Mudstone: dark grey. Laminae and one very thin bed of very fine grained sandstone. Sand-filled lenticular-shaped horizontal burrows. Abrupt basal contact.
1858.71-1859.97 m	Interbedded sandstone-mudstone: very fine grained sandstone is the dominant lithology. Sandstone beds have no visible sedimentary structures. Mudstone interbeds are extensively bioturbated - mostly with horizontal burrows, and a few vertical ones. Basal part of interval is thoroughly bioturbated.

DOIG FM

1859.97-1865.07 m	Mudstone: silty/sandy. Upper 1 m is thoroughly bioturbated with sand-filled burrows - mostly horizontal burrows and a few vertical. Remainder of interval is black mudstone with abundant fine laminae of silt. Scattered dolomite nodules. Abrupt basal contact.
1865.07-1867.2 m	Sandstone: very argillaceous, very fine grained sandstone. Appears to be deformed. Bivalve debris in middle of interval.

NOTE: position of major erosion surface not definitive. First choice is at 1853.8 m; second

choice at 1853.85 m.

Dome et al Gordondale 14-33-78-11W6
Core 1*:* 1847-1859.2 m. Rec. 12.07 m. 9 boxes. Full diameter.
Examined 12th November 1998
Core and log depths do not correspond and measuring the core indicates only 11.6 m of recovery.
Equivalent log depths are 1842.3-1854.5 m (recovered core from 1842.3-1853.9 m). Depths given below are log depths.

CHARLIE LAKE FM

1842.3-1842.7 m	Mudstone: light maroon red, light grey and greenish grey colours. Mottled texture. May be anhydritic. Base marked by a 0.5 to 0.75 cm thick, grey mudstone bed.
1842.7-1843.7 m	Anhydrite: yellowish grey on outer core surface, medium grey on broken surfaces. Very thinly bedded with a few thicker beds.
1843.7-1844.7 m	Mudstone: maroon red with greenish grey mottles. Internal fabric difficult to detect. Upper contact appears to be rapidly gradational; lower contact abrupt.
1844.7 -1845.05 m	Anhydrite: cf. above.
1845.05-1845.4 m	Mudstone: alternating maroon red-greenish grey thin beds and coarse laminae. There are a few laminae of dark grey mudstone. Red-coloured beds more common in lower part of interval. Upper contact not preserved but there is a rapid lithological change. Abrupt basal contact. Some beds are over-steepened.

HALFWAY FM

1845.4-1847.8 m	Sandstone: fine to medium grained; light grey. Mottled to brecciated fabric. Lenses, streaks and fracture-fills of red clay. Fabric has disrupted appearance. Basal contact not preserved. Possibly an incipient paleosol development.
1847.8-1852.5 m	Sandstone: light grey; fine grained. Predominantly massive with some locally preserved thin beds and current ripple laminae. Also, there are some vague indications of load deformation. There is a 1 cm thick mudstone bed at about 1850.3 m. About 12 cm above base there is a muddy layer. Locally mottled, possibly due to incipient calcite cementation. Abrupt basal contact.

DOIG FM

1852.5-1853.9 m	Interbedded mudstone-sandstone: very fine grained sandstone. Sandstone beds more abundant in upper part of interval (i.e., general coarsening-upward trend). Extensively load deformed.

NOTE: although the DOIG-HALFWAY contact is abrupt, there is an overall coarsening-upward aspect between the two formations. The probable unconformity surface may be at the base of the Charlie Lake Fm and the Halfway sandstone is chronologically part of Doig depositin.

Canwest Gordondale 2/14-33-78-11W6
Core 1*:* 1862-1880.2 m. Rec. 18 m. 13 boxes. Full diameter.
Examined 12th November 1998

DOIG FM

1862-1866.5 m	Mudstone: dark grey to black. Overall coarsening-upward aspect - i.e., siltstone beds more common upwards. Load deformation structures common where siltstone beds are abundant. Small calcite/dolomite nodules present.
1866.5-1868.8 m	Siltstone: light grey. Massive in appearance, difficult to detect sedimentary structures. Scattered zones of dolomite nodules. Gradational base; abrupt top.
1868.8-1871.1 m	Interbedded siltstone-mudstone: thin beds (few mm to 12 cm) of siltstone separated by 1-2 cm thick beds of mudstone. Gradational downward change.
1871.1-1874.7 m	Interbedded mudstone-siltstone: about equal proportions of siltstone to mudstone. Load deformation structures are common. Gradual downward change to underlying strata.
1874.7-1880.2 m	Mudstone: minor amounts of silt laminae.

NOTE: 1866.5 to base of core is an overall coarsening-upward succession.

BP et al Pouce Coupe South 6-4-78-12W6
Core 4: 1975-1992.6 m Rec. 15.05 m. 12 boxes. Slabbed. Generally good preservation.
Examined 19/20 April 1999

CHARLIE LAKE FM

1975-1975.9 m	Sandstone: fine grained; light grey; speckled with black chert grains. Poorly defined bedding. Abrupt basal contact.
1975.9-1976.2 m	Anhydrite: medium grey; crystalline. Interval consists of at least three 1 cm beds separated by clay seams.

?HALFWAY FM

1976.2-1976.21 m	Mudstone: dark grey; fine laminae of silt.
1976.21-1977.39 m	Interbedded mudstone-sandstone: varies between sandstone-dominant to mudstone-dominant. Light grey, very fine grained sandstone in beds ranging from fine laminae to 2 cm thick. No obvious sedimentary structures. Minor load deformation. Basal unit is mostly sandstone beds 1-2 cm thick separated by clay laminae - this unit rests abruptly on underlying beds.
1977.39-1978.29 m	Sandstone: very light grey to white; fine to medium grained; coarser grains tend to be black chert. Coarsely cross bedded. Abrupt basal contact.
1978.29-1980.59 m	Sandstone: fine grained; medium to dark grey (distinct colour contrast with overlying sandstone). Thick, low-angle cross beds; massive in part.

Basal contact appears to be abrupt; rests on a thin clay-rich sandstone bed.

1980.59-1982 m Sandstone: fine grained; light to medium grey. Thin to thick (up to12 cm thick) beds separated by layers of clay-rich sandstone. Ripple cross laminae present in lowermost beds. Gradational into underlying interval.

?DOIG FM

1982-1983.8 m Interbedded/interlaminated mudstone-sandstone: Laminae to thin (usually <2 cm) beds of very fine grained sandstone interbedded with mudstone. Medium to dark grey. Minor load deformation. Disrupted basal contact.

1983.8-1990.05 m Sandstone: medium to dark grey; very fine grained. Mostly massive; some scattered subhorizontal beds.

1990.05-1992.6 m Missing core.

NOTE: possible major erosion surface at 1980.59 m.

Summit Mirage 8-8-79-7W6

Core 1: 1379-1395 m Rec. 16 m 12 boxes Slabbed

Examined 16th October 2002

CHARLIE LAKE FM

1379-1383.18 m Dolomitic sandstone: very fine to fine grained. Light brownish grey with pinkish hue in places. Mottles, patches and layers of dolomitized sandstone. Scattered to locally concentrated pyrite crystals/very small nodules (1 mm to 1 cm). Complex fabric - in places appears to contain small (<1 cm) clasts - but this could be a diagenetic feature. Bedding not apparent. Abrupt basal contact.

HALFWAY FM

1383.18-1383.23 m Dolomitic sandstone: fine to coarse grained. Appears to contain small (<5 mm) mud clasts. Basal contact masked by extensive pyritization.

1483.23-1385.31 m Coquina: ranges from a sandy coquinal dolostone to a dolomitic coquinal sandstone. Large, rounded, elliptical shell clasts (?bivalve) in a sandy and dolomite matrix. Some small vugs and molds. Many clasts are aligned along low angle cross beds. Slight pinkish tint in upper 1 m. Uppermost 10 cm consists of irregular small lenses of sandstone separated by mm-thick, irregular clay laminae. Erosional basal contact.

1385.31-1387.76 m Sandstone: very fine to fine grained. Light grey. Some minor amounts of coquina in upper 50 cm - contains scattered vugs and molds. Massive to faintly bedded. Scattered mud laminae. A 3 cm layer of anhydrite 76 cm below top of interval. Transitional basal contact (interlaminae of mud).

1387.76-1388.34 m Interbedded sandstone-mudstone: laminae to very thin beds of very fine grained sandstone intercalated with mudstone. Sand-filled horizontal burrows are common. Planar and ripple laminae. Transitional basal contact.

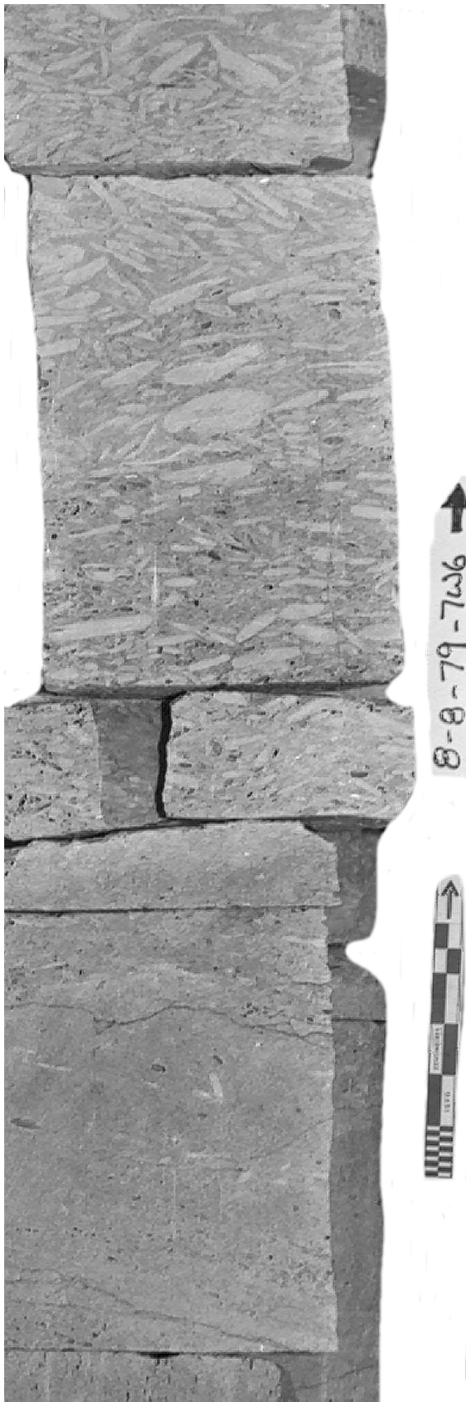
1388.34-1392.91 m Coquinal sandstone: multiple beds. Small clasts and molds of shelly material in a sand matrix. Abrupt basal contact.

1392.91-1394.69 m Coarsening upward interval: Lower 30 cm consists of very thin beds of

	very fine grained sandstone intercalated with mudstone laminae/very thin beds, grading up into very fine grained sandstone. No visible sedimentary structures. One thin interval (15cm) appears to be severely deformed. Basal contact transitional.
DOIG FM	
1394.69-1395 m	Mudstone: silt/sand lamina. General upward increase in sand content.

NOTE: possible major erosion surface at 1392.91 m.

8-8-79-7W6



Coquinal dolostone
Halfway Fm

Home et al Mirage 8-9-79-7W6
Core 1: 1354-1372.2 m Rec. 18.2 m 16 boxes Slabbed
Examined 16th October 2002

CHARLIE LAKE FM

1354-1356.45 m	Dolostone-argillaceous dolostone-sandy argillaceous dolostone: Contains a 10 cm interval with coarse sand grains. Mottled to lenticular fabric. Basal contact vague, probably transitional.
1356.45-1356.85 m	Brecciated dolostone/sandstone: small to large rounded clasts of dolomitic sandstone and sandy dolostone in a muddy matrix. Clasts have a pinkish hue. Breccia appears to be due to either slumping or a diagenetic fabric. Rapid transitional basal contact.

HALFWAY FM

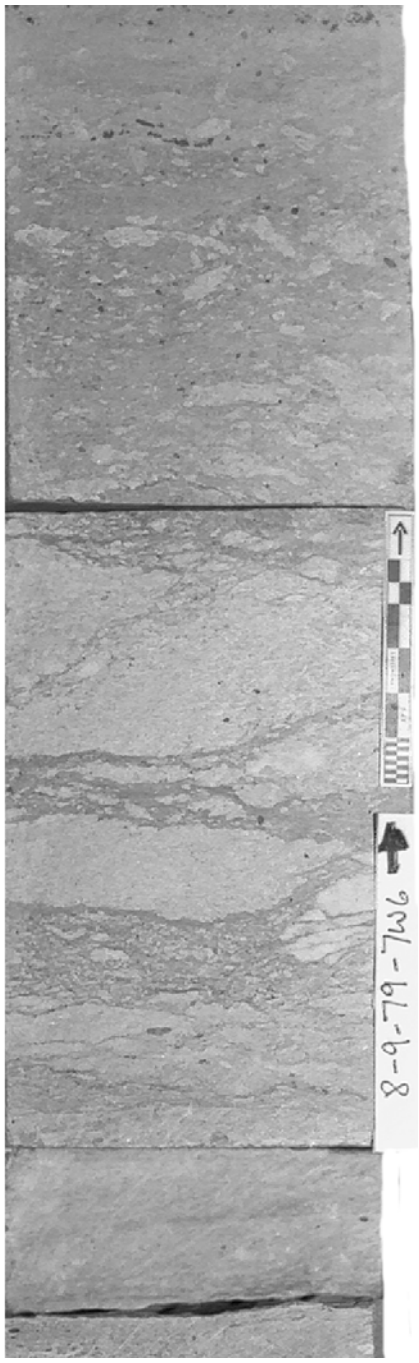
1356.85-1360.77 m	Coquinal sandstone: several beds that grade up from a coquina into a sandy dolostone/dolomitic sandstone. Lower 80 cm consists of several thin beds each consisting of a basal coquina with small (<1 cm) mudstone clasts grading up into sandstone. Abrupt basal contact.

DOIG FM

1360.77-1361.42 m	Sandstone: fine grained. A few scattered small (<1 cm) mudstone clasts. Brownish grey. No apparent sedimentary structures. Rapidly transitional basal contact of interlaminated sand-mud.
1361.42-1362.67 m	Interbedded to interlaminated sandstone-mudstone: Greenish grey. Laminae to very thin beds. Some lenticular beds. A few horizontal burrows. Basal 10 cm load deformed.
1362.67-1267 m	Sandstone: very fine to fine grained. Light grey to brownish grey. Scattered mud laminae. Some dolomite nodules in basal 15 cm. Vaguely bedded to massive. Some deformed beds. Transitional basal contact.
1367-1367.8 m	Mudstoen grading up into silty/sandy mudstone: Dark grey. Upper 20 cm is silty/sandy. Mudstone in lower part contains fine silt laminae. Abrupt basal contact.
1367.8-1369.25 m	Interlaminated to interbedded sandstone-mudstone: Predominantly very fine grained sandstone. There are three thick sandstone beds separated by thick intervals of interlaminated to very thinly interbedded mudstone-sandstone (plane laminae with a few ripple laminated beds). Abrupt basal contact.
1369.25-1370.55 m	Sandstone: very fine grained. Overall sanding-up aspect to interval. Fine mud laminae in lower 60 cm, and mostly sandstone in upper part. Transitional basal contact.
1370.55-1372.2 m	Interlaminated to very thinly interbedded sandstone-mudstone: Some ripple laminae, but mostly planar laminated. A few 5-10 cm thick sandstone beds; most are <2 cm thick.

NOTE: possible major erosions surface at 1360.77 m.

8-9-79-7W6



Charlie Lake Fm: brecciated dolostone (interval 1356.45 - 1356.85 m)

Summit et al Mirage 14-25-79-8W6
Core 1: 1388-1406 m Rec. 18 m 13 boxes Full diameter
Examined 16th October 2002

CHARLIE LAKE FM

1388-1389.17 m	Dolostone: argillaceous. Mottled. Minor veins of anhydrite in upper 15 cm. Brownish grey. No apparent internal sedimentary structures. Vague, possibly deformed, or diagentically changed, basal contact.
1389.17-1389.87 m	Dolomitic mudstone/very argillaceous dolostone: Greenish grey. Some mottling. Arbitrarily chosen base.
1389.87-1392.2 m	Argillaceous dolostone/very dolomitic mudstone: Mottled. No obvious sedimentary structures. Base appears to be a mixing zone consisting of a 4 cm thick interval of sandy dolostone.

HALFWAY FM

1392.2-1394.85 m	Sandstone: fine to coarse grained. Upper 80-100 cm has a pinkish hue and is dolomitic and anhydritic which results in a complex fabric. Lower part of interval is planar bedded and low angle cross bedded. Change between lower and upper parts appears to be transitional. Some small bivalve clasts in lower part of interval. Transitional basal contact.
1394.85-1398.71 m	Coquinal sandstone: series of fining-up beds consisting of a basal coquina (of variable thicknesses) grading up into fine grained sandstone. Coquinas contain very small to large bivalve clasts and molds. Some coquinas are porous, others not. Abrupt basal contact.
1398.71-1398.82 m	Mudstone: abundant silt/sand laminae. Abrupt basal contact.
1398.82-1403.92 m	Coarsening-upward interval: Lower part consists of argillaceous very fine grained sandstone that appears to be locally deformed, transitionally overlain by fine grained sandstone with very low angle cross beds and coquinal layers. Lower part of interval has remnant laminae in places. Transitional basal contact.
1403.92-1406 m	Mudstone: dark grey to black. Abundant silt/sand laminae with some very thin beds. Minor burrowing.

NOTE: possible major erosion surface at 1398.71 m.

Poco et al Gordondale 8-34-79-9W6
Core 1: 1597.75-1615.75 m Rec. 12.5 m 6 boxes Full diameter with a few slabbed pieces. Examined 17th October 2002

CHARLIE LAKE FM

1597.75-1600.5 m	Mudstone: brick-red with irregular patches of light grey replacement dolomite (imparts a pseudo-breccia appearance). Abrupt basal contact.
1600.5-1600.55 m	Anhydrite: irregular styolitic basal contact.
1600.55-1602.35 m	Dolostone: light to medium grey. Finely to coarsely laminated - planar, crinkly and some small-scale domes - stromatolitic. A few intercalations of anhydrite. Abrupt basal contact.
1602.35-1602.65 m	Breccia: poorly sorted very small to large clasts in a dolomite matrix. Slight yellowish grey color. Clasts are tabular and randomly oriented. Characteristics suggest a slump origin. Abrupt basal contact.
1602.65-1602.97 m	Dolostone: medium grey. Vaguely laminated to possibly disrupted. Contains several clay laminae draping uneven surfaces - one of which is at the base.
1602.97-1603.19 m	Dolostone: complex nodular fabric. Irregular clay laminae and streaks common in lower 10 cm, less in remainder of interval. Irregular, uneven basal contact coated with a thin (<1 mm) clay layer.

HALFWAY FM

1603.19-1603.69 m	Sandstone: fine grained with scattered medium grains. Clay laminae in basal 10-15 cm. Highly disrupted to deformed Basal contact load deformed.
1603.69-1604.73 m	Sandstone: a fining-up unit. Coarse grained in basal 15 cm grading up to fine grained. Faintly bedded with hints of low angle cross beds in the coarse grained part. Abrupt basal contact.
1604.73-1605.41 m	Sandstone: fine grained. Light grey. Low angle cross beds. Base marked by a number of elliptical dolomite nodules.
1605.41-1605.61 m	Sandstone: fine grained. Contains irregular clay laminae. Slightly disrupted bedding. Basal contact poorly preserved.
1605.61-1608.35 m	Sandstone: fine grained. Light brownish grey. Difficult to detect any sedimentary structures on milled core surface. Transitional basal contact.

DOIG FM

1608.35-1609.25 m	Interlaminated sandstone-mudstone: sandstone is the dominant lithology. Lenticular and planar laminated sandstone interlaminated with mudstone. Vertical and horizontal burrows present. Transitional basal contact.
1609.35-1610.25 m	Mudstone: dark grey to black. Abundant laminae and thin beds of silt/sand.

NOTE: position of a major erosion surface is not well defined, possibly at 1604.73 m where there is a significant grain size change

Shell Gordondale 8-1-79-10W6

Core 1: 1723.8-1730.3 m Rec. 6.5 m 6 boxes Slabbed
Core 2: 1730.3-1748.8 m Rec. 18.5 m 17 boxes Slabbed
Examined 17th October 2002

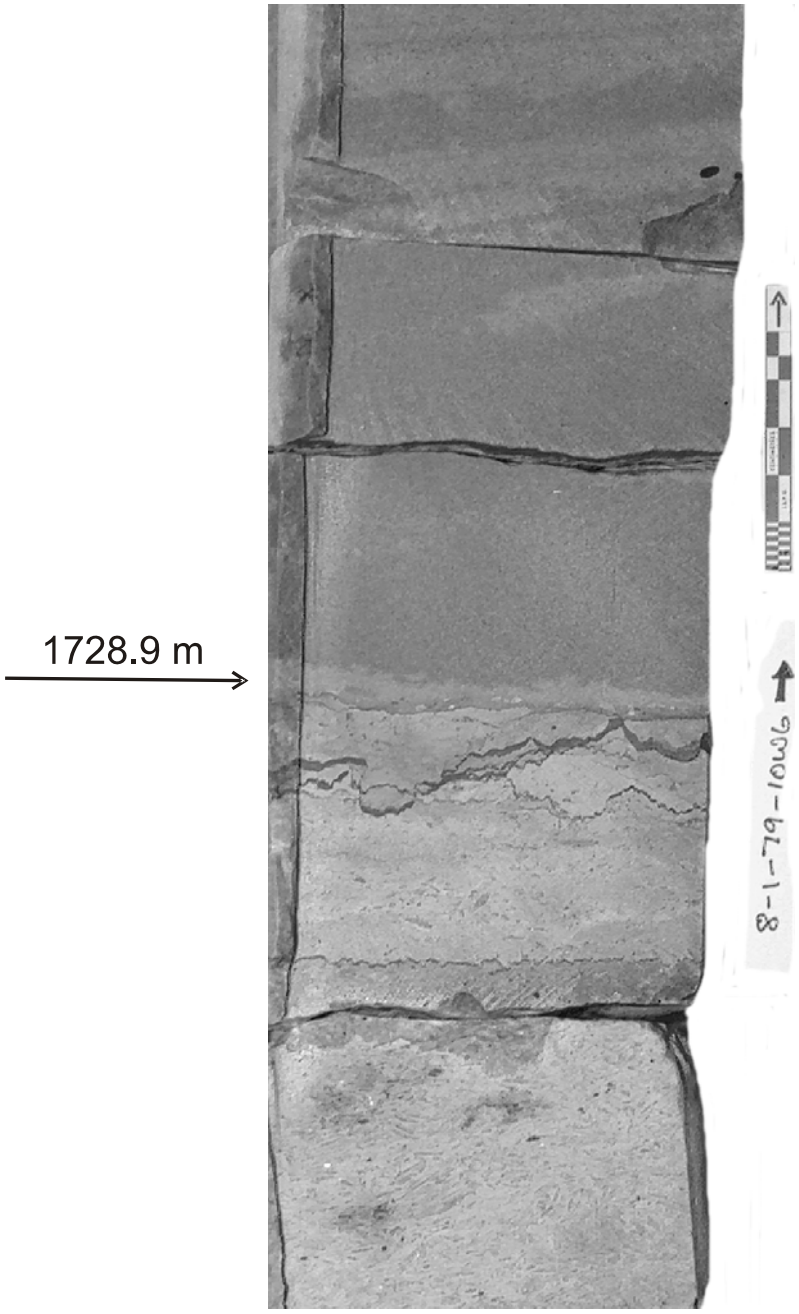
HALFWAY FM

1723.8-1728.9 m	Sandstone: fine grained. Light grey and brownish grey. Scattered lighter colored patches of dolomitic sandstone and veins of dolomite. Mostly massive with some zones of very low-angle cross beds - latter especially common in lower 50 cm. Abrupt basal contact.
1728.9-1737.29 m	Coquinal dolostone/sandy dolostone and sandstone: Series of fining-up beds consisting of a basal coquinal dolostone grading up into very fine grained sandstone. Light grey with some coquinas having a pinkish hue. Coquinal clasts are generally small, mostly <1 cm; highly packed and with minor moldic porosity. Each bed is erosionally based. A few beds are sandstone only, with a small amount of shell debris near base of bed. A few anhydrite nodules. Toward base of interval the beds become thinner and clay laminae are present.
1737,29-1739.4 m	Sandstone: very fine grained. Thin to thick beds separated by mud-laminated sandstone. Some burrows in mud-laminated sandstone.
1739.4-1740.4 m	Fining-up unit: basal coquina grading up into very fine grained sandstone. Abrupt basal contact.
1740.4-1741.3 m	Sandstone: very fine grained. Thin to thick beds. Scattered throughout are irregular, anastomosing clay lamiane.

Rest of core not measured

NOTE: possible major erosion surface at 1728.9 m.

8-1-79-10W6



PCP Gordondale 6-5-79-10W6
Core 1: 1732-1750 m Rec. 16.25 m 15 boxes Slabbed
Examined 17th October 2002

CHARLIE LAKE FM

1732-1733.82 m	Mudstone: brick-red. Mottled. A few 1-2 cm layers/beds of dolostone. Abrupt basal contact.
1733.82-1734.46 m	Dolostone: dolomicrite. Fine laminae to very thin beds (<2 cm). Mildly deformed in places. A 1 cm thick anhydrite bed about 17 cm above base. Diffuse basal contact - possibly due to dolomitization of underlying sandstone.

?HALFWAY FM

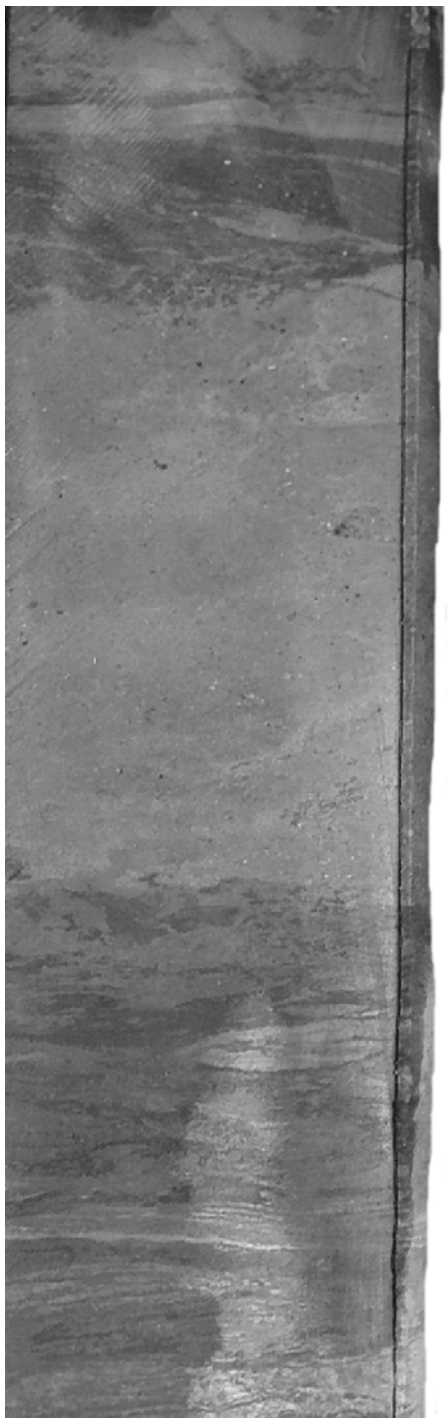
1734.46-1734.59 m	Sandstone: fine to medium grained with scattered coarse grains. No obvious sedimentary structures. Abrupt basal contact.

DOIG FM

1734.17-1736.17 m	Mudstone: dark grey to black. Abundant laminae to very thin beds of silt/sand. Some dolomitization, especially immediately below the overlying sandstone. Basal 10 cm consists of shelly, silty mudstone.
1736.17-1743.37 m	Coarsening-upward succession: lower half consists of interlaminated to very thinly interbedded mudstone-siltstone-very fine grained sandstone with minor bed deformation and some burrows (horizontal forms more prevalent). Grades up into thicker beds of sandstone intercalated with minor amounts of mudstone, in turn grading up into sandstone beds, some of which contain shell debris and planar bedding to very low angle cross bedding. Gradational basal contact.
1743.37-1747 m	Coquinal dolostone-sandy coquinal dolostone grading up into very fine grained sandstone: lower 1 m contains beds with large shell clasts and zones of recrystallization where coarse dolomite is present. Basal 1 m overlain by about 1 m of small-clast coquinas which have some moldic porosity, in turn overlain by sandstone. Base of interval rests erosionally on underlying beds.
1747-1748.05 m	Mudstone: dark grey to black. Abundant laminae to very thin beds of silt/sand. Minor bed deformation and a few vertical and horizontal burrows.

NOTE:
The sandstone identified as Halfway Fm may be too thin to warrant classifying it as a formation. Possible major erosion surface at 1734.59 m.

6-5-79-10W6



CHARLIE
LAKE FM

1734.59 m

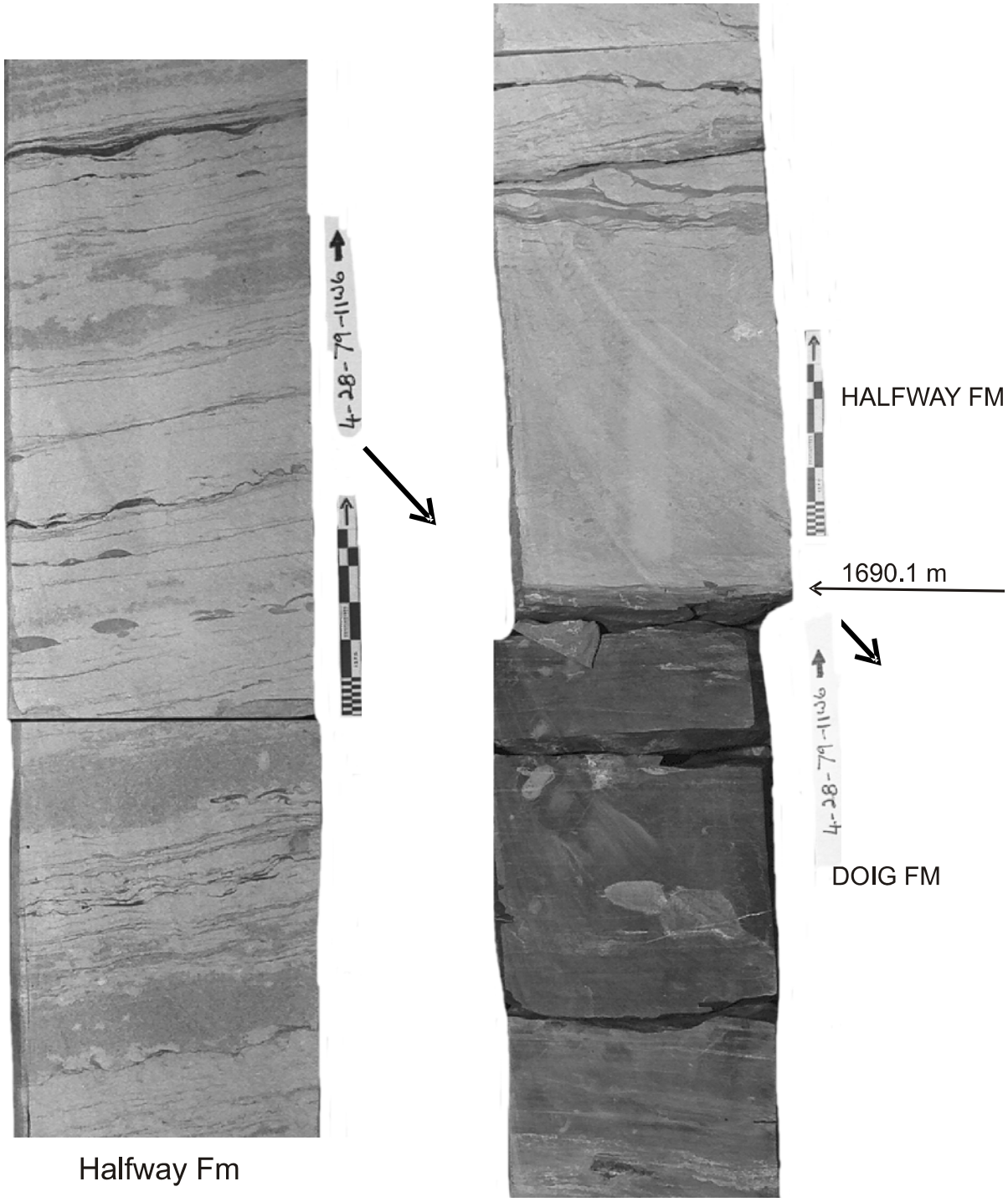
DOIG FM

Shell Gordondale 4-28-79-11W6
Core 1: 1686-1704 m Rec. 18 m 13 boxes Slabbed
Examined 17th October 2002
Log/core depths do not correspond. Equivalent log depths are about 4 m deeper, i.e.,1690-1708 m

HALFWAY FM	
1686-1690.1 m	Sandstone: light grey. Fine grained. Upper 1.07 m consists of massive to vaguely cross bedded sandstone. Remainder of interval consists of sandstone beds separated by intercalated mudstone laminae and very thin beds. Thicker beds in this lower part are massive or cross bedded. Basal bed is 11 cm thick and overlies an abrupt basal contact.
DOIG FM	
1690.1-1691.12 m	Mudstone: dark grey to black. Fine laminae to very thin beds of silt/sand. Minor bed deformation and a few burrows. Gradational basal contact.
1691.12-1699.48 m	Sandstone: very fine grained, argillaceous. Mostly massive with some laminated zones. Upper 1.5-2 m contains fine mud laminae in sandstone beds, except for uppermost 70 cm which is massive. Gradational basal contact.
1699.48-1700.63 m	Interbedded sandstone-mudstone: fine laminae to very thin beds. Minor bed deformation and some burrows. Gradational basal contact.
1700.63-1704 m	Interlaminated to interbedded mudstone-sandstone: fine laminae to very thin beds. Minor bed deformation and some burrows.

NOTE: possible major erosion surface at 1690.1 m

4-28-79-11W6



Halfway Fm

Dome et al Pouce Coupe 10-6-79-12W6

Core 2: 1813.2-1822.6 m Rec. 8.2 m 6 boxes Full diameter
Core 3: 1822.6-1837.6 m Rec. 11.35 m 8 boxes Full diameter
Core 4: 1837.6-1839 m Rec. 1.4 m 1 box Full diameter
Examined 17th October 2002

CHARLIE LAKE FM

1813.2-1814.04 m	Mudstone: brick-red. Dolomite mottles. Abrupt basal contact with a 1 cm thick zone if interlaminated black and red clay.
1814.04-1814.96 m	Dolostone: light to medium grey. Finely laminated - probably stromatolites. Abrupt basal contact coated with 1 mm of black clay.
1814.96-1815.87 m	Mudstone: brick-red. Cf. above. Abrupt basal contact.
1815.87-1816.97 m	Dolostone. Stromatolitic - fine planar to moderately undulose laminae,
1816.97-1817.24 m	Dolostone: brownish grey. Highly deformed. Contains an anhydrite filled vein. Abrupt, steeply inclined, basal contact.
1817.24-1817.4 m	Anhydrite/dolomitic anhydrite: Abrupt, uneven basal contact coated with 1 mm of black clay.
1817.4-1817.9 m	Dolostone: finely laminated throughout, mostly planar, some undulose - stromatolites. Uppermost 2 cm contains small (<1 cm) clasts. Abrupt basal contact.

HALFWAY FM

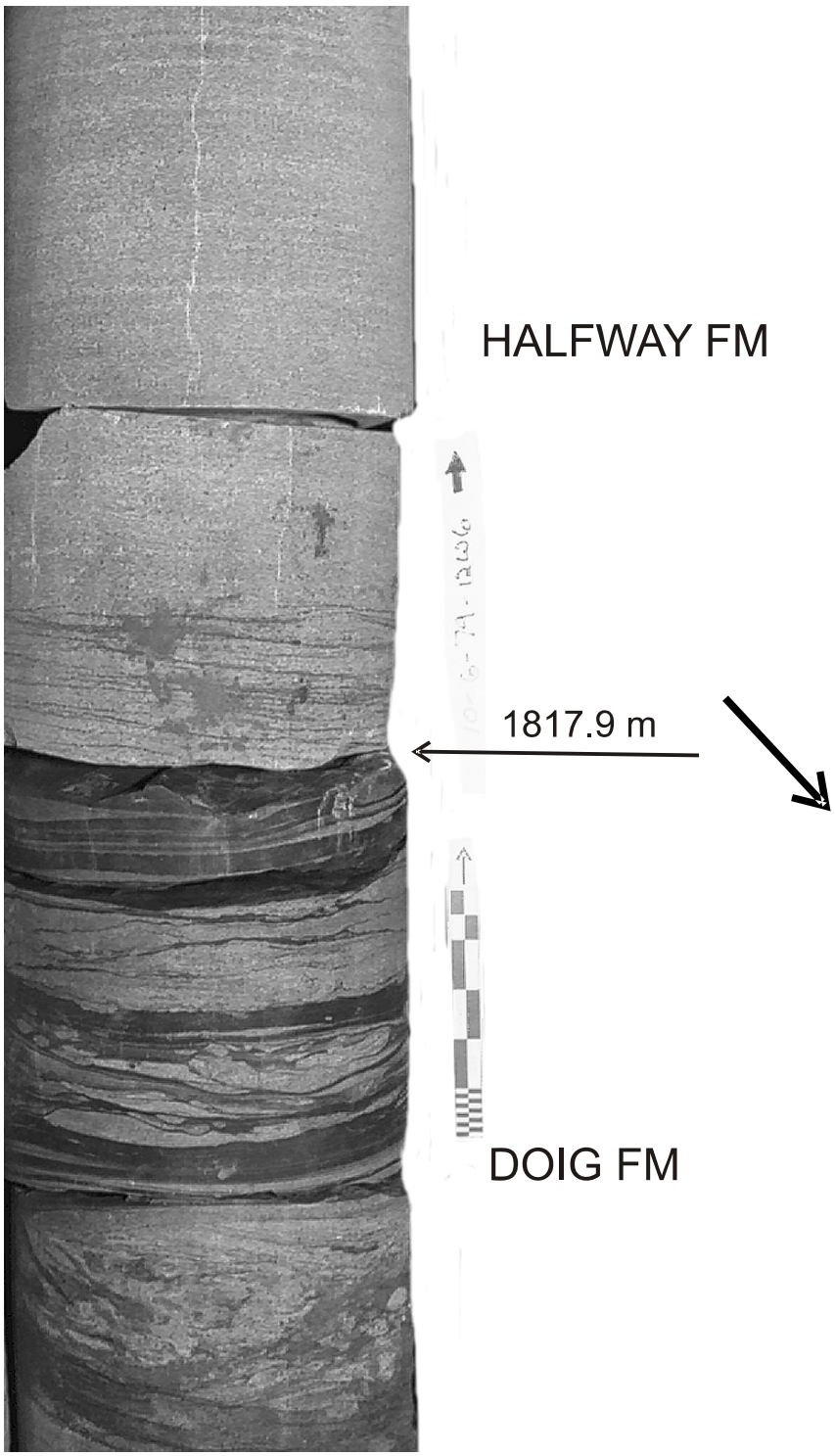
1817.9-1818.04 m	Sandstone-mudstone: lenses of fine to medium grained sandstone separated by dolomicrite/clay. Basal contact poorly preserved.
1818.04-1825 m	Sandstone: fine to medium grey, locally coarse. Dark grey. Some horizons contain small (<1 cm) mud clasts. Low angle cross beds throughout. Probably consists of several beds. Dead oil seen in some pores. Basal 3 cm contains mud laminae. Abrupt basal contact.

DOIG FM

1825-1827.66 m	Mudstone: dark grey to black. Abundant fine laminae and very thin beds of silt/sand. Planar and ripple laminae. Minor bed deformation. Some horizons contain vertical and horizontal burrows. Gradational basal contact.
1827.66-1833.95 m	Sandstone: very fine to fine grained. Multiple beds separated by clay-laminated sand or bioturbated muddy sandstone. 10 cm above base is a 35 cm thick sandy mudstone.
1833.95-1837.6 m	Missing core
18337.6-1839 m	Mudstone: dark grey to black. Fine laminae to very thin beds of silt/sand and some thicker beds with shell debris.

NOTE: possible major erosion surface at 1825 m.

10-6-79-12W6



Oil et al Pouce Coupe 5-23-79-12W6
Core 1*:* 1707.75-1725 m. Rec. ? 16 boxes. Full diameter.
Core 2*:* 1725-1733.25 m. Rec. ? 7 boxes. Full diameter,
Core 3*:* 1733.25-1743.75 m. Rec. ? 7 boxes. Full diameter.
Examined 10th November 1998

HALFWAY FM

1707.75-1711.2 m	Sandstone: fine grained; light grey. Calcite cement. Comprised of a series of fining-up beds. Basal bed is 23 cm thick and rest abruptly on underlying mudstone. Base is load deformed. The lower 15-17 cm is planar laminated, above this there is a gradual increase in the amount of interbedded/interlaminated mudstone. Upper part of bed is ripple laminated which is erosionally overlain by next bed. Above the basal bed, individual beds are thicker and tend to contain less mudstone. Mudstone clasts present near the base of some beds. Tendency for beds to thicken up-section.. Most beds are planar bedded in their lower part grading up into finely laminated sandstone, some beds with a few clay laminae.
?DOIG FM	
1711.2-1711.45 m	Interbedded mudstone-sandstone: load deformation structures are common. Thin interbeds.
1711.45-1714 m	Sandstone: very fine to fine grained. Thin mudstone beds and laminae. Fine, planar and ripple laminae. Load deformed beds. Gradational base and top.
1714-1728.5 m	Interbedded mudstone-sandstone: dark grey to black. Overall coarsening-upward trend, seen as upward increase in sandstone interbeds/laminae. Planar laminated. Load deformation of some beds. Calcite nodules (few mm to 8 cm diameter) occur as scattered nodules or concentrated in layers (probably resedimented). Load deformation structures are very common from 1725 to 1727 m. An abrupt deflection on the gamma-ray trace at 1714-1715 m appears to coincide with change from sandstone-dominant to mudstone-dominant.
1728.5-1731.75 m	Interbedded sandstone/siltstone-mudstone: Argillaceous, very fine grained sandstone to coarse siltstone. Highly deformed.
1731.75-1738 m	Mudstone: silty to sandy. Gradational upward change to sandier strata.
1738-1740 m	Sandstone/siltstone: argillaceous, very fine grained sandstone to coarse grained siltstone. Mudstone interbeds. Overall coarsening-upward trend.
1740-1743.5 m	Mudstone: cf. above.

NOTE: the total interval is a large-scale coarsening-upward succession, within which are smaller scale coarsening-up cycles.

Dome Pouce Coupe 2-27-79-13W6
Core 1: 1744-1762 m Rec. 16.7 m 15 boxes Full diameter
Examined 18th October 2002
Core/log depths do not correspond. Equivalent log depths are 1747-1765 m

CHARLIE LAKE FM

1744-1745.25 m — Dolostone: light grey. Some clay laminae in upper 15 cm. Dense, finely crystalline. No internal features seen Abrupt basal contact.

HALFWAY FM

1745.25-1750.5 m — Sandstone: mostly very fine to fine grained.
1745.25-1746.6 fining-up bed. Fine to medium grained in basal 30 cm with patches of dolomitization (mottled appearance). Upper 5 cm contains fine laminae and very thin beds of mudstone.
1746.6-1750.5 Fining-up bed. Fine grained with some medium grains. Mostly massive with some traces of very low-angle cross bedding. Upper 50 cm consists of thin beds of sandstone separated by thin to thick clay laminae, and one 5 cm thick mudstone bed.
Interval has an abrupt basal contact.

DOIG FM

1750.5-1753.25 m — Mudstone: dark grey to black. Abundant laminae of silt/sand. No bioturbation. Abrupt basal contact.

1753.25-1757.75 m — Sandstone; very fine grained. Argillaceous in places. No obvious sedimentary structures. Basal 50 cm contains muddy layers and lenses. Rapidly gradational basal contact.

1757.75-1760.7 m — Mudstone: dark gey to black. Silt/sand laminae throughout with a higher density of lamination in upper 1 m. Minor load deformation.

NOTE: possible major erosions surface at 1750.5 m.

Summit Bilawchuk 2-19-80-8W6
Core1: 1446.4-1464.4 m Rec. 17.7 m 13 boxes. Partially slabbed.
Examined 18th October 2002
Core/log depths do not match. Equivalent log depths are 1442.4-1460.4 m

CHARLIE LAKE FM

1446.4-1452.9 m — Mudstone: brick-red. Variably mottled. A few nodules and veins of anhydrite in lower 2 m. Abrupt basal contact coated with a 1 mm clay layer.

1452.9-1453.44 m — Anhydrite/dolostone: an upper and lower interval of "chicken-wire" anhydrite nodules with a middle interval of crudely laminated dolostone containing a few isolated anhydrite nodules. Abrupt basal contact coated with a clay lamina.

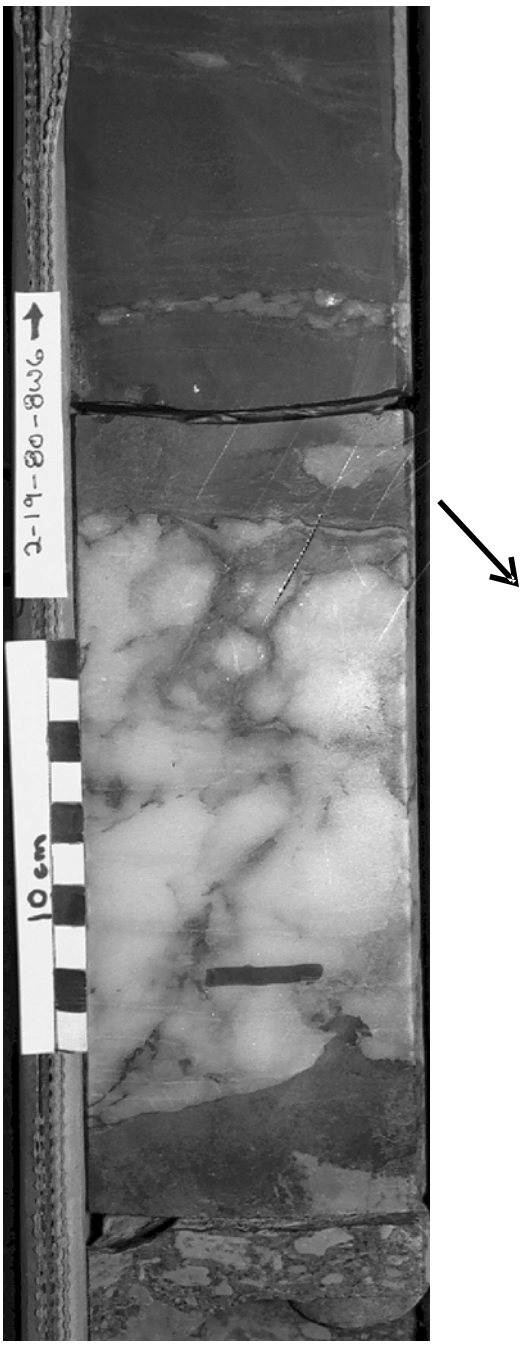
HALFWAY FM

1453.44-1454.54 m — Sandstone: fine to medium grained, dolomitic. Scattered to locally concentrated shell debris - some of latter has small molds. Scattered small

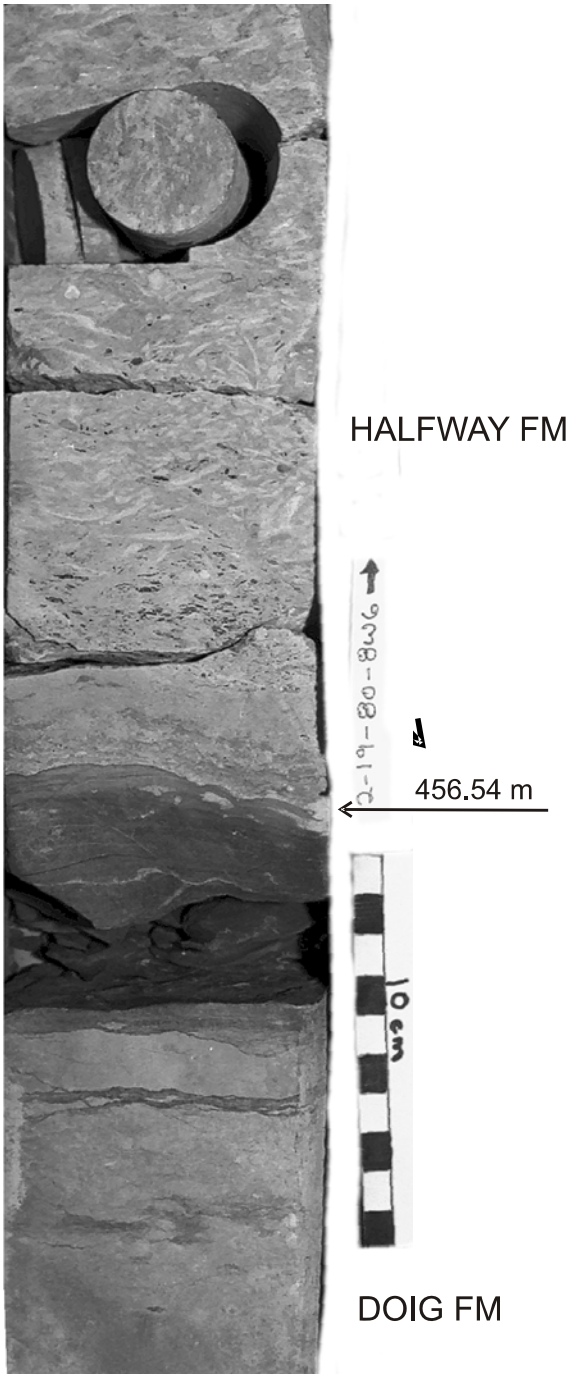
	nodules of anhydrite. Slight pinkish hue. Immediately below the overlying anhydrite the uppermost 2 cm has a distinct character - the fine grained sandstone becomes dolomitic to anhydritic and within about 2 cm of the upper contact the sandstone has spotty appearance, this is overlain by a clay lamina, in turn overlain by a light coloured silt mud layer. The latter is overlain by the clay lamina at the contact with the overlying anhydrite. Gradational into underlying beds.
1454.54-1456.54 m	Coquinal dolostone: Small to large shell clasts in a sandy dolomite matrix. Clasts vary in orientation, from sub-parallel to bedding to vertically stacked. There are patches where dolomite has completely replaced the shell material. Erosional basal contact.
DOIG FM	
1456.54-1456.61 m	Mudstone: silty.
1456.61-1458.51 m	Sandstone: very fine to fine grained, argillaceous. Scattered irregular mud laminae. Scattered shell debris. Beds in upper 50 cm appear to be highly deformed. Lower part is well bedded. Abrupt basal contact.
1458.51-1459.07 m	Mudstone: dark grey. Laminae, lenses and very thin beds of silt/sand. Minor burrowing.
1459.07-1460.65 m	Interbedded sandstone-mudstone: thin to thick beds of very fine grained sandstone with zones of laminated mudstone. Abundant burrows in muddy intervals. A few large vertical burrows. Minor load deformation in muddy intervals. Gradational from underlying interval.
1460.65-1462.31 m	Mudstone: dark grey to black. Scattered silt laminae. Abrupt basal contact marked by a 2 cm thick partially dolomitized silty mudstone.
1462.31-1463.81 m	Sandstone: very fine to fine grained. Thick beds separated by mud-laminated sandstone or thin mudstone beds. Gradational basal contact.
1463.81-1464.06 m	Mudstone-sandstone: interlaminated to very thinly interbedded mudstone and sandstone.

NOTE: possible major erosion surface at 1456.54 m.

2-19-80-8W6



Mosaic anhydrite in the basal unit of the Charlie Lake Fm



Shell Bilawchuk 8-4-80-9W6
Core 1: 1584-1602 m Rec. 8.95 m 9 boxes Slabbed
Examined 18th October 2002

CHARLIE LAKE FM

1584-1589.8 m	Mudstone: brick-red. Dolomite mottling. Faintly laminated in places. Abrupt basal contact.
1589.8-1589.89m	Anhydrite: crystalline. Abrupt basal contact.
1589.89-1589.94 m	Mudstone: brick-red. Lenses and layers of anhydrite. Abrupt basal contact.
1589.94-1590.1 m	Dolostone: medium grey. Faintly laminated. Chicken-wire anhydrite in basal 3 cm. Small clasts in a muddy dolomite matrix in basal 1 cm. Abrupt basal contact.
1590.1-1590.19 m	Dolostone/dolomitic mudstone: contains nodules of pink anhydrite. Basal 2-3 cm appears to be disrupted. Abrupt basal contact.
1590.19-1590.22 m	Dolomicrite: brownish grey. No apparent sedimentary structures. Abrupt basal contact.
1590.22-1590.34 m	Anhydrite: chicken-wire fabric of white to light grey anhydrite with a pink nodule at top of interval. Abrupt basal contact coated by a 1 mm clay lamina.
1590.34-1590.39 m	Dolostone: finely laminated - stromatolites. Abrupt, styolitic basal contact with a clay coating.
1590.39-1590.49 m	Dolostone: brownish grey. Very finely crystalline. No apparent sedimentary structures. Abrupt basal contact coated with clay.
1590.49-1590.68 m	Dolostone: finely laminated. Diffuse basal contact.
1590.68-1591.41 m	Dolostone: finely laminated (stromatolites). Scattered to locally abundant anhydrite nodules. Abrupt, clay-coated basal contact.

HALFWAY FM

1591.41-1591.97 m	Sandstone: medium to coarse grained. Planar beds and very low angle cross beds. Upper 4 cm contains very small dolostone clasts and small sand granules that grade up into dolomitized sandstone. Abrupt, slightly load deformed basal contact.
1591.97-1592.02 m	Sandstone: fine grained with scattered coarse grains. Appears to be highly deformed.
1592.02-1602 m	Missing core

NOTE: possible major erosion surface at 1591.97 m.

8-4-80-9W6

Mosaic anhydrite in the Charlie Lake Fm (interval 1590.19 - 1590.39 m)

Norwich LL&E Gordondale 8-2-80-10W6
Core 1: 1654-1672.1 m Rec. 18.1 m 17 boxes Slabbed
Examined 18th October 2002

CHARLIE LAKE FM

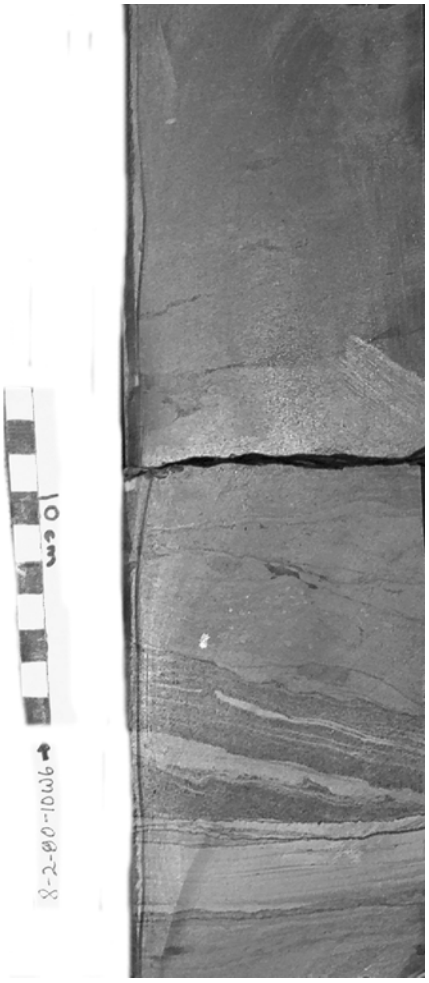
1654-1654.11 m	Dolostone/dolmitic mudstone: brownish grey with thin lenses of red mudstone. Fine, planar to mildly undulose laminae. Rapidly gradational basal contact.
1654.11-1655.71 m	Mudstone: brick-red. Small patches, nodules and irregular layers of dolomite. Abrupt basal contact.
1655.71-1655.84 m	Dolostone-mudstone: irregular 2-3 cm thick beds/layers of dolostone separated by thin layers and lenses of red mudstone.
1655.84-1656.58 m	Dolostone: light brownish grey to dark grey. 1655.84-1656.04 m Anhydritic dolostone. Very thin to thin irregular beds with some fine laminae. Abrupt basal contact. 1656.04-1656.14 m Dolostone. Finely to coarsely laminated (alternating black and brownish grey dolomite laminae). Lower part of bed is highly deformed, as is the basal contact. 1656.14-1656.58 m Dolomicrite. Brownish grey. Very thin beds. A few clay laminae. Lower 6 cm contains what are interpreted to be synaeresis cracks. Abrupt basal contact.
1656.59-1663.48 m	Mudstone: brick-red. Dolomite mottling. A few thin (1-2 cm) beds of dolostone. Abrupt basal contact.
1663.48-1664.43 m	Dolostone: light brownish grey. Multiple beds of dolomicrite and one interval of finely laminated dolomicrite/argillaceous dolostone located in middle of interval. Rests abruptly on a 5 mm thick clay layer.

?HALFWAY FM

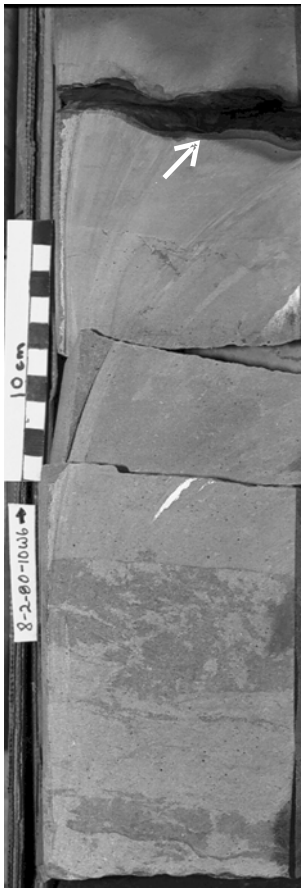
1664.43-1664.58 m	Sandstone: fine grained with scattered, black, medium, chert grains. No obvious sedimentary structures. Abrupt basal contact.
1664.58-1669.03 m	Coarsening-up succession: basal 1.7 m consists of thoroughly bioturbated argillaceous sandstone. Intense load deformation also seen. Grades up into well bedded, partially dolomitized (light grey) very fine to fine grained sandstone (medium grey). Planar bedding and very low-angle cross bedding. Two 2-10 cm thick zones of mud-laminated sandstone. Upper 20 cm contains small pyrite nodules. Abrupt basal contact.
1669.03-1672.1 m	Sandstone: very fine to fine grained. Partially dolomitized. Planar bedded with mud laminae in basal 20 cm.

NOTE:
Possible major erosion surface at 1664.58 m.
Strata identified as Halfway Fm may be too thin to classify as a formation.

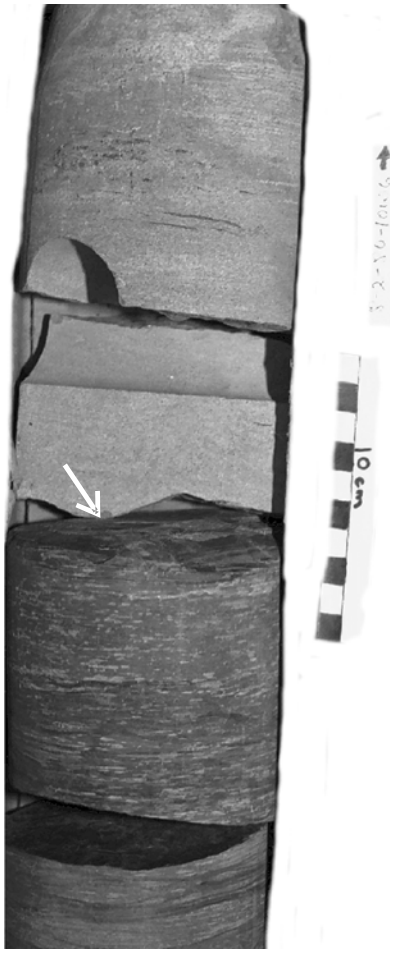
8-4-80-9W6



Basal unit ofthe Charlie Lake Fm



Charlie Lake - Halfway contact



Halfway - Doig contact

Pembina et al Gordondale 9-3-80-11W6
Core 1: 1795-1807.4 m Rec. 12.15 m 9 boxes Full diameter
Examined 18th October2002
Core/log depths mismatched. Equivalent log depths are 1793-1805.4 m

CHARLIE LAKE FM

1795-1800.35 m	Mudstone: brownish grey in upper 2 m grading down into brick-red. Extensive dolomite mottling in the brownish grey part, less in brick-red mudstone. Abrupt basal contact.
1800.24-1800.75 m	Dolostone: brownish grey. Fine, undulose laminae and lenticular beds. Gradational basal contact.
1800.75-1800.86 m	Mudstone: brick-red with streaks of brownish grey dolomite. Diffuse basal contact.
1800.86-1801.19 m	Anhydritic dolostone: Contains small white anhydrite nodules - most abundant in lower 10 cm. Scattered clay laminae. Very thinly bedded in upper third; crudely bedded to coarsely laminated in lower 10 cm. Abrupt basal contact.

DOIG FM

1801.19-1801.53 m	Mudstone: Grey. Very silty/sandy. Either thoroughly bioturbated or completely load deformed.
1801.53-1801.79 m	Sandstone: very fine to fine grained. Argillaceous. Mud laminae in basal 8 cm. Most of interval consists of laminated to burrowed sandstone.
1801.79-1802.39 m	Mudstone: laminae to very thin beds of silt/sand. Sandy beds are burrowed. Gradational basal contact.
1802.39-1805.99 m	Sandstone: very fine to fine grained. Interbeds of muddy sandstone and sandy mudstone. Laminae scattered throughout interval. Patches of nodular anhydrite. Burrows present in muddy beds.
1805.99-1807.15 m	Mudstone-sandstone: thin to thick intervals of mudstone, sandy mudstone and muddy sandstone. Scattered dolomite nodules (?pseudomorphs after anhydrite). Some laminae preserved. Minor load deformation in sandy beds.

9-3-80-11W6

CHARLIE LAKE FM

1801.19 m

DOIG FM

Apexco et al Pouce Coupe 11-10-80-12W6
Core 1: 5511-5565 ft Rec. 54 ft 13 boxes Full diameter
Examined 18th October 2002
Core/log depths mismatch. Equivalent log depths are 5506-5560 ft

CHARLIE LAKE FM

5511-5534 ft	Mudstone: brick-red in lower 6 ft grading up into brownish red and finally into greyish light brown in upper 3-4 ft. Variable intensity of dolomite mottling - most intense in the grey-brown interval. Scattered patches and nodules of light grey dolomite. Abrupt basal contact.
5534-5535' 4"	Anhydrite: light grey. Crystalline. Diffuse basal contact.
5535' 4"-5536' 5"	Intercalated red mudstone-anhydrite-dolomitic anhydrite
5536' 5"-5537' 2"	Dolostone/anhydritic dolostone: Anhydrite nodules. Basal contact not preserved.

HALFWAY FM

5537' 2"-5545' 6"	Coquinal sandy dolostone and sandstone: basal coquinal dolostone grading up into fine grained sandstone. Basal 4" contains small to large clasts similar in appearance to underlying dolomitized sandstone. Some moldic porosity in coquina. Coquinal interval contains a 2" band of dolomite with “floating” small pebbles. Upper sandstone contains scattered coarse grains and granules, and some small (<5 mm) mudstone clasts. Interval probably contains several beds. Abrupt, erosional basal contact.
5545' 6"-5546' 4"	Sandstone-mudstone: very thin to thin beds of very fine grained sandstone intercalated with mud laminae and mudstone beds.
5546' 4"-5564' 4"	Sandstone: very fine to fine grained. Low to medium angle cross beds. Incipient dolomitization. A few thin intervals with mud laminae or mudstone. Rapidly gradational basal contact.

DOI G FM

5564' 4"-5565'	Sandstone-mudstone: very thin beds of very fine grained sandstone intercalated with mudstone and mud laminae. Several large horizontal burrows present, and more numerous, but still not abundant, small vertical and horizontal burrows.

NOTE: possible major erosion surface at 5545' 6".

11-10-80-12W6

HALFWAY FM

5545’ 6”

DOIG FM

Canterra et al Pouce Coupe 14-26-80-12W6
Core 1: 1625.3-1643.1 m Rec. 1.35 m 13 boxes Full diameter
Examined 18th October 2002

CHARLIE LAKE FM

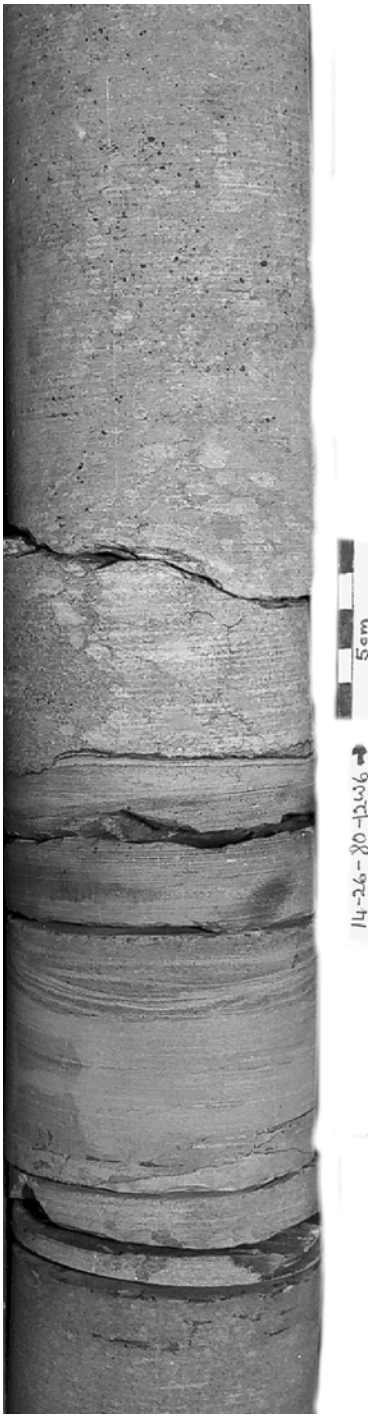
1625.3-1630.6 m	Mudstone: brownish grey. Complex dolomite mottling. Abrupt basal contact.
1630.6-1631.65 m	Dolostone-anhydrite: interlaminated dolomite and anhydrite. Also contains small to large anhydrite nodules in the basal 15 cm and about 55 cm above base. Minor bed deformation. Abrupt, irregular, possibly load deformed basal contact.
1631.65-1632.22 m	Sandstone: very fine to fine grained with scattered coarse grains and granules and medium grains in basal 5 cm. Dolomitic cement. No obvious sedimentary structures. Abrupt, clay-coated basal contact.

DOIG FM

1632.22-1632.72 m	Sandstone: very fine grained. Mud laminated in places. Some burrows. Gradational basal contact.
1632.72-1642.65 m	Mudstone-sandstone: laminae to very thin beds. Predominantly mudstone. Sandy intervals contain some vertical and horizontal burrows. Mudstone dominant intervals tend to lack burrows.

NOTE: possible major erosion surface at 1632.22 m.

14-26-80-12W6



CHARLIE
LAKE FM

1632.22 m

DOIG FM

Shell Whitelaw #1 2-14-82-2W6
Cores 6 to 9*:* 3335-3372 ft.
1 ins. diameter core (full diameter preserved).
Examined 15th October 1998

MONTNEY FM
Badly broken into small core fragments. According to log character the core contains part of two small-scale coarsening-upward cycles (the top sandstone of the lower cycle and the mudstone of the upper cycle).

Cores 10 to 19*:* 3472-3521 ft.
1 ins. diameter core (full diameter preserved).
Examined 15th October 1998

MONTNEY FM
Badly broken into small core fragments. Interbedded sandstone-mudstone. Difficult to see details.

Core 20*:* 3521-3541 ft.
Standard diameter core (full diameter preserved).
Examined 15th October 1998

MONTNEY FM
Predominantly very fine to fine grained sandstone with clay interlaminae and some thin mudstone interbeds. A typical beds consists of the following vertical succession: abrupt, ?erosional base - planar laminated sandstone - gradational change into current-ripple laminated sandstone, commonly deformed (some beds capped by mudstone).
Units are 20 cm to 1 m thick; most are 30 to 45 cm thick.

Cores 21 to 27*:* 3541-3581 ft.
1 ins. diameter core (full diameter preserved).
Examined 15th October 1998

MONTNEY FM
Interbedded sandstone and mudstone; mostly sandstone

Core 28*:* 3714-3749 ft.
1 ins. diameter core (full diameter preserved).

MONTNEY FM
Light grey mudstone with some minor amounts of sandstone near top of core.

Part 3: northeast British Columbia, Townships 77 to 85W6

CONTENTS

Esso Bisette 12-3-77-16W6
Core 9: 2529.07-2539.32 m Rec. 8 m. 7 boxes. Slabbed
Core 10: 2539.32-2547.57 m Rec. 8.25 m. 6 boxes. Slabbed
Core 11: 2547.57-2550 m Rec. 1.33 m. 1 box. Slabbed.
Examined between 21-24 September 1999

CHARLIE LAKE FM

2529.07-2534 m	Mudstone-dolomudstone: light and dark grey mottled to banded appearance. One bed of coarsely laminated dolostone (yellowish grey colour) at about 2533.3 m. Scattered throughout are uneven beds. Appears to be disrupted to load deformed. Basal contact not preserved.

HALFWAY FM

2534-2537.07 m	Sandstone: predominantly fine grained. Massive or with low angle cross beds.
2537.07-2539.32 m	Missing core
2539.32-2547.57 m	Sandstone: mostly fine grained, locally occurring beds with medium or coarse grains. Upper 1.5 to 2 m is massive with some low-angle cross beds, underlain by 1.7 to 1.9 m of load deformed, thinly bedded, laminated sandstone with very thin interbeds of mudstone. Lower part of interval consists of fine to coarse grained beds. Interval contains porous horizons.
2547.57-2548.9 m	Sandstone-mudstone: thin to thick beds of very fine to fine grained, laminated sandstone interlaminated to interbedded with mudstone.
2548.9-2550 m	Missing core.

Dome et al Doe 1-12-80-14W6
Core 1: 1629.2 - 1647.4 m. 13 boxes
Core 2: 1647.4 - 1661.2 m. 10 boxes
Full diameter. Well preserved
Examined 28th June 2005

CHARLIE LAKE FM

1629.2 - 1629.84 m	Dolostone: thin interbeds of anhydrite. Basal contact not preserved but there is a abrupt facies change.
1629.84 - 1630.74 m	Anhydrite: white to light grey. Crudely bedded - minor deformation. Abrupt basal contact.
1630.74 - 1631.86 m	Mudstone-siltstone: several abrupt-based intervals of mudstone and siltstone, one of which is capped by anhydritic mudstone Units vary from finely laminated to burrowed, with dolomite mottling in places. Abrupt basal contact.
1631.86 - 1632.28 m	Anhydrite: light to medium grey. Crystalline. Abrupt basal contact.
1632.28 - 1634.46 m	Sandstone: very fine to fine grained. Lower half has reddish tint, upper half is light grey. Sedimentary structures not obvious but lower half appears to be disrupted to deformed. Some horizontal burrows in top third. Interval may consist of several beds - some indications of internal erosion surfaces. Basal surface not well defined - could be rapidly gradational.

1634.46 - 1634.71 m Mudstone: silty and dolomitic. Reddish colour. Mottled fabric in lower half. Abrupt basal contact.

1634.71 - 1635.07 m Anhydrite: light grey on outer core surface, dark grey on fresh surface. Very finely crystalline. Abrupt basal contact.

1635.07 - 1635.33 m Mudstone: red. Laminae of silt, dolomite and anhydrite, and some disrupted very thin beds. Diffuse basal contact.

1635.33 - 1635.95 m Dolostone/argillaceous dolostone: very finely crystalline. Slightly mottled. Abrupt, undulose basal contact covered with a mm-thick clay layer.

1635.95 - 1636.17 m Anhydrite: crystalline. White on outer core surface, light brownish grey on fresh surface.

Fort St John Mbr

1636.17 - 1642.07 m Sandstone: dolomitic. Very fine grained. Light grey. Multiple beds. Some thin interbeds of dolostone in lower 1 m. Variety of sedimentary structures ranging from horizontal laminae, ripple laminae and very low angle cross laminae. Dolomite/anhydrite mottling scattered throughout interval. Burrows present but not very common - a long very thin burrow present in top-third of interval. Basal contact not very clear.

1642.07 - 1642.53 m Sandstone-mudstone: thin to thick beds of very fine grained sandstone separated by silty-sandy, laminated mudstone. Abrupt basal contact.

?Base of Fort St John Mbr

1642.53 - 1642.97 m Anhydrite-dolostone: coarsely interlaminated to thinly interbedded. Minor deformation of anhydrite. Basal contact not preserved.

1642.97 - 1645.73 m Sandstone: dolomitic; very fine grained; light grey. Argillaceous in places. Multiple units - several significant erosional surfaces are present. Sedimentary structures not readily seen - some intervals of fine laminae. Abrupt basal contact.

1645.73 - 1647.02 m Anhydrite: several beds separated by chemically eroded surfaces. Top few cm marked by enterolithic anhydrite, Remainder of interval coarsely laminated. Abrupt basal contact.

1647.02 - 1647.67 m Dolostone: very finely crystalline. Light to medium grey. Massive throughout most of interval, grading up into coarse laminae in top 15 cm. Abrupt basal contact.

1647.67 - 1647.85 m Anhydrite: White on outer core surface; medium to dark grey on fresh surface. Crystalline. Abrupt basal contact.

1647.85 - 1651.73 m Dolostone: very finely crystalline/dolomicrite. Sandy in places. Mottled to disrupted fabric in places; massive in others. A few places where fine to coarse laminae are preserved. One thin (few cm) interbed of anhydrite near base of interval.

1651.73 - 1652.13 m Anhydrite: Crudely bedded. Basal contact not preserved.

1652.13 - 1656.53 m Dolostone: Similar to above. A zone of thin anhydrite beds 53 to 68 cm above base. Dolostone below the anhydrite has a very disrupted fabric. Basal contact may be either abrupt or rapidly gradational.

1656.53 - 1657.63 m Anhydrite: light grey on outer core surface, dark grey on fresh surface. Internal structure not readily seen. Abrupt basal contact.

1657.63 - 1661.2 m Dolostone: similar to above. Mottled in upper third; generally massive in lower two-thirds.

1-12-80-14W6

Fort St. John Mbr

Charlie Lake Fm: enterolithic anhydrite

Champlin Two Rivers 14-32-82-16W6
Core 1: 4284 - 4335 ft. 7 boxes. Full diameter. Well preserved.
Examined 14th September 2004

CHARLIE LAKE FM

4284 - 4292' 9"	Dolostone: very finely crystalline; argillaceous. Mottled appearance - some may be due to bioturbation. Abrupt basal contact.
4292' 9" - 4293' 9"	Anhydritic dolostone: dark grey with light grey lenses and spots of anhydrite. A thick bed of anhydrite at base of interval.
4293' 9" - 4298' 11"	Dolostone: mottled (as above). Abrupt basal contact.
4298' 11" - 4301' 2"	Dolostone-anhydrite: crudely interlaminated to very thin interbeds. Some of laminated beds may be stromatolites. Spotted in places due to presence of small replacement anhydrite nodules in dolostone beds. Abrupt basal contact.
?Siphon Mbr	
4301' - 4302' 1"	Sandstone-mudstone: interlaminated to very thin interbeds. Horizontal and very low-angle ripple laminae. Minor bed distortion in lower 2-3 cm. Rapid transitional basal facies change.
4302' 1" - 4307' 9"	Sandstone: fine grained. Light to medium grey. Spotted fabric due to incipient anhydrite cement. Anhydrite cementation/replacement is more pervasive near base of interval. Basal contact not preserved.
4307' 9" - 4311'	Dolostone: light grey. Very finely crystalline. A few irregular clay laminae.
4311 - 4311' 6"	Dolomitic anhydrite
4311' 6" - 4313' 1"	Dolostone-argillaceous dolostone: crudely bedded - probably distorted.
4313' 1" - 4335'	Missing core

Core 2: 5000-5025 ft.
Rec. 25 ft (actually measured 26 ft of core). 6 boxes. Full diameter.
Core 3: 5026-5040 ft.
Rec. 14 ft. 3 boxes. Full diameter.
Examined between 21-24th September 1999.

CHARLIE LAKE FM

5000-5022' 4"	Dolomudstone: yellow grey. Finely crystalline. Unevenly bedded to patchy appearance. A few thin zones of coarse laminae. Basal few cm brecciated and rests abruptly on underlying bed.
HALFWAY FM	
5022' 4"-5024' 5"	Sandstone: medium grained with some locally occurring coarse grains. Light grey. Massive. Vague indications that bed is severely load deformed. Erosional basal contact.
5024' 5"-5025' 10"	Sandstone: medium to coarse grained. Upper 2 ins. Consists of finely interlaminated sand-clay. Erosional basal contact.
5025' 10"-5027 ft	Sandstone-mudstone: finely interlaminated. Mostly planar laminae. A few burrowed beds.

5027-5039 ft	Sandstone: fine to medium grained. Calcareous in places. Low to medium angled cross beds. Basal contact not preserved.
5039-5040 ft	Sandstone: very fine grained. Irregular wisps/stringers of clay.

14-32-82-16W6 Interval 4298’ 11” - 4301’ 2”

14-32-82-16W6 Interval 4301’ 2” - 4307’ 9”

Wainoco Two Rivers 16-34-82-16W6
Core 1: 1418.4-1430.8 m 9 boxes. Full diameter. Moderate to good preservation.
Examined 23 September 2003

HALFWAY FM

1418.4-1426 m	Sandstone: fine to medium grained. Light to medium grey. Mostly cross bedded with a few thin intervals of deformed bedding. Lower 60-75 cm is dark grey. Basal 10-15 cm contains isolated coarse grains usually present along bedding planes. Basal contact not preserved - core badly broken.
1426-1429 m	Sandstone: predominantly fine grained. Light grey. A few thin intervals of finely interlaminated mud and sand between sandstone beds. Some deformation. At least two intervals with low angle cross beds.
1429-1429.14 m	Sandstone-mudstone: upper two-thirds consists of sandstone lenses separated by clay; lower third mostly mudstone. Gradational base.
1429.14-1429.62 m	Sandstone: light grey. Very fine grained with scattered patches and isolated occurrences of medium and coarse grains of black chert.

NOTE: possible major erosion surface occurs at 1426 m, but poor preservation of core at this depth makes it difficult to confirm

Core 2: 1446-1464.2 m
13 boxes. Full diameter. Well preserved
Examined 23 September 2003

HALFWAY FM

1446-1460.6 m	Sandstone: predominantly fine grained. Light to medium grey. Low angel cross beds throughout - probably multiple beds. Scattered mud laminae and a few beds with mud-chip clasts. Tendency for lower beds to contain more mud laminae.
1460.6-1463.1 m	Sandstone-mudstone: Very fine grained, thickly bedded, finely laminated sandstone. Interbedded with very thin bed s (few cm)and laminae of sand laminated mudstone. Some mud laminae are deformed.
1463.1-1464.2 m	Sandstone: light grey. Fine grained. Scattered mud laminae.

16-34-82-16W6

Interval 1429 - 1429.62 m

Interval1429.14 - 1429.62 m

Westcoast Long Lac Gk Boundary 10-19-83-13W6
Core 1: 1465-1482 m Rec. 17 m. 11 boxes. Full diameter.
Examined between 21-24th September 1999

CHARLIE LAKE FM

1465-1466.3 m	Dolostone: medium to dark grey. Very finely crystalline. Coarsely laminated to massive. Calcite-filled fractures. Basal contact not preserved.

HALFWAY FM

1466.3-1467.8 m	Sandstone: very fine to fine grained. Top 40 cm consists of finely laminated sandstone with some clay laminae - defines low-angle cross beds and in a few places current-ripples. Laminated beds rest abruptly on underlying sandstone. Lower part of interval is coarsely laminated to massive. Basal contact not preserved.
1467.8-1468.8 m	Coquinal sandstone: Fine to medium grained sandstone with ?bivalve clasts. Interval has two distinct horizons - the lower is dominated by bivalve clasts, the upper is predominantly sandstone with scattered bivalve clasts. Difficult to tell is the subdivisions are two separate beds or a fining-upward, single bed. Base of interval is an erosional surface.
1468.8-1468.94 m	Sandstone: very fine to fine grained with a few scattered bivalve clasts near the base. Some clay in upper 2 cm. Sub-horizontal bedding. Abrupt basal contact.
1468.94-1469.74 m	Sandstone: very fine grained. Current-ripple laminae.
1469.74-1469.86 m	Mudstone-sandstone; interlaminated to very thinly interbedded. Very fine grained sandstone. Minor load deformation structures.
1469.86-1471.86 m	Sandstone: fine to medium grained. Light grey. Massive appearance - vague indications of planar beds. Possibly consists of several beds.
1471.86-1473.22 m	Sandstone-mudstone: dark grey. Coarse laminae to medium beds; some lenticular sandstone beds in the more muddy portions. Minor load deformation structures. A few sub-vertical and horizontal burrows.
1473.22-1475.37 m	Sandstone: very fine to fine grained. Thin to medium beds separated by zones of very thinly interbedded sandstone-mudstone. Traces of planar bedding. Load deformation structures are common.
1475.37-1475.9 m	Mudstone-sandstone: finely interlaminated with some lenticular beds of current-ripple laminated sandstone. Beds are slightly load deformed. Basal contact not preserved.
1475.9-1476.36 m	Sandstone: fine grained. Light grey. Massive. Abrupt basal contact.
1476.36-1476.89 m	Sandstone: very fine grained. Uneven and wispy laminae of clay.
1476.89-1482 m	Sandstone: very fine grained. Light grey. Generally massive. Some zones with clay laminae.

NOTE: possible major erosion surface at 1468.8 m

Champlin et al Two Rivers 6-9-83-16W6
Core 1: 4190-4227 ft 8 boxes. Full diameter. Well preserved.
Examined 23 September 2003; 16th September 2004, and 28th June 2005 (latter date photographed full core).

CHARLIE LAKE FM

4190'- 4195 ‘	Dolostone: argillaceous. Light grey on fresh surface. Mottled grey and brownish red on outer core surface. Upper 1.25 ft contains fine mud laminae. Below which the remainder of interval appears to be deformed. Possibly some sand in places. Basal contact not preserved.
4195'- 4196'	Anhydrite: light to medium grey. Abrupt basal contact.
4196'- 4201' 10"	Sandstone: outer core surface mottled grey and brownish red; fresh surfaces tend to be light grey. Very fine grained grading up into argillaceous sandstone/sandy mudstone. Mottled to disrupted fabric. A few mm of black shale at base of interval
4201' 10"- 4203' 3"	Dolostone/anhydrite. Outer core surface is yellowish brown; fresh surface brownish grey. Difficult to discern any fabric because of milling on core surface
4203' 3"- 4204' 1"	Interlaminated dolostone-anhydrite: white anhydrite; grey dolomite. Coarsely laminated to very thinly bedded. Highly deformed with brecciated beds in uppermost part of unit. Top of interval contains a 1 cm thick black mudstone layer. Basal contact poorly preserved.
4204' 1"- 4204' 9"	Dolostone: very finely crystalline. Brownish grey. Finely laminated - horizontal to slightly uneven. Abrupt basal contact.
4204' 9"- 4206' 6"	Anhydrite: off-white to yellowish white. Dolomitic. Small nodular clusters Brecciated in parts. Abrupt basal contact.
4206' 6"- 4207' 1"	Dolostone: yellowish brown on outer surface; grey on fresh surface. Very finely crystalline. Small (mm-scale vugs). Some fine clay laminae. May be deformed. Abrupt basal contact.
4207' 1"- 4207' 2"	Shale: dark grey; silty.
Siphon Mbr	
4207' 2"- 4208' 4"	Sandstone: very fine to fine grained. Light grey to yellowish grey. Dolomitic. Mottled. Possibly bioturbated. Argillaceous.
4208' 4"- 4209' 4"	Sandstone: medium grey. Yellowish grey on outer surface. Dolomitic.
4209' 4"- 4221' 5"	Sandstone: dark brown to light brownish grey (possibly due to oil stain). Fine to medium grained. Mottled fabric. Vague hints of cross bedding. Contact with underlying dolostone obscured by dolomitization ; basal part of sandstone very dolomitic. Base is chosen at a color change.
4221' 5"- 4223 ‘	Dolostone: brownish grey. No obvious sedimentary structures.
4223 - 4227'	Missing core

6-9-83-16W6
Core 1 4190 - 4227 ft

Top

Bottom

Arrow indicates approx. base of Siphon Mbr

Top of Siphon Mbr indicated by arrow

6-9-83-16W

Upper part of interval
4190’ - 4195 ft

Basal contact of interval
4196’ - 4201’ 10”

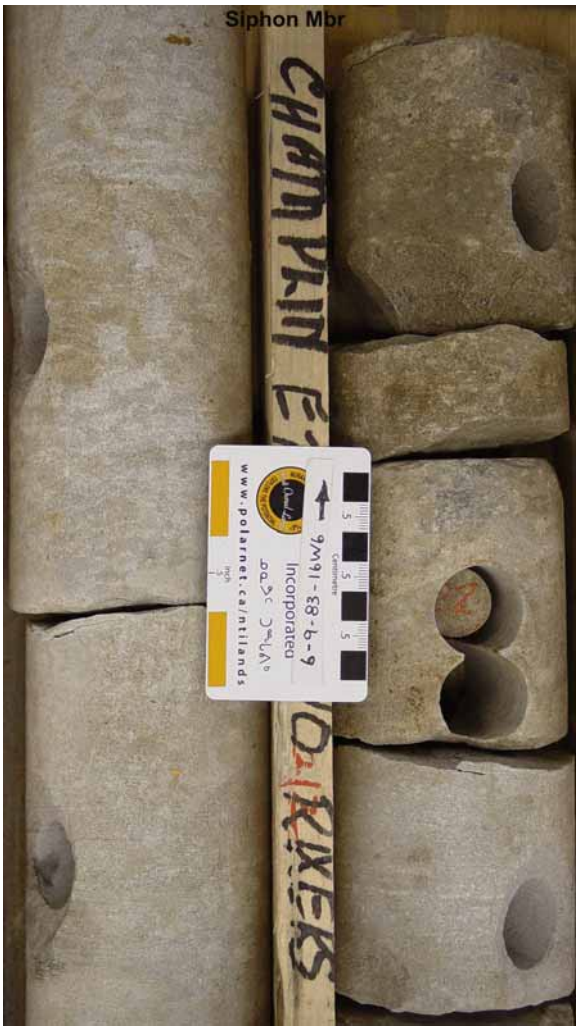
Spans interval 4203’ 3” to 4206’ 6”

6-9-83-16W6

Top of the Siphon Mbr

Mottled sandstone of the Siphon Mbr (probably due to anhydrite/dolomite cementation). Interval 4207' 2" - 4208' 4"

6-9-83-16W6



Sandstone of the Siphon Mbr
Interval 4209’ 4” - 4221’ 7”

Base of Siphon Mbr - difficult to identify accurately because of dolomitization of the Siphon sandstone

Dome et al Wilder 6-35-83-20W6
Core 1: 4782-4842 ft. Rec. 60 ft. 13 boxes. Full diameter.
Examined between 21-24th September 1999

CHARLIE LAKE FM

4782-4788' 6"	Mudstone-sandstone-siltstone: Mottled appearance due to intense mixing of lithotypes by load deformation. A few remnants of planar laminated beds. Basal contact not preserved.
4788' 6"-4790' 5"	Dolomudstone: light grey with irregular patches of medium grey. No visible sedimentary structures. Abrupt, gently undulose basal contact.
4790' 5"-4791' 1"	Sandstone: medium grained. Dark grey to bluish-black - colour may be due to presence of black chert and/or phosphatic grains. Abrupt, slightly load deformed basal contact.
4791' 1"-4812' 7 "	Mudstone-sandstone-siltstone: mostly intensely deformed mudstone with lenses and blebs of sandstone/siltstone. A few in situ sandstone beds up to 6 ins. thick. Mudstone appears to be dolomitic.
4812' 7"-4815' 2"	Dolostone: very finely crystalline. Light grey. Fine to coarse, undulose laminae. Some laminae are slightly contorted to mildly brecciated. Some of coarser laminae may be anhydrite. Basal contact diffuse due to replacement of upper few centimetres of underlying bed by dolomite.

HALFWAY FM

4815' 2"-4842 ft	Sandstone: fine grained (quartz and some black chert). A few horizons of cross beds. Porous.

Imperial Pacific Alces 3-30-84-14W6
Cores 5 to 9: 4040 - 4173 ft
Core 5: 5 boxes. Core 6: 4 boxes. Core 7: 6 boxes. Core 8: 6 boxes. Core 9: 11 boxes. All full diameter and well preserved.
Examined 16th September 2004

CHARLIE LAKE FM
"2nd Brown Unit"

4040- 4041' 6"	Mudstone: contains irregular lenses to very thin beds of silty dolostone.
4041' 6"- 4045' 9"	Sandstone: very fine grained; dolomitic. Anhydrite-filled fractures near base of interval. About mid-way through interval there is a zone containing lenses of anhydrite. Diffuse basal contact.
4045' 9"- 4047' 5"	Anhydrite-dolostone-dolomitic sandstone: grades up from anhydrite to dolostone to dolomitic sandstone. Diffuse, poorly defined basal contact
4047' 5"- 4048' 5"	Dolostone: light grey; very finely crystalline. No visible sedimentary structures. Transitional basal contact.
4048' 5"- 4050' 2"	Anhydrite: light grey; crystalline. Abrupt basal contact.

"2nd Brown Unit"

4050' 2"- 4053' 5"	Dolomitic mudstone: light grey. Lenses of very fine grained sandstone. Abrupt colour change at base.
40530' 5"- 4059' 7"	Dolomitic siltstone: Oil stained. Bedding tends to be obscured by stain but

	where seen it is uneven and disrupted. Basal contact not preserved.
4059' 7"- 4123' 10"	Dolomitic mudstone/dolomudstone: interbeds of very fine grained sandstone and coarse grained siltstone. Variable dolomitization imparts mottled look. Zones of vertical, anhydrite-filled fractures. Basal contact is erosional and is overlain by a thin unit of medium to coarse-grained sandstone with a few scattered small granules.
"Pink Unit"	
4123' 10"- 4134' 8"	Anhydrite: light grey; crystalline. Oil stained in top 20". Abrupt basal contact.
4134' 8"- 4135' 4"	Mudstone/silty mudstone: brown coloured. Finely laminated. General coarsening-upward aspect - upper part of interval has more very thin beds and coarse laminae of sandstone. Abrupt basal contact marked by a mm-thick black clay layer.
4135' 4"- 4137' 2"	Anhydrite: upper 5" interlaminated with mudstone. Abrupt basal contact.
4137' 2"- 4137' 10"	Interlaminated to very thinly interbedded mudstone-anhydrite: Brick-red colour. Rapidly transitional basal contact.
4137' 10"- 4148' 4"	Anhydrite: light grey; crystalline.
4148' 4"- 4151' 6"	Anhydrite: oil stained. Dark brown. Abrupt basal contact.
"Yellow Unit"	
4151' 6"- 4165' 11"	Interbedded sandstone-mudstone-dolomudstone: Anhydrite-filled horizontal to low-angle fractures throughout interval. Very fine grained sandstone. Oil stained in upper 40", and contiguous with stain in overlying anhydrite. Also oil stained between about 4158-4162 ft. Basal bed is a 1 cm thick anhydrite bed.
4165' 11"- 4170' 7"	Interbedded mudstone-sandstone: Brick-red and grey mudstone beds. Very fine grained sandstone. Anhydrite-filled fractures. Ripple forms in some sandstone beds. Abrupt basal contact.
4170' 7"- 4173'	Interbedded dolomitic mudstone-sandstone: thin to thick beds. Scattered thin (1 cm) beds of anhydrite.

NOTE: Roy (1972 - Bulletin of Canadian Petroleum Geology) described the basal bed of the 2nd Brown unit as a "conglomerate" - this seems to overstep the definition; the bed contains mostly medium to coarse grains with only a few scattered small granules. However, the importance Roy placed on this bed - an unconformity (i.e., Boundary unconformity) - is still valid.

Interval 4165’ 11” - 4170” 7”

Mottled sandstone in
interval 4059’ 7” - 4123’ 10”

Base of “2nd Brown Unit”
(i.e., Boundary unconformity)

Encal et al Cecil 9-20-84-17W6
Core 1: 1250-1258 m 6 boxes. Full diameter. Well preserved.
Examined 24 September 2003
Log depths appear to be about 1 m shallower than corresponding core depth.

CHARLIE LAKE FM

1250-1253.47 m	Dolostone: very finely crystalline. Mottled fabric - light grey/white and brownish red coloration. Scattered large pyrite crystals. Anapparent abrupt basal contact.
Cecil Mbr	
1253.47-1256.37 m	Sandstone: very fine grained. Vague remnants of near-horizontal bedding. Extensively oil stained except for top 12 cm and basal 1 m. Immediately underlying the oil stained sandstone there is 50 cm of patchily to nodular development of dolomite/anhydrite cement. Similar nodules also present in parts of the oil stained sandstone. Oil staining gives an earthy brown color to sandstone. Basal contact is partially obscured by dolomitization, but appears to be abrupt.
Base of Cecil Mbr	
1256.37-1257.65 m	Dolostone: similar to above.

9-20--84-17W6

Interval 1253.47 - 1256.73 m
Oil stained Cecil Mbr. Core piece from near top of member

Interval 1253.47 - 1256.73 m
Oil stained Cecil Mbr

Interval 1253.47 - 1256.73 m
Unstained Cecil Mbr with incipient anhydrite cement

Interval 1253.47 - 1256.73 m
Oil stained Cecil Mbr. resting on stained dolostone (arrow)

Scurry Rainbow Scurry Cego Eagle 8-10-84-18W6
Core 1: 1861-1878.75 m 13 boxes. Full diameter. Well preserved.
Examined 23 September 2003

MONTNEY FM - basal beds
Dark grey to black silty shale. Fine silt laminae. Small silt lenses. Minor load deformation of lenticular beds. Amount of silt laminae increases up-section.

Scurry Cego Eagle 15-25-84-18W6
Core 1: 1271 -1 283 m 8 boxes. Slabbed. Well preserved.
Examined 14th September 2004

CHARLIE LAKE FM

1271 - 1277.43 m	Mudstone: silty-sandy. Earthy grey with some maroon-tinted beds in middle of interval. Disrupted bedding - could be bioturbation, but looks more like soft sediment deformation.. Lenticular beds of silt/sand. Some coarse laminae. Abrupt basal contact. PHOTO
Cecil Mbr	
1277.43 - 1277.48 m	Sandstone-argillaceous sandstone: Very thin (1-2 cm). Irregular beds of very fine grained sandstone separated by argillaceous sandstone. Minor deformation. Light grey.
1277.48 - 1279.18 m	Sandstone: Oil stained. Dark grey to brown. Fine grained. With abundant "spots" of anhydrite cement. Vague indications of low-angle cross beds. Basal contact obscured by dolomitization. PHOTO
Base of Cecil Mbr	
1279.18 -1280.38 m	Dolomitic sandstone: very fine to fine grained. Argillaceous. Disrupted fabric - possibly burrowed, but mostly soft sediment deformation. Gradational facies change from underlying unit.
1280.38 - 1283 m	Sandstone: as above but more argillaceous.

Total Bear Flat 12-24-84-21W6
Core 1: 1654-1669 m 11 boxes. Full diameter. Well preserved.
Examined 23 September 2003

DOIG FM (cored in a "thick" Doig sandstone interval)
Entire core consists of argillaceous sandstone to very sandy mudstone, mostly occurring as finely interlaminated sand and mud. Common occurrences of deformed bedding. Vertical and horizontal burrows throughout interval. Dark grey color. Individual beds tend to be thin (a few centimeters) with a few thicker beds. Ripple laminae in places.

12-24-84-21W6
DOIG FACIES

Ripple laminae

Burrows

Burrows and ripple laminae

Southern Production No. B-14-1, 1-12-84-23W6 (Type section of the Halfway Fm)
Core 10: 5026-5036 ft Rec. 10 ft. 2 boxes. Full diameter.
Core 11: 5036-5061 ft Rec. 25.4 ft. 6 boxes. Full diameter.
Core 12: 5061-5071 ft. Rec. 10.5 ft. 3 boxes. Full diameter.
Core 13: 5071-5121 ft Rec. 51.5 ft. 11 boxes. Full diameter.
NOTE: cores 12 and 13 share one box.
Core 14: 5121-5169 ft. Rec. 48.3 ft. 10 boxes. Full diameter.
Examined between 21-24th September 1999

General Comment: Lower part of cored interval is coarsening-upward succession overlain by a thick interval dominated by sandstone. Latter consists of thin to thick fining-upward beds with a few scattered very thick sandstone beds. The lowest of these fining-upward units is thicker than succeeding fining-upward units.

HALFWAY FM

5026-5033 ft	Sandstone: fine to medium grained. Appears to be a single unit. Massive to vague planar beds. Brownish grey in places. Abrupt basal contact.
5033-5061 ft	Sandstone-argillaceous sandstone: Fine grained. A series of fining-upward units, 1 to 2 ft thick . Units consist of massive or cross bedded (low angle) sandstone grading up into a few inches of crudely interlaminated sand-clay. Some load deformation structures, especially in clay-rich zones.
5061-5064' 9"	Sandstone: fine grained. Cross bedded throughout. Probably a single unit.
5064' 9"-5085 ft	Sandstone: medium to thick fining-upward units (cf. 5033-5061 ft).
5085-5103 ft	Sandstone: fine grained - slightly coarser grained in lower part of interval.. Cross bed sets. Probably consists of several units - there is at least one very thick unit within the interval. Clay laminae doublets in some cross bed sets suggest tidal influence. Basal contact appears to be erosional.
5103-5115 ft	Sandstone: thin to thick, fining-upward units. Each unit consists of fine grained sandstone grading up into argillaceous sandstone or finely interlaminated sand-clay.
5115-5121 ft	Sandstone: at least three fining-upward units of fine to coarse grained sandstone. Abundant black chert. Black chert and coarser grain size differentiates this unit from overlying interval.
5121-5129' 6"	Sandstone: fine grained. At least three fining-upward units. Cross bedded sandstone. Bivalve molds in top 1 ft.
5129' 6"-5141 ft	Sandstone: thin to thick fining-upward units. Mostly fine grained except in basal 1 ft where coarse grains are present. Most units grade up into interlaminated sand-clay. Basal unit appears to rest erosionally on underlying strata.
5141-5169 ft	Mudstone-sandstone: mudstone-dominant lower part grading up into argillaceous sandstone in upper part. Dark grey to black. Very fine to fine grained sandstone. Fine laminae to very thin interbeds; a few lenticular sandstone beds. Abundant load deformation structures.

1-12-84-23W6
DOIG FACIES

1-12-84-23W6

HALFWAY FM

DOIG FM

1-12-84-23W6
Halfway Facies

Burrows

Cross beds

Medium-grained sandstone on erosion and bedding planes

Possible clay doublets

Primewest Boundary 8-12-85-13W6
Core 1: 1286.9 - 1293 m. 5 boxes. Full diameter. Well preserved
Examined 16th September 2004

COMMENT: log depth for top of Boundary Member is at 1289 m but there are no distinct changes at this depth in the core. Either a) a strong possibility that log/core depths mismatch - core would have to be about 2.5 m lower, placing the entire core in the Boundary Mbr, or b) the top of the Boundary Mbr is at core depth 1289.54 m

1286.9-1288.14 m	Dolostone: oil stained. Very finely crystalline. Stain makes it difficult to see any internal features.
1288.14-1288.24 m	Dolostone: finely laminated; partially oil stained
1288.24- 1289.54 m	Dolostone: oil stained. Small vugs scattered throughout interval. Difficult to see any features.
1289.54-1290.86 m	Dolostone: light grey; finely laminated with some clay laminae. Abrupt colour change against underlying unit,
1290.86-1292.06 m	Dolostone: oil stained. Similar to other oil stained intervals. Abrupt colour change against underlying unit
1292.06-1292.3 m	Dolostone: brownish grey - gradual colour change from underlying unit. No apparent sedimentary features.
1292.3-1293 m	Dolostone: oil stained.

Esso Unit Boundary 11-17-85-13W6
Core 1: 1292 - 1299 m 5 boxes. Slabbed. Mid-part of core broken into small segments
Core 2: 1299 - 1302.8 m 3 boxes. Slabbed. Well preserved
7 cm diameter core. A large number of core pieces have been removed and replaced with equivalent length of cardboard.
Depths below 1294.3 m may be inaccurate.
Examined 15th September 2004

CHARLIE LAKE FM
"2nd Brown Unit"

1292 - 1294.3 m	Dolostone: silty-sandy. Light grey. Very finely crystalline. Faint silty beds are mildly deformed. Abrupt basal contact.
Boundary Mbr	
1294.3 - 1299.3 m	Bioclastic/pelletal dolostone: alternating oil stained and non-stained intervals. No apparent difference in lithology between the stained/non-stained intervals - although a few of the non-stained zones appear to be less porous. Horizontal to very low angle bedding; a few thin, finely laminated intervals. Top 24 cm has a disrupted fabric. Base not preserved probably present in removed core piece.
1299.3 - 1300.25 m	Dolostone: very finely crystalline. Light grey. Mm-scale to 10 cm thick dolostone beds separated by clay laminae. Horizontal bedding. A few styolites. Abrupt basal contact.
1300.25 - 1301.35 m	Dolomudstone-anhydrite: two intervals of thinly bedded anhydrite.

	Alternating oil stained and non-stained intervals.
1301.25 - 1302.8 m	Missing core

11-17-85-13W6

Interval 1292 - 1294.3 m

Contact between the "2nd Brown Unit" and the Boundary Mbr

Interval 1294.3 m - 1299.3 m

Interval 1299.3 m - 1300.25 m

Imperial Pacific Boundary 16-17-85-13W6
Core 1: 4250 - 4306 ft. 12 boxes. Slabbed. Well reserved.
Examined 16th September 2004

CHARLIE LAKE FM
"2nd Brown Unit"

4250- 4255' 6"	Mudstone: dolomitic, silty. Light grey. At least 4 units. Basal contacts of upper 3 units are severely load deformed; basal contact of lowermost bed is planar. Some displacive anhydrite present at a few horizons. Internal structures are vague and indicate presence of horizontal and distorted bedding.
4255' 6" - 4264' 1"	Mudstone: silty; dolomitic; light grey. Vaguely bedded. Transitional basal facies change.
4264' 1"- 4273' 4"	Mudstone: similar to overlying interval but bedding is better defined - horizontal with some uneven beds. Brownish grey in places. Probable abrupt basal contact.
4273' 4" - 4285' 6"	Mudstone: similar to above but bedding is poorly defined. Some very thin interbeds of very fine grained sandstone. Basal contact is abrupt and is overlain by about 16" of mudstone with irregular patches of replacement anhydrite.
Boundary Mbr	
4285' 6" - 4290'	Mudstone: better defined bedding than overlying mudstone. Minor displacive anhydrite. Abrupt basal contact overlain by a thin layer of anhydrite or anhydritic dolostone containing a few small shell fragments. Latter separated from underlying unit by a mm-thick clay layer.
4290' - 4291' 9"	Dolomudstone: very thin to thin beds. Scattered clay laminae. Abundant styolites. A few small anhydrite nodules. Possible one anhydrite-filled shell. Abrupt basal contact.
4291' 9" - 4292' 1"	Pelletal dolomudstone: porous. Oil stained. Basal contact not preserved. PHOTO - includes top of underlying unit.
4292' 1" - 4292' 3"	Dolostone: finely laminated. Oil stained Basal contact not preserved.
4292' 3" - 4293' 1"	Pelletal dolostone: vuggy porosity. Oil stained. Some vertical fractures. Abrupt basal contact.
4293' 1" - 4294' 1"	Dolostone: finely laminated - irregular and undulose; could be stromatolites. Oil stained. Some vertical fractures.
4294' 1" - 4295' 9"	Interbedded pelletal dolostone-dolomudstone: very thin to thin beds. Probable bird's eye porosity/fabric. Abrupt basal contact.
4295' 9" - 4296' 3"	Dolomudstone: finely laminated to very thinly bedded. Basal contact not preserved.
4296' 3" - 4298'	Pelletal dolostone: poorly defined bedding. Vuggy porosity (mm-scale vugs). One 3 cm anhydrite nodule near base. Basal contact not preserved.
4298' - 4299' 7"	Dolomudstone: fine to coarse, uneven and undulose laminae with some local , minor distorted laminae (possible stromatolites) . Abrupt basal contact4299' 7" - 4302' Dolomudstone: thin to thick beds separated by mm-thick clay layers. No visible sedimentary structures.

4302' - 4306'	Missing core

16-17-85-13W6

Interval 4250 - 4255’ 6”

Interval 4273’ 4” - 4285’ 6”

Interval 4285’ 6” - 4290”
Boundary Mbr

16-17-85-13W6

Interval 4292’ 1” - 4292’ 3”

4291’ 1”

Interval 4291’ 9” - 4292’ 3”

Interval 4294’ 1” - 4295’ 9”

Interval 4298’ - 4299’ 7”

Texaco Boundary Lake 2/6-29-85-13W6
Core 1: 1391-1409.2 m Rec. ? 13 boxes. Slabbed.
Examined between 21-24th September 1999

CHARLIE LAKE FM

1391-1395.6 m — Mudstone: brownish grey with patches/bands/wisps of light grey material. Dolomitic. Crude planar bedding with some areas that appear to be contorted. Near base of interval there is an 18 cm-thick brecciated mudstone. Abrupt basal contact.

1395.6-1395.81 m — Dolostone-dolomitic sandstone: light grey. Details (top-to-base, as follows:

- 6.5 cm very fine grained sandstone with clay partings
- 8.5 cm coarsely laminated sandy dolostone: laminae slightly contorted
- 18 cm dolomitic sandstone: fine grained; massive.
- 7 cm sandy dolostone: slightly contorted fine laminae; abrupt, uneven basal contact
- 5 cm dolostone: highly contorted laminae; abrupt basal contact.

1395.81-1395.88 m — Dolomudstone: brownish grey. Possibly oil stained. Near the upper contact there is an irregular lense (up to1.5 cm thick) of fine to medium grained, dolomitic sandstone. About 5 mm above base there is a black layer about 5 mm thick of indeterminate materia l(possibly organic rich). Abrupt basal contact.

1395.88-1398.94 m — Sandstone-mudstone: predominantly 2 to 2.5 cm-thick beds of very fine grained, laminated sandstone separated by clay laminae or very thin beds of mudstone. Planar laminae common in clay-rich beds. One vertical burrow present. Basal beds tend to be load deformed and of fine sand grade.

1398.94-1399.77 m — Mudstone: dark brownish-grey. Probably dolomitic. Appears to be oil stained (colour and odor). Laminae and lenses of silt. Basal 25 cm lacking visible sedimentary structures - has mottled appearance. Basal contact is rapidly gradational.

HALFWAY FM

1399.77-1401.9 m — Coquinal sandstone: Bivalve debris in a matrix of fine to medium grained sand. Abundant moldic porosity. Possibly consists of two beds - division possibly at a zone containing a concentration of mudstone clasts and a slightly finer sand grade. Very small, up to 3 cm long, tabular mudstone clasts are present throughout interval. A large amplitude styolite is present about 45 cm above base of interval. Erosional basal contact.

DOIG FM

1401.9-1404.7 m — Sandstone-mudstone: brownish grey (plus distinct odor suggest oil staining). Interlaminated to thinly interbedded sandstone-mudstone with one 15 cm-thick, cross bedded sandstone. Very fine to fine grained sandstone. Some lenticular beds. Thinner beds have some minor load deformation structures.

1404.7-1407.04 m — Sandstone: very fine grained with coarse grains in basal 15 cm, and some

scattered throughout interval. Slightly argillaceous. Lower half is oil stained; upper half is not. A few vague indications of planar bedding, otherwise lacking sedimentary structures. The few bedding planes and slight variations in grain size suggest multiple beds. Abrupt, slightly load deformed basal contact.

1407.04-1409.2 m Sandstone-mudstone: coarse interlaminae to thin interbeds. Dark grey - appears to be oil stained. Some load deformation structures and a few vertical and horizontal burrows.

NOTE: possible major erosion surface at 1409.1 m

Sorrel Boundary 10-29-85-13W6
Core 2: 1384-1402 m 13 boxes. Full diameter. Well preserved.
Examined 25 September 2003.

CHARLIE LAKE FM

1384-1390.65 m Dolostone/dolomitic mudstone: mottled fabric. Mudstone mostly replaced by dolomite. Light brownish grey. Intensity of mottling varies throughout interval.

1390.65-1390.95 m Dolostone: light brownish grey to off-white. Basal half lacks any obvious fabric but grades up into laminated to very thinly bedded (< 1cm) white dolostone. Abrupt basal contact.

1390.95-1391.02 m Dolostone: white. Fine to coarse planar laminae. Abrupt basal contact.

HALFWAY FM

1391.02-1391.07 m Mudstone: greenish grey. Rapidly transitional basal contact. Photograph

1391.07-1394.13 m Sandstone: very fine grained. Brownish grey. ?Oil stained. Traces of low angle crossbeds in lower part of interval. Rests abruptly on a burrowed surface.

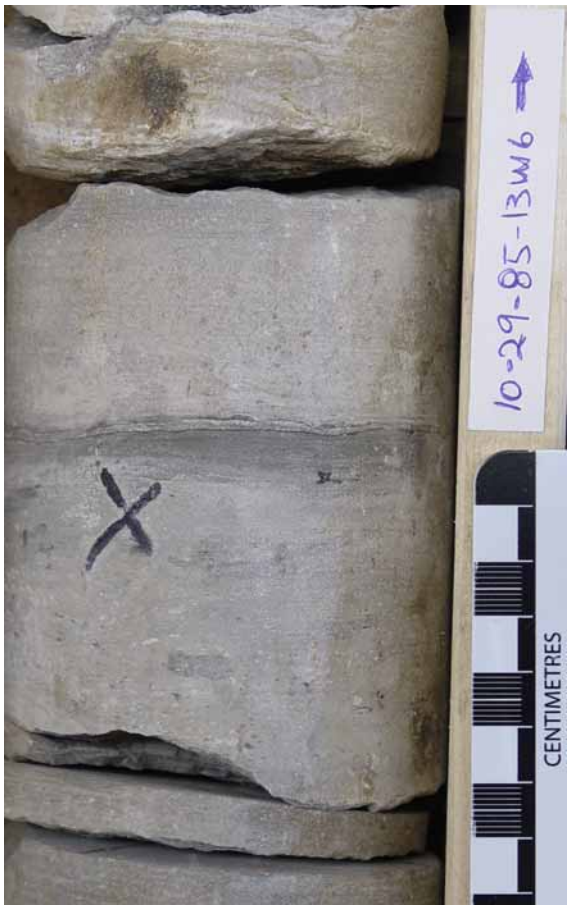
1394.13-1396.55 m Sandstone: very fine grained. Contains several horizons with mud laminae - this suggests interval consists of a number of fining-up beds., but details of bedding are not apparent. Subhorizontal laminae present.

1396.55-1400.41 m Coquinal sandstone: several beds of fining-up coquinal, very fine grained sandstone. Shell-rich parts of beds have moldic porosity.

1400.41-1402 m Sandstone: thin to thick beds separated by argillaceous sandstone zones or mudstone layers. Bed thickness increases up-section. Some soft sediment deformation and a few burrowed horizons.

NOTE: possible major erosion surface at 1394.13 m

10-29-85-13W6



Mudstone layer between the Charlie Lake and Halfway formations (1391.02 -1391.07 m)

Halfway Fm: base of interval1391.07 - 1394.13 m

Texaco et al Boundary 2-30-85-13W6
Core 1: 1386-1404 m Rec.18 m 13 boxes. Full diameter. Well reserved.
Examined 24 September 2003

CHARLIE LAKE FM

1386-1389.2 m	Dolostone: mottled fabric. Argillaceous. Varying levels of mottling - from minor to intense. Most intense in mid part of interval. Brownish grey with slight reddish tint in lower 50 cm. Traces of horizontal bedding. Abrupt basal contact with a mm-thick clay layer.
1389.2-1389.62 m	Anhydrite-dolostone: Upper 9 cm almost entirely white, fine to coarsely laminated anhydrite. Remainder of interval consist of finely interlaminated to very thinly interbedded anhydrite and dolomite. Sub-horizontal bedding with the interlaminated areas commonly contorted. Mm-thick clay layer at base.
1389.62-1389.72 m	Dolostone: fine to coarse, irregular laminae. Small, scattered anhydrite nodules. Abrupt basal contact.
1389.72-1389.73 m	Shale: black

HALFWAY FM

1389.73-1389.92 m	Sandstone: dolomitic, fine to medium grained, with scattered coarse grains of black chert. Extensive dolomite/anhydrite cement. No visible sedimentary structures throughout most of interval - possibly slightly contorted in upper 1 - 4 cm. Basal contact poorly preserved.
1389.92-1390.63 m	Interbedded-interlaminated sandstone-mudstone: 70% very fine to fine grained sandstone. Fine laminae to thin beds. Horizontal laminae - some minor contorted bedding in muddier intervals. Some possible small horizontal burrows in at least one mudstone interval (about 24-36 cm below top of interval - associated with contorted beds). Minor replacement anhydrite (white). Basal bed contains randomly oriented mud clasts in a sand/mud matrix. Abrupt, slightly load deformed basal contact.
1390.63-1392.08 m	Sandstone: very fine grained. Brownish grey. Patches/streaks of dolomite/anhydrite cement. Vague horizontal beds. Abrupt change to underlying facies.
1392.08-1392.82 m	Sandstone: ver fine to fine grained. Extensively replaced by dolomite/anhydrite imparting a mottled to pseudo-breccia appearance.
1392.82-1396.52 m	Sandstone: very fine to fine grained. Patchily developed dolomite/anhydrite replacement - mottles and parallel to bedding - but not as extensive as in overlying interval. Poorly defined horizontal beds or very low angle cross beds. Some oil staining in lower part of interval. Abrupt, very slightly load deformed basal contact.

DOIG FM

1396.52-1397.49 m	Interbedded sandstone-mudstone: About 80% sandstone in beds 1 to35 cm thick. Very fine to fine grained. Finely laminated beds, mostly horizontal, a few ripple laminated. Base of interval arbitrarily chosen where mudstone beds become less prominent
1397.49-1400.69 m	Sandstone: very fine grained. Finely laminated. Interlaminated with mudstone but only a few discrete, very thin (few mm) mudstone beds.

	Some very low angle intersecting laminae in a few beds. Some intervals rich in mud laminae contain small vertical burrows; especially common in lower 1 m. Gradational base.
1400.69-1401.19 m	Mudstone: contains sandstone lenses and sand-filled horizontal burrows. Gradational base.
1401.19-1401.74 m	Mudstone: dark grey. Dolomitic. Scattered small shell fragments. Abrupt basal contact.
1401.74-1401.96 m	Coquinal dolostone: highly comminuted shell debris in a dolomite-clay matrix. No obvious shell orientation. Abrupt basal contact.
1401.96-1402.09 m	Dolostone: very finely crystalline. Brownish grey. Abrupt basal contact
1402.09-1402.5 m	Coquinal, muddy dolostone: Consists of several thin beds separated by muddy layers. Abrupt basal contacts of all beds.
1402.5-1404 m	Interbedded sandstone-mudstone: thin (<10 cm) beds of laminated very fine grained sandstone separated by mudstone beds/layers (<1 cm thick). Sandstone beds commonly contain clay laminae. Some of the thicker sandstone beds contain ripple laminae. Minor load deformation. Some burrows.

NOTE: Major facies change at 1389.92 m may be a reflection of an erosion surface - but masked by diagenetic fabric.

2-30-85-13W6

Charlie Lake Fm: interval 1386 - 1389.2 m. Mottled dolostone

Charlie Lake Fm: interval 1389.2 - 1389.62 m

Halway Fm: interval 1389.73 - 1389.92 m

Halfway Fm: interval 1390.16 - 1390.26 m

2-30-85-13W6

Doig Fm: interval 1402.09 - 1402.5 m
Coquinal, muddy dolostone.

Doig Fm: interval
1402.5 - 1404 m

Texaco Amerada Boundary 2/14-13-85-14W6
Core 1: 1382-1400 m 13 boxes. Slabbed. Generally well preserved, although much of core is in short segments.
Examined 24 September 2003

CHARLIE LAKE FM

1382-1383.52 m	Dolostone: Mottled. Argillaceous. Brownish grey with light to dark grey mottles. Some areas completely brownish grey dolomite, especially in lower 20 cm. Rapidly gradational base.
1383.52-1384.59 m	Dolostone: brick-red with patches, lenses and layers of brownish grey dolostone. Mottled appearance.
1384.59-1384.72 m	Dolostone: red color . Grey colored dolomite nodules - could be replacement of anhydrite nodules. Contorted in places. Abrupt basal contact with 1 mm thick clay layer.
1384.72-1385.01 m	Anhydrite: Light grey. Thin, irregular beds. Abrupt basal contact.
1385.01-1385.21 m	Mudstone: light and dark brick-red colored patches and layers. Dolomitic. Some argillaceous dolostones. Abrupt basal contact.
1385.21-1385.26 m	Brecciated dolostone-anhydritic dolostone-mudstone: Red to brown dolostone/breccia beds in mudstone. Abrupt basal contact with 1 mm thick clay layer.
1385.26-1385.37 m	Anhydrite to anhydritic dolstone: Light grey. Vaguely bedded. Abrupt basal contact.
1385.37-1385.47 m	Anhydrite: Brownish grey. Dolomitic. Coarse laminae to thin beds. Possibly a rapidly gradational base.
1385.47-1385.87 m	Sandstone: thin to thick beds of dark grey to brownish grey, very fine grained sandstone. Basal 3 cm contains breccia with clasts apparently of dolomitic anhydrite. Extensive dolomitization. Abrupt basal contact.
1385.87-1386.21 m	Anhydrite: very finely crystalline. Devoid of structures. Basal contact not preserved.
1386.21-1386.31 m	Sandstone: Dolomitic. Abundant small elliptical clasts (< 1 cm) in a fine to medium grained sandstone with scattered coarse grains. Irregular, abrupt basal contact.
1386.31-1386.45 m	Anhydrite: light grey. Nodular.
1386.45-1387.5 m	Coquinal dolostone: sandy. Small to medium-sized, densely packed shell debris in a sandy dolomite matrix. Moldic porosity in places. Top 6 cm contains anhydrite nodules and irregular patches of replacement dolomite. Shell debris tends to be aligned along very low angle cross beds. Styolites present in basal 20 cm. Base marked by rapid change from underlying sandstone - not obvious if it is abrupt or rapidly gradational.

HALFWAY FM

1387.5-1387.97 m	Sandstone: very fine to fine grained with scattered small (<8 mm) pebbles of black chert and some shell debris. Basal 2 cm has a concentration of granules in a sand matrix. Basal contact not well preserved.
1387.97-1388.03 m	Shelly sandstone: medium to large, scattered shell fragments in a very fine grained sandstone. Abrupt, non-erosional basal contact.
1388.03-1388.19 m	Coquinal dolostone: sandy. Very small shell fragments in a sand- dolomite

	matrix. Coarse grains and granules of black chert in uppermost part of interval. Basal 2 cm contains scattered coarse grains of black chert. Abrupt basal contact.
1388.19-1388.33 m	Sandstone: very fine grained with "pods" containing coarse grains to very small pebbles of quartz and chert. Large replacement anhydrite nodules. Basal contact not preserved.
1388.33-1389.31 m	Sandstone: Very fine to fine grained. Extensively dolomitized. Light to whitish grey. Lower 40 cm contains interbeds of dolomitic mudstone.
1389.31-1389.44 m	Mudstone: dark grey. Gradational base.
1389.44-1390.88 m	Sandstone: fine grained. Light to medium grey with a reddish brown color in mid part of interval. Patchy to extensively developed replacement dolomite/anhydrite - tends to follow bedding, with some areas having a contorted appearance. Bedding appears to be horizontal. Oil stained. Local concentrations, but not common, of shell debris. Abrupt basal contact. Photograph of dolomitization/anhydrite replacement.
1390.88-1390.94 m	Mudstone-sandstone: thinly interbedded.
1390.94-1391.4 m	Sandstone: very fine grained. Extensive replacement by dolomite/anhydrite - almost complete in basal 20 cm. Appears to have contorted bedding. Abrupt basal contact.
1391.4-1391.45 m	Mudstone: medium grey. Dolomitic. Abrupt basal contact.
1391.45-1392.78 m	Sandstone: very fine grained. Variable amounts of replacement dolomite/anhydrite - some zones of near-complete replacement. Bedding appears to be horizontal although some beds with extensive replacement appear to be contorted.
1392.78-1396.73 m	Sandstone: very fine grained. Medium grey. Minor amount of clay laminae in upper 30 cm. Difficult to see bedding. Probably multiple beds. Rapidly gradational base.
1396.73-1398.2 m	Interbedded sandstone-mudstone: thick sandstone beds in lower 70 cm thin beds to laminated in upper 70 cm. Flasers in some of lower sandstone beds. Abundant vertical and horizontal burrows. Photograph.
1398.2-1399.53 m	Sandstone: very fine grained. Minor argillaceous zones. Some thin beds/zones of fine/medium sandstone. Probably several beds. Abrupt basal contact.
1399.53-1399.73 m	Interbedded sandstone-mudstone
1399.73-1399.95 m	Sandstone: very fine grained. Erosional base overlain by 5 cm of mudstone clasts in a fine/medium sand matrix. Clasts up to 2 cm long.
DOIG FM	
1399.95-1400.21 m	Interbedded sandstone-mudstone

NOTE: possible major erosion surface at 1388.19 m

2/14-13-85-14W6

Charlie Lake Fm: interval 1384.59 - 1384.72 m. Basal contact

Charlie Lake Fm: interval 1386.45 - 1387.5 m. and contact with overlying anhydrite bed

Halfway Fm: interval 1385.19 - 1388.33 m

2/14-13-85-14W6

Halfway Fm: interval 1388.33 - 1389.31 m

Halfway Fm: interval 1389.44 - 1390.88 m. Mid part of interval.

2/14-13-85-14W6

Halfway Fm: interval 1389.44 - 1390.88 m. Dolomite mottled sandstone

?Halfway Fm: interval 1396.73 - 1398.2 m. Burrowed, laminated sandstone.

Amerada Boundary 6-20-85-14W6
Core 1: 4203 - 4263 ft. 16 boxes. Full diameter. Well preserved.
Examined 15th September 2004

CHARLIE LAKE FM
"2nd Brown Unit"

4203 - 4220 ft	Mudstone: brick-red with some zones that are light grey. Silty-dolomitic. Mottled fabric. Fine laminae and some very thin beds. Local concentrations of low-angle, anhydrite-filled fractures. Contains two thin (5 and 10 cm) beds of anhydrite in top half of interval. Abrupt basal contact.
4220 - 4220' 5"	Sandstone: fine to coarse grained. Grey with reddish patches. Traces of medium-angle crossbeds. Abrupt, probably erosional, basal contact.

"Pink Unit"

4220' 5" - 4228' 9"	Anhydrite: light grey; crystalline. Top 7" consists if interbedded anhydrite and red mudstone. Abrupt basal contact.
4228' 9" - 4229' 4"	Mudstone: brick-red mudstone grading up into interbedded mudstone and anhydrite. Upper contact has mudcracks. Abrupt basal contact.
4229' 4" - 4235' 6"	Anhydrite: light grey; very finely crystalline
4235' 6" - 4239' 3"	Dolostone: fine to medium crystalline; light grey with areas of earthy grey. May be bioclastic. Minor porosity - small vugs or leached shell debris. No obvious internal fabric. Basal contact at a core break but rapid lithology change suggests and abrupt contact.
4239' 3" - 4244' 11"	Anhydrite: thin interlaminae and very thin beds of dolostone. Abrupt basal contact.

"Yellow Unit"

3244' 11" - 4247' 11"	Mudstone: brick-red to greenish grey. Abundant anhydrite and dolomite-filled low-angle and vertical fractures. Some replacive anhydrite. Abrupt basal contact.
4247' 11" - 4248' 6"	Anhydrite: Abrupt, load-deformed basal contact.
4248' 6" - 4249' 3"	Mudstone-anhydrite: two brick-red mudstone beds separated by an anhydrite bed. Anhydrite-filled fractures in lower mudstone. Abrupt basal contact.
4249' 3" - 4253' 10"	Dolostone-anhydrite: dolostone grading up into anhydrite. Light grey. No visible sedimentary structures. Abrupt basal contact.
4253' 10" - 4254' 1"	Mudstone: grey. Abrupt basal contact.
4254' 1" - 4263'	Mudstone: brick-red. Several anhydrite interbeds. Abundant anhydrite-filled, low-angle fractures.

"2nd Brown Unit", 4203 - 4220'

Base of "2nd Brown Unit"
at 4220' 5"

"Pink Unit", 4220' 5" - 4228' 9"
- anhydrite and red mudstone

"Pink Unit", 4228' 9" -4229' 4"
- red mudstone with mudcracks

“Yellow Unit”, 4254’ 1” - 4263’: anhydrite veins and beds inred mudstone

Suncor Paradise 5-27-85-15W6
Core 1: 1743-1761 m 13 boxes. Slabbed. Well preserved although cut surfaces have prominent saw marks.
Examined 23 September 2003

MONTNEY FM

1743-1745.35 m	Sandstone: very fine grained. Brownish grey. No visible sedimentary structures. Abrupt, slightly load deformed basal contact.
1745.35-1746.13 m	Mudstone-sandstone-siltstone: Dark grey. Abundant intercalations of sand/silt laminae and very thin beds (<2 cm thick). Mostly planar laminae.
1746.13-1746.19 m	Sandstone: very fine grained. Fine planar laminae. Mud laminae in upper 1 cm. Abrupt basal contact.
1746.19-1747.67 m	Mudstone: Dark grey. A few, scattered thin (up to 8 cm) beds of very fine grained sandstone as well as intercalated silt/sand laminae. Sandstone beds finely laminated and a few are deformed. Abrupt basal contact.
1747.67-1748.08 m	Sandstone: very fine grained. Three fining-up beds. Planar laminated sandstone grading up into interlaminated sand and mud. Abrupt basal contacts. Upper bed appears to contain a large ripple form in basal part of bed. Middle bed contains a very small ripple form.
1748.08-1748.31 m	Mudstone: a 2 cm thick sandstone bed in middle of the interval and a 3 mm sandstone just underneath it. Thicker sandstone bed contains small-ripple laminae. Abrupt basal contact.
1748.31-1748.41 m	Sandstone-mudstone: very fine grained sandstone. Vertical succession is 8-9 cm of sandstone - 5 mm of mudstone -few mm to1 cm of wedge shaped sandstone bed. Load deformed Load deformed. Steep, abrupt basal contact.
1748.41-1748.46 m	Mudstone: brownish grey. Rapidly gradational base.
1748.46-1748.49 m	Sandstone: very fine grained. Fine, planar laminae. Load deformed basal contact. Slightly coarser grained at base.
1748.49-1748.495 m	Mudstone abrupt basal contact.
1748.495-1748.75 m	Sandstone: very fine grained. Steeply dipping basal contact. Appears to be internally deformed.
1748.75-1748.77 m	Mudstone: abrupt basal contact.
1748.77-1749.16 m	Sandstone: vert fine grained. Lenses of mud-chip clasts (mm-size) and a few individual scattered mud-chips. Appears to be deformed. Abrupt basal contact. Photograph: lenses of mud-chips.
1749.16-1749.24 m	Interlaminated sandstone-mudstone: Planar laminae with some very small-scale bed loading (mm-scale). Rapidly gradational base.
1749.24-1749.43 m	Mudstone: A few silt laminae. Rapidly gradational base.
1749.43-1751.43 m	Sandstone: very fine grained. Several beds ranging from a few cm to 65 cm thick, separated by 1-10 cm thick mudstone intervals. Finely to coarsely laminated sandstone - thicker beds have lamina-sets. Some beds contain ripple laminae. A few of the thinner beds are load deformed. One of the thicker beds contains mud-chip clasts in its basal part. Thinner beds tend to contain mud laminae. All beds have abrupt bases.
1751.43-1752.23 m	Sandy mudstone: highly deformed. Gradational base.

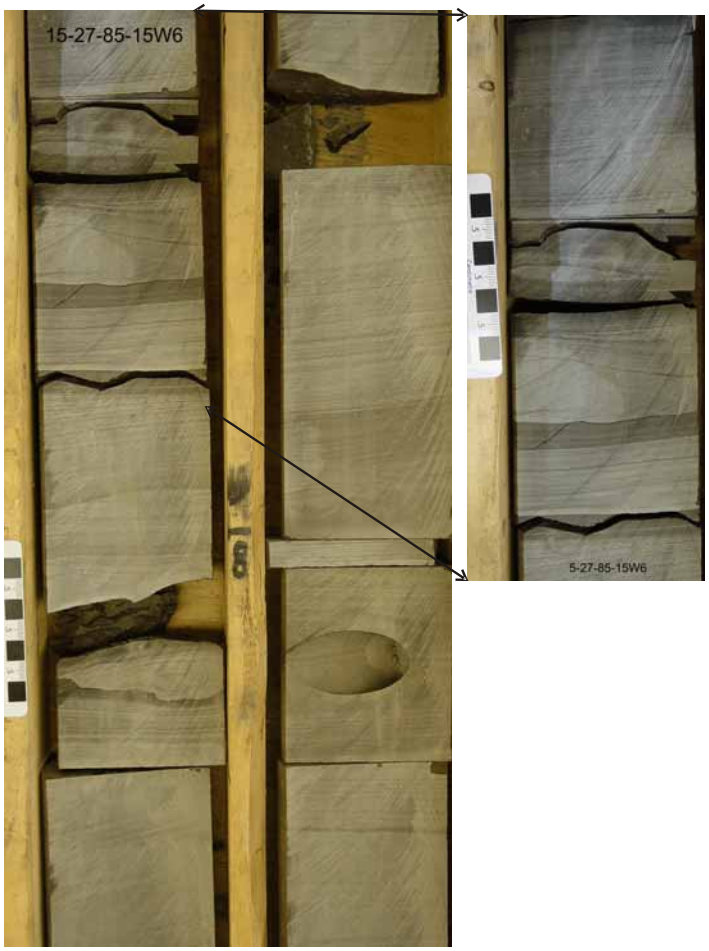
1752.23-1755.83 m Mudstone: dark grey to black. Few silt/sand laminae and there is one 10 cm thick bed of very fine grained sandstone or coarse siltstone

1755.83-1758.63 m Interbedded mudstone-sandstone: mostly thick mudstone intervals separated by thin to thick (4 to 26 cm) sandstone beds. Most of the sandstone beds contain planar laminae and intercalated mud laminae, except for one 7 cm thick bed that contains ripple laminae.

1758.63-1761 m Mudstone: abundant laminae and very small lenses ofsand/silt.

5-27-85-15W6

1748 - 1749.16 m



Probable turbidites in interval 1749.43 - 1751.53 m

Placer Flat Rock 10-18-85-16W6
Core 1: 1461-1479.2 m 12 boxes. Full diameter. Well preserved.
Examined 24 September 2003

CHARLIE LAKE FM

1461-1461.82 m	Dolostone/sandy dolostone: light grey with some brownish grey tint. Vaguely bedded. Abrupt basal contact with a 1 mm clay layer.
1461.82-1461.88 m	Anhydrite: light grey to whitish grey. Dolomitic. Abrupt basal contact.
1461.88-1462.03 m	Dolostone: finely laminated near top but no fabric in lower part. Abrupt basal contact.

HALFWAY FM

1462.03-1464.92 m	Sandstone: dark grey with lighter grey spots and zones of anhydrite-cemented sandstone. Fine grained. Vague suggestions of cross bedding. Top 35 cm extensively anhydrite or dolomite cemented.
1464.92-1466.58 m	Sandstone: as above but more intensely anhydrite/dolomite cemented. Vague suggestions of cross bedding. Base masked by diagenetic fabrics.
1466.58-1466.74 m	Mudstone/argillaceous dolostone: lenses of dolostone separated by thin, irregular muddy layers.
1466.74-1467.16 m	Sandstone: Complex mottled fabric due to either anhydrite or dolomite cementation and/or replacement. Fine grained.
1467.16-1468.31 m	Sandstone: spotty dolomite/anhydrite cement with a few patches where it is more pervasive, especially in lower part of interval.
1468.31-1468.95 m	Sandstone-dolostone: thin (4-10 cm) beds separated by mudstone layers (<1 cm thick).
1468.95-1470.19 m	Sandstone: very fine to fine grained. High angle cross beds in lower part of interval grading up into massive sandstone that contaisn wispy clay laminae. Erosional base. This interval plus overlying interval (1468.31-1470.19 m) part of a fining-up bed.
1470.19-1470.21 m	Mudstone: black. Small sand lenses.
1470.21-1474.05 m	Sandstone: contains at least two erosionally based beds. Mostly fine grained with medium grains in basal 5 cm of each bed. Traces of low-angle cross beds. Dolomitic.
1474.05-1474.7 m	Interbedded sandstone-mudstone: thin ly interbedded in lower part grading up into thicker sandstone beds separated by clay laminae. Lenticular beds and sand laminae in lower, muddy part of interval. Minor horizontal burrows in lower part. Abrupt basal contact.
1474.7-1476.46 m	Sandstone: several erosionally based beds. Two of the beds contain medium grained sandstone at their base, grading up into fine grained sandstone. One bed grades up from a massive, fine to medium sandstone into a ripple laminated fine grained sandstone. There is at least one other bed that appears to be vaguely ripple laminated.

NOTE possible major erosion surface at 1466.58 m.

Placer Flatrock 10-19-85-16W6
Core 1: 1271.2 - 1289.2 m 10 boxes. Full diameter. Well preserved.
Examined 15th September 2004

CHARLIE LAKE FM

1271.2 - 1278.27 m	Dolomudstone: complex diagenetic/remnant sedimentary fabric (mottles fabric). Colour varies from light grey with minor reddish tint to brick-red. Contains one 8-10 cm thick anhydrite beds in mid-part of interval. Basal contact not well reserved.
?Siphon Mbr	
1278.27 - 1280.14 m	Dolostone/Silty dolostone: dark grey. There is an internal erosion surface at about 1278.83 m. Base of interval within a broken part of the core.
Base of Siphon Mbr	
1280.14 - 1285.31 m	Dolostone: mottled medium and light grey; scattered red intervals. Typical fabric seen in many Charlie Lake beds.
1285.31 - 1289.2 m	Missing core

BHP Can. Cecil 2/10-6-85-17W6
Core 1: 1251 - 1269.2 m. 12 boxes. Boxes 2 and 12 slabbed; boxes 1 and 3 half of contents slabbed; rest full diameter.
Examined 15th September 2004

May be a mismatch between core and log depths - core character/depths appear to be about 1m deeper than log response.

CHARLIE LAKE FM

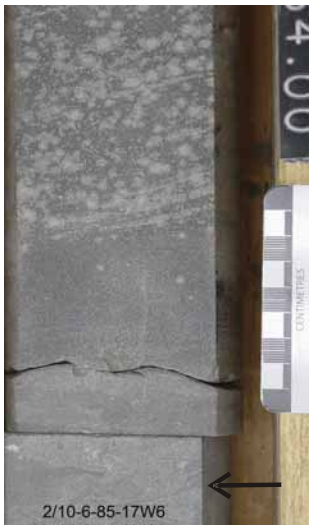
1251 - 1251.09 m	Dolostone: brownish grey. Very finely crystalline. Coarsely laminated to very thinly bedded. Basal contact not preserved but facies change is rapid.
1251.09 - 1251.49 m	Anhydrite: light to medium grey on fresh surface; brown on outer core surface. Crystalline. Dolomitic. Rapid transitional basal change.
1251.49 - 1251.89 m	Dolostone: Fine to coarse horizontal laminae - some minor distortion. A few low-amplitude styolites. Abrupt basal contact. ?Siphon Mbr
1251.89 - 1252.48 m	Sandstone: very fine grained; dolomitic. No visible sedimentary structures. Rapid transitional change from underlying facies.
1252.48 - 1254 m	Sandstone: fine grained.. Spotted fabric due to incipient anhydrite cement. Spotted nature declines from base to top. Traces of medium-angle cross beds - especially in lower part of interval. Abrupt, probably erosional, basal contact. Appears to be a single depositional unit that may include the overlying sandstone.
?Base of Siphon	
1254 - 1256 m	Dolomitic sandstone to sandy dolostone: very fine grained. Immediately below upper contact load deformation has mixed sand-mud into a complex fabric. Remainder of interval has a vague mottled appearance. Basal contact appears to be transitional.
1256 - 1257.3 m	Dolomudstone: mottled (typical Charlie Lake fabric). Medium to dark

	grey with reddish and orange tint at some horizons. Some of the mottling may be burrows. Abrupt, inclined, basal contact.
1257.3 - 1257.54 m	Anhydrite: Finely crystalline. Abrupt basal contact.
1257.54 - 1266.34 m	Dolomudstone: mottled. Abrupt, uneven basal contact.
1266.34 - 1266.56 m	Sandstone-dolostone: mixing of facies due to extreme bed disruption. Light brownish grey. Abrupt basal contact marked by a <1 mm thick clay layer.
Cecil Mbr	
1266.56 - 1266.66 m	Sandstone: fine to medium grained. No visible sedimentary structures. Basal contact abrupt and wavy - latter may be due to minor bed loading. PHOTO of basal contact.
1266.66 - 1267.76 m	Sandstone: fine grained. Oil stained in places. Horizontal bedding. Spotted fabric due to incipient anhydrite cement.
1267.76 - 1269.2 m	Missing core - should include base of the Cecil Mbr

2/10-6-85-17W6

Top of Siphon Mbr at 1251.89 m

Siphon Mbr - incipient anhydrite cement



Base of Siphon Mbr

Mottled dolostone (1257.54 -1266.34 m)

Oil stained Cecil Mbr. Top of Cecil Mbr at 126.56 m

Scurry Placer West Eagle 2/8-7-85-18W6
Core 1: 1814-1832 m 13 boxes. Slabbed. Well preserved.
Examined 23 September 2003

MONTNEY FM (prominent sandstone interval in the Sandstone Member)

1814-1817.1 m	Mudstone: dark grey with brownish tint. Massive to faintly laminated. Abrupt basal contact.
1817.1-1817.13 m	Sandstone/siltstone: coarse siltstone to very fine grained sandstone. . Interlaminated with mudstone. Abrupt, slightly load deformed basal contact
1817.13-1817.79 m	Mudstone: as above
1817.79-1817.82 m	Silstone-mudstone: highly deformed bed - overturned laminae.
1817.82-1818.05 m	Mudstone: contains a 5 mm thick coarse grained silstone mid-way through interval. Abrupt basal contact.
1818.05-1818.25 m	Sandstone/silstone: either coarse siltstone or very fine grained sandstone. Mostly without sedimentary structures except for planar laminae in upper 5 cm. Light-medium grey. Abrupt basal contact.
1818.25-1818.39 m	Mudstone: as above
1818.39-1818.58 m	Sandstone/siltstone: no visible sedimentary structures. Abrupt basal contact.
1818.58-1818.74 m	Mudstone: as above
1818.74-1819.33 m	Sandstone/siltstone: no visible sedimentary structures. Abrupt basal contact.
1819.33-1819.48 m	Mudstone: as above
1819.48-1819.68 m	Sandstone/siltstone: no visible sedimentary structures. Abrupt basal contact.
1819.68-1819.86 m	Mudstone: as above
1819.88-1820.06 m	Sandstone/siltstone: as above but planar laminae in basal 9 cm. Basal contact not preserved.
1820.06-1821.11 m	Mudstone: Lower 36 cm contains deformed silt lenses and laminae. Upper 34 cm has planar laminae. Abrupt basal contact.
1821.11-1822.61 m	Mudstone: less silt/sand laminae than overlying mudstone
1822.61-1828.96 m	Sandstone/siltstone: no visible sedimentary structures. Abrupt basal contact
1828.96-1823.19 m	Mudstone: dark grey with brownish tint. Massive to faintly laminated. Abrupt basal contact.
1823.19-1823.33 m	Sandstone/siltstone: no visible sedimentary structures. Abrupt basal contact
1823.33-1823.49 m	Mudstone: as above
1823..49-1823.78 m	Sandstone/siltstone: as above
1823.78-1824.11 m	Mudstone: as above
1824.11-1824.48 m	Sandstone/siltstone: as above
1824.48-1824.71 m	Mudstone: as above
1824.71-1825.07 m	Sandstone/siltstone: as above. Basal contact not preserved.
1825.07-1825.35 m	Mudstone: as above
1825.35-1825.45 m	Sandstone/siltstone: as above
1825.45-1825.57 m	Mudstone: as above

1825.57-1825.91 m Sandstone/siltstone: as above
1825.91-1831.71 m Mudstone-siltstone/sandstone: interlaminated silstone-mudstone asdn a few thicker (up to 7 cm) beds of laminated very fine grained sandstone.

NOTE: logs indicate porous siltstone/sandstone interval between 1826-1830 m but this is not reflected in the core. Are the core depths correct?

CD COG North Pine 16-14-85-18W6
Core 1: 1301-1319.2 m 11 boxes. Full diameter. Well preserved.
Examined 24 September 2003
Note: Core depths about 0.75 to1 m lower than log depths

CHARLIE LAKE FM
1301-1302.06 m Mudstone: brick-red with patches/lenses of light grey. Dolomitic. Gradational base.
Coplin Mbr
1302.06-1306.02 m Anhydrite: light to medium grey. Dolomitic, especially in upper few cm where it is mostly dolomite. No visible structures. Abrupt basal contact.
Base of Coplin Mbr
1306.02-1306.15 m Sandstone: light grey. Fine to medium grained with scattered coarse grains and granules. Partially dolomitized in basal few cm - masks basal contact.
1306.15-1307.48 m Dolostone: very finely crystalline. Brownish grey. Coarsely laminated to very thinly bedded. Abrupt basal contact.
1307.48-1307.62 m Sandstone: very fine to fine grained. Very light grey. Dolomitic to partially dolomitized. Possibly thinly bedded. Basal contact not preserved.
1307.62-1311.42 m Dolostone-mudstone: light grey dolostone beds; greenish grey dolomitic mudstone beds. Very finely crystalline dolostone with mottled fabric in places. Lenticualr beds of dolostone encased in dolomitic mudstone.. Minor bed loading structures. Abrupt basal contact.
North Pine Mbr
1311.42-1313.82 m Sandstone: fine grained. Variably dolomitized. Between 1312.37-1312.67 m there is a sandy dolostone (unsure if originally a carbonate bed or replacement of sandstone). Base is highly deformed.
1313.82-1313.94 m Dolostone: contorted. Highly disrupted basal contact.
1313.94-1314.07 m Dolomitic sandstone: contorted. Basal contact not preserved.
1314.07-1314.26 m Interlaminated dolstone-mudstone: Beds <1 cm thick. Light to dark brownish grey. Mudstone is dolomitic. Minor deformation of bed in lower part of interval.
1314.26-1314.83 m Dolostone: argillaceous. Light brownish grey and light grey colours. Mottled fabric in places.
1314.83-1315.35 m Sandstone: at least two beds of fine grained sandstone. Base part of upper bed contains dolomitized mud clasts and tends to be fine to medium grained. Lower bed is mottled and basal contact is load deformed.
1315.35-1315.59 m Dolostone: light grey. Very finely crystalline. Basal contact not preserved.

1315.59-1315.69 m	<u>Sandstone:</u> fine grained. Brownish grey. Abrupt basal contact.
1315.69-1316.33 m	<u>Dolostone:</u> yellowish light grey. Mottled fabric. Basal contact apparently not preserved.
1316.33-1316.91 m	<u>Sandstone:</u> fine grained. Dolomitic. Vague traces of cross beds or ripple laminae.
1316.91-1319.2 m	Missing core

16-14-85-18W6

Upper contact of North Pine Mbr

Anhydritic-dolomitic sandstone (1311.42 - 1313.82 m)

Suncor Stoddart 6-4-85-20W6
Core 1: 1677-1689.5 m Rec. 12.5 m 9 boxes. Full diameter. Well preserved
Examined 23 September 2003

DOIG FM

1677-1680.5 m	Sandstone: fine to medium grained. Quartz and black chert. Well sorted. At least 2 beds. Light grey. Cross beds and planar laminae. Abrupt basal contact.
1680.5-1681.55 m	Muddy sandstone: Fine grained. Fine to coarse laminae with mud interlaminae. Dark grey. Possibly consists of several beds - there are several distinct planar surfaces that could be the base of individual beds. Abrupt basal contact.
1681.55-1686.4 m	Interbedded sandstone-mudstone: predominantly thin to thick bedded very fine to fine grained sandstone beds separated by thin mudstone beds (< 1 cm thick). Fine to coarse laminae are common. Small vertical and horizontal burrows present in many beds. Deformation is common. Basal bed is highly deformed consisting of irregular patches and lenses of sandstone within mudstone.
1686.4-1687.13 m	Sandy mudstone/muddy sandstone: scattered medium and coarse grains in generally very fine to fine grained sandstone. Appears to be highly deformed.
1687.13-1687.15 m	Sandstone: medium to coarse grained; scattered small granules. A lense shaped unit up 0 to 2 cm thick.
1687.15-1687.71 m	Muddy sandstone/sandy mudstone: highly deformed with total mixing of sand and mud such that no bedding remains.
1687.71-1689.5 m	Sandstone: thin to thick beds of very fine grained sandstone intercalated with mudstone. Trend towards an upward decrease in bed thickness and increased mudstone intercalations. Thinner beds tend to be deformed and contain horizontal and vertical burrows.

6-4-85-20W6

Doig facies within interval 1681.55 - 1686.4 m

High Field Red Creek 6-3-85-21W6
Core 1: 5094-5154 ft 13 boxes. Full diameter. Well preserved.
Examined 24 September 2003

DOIG FM
Typical Doig facies of thin to thick beds of very fine grained sandstone interbedded with dark grey silty mudstone. Plane and ripple laminae are common. Bioturbated beds are abundant, with a predominance of horizontal burrows.

About halfway through the core there is a sandstone interval about 2 ft thick consisting of burrow mottled argillaceous, very fine grained sandstone with scattered bivalve debris.

Penn West Red 11-22-85-21W6
Core 1: 1661-1679 m Rec.17.85 m 13 boxes. Full diameter. Well preserved
Approximately 20 degrees of structural dip in the core. Depths have not been adjusted for dip.
Examined 25 September 2003

DOIG FM

1661-1664.4 m	Mudstone: dark grey to black. Some silt laminae. Basal contact not preserved.
1664.4-1665.15 m	Bioclastic sandstone: silty, argillaceous. Fabric is messy - either because of extensive soft sediment deformation or burrow mottling, although there are no signs of individual burrows. Basal contact not preserved.
1665.15-1667.7 m	Mudstone: as above.
1667.7-1668.3 m	Sandstone: very fine grained. Cross bedded sandstone grading up into thoroughly bioturbated argillaceous sandstone. Traces of shell debris. Basal contact not preserved.
1668.3-1679 m	Mudstone: similar to above but more silt laminae and very small silt lenses.

Penn West Red 10-33-85-21W6
Core 1: 4602-4662 ft 12 boxes. Top 5.5 boxes slabbed, remainder are full diameter. Well preserved.
Examined 25th September 2003

CHARLIE LAKE FM
North Pine Mbr

4602-4604' 9"	Sandstone: fine grained. Slight pinkish tint. Mottled to lenticular fabric - possibly due to burrowing. Some soft sediment deformation. Abrupt basal contact.
4604' 9"-4607' 1"	Mudstone: brick-red with four irregular lenses of greenish grey mudstone. Basal contact not preserved.
4607' 1"-4610' 8"	Sandstone: fine grained. Reddish color in top 9"; brownish grey elsewhere. Mottled appearance. Abrupt irregular contact (may be due to chemical

erosion). Separated from underlying bed by a 2 mm clay layer.

4610' 8"-4613' 6" Dolostone-anhydrite: coarsely laminated to very thinly bedded. Irregular and uneven beds. Abrupt basal contact.

4613' 6"-4616' 2" Dolomitic mudstone/argillaceous dolostone: laminated to very thinly bedded. Lenticular beds and clay laminae. Gradational basal contact.

4616' 2"-4616' 3 " Sandstone/mudstone: sandstone lenses separated by mud/dolomitic mud laminae.. Abrupt basal contact.

4616' 3"-4623' 1" Sandstone: mostly fine grained. Light brownish grey. Erosional basal surface coated in pyrite and overlain by about 0.5" of medium grained sandstone, in turn overlain by low to high angle cross bedded sandstone, grading up into upper third of interval that consists of partially dolomitized sandstone with clay lenses and irregular laminae. Upper beds appear to be deformed. Photograph of basal contact.

4623' 1"-4624' 7" Sandstone: very fine grained. Well sorted. No apparent sedimentary structures. Pyritized, erosional basal contact.

Base of North Pine Mbr

(NOTE: full diameter core below 4624' 7")

4624' 7"-4628' Dolostone/argillaceous dolostone: mottled appearance in lower two-third grading up into thin to thick beds of dolostone separated by clay laminae. Irregular, abrupt basal contact with a mm-thick clay layer.

4628'-4628' 2" Anhydrite: crystalline. Abrupt basal contact with a mm-thick clay layer.

4628' 2"-4634' 5" Argillaceous dolostone/dolomitic mudstone: mottled. Middle third of interval is brick-red; remainder is greenish grey. Abrupt, uneven basal contact (several cm of relief) - marked by mm-thick clay layer.

4634' 5"-4643' 1" Dolostone: greenish grey with lenses/streaks of lighter toned dolostone in a greenish background. Styolitic, abrupt basal contact.

4643' 1"-4643' 10" Anhydrite: crystalline. Abrupt, inclined basal contact (probably inclined due to soft sediment deformation).

4643' 10"-4656' 8" Complexly mottled mix of sandstone-dolostone and argillaceous dolostone: Uncertain if mottling is a diagenetic fabric or burrow mottling (or both). Gradational basal contact.

4656' 8"-4660' 6" Dolostone: very finely crystalline. Faint lenticular fabric.

NOTE:
Log pick for base of North Pine Mbr is 4626 ft, whereas core depth is 4624' 7“, thus log depth is about 1' 5" deeper than core depth.

Log pick for top of the Fort St John Dolomite Mbr is 4651 ft but core succession does not seem to show any significant change at this level (within a complexly mottled interval of sandstone-dolostone-argillaceous dolostone). Even if core depths are readjusted by 1' 5" there is still no significant lithological change to suggest a distinct top for the Fort St John Dolomite. However, if the top of the Fort St John Dolomite is chosen at log depth 4644 ft - this would almost coincide with a lithology change seen in core at 4643' 10"

10-33-85-21W6

North Pine Mbr (4610’ 8” - 4613’ 6”)

North Pin Mbr (4602’ - 4604’ 9”)

Imperial et al Red Creek 11-25-85-22W6
Core 1: 5514-5574 ft 12 boxes. Slabbed. Well preserved
Core 2: 5574-5581 ft 1 box. Badly broken
Core 3: 5581-5591 ft 4 boxes. Slabbed. Well preserved.
Examined 25 September 2003
NOTE: measured more core 3 than officially recorded

DOIG FM	
5514'-5524' 10"	Sandstone: very fine grained. Thin to thick beds (few cm to15 cm thick)separated by very thin mudstone beds or laminated sandy intervals. Burrowed. Dark grey. Beds tend to thicken upward and contain fewer burrows. Lower 2 ft contains deformed beds and burrows are abundant. Thicker beds have abrupt basal contacts and contain plane laminae to very low angle cross laminae that grade upward into mud laminated sandstone (some beds have ripple laminae in the upper part) which may be burrowed. Gradational from underlying strata.
5524' 10"-5553' 10"	Mudstone: dark grey. Basal 10 cm is a thoroughly bioturbated, argillaceous sandstone layer resting abruptly on underlying beds. Very silty/sandy mudstone in lower beds grading up into very argillaceous sandstone. Thoroughly bioturbated throughout. Minor amount of scattered shell debris. A few remnants of bedding preserved near top of interval. Abrupt basal contact.
5553' 10"-5567'	Sandstone: very fine grained. Grey. Thin to thick beds with fine laminae. Lower 4ft has thinner beds and burrowed muddy intervals; upper 9 ft has thicker, laminated beds with only a few muddy intervals.
5567'-5574'	Missing core
5574-5581'	Poor core recovery - small fragments of mudstone and very fine grained sandstone
5581'-5582' 10"	Silty/sandy mudstone: thoroughly bioturbated with only a few remnants of original laminated beds. Abrupt basal contact.
5582' 10"-5593' 1"	Sandstone: light to medium grey. Fine grained. Massive to vaguely bedded. Presence of several zones with mm-thick clay laminae indicates presence of several beds.
5593' 1"-5594' 7"	Poorly preserved core - fragments of very fine to fine grained sandstone with common occurrences of mud laminae.

11-25-85-22W6

Doig facies in interval 5514 - 5524’ 10”

Bed contact at 5582’ 10 “

Cherokee et al South Inga 16-19-85-23W6
Core 1: 1500-1518 m Rec.18 m. 18 boxes. Full diameter. Well preserved.
Examined 25 September 2003

CHARLIE LAKE FM

1500-1501.3 m	Dolostone: very finely crystalline. No obvious fabric. Gradational basal contact.
1501.3-1503.7 m	Mudstone: brick-red. Dolomite mottling. Abrupt, irregular basal contact.
1503.7-1504.95 m	Dolostone-mudstone: predominantly very finely crystalline dolostone. Medium grey. Scattered laminae and thin beds of mudstone. Abrupt basal contact.
1304.95-1505.59 m	Anhydrite: basal contact not preserved.
1305.59-1505.93 m	Interbeds of anhydrite and mudstone: Two beds of each with the basal bed being anhydrite. Contorted beds in the anhydrite. Abrupt basal contact.
Inga Member	
1505.93-1506.53 m	Argillaceous/dolomitic sandstone: very fine grained. Overall coarsening-up aspect.. Sandy mudstone and laminated mudstone in basal 10-15 cm grading up into lenticular argillaceous sandstone, in turn grading up into a more massive appearing sandstone. Bioturbated lenticular sandstone beds. Abrupt basal contact.
1506.53-1509.83 m	Sandstone: fine grained. Light grey to whitish grey. Oil stained in lower 1 m. Vertical succession is: Top: Burrow mottled sandstone Structureless sandstone Base: Oil stained, anhydrite mottled, vaguely cross bedded sandstone
1509.83- 1510.06 m	Mudstone: basal 4 cm is sand-free; remainder contains sand-filled burrows. Basal contact not preserved.
Base of Inga Mbr	
1510.06-1510.55 m	Sandstone: fine grained. No obvious sedimentary structures. Abrupt, obviously erosional basal contact.
1510.55-1510.78 m	Mudstone: contains silt/sand laminae, lenses and burrow fills.
1510.78-1511.08 m	Sandstone: very fine grained; some medium grains. No obvious sedimentary structures. Abrupt basal contact.
1511.08-1511.31 m	Mudstone: contains siltlaminae. Abrupt basal contact.
1511.31-1512.23 m	Interlaminated dolostone-anhydrite: Difficult to see any fabric. Basal contact is arbitrarily chosen where dolsotone seems to be prevalent.
1512.23-1513.58 m	Dolostone: medium to dark grey. Fine to medium crystalline. Clay laminae in lower 20 cm. Rests on an uneven surface.
1513.58-1513.76 m	Dolostone: light grey. Coarse, undulose laminae. Abrupt basal contact.
1513.76-1515.28 m	Dolostone: greenish grey. Argillaceous. Some clay laminae near top of interval. Vaguely mottled. Abrupt basal contact.
1515.28-1515.98 m	Dolomitic mudstone: reddish tint. Abrupt basal contact.
1515.98-1516.13 m	Anhydrite: crystalline. Abrupt basal contact.
1516.13-1516.63 m	Dolostone: dark gray. ?Argillaceous. Laminated in places. Abrupt basal contact marked by a mm-thick clay layer.
1516.63-1516.88 m	Anhydrite: crystalline. Abrupt basal contact.

1516.88-1517.31 m Dolostone: very finely crystalline. No obvious fabric. Abrupt basal contact.
1517.31-1517.49 m Anhydrite: crystalline. Abrupt basal contact.
Remainder of core is badly broken and succession difficult to determine.

Texaco Texcan Coplin 16-21-85-23W6
Core1: 4570-4625 ft 12 boxes. Full diameter. Well preserved.

CHARLIE LAKE FM
Yellow unit
4570-4574' 2" Mudstone-dolostone: Brick-red mudstone with thin to thick interbeds of dolostone. Some dolomite replacement in the mudstone. Abrupt basal contact.
Orange unit
4574' 2"-4576' 2" Anhydrite: finely crystalline. Medium grey on fresh surface. Abrupt basal contact.
4576' 2-4576' 9" Dolostone: creamy white/ whitish grey. Very finely crystalline. No obvious fabric/sedimentary structures. Gradational base.
4576' 9"-4577' 1" Dolostone-mudstone: light to medium grey. Plane laminae throughout. Abrupt basal contact.
4577' 1"-4577' 6" Mudstone: medium-dark grey. Base not preserved.
4577' 6"-4585' 6" Anhydrite-dolostone: Dolostone more common in basal part of interval. Anhydrite is dolomitic and ranges into anhydritic dolostone. Gradational base.
Base of Orange unit
4585' 6"-4597' Mudstone: brick-red. Dolomitic.
4597' -4597' 3" Dolostone-anhydritic dolostone: brick-red. Thin, brecciated uppermost bed. Abrupt basal contact.
4597' 3"-4597' 9" Anhydrite: abrupt basal contact.
4397' 9"-4598' 5" Dolostone: very finely crystalline. Brownish grey. Basal contact not preserved.
4598' 5"-4607' 3" Mudstone: brick-red with irregular patches of greenish-grey mudstone. Basal 20" contains lenses and patches of dolomite. Abrupt basal contact inclined at about 50 degrees - probably oversteepened by soft sediment deformation.
Coplin Mbr
4607' 3"-4614' 8" Anhydrite-dolostone: predominantly anhydrite with some dolostone beds in lower 2 ft. Abrupt basal contact- rests on a dolomitized mudstone that has some remnant red color.
Base of Coplin Mbr
4614' 8"-4623' Mudstone: brick-red with a few patches of greenish-grey mudstone. Dolomitic
4623'-4645' Dolostone: brownish grey with some darker zones. Very finely crystalline. Short intervals of laminated dolostone separated by thicker massive dolostone.

PanAm Coplin 6-33-85-23W6
Core 1: 4640-4700 ft Rec. 60 ft. 13 boxes. Full diameter. Well preserved.
Core 2: 4700-4760 ft Rec. 60 ft. 13 boxes. Slabbed. Well preserved.
Examined 25 September 2003

CHARLIE LAKE FM

4640'-4641' 3"	Dolomitic mudstone: brick-red with light green mudstone. Uneven basal contact with few cm of relief and is marked by a mm-thick clay layer. Possibly due to chemical erosion.
4641' 3"-4642' 3"	Interbeds of dolostone/anhydrite: Light grey. Vertical succession is - Top Dolostone Anhydritic dolostone/dolomitic anhydrite Base Dolostone - abrupt basal contact
4642' 3" 4642' 5"	Anhydrite: light-medium grey. Finely crystalline
4642' 5"-4650'	Dolomitic mudstone: brick-red.. Mottled and complex diagenetic fabric. Basal few cm is greenish grey. Abrupt basal contact with a 1 mm lay layer.
Coplin Mbr	
4650'- 4651' 5"	Anhydrite: as above. Basal contact not preserved.
4651' 5"-4654' 1"	Mudstone: brick-red. As above.
4654' 1"-4657' 10"	Anhydrite: finely crystalline. Basal contact not preserved.
Base of Coplin Mbr	
4657' 10"-4660'	Dolostone: thin to thick beds of dolostone separated by thin argillaceous beds. Near, or at, base there is a 7 cm thick, highly contorted bed of fine grained sandstone which shows minor bed loading int underlying strata.
4660'-4661' 8"	Anhydrite: as above. Basal contact not readily seen.
4661' 8"-4666' 8"	Dolostone: mottled and complex diagenetic fabric. Abrupt basal contact.
Blueberry Mbr	
4666' 8"-4666' 11"	Sandstone: dolomitic, fine grained with small (< 1 cm) mud clasts. Abrupt, load deformed basal contact.
4666' 11"-4668' 10"	Mudstone: brick-red becoming lighter red and then grey in upper part of interval. Abrupt basal contact.
4668' 10"-4669' 6"	Anhydrite: light grey. Finely crystalline. Basal contact not preserved.
4669' 6"-4671' 11"	Mudstone: brick-red - as above. Irregular occurrences of sand - possibly by complete bioturbation or extreme soft sediment deformation. Basal contact not preserved.
4671' 11"-4673' 4"	Limestone: dolomitic. Very finely crystalline. Complex mottled fabric due to either anhydrite crystal or dolomitization. No visible sedimentary structures. Abrupt, uneven basal contact.
4673' 4"-4674' 10"	Anhydrite: as above. Abrupt basal contact.
4674' 10"-4676' 10"	Calcareous/dolomitic mudstone grading up into dolomitic limestone: Very finely crystalline. No apparent sedimentary structures. Abrupt basal contact.
4676' 10"-4678' 5"	Anhydrite: massive near base grading up into nodular anhydrite, in turning grading up into enterolithic anhydrite. Almost completely dolomitized in

places.

Base of Blueberry Mbr

4678' 5"-4679' 10"	Dolomudstone: contains small dolomite nodules - these could be replacement of anhydrite nodules. Thinly bedded mudstone.
4679' 10"-4689' 1"	Dolomitic mudstone/argillaceous dolostone: Lenticular to thin planar beds. Minor bed deformation.
4689' 1"-4690' 3"	Mottled grey mudstone grading up into brick-red dolomite mottled mudstone: abrupt basal contact.

Inga Mbr

4690' 3"-4693' 3"	Dolostone/argillaceous dolostone: very thin beds and laminae.
4693' 3"-4694'	Mudstone: brick-red. Mottled. Basal contact not preserved.
4694-4696' 2"	Dolostone/anhydritic dolostone: zones of coarse laminae. Abrupt basal contact.
4696' 2"-4696' 4"	Mudstone: grey. Abrupt basal contact.
4696' 4"-4700' 4"	Dolostone: very finely crystalline. Thinly bedded. Argillaceous. Abrupt basal contact.

Base of Inga Mbr

4700' 4"-4704' 6"	Dolomitic mudstone: light to medium grey. Mottled fabric. Abrupt basal contact.
4704' 6"-4706' 7"	Dolostone: coarse, undulose laminae - possibly due to mild deformation or are stromatolites. Possibly anhydritic. Abrupt basal contact.
4706' 7"-4707' 11"	Dolomitic mudstone: brownish grey. Faintly mottled.
4707' 11"-4708' 2"	Dolomitic mudstone: intensely mottled
4708' 2"-4711' 2"	Mudstone: intensely mottled. Gradational color change to grey from underlying mudstone.
4711' 2"-4717' 7"	Mudstone: light brick-red. Mottled.
4717' 7"-4717'11"	Very thinly interbedded dolsotone-very fine grained sandstone: Abrupt basal contact.
4717' 11"-4718' 8"	Mudstone: brick-red. Abrupt, regular basal contact with a 2 mm clay laye - looks like chemical erosion.
4178' 8"-4719' 2"	Anhydrite: crystalline. Abrupt basal contact.

North Pine Mbr

4719' 2"-4721' 7"	Dolostone: very finely crystalline. Argillaceous. Brownish grey. Mottled to lenticular fabric. Possibly burrowed in places. Abrupt, irregular basal contact.
4621' 7"-4723' 8"	Dolostone/anhydritic dolostone: coarsely bedded with local indications of soft sediment deformation. Argillaceous. Abrupt basal contact.
4723' 8"-4726' 3"	Argillaceous dolostone: coarsely laminated to thinly bedded.
4726' 3"-4727' 3"	Dolostone: dark grey, lighter grey near base. Contains irregular lenses and patches of very fine grained sandstone.
4727' 3"-4727' 5"	Sandstone-mudstone: a lower interval of finely interlaminated mud and sand overlain by 1" bed of sandstone.
4727' 5"-4729' 3"	Sandstone/argillaceous sandstone: extremely load deformed very fine grained sandstone and thin intervals of mudstone. Very little original bedding preserved except in basal 4".
4729' 3"-4733' 3"	Sandstone: light grey to whitish grey. Fine grained. Low to medium angle

	cross beds. Abrupt basal contact.
4733' 3"-4734' 5"	Sandstone: some argillaceous zones. Completely disrupted, either through bioturbation of soft sediment deformation.
4734' 5"-4735' 6"	Argillaceous sandstone: throughly bioturbated argillaceous sandstone. No remnants of bedding remain. Gradational base.
4735' 6"-4739' 4"	Mudstone: partially dolomitized. Minor deformation. Abrupt basal contact.
Base of North Pine Mbr	
4739' 4"-4747' 4"	Dolostone-anhydrite: mostly coarsely laminated to thin bedded with a few thicker beds of dolostone. Abrupt basal contact wiht a mm-thick clay layer.
4747' 4"-4752'	Dolostone: greenish grey. Very finely crystalline. No visible sedimentary structures or fabric. Abrupt basal contact
4752'-4752' 4"	Anhydrite: dolomitic. Crudely bedded. Abrupt basal contact.
4752' 4"-4754' 5"	Dolostone: similar to that at 4747' 4". Abrupt basal contact.
4754' 5"-4759' 11"	Dolostone/argillaceous dolostone: contains mudstone laminae. Finely laminated to very thinly bedded. Near base are irregular, lenticular beds separated by argillaceous material.

6-33-85-23W6

Red mudstone facies within the Coplin Mbr (4651' 5" - 4654' 1")

Interval 4678' 5" - 4679' 10"

North Pine Mbr (4723' 11" - 4726' 3"

Interval 4739' 4" - 4747. 3"

Part 4: northeast British Columbia, Townships 86 to 88W6

CONTENTS

Texaco et al Boundary 5-1-86-14W6
Core 1: 1434-1452 m Rec. ?full. 13 boxes. Slabbed.
Examined 21-24th September 1999

CHARLIE LAKE FM

1434-1434.89 m	Mudstone: brownish grey; no visible sedimentary structures. Possibly dolomitic. Transitional with underlying unit.
1434.89-1434.99 m	Anhydrite-mudstone: lenses and bands of light grey anhydrite encased in brownish-grey, ?dolomitic mudstone. Base of interval marked by a 3 mm-thick band of black, ?organic-rich clay resting abruptly on underlying unit.
1434.99-1435.19 m	Brecciated dolomudstone: in situ fracture breccia. Anhydrite-filled fractures. Vaguely bedded/laminated mudstone. Abrupt, inclined basal contact.
1435.19-1435.22 m	Anhydrite: 3 to 5 cm thick - variable due to inclined upper contact. Coarse, uneven laminae. Abrupt, planar, lower contact.
1435.22-1435.25 m	Dolostone-anhydrite: fine to coarse interlaminae of dolomite and anhydrite. Laminae are broadly undulose. Abrupt basal contact.
1435.25-1435.31 m	Dolomudstone: yellowish grey, Convolute laminae. Clay partings.
1435.31-1438.29 m	Dolostone; mottled to banded appearance. Light grey, brownish grey with patches of black (possibly dead oil). A few remnants of planar bedding. Lower 18 cm contains rounded, brownish grey dolostone clasts, a few mm to 3.5 cm long, although most are <1 cm, “floating” in a light grey mudstone. Abrupt basal contact.

DOIG FM

1438.29-1446.3 m	Sandstone-mudstone: overall coarsening-upward interval. Basal 1.97 m is mudstone-dominant, with increasing sand content upward. Lowermost 90 cm mostly brownish dark grey mudstone with scattered laminae/lenses of silt/sand. Some of the sandier beds in the lower 1.97 m contain a few vertical burrows. Lower interval rest abruptly on underlying beds. Upper 6.04 m consists of beds of very fine grained sandstone up to 25 cm thick interspersed with zones of interlaminated mud-sand. Planar laminae the dominant sedimentary structure; a few current-ripple laminated sand lenses and scattered occurrences of vertical burrows. Some minor load deformation structures with one bed that is severely deformed. Transition from lower to upper interval marked by a thin, distorted bed of medium grained sandstone.
1446.3-1452 m	Mudstone-sandstone: overall coarsening-upward aspect, but is less sandy than overlying coarsening-upward interval. Basal 85 cm mostly mudstone gradationally overlain by interlaminated to very thinly interbedded mudstone-sandstone (most sandstone beds < 5 cm thick). Planar laminae is the prevalent sedimentary structure; some current-ripple laminae. Scattered occurrences of vertical burrows. Load deformation structures common with a few beds totally contorted.

Esso NFA Boundary Lake 14-1-86-14W6
Core 1: 4286-4336 ft Rec. 50 ft. 11 boxes. Full diameter. Well preserved.
Examined 25 September 2003

CHARLIE LAKE FM

2nd Brown unit	
4286'-4287' 7"	Micritic limestone: Dolomitic. Vaguely bedded. Light grey. Abundant small (mm-scale) pyrite crystals scattered throughout. Between about 4296-4298' mostly dolostone. Abrupt basal contact.
4287' 7"-4308' 9"	Shelly dolostone: Very finely crystalline. A few large fragments of shell debris. Oil stained throughout most of interval. Abrupt basal contact with a mm-thick clay layer.
4308' 9"-4311' 10"	Micritic limestone: Light grey. Numerous clay laminae. Very thin to thin beds. Abrupt basal contact with mm-thick clay layer. Photograph
Boundary Mbr	
4311' 10"-4313' 4"	Dolostone: Very finely to medium crystalline. Scattered bioclastic material. Oil stained. Base masked by oil stain.
4313' 4"-4315' 5"	Interbedded dolostone-anhydrite: thin to thick interbeds. Mildly deformed bedding. Oil stained in upper half.
4315' 5"-4320' 7"	Anhydrite: dolomitic. Grey.
4320' 7"-4321' 10"	Dolostone: very finely crystalline. Oil stained.
4321' 10"-4328 ‘	Anhydrite: light/medium grey. Abrupt basal contact.
4328-4328' 4"	Dolomitic mudstone: brick-red color. Contains a 1 cm dolostone bed. Abrupt basal contact.
Pink unit	
4328' 4"-4335' 6"	Anhydrite: light grey. Massive. Crystalline.

14-1-86-14W6

Oil stained beds of the “2nd Brown Unit”
(4298’ 7” - 4311’ 10”)

Contact between the “2nd Brown Unit”
and the Boundary Mbr at 4311’ 10”

Dome et al Boundary Lake 6-5-86-14W6
Core 1: 1274-1292.25 m 13 boxes. Full diameter. Well preserved.
Examined 25 September 2003

CHARLIE LAKE FM
2nd Brown Unit

1274-1275.77 m	Mudstone: red, mottled. Abrupt, irregular basal contact.
1275.77-1276.81 m	Mudstone: brownish grey; mottled. Gradational basal contact
1276.81-1281.37 m	Mudstone: red; mottled. Numerous sub-vertical and sub-horizontal, anhydrite-filled fractures. Abrupt basal contact.
1281.37-1281.51 m	Dolostone: irregular patches of red mudstone. Abrupt basal contact. .
1281.51-1282.44 m	Dolostone: brownish grey. Probably oil stained. Thin to thick beds of very finely crystalline dolomite. Some mottling in uppermost beds. Some coarsely laminated beds. Basal contact not preserved.
1282.44-1282.54 m	Sandstone: light grey. Very fine grained. Abrupt basal contact. Photograph.

Pink Unit

1282.54-1285.54 m	Anhydrite: predominantly massive with coarse, undulose laminae of anhydrite and dolomite in basal 10 cm and some contorted coarse laminae near top of interval. Abrupt color change at base.
1285.54-1286.66 m	Dolostone: uneven to undulose beds. Possibly stromatolites. Abrupt basal contact.
1286.66-1286.96 m	Interbedded dolostone-mudstone: thin beds. Reddish tint in lower half of interval. Irregular bedding. Abrupt basal contact.
1286.96-1287 m	Anhydrite: pink tint. Abrupt basal contact.
1287-1289.5 m	Anhydrite grading up into anhydritic dolostone. Base not preserved.
1289.5-1289.72 m	Interlaminated to interbedded dolostone and mudstone: Fine laminae. Basal mudstone is brick-red.
1289.72-1290.52 m	Anhydrite: abrupt basal contact.
1290.52-1290.86 m	Dolostone: gradational basal contact.
1290.86-1291.04 m	Mudstone: brick red. Basal contact not preserved.
1291.04-1292.25 m	Anhydrite: dolomitic.

6-5-86-14W6

"2nd Brown Unit"
(1281.37 - 1281.51 m)

"2nd Brown Unit
(bed contact at 1281.51 m)

Stromatolites in the Pink
Unit (1282.54 - 128564 m)

Mark West Stoddart 16-15-86-20W6
Core 1: 1542 - 1552.6 m Rec.10.2/10.6 m (my measurements indicate 10.54 m recovered).
10 boxes. Full diameter. Well preserved.
Examined 28th June 2005

DOIG FM

1542 -1550.70 m	Sandstone-silstone-shale: interlaminated to very thinly interbedded. Shale is black. Beds/laminae of coarse silt to very fine sand. Sandstone/siltstone beds are few mm to few cm thick, with a few thicker beds, one near top of interval is 12 cm thick. Low-relief ripples are common. Scattered, generally small horizontal burrows. [PHOTOS of various facies]. Abrupt basal contact [PHOTO].
1550.70 - 1552.54 m	Sandstone: very fine grained. Medium to dark grey. Two fully preserved erosionally based units. Upper unit is 38 cm thick and consists of a basal coquinal sandstone rapidly grading up into a very fine grained sandstone with scattered bivalve debris [PHOTO]. Base of underlying unit is about 8 cm aboe base of core and is abrupt and load deformed [PHOTO]; internal sedimentary structures not readily seen, but appears to be finely laminated..

16-15-86-20W6

Interval 1542 - 1550.7 m

Coquinal sandstone

Load deformation (1550.7 - 1552.54 m)

Doig Fm facies

Encal et al Montney 16-36-86-20W6
Core 1: 1419-1437 m Rec. ?full. 13 boxes. Full diameter.
Examined sometime between 21-24th September 1999

CHARLIE LAKE FM

1419-1420.9 m	Limestone-dolostone: upper 50-60 cm is dolomitic limestone; remainder mostly dolostone to calcareous dolostone. Complex mottled appearance of light and dark grey to black patches, bands, lenses and wisps (diagenetic fabric). A few remnants of original planar bedding. Transitional with underlying unit.
1420.9-1423.04 m	Mudstone: light to medium grey with dark grey mottles (dolomitic?). Rusty colour of weathered surface suggest presence of significant amounts of an iron-bearing mineral - probably pyrite. Vague, uneven beds. Load deformation structures common. Abrupt basal contact.
1423.04-1424.09 m	Dolostone: complex mottled fabric of dark and brownish grey patches. Long transitional zone with underlying unit (about 10 cm). Load deformed throughout.
1424.09-1426.29 m	Mudstone-dolostone: similar to above but with less deformation. Basal contact is a 5 to7 cm thick transitional zone of mixing with the underlying sandstone - not sure if it is due to load mixing or diagenetic replacement of the upper few cm of sandstone with dolomite.

HALFWAY FM

1426.29-1426.95 m	Dolomitic to calcareous sandstone: complex fabric due to carbonate partially replacing the sand grains. At least three zones of upward increasing carbonate - top of each zone capped by a pure carbonate or a sandy carbonate; lower part of each zone is sandstone with patchily developed carbonate. Transitional into underlying sandstone.
1426.95-1437 m	Sandstone: fine to medium grained. Light to medium grey. Upper 2 to 3 m has blotchy appearance due to incipient carbonate cement. Cross bed sets.

Gulf Boundary Lake North 16-25-87-15W6
Core 1: 1314-1332 m Rec. 18 m. 13 boxes. Slabbed
Core 2: 1332-1341 m Rec. 9 m. 7 boxes. Slabbed.
Examined sometime between 21-24th September 1999

CHARLIE LAKE FM

1314-1317.05 m	Mudstone: brick-red. Unevenly bedded to disrupted fabric, with some small-scale brecciated beds. Patches of light grey dolomitic mudstone or replacement dolomite (some of the dolomite may have replaced anhydrite nodules - remnant nodular shape). Abrupt basal contact.
1317.05-1317.34 m	Anhydrite: light grey. Coarsely laminated to uneven, very thin beds. A few horizons of nodular anhydrite. Abrupt basal contact.
1317.34-1319.31 m	Mudstone: highly disrupted to brecciated fabric. Brick-red. Abrupt basal contact.

1319.31-1319.88 m	Anhydrite: similar to that above. Basal contact a 1 cm transition zone of interlaminated mudstone-anhydrite.
1319.88-1321.42 m	Mudstone: light brown/tan colour. Disrupted to brecciated fabric. Transitional basal contact.
1321.42-1321.57 m	Anhydrite: upper 13 cm consists of nodular to unevenly bedded anhydrite. Lower 1 to 2 cm consists of coarsely laminated anhydrite filling in a depression on underlying strata.
1321.57-1321.63 m	Dolostone: light brownish grey and medium brownish grey. Finely laminated - planar laminae in lower part of bed and small domes in upper part (laminae could be stromatolites). Basal 1 cm of bed consists of recrystallized dolomite resting on an uneven surface of the underlying bed.
HALFWAY FM	
1327.28-1323.13 m	Sandy Coquina: Dolomitic. Small to large bioclasts (probably bivalves) and some mudstone clasts in a sandy dolomite to dolomitic sandstone matrix. Clasts aligned predominantly subhorizontally but where there is a high density of clasts they may be subvertically aligned. Possible consists of three beds. Lowest 25 cm is mostly sandstone with scattered bioclasts: upper part of interval is clast-dominant with a thin (1-2 cm)sandy horizon that could be an indication of a bed split. Moldic porosity is common but interconectedness is modest, hence permeability is probably not very high.
1323.13-1326.7 m	Sandstone: very fine to fine grained. 15 to 25 cm-thick beds. Scattered bivalve debris. Beds consist of massive sandstone or bioclastic sandstone grading up into a thin zone of argillaceous sand. Also present are thin zones of finely laminated sandstone with extensive replacement of sand by dolomite. A few vertical burrows. Some dolomite-filled sub-horizontal fractures. Lowest bed rests abruptly on underlying coquina.
1326.7-1327.19 m	Coquina: lower 15 cm consists of densely packed bivalve clasts in a dolomitic sand matrix, abruptly overlain by 14 cm of shelly sandstone capped by 1 to 2 cm of dolomite replacing the sandstone. Not sure if the contact between the two lithotypes is a true bedding surface or a rapid fining-upward change. Abrupt basal contact.
1327.19-1327.28 m	Sandstone: very fine grained Contains a large dolomite nodule that appears to be a pseudomorph of anhydrite.
1327.28-1329.58 m	Coquina: similar to those above. Oil stained in basal 40 cm and three isolated oil stained zones throughout remainder of interval. A few thin sandstone layers may indicate there are several beds but difficult to be definitive. One of the sandy layers is partially replaced by anhydrite. Basal contact not preserved.
1329.58-1330.03 m	Sandstone: fine grained. Light grey. Scattered bivalve debris. Scattered anhydrite nodules. Fracture breccia in upper part. Basal contact not preserved.
1330.03-1330.8 m	Coquinal sandstone: mid-part is oil stained. May consist of several beds. Dolomitic. Basal contact not preserved.
1330.8-1332 m	Sandstone: fine grained. Dolomitic. Abundant, very small bioclasts. Spotted appearance (1 mm white spots) - carbonate or anhydrite? Small

moldic pores. Scattered oil stained zones.

?DOIG FM

1332-1334.17 m Sandstone: very fine to fine grained. Medium grey. Argillaceous in places. Laminae to very thin beds. Vague, uneven bedding; generally no visible sedimentary structures. Some load deformation structures. Vertical burrows present in some argillaceous zones. Transitional basal contact.

1334.17-1335.16 m Sandstone: very fine to fine grained. White spots (1 mm) throughout - carbonate or anhydrite? No visible sedimentary structures. Appears to be a single unit. Load deformed basal contact.

1335.16-1337.46 m Sandstone-mudstone: laminae to thin beds of very fine grained sandstone interbedded with some thoroughly bioturbated argillaceous sandstone and interlaminated with mudstone. Gradational with underlying unit.

1337.46-1341 m Mudstone: dark grey to black. Laminae and very thin beds of coarse silt/very fine sand. Scattered bioclasts. Between 1339.06-1339.66 m there is a muddy sandstone, the mixing of lithotypes due to intense load deformation. Interval tends to be sandier up-section.

Archean Oxbow Rigel 6-33-88-16W6

Core 1: 1137 - 1144.25 m. 6 boxes. Full diameter. Well preserved. Although in lower part of core it consists of small core segments.
Examined 15th September 2004

Cored interval includes the Siphon Mbr but it is difficult to correlate the distinct log response to the core lithology. Log depths of the Siphon Mbr are 1141-1143 m: the top of the Siphon may be at core depth 1140.59 m but the base is not readily identified in the core.

CHARLIE LAKE FM

1137 - 1138.12 m Dolostone: mottled fabric. Crudely bedded. Sandy in basal 12 cm. Typical Charlie Lake facies. Abrupt, inclined basal contact with a thin clay layer.

1138.12 - 1138.19 m Dolomitic sandstone: fine grained. Uneven, coarse, horizontal bedding. Small (< 1 cm) discoidal mudstone clasts. Erosional basal contact - slightly load deformed.

1138.19 - 1140.59 m Dolostone: mottled fabric. Transitional with underlying unit.

?Siphon Mbr

1140.59 - 1141.18 m Sandstone: very fine grained. Dolomitic. Thin beds separated by very thin beds of mudstone or clay laminae. Disrupted beds. Some styolites. Transitional with underlying unit.

1141.18 - 1141.33 m Sandstone: very fine grained. Finely laminated thin beds separated by mm-thick clay laminae. Very low amplitude ripples (may be wave ripples). Near base of unit there is a 2 cm layer of replacement anhydrite nodules. Transitional with underlying unit.

1141.33 - 1141.99 m Sandstone: very fine grained. Contains streaks and laminae of clay. Highly disrupted fabric in top half of interval and basal 5 cm. Between

	the disrupted intervals the sandstone is less argillaceous and less disrupted. Abrupt basal contact with a 3-5 mm black clay layer separating the sandstone from the underlying interval.
1141.99 - 1144.01 m	Sandstone: fine grained. No obvious sedimentary structures.
1144.01 - 1144.25 m	Missing core

1138.19 m

Base of interval 1138.12 - 1138.19 m

Siphon Mbr: interval 1140.59 - 1141.18 m

Siphon Mbr: interval 1141.18 -1141.33 m

Contact at 1141.99 m

Decl. Cache 6-22-88-22W6
Core 1: 4905 - 4935 ft. 7 boxes. Full diameter. Well preserved.
Examined 14th September 2004

CHARLIE LAKE FM

4905 - 4910'	Sandstone-argillaceous sandstone: Burrow mottled; possible soft sediment deformation. Very fine grained. Dark grey. Abrupt basal contact.
Artex Mbr	
4910 -4919' 6"	Sandstone: fine grained. Medium to dark grey. Medium to high angle cross beds except in basal 1 ft where bedding is sub-horizontal. Cross bedding appears to be unidirectional. Thin clay layers/laminae along some cross beds. Incipient dolomite/anhydrite cement. Basal contact is vague.
Base of Artex	
4919' 6" - 4931'	Sandstone/argillaceous sandstone: burrow mottled; possibly some soft sediment deformation. Rapid transitional basal facies change.
4931 - 4934'	Mudstone: silty-sandy. Dark grey. Mottled to vaguely bedded.

6-22-88-22W6

Interval 4905’ - 4910’

Base of 4905 - 4910’ interval;
top of Artex Mbr

6-22-88-22W6

Artex Mbr

Facies in interval 4919’ 6” - 4931”

CanHunter et al Bernadet 6-10-88-25W6

Core 1: 1645 - 1662 m 9 boxes. Slabbed. Generally well preserved.
Core 2: 1662 - 1665.6 m 3 boxes. Slabbed. Generally well preserved
Core 3: 1665.8 - 1672.4 m 5 boxes. Slabbed. Generally well preserved
Core 4: 1672.4 - 1676.8 m 3 boxes. Slabbed. Generally well preserved
Core and log depths may be mismatched by about 1 m.
Examined 15th September 2004

CHARLIE LAKE FM

1645.8 - 1647.07 m Dolomitic mudstone: light grey with reddish tint in mid-part of interval. Lower 3 cm contains fine laminae grading up into poorly defined, thin, disrupted beds. Separated from underlying interval by a thin layer of black clay.

1647.07 - 1647.16 m Dolostone: very finely crystalline. Earthy grey colour. Basal contact not preserved.

1647.16 - 1647.72 m Mudstone: dolomitic to silty. Dull brick-red colour. Poorly defined to disrupted bedding. Abrupt basal contact marked by a thin clay layer.

1647.72 - 1647.8 m Anhydrite: finely laminated to very thinly bedded. Clay laminae at top and base of interval. Abrupt basal contact.

1647.8 - 1648.5 m Mudstone: reddish grey mudstone grading up into dull-red silty/dolomitic mudstone. Similar to overlying interval. Abrupt basal contact on which lies a layer of elongate, irregular anhydrite nodules.

1648.5 - 1648.83 m Mudstone: brick-red. Abrupt basal contact marked by a grey clay layer.

1648.83 - 1648.88 m Anhydrite: A 3-5 mm thick black clay layer at base. Irregular upper and lower contact.

1648.88 - 1649.99 m Mudstone: red to grey. Some silty beds. Gradational basal facies change.

1649.99 -1652.14 m *Sandstone:* several sandstone beds separated by dolomitic mudstone intervals a few cm thick. Bed contacts are poorly preserved. Vague indications of horizontal bedding at a few horizons. Near base there is a thin interval rich in pyrite nodules. Basal contact not preserved.

1652.14 - 1652.85 m Mudstone: dolomitic. Black mudstone interbedded with earthy grey dolomitic mudstone. Some intervals of very thin beds and disrupted beds. Basal contact not preserved.

?2nd Green Unit

1652.85 - 1653.33 m Limestone/dolostone: coarse, undulose laminae of limestone/dolostone. Lower part of interval has replacive fabric which disrupts the laminae. Possibly stromatolites. Rapid transitional basal facie change.

1653.33 - 1653.59 m Dolostone/dolomudstone: very thin beds grading up into coarse laminae. Minor bed distortion. Basal contact not preserved.

1653.59 - 1653.8 m Sandstone: very fine grained. Dolomitic. Disrupted beds. Severely load deformed in basal part - mixed into underlying bed.

Base of 2nd Green Unit

1653.8 - 1654.17 m Dolomudstone: thin to thick beds - light grey alternating with dark grey. Abrupt basal contact.

1654.17 - 1654.29 m Dolomudstone-mudstone: coarse laminae in lower part grading up into alternating mudstone-dolomudstone. Lower, coarse laminae may be

stromatolites. Basal contact not preserved.

"Limestone or A Unit"

1654.29 - 1657.09 m	Dolomitic limestone: dark grey. Abundant styolites and horizontal, calcite/dolomite-filled fractures. Appears to argillaceous in lower part of interval.
1657.09 -1662 m	Missing core (base of Limestone/A Unit in this interval)
1662 - 1665.2 m	Mudstone: light to medium grey. Laminae and very thin interbeds of silt/sand.
1665.2 - 1665.8 m	Missing core
1665.8 - 1676.8 m	Interbedded sandstone-mudstone: Very fine to fine grained sandstone. predominantly sandstone below 1672 m. Slight reddish tint in basal 1 m. Thick sandstone beds devoid of sedimentary structures. Mudstone intervals contain burrowed and disrupted beds of sandstone.

6-10-88-25W6

2nd Green Unit: interval 1652.85 - 1653.33 m

Interval1665.8 1676.8 m
(lower Charlie Lake Fm)

Texaco West Blueberry 14-20-88-25W6
Core 1: 1399 - 1405.7 m 5 boxes. Slabbed. Well preserved
Examined 14th September 2004

CHARLIE LAKE FM

1399 - 1399.73 m	Dolomitic mudstone-argillaceous dolostone: very finely crystalline dolostone. Light grey. Scattered replacement anhydrite nodules. Basal 25 cm contains intervals of disrupted laminae. Basal contact not preserved.
1399.73 - 1400.01 m	Sandstone-mudstone: interlaminated to very thin interbeds. Scattered horizontal burrows. Minor bed deformation. Basal mudstone rests abruptly on underlying unit.
1400.01 - 1401.51 m	Mudstone-siltstone: very thin to thin interbeds. Medium to dark grey. Disrupted fabric - some due to bioturbation. Mm-thick clay layer at base of interval.

Blueberry Mbr

1401.51 - 1405.7 m	Sandstone: very fine to fine grained. Dark grey. Argillaceous in upper 30-40 cm. Bulk in interval is anhydrite mottled with vague indications of low-angle cross beds. Lower 40 cm is lighter grey than that above and contains well defined very low-angle cross beds.

Log character suggests core penetrates base of Blueberry Mbr - but it doesn't, consequently the log/core depths are mismatched. Equivalent log depths should be about 0.5 to 1 m higher.

14-20-88-25W6

Interval 1399.73 - 1400.01 m

Top of Blueberry Mbr at 1401.51 m

Anhydrite mottling in the Blueberry Mbr.

Low-angle cross-beds in the lower part of the Blueberry Mbr

Part 5: northeast British Columbia, map areas 93 and 94.

CONTENTS

b-40-L/94-H-7	1167 - 1176 m
a-12-D/94-H-8	3470 - 3530 ft
d-89-D/94-H-10	3320 - 3380 ft
d-71-E/94-H-11	3480 - 3530 ft
c-18-A/94-H-12	1333 - 1260 m
c-68-A/94-H-12	3720 - 3804 ft
d-51-B/94-H-12	100 - 1118.7 m

Aquitaine Sun Down a-23-I/93-P-7
Core 4: 3145-3163 m Rec. 18 m. 13 boxes. Slabbed.
Examined sometime between 21-24th September 1999

CHARLIE LAKE FM

3145-3145.42 m	Mudstone: brick-red with light grey patches (few mm to 2 cm diameter) of dolomitic mudstone. Disrupted fabric. Abrupt basal contact.
3145.42-3146.59 m	Anhydrite: light grey. Coarsely laminated to thinly bedded. Some replacement dolomite and dolomite laminae.
3146.59-3155.93 m	Mudstone: light to medium grey with patches of dark grey. Varies from vaguely and unevenly bedded to disrupted fabric, to a diagenetic fabric caused by replacement by dolomite. Abrupt basal contact.
3155.93-3156.17 m	Dolostone-calcareous dolostone: very finely crystalline or dolomicritic. Coarsely laminated to very thinly bedded. Medium to dark grey. Basal contact not preserved.
3156.17-3157.47 m	Dolostone: medium to dark grey. Massive or zones with a complex diagenetic fabric (mixed light and dark colours). Basal contact a 5-7 cm zone of dolomite cemented sandstone to sand being replaced by dolomite.

HALFWAY FM

3157.47-3157.95 m	Sandstone: very fine grained. Medium grey with dark grey patches - caused by irregular replacement by dolomite. Uneven, thin beds.
3157.95-3163 m	Sandstone: very fine grained. Light grey. Clay partings throughout indicate planar beds. Most of core below about 3160 m is in small fragments.

Canadian Hunter Brassey d-71- C/93-P-10 (2d-71-D/93-P-10)
Core 3: 2939 - 2957.2 m. Rec. 14.95/18.2 m. 11 boxes. Slabbed. Generally well preserved but the Artex sandstone is broken into small core lengths
Core/log depths appear to be mismatched by about 0.75 - 1 m (i.e. equivalent log depth is deeper than core depth)
Examined 28th June 2005

CHARLIE LAKE FM

2939 - 2942.16 m	Mudstone: dolomitic. Light to medium grey. Sedimentary structures not readily seen except in basal 30 cm which appears to be burrow mottled. Abrupt basal contact.
2942.16 - 2942.26 m	Siltstone-mudstone: very thin siltstone beds separated by mudstone. At least 3 siltstone beds. Abrupt basal contact.

Artex Mbr

2942.26 - 2942.99 m	Sandstone: very fine grained. Faintly mottled probably due to incipient anhydrite cement. No obvious sedimentary structures. Abrupt basal contact.
2942.99 - 2946.51 m	Sandstone: fine grained. Spotted appearance - probably due to incipient anhydrite cement. Black colour because of oil staining. Multiple sets of medium to high angle cross beds - separated by reactivation surfaces.

	Abrupt basal contact.
Base of Artex Mbr	
2946.51 - 2954.1 m	Mudstone-siltstone: light grey. Silty mudstone. Siltstone beds range from finely laminated to thoroughly bioturbated. Some dolomite mottling in a few places.
2954.1 -2957.2 m	Missing core

2-d-71-D/93-P-10

Oil stained Artex Mbr above basal contact at 2946.51 m

Top of Artex Mbr (2942.26 m)

Home Sundown d-13-H/93-P-10

Core 1: 2541-2551 m Rec. 4.8 m. 8 boxes. Full diameter.
Core 2: 2551-2561.3 m Rec. 10.55 m. 8 boxes. Full diameter
Core 3: 2561.3-2562.6 m Rec. 0.5 m. 1 box. Full diameter
Core 4: 2562.6-2569.6 m Rec. 6.25 m. 5 boxes. Full diameter.
Examined sometime between 21-24th September 1999

CHARLIE LAKE FM

2541-2544.7 m	Mudstone: dark grey with bands of medium grey in upper 50 cm, remainder mostly medium grey. Scattered large pyrite nodules up to 8 sm long. Uneven and load deformed bedding. Small (few mm) patched of replacement dolomite. Basal contact not preserved.
2544.7-2545 m	Dolostone: dark grey to black. Small blebs and uneven laminae of white, coarsely crystalline dolomite. Possibly argillaceous. Gradational with underlying strata.
2545-2546.5 m	Mudstone: as above. Medium grey. Vague uneven, disrupted bedding. Basal contact appears to be rapidly transitional.
2546.5-2548.45 m	Mudstone: contains large sandstone balls (intense load deformation). Patchy colours suggests some dolomite replacement of the rock.
2548.45-2548.67 m	Dolostone: light grey. Very finely crystalline. Coarsely laminated. Abrupt basal contact.

HALFWAY FM

2548.67-2548.84 m	Sandstone: fine grained. Medium grey. Disrupted-looking fabric due to patchy dolomitization.
2548.84-2549.5 m	Sandstone: fine to medium grained. 1-3 cm-thick beds separated by clay partings. Uneven, planar bedding.
2549.5-2560.25 m	Sandstone: fine grained with some zones of medium grained sand. Light grey. Cross bed sets. Some clay doublets suggestive of tidal influence. There are a few zones of very fine grained sandstone that are intensely load deformed. Basal contact not preserved but rapid lithology change and log response suggest an abrupt contact.
2565.25-2566.95 m	Mudstone: dark grey to black. Thin (<5 cm) interbeds of very fine grained sandstone - commonly load deformed. Abrupt basal contact.
2566.95-2567.9 m	Sandstone: very fine grained. Light grey. Very thin (<2cm) planar beds.
2567.9-2568.09 m	Mudstone: fine, planar laminae of silt/very fine sand.

NOTE:
Depth for mudstone at 2565.25 m taken from log response due to badly broken nature of core.

Possible major erosion surface at 2560.25 m

Home et al Rigel d-87-K/94-A-10
Core 1: 1269-1275.6 m Rec. 6.3 m 5 boxes Slabbed
Core 2: 1275.6-1290.25 m Rec. 14.5 m 10 boxes. Slabbed
Examined between 21-24th September 1999

CHARLIE LAKE FM

1269-1274.34 m	Three cycles of mudstone grading up to dolostone: two full cycles and lower part of a third. Brownish grey mudstone grading up into medium to dark grey dolostone. The gradation is seen as dolomite replacing mudstone through a series of bands, lenses and irregular patches, finally grading into a dolostone. Base of cycles may be abrupt or rapidly gradational. No visible sedimentary structures. Disrupted fabric.
1274.34-1274.4 m	Mudstone or dolomudstone: light to medium grey. Fine to coarse undulose laminae. Basal 1 cm is mottled - due to recrystallization. Abrupt, uneven contact.

HALFWAY FM

1274.4-1275.3 m	Sandstone: light to medium grey. Fine grained. Mottled appearance due to incipient dolomite cementation/replacement.
1275.3-1275.6 m	Missing core.
1275.6-1276.5 m	Sandstone: similar to above. Traces of cross bedding in zones least affected by cementation/replacement. Gradational with underlying strata.
1276.5-1281.5 m	Sandstone: fine grained. Multiple beds. Base of interval marked by a 10 cm-thick coquinal sandstone resting abruptly on underlying beds. Massive to cross bedded. Locally occurring, mm-size mudstone clasts.
1281.5-1283.9 m	Sandstone: medium grey. Very fine to fine grained; slightly argillaceous. Mostly massive but with two zones of current-ripple laminae. Rapidly gradational with underlying beds.

DOIG FM

1283.9-1290.1 m	Sandstone-mudstone: dark grey. Sandstone is predominant. Some finely laminated beds. Load deformation structures are common.

NOTE: possible major erosion surface at 1281.5 m

AEC OGY Fireweed d-13-A/94-A-13
Core 1: 1570-1588.2 m Rec.18.05 m 13 boxes. Slabbed.
Core depth may be about 1 m higher than corresponding log depths.
Examined sometime between 21-24th September 1999

HALFWAY FM

1570-1573.55 m	Dolomitic sandstone: mottled appearance due of patchy development of replacement carbonate. Upper 1 m is mostly sandy dolostone. Transitional with underlying sandstone.
1573.55-1577.68 m	Sandstone: dark grey. Fine grained with coarse grains of white and black chert in basal 18 cm. Mostly massive with some patches of cross beds. Erosional basal contact.
1577.68-1588.05 m	Sandstone: light to medium grey. Mostly fine grained, locally medium grained. Upper 1.5 to 2 m slightly argillaceous and has a mottled appearance. Bulk of interval consists of erosionally-based, cross bedded units up to1 m thick. Clay doublets on cross beds suggest tidal influence.

NOTE: possible major erosion surface at 1577.68 m.

Wainoco et al Inga c-26-B/94-A-13
Core 1: 1576 - 1585 m. 7 boxes. Full diameter. Well preserved.
Core 2: 1585 - 1603 m. 13 boxes. Full diameter. Well preserved
Examined 14th September 2004

HALFWAY FM

1576 - 1578.66 m	Sandstone-mudstone: predominantly very fine to fine grained sandstone with lenses and laminae of mudstone. Some lenticular sandstone beds. Minor load deformation and burrows. Basal bed is a 2 cm mudstone resting abruptly on underlying sandstone.
1578.66 - 1579.06 m	Sandstone: fine grained with a few mm of coarse grains at base of interval. Abrupt basal contact.
1579.06 - 1581.36 m	Sandstone: fine grained grading up into very fine grained in upper few cm. Planar cross beds throughout - except in top 6 cm which contains disrupted argillaceous sandstone. Clay and carbonaceous debris on some cross beds. Appears to be a single depositional unit. Abrupt basal contact.
1581.36 - 1584.01 m	Interbedded sandstone-mudstone: predominantly very fine to fine grained sandstone. Beds range from few cm to 15 cm thick. Load deformation is common. - some quite severe. Some horizontal burrows. Abrupt basal contact.
1584.01 - 1584.43 m	Sandstone: fine grained grading up into 5 cm of argillaceous sandstone/sandy mudstone. No visible sedimentary structures.
1584.43 - 1585 m	Missing core
1585 - 1591.6 m	Interbedded sandstone-mudstone: beds up to 50 cm thick. Very fine to fine grained sandstone with a few beds of medium grained sandstone. Most beds are load deformed and some of the medium grained sandstone

	beds have very low-angle cross beds. Some horizontal burrows. Mm-size pyrite nodules are present in a few horizons - usually concentrated in thin, cm-scale bands.
1591.6 - 1595.55 m	Sandstone: very fine to fine grained. At least 6, erosionally-based beds with cross bedding. Medium to high angle cross beds. Commonly adjacent beds have opposing dip directions on cross beds. Uppermost bed has poorly defined cross beds; tending to be massive with the top 5 cm disrupted. Abrupt basal contact.
1595.55 - 1602.6 m	Sandstone-mudstone: thin to thick beds of very fine to fine grained sandstone separated by thin, muddy sandstone or sandy mudstone. Beds usually 15-30 cm thick, one over 1 m thick. Very low angle cross beds are common. Argillaceous units commonly load deformed.
1602.6 - 1603 m	Missing core

NOTE: Most significant facies change is at 1581.36 m where high angle cross bedded sandstone rests erosionally on underlying beds - this could be a significant erosion surface.

c-26-B/94-A-13

1581.36 m

Part of interval 1879.06 - 1581.36 m

WestNat et al Blueberry d-6-D/94-A-13
Core 1: 5200 - 5252 ft. 11 boxes. Full diameter. Well preserved.
Core 2: 5252 - 5287 ft. 8 boxes. Full diameter. Well preserved
Core 3: 5287 - 5347 ft. 12 boxes. Full diameter. Well preserved
Examined 14th September 2004 and 29th June 2005

CHARLIE LAKE FM

5200 - 5202'	Mudstone: contains a few lenses/layers and thin beds of anhydrite. In palces anhydrite has pseudo-brecciated appearance. Dolomitic - in places beds are dolomicrite. Faintly mottled in places. Abrupt basal contact.
5202 - 5203' 2"	Anhydrite: minor intercalations of dolomudstone. Crudely bedded, Dirty white on outer core surface; medium grey on fresh surface. Abrupt basal contact.
5203' 2" - 5205' 10"	Mudstone - dolomudstone: contains a 7" interval of intercalated anhydrite-mudstone in middle of unit. Varies from finely laminated to very thinly bedded to vaguely bedded. Abrupt basal contact.
5205' 10" - 5207' 6"	Anhydrite: coarsely laminated to very thinly bedded. Mudstone laminae present a few cm above base of interval. Abrupt basal contact.
5207' 6" - 5209' 2"	Dolomudstone: Vaguely bedded to mottled. Local small patches of anhydrite - more common in basal few cm. Irregular, abrupt basal contact.
5209' 2" - 5209' 9"	Anhydrite: Coarsely laminated to very thinly bedded. Abrupt basal contact.
5309' 9" - 5210' 9"	Mudstone - dolomudstone: Finely laminated to very thinly bedded. Abrupt basal contact.
5210' 9" - 5214'	Anhydrite: three distinct units: A. Lower unit: medium to coarse laminae in basal few cm grading up into disrupted beds. Abrupt basal contact. B. Middle unit: coarsely laminated; minor bed deformation. Basal contact not preserved. C. Upper unit: faint, disrupted thin beds. Abrupt basal contact.
5214 - 5215' 7"	Dolomudstone - mudstone: Vaguely bedded. Anhydrite-filled fractures. Abrupt basal contact.
5215' 7" - 5218' 6"	Anhydrite: thinly bedded. Basal few cm consists of interbedded anhydrite-mudstone. Rapid transitional basal contact.
5218' 6" - 5219' 1"	Mudstone - siltstone: dark grey. Finely laminated to very thinly bedded. Abrupt basal contact.
5219' 1" - 5225' 5"	Mudstone: dolomitic and silty. Medium grey. Lower two-thirds has very disrupted fabric that may be due to thorough bioturbation and/or soft sediment deformation. Upper third is less disrupted with some remnant bedding planes. Transitional change between upper and lower intervals. Abrupt basal contact.
5225' 5" - 5226' 8"	Mudstone - anhydrite: A distinct finely laminated to very thinly bedded interval of mudstone with a 4" thick, mildly deformed bed of anhydrite near top of interval. Anhydrite is coarsely laminated to very thinly bedded. Abrupt bed contacts for anhydrite unit. Abrupt basal contact.
5226' 8" - 5242' 8"	Mudstone - dolomiudstone: a number of units separated by abrupt bedding

	surfaces and colour variations. Some anhydrite beds/lenses in upper1.5'. Zones of burrow mottling and vague, uneven bedding. A few horizons with discrete burrows. Burrows mostly horizontal. Abrupt basal contact.
5242' 8" - 5244' 8"	Anhydrite: vaguely bedded. Deformed clay laminae in lower 6". Abrupt basal contact.
5244' 8" - 5249' 3"	Mudstone: silty to sandy. Finely laminated to very thinly bedded. Tendency to become sandier/siltier up-section. Low-relief ripples. About 9" above base there is a 4" thick anhydrite bed.
5249' 3" - 5252'	Missing core
5252 - 5255' 3"	Shale: dark grey to brownish black. Fine silt laminae. Scattered mm-scale anhydrite nodules with a zone of more densely spaced nodules at about 5254' 2". Lower 1.3 ft is dolomitic.
5255' 3" - 5259' 4"	Dolostone: sandy dolostone grading up into dolostone, in turn grading up into argillaceous dolostone.. Vaguely bedded and laminated. Abrupt basal contact.
Blueberry Mbr	
5259' 4" - 5260' 11"	Sandstone: light grey with dark grey patches. Fine grained. No visible sedimentary structures.
5260' 11" - 5266' 2"	Sandstone: dark grey. Fine grained. Anhydrite mottles - incipient cementation. Possibly oil stained. No visible sedimentary structures.
5266' 2" - 5269' 2"	Sandstone: dark grey. Fine grained. Faintly cross bedded - low to medium angle. Possibly oil stained. Basal contact poorly preserved.
5269' 2" - 5271' 8"	Sandstone: dark grey. Fine grained. Vaguely bedded with some zones of disrupted bedding. Possibly oil stained. Abrupt colour change at base.
5271' 8" - 5272' 9"	Sandstone: fine grained. Light grey. No visible sedimentary structures. Abrupt basal contact.
5272' 9" - 5273' 1"	Sandstone-mudstone: very thin to thin interbeds. Laminated. Some lenticular sandstone beds. Some possible burrows. Gradational basal facies change.
5273' 1" - 5275' 4"	Dolomitic sandstone: very fine to fine grained. Vague, irregular beds. Slightly argillaceous. Load deformed basal contact.
Base of Blueberry Mbr	
5275' 4" - 5285' 10"	Mudstone: silty, dolomitic. Contains two thin beds of anhydrite. Burrow mottled to vaguely bedded.
5285' 10" - 5287'	Missing core
5287' - 5291' 10"	Sandstone-mudstone: bioturbated to disrupted fabric imparting a “clotted” look.
5291' 10"- 5297' 2"	Sandstone: contains irregular mudstone lenses. Similar to overlying unit but with less mudstone. Abrupt basal contact overlain by mud-clast bearing, 1 cm thick sandstone bed.
5297' 2" - 5309' 7"	Mudstone: dolomitic. Blebs and small lenses of siltstone. Burrow mottled. Scattered, 5-10 cm thick beds of finely laminated, contorted anhydrite. Tops of anhydrite beds chemically eroded and capped by a mm-thick clay layer. Abrupt basal contact.
Inga Mbr	
5309' 7" - 5314' 7"	Sandstone: fine grained. Medium to dark grey. Massive to

	disrupted/bioturbated fabric. Argillaceous in upper 30 cm where bioturbation is common. Abrupt basal contact.
Base Inga Mbr 5314' 7" - 5347'	Mudstone: Finely laminated to bioturbated. Abundant silt laminae. Contains a few thin anhydrite beds - beds mildly deformed. Burrow mottled in places. Some moderately deformed mudstone beds.

d-6-D/94-A-13

Interval 5219’ 1” - 5225’ 5”

Interval 5225’ 5” - 5226’ 8”

d-6-D/94-A-13: Cored Blueberry Mbr

CDR Fireweed d-31-G/94-A-13

Core 6: 4423 - 4455 ft	Rec. 32 ft	7 boxes
Core 7: 4455 - 4469 ft	Rec. 14 ft.	3 boxes
Core 8: 4469 - 4494 ft	Rec. 23 ft	5 boxes
Core 9: 4494 - 4552 ft	Rec. 58 ft	12 boxes

Full diameter. Generally well preserved.
Examined 29th June 2005

These cores were chosen for examination in order to determine the lithological character of the Baldonnel-Charlie Lake contact chosen at 4427 ft from logs - this would fall within core 6. Unfortunately there is no obvious lithological change to account for the very distinct log pick for the contact - unless the core/log depths are mismatched. The most prominent lithological change is between cores 6 and 7, at core depth 4455 ft - if this corresponds to the log change at 4427 ft there would be a 28 ft mismatch (!)

Core 6: vuggy, medium crystalline, dark grey dolostone with an abundance of large vertical, oblique and horizontal, anhydrite-filled fractures. Boxes 6 and 7 contain brecciated dolostone - these appear to be fracture and/or solution collapse breccias.

Core 7: predominantly dark grey dolomitic mudstone to dolomudstone. There are no anhydrite-filled fractures, although there are a few anhydrite nodules. Some brecciated intervals, mostly in the basal part of core. Near top of core there is an over-steepened bedding plane.

Core 8: top 2 ft highly disrupted to brecciated fabric in mudstone. Remainder of core consists of dark grey mudstone/dolomudstone. A few styolites. Vague bedding and some motling. Bootom piec of core has a bitumen coated fracture surface.

Core 9: Top 80 ins similar to lower part of core 8. Below, the core contains interbedded mudstone and anhydrite in units up to 30 ins thick. Anhydrite beds have a distinct rusty colour on outer core surface. Most of anhydrite beds are nodular or irregularly nodular. Basal contacts of anhydrite beds usually abrupt; upper contacts vary from abrupt to rapidly transitional. Some upper contacts appear to have chemical erosion. Mudstone beds are crudely bedded, mottled and mildly deformed.

d-31-G/94-A-13

Core 6: Anhydrite-filled fractures

Core 6 - vuggy dolsotone

Core 8: breccia

Core 6: breccia

Esso Gulf Buick d-6-A/94-A-14
Core 1: 1358 - 1376 m Rec. 18 m 13 boxes
Core 2: 1376 - 1386 m Rec. 10 m 8 boxes
Slabbed. Well preserved although parts of core are broken into short lengths.
Examined 29th June 2005

DOIG FM

1358 - 1359.86 m — Sanding-up interval: a basal 7 mm thick black shale rests abruptly on underlying sandstone. Shale overlain by a 2 cm thick, finely laminated fine grained sandstone beds, in turn abruptly overlain by a 13 cm thick black fissile shale, which in turn is overlain by a bed of very fine grained sandstone. About 60% of interval is silty-sandy mudstone (possibly bioturbated and containing scattered bioclastic debris) and upper part of interval contains erosionally based sandstone beds up to 37 cm thick.

?Top of ATSB

1359.86 - 1379 m — Sandstone: very fine to fine grained. Well sorted. Predominantly low and medium angle cross bedded - all cross beds appear to be oriented in the same direction. Only a few non-cross bedded units - these are homogenous or may contain irregular laminae, and a few have burrows. Top 10 cm contains a conglomeratic layer with clasts of the underlying sandstone in a clay-sand matrix. Conglomerate is 3 cm thick overlain by 7 cm of finely laminated, fine grained sandstone. About 3 cm below the conglomerate there is a 2 mm thick laminae of black clay. Most of interval is very uniform in appearance.
Abrupt basal contact. 6-7 cm of lenticular, very fine grained sandstone rests on shale with an abrupt, inclined contact. Sand lenses are separated by clay laminae. This distinct lenticular sandstone is overlain abruptly by cross bedded, fine grained sandstone - there is some micro-faulting in the lowermost cross bedding.

Base of ATSB

1379 - 1386 m — Mudstone - shale: brownish black. Homogenous to vaguely bedded; local silt laminae.

d-6-A/94-A-14

1358- 1359.86 m

Upper contact of ATSB and possible RSME

Burrows in the ATSB

Crosss beds within the ATSB

Basal contact of ATSB

Atcor et al Buick c-94-G/94-A-14
Core 1: 1279-1290.2 m Rec. 10.85 m. 8 boxes. Full diameter.
Examined between 21-24th September 1999.

CHARLIE LAKE FM

1279-1284.8 m	Dolomitic mudstone/argillaceous dolostone: Complex mottled fabric due to dolomite replacing mudstone. Light to dark grey - the lighter areas appear to be dolomitic. Some zones are entirely dolostone. Some of the mottles resemble burrows. Basal contact not preserved.

HALFWAY FM

1284.8-1288.55 m	Sandstone: light to medium grey. Fine grained. Upper 50 cm calcareous. Cross bedded. Abrupt, slightly load deformed basal contact.

DOIG FM

1288.55-1289.85 m	Mudstone: medium to dark grey. Irregular patches, lenses, wisps and spots (1 mm) of replacement dolomite.

NOTE: possible major erosion surface at 1288.55 m.

CNRL Rigel a-14-A/94-A-15
Core 1: 1262.25-1280.25 m Rec. 17.7 m. 13 boxes. Full diameter. Well preserved.
Examined sometime between 3rd - 6th October 2000

HALFWAY FM

1262.25 - 1267.5 m	Sandstone: top 15 cm consists of fine grained sandstone with two bands of replacement dolomite. The remainder of the interval consists of dark, brownish grey, oil stained, fine grained sandstone. Near top of unit high-angle cross beds are present, but most of interval there are no visible sedimentary structures. Abrupt, erosional contact overlain by slightly coarser sand than most of interval and containing a few granule-size grains.
1267.5 - 1276.7 m	Sandstone: light grey, very fine grained. Incipient dolomitisation along bedding planes. Predominantly uniform in appearance with some vague hints of medium-angle cross beds. In the lowermost 1-2 m there are features that may be sub-vertical, lined burrows.
1276.7 - 1279.5 m	Sandstone-mudstone: thin to thick beds of very fine grained sandstone intercalated with laminated mudstone. Overall sanding-up trend. Some possible horizontal burrows in the mudstone beds - but not very common.

NOTE: possible major erosion surface at 1267.5 m.

PCI Beavertail d-79-A/94-A-15
Core 1: 1241 - 1251 m Rec. 9.75 m. 7 boxes. Full diameter wit ha few slabbed core pieces. Well preserved.
Examined 29th June 2005

CHARLIE LAKE FM

1241 - 1243.10 m	Mudstone - dolomudstone: Mottled. Light to medium grey. Abrupt basal facies change but contact not well reserved,
1243.10 - 1244.05 m	Dolomudstone: light grey. Vague, irregular beds. Some possible small burrows about mid-point in interval. Abrupt basal contact.

HALFWAY FM

1244.05 - 1248.95 m	Sandstone: predominantly fine grained with layers of medium sand to granules in basal 20 cm. Low angle cross beds in basal 60 cm, with medium to high angle cross beds in remainder of interval. Some clay laminae in upper beds. Very finely laminated immediately below contact with Charlie Lake Fm. Consist of several units separated by reactivation surfaces. Abrupt, erosional basal contact

DOIG FM

1248.95 - 1250.25 m	Mudstone - siltstone - sandstone: Intercalated laminae, lenses and very thin beds. Thin beds have horizontal or ripple laminae. Majority of interval is burrow mottled.

NOTE: possible major erosion surface at 1248.95 m.

d-79-A/94-A-15

Contact at 1244.05 m

Cross beds in the Halfway Fm

Basal contact of the Halfway Fm

Pacific Sinclair Nancy d-84-A/94-A-15
Core 1: 3963 - 4023 ft. 13 boxes.
Core 2: 4023 - 4084 ft. 13 boxes
Full diameter. Well reserved. Log and core depths do not appear to correspond; equivalent log depths are approximately 3953 - 4013 ft.
Examined 29th June 2005.

CHARLIE LAKE FM

3971' - 3971‘ 10" Dolostone - mudstone: Mottled fabric. Slight reddish tint in places. Abrupt basal contact.

3971' 10" - 3972' 2" Anhydrite: Inclined, irregular upper contact draped with a mm-thick clay layer. Abrupt basal contact, also draped by mm-scale clay layer.

3972' 2" - 3973' 8" Mudstone - dolostone: Finely laminated in upper third, irregularly bedded and laminated in lower two-thirds. Abrupt basal contact.

“A” Marker

3973' 8" - 3982' 6" Limestone: distinct ribbon-like/nodular fabric. Some zones are more massive or planar bedded. Gradational basal contact.

Base of “A” Marker

3982' 6" - 3986' 9" Mudstone: Grey. Lower, massive interval separated from upper, laminated interval by a thin (3 - 4 cm) anhydrite bed. Abrupt basal contact.

3986' 9" - 4007' 3" Mudstone: brick-red, mottled mudstone grading up into brownish grey mudstone. Abrupt basal contact.

4007' 3" - 4007' 8" Anhydrite: abrupt basal contact.

4007' 8" - 4018' 2" Mudstone: red with greenish grey mottles (latter mostly in lower third of interval). Abrupt basal contact.

4018' 2" - 4020' 11" Anhydrite: Basal 3" consists of intercalated shale and anhydrite above which ther are two thick anhydrite beds separated by a 3"' shale unit that itself contains a thin anhydrite bed. Abrupt basal contacts for all internal units.

4020' 11" - 4061' 10" Mottled mudstone: brownish grey to light grey with reddish tint in upper 2' grading up from medium to dark grey mudstone. Mottled fabric more intense in lower part of interval, with some areas of complete dolomitization. Abrupt basal contact.

4061' 10" - 4062' 1" Mudstone - dolostone: Coarse laminae and very thin beds of dolostone intercalated with mud laminae. Abrupt basal contact.

4062' 1" - 4062' 6" Dolostone - argillaceous dolostone: Disrupted fabric. Abrupt basal contact.

HALFWAY FM

4062' 6" - 4069' 1" Sandstone: Fine grained. Faint, irregular horizontal bedding. Difficult to decipher basal contact.

Sketch of basal contact:

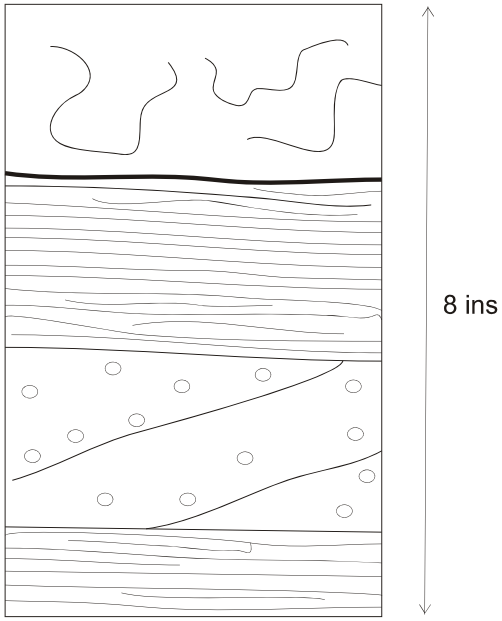
Load deformed or burrowed

Clay layer

Finely laminated sandstone and mudstone. Muddier towards base.

Medium angle dip on granular sandstone beds

Silty-sandy mudstone



DOIG FM

4069' 1" - 4084 ‘ Coarsening-up interval: grades up from black mudstone into thinly interbedded mudstone and very fine grained sandstone. Several beds of burrowed sandstone (mostly horizontal burrows).

2d-84-/94-A-15

Ribbon limestone in
the “A” marker

Charlie Lake Fm:
bed contact at 4062’ 1”

Charlie Lake - Halfway
contact at 4062’ 6”

Halfway - Doig contact

Ashland et al West Peejay d-31-G/94-A-15
Core 1: 3895 - 3953 ft Rec. 58 ft. 13 boxes. Full diameter with some slabbed segments. Well preserved.
Examined sometime between 3rd and 6th October 2000

Difficult to correlate core to log response therefore only thicknesses are given, not core depths.
CHARLIE LAKE FM

1.5 ft — Mottled dolostone: light and medium grey mottling, Very finely crystalline. Abrupt basal contact.

4 ft — Bioclastic dolostone: uncertain if a single or multiple units. The following vertical succession is noted (top to base):

6" dolomicrite with scattered very small clasts. An irregularly shaped, spherical anhydrite nodule with diffuse borders occurs near top of interval. Gradational with underlying facies

10" Dolomicrite with floating, pinkish grey clasts (up to 3 cm long) of bioclastic dolostone (clasts have abundant molds of shell debris). Rapidly transitional with underlying facies.

32" Bioclastic dolostone: fine to coarse bioclasts (commonly as molds) and very large clasts of grey dolomicrite. Basal 3' has smaller clasts and an anhydrite nodule. Abrupt, presumably erosional basal contact. 3.5 ft

Dolomicrite: light, yellowish grey intercalated with lenses of dolarenite. Minor bed deformation.

16" — Bioclastic dolostone: grades up from a coarse bioclastic dolostone with flat mud clasts, into a well sorted dolarenite, in turn overlain by 7-8" of dolarenite with layers of replacement dolomite (or are they large flat dolomudstone clasts?). Abundant moldic porosity. Erosional basal contact.

24' 6" — Dolostone: medium grey. Uniform appearance except in top 5 ft where there are laminae and very thin beds of yellowish grey dolostone. These latter beds are commonly laminated and some beds have minor deformation. These bed types gradually decline downward and only a few such beds are seen in rest of interval. Base of interval appears to rest abruptly on a thin shaly bed.

2' 2" — Interbedded dolostone-mudstone: medium grey dolostone and dark grey mudstone. Laminae to thin beds. Planar laminated. Basal dolostone bed rests abruptly on Doig facies.

DOIG FM

16' 4" — Interbedded siltstone-sandstone-mudstone: dark grey colour. Laminae to very thin beds. Laminae and ripple laminae of coarse silt and very fine sand.

Comment: unlike some adjacent wells there is no basal sandstone facies between the Doig and typical Charlie Lake facies.

Candel Sr Nancy d-54-H/94-A-15
Core 1: 3826-3886 ft Rec. ? 13 boxes. Part slabbed, part full diameter.
Examined sometime between 21-24th September 1999

CHARLIE LAKE FM

3826-3845 ft — Dolomitic mudstone: light to medium grey. Complex mottled, diagenetic fabric due to replacement of mudstone by dolomite. Dolomitic patches are brownish light grey. Basal contact not preserved but lithological change is rapid.

HALFWAY FM

3845-3853 ft — Coquinal sandstone: at least seven beds, 3 to12 ins thick. Each bed consists of a basal coquinal sandstone grading up into fine grained sandstone that may contain bioclasts. Bioclasts usually small, <3 mm, with some up to 7 mm. A few of the beds are oil stained.. Transitional with underlying strata.

3853-3869' 3" — Sandstone: very fine to fine grained. Light grey. Multiple beds: basal parts of beds marked by either a coquinal sandstone or dolomite clasts (range from a few mm to about 8 cm long); dolomite clasts may be present in the coquinal sandstones. Coquinas are not as prominent as in overlying beds. There are a few thin beds (few mm to 3 cm thick) of dolomudstone interbedded within the sandstone; the most prominent tend to directly overlie coquinas. Some beds with clay laminae. Transitional with underlying beds.

DOIG FM

3869' 3"-3870' 1" — Sandstone: very fine grained. Thin beds (2-15 cm thick) separated by clay laminated sandstone. There is one thin dolostone bed (although it could be a large flat clast?). Transitional with underlying beds.

3870' 1"-3886 ft — Sandstone-mudstone: interlaminated to interbedded. General upward increase in sand content. Fine, planar laminae are the dominant structure; some current-ripple laminae. Bed load structures are common.

COMMENT: the Halfway/Doig succession appears to be an overall coarsening-upward succession.

Pacific Sr Candel Peejay d-59-H/94-A-15
Core 1: 3862 - 3902 ft 9 boxes. Rec. 40 ft. Full diameter in top 6 boxes, slabbed in bottom 3 boxes. Well preserved.
Examined sometime between 3rd and 6th October 2000

CHARLIE LAKE FM

3862 - 3894' 7" — Mottled dolostone: complex patterns of brownish grey dolomite replacing dark grey dolomite (possibly argillaceous). Intensity of replacement varies, but in basal 2 ft there is almost complete replacement of the dark grey dolomite. Higher gamma-ray values at 3970, 3978-80 and 3986-90 ft appear to correspond to those zones of lesser replacement, where the dark

grey dolomite is more abundant.

3894' 7" - 3895' 2" Interbedded dolostone and mudstone: predominantly brownish to yellowish grey dolostone. Interval contains a 4" thick bed of blotchy dolostone encased in laminated dolostone. Some laminae may be stromatolites.

3895' 2" - 3895' 10" Sandy dolostone: 60% of bed has patchily developed replacement dolomite although the basal 1.5" is completely dolomite. Basal contact not well preserved - may be affected by subsequent diagenesis.

3895' 10" - 3896' 3 " Sandstone: very fine grained, dolomitic. Patchy development of replacement dolomite. Basal contact abrupt and rests on a deformed bed of silty, dolomitic mudstone.

DOIG FM

3896' 3" - 3902 ft Interbedded siltstone-sandstone-mudstone: light brownish grey. Laminae to thin beds of coarse silt and very fine sand intercalated with laminae and very thin beds of mudstone. Beds generally finely laminated, minor load deformation - more common in top 1 ft.

NOTE: possible major erosional surface at 3896' 3".

Pacific SR Candel Nancy d-68-H/94-A-15

Core 1: 3840 - 3898 ft 13 boxes. Mostly slabbed except for bottom 4.5 boxes. Well preserved. Examined sometime between 3rd and 6th October 2000

CHARLIE LAKE

3840 - 3845' 6" Mottled dolostone: typical dolostone facies of the lower Charlie Lake Fm. Abrupt basal contact.

3845' 6" - 3846 ft Dolostone: sandy. Small, black, rounded mudstone clasts (<2 mm) in top 1 ins of interval. Most of unit is highly deformed. Base of unit poorly defined, may be gradational.

3846 - 3848' 8" Bioclastic dolostone: basal 1 ft contains large bioclasts and dolomudstone clasts, grading up into dolarenite with floating dolostone clasts (< 1 cm). Upper 4 ins has no large clasts. Possibly sandy. Vague cross beds in lower 6 ins. Basal contact poorly preserved but is an abrupt facies change.

HALFWAY FM

3848' 8" - 3855' 6" Sandstone: very fine to fine grained. Generally uniform in appearance with a few light-coloured patches of replacement dolomite. Basal 14 ins contains large rounded mudstone clasts and a few bioclasts in a sand matrix - clasts vaguely aligned along very low-angle cross beds.

DOIG FM

3855' 6" - 3867' 6" Sandstone: very fine grained; light grey. Very thin to thin beds with interlaminae of mudstone. >90% sandstone. Lacking visible sedimentary structures. Minor bed deformation.

3867' 6" - 3873 ft Interbedded sandstone-mudstone: about 70% very fine to fine grained sandstone. Laminae to very thin beds of sandstone, interlaminated to interbedded with silty mudstone. Minor load deformation. Some possible

horizontal burrows and a few current rippled beds.

3873 - 3881 ft Interbedded sandstone-mudstone: 40-50% very fine grained sandstone. Overall sanding-up interval. Similar to overlying interval, although starved ripples and deformed beds more common. Some possible horizontal burrows.

3881 - 3898 ft Interlaminated to interbedded mudstone-sandstone: mudstone-dominant. Dark grey to black.

NOTE: possible major erosion surface at 3855' 6".

Tenneco Peejay b-76-H/94-A-15

Core 1: 3830-3870 ft 9 boxes. Full diameter. Well preserved.
Examined sometime between 3rd and 6th October 2000

CHARLIE LAKE FM

3830 - 3846 ft Mottled dolostone: typical fabric of Charlie Lake dolostones from this part of the formation. Variable intensity of replacement fabric. Consists of light brownish grey and medium to dark grey dolomite. Scattered small (few mm diameter) anhydrite nodules. Basal 1 ft not as mottled as rest of interval. Basal contact is abrupt and consists of about 1-2 ins of dense, very finely crystalline dolostone resting abruptly on finely crystalline, moldic dolostone.

3846 - 3848 ft ?Dolarenite: finely crystalline. Scattered anhydrite nodules - generally small but with at least one large nodule. Possible bioclasts and mud clasts. Moldic and vuggy porosity (small).

HALFWAY FM

3848 - 3862' 6" Sandstone: very fine to fine grained. Generally uniform in appearance. Scattered occurrences of dolomite replacement along bedding planes - also helps to identify bedding as sub-horizontal. Basal 8 ins contains bioclasts and mudstone clasts. Basal contact has been cut, therefore difficult to indicate nature of contact.

3862' 6" - 3870 ft Sandstone: very fine grained. Thin to thick beds; overall thickening-up character. Some patches of replacement dolomite (minor). Thinner beds have indications of load deformation and some possible horizontal burrows.

NOTE: possible major erosion surface at 3862' 6".

Tenneco Nancy A-2 d-76-H/94-A-15

Core 1: 3830-3875 ft 10 boxes. Slabbed except for bottom 2 boxes. Well preserved.
Examined sometime between 3rd and 6th October, 2000

HALFWAY FM

3830 - 3853 ft Sandstone: Ranges upward from a very fine grained sandstone to a bioclastic sandstone, to a sandy bioclastic sandstone. There is no obvious break in the vertical succession, although dolomitic beds tend to be

prevalent above about 3846 ft. Base of interval arbitrarily chosen at the base of a 3 cm thick layer of replacement dolomite.

3853 - 3855' 7" Sandstone: very fine grained. Laminae to very thin layers of intercalated mudstone. Minor bed loading.

DOIG FM

3855' 7" - 3875 ft Mudstone-sandstone: interlaminated to thinly interbedded. Overall sanding-up trend. Horizontal; laminae and some current-ripple laminae. Some lenticular sand beds. Minor bed loading and some possible horizontal burrows.

Tenneco Peejay b-86-H/94-A-15

Core 1: 3820-3860 ft. 9 boxes. Rec. 41.5 ft. Full diameter. Well preserved.
Examined sometime between 3rd 6th October 2000.

CHARLIE LAKE FM

3820-3827 ft Dolomicrite: light grey to light yellowish grey. Finely laminated to very thinly bedded. Contains some zones with a mottled appearance (a diagenetic facies that is common in the lower Charlie Lake Fm). About 2 ins below top of interval there is a 3 ins bed of brownish grey anhydrite with mildly deformed upper and lower contacts.

3827-3830' 7" Bioclastic dolostone: consists of 4 or 5 fining-up beds, 4-10 ins thick. Several zones rich in large bioclasts (bivalves and/or brachiopods). Base of interval is abrupt and uneven - probably erosional.

3830' 7"-3833 ft Anhydrite: cream coloured to light grey. Contains several lenses of bioclastic dolostone (possibly these lenses were beds that have been dislocated due to load deformation). Abrupt, uneven basal contact with up to 2 ins of relief.

3833-3847 ft Bioclastic dolostone: Probably composed of multiple beds but difficult to detect. Two large, irregular patches of white replacement anhydrite. Abundant moldic porosity. Some of the large bioclasts are readily identified as bivalve debris. Zones of oil staining. Sandy in lower 12 ins. Basal contact is abrupt, probably erosional.

HALFWAY FM

3847-3852' 6" Sandstone: fine grained. Uniform appearance - difficult to detect bedding/sedimentary structures. Several oil stained zones. Gradational basal contact.

3852' 6"-3858 ft Sandstone-mudstone: approximately 70-80% of very fine grained sandstone in laminae to thick beds. Sandstone tends to be argillaceous. Some possible horizontal burrows. Minor load deformation. Patches of replacement dolomite. Gradational change from underlying interval.

DOIG FM

3858-3861 ft Mudstone-sandstone: about 50% sandstone in laminae, lenses and very thin beds. Some current ripple laminae. Possibly a few horizontal burrows. Minor load deformation.

NOTE: possible major erosion surface at 3847 ft.

Candel et al Peejay d-22-I/94-A-15
Core 1: 3720-3780 ft 12 boxes. Full diameter. Well preserved.
Examined sometime between 3rd and 6th October 2000

CHARLIE LAKE FM

3720 - 3726 ft	Mottled dolostone: typical dolostone fabric found in this part of the Charlie Lake Fm. Fairly abrupt basal contact.
3726 - 3737' 4"	Dolarenite/bioclastic dolostone: very fine clasts. Some moldic porosity. Probably contains multiple beds but difficult to define individual beds. Basal contact not preserved but the facies change is abrupt.
3737' 4" - 3741 ft	Dolomicrite: slightly argillaceous. Poorly defined bedding. Abrupt basal contact.

DOIG FM

3741 - 3780 ft	Mudstone: intercalated with laminae and very thin beds of coarse silt and very fine sand. Overall sanding-up aspect.

Pacific Sr Candel Wildmint d-84-I/94-A-15
Core 1: 3625 - 3685 ft 13 boxes. Slabbed. Well preserved.
Core 2: 3685 - 3714 ft 4 boxes. Slabbed. Well preserved.
Log depth/core depth mismatch - logs should be about 3 ft higher.
Examined 16th September 2004

CHARLIE LAKE FM

3625 - 3627' 3"	Sandstone: very fine grained. Basal 10 cm contains deformed, very thin beds of sandstone interlaminated with mudstone. Basal contact not preserved.
3627' 3" - 3628' 1"	Sandstone: fine to medium grained, some coarse grains. Some granules and very small pebbles overlying basal erosion surface.
3628' 1" - 3639'	Sandstone: very fine grained; argillaceous. Partially dolomitized. Basal few cm marked by presence of small nodules and lenses of pyrite (1 to 3 cm), Gradational basal facies change.
3639 -3649'	Mudstone: shale-like lower part grading up into silty-sandy mudstone. Contains silt/sand laminae and very thin beds. Abrupt basal contact.

HALFWAY FM

3649 - 3649' 6"	Sandstone: light grey. Basal few cm rich in medium and coarse sand grains and small discoidal mudstone clasts (< 1 cm) - grades up into fine to medium grained sandstone. Top few cm is rich in pyrite nodules. Erosional basal contact.
3649' 6" - 3712' 6"	Sandstone: very fine to fine grained. Scattered throughout are thin layers and laminae of clay, or zones of interlaminated clay and sandstone. A series of thin to thick beds of sandstone beds but distinguishing individual beds is difficult. Sedimentary structures generally absent with some vague

	indications of horizontal and very low-angle bedding. Possibly some horizontal burrows in clay-rich zones, but they are not very common. Transitional basal facies change. Between 3702-3705' 5" there is a bed (or beds) of sandy dolostone/ dolomitic sandstone with some leached porosity .
3712' 6" - 3714'	Interbedded sandstone-mudstone. Load deformed and convoluted beds. Bioturbated.

NOTE: possible major erosion surface at 3649' 6".

d-84-I/94-A-15

Interval 3649’ - 3649’ 6”

Interval 3649’ 6” - 3712’ 6”

Doig Fm: interval
3712’ 6” - 3714’

Pacific SR Candel Ptarmigan d-90-I/94-A-15
Core 1: 3673 - 3733 ft. 13 boxes. Slabbed. Well preserved
Core 2: 3733 - 3758 ft. 5 boxes. Slabbed. Well preserved
Examined 14th September 2004

CHARLIE LAKE FM

3673' - 3694' 10"	Sandstone: Very fine to fine grained. Thin to thick beds separated by intervals of mudstone or argillaceous sandstone. Overall sanding-up aspect, with very thin sandstone beds and laminae interbedded with mudstone more prevalent in lower part of core and thicker beds of sandstone more common in upper 15-16 ft of interval. Mostly massive sandstone beds, some with horizontal bedding. Some burrow mottled sandstone beds in upper 5 ft. The shaliest part of interval is about 2 ft above base of interval. Lower part of interval has horizontal and ripple laminae. A few small horizontal burrows present. Transitional basal facies change.

HALFWAY FM

3694' 10" - 3750'	Sandstone: very fine to fine grained. Medium grey. Predominantly massive with scattered zones of partially dolomitized sandstone where soft sediment deformation can be seen preserved. At about 3737.5 ft there is a mud-clast layer (clasts are dolomitized). Small to large (2- 4 cm) pyrite nodules in basal 15 cm. Rapid transitional basal facies change.

DOIG FM

3750' - 3755'	Mudstone: silty-sandy. Dark grey. Faintly laminated.
3755' - 3758 ‘	Missing core

NOTE: the mudstone-clast layer at 3737.5 ft could be an indicator of a major erosion surface.

d-90-I/94-A-15
Sandy beds in the lower Charlie Lake Fm

Unocal HB Peejay d-58-C/94-A-16
Core 1: 1091 -1104.75 m 12 boxes. Full diameter . Well preserved.
Core 2: 1104.75 - 1110 m. 5 boxes. Full diameter . Well preserved
Examine sometime between 3rd and 6th October 2000

CHARLIE LAKE FM

1091 - 1093.57 m	Dolostone: argillaceous. In parts. Mottled. Possibly bioturbated in places - especially in argillaceous zones. Lower 30 cm is mostly sandy dolostone. Abrupt basal contact.
1093.57 - 1093.63 m	Argillaceous dolostone-dolomitic mudstone: dark grey. Possibly bioturbated. Abrupt basal contact.
1093.63 - 1094.33 m	Dolostone: very finely crystalline. Oil stained. Gradational from underlying non-stained unit.
1094.33 - 1101.57 m	Dolostone and sandy dolostone: sandy dolostone occurs as discrete horizons within the predominantly dolostone interval. Sandy horizons tend to be lighter coloured. Variably mottled with a few horizons of laminae.
Siphon Mbr	
1101.57 - 1105 m	Sandstone: very fine to fine grained. Oil stained. Vaguely bedded. Basal contact not preserved.
Base of Siphon	
1105 - 1110 m	Argillaceous dolostone: Mottled to lenticular fabric. Scattered sandy beds - more common towards base of cored interval.

Union HB Suncor Pacific Crush d-89-C/94-A-16
Core 1: 3837-3897 ft (measured 52 ft of preserved core) 12 boxes. Slabbed. Intervals of sandstone badly broken and large number of core plugs in the sandstone intervals make for poor preservation of these units.
Examined sometime between 3rd and 6th October 2000; re-examined 15th September 2004

CHARLIE LAKE FM

3837 - 3841' 9"	Mudstone: silty, sandy. Lenses, blebs and very thin beds of very fine grained sandstone impart a distinct mottled appearance. Some less disrupted beds near base of interval. Basal contact disrupted.
3841' 9" - 3844' 5"	Sandstone: very fine grained. Irregular, distorted clay interlaminae. Abrupt basal contact.
3844' 5" - 3857' 10"	Mudstone: variably dolomitized. Scattered lenses, irregular laminae of very fine sandstone/coarse siltstone. Some of the thicker sand lenses are current-ripple laminated. Zones of disrupted bedding. Transitional change from underlying unit.
3857' 10" - 3865' 1"	Mudstone: dark grey . Silty/dolomitic. Some horizons similar to overlying facies. Abrupt facies change at base - although contact is not preserved.
3865' 1" - 3868' 8"	Dolomitized mudstone: earthy grey. Incipient to weakly developed mottling. Finely laminated in basal few cm (?stromatolites). Abrupt basal contact.

HALFWAY FM

3868' 8" - 3871'	Sandstone: Dark grey to almost black. medium to coarse grained, with an overall fining-up aspect to interval. Scattered granules and very small pebbles in lower part of interval. Faint traces of horizontal bedding. Abrupt, erosional basal contact - rests on a thin muddy bed.
DOIG FM	
3871'- 3883' 7"	Interbedded sandstone-mudstone: very fine to fine grained, locally medium grained. Thin (<5 ins) sandstone beds in upper 2 ft. Interbeds of mudstone in lower beds. Some local dolomitization. Abrupt-based sandstone beds - some with load deformed bases. Two beds with load deformed bases contain small mud clasts (< 5 mm). Sedimentary structures not apparent in upper beds, but fine laminae are present in some of the lower beds. Gradational with underlying strata.
3883' 7" - 3893' 9"	Mudstone: medium grey to dark grey. Laminae and very thin beds of coarse grained siltstone to very fine grained sandstone. A few contorted beds of sandstone. Local load deformation. Downward decline in thickness and number of silt/sand beds. Typical Doig facies.
3893' 9" - 3897 ft	Missing core.

.

NOTE: possible major erosion surface at 3871'.

d-89-C/94-A-16

Charlie Lake Fm: 3837’ - 3841’ 9” and bed contact at latter depth

Contact at 3868’ 8”

Doig facies, 3871’ - 3883’ 7”

CNRL West Currant a-33-D/94-A-16 (core boxes labeled d-23-D/94-A-16 - this is the surface location; a-33-D is a deviated hole from the surface location)
Core 1: 1195.25 - 1213.7 m 13 boxes. Full diameter. Well preserved.
Log/core depths do not correspond - log character is about 0.9 to1 m deeper than core depths.
Examined 28th June 2005.

CHARLIE LAKE FM

1195.25 - 1196.33 m Mudstone/dolsotone: mottled fabric. A few horizontal beds preserved.

1196.33 - 1196.56 m Mudstone-dolostone: Lower 10 cm consists of thick (5-6 cm) beds of disrupted dolomitic mudstone overlain by fine to coarsely laminated and very thin beds of shale and dolostone/silty dolostone. Abrupt basal contact.

1196.56 - 1200.56 m Sandstone: very fine grained; well sorted. Light to dark grey. Upper 80 cm has spotted appearance (probably due to incipient anhydrite cement). No visible sedimentary structures. Abrupt basal contact.

1200.56 - 1201.56 m Bioclastic dolostone: vuggy. Possibly oil stained.. Finely comminuted fossil debris. Dolomitization has probably destroyed much of the original fabric.

1201.56 - 1201.96 m Sandstone-mudstone: Thin sandstone beds intercalated with dolomitized mudstone. Irregular mudstone beds - possibly due to soft sediment deformation.

1201.96 - 1203.06 m Interlaminated siltstone-mudstone: Horizontal and ripple laminae (low-relief ripple). No indications of burrowing. Abrupt basal contact

Top of "A" marker

1203.06 - 1213.70 m Coarsening-upward interval: predominantly dark grey to black mudstone with fine laminae of silt/very fine sand and a few thicker sandstone beds grading up into a predominantly sandstone interval with mud laminae. The change to a sandier interval occurs at about 1208.56 m - the sandier part corresponds to the "A marker"

Sandstone interval: upper 20 cm thoroughly bioturbated. Below, bioturbated beds are present but not common. Horizontal burrows more common than vertical. Sandstone beds a few mm to several cm thick, separated by clay laminae. Beds are finely laminated - horizontal and current ripple laminae. A few beds are deformed.

Mudstone interval: millimetre thick silt/sand laminae with 1-2 cm thick beds of siltstone and sandstone - latter usually ripple laminated. Vertical and horizontal burrows are present but not abundant. Some bed deformation.

a-33-D/94-A-16 (surface location a-23-D/94-A-16)

Charlie Lake Fm: contact at 1200.56 m

Charlie Lake Fm; contact at 1203.06 m

Upper part of interval 1203.6 - 1213.7 m

Lower part of interval 1203.6 - 1213.7 m

Texcan Texaco Buckthorn d-62-D/94-A-16
Core 1: 3865-3921 ft 12 boxes. Slabbed. Well preserved.
Examined sometime between 3rd and 6th October, 2000

CHARLIE LAKE FM

3865 - 3882 ft	Mottled dolostone: typical Charlie Lake dolostone type. Abrupt basal contact.
3882 - 3882' 8"	Anhydrite-dolomitic anhydrite: fine laminae of dolostone and anhydrite at base of interval grading up into 1-4 cm thick anhydrite beds.
3882' 8" - 3883 ft	Dolostone: finely laminated. Laminae range from sub-horizontal to undulose - probably stromatolites.
3883 - 3883 ft	Dolostone: possibly consists of two fining-up beds. Intraclastic dolarenite grading up into dolomicrite. Abrupt basal contact.

HALFWAY FM

3883 - 3889 ft	Sandstone: fine to medium grained; granular in basal 4 ins. Low to medium angle cross beds - highlighted by incipient dolomitization along bedding planes. Upper contact marked by a mm-thick clay layer. Lower contact is erosional and severely load deformed into underlying mudstone.

DOIG FM

3889 - 3890' 3"	Mudstone: silty to sandy, gradational basal contact.
3890' 3" - 3906 ft	Sandstone: very fine grained. Poorly defined bedding. Rapidly gradational basal contact.
3906 - 3921 ft	Mudstone-sandstone/siltstone: dark grey mudstone interlaminated to very thinly interbedded coarse siltstone to very fine grained sandstone. A few possible small vertical and horizontal burrows.

NOTE: possible major erosion surface at 3889 ft.

Union HB Buckthorn d-64-D/94-A-16

Core 1: 3880 - 3940 ft. 13 boxes. Mostly full diameter except through the Halfway Fm where it has been slabbed..

NOTE: core has been arranged opposite from the standard practice; top is on the left, rather than the right.

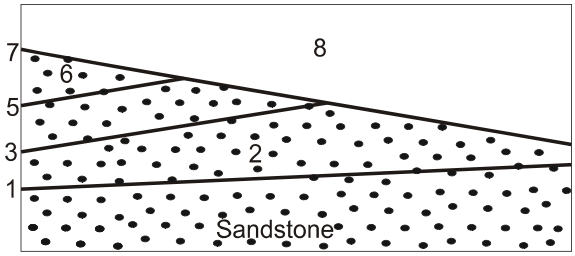
Examine ?? June 2005.

CHARLIE LAKE FM

3880' - 3881' 10"	Anhydrite: large irregular patches of brownish grey replacement dolomite. Abrupt basal contact.
3881' 10" - 3891' 4"	Mudstone: medium to dark grey. Intercalated with thin beds of dolomudstone and some lenses pf ?siltstone.
3891' 4" - 3893' 10"	Dolomudstone: medium brownish grey. Abrupt basal contact.
3893' 10" - 3897' 10"	Anhydrite: Abrupt basal contact.
3897' 10" - 3904' 5"	Mudstone: as above. Diffuse basal contact.
3904' 5" - 3919' 7"	Dolomudstone: mottled fabric. Some silty beds in upper 1-2 ‘ where lenticular and irregular beds are preserved. Abrupt, irregular basal contact
3919' 7" - 3920' 11"	Dolostone: two, possibly three units of irregularly bedded dolostone. Coarsely laminated in upper few cm. Abrupt basal contact draped by a clay layer.

Sketch of contact:

8. Dolostone
7. Clay layer.
6. Lens of fine grained sandstone
5. Black clay layer
4. Thin layer of very fine grained sandstone
3. Black clay layer
2. Thin layer of fine to medium grained sandstone
1. Black clay layer



1 to7 may be a truncated ripple.

HALFWAY FM

3920' 11" - 3925' 6"	Sandstone: very fine to fine grained. Mostly massive with faint traces of horizontal bedding. Anhydrite cement mottling. Top 5" is argillaceous - consisting of interlaminated sandstone and mudstone. Abrupt basal contact

DOIG FM

925' 6" - 3937'	Mudstone: medium grey. Siltstone - in laminae, small lenses and very thin beds. A few burrows are present.
3937' - 3940'	Missing core.

NOTE: possible major erosion surface at 3925' 6".

d-64-D/94-A-16

Charlie Lake Fm: contact at 3919’ 7”

Charlie Lake - Halfway contact

Halfway - Doig contact

Union HB East Peejay d-72-D/94-A-16
Core 1: 3841-3901 ft 13 boxes. Slabbed. Well preserved.
Examined sometime between 3rd and 6th October 2000.

NOTE: core depths and log depths do not appear to correspond. Prominent gamma-ray response at 3868 ft appears to correlate to core depth 3862 ft. The descriptions are given as core depths.

CHARLIE LAKE FM

3841 - 3847' 6'	Mottled dolostone: typical lower Charlie Lake diagenetic facies. Replacement fabric tends to be sub-horizontal. Abrupt basal contact.
3847' 6"- 3847' 8.5"	Anhydrite: light grey. Abrupt, uneven basal and upper contacts.
3847' 8.5" - 3853' 7"	Mottled dolostone
3853' 7" - 3854' 1"	Anhydrite/dolomitic anhydrite: Abrupt basal/upper contacts.
3854' 1" - 3862 ft	Mottled dolostone: although the basal contact not preserved due to extensive plug coring the facies change is abrupt.

HALFWAY FM

3862 - 3886 ft	Sandstone: Upper 1 ft appears to consist of several thin beds of granulestone grading up into sandstone, and the uppermost bed is dolomicrite. Below, the bulk of the interval consists of fine to medium grained sandstone that is cross bedded throughout. A few examples of intersecting cross bed sets that indicate multiple beds, or migrating bedforms. Base of interval marked by an abrupt, probably erosional contact, above which there is a 1 cm thick layer that contains small clasts and granules.

DOIG FM

3886 - 3897 ft	Sandstone-mudstone: very fine to fine grained. Laminae and very thin beds of intercalated mudstone. Overall sanding-up aspect although predominantly sandstone. Most of beds are load deformed and there is one 8 ins thick bed with cross beds. Possibly some horizontal burrows. Gradational basal contact .
3897 - 3900 ft	Sandstone-mudstone: thinly interbedded ,very fine grained sandstone and mudstone. Fine laminae the prevalent sedimentary structure.

3900 - 3901 ft Missing core

NOTE: possible major erosion surface at 3886 ft.

Union HB East Peejay d-82-D/94-A-16
Core 1: 3840-3898 ft 12 boxes. Slabbed. Well preserved.
Examined sometime between 3rd and 6th October 2000

CHARLIE LAKE FM

3840 - 3848' 9"	Mottled dolostone: typical lower Charlie Lake diagenetic facies. Abrupt base.
3848' 9" - 3849' 6"	Anhydrite: light grey. Dolomitic. Abrupt basal contact.
3849' 6" - 3856' 3"	Mottled dolostone: typical lower Charlie Lake diagenetic facies.
3856' 3" - 3857' 11"	Dolostone: light grey. Upper 9 ins is uniform in appearance. Lower 1 ft consists of several beds, some of which have coarse, undulose laminae. The basal bed is finely laminated and encloses lenses of coarse sand. Laminae appear to be stromatolites. Rapidly gradational with underlying strata.

HALFWAY FM

3857' 11" - 3866' 4"	Sandstone: oil stained; predominantly fine to medium grained, locally coarse grained and a few granular layers. Cross bed sets. Basal contact not preserved, presumed to be abrupt due to distinct facies change.
3866' 4" - 3890 ft	Sandstone: predominantly fine grained with a few beds containing medium grains and small bioclasts. Some replacement dolomite. Mostly without visible sedimentary structures. Towards base of interval there are mudstone laminae and very thin beds and fine laminae present in these basal beds. Rapidly transitional with underlying beds.

DOIG FM

3890 - 3898 ft	Mudstone-sandstone: predominantly brownish grey mudstone with laminae and very thin beds of intercalated coarse grained siltstone to very fine grained sandstone. Some lenticular sandy beds. Minor load deformation.

NOTE: major facies shift at 3866' 4" suggests a major boundary, probably erosional.

Union HB East Peejay d-92-D/94-A-16
Core 1: 3830-3890 ft 13 boxes. Slabbed. Well preserved.
Examined sometime between 3rd and 6th October 2000

CHARLIE LAKE FM

3830 - 3833' 4"	Mottled dolostone: typical diagenetic facies of the lower Charlie Lake Fm.
3833' 4" - 3833' 7"	Anhydrite: light grey. Abrupt basal and upper contacts.
3833' 7" - 3839' 5"	Mottled dolostone:
3839' 5" - 3839' 9"	Anhydrite: similar to above.
3839' 9" - 3846' 6"	Mottled dolostone: abrupt basal contact. Lower 2 ins has crude, coarse laminae.
3846' 6" - 3847' 1"	Dolostone: several thin beds of light to dark grey dolostone and argillaceous dolostone. Lowermost, 2 ins thick bed, contains small-scale domal stromatolites and rest abruptly on underlying strata.

HALFWAY FM

3847' 1" - 3858' 4"	Sandstone: oil stained. An overall fining-upward trend, with the lower 3.5 ft consisting of conglomeratic medium to coarse grained sandstone, grading up into medium grained sandstone. Consists of several beds (at least three) - each beds starts with an erosional surface, overlain by granular sandstone and small clasts. The basal bed is the coarsest and contains a few molds of bioclasts (probably bivalves). Interval rests erosionally on underlying strata.

DOIG FM

3858' 4" - 3859' 4"	Sandstone: fine grained. Mostly without visible sedimentary structures, except in basal 1 ins where fine laminae are present.
3859' 4" - 3860' 8"	Mudstone: intercalated with laminae and very thin beds of very fine grained sandstone. Abrupt basal contact.
3860' 8" - 3876' 2"	Sandstone: very fine to fine grained, with medium grained sand present immediately below the overlying mudstone. A few laminae and very thin beds of intercalated mudstone. Sandstone beds 1 to15 cm thick with fine, subhorizontal laminae in the thinner beds, and no visible sedimentary structures in the thicker beds. At about 3868 ft there is a layer of rounded mudstone clasts. Some vertical burrows in lower beds, where mudstone becomes more common. Gradational with underlying beds.
3876' 2" - 3890 ft	Mudstone: laminae and very thin beds of intercalated very fine grained sandstone. Laminated beds throughout. Some load deformation and a few vertical and horizontal burrows in upper 1-1/5 ft, below which there are no biogenic structures.

NOTE: possible major erosion surface at 3858' 4".

Ultramar Ranger Peejay b-98-D/94-A-16
Core 1: 1177-1195.25 m 13 boxes. Slabbed. Well preserved.
Examined sometime between 3rd and 6th October 2000

CHARLIE LAKE FM

1177 - 1177.13 m	Mottled dolostone: abrupt basal contact.
1177.13 - 1177.3 m	Anhydrite: wisps and one large oblique lense of medium grey dolomite. Abrupt basal contact.
1177.3 - 1177.53 m	Mottled dolostone:
1177.53 - 1178.15 m	Bioclastic dolostone: light grey; fining-uptrend. Small bioclasts - usually as molds (up to 4 mm long). Incipient replacement by anhydrite in upper two-thirds of interval. Abrupt basal contact.
1178.15 - 1178.3 m	Dolomite breccia/conglomerate: large sub-rounded clasts of dolomicrite in a matrix of finely crystalline dolomite with patches of replacive anhydrite. Appears to be a sedimentary breccia/conglomerate.
1178.3 -1178.77 m	Bioclastic dolostone: fining-up trend. Large bioclasts and some dolomudstone clasts. Moldic porosity. Many of the bioclasts oriented sub-vertically. Abrupt, erosional base.

1178.77 - 1179.19 m Sandstone: dolomitic; minor bioclasts and dolomudstone clasts near base. Incipient, blotchy dolomitization. Erosional base.

1179.19 - 1179.61 m Bioclastic dolostone: bioclastic dolostone grading up into dolarenite. Some dolomudstone clasts near base. Crude sub-horizontal bedding. Erosional base.

1179.61 - 1186.11 m Sandstone-dolomudstone: very fine to fine grained. Interbedded with thin (<5 cm) beds of yellowish grey dolomudstone - common in upper 3 m, less common in lower part. Some dolomudstone beds are deformed, a few to the point of brecciation. Some synaeresis cracks in dolomudstones. Some sand beds incorporate clasts of the dolomudstone. Lower 2-3 m has argillaceous laminae and thin layers, and sandstone beds tend to be argillaceous. Laminae common in these lower beds. Transitional lower contact.

HALWAY FM

1186.11 - 1195.25 m Bioclastic sandstone-sandstone: multiple beds consisting of basal coarsely bioclastic sandstone grading up into very fine to fine grained sandstone. Each bed is erosionally based. Sub-horizontal bedding most common. Minor argillaceous intercalations. Beds range in thickness from a few cm to about 1 m. Oil stained in lowest beds.

Union HB East Peejay d-2-E/94-A-16

Core 1: 3815-3865 ft 11 boxes. Slabbed. Well preserved.
Examined sometime between 3rd and 6th October 2000

CHARLIE LAKE FM

3815 - 3820' 7" Mottled dolostone: typical Charlie Lake dolostone facies. Lower 18 ins almost entirely replaced by brownish grey dolomite.

3820' 7" - 3821' 2" Anhydrite: abrupt top, diffuse base.

3821' 2" - 3828' 4" Mottled dolostone:

3828' 4" - 3829 ft Mottled dolostone with anhydrite: small to large, irregular anhydrite nodules.

3829 - 3829' 5" Anhydrite: light grey; massive.

3829' 5" - 3830' 1" Dolostone: thin beds of light grey and brownish grey dolomicrite. Basal 3 ins consists of coarsely laminated light grey and brownish grey dolomite which contains fractures filled with coarse dolomite. Some of the light grey dolostone appears to contain dolomite-replaced anhydrite nodules.

HALFWAY FM

3830' 1" - 3832' 4" Bioclastic sandstone: small pebbles and molds of bioclasts (?bivalves) in a medium to coarse sand matrix. Abrupt, load deformed basal contact.

3832' 4" - 3835' 4" Bioclastic sandstone: grades up into fine grained sandstone with mud lenses. Fine to medium grained with small to medium-size bioclasts (commonly as molds); and some occurrences of coarse to granular quartz grains. Upper 14 ins predominantly load deformed, fine grained sandstone. Abrupt basal contact.

3835' 4" - 3836' 8" Mudstone: lower 8 ins predominantly mudstone, grading up into load

	deformed, very fine grained sandstone with mudstone lenses and laminae. Abrupt basal contact.
3836' 8" - 3837' 9"	Bioclastic sandstone: medium to coarse bioclasts in a fine to medium sand matrix; rapidly grades into fine grained sandstone in upper 3 ins. Abrupt, erosional basal contact.
3837' 9" - 3856 ft	Sandstone: fine grained; very thin to thin beds. Overall sanding-up/thickening-up aspect to interval. Fine or crude laminae present; some indications of ripple cross laminae. Local load deformation. Transitional basal contact.
DOIG FM	
3856 - 3865 ft	Mudstone: intercalated with fine laminae and very thin beds of coarse grained siltstone to very fine grained sandstone. Some lenticular sand beds and ripple laminated beds. Local load deformation.

NOTE: possible major erosion surface at 3837' 9".

CNRL et al Peejay d-13-E/94-A-16
Core 1: 3823-3884 ft 13 boxes. Slabbed. Well preserved.
Examined sometime between 3rd and 6th October 2000

Note: Core/log depths may not correspond. Log response suggests core depths should be about 4 ft higher to match log responses. Depths are core depths.

CHARLIE LAKE FM	
3823 - 3840' 6"	Mottled dolostone: typical Charlie Lake facies type. Basal part is stained extensively with iron oxide and contains lenses of coarse dolomite. Transitional basal contact,
3840' 6"- 3840' 7.25"	Dolostone: dark grey with small lenses (mm-scale) of coarse dolomite (birdseye structures?). Abrupt basal contact.
3840' 7.25"-3840' 9.5"	Dolostone: brownish grey. Broad, low amplitude, undulose fine to coarse laminae - probably stromatolites. Abrupt basal contact.
3840' 9.5"- 3841' 1"	Dolostone: very finely crystalline/micritic. Brownish grey. Transitional with underlying strata.
HALFWAY FM	
3841' 1" - 3842 ft	Sandy dolostone/dolomitic sandstone: blotchy to crudely bedded. No visible sedimentary structures. Basal contact appears to be abrupt.
3842 - 3849' 2"	Sandstone: fine to medium grained with two zones containing granular sandstone, one of which occurs immediately above the abrupt basal contact. Consists of at least three units. Cross bedded - with incipient dolomitization along bedding planes.
DOIG FM	
3849' 2" - 3852 ft	Sandstone-mudstone: typical interbedded Doig facies. Overall sanding-up aspect. About 15 ins below top of interval there is a 22 ins thick zone of extensive dolomitization. Transitional with underlying strata.

3852 - 3884 ft	Mudstone: with laminae and very thin beds of coarse grained siltstone to very fine grained sandstone.

NOTE: facies contact at 3849' 2" is most likely a major erosion surface.

Penzoil Tenneco Bulrush d-94-F/94-A-16
Core1: 3640 - 3700 ft. 12 boxes. Full diameter. Well preserved but much of core in small segments in upper part of core.
Examined 15th September 2004

CHARLIE LAKE FM

3640 - 3648 ft	Dolostone: massive to mottled; vaguely bedded. Earthy grey. Basal contact not preserved.
3648 - 3656 ft	Dolomitic sandstone: very fine to fine grained. Partially dolomitized in places. Mottled to vaguely bedded. Basal contact appears to be abrupt.
3656 - 3672 ft	Dolostone: argillaceous and also thin clay laminae. Interlaminated to thinly bedded. Horizontal laminae. Earthy grey. Basal 3 cm consists of disrupted dolostone-mudstone.
3672 - 3683 ft	Dolostone: earthy grey. Slightly argillaceous. Some wisps, streaks and laminae of clay. Mostly massive in appearance; vaguely bedded in places. Some probable load deformation in basal 1 ft. Abrupt basal contact.

DOIG FM

3683 - 3696 ft	Mudstone: dark grey to black. Faint, very fine laminae of silt..
3696 - 3700 ft	Missing core

Dome Provo Co-op East Bulrush d-5-K/94-A-16
Core 1: 3630-3690 ft Rec. 60 ft. 13 boxes. Full diameter.
Examined sometime between 21-24th September 1999

CHARLIE LAKE FM

3630-3633' 4"	Mudstone: dolomitic and anhydritic. Complex mottled diagenetic fabric. Light grey to brownish grey. Abrupt basal contact.
3633' 4"-3635' 10"	Anhydrite: light grey to white. Massive to thinly bedded. Some local deformation. Abrupt, irregular basal contact with up to 4 cm of relief.
3635' 10"-3637' 10"	Mudstone: brownish grey to light grey. Complex mottled diagenetic fabric. Abrupt basal contact.
3637' 10"-3638' 7"	Anhydrite: light grey. Abrupt basal contact.
3638' 7"-3641' 4"	Mudstone: similar to above. Abrupt basal contact.
3641' 4"-3641' 9"	Anhydrite: similar to above. Abrupt basal contact.
3641' 9"-3648 ft	Dolomitic mudstone: complex mottled diagenetic fabric due to dolomitization of mudstone. Dolomitic areas are rusty brown; undolomitized areas are medium to dark grey. No preserved original structures. Abrupt basal contact.
3648-3668 ft	Mudstone-siltstone: dark grey, slight dolomitic mudstone with laminae,

	lenses and very thin beds of siltstone. Minor bed load structures with one bed intensely deformed.
HALFWAY FM	
2668-3670' 7"	Coquinal sandstone: two beds with coquina at the base grading up into fine grained sandstone. Large bioclasts (?bivalves) - some moldic. Abrupt basal contacts.
3670' 7"-3680 ft	Sandstone: very fine to fine grained. Light grey. Generally massive with some faint laminae. Some patches of replacement dolomite. Transitional with underlying beds.
DOIG FM	
3680-3690 ft	Mudstone-Sandstone: interlaminae and very thin interbeds. General sanding-up trend.

NOTE: Abrupt facies change at 3670'7" probably a major erosion surface.

Union HB Beaver Dam d-1-L/94-A-16
Core 1: 3705 - 3760 ft. 12 boxes. Full diameter core. Well preserved.
Examined 16th September 2004

DOIG FM	
3705-3722 ft	Sandstone: very fine to fine grained. Brownish grey. Finely laminated throughout. Minor clay laminae. Predominantly horizontal laminae with a few examples of very low-angle intersecting laminae and a few examples of current-ripple laminae. Interval 3721-3722 ft is a transitional zone between mudstone-dominant underlying strata and sandstone-dominant beds above - consists of interbedded to interlaminated sandstone and mudstone Upper part of interval is partially dolomitized. A few beds have small horizontal burrows. Minor sedimentary deformation at a few horizons.
3722-3760 ft	Mudstone: dark grey to black. Fine laminae and small lenses of coarse silt to very fine sand. There are a few beds (up to 5 cm thick) of very fine grained sandstone. A few horizontal burrows.

d-1-L/94-A-16

Doig facies, interval 2705 - 3722 ft.

Union HB Mink d-83-L/94-A-16
Core 1: 3610 - 3670 ft 13 boxes. Full diameter. Well preserved.
Core 2: 3670 - 3705 ft 8 boxes. Full diameter. Well preserved
Examined 16th September 2004

CHARLIE LAKE FM

3610- 3630' 9"	Mudstone: silty to sandy; extensive areas of dolomitization imparting a mottled appearance. Medium grey with greenish grey mottling. Vague horizontal beds and some disrupted beds. Basal contact diffuse and dolomitized.
3630' 9"- 3632' 9"	Dolostone: brownish grey. Coarsely laminated to very thinly bedded. Scattered 1 cm vugs. Oil stained. Ague basal contact.
3632' 9"- 3634' 6"	Mudstone: dolomite replacement mottling. Breccia in basal 10 cm.
3634' 6"- 3640'	Dolostone: brownish grey; very finely crystalline. Oil stained in lower half. At least two thin (mm-scale) clay beds separating interval into at least three beds. No visible sedimentary structures. Vague basal contact due to dolomitization

DOIG FM

3640- 3686'	Sandstone-siltstone: very fine grained sandstone and coarse siltstone. Light brownish grey. Extensive dolomitization imparts mottled appearance. No visible sedimentary structures. Rapid transitional basal facies change.
3686 -3705'	Mudstone: dark grey to black. Fine laminae of siltstone which are less common in lower part of mudstone interval. Primarily horizontal laminae with a few isolated lenses of current ripple laminae.

Anderson et al Bubbles d-88-I/94-G-1
Core 1: 4579-4608 ft. Rec. 22 ft
Core 2: 4608-4629 ft. Rec. 21 ft
Core 3: 4629-4674 ft. Rec. 44 ft
Core 4: 4674-4704 ft. Rec. ?
Full diameter core. Well preserved.
Examined sometime between 3rd and 6th October 2000

Baldonnel Fm and Charlie Lake Fm, including the Siphon Mbr.

Varies from vuggy dolostone to non-vuggy, or slightly vuggy, dolostone. Vugs range in size up to 10 cm in diameter. Vuggy dolostone tends to be light grey, non-vuggy dolostone dark grey. Styolites are common. Gamma-ray log through this interval indicates significant variation but macroscopic character of the core does not appear to correlate to the log character changes. Gamma-ray activity make be reflecting minor grain size changes, or clay/phosphate content.

Core 4 intersects beds correlated to the Siphon Member (approx. 4692-4698 ft). Base of Siphon not preserved due to core being cut at this level. Basal part of presumed Siphon consists of light,

brownish grey, vuggy, fine to medium crystalline dolostone that grades up into dark grey dolostone. Latter rapidly grades up into dolomicrite with clay laminae - this probable accounts for the high gamma readings. The clayey dolostone grades up into massive, slightly coarser crystalline dolostone.

Underlying the Siphon Mbr is dark grey, mottled dolostone containing scattered small nodules of anhydrite.

Homestead et al Green c-55-I/94-G-7
Core 1: 3950-4009 ft. 13 boxes
Core 2: 4009-4048 ft. 9 boxes
Core 3: 4048-4077 ft. 6 boxes
Core 4: 4077-4108.6 ft. 7 boxes.
Full diameter. Well preserved.
Examined sometime between 3rd and 6th October 2000

Baldonnel Fm and Charlie Lake Fm, including the Siphon Mbr.

Bulk of the Baldonnel is biodolomicrite: highly comminuted shell debris in a dolomicrite matrix. Gamma-ray "kick" at 3958-3960 ft appears to be in response to presence of an argillaceous dolostone in abrupt contact with underlying, slightly lighter coloured dolostone with anhydrite nodules. Gamma-ray "kick" at 4042 ft may be in response to facies change - below "kick" the beds consist of biodolomicrite, above the "kick" beds are possibly argillaceous.. The contact between these two facies types is abrupt and irregular.

Below 4042 ft gamma-ray log has blocky character - this seems to reflect the presence of a uniform-looking dolostone that has very little development of vugs.

Gamma-ray "kick" at 4086-4089 ft appears to correspond to interval of finely laminated argillaceous dolostone and/or dolomitic shale. This interval rests abruptly on lighter grey dolostone - the area of contact has dolomite-filled subhorizontal fractures. Below this contact is the Siphon Mbr. Unable to identify any changes at the base of the Siphon Mbr.

PanAm Dome A1 Green Creek d-76-I/94-G-7
Core 1: 5030-5079 ft 11 boxes. Rec. 49 ft. Slabbed. Well preserved
Core 2: 5079-5116 ft 8 boxes. Rec. 37 ft. Slabbed. Well preserved.
Examined sometime between 3rd and 6th October 2000

CHARLIE LAKE FM

5030-5043' 8"	Mottled dolostone: patches, wisps, lenses, irregular laminae and bands of brownish grey very finely crystalline dolostone in a background of medium to dark grey very finely crystalline dolostone. An unusual diagenetic fabric common to the lower part of the Charlie Lake Fm. Abrupt basal contact.
5043' 8"-5046' 8"	Dolostone: light brownish grey. Micritic/very finely crystalline. Massive to coarsely laminated/very thinly bedded. Beds/laminae present at base and midway through interval. Scattered small (<1 cm) anhydrite nodules - diagenetic. In parts of the massive dolostone there are examples of the mottled dolostone described above. Basal contact not preserved.
5046' 8"- 5048' 10"	Dolostone: scattered small (<1 cm) anhydrite nodules and thin-walled shell debris in a micritic/very finely crystalline dolostone. Basal contact vague, possibly gradational.
5048' 10"- 5049' 10"	Dolostone: light brownish grey. Micritic/very finely crystalline. Vaguely laminated in upper few inches. Thin lenses and wisps of clay in the lower few inches; curving wisps.
5049' 10"- 5050' 3"	Anhydrite in a dolomite matrix: irregular shaped lenses, nodules and layers of anhydrite. Tends to be layered near base. Rapidly transitional base and top.
5050' 3"- 5050' 8"	Dolostone: micrtic/very finely crystalline. Coarsely laminated. Scattered laminae and lenses of anhydrite. Base and top appear to be rapidly transitional.
5050' 8"- 5057 ft	Mottled dolostone: cf. above description. In places the dark grey dolostone has been completely replaced.
5057- 5058' 2"	Dolostone: brownish grey. Micritic/very finely crystalline. Faint wisps/streaks of darker dolomite. Abrupt base and top.
5058' 2"- 5061 ft	Mottled dolostone: mostly dark grey dolostone. Abrupt, uneven (1 to 2 cm of relief) basal contact.
5061- 5062 ft	Dolostone: brownish grey with wisps, streaks and irregular laminae and patches of dark grey dolostone. Abrupt basal contact.
5062- 2062' 3"	Anhydrite: top 1 ins is white anhydrite resting abruptly on irregularly bedded medium to dark grey anhydrite. Latter contains very thin (<1 mm) laminae of black clay. Bedding slightly distorted. Abrupt, uneven basal contact.
2062' 3"- 2065' 5"	Dolostone-anhydrite: predominantly very finely crystalline dolostone in coarse laminae, very thin beds and vaguely bedded zones. Scattered throughout are small patches of replacement anhydrite and in the mid part of the unit there are layers and lenses (up to1 cm) of anhydrite interlaminated with 4-5 cm thick dolostone beds. Basal contact is abrupt.
2065' 5"- 5066' 3"	Mottled dolostone: cf. above description. Abrupt basal contact.

5066' 3"- 5067' 1"	Sandstone: fine to medium grained; dolomitic; dark grey. Subhorizontal bedding. Basal contact not preserved.
5067' 1"- 5087 ft	Mottled dolostone: variable intensity of replacement. Top 6 ins entirely brownish grey dolostone. Basal contact is a rapid gradational change.
5087-5095 ft	Dolostone: Micrite/very finely crystalline. Brownish grey. Vaguely mottled. A few large nodules (2-3 cm) of irregularly shaped pyrite nodules. Basal contact is diffuse due to dolomite replacing the upper few inches of the underlying sandstone.
5095- 5100 ft	Sandstone: fine grained. Dark grey. Dolomitic. Faintly bedded. Basal contact not preserved.
5100- 5115' 4"	Mottled dolostone: variable intensity of replacement.. Patches of irregularly laminated dolostone. Scattered small anhydrite and irregular patches of replacement anhydrite. Basal contact appears to be abrupt.
5115' 4"- 5116 ft	Sandstone: fine grained, dolomitic.

Core 4: 5140-5154.6 ft 4 boxes. Rec. 14.6 ft. Slabbed. Well preserved.

CHARLIE LAKE FM

5140- 5141' 3"	Mottle dolostone: small patches of replacement anhydrite. Vague basal contact.
5141' 3"- 5143' 6"	Sandstone: dolomitic. Abrupt basal contact.
5143' 6"- 5144' 4"	Dolostone: coarsely laminated to very thinly bedded. Very finely crystalline. Abrupt basal contact
5144' 4"- 5148 ft	Sandstone: dolomitic. Poorly defined bedding.
5148- 5154.6 ft	Mottled dolostone: see previous description.

Westcoast Amoco Dome Green d-85-I/94-G-7
Core 2: 4088-4148 ft. 13 boxes
Core 3: 4150-4166 ft. 2 boxes
Full diameter. Well preserved.
Examined sometime between 3rd and 6th October 2000

Baldonnel Fm and Charlie Lake Fm, including the Siphon and Cecil members.

Dolomicrite: fractured (filled with coarse dolomite crystals); some fracture brecciation. Variably argillaceous. Minor gamma-ray "kick" at 4094 ft corresponds to gradual change from dolostone with argillaceous partings to less argillaceous dolostone.

Top of Siphon marked by a rapid vertical change to a more argillaceous dolostone overlying the Siphon. Within the 5 ft of strata overlying the Siphon there are numerous vertical and horizontal fractures filled with coarse dolomite crystals, and some of the larger fractures have breccia fabrics.

Siphon Mbr: characterized by the presence of abundant very small vugs (<1 mm). Possible base of Siphon at 4130 ft marked by dolostone resting abruptly on dark grey to black argillaceous dolostone.

Interval between Siphon and Cecil members has vague thin beds and is partly mottled.

Top of Cecil at 4143 ft: Cecil consists of dark grey, very fine grained sandstone - most of core in this interval is badly broken.

Strata below Cecil (core 3) consists of medium grey, vuggy (<2 mm) dolostone, possibly sandy in places.

Core 4: 4170-4211 ft.
9 boxes. Full diameter. Well preserved..

Includes the Nancy Mbr of the Charlie Lake Fm. Between 4170-4191 ft.

At 4191 ft there is a distinct facies change: strata above consist of dark grey dolomicrite with very small vugs concentrated at several zones. At 4191 ft there is an irregular, slightly brecciated surface with 2-4 cm of relief and overlain by dark grey dolomicrite with some coalesced anhydrite nodules. Strata immediately below the contact is a 12-14 ins thick bed of light grey dolomicrite, below which is a succession of interbedded dark and light grey dolomicrite with numerous horizons of brecciated dolostone. Difficult to tell if breccias are sedimentary or diagenetic: some appear to be the result of over-steepening of beds, others appear to be due to solution collapse.

WGSI Bubbles b-19-A/94-G-8
Core 1: 4277-4326 ft. Rec. 49 ft. 11 boxes
Core 2: 4326-4416 ft. Rec. 50 ft. 11 boxes
Cores examined between 3rd and 6th October 2000

Baldonnel Fm and Charlie Lake Fm, including the Siphon Member

Bulk of core consists of dark grey, vuggy dolomicrite. Gamma-ray log deflection at 4320 ft not marked by any obvious facies change in core.

Tip of Siphon marked by a slightly argillaceous interval and base of member may be a change to an underlying argillaceous dolostone at about 4408 ft. Internal character of Siphon not much different from that of the enclosing beds.

Pacific Imperial Jedney d-44-C/94-G-8
Examined sometime between 3rd and 6th October 2000

Core 1: 5397-5410 ft 3 boxes. Full diameter. Broken into small pieces.

Oil stained, fine to medium grained, partially calcareous sandstone. Due to fragmented nature of core unable to seen any sedimentary structures.

Core 2: 5411-5425 ft 3 boxes. Full diameter. Fragmented into small pieces.
Light grey, medium grained sandstone. Some oil staining. Porous. Some styolites. Traces of sub-horizontal bedding.

Core 3: 5426-5460 ft 6 boxes. Full diameter. Moderately well preserved.
Light grey, fine to medium grained (mostly latter) sandstone. Porous. Abundant scattered pyrite nodules (1 mm diameter). Scattered occurrences of medium-angle cross beds.

Core 4: 5460-5461.5 ft. 1 box. Full diameter. Moderately well preserved.
Cf. Core 3.

Core 5: 5461.5-5497 ft 7 boxes. Full diameter. Well preserved.
Uniform appearing medium-grained sandstone. Some minor grain-size changes suggests multiple beds but difficult to detect physical changes that would indicate individual beds. Cross bedding is common. Abundant small pyrite nodules, usually scattered but can be local concentrations.

Core 6: 5497-5504 ft 2 boxes. Full diameter. Well preserved.
Cf. Cores 3 to 5. Also contains two thin (2-4 cm) muddy beds. Sandstone beds rest abruptly/erosionally on the mudstone beds. The upper mudstone bed (4 cm thick) contains sand laminae and is gradational with underlying sandstone.

Core 7: 5504-5513 ft 2 boxes. Full diameter. Well preserved.
5504-5511 ft. Sandstone: light grey, fine grained. Generally massive. Abrupt, probably erosional, basal contact.
5511-5513 ft. Mudstone-sandstone: finely interlaminated to very thinly interbedded. Sandstone is very fine grained. Some ripple laminae, especially in upper 6-8 ins.

Comment: difficult to infer much about deposition due to lack of sedimentary structures. The dominance of sandstone above 5511 ft implies a relatively high-energy depositional environment. Is the contact at 5511 ft a major erosional break - such as an unconformity or surface of regression?

PEX et al Jedney c-86-C/94-G-8
Core 1: 4695-4701 ft 2 boxes. Slabbed. Well preserved.
Core 2: 4701-4723 ft 5 boxes. Slabbed. Well preserved.
Core 3: 4723-4774 ft 11 boxes. Slabbed. Well preserved.
Core 4:4774-4801 ft 6 boxes. Slabbed. Well preserved.
Core 5: 4801-4830 ft 6 boxes. Slabbed. Well preserved.
Examined sometime between 3rd and 6 th October 2000

BALDONNEL FM
4695-4722 ft Biomicrite to biodolomicrite: dark, brownish grey. Scattered zones containing coarse calcite crystals. Predominantly dolomitic.

4722-4725' 6"	Biomicrite: vuggy. Scattered layers rich in bioclastic debris - most probably bivalve and/or brachiopod. Upper contact not preserved. Lower contact has a styolite.
4725' 6"-4830 ft	Biomicrite-biodolomicrite: dark grey with varying amounts of moldic and vuggy porosity (usually small, <2 mm, vugs). Some highly porous zones, others less so. Styolites scattered throughout interval. Some diagenetic overprinting where coarse calcite nodules or patches and lenses occur, and where a mottled fabric is present. In core 5 there is a good example of a coarse ribbed brachiopod shell (mold). Difficult to detect macrofacies changes in core. Some beds are identifiable and where seen consist of a basal erosional surface overlain by medium to coarse bioclasts grading up into finer bioclasts and biomicrite.

Core 6: 5320-5332 ft 3 boxes. Rec. 11 ft. Full diameter. Well preserved.
Examined sometime between 3rd and 6th October 2000

Cored from part of a thin coarsening-upward unit. Core consists of irregular patches and layers of light brownish grey and dark grey dolomite in a very fine grained sandstone. No other features visible.

Core 7: 5365-5423 ft 12 boxes. Rec. 56 ft. Slabbed. Generally well preserved
Core 8: 5423-5451 ft 6 boxes. Rec. 28 ft. Slabbed. Well preserved.
Core 9: 5451-5474 ft. 5 boxes. Rec. 20.5 ft. Slabbed Well reserved.
Examined sometime between 3rd and 6th October 2000.

CHARLIE LAKE FM

5365 - 5367 ft	Missing core
5367 - 5369 ft	Mudstone: poorly preserved part of core - broken into small pieces. Laminae to very thin beds of silt/very fine sand. Charlie Lake-Halfway contact poorly preserved.

HALFWAY FM

5369 -5374 ft	Sandstone: very fine to fine grained, locally medium grained. Medium grey colour from 5369 ft to about 5427 ft then gradually changes to a lighter grey. Slightly calcareous in places. Unit made up of well bedded (very low angle bedding), structureless and load deformed intervals. Individual beds not well defined. Scattered muddy layers. Scattered occurrences of styolites. Scattered small (<3 mm) pyrite nodules, especially in the light grey parts of the unit.

Teepee Creek/West Laprise c-14-J/94-G-8
Core 1: 1304.2-1321.8 m. 12 boxes
Core 2: 1321.8-1327.6 m 4 boxes
Core 3: 1327.6-1338.8 m 8 boxes

Core 4: 1338.8-1343.2 m 3 boxes
Core 5: 1343.2-1354 m 7 boxes
Full diameter core. Well preserved.
Examined sometime between 3rd and 6th October 2000

Charlie Lake Fm and possibly includes the Siphon, Cecil, Nancy and Boundary members

Gamma-ray kick at 1305-1306 m poorly reflected in macrofacies of the core - possibly within part of core that is badly broken in small fragments. Strata above and below the broken core are similar - dark grey, vuggy dolostone.

Strata identified as Siphon on logs not distinct from over- and underlying beds.

At 1319 m (possibly the top of the Cecil Mbr) dolostones above this level have abundant vuggy porosity, strata below are denser, dark grey dolomicrite with few vugs, several horizons rich in anhydrite nodules, vaguely bedded and contains oblique, dolomite-filled fractures. These ?Cecil strata extend to about 1324.5 m where the dolostones become vuggier but which quickly changes down-section into non-vuggy dolostone with nodules and vague cross laminae.

Nancy Mbr not easy to separate from enclosing strata, although top of Nancy may be where the core is broken into small fragments. Likewise the Boundary Mbr is not easy to distinguish.

At about 1349 m there is a distinct, abrupt facies change. Strata above are brownish grey and extend to about 1344.5 m (possibly the Boundary Mbr). Below 1349 m the strata are dark grey and well bedded and laminated for about 12 cm, below which bedding is vague and sporadically developed, but also present are brecciated beds.

BP et al Laprise a-45-B/94-G-9
Core 1: 1376-1393.2 m Rec. ? 12 boxes. Full diameter (6.5 cm)
Core 2: 1393.2-1401.2 m Rec. ? 6 boxes. Full diameter.
Core 3: 1401.2-1409 Rec. ? 10 boxes. Full diameter.
Examined sometime between 21-24th September 1999

CHARLIE LAKE

1376-1394.13 m — Three coarsening-upward cycles: dolomitic mudstone grading up into fine grained sandstone. Mudstone appears to rest abruptly on underlying beds and in turn grades up into sandstone. Mudstone has a complex diagenetic fabric due to replacement by dolomite. Some zones within the mudstone are entirely dolomite. In the sandstone of the lower two cycles there appears to be some diagenetic anhydrite, also resulting in a complex fabric. No visible sedimentary structures.

HALFWAY

1394.13-1409 m — Sandstone: very fine grained. Medium grey. Multiple beds of either massive or cross bedded sandstone grading up into argillaceous sandstone or interlaminated clay-sand. Bed thickness varies from a few cm to 25 cm. Local load deformation structures, especially in the argillaceous zones.

Canwest PetroCanada Tommy b-86-E/94-G-9
Core 2: 1061.25-1064.25 m 3 boxes. Rec. 3 m. Slabbed. Well preserved.
Core 3: 1064.25-1082.5 m 13 boxes. Rec. 18 m. Slabbed. Well preserved.
Core 4: 1082.5-1100.75 m 13 boxes. Rec. 18.25 m. Slabbed. Well preserved.
Core 5: 1100.75-1119.3 m 13 boxes. Rec. 118.55 m. Slabbed. Well preserved.
Examined sometime between 3rd and 6th October 2000

Core/log depths may be misaligned by about 0.5 m (i.e., log depths 0.5 m deeper than core depth)

CHARLIE LAKE FM

1061.25-1065.5 m — Mudstone-sandstone: burrow-mottled very fine grained sandstone, argillaceous sandstone and sandy mudstone. Few preserved beds. Possibly some load deformation. Basal contact not well preserved - possibly gradational over a 8-20 cm interval of load deformed sandstone-mudstone.

1065.5-1069.03 m — Sandstone: fine to medium grained; slightly calcareous. Generally uniform appearance with some traces of possible low-angle cross bedding (seen as grain size variations). Mid-part of interval is oil stained - porous. Lower boundary of oil stain is diffuse; upper boundary is abrupt. Unstained parts are less porous, better cemented. Some scattered mud laminae. Basal contact is abrupt and mildly load deformed. At about 1066 m there is an irregular band (few mm thick) of pyrite.

1069.03-1069.77 m — Mudstone: silty to sandy (very fine grained). Internally changes vertically from mudstone to argillaceous sandstone and back to a mudstone. Load

	deformation features common.
1069.77-1070.42 m	Sandstone: very fine to fine grained with some argillaceous layers; calcareous. Coarsely and crudely bedded. Abrupt basal contact. Minor load deformation structures.
1070.42-1071.4 m	Mudstone: medium grey; silty to sandy. Minor to moderate load deformation. Remnants of bedding. Gradational basal contact over a 5-10 cm interval.
1071.4-1072.5 m	Sandstone: very fine to fine grained with some argillaceous layers. Minor to moderate load deformation. Fine subhorizontal laminae in basal 10 cm. Basal contact appears to be abrupt.
1072.5-1074.3 m	Siltstone-sandstone-mudstone: laminae and irregular very thin beds of coarse grained siltstone to very fine grained sandstone and mudstone. Interval tends to be sandier up-section. Moderately load deformed with some zone of intense deformation, resulting in brecciation in places. In lower 4.5 cm there are layers containing small (<1 mm), scattered bioclasts. Abrupt, non-erosional basal contact.
1074.3-1076.3 m	Bioclastic sandy mudstone: scattered small bioclasts (mostly <1 mm; a few larger clasts) in sandy mudstone. Bioclasts mostly unidentifiable, a few seem to be bivalve and/or brachiopod debris. Mottled appearance with little trace of bedding - mottling could be due either to bioturbation or load deformation, no conclusive evidence for either. Calcareous. Diffuse, possibly load deformed basal contact.
1076.3-1077.56 m	Mudstone: silty to sandy. Mottled appearance - seems to be due to intense load deformation. Gradational basal contact.
1077.56-1079.46 m	Argillaceous sandstone: very fine to fine grained, muddy. Severely load deformed, with only a few remnants of original bedding. A few siderite nodules.
1079.46-1080.24 m	Sandstone: very fine to fine grained; partially argillaceous. Some calcite cement. Upper 25 cm finely laminated, below which unit is more uniform in appearance and possibly load deformed. In middle of interval there are scattered, small calcite spheres - these appear to be of diagenetic origin rather than biological. Diffuse lower contact.
1080.24-1082 m	Sandstone: dark grey, fine to medium grained. Uniform appearance - no visible sedimentary structures. Basal contact not preserved.
1082-1087.37 m	Sandy mudstone to argillaceous sandstone: uniform to mottled appearance. Only vague indications of original bedding. Patchily developed, brownish grey, replacement dolomite. Abrupt, non-erosional, basal contact.
1087.37-1090.5 m	Sandstone: fine grained, medium grey. Varies from uniform in appearance to a few zones of thin beds. Basal contact appears to be abrupt.
1090.5-1091.75 m	Sandy mudstone: silty mudstone in lower 30 cm grading up to sandy mudstone. Mottled to vaguely bedded. Basal contact not preserved.
1091.75-1098.1 m	Sandstone: very fine to fine grained. Vaguely bedded (sub-horizontal) but mostly mottled in appearance - latter appears to be due to load deformation, and possibly bioturbation, although former seems more

probable. Becomes muddy up-section.

1098.1-1098.18 m Mudstone: unevenly laminated. Abrupt, uneven (1 cm of relief) basal contact.

1098.18-1098.23 m Calcareous mudstone: Upper 1-2 cm highly calcareous, less so below. Basal contact is poorly defined, irregular and possibly deformed. Small calcite nodules (few mm in diameter) and amalgamated nodules form a thin layer at top of interval (a possible hardground?).

1098.23-1098.28 m Silty mudstone: vermiform/enterolithic-like mottling throughout. Lighter coloured patches are more calcareous than the darker ones.

1098.28-1098.39 m Mudstone: silty to sandy. Gradational basal contact.

Note: 1098.1-1098.39 m probably corresponds to high gamma-ray "kick" on logs at 1098.1-1099.1 m - which is chosen as the Charlie Lake-Halfway contact on logs.

HALFWAY FM

1098.39-1119.3 m Sandstone: very fine to fine grained.; light to medium grey colour; slightly calcareous. Multiple beds that are cross bedded (very low angle) or load deformed or have no visible sedimentary structures. Internal erosional surfaces also indicate multiple beds. Most beds difficult to separate but where present are 30-50 cm thick. Deformed strata tend to be argillaceous or contain mud laminae. Sandy parts are porous. Scattered small (<5 mm) pyrite nodules, especially in upper 5-7 m. Some clay-filled styolites.

Comment: Halfway strata are high-energy deposits, probably storm deposits. Charlie Lake beds are low to moderate energy deposits. Note the predominance of siliciclastic beds in this part of the Charlie Lake Fm, in contrast to other areas where carbonates and evaporites predominate.

Bluesky et al Antler d73-F/94-G-9

Core 1: 1197-1215.3 m 13 boxes. Full diameter. Well preserved.
Examined sometime between 3rd - 6th October 2000

DOIG FM.

Lower 2.87 m consists of mudstone-dominant strata overlain by mudstone-dominant and sandstone-dominant intervals of varying thicknesses..

Changes from mudstone/sandstone-dominant intervals usually gradual except for lowest sandy interval which rests abruptly and probably erosionally on lowest 2.87 m of mudstone.

Sandstone-dominant intervals: very thin to thin beds (few cm to 25 cm) of very fine grained sandstone interbeddd with very thin mudstone or muddy sandstone. Individual beds commonly fine-up from a mudstone-clast-bearing basal zone to muddy sandstone. Mudstone clasts are spherical and up to 5 mm in diameter. Some beds have bioclast debris (?bivalve fragments). Styolites are common. Most beds have some bed deformation, varying from minor to moderate. Greater deformation in the muddier beds.

Mudstone-dominant intervals: varies from silty to sandy mudstone. Some intervals have abundant laminae to very thin beds of silt/very fine sand. Some starved-ripple laminae. Bed deformation is minor.

COMMENT: storm-generated sandy beds, probably deposited in the offshore to lower shoreface transition zone.

PetroCanada AEC Tommy b-21-L/94-G-9
Core 1: 1148.5-1161.55 m Rec. 13.05 m. 9 boxes. Slabbed. Well preserved.
Examined sometime between 3rd and 6th October 2000

DOIG FM

1138.5 -1159.79 m

Sandstone: alternating thin to thick (few cm to 40 cm) beds of bioclastic sandstone and very fine grained sandstone. Calcareous. Many of the thicker beds have a basal zone of light to medium grey bioclastic sandstone that grades up into lighter grey, very fine grained sandstone. Bioclasts are of indeterminate origin, rounded, discoidal, up to 5 cm in diameter, but most are <2 cm; commonly aligned along cross beds and where densely packed are imbricated. Associated with the bioclasts are small (generally <3 mm, some up to 8 mm) mudstone clasts. Many of the bioclastic intervals are multiple beds and they contain low to medium angle cross beds. Difficult to detect sedimentary structures in sandstone beds. Most beds have erosional bases; many are load deformed - especially the sandstone beds which tend to be argillaceous, and styolites are common. There are a few mud-filled vertical fractures.
Prominent sandstone-dominant intervals between:
1149.88 and 1151.42 m
1154.4 and 1155.93 m
Lower 1.1 m of core consists of alternating beds of sandstone and bioclastic sandstone that are load deformed. The first thick bioclastic bed begins at 1158.6 m, above which there is a thick interval of bioclastic sandstone with low-angle cross beds and which grades up into sandstone at about 1156.59 m. Basal contact of the thick bioclastic interval is load deformed, as are parts of the overlying sandstone. This 2.01 m thick bioclastic interval appears to be a single unit.

Between 1159.79 and 1161.55 m the core consists of thinly interbedded very fine grained, argillaceous sandstone and dark, brownish grey mudstone. All beds in this interval are load deformed, some severely - resulting in over-steepened bedding.

Comment: series of high-energy storm deposits (waning flow conditions) - fining-upward beds, and/or high-energy deposition in the storm wave zone - cross bedded units, in a marine, shoreface setting.

Precambrian et al Trutch d-37-I/94-G-10
Core 1: 1202.2-1220 m Rec. 18.2 m. 13 boxes. Full diameter.
Examined sometime between 21st-24th September 1999

CHARLIE LAKE FM

1202.2-1203.18 m	Sandstone: fine grained. Medium grey. Micaceous. Sets of planar cross beds. Slightly load deformed, erosional basal contact.
1203.18-1204.86 m	Mudstone: sandy, dolomitic. Replacement dolomite imparts complex diagenetic fabric. Load deformation structures common in lower and upper part of interval. Lower 50-70 cm has thinly interbedded mudstone-sandstone. Basal contact appears to be abrupt.
1204.86-1206.78 m	Coarsening-upward succession: Basal 40 cm of dolomitic mudstone grading up into load deformed, argillaceous sandstone. Abrupt basal contact.
1206.78-1208.95 m	Coarsening-upward succession: Basal 46 cm consists of silty to sandy mudstone rapidly succeeded by fine grained, locally argillaceous, sandstone. There is a 4 cm-thick mudstone bed at 1207.41 m within the sandy part of the succession. No obvious sedimentary structures - vague hints of contorted beds.
1208.95-1211.55 m	Coarsening-upward succession: About 72 cm of mudstone grading up into sandstone-dominant interval. Very fine to fine grained sandstone with some medium grained sandstone in upper 70 cm. Upper 70 cm consists of 12-30 cm-thick beds of sandstone grading up into thin mudstone or argillaceous sandstone. Base of interval an abrupt contact.

HALFWAY FM

1211.55-1220.4 m	Sandstone: very fine to fine grained. Medium grey. Upper 1.1 m is argillaceous - with wisps and irregular laminae of clay and one thin (1 cm) bed of mudstone. Multiple beds, although bed contacts not well preserved. Massive or cross bedded, or load deformed (especially in argillaceous sandstones). Below about 1212.65 m clay content declines.

Precambrian Trutch c-13-A/94-G-15
Core 1: 1057.5-1075.75 m Rec. ? 12 boxes. Full diameter.
Examined sometime between 21st-24th September 1999

CHARLIE LAKE FM

1057.5-1059.9 m	Coarsening-upward succession: dolomitic mudstone grading up into sandy mudstone. Complex dolomite-replacement fabric. Completely dolomitized areas are a light tan colour. Abrupt basal contact.
1059.9-1066.15 m	Coarsening-upward succession: dolomitic mudstone grading up into fine to medium grained, cross bedded sandstone. Similar to overlying unit. Multiple beds. Abrupt basal contact.
1066.15-1071.1 m	Coarsening-upward succession: Basal 1.4 m consists of interbedded dolomitic mudstone (some almost completely dolomitized) and sandstone.

	Remainder of interval consists of fine grained, dark grey, sandstone with no visible sedimentary structures. Basal contact not preserved.
?HALFWAY FM	
1071.1-1075.5 m	Sandstone: very fine to fine grained. Dark grey. No visible sedimentary structures. Upper 20-30 cm is slightly argillaceous and also contains a few clay laminae and very thin beds of mudstone.

Union et al Skwat d-30-B/94-H-1
Core 1: 3540-3590 ft. Rec. ? 11 boxes. Full diameter
Examined sometime between 21st-24th September 1999

CHARLIE LAKE FM	
3540-3545 ft	Mudstone: light tan colour. Complex diagenetic fabric due to dolomite replacement. Basal 0.5 ins consists of laminated mudstone, overlain by 8 ins of brecciated mudstone. Abrupt basal contact.
3545-3546' 3"	Sandstone: very fine grained. Disrupted fabric due to dolomite replacement. Two nodules of sparry dolomite about midpoint in unit. Base marked by presence of light green mudstone clasts (similar to immediately underlying lithology).
DOIG FM	
3546' 3"-3546' 10"	Mudstone: light green. Basal contact difficult to see clearly but appears to be gradational.
3546' 10"-3565' 7"	Sandstone-mudstone: predominantly sandstone. Thin to medium beds (1 to 20 ins.) of fine grained, locally coarse, sandstone interbedded with thin (<1 ins.) Mudstone beds. Mostly plane beds with some current-ripple laminae. General tendency for sandstone beds to thicken up-section. Basal contact of interval abrupt.
3565' 7"-3570' 10"	Mudstone: black. Massive with vague silt laminae. Gradational with underlying unit.
3570' 10"-3572' 10"	Mudstone-sandstone: thin beds of very fine grained, finely laminated (planar and current-ripple) sandstone interlaminated with black mudstone. Gradational with underlying beds.
3572' 10"-3576 ft	Mudstone: black. Fine laminae of silt throughout. Basal few inches has a few, very thin sandstone beds. Abrupt basal contact.
3576-3577' 6 "	Small coarsening-upward cycle: mudstone with silt laminae grading up into vaguely laminated, very fine grained sandstone.
3577' 6"-3580' 6"	Sandstone: very fine grained. Consists of at least three fining-up beds about 12 ins thick. Each bed has an abrupt basal contact overlain by massive sandstone grading up into a thin zone of argillaceous sandstone or mudstone. Sandstone in lowest bed is deformed and contains some fine clay-laminae. Other two beds are vaguely planar bedded.
3580' 6"-3581' 10"	Sandstone-mudstone: interlaminated to thinly interbedded. Also some lenticular beds of sandstone. Load deformation structures are common. Some beds with current-ripple laminae. Rapidly gradational with underlying unit.

3581' 10"-3590 ft Mudstone: dark grey. Fine laminae and small lense of silt throughout.

NOTE: core depths and log character do not seem to correspond - may need to lower core depths by 4-5 ft to match log character.

CNRL Laurel d-9-C/94-H-1
Core 1: 3585 - 3645 ft 13 boxes. Full diameter with a few slabbed pieces. Rec. 60 ft.
Core and log depths do not appear to correspond; core depths about 2 ft deeper than log response - core depths are given.
Examined 9th October 2001

CHARLIE LAKE FM

3585-3592' 4" Calcareous dolostone: brownish grey, very finely crystalline. Scattered patches of mottled fabric with more persistent mottles in lower 3 ft. Scattered shell debris (bivalves and/or brachiopods, and bryozoa). Some vuggy porosity (very small vugs - 1 mm). Diffuse basal contact.

3592' 4"-3601 ft Calcareous dolostone: possibly argillaceous. Brownish grey. Very finely crystalline. No obvious bedding. Minor patches of mottles.

3601-3609' 6" Calcareous dolostone: possibly argillaceous. Brownish grey. Alternating intervals of mottled dolostone and non-mottled dolostone. In some non-mottled dolostone intervals there are breccia-like units (appears to be in-situ dessication and/or fracturing). Some mottled intervals have a pseudo-nodular to brecciated appearance.. A mottled interval rest abruptly on underlying bed.

3609' 6"-3610‘ 6" Dolomitic mudstone: finely laminated to very thinly bedded. No mottling and darker grey than enclosing intervals. Scattered small (<1 mm) vugs. Basal contact is diffuse over a thin interval. Possibly phosphatic.

3610' 6"-3614' 10" Mottled dolostone: brownish grey. Basal 18" has pseudo-nodular appearance. Abrupt basal contact.

3614' 10"-3628' 10" Calcareous dolostone: brownish grey. Moderately mottled in a few intervals. A sandy zone at about 3619 ft. At 3627' 10" there is a pseudo-breccia caused by multi-directional, closely spaced fractures. Abrupt basal contact.

HALFWAY FM

3628' 10"-3633' 6" Sandstone: very fine to fine grained. Oil stained. Massive to vaguely cross bedded. Highly porous. Calcareous cement. Abrupt, load deformed basal contact.

DOIG FM

3633' 6"-3645 ft Mudstone: medium to dark grey. Fine silt laminae throughout.

NOTE: possible major erosion surface at 3633' 6".

CNRL Charter et al Drake b-2-L/94-H-1
Core 1: 1047 - 1059 m 7 boxes. Full diameter. Core badly broken into small fragments and a

large number of core plugs.
Examined 9th October 2001

CHARLIE LAKE FM

1047-1048.17 m	Dolostone-anhydrite: Upper 50 cm consists of brownish grey, very finely crystalline dolostone with veins of anhydrite. Grades down into about 20 cm of complexly mottled interval of dolostone and anhydrite, in turn grading down into finely to coarsely laminated and very thin beds of calcareous anhydrite with minor amounts of dolostone.
1048.17-1048.37 m	Dolostone: dark brown oil stain. Finely laminated.
1048.37-1063.2 m	Mottled dolostone: Complexly mottled fabric of light grey and medium/brownish grey dolostone. Calcareous in places. A few fractures filled with anhydrite and some thin anhydrite beds in upper 2 m. At about 1053 m there is a 7 cm-thick brecciated mudstone layer. Basal 10 cm consists of dark grey dolomitic mudstone with very thin layers of phosphatic material. Abrupt basal contact.

HALFWAY FM

1053.2-1055.35 m	Sandstone: fine grained. Porous. Patchy development of white calcite cement. Tendency to fine up into argillaceous sandstone. Vaguely cross bedded. Basal erosional surface overlain by about 2 cm of mud-clast-bearing (clasts 1-2 mm long) sandstone.

DOIG FM

1055.35-1057 m	Sandstone: very fine grained and contains fine mud laminae. Some possible ripple laminae.

NOTE: possible major erosion surface at 1055.35 m.

Encal et al Wildmint d-5-A/94-H-2
Core 1: 3635-3695 ft. 13 boxes. Full diameter, a few slabbed pieces
Core 2: 3695-3735 ft 9 boxes. Full diameter, a few slabbed pieces
Examined 9th October 2001

CHARLIE LAKE FM

3635-3643 ft	Interbedded calcareous sandstone-calcareous mudstone: light grey calcareous sandstone in very thin beds, irregular small to large lenses and commonly load deformed. Mudstone is brownish grey. Some laminated beds present. General upward increase in sandstone content. Abrupt basal contact.
3643-3652' 9"	Mudstone: medium grey to brownish grey. Finely laminated. Dolomitic in places, with some zones completely replaced by dolomite. Abrupt basal contact.
3652' 9"-3653' 9"	Dolomite coquina: molds of shell debris (very porous unit). Oil stained. Basal contact appears to be abrupt.
3653' 9"-3659' 9"	Dolostone: very finely crystalline. Brownish grey. Varies from massive to irregularly laminated to mottled. Vague basal contact.

3659' 9"-3660 ft	Dolomite coquina: molds of shell debris. Porous but connectedness of pores may give rise to low permeability.
3660-3670' 2"	Mottled dolostone: light brownish grey with darker brownish grey mottles. Gradational basal change.
3670' 2"-3671 ft	Dolostone: brownish and medium grey in colour. Argillaceous. Finely laminated. Abrupt basal contact.
3671-3688 ft	Mottled dolostone: as above.
3688-3689' 8"	Dolostone: argillaceous. Small to large irregular lenses of light grey material in a brownish grey groundmass. Fabric appears to be the result of bed disruption. Basal 5" brownish grey, calcareous mudstone with small lenses of limestone just above the abrupt basal contact.
3691' 9"-3698 ft	Missing core
HALFWAY FM	
3698-3704' 9"	Interbedded sandstone-mudstone: thin to thick beds of very fine grained sandstone separated by thin mudstone beds. Mudstone beds contain highly deformed sand layers and sand-balls.
3704' 9"-3712 ft	Sandstone: fine grained. No visible sedimentary structures. Oil stained.
DOIG FM	
3712-3735 ft	Mudstone: dark grey. Fine laminae to very thin beds of siltstone. A few lenticular beds of silt.

Union HB Snowberry b-21-A/94-H-2
Core 1: 3595-3645 ft Rec. 50 ft. 11 boxes. Slabbed.
Examined sometime between 21-24th September 1999

CHARLIE LAKE FM	
3595-3600' 5"	Mudstone-anhydrite: basal 9 ins consists of 1-5 ins-thick anhydrite beds separated by clay partings or very thin mudstone beds. Abrupt basal contact. Abruptly overlain by mudstone with scattered bands (2-5 ins-thick) of anhydrite. Mudstone is light and dark grey with some patches of brownish grey. Some brecciated zones. Complex diagenetic fabric caused by partial dolomitization.
3600' 5"-3605' 6"	Mudstone: medium and dark grey. Complex diagenetic fabric due to partial dolomitization. Abrupt basal contact.
3605' 6"-3613' 9"	Dolomudstone/mudstone: yellowish grey to light brown-grey or tan. Scattered lenses and nodules of anhydrite. Complex dolomite-replacement diagenetic fabric in places. A few planar surfaces possibly remnant bedding. About 22 ins above base there is a 6-10 ins-thick anhydrite bed that has an abrupt basal contact with about 2 ins of relief. About 16 ins above base there is a 2 ins-thick fracture breccia. Basal contact of unit is abrupt.
?DOIG FM	
3613' 9"-3645 ft	Mudstone-siltstone: Brownish grey colour. Mudstone-dominant with an upward increase in laminae, lenses and very thin beds of silt/very fine sand.

NOTE: difficult to relate core lithology with log character! Log and core depths probably do not correspond. Log depth 3618 ft appears to be the Charlie Lake-Doig contact. By dropping the core depths by about 8 ft the lithological changes tend to align with log character changes.

CNRL et al Wildmint d-26-A/94-H-2
Core 1: 3690 - 3750 ft. 13 boxes. Slabbed.
Examined 9th October 2001

CHARLIE LAKE FM

3690-3692' 4"	Brecciated dolostone: light grey. Slightly calcareous. Mostly small, sub-angular clasts, some larger rounded clasts. Poorly sorted. Vuggy and intergranular porosity. Fabric appears to be more like solution collapse, rather than a sedimentary breccia - possibly pedogenic. Abrupt basal contact.
3692' 4"-3713 ft	Dolomitic mudstone: grades up into dolomitic, very fine-grained sandstone. Fine laminae to very thin beds in the mudstone. No visible sedimentary structures in the sandstone.

HALFWAY FM

3712-3719 ft	Sandstone: very fine to fine grained. Top few inches consists of very thinly interbedded sandstone-mudstone. Base chosen at a distinct load-deformed bed. No visible sedimentary structures.

DOIG FM

3719-3750 ft	Mudstone: fine laminae and thin lenses of silt with very thin interbeds of sandstone in upper 1 ft.

CNRL et al Wildmint d-44-A/94-H-2
Core 1: 3506 - 3556 ft 11 boxes. Full diameter
Core 2: 3556 - 3571 ft 4 boxes. Full diameter
Examined 10th October 2001

CHARLIE LAKE FM

3506-3510' 8"	Mottled dolostone: predominantly light-medium grey with various shapes/sizes of yellowish grey dolomite mottles. Gradational basal contact.
3510' 8"-3516' 6"	Mottled dolostone: greater amount of yellowish grey dolomite than overlying interval. Gradational basal contact.
3516' 6"-3523' 4"	Mottled dolostone: more grey dolomite than yellow
3523' 4"-3524' 2"	Mottled dolostone: almost entirely yellowish to brownish grey dolomite. Pseudo-breccia appearance. Abrupt basal contact.
3524' 2"-3527' 2"	Mottled dolostone: mostly grey colour. Gradational basal contact
3527' 2"-3533' 3"	Mottled dolostone: mostly yellowish/brownish grey colour. Basal few cm has a breccia-like appearance.
3533' 3"-3533' 11"	Mudstone: contains yellowish grey laminae of dolomite. Near base of interval there are irregular light grey patches that appear to contain

	phosphatic material. Gradational basal contact.
3533' 11"-3542' 5"	Mottled dolostone: predominantly yellowish/brownish grey.
3542' 5"-3543' 6"	Brecciated dolostone: yellowish/brownish grey. Small to large laminated clasts in a dolomicrite matrix. Abrupt basal contact.
HALFWAY FM	
3543' 6"-3568 ft	Sandstone: fine grained. Porous. Slightly calcareous. Massively to vaguely bedded. Erosional basal contact overlain by thin layer of granular sandstone.
DOIG FM	
3568-3571 ft	Interbedded sandstone-mudstone: thin beds of very fine grained sandstone intercalated with laminae to very thin beds of mudstone.

Union HB Wildmint d-57-A/94-H-2
Core 1: 3675 - 3720 ft 11 boxes. Slabbed
Examined 10th October 2001

CHARLIE LAKE FM

3675-3691' 6"	Calcareous mottled dolostone: light brownish grey with some zones of moderate mottling.
3691' 6"-3696' 10"	Mottled dolostone: calcareous in places. Light yellowish grey mottles in a brownish grey background. Mottling varies from moderate to intense. At least two abrupt bed contacts preserved, otherwise devoid of bedding.
3696' 10"-3698' 4"	Dolostone-sandstone: coarse laminae to very thin beds of light grey, very fien to fine grained sandstone in a brownish grey dolostone. Basal contact is diffuse and probably diagenetically altered.

DOIG FM

3698' 4"-3700 ft	Dolostone-dolomitized mudstone: contains a fabric similar to the mottled dolostone seen in the basal Charlie Lake Fm in the Wildmint area interspersed with bedded dolomitic mudstone. Gradational change from underlying beds.
3700-3720 ft	Mudstone: contains laminae, lenses and very thin beds of siltstone. A few very small dolomite nodules present.

Union HB Wildmint d-66-A/94-H-2
Core 1: 3649 - 3701 ft 9 boxes. Slabbed
Core 2: 3701 - 3713 ft 3 boxes. Slabbed
Examined 10th October 2001

CHARLIE LAKE FM

3649-3653' 6"	Mottled dolostone: long segments of non-mottled brownish grey dolomite alternating with moderately mottled intervals.
3653' 6"-3664' 8"	Mottled dolostone: moderately to intensely mottled. Yellowish brown mottles in a brownish grey background. Gradational basal contact.
3664' 8"-3667' 2"	Mottled dolostone: moderately mottled.
3667' 2"-3668' 5"	Brecciated dolostone: light yellowish brown clasts in a brownish grey matrix. Laminated clasts. Upper contact appears to be gradational; basal contact is styolitic. Possibly a diagenetic breccia.
3668' 5"-3669 ft	Dolostone: very finely crystalline. Brownish grey. Vague lighter coloured patches. Abrupt basal contact.

HALFWAY FM

3669-3705 ft	Sandstone: predominantly fine grained, locally granular - especially at the base of some beds. Interval consists of several erosionally based beds. Low to medium angle cross beds are common. Base of interval in erosional contact with mudstone.

DOIG FM

3705-3713 ft	Interbedded sandstone-mudstone: laminae to very thin beds of very fine grained sandstone alternating with laminae and thin beds of mudstone.

Dome et al Weasel d-10-B/94-H-2
Core 1: 1186 - 1204 m 13 boxes. Slabbed
Examined 10th October 2001

HALFWAY FM
Mostly fine grained. Medium to dark grey. Oil stained in places. Slightly calcareous to dolomitic. Mostly without visible sedimentary structures with some intervals of low-angle cross bedding (highlighted by carbonate/anhydrite cement). Upper 1 ft of core has extensive carbonate replacement imparting a mottled look. At about 1202 - 1203 m there is are several thin zones of shelly sandstone. A few places where clay laminae and seams are present.

It is presumed that the sandstone consists of multiple beds but it is difficult to identify single beds.

Encal et al Weasel d-67-B/94-H-2
Core 1: 3788 - 3841 ft 11 boxes. Slabbed
Examined 10th October 2001.

CHARLIE LAKE FM

3788-3798' 8"	Mottled dolostone: mottling varies in intensity. Light yellowish grey mottles in a brownish grey background. Majority of mottles subparallel to bedding.
3798' 8"-3799' 2"	Thinly bedded dolostone: oil stained. Very thin to thin beds of light yellowish brown and brownish dolostone.
3799' 2"-3812' 8"	Mottled dolostone: similar to other mottled dolostones in this part of the Charlie Lake Fm. Basal 2 ft is less mottled and dominated by white-flecked medium grey dolostone. Basal contact not preserved but rapid lithological change suggests an abrupt contact.
HALFWAY FM	
3812' 8"-3837 ft	Sandstone: predominantly fine grained, locally medium grained. Cross bedded in places. Slightly calcareous. Oil stained. Basal erosional surface overlain by thin layer of coarse grained sandstone.
DOIG FM	
3837-3841 ft	Interbedded mudstone-sandstone-siltstone: laminae to very thin beds. Some minor load deformation of beds.

Encal et al Weasel d-68-B/94-H-2 (originally Union et al)
Core 1: 3827 - 3887 ft. Rec. 58 ft. 13 boxes. Slabbed.
Examined 10th October 2001

CHARLIE LAKE FM

3827-3833 ft	Mottled dolostone: light yellowish grey mottles in a light brownish grey

	background. Intensely mottled. Abrupt basal contact.
3822-3834 ft	Dolostone: fine laminae to thick beds of very finely crystalline dolostone. Light grey to brownish grey colours. Some minor bed loading.
3834-3838' 6"	Mottled dolostone: yellowish grey mottles. Moderate to intense mottling.
3838' 6"-3861' 6"	Mottled dolostone: light to medium grey mottles. Weakly to moderately mottled. Most of mottles appear to follow original bedding. Gradational basal contact (arbitrarily chosen where intensity of mottling changes)
3861' 6"-3865 ft	Dolostone and sandy dolostone: Vaguely bedded to mottled. Abrupt basal contact.
3865-3875' 6"	Mottled dolostone: light yellowish grey mottles in a light grey background.
3875' 6"-3877' 10"	Dolostone: crudely bedded to mottled. Abrupt basal contact.
DOIG FM	
3877' 10"-3885 ft	Interbedded siltstone/sandstone-mudstone: laminae to thin beds. A few load deformed beds.

Encal et al West Milligan d-84-F/94-H-2 (original boxes labeled Suncor Beatton)
Core 2: 1130 - 1148.2 m 14 boxes. Slabbed. Parts of core in box 10 badly broken
Examined 10th October 2001

CHARLIE LAKE FM	
1130-1133 m	Mottled dolostone: light to medium grey colours. Moderately to intensely mottled.
1133-1133.15 m	Brecciated dolostone: poorly sorted, sub-rounded to rounded clasts. Clast size ranges from a few mm up to 7 cm, but most are <1 cm. Abrupt basal contact.
HALFWAY FM	
1133.15-1139.55 m	Sandstone: medium to coarse grained, locally granular. Porous. Multiple beds with horizontal bedding and low-angle cross beds. Basal erosional contact.
1139.55-1148.2 m	Sandstone: fine grained; argillaceous in places. Scattered mudstone. Thinly bedded. Mild load deformation is common. Badly broken parts of core are oil stained.

CNRL et al Milligan d-44-G/94-H-2 (box labeled Union HB)
Core 1: 3688 - 3738 ft. Rec. 36 ft. (actually only measured 34ft of core!) 8 boxes. Full diameter.
Examined 10th October 2001

Log depths and core depths appear not to correspond. Log depth 3696 ft indicates lithology change but corresponding core depth is 3692' 3". Core depths are given below.

CHARLIE LAKE FM	
3688-3692' 3"	Mottled dolostone: light to medium grey mottles with a tinge of yellowish grey in upper 8". Abrupt basal contact.
HALFWAY FM	
3692' 3"-3715 ft	Sandstone: predominantly fine grained. Cross bedded in places. Oil stained between 3695-3704 ft. Erosional basal contact.
DOIG FM	
3715-3722 ft	Interbedded sandstone-mudstone: laminae to thin beds, some lenticular beds. Plane laminae most common sedimentary structure.
3722-3738 ft	Missing core

Union HB Willow b-10-H/94-H-2
Core 1: 3610-3651 ft Rec. ? 9 boxes. Slabbed
Core 2: 3651-3675 ft Rec. ? 6 boxes. Slabbed
Examined sometime between 21-24th September 1999

CHARLIE LAKE FM	
3610-3630 ft	Dolomitic mudstone: Complex dolomitization fabric. Brecciated mudstone present 1 to1.5 ft above base. Basal contact not preserved due to broken nature of core. However, the basal bed appears to be a brecciated mudstone.
HALFWAY FM	
3630-3655 ft	Sandstone: medium grey. Medium grained. Very porous. Massive to faintly cross bedded (low angle). Appears to be one unit. Basal contact not preserved due to broken nature of core. However, at or near the base is a core fragment with coarse grained sandstone (distinct black and white chert grains, plus quartz).
3655-3669 ft	Sandstone: very fine grained; argillaceous in places. A few thin mudstone interbeds, especially in upper part of interval. Some dolomitized horizons and laminae (light grey colour). No visible sedimentary structures. Some load deformation of bed bottoms.
3669-3675 ft	Sandstone: very fine grained. Brownish grey. Massive. Some dolomitization - seen as faint streaks and wispy laminae.

NOTE: possible significant stratigraphic contact at 3655 ft.

CNRL et al Willow d-47-H/94-H-2 (Kewana et al Woodrush on box)
Core 1: 3566 - 3620 ft. Rec. 54 ft. 12 boxes Full diameter
Core and log depths appear not to correspond. Log depths appear to be 2.5 to 3 ft deeper than corresponding core depth. Also, core appears to have penetrate the Doig Fm which would not be the case when core depths are placed against the logs - this also suggests a non-correspondence between log and core depths. Core depths are given below
Examined 10th October 2001

CHARLIE LAKE FM

3566-3572' 6"	Mottled dolostone: light and medium grey colours
3572' 6"-3572' 10"	Oil stained mottled dolostone
3572' 10"-3581 ft	Mottled dolostone: light and medium grey colours
3581-3582 ft	Banded dolostone: bands of light and medium grey dolostone. Distinct rusty alteration on outer core surface.
3582-3597' 10"	Mottled dolostone: light and medium grey colours. Mottling most intense in lower 2 ft. Abrupt basal contact.

HALFWAY FM

3597' 10"-3617' 2"	Sandstone: predominantly fine grained with coarse grains and granules in basal 1". Top 6" has load deformation. Vague indications of low-angle cross beds. Oil stained. Erosional basal contact.

DOIG FM

3717' 2"-3620 ft	Interbedded sandstone-mudstone: laminae to thin beds. Finely laminated sandstone/siltstone. About 70% sandstone/siltstone.

CNRL Milligan d-54-J/94-H-2
Core 1: 3630 - 3690 ft. 13 boxes. Full diameter
Core 2: 3690 - 3718 ft 3 boxes. Full diameter
Examined 10th October 2001

CHARLIE LAKE FM
"A" Marker 3630-3640' 5"

3630-3635' 3"	Dolostone: brownish grey. Very finely crystalline. Vaguely mottled.
3635' 3"-3640' 5"	Limestone: light to dark grey. Nodular to ribbon. Basal 3" finely laminated. Abrupt basal contact.

Base of "A"/Limestone marker

3640' 5"-3644' 1"	Mottled dolostone: moderately to intensely mottled. Light greenish grey mottles in a brownish grey background. Gradational basal contact.
3644' 1"-3647' 11"	Mottled dolostone: moderately mottled.
3647' 11"-3648' 11"	Mottled dolostone: intensely mottled
3648' 11"-3652' 5"	Mottled dolostone: moderately mottled with some intensely mottled patches.
3652' 5"-3653' 5"	Mottled dolostone: intensely mottled. Yellowish grey mottles.
3653' 5"-3657' 1"	Mottled dolostone: moderately mottled with a thin zone of intensely mottled light greenish grey dolostone.
3657' 1"-3665' 1"	Mottled dolostone: weakly to moderately mottled. Brownish grey.

3665' 1"-3671' 5"	Mottled dolostone: moderately to locally intensely mottled. Light yellowish grey mottles.
3671' 1"-3672' 1"	Dolostone: vuggy, very finely crystalline dolostone. Oil stained.
3672' 1"-3673' 5"	Mottled dolostone: intensely mottled
3673' 5"-3677 ft	Bioclastic dolostone: oil stained
3677-3680 ft	Mottled dolostone: intensely mottled. Light yellowish grey.
3680-3691 ft	Dolostone: vaguely mottled.
3691-3702 ft	Dolostone: light to medium grey colours. Banded to mottled in places. Basal contact not preserved.
HALFWAY FM	
3702-3716' 8"	Sandstone: poorly preserved part of core. Fine to medium grained, locally coarse grained. Vague cross beds. Basal contact not preserved.
DOIG FM	
3716' 8"-3718 ft	Interbedded sandstone-mudstone: laminae to thin beds. Coarse silt to very fine sand.

Cigol et al Beatton d-1-K/94-H-2
Core 1: 3706 - 3766 ft 13 boxes. Full diameter
Core 2: 3766 - 3783 ft 4 boxes Full diameter
Examined 11th October 2001

CHARLIE LAKE FM	
3706-3712' 3"	Mottled dolostone: moderately to intensely mottled. Abrupt basal contact
3712' 3"-3712' 8"	Laminated dolostone: fine laminae. Light grey. Contains a 1" thick zone of contorted laminae. Abrupt basal contact.
3712' 8"-3723 ft	Mottled dolostone: Moderately to intensely mottled. Gradational change from underlying sandstone apparently due to partial dolomitization of upper part of underlying sandstone.
HALFWAY FM	
3723-3772 ft	Sandstone: medium grey. Fine grained with a thin zone of mudstone intraclasts at about 3739 ft (small, rounded and elongate clasts up to 2 mm, but most <1 mm). Several thin intervals containing mud laminae. No other visible sedimentary structures. Basal contact is abrupt and severely load deformed.
DOIG FM	
3772-3782 ft	Mudstone: dark grey to black. Silty. Severely load deformed or burrow mottled - difficult to determine which due to dark coloration and unslabbed nature of core.

Dome et al Prespatou c-25-B/94-H-3
Core 1: 1298 - 1316.2 m 11 boxes. Full diameter. A few slabbed pieces.
Core 2: 1316.2 - 1322 m 2 boxes. Full diameter. A few slabbed pieces
Examined 11th October 2001

CHARLIE LAKE FM

1298-1307.28 m Mottled dolostone: variable intensity of mottling. Medium and light grey dolostone. In top 6-7 m there are several short intervals with complete replacement of medium grey dolomite by light grey dolomite, within which there is a faint reticulate pattern (rectangular areas about 2 cm long). Scattered frondescent pyrite nodules. Abrupt basal contact Difficult to relate log pattern changes to macrofacies.

HALFWAY FM

1307.28-1307.68 m Sandstone: very fine grained. Light grey. Well cemented. Large pyrite nodules in top 5 cm - immediately below dolostone. Gradational with underlying bed.

1307.68-1313.48 m Coquinal dolostone: multiple beds of varying thickness. Each bed has the following vertical succession: erosional base - moldic coquinal dolostone - rapidly grades up into shelly dolostone - and in a few beds capped by a slightly sandy dolostone. Cross bedding in coquinal part of beds. Appears to be mostly bivalve debris, possibly some brachiopods. Oil stained in porous coquinas. Basal bed rests erosionally on underlying strata.

DOIG FM

1313.48-1322 m Interbedded mudstone-siltstone: laminae to thin beds; some lenticular beds. Fine laminae throughout. Some load deformation. A few vertical and horizontal burrows. Possibly a few beds are burrow mottled.

Home Murphy Wargen c-91-F/94-H-3

Core 1: 1265 - 1277 m. Rec. 12 m. 9 boxes. Slabbed.
Examined 11th October 2001

CHARLIE LAKE FM

1265-1269.66 m Mottled dolostone: light grey and brownish grey colours. Moderately to intensely mottled. Mottling less distinct in lower two-thirds of interval. Basal contact is a vague and appears to be a zone of dolomitization of the underlying sandstone.

HALFWAY FM

1269.66-1273.75 m Sandstone: light to medium grey with a slight brownish hue.. Fine grained. Slightly calcareous. Low to medium angle cross bed sets. Abrupt, slightly load deformed basal contact.

DOIG FM

1273.75-1277 m Interbedded sandstone-mudstone: Predominantly thin to thick beds of argillaceous, very fine grained sandstone separated by thinner mudstone layers. Medium to dark grey. Sedimentary structures difficult to see - indications of low-relief ripples in mud laminated beds.

Home et al Warsaw c-32-K/94-H-3

Core 1: 1219-1237 m Rec. 18 m. 13 boxes. Slabbed

Examined sometime between 21-24th September, 1999

CHARLIE LAKE FM

1219-1227.14 m	Dolostone/dolomitic mudstone: areas of complexly dolomitized mudstone interspersed with areas of partially dolomitized mudstone. Light and dark grey; some areas with brownish hue. Change between dolomitized and partially dolomitized areas is gradational. Abrupt basal contact.
1227.14-1227.19 m	Dolostone: brownish grey. Finely laminated. Rests abruptly on a broadly undulose surface.

?HALFWAY FM

1227.19-1227.87 m	Dolomitized sandstone: very fine to fine grained. Complex mottled fabric. Upper 7-8 cm contains small (mm-size) mud clasts. Abrupt basal contact.
1227.87-1228.86 m	Sandstone: medium to dark grey. Fine to medium grained. Low angle cross beds. Partially dolomitized along bedding planes. Basal contact not preserved.

DOIG FM

1228.86-1237 m	Coarsening-upward succession: mudstone grading up into sandstone; becomes sandstone dominant at about 1234 m. Very fine to fine grained sandstone with clay partings and laminae in lower part of sandstone part of succession. Mudstone is dark grey with scattered laminae and lenses of silt.

Talisman et al Nig 2b-42-F/94-H-4
Core 2: 1508.5 - 1526.6 m. 13 boxes. Slabbed.
Examined 11th October 2001

CHARLIE LAKE FM

1508.5-1509.8 m	Sandy dolostone/dolomitic sandstone: medium to dark grey. Well cemented. No visible sedimentary structures. Gradational basal contact - banded appearance over gradational interval.
1509.8-1512.3 m	Mottled dolostone: light and medium grey mottles. Three intervals, 20-30 cm thick of medium grey dolostone completely replaced by light grey dolostone. Gradational basal contact due to dolomitization of uppermost part of underlying sandstone.

HALFWAY FM

1512.3-1514.6 m	Sandstone: very fine to fine grained. Blotchy to mottled appearance due to irregular development of dolomite cement and replacement dolomite.
1514.6-1519 m	Sandstone: fine grained, locally medium grained. Cosets of cross beds.
1519-1522 m	Sandstone: argillaceous, fine grained.
1522-1525 m	Sandstone: fine grained, locally medium grained. Cosets of cross beds. White grains scattered throughout - probably weathered chert. Erosional basal contact.

DOIG FM

1525-1526.6 m	Interbedded mudstone-siltstone: Immediately underlying the Halfway sandstone is a 6-7 cm thick dolomitized zone that grades down into

mottled mudstone (possible pedogenic feature?).
Details:
1525-1525.59 m Dolostone and mottled mudstone
1525.59-1525.68 m Laminated mudstone. Brownish colour - could be oil stained
1525.68-1525.8 m Dolomite-mottled mudstone. Contorted beds.
1525.8-1525.87 m Laminated mudstone
1525.87-1526.23 m Dolostone: complex replacement fabric Abrupt basal contact
1526.23-1526.6 m Argillaceous, very fine grained sandstone. Scattered medium and coarse grains.

CNRL et al Sojer c-89-L/94-H-4 (core boxes indicate that Czar was original operator)
Core 1: 1513 - 1531.3 m 13 boxes. Full diameter.
Examined 11th October 2001

HALFWAY FM
Sandstone: fine to medium grained with a 30 cm-thick conglomerate about 60 cm above the base of the core which rests on an erosional surface. Underlying the conglomerate is fine grained sandstone. A few mud-laminated zones in lower part of core.
Cross beds present throughout core - indicative of multiple beds.
A few patches of incipient dolomitization.
Good intergranular porosity.

Ammin Laprise c-55-E/94-H-5
Core 1: 1305.8-1321 m Rec. 15.1 m. 11 boxes. Slabbed.
Examined sometime between 21-24th September, 1999

CHARLIE LAKE FM

1305.8-1306.55 m	Sandstone: very fine grained. Medium to dark grey. Massive.
1306.55-1311.72 m	Dolomitic mudstone: complex diagenetic fabric. Some areas are completely dolomitized. Gradational with underlying bed.
1311.72-1312.85 m	Dolostone: light grey. Massive to vaguely bedded. Abrupt basal contact - marked by a very thin zone of finely laminated mudstone.
1312.85-1314.09 m	Dolomitic mudstone: similar to above. Basal contact not preserved.
1314.09-1321 m	Sandstone: very fine to fine grained, locally medium grained. Upper 1-2 m of core is badly broken. Thick, massive beds alternating with thin sandstone beds with clay laminae or load deformed argillaceous sandstone.

PEX et al Laprise a-99-E/94-H-5 (box labeled Pacific Imperial)
Core 2: 4375 - 4425 ft 10 boxes. Full diameter (2.5"). Core broken into short lengths.
Examined 11th October 2001

LOWER CHARLIE LAKE FM AND HALFWAY FM
Sandstone: predominantly fine grained; some medium. Divided into cross bedded and argillaceous intervals, 4 to 8 ft thick - indicates multiple beds (at least 6 cross bedded intervals). Argillaceous intervals commonly load deformed.. Upper 5ft of core has incipient dolomitization.

Triad BP Birley c-36-A/94-H-6
Core 1: 4000 - 4048 ft 10 boxes. Slabbed
Core 2: 4049 - 4069 ft 4 boxes. Slabbed
Corresponding log depths about 4-6ft deeper than core depths
Examined 10th October 2001

CHARLIE LAKE FM

4000-4013' 10"	Mottled dolostone: yellowish grey mottles in a light brownish grey background. Basal 8" completely altered to brownish grey dolomite. Apparently an abrupt basal contact.
4013' 10"-4016 ft	Dolostone: well bedded. Dark yellowish grey and light brownish grey laminae to thin beds. Some minor bed deformation, including a high-angle reverse bed fault in upper 3". Abrupt basal contact.
4016-4023' 8"	Mottled dolostone: as above
4023' 8"-4025' 7"	Dolostone: well bedded. Cf. as above.
4025' 7"-4032 ft	Mottled dolostone: lower intensity of mottling in basal 18".
4032-4035' 10"	Dolostone: light brownish grey. Only faint traces of mottling. Abrupt basal contact.
4035' 10"-4038' 10"	Mottled dolostone: gradational upward change from weakly mottled to moderately mottled.
4038' 10"-4044 ft	Mottled dolsotone: similar to overlying interval. Basal contact is gradational - probably due to dolomitization of uppermost sandstones.

HALFWAY FM

4044-4045 ft	Sandstone: patchy development of replacement dolomite in a fine to medium grained sandstone.
4045-4055' 4"	Sandstone: fine grained. Irregular distribution of carbonate cement. Medium to high angle cross bedding. May be a single bed that changes vertically from high-angle cross beds to medium angle, to horizontal bedding. Oil stained. Basal erosion surface overlain by very thin layer of medium grained sandstone.

DOIG FM

4055' 6"-4069 ft	Sandstone: very fine grained. Intercalated with laminae and thin beds of mudstone. Finely laminated in places.

Dome et al Martin d-91-E/94-H-6
Core 2: 1220 - 1238 m. 13 boxes. Full diameter.
Examined 11th October 2001

CHARLIE LAKE FM

1220-1229.2 m	Mottled dolostone: light and medium grey colours. Diffuse basal contact.

HALFWAY FM

1229.2-1231 m	Sandstone: fine grained. Cross bedded. Some deformed bedding. Contains at least three beds: cross bedded sandstone grading up into slightly argillaceous, deformed sandstone. Erosional basal contact.

DOIG FM

1231-1238 m	Interbedded sandstone-mudstone: intercalations of laminae and thin beds.

CDR et al Evergreen d-25-B/94-H-7
Core 1: 3668 - 3728 ft. 13 boxes. Mostly full diameter except for core in boxes 4 and 5.
Examined 11th October 2001

CHARLIE LAKE FM

3668-3677' 5"	Mottled dolostone: light yellowish grey and brownish grey colours. Weakly to moderately mottled. Abrupt basal contact.
3677' 5"-3683' 6"	Dolostone: very finely crystalline. Brownish grey. Vaguely mottled.
3683' 6"-3683' 7"	Bioclastic dolostone: small bioclasts (coarse sand grade). Argillaceous, in part. Abrupt basal contact.
3683' 7"-3684' 3"	Dolostone: Laminated to thinly bedded. Argillaceous. Abrupt basal contact.
3684' 3"-3685' 5"	Bioclastic dolostone: thin beds. Sandy. Load deformation.

DOIG FM

3685' 5"-3728 ft	Interbedded siltstone-mudstone: laminae to thin beds. Overall coarsening upward aspect (i.e., more siltstone beds in upper part of interval). Some dolomitization of beds in upper 4 ft.

Union et al Highland d-71-H/94-H-7
Core 1: 3606 - 3666 ft 13 boxes. Slabbed
Core 2: 3666 - 3706 ft 9 boxes Slabbed
Core 3: 3706 - 3766 ft 13 boxes. Slabbed
Examined 11th October 2001

CHARLIE LAKE FM

3606 - 3667 ft	Mottled dolostone: variable intensity of mottling. A white speckled dolostone at about 3630 - 3624 ft; white specks possibly sand-size bioclasts. Latter bed underlain by about 8" of brecciated dolostone.
3667 - 3688 ft	"A" marker: light brown dolostone. Badly broken core. Basal contact is a rapid lithological change but there is no one horizon at which to place a contact. Could be a diagenetically altered zone.
3688 - 3736 ft	Mottled dolostone: typical of this part of the Charlie Lake Fm

HALFWAY FM

3736 - 3744 ft	Sandstone: fine grained sandstone. Erosional basal contact.

DOIG FM

3744 - 3766 ft	Interbedded sandstone-mudstone: Very fine grained sandstone predominant facies.

ARL Norcen Zaremba b-40-L/94-H-7 (boxes labeled Lapp)
Core 1: 1167 - 1176 m. 7 boxes. Slabbed.
Examined 11th October 2001

CHARLIE LAKE FM

1167-1167.3 m	Dolostone: medium grey. Very finely crystalline. Several horizons with small rounded dolomite clasts. Rapidly gradational base.
1167.3-1167.56 m	Mottled dolostone: moderately mottled. Light yellowish grey and light brownish grey. Basal contact is an inclined surface.
1167.56-1167.74 m	Mottled dolostone: intensely mottled to complete replacement.
1167.74-1168.26 m	Mottled dolostone: weakly to moderately mottled. In lower 15 cm there are thin beds. Gradational basal contact.
1168.26-1171.21 m	Mottled dolostone: moderately to intensely mottled, with some large patches of complete replacement. Basal 20 cm is an interval of complete replacement.
1171.21-1173.21 m	Mottled dolostone: weakly to moderately mottled. Two thin intervals of finely laminated dolostone. Gradational basal contact.
1173.21-1174.69 m	Mottled dolostone: weakly to moderately mottled. Sandy. Basal 4-5 cm is an argillaceous bed resting abruptly on underlying sandstone.

HALFWAY FM

1174.69-1176 m	Sandstone: fine grained with medium and coarse grains along cross beds and at the base of individual beds. Medium to high-angle cross beds.

Union HB BA Cranberry a-12-D/94–H-8
Core 1: 3470 -3530 ft 13 boxes. Slabbed.
Examined 11th October 2001

CHARLIE LAKE FM

3470-3489' 3"	Mottled dolostone: light yellowish grey and light brownish grey colours. Variable intensity of mottling; some intervals of complete replacement. Basal 2" appears to be contorted and rests abruptly on underlying bed,
3489'3"-3489' 8"	Dolostone: laminated. Brownish grey
3489' 8"-3496 ft	Mottled dolostone: intensely mottled with intervals of complete replacement. Abrupt basal contact.
3496-3497' 2"	Dolostone: laminated to very thinly bedded. Some minor warping of laminae. Lower 6" is oil stained. Apparent gradational basal contact.
3497' 2"-3498' 10"	Mottled dolostone
3498' 10"-3501' 3"	Dolostone: coarse laminae to thin beds. Minor deformation in places. Slightly argillaceous. Abrupt basal contact.
3501' 3"-3501' 7"	Bioclastic dolostone: extensively replaced by dolomite, especially basal

	1". Abrupt basal contact.
3501' 7"-3506' 4"	Dolostone: laminae to thick beds, locally intensely deformed. Contains a 0.5" thick bioclastic dolostone about 10" above base. Gradational basal contact.
3506' 4"-3507' 9"	Dolostone: spotted fabric. Hints of original horizontal bedding remain. Abrupt basal contact.
3507' 9"-3507' 11"	Bioclastic dolostone: erosional base. Small (<5 mm) bioclasts.
DOIG FM	
3507' 11"-3511' 6"	Dolomitized mudstone-mudstone: dolomite replaces mudstone along bedding as well as nodules - latter have a “chicken-wire” fabric reminiscent of anhydrite (perhaps originally anhydrite).
3511' 6"-3530 ft	Interbedded mudstone-siltstone: fine laminae to thick beds, some lenticular beds. Some beds are finely laminated. Minor load deformation. Some possible horizontal burrows otherwise lacking in trace fossils.

CNRL B-1 Redeye d-89-D/94-H-10 (box labeled PanAm)
Core 2: 3320 - 3380 ft. 13 boxes. Slabbed
Examined 10th October 2001

CHARLIE LAKE FM

3320-3334 ft	Mottled dolostone: yellowish brown mottles in a brownish grey background. Mostly intensely mottled, some moderately mottled intervals. Basal contact not preserved.

HALFWAY FM

3334-3359 ft	Sandstone: fine to medium grained. Oil stained in places. Horizontal and medium-angle cross bedding, as well as intervals with no visible sedimentary structures. Some patches of carbonate replacement. Basal erosional surface.

DOIG FM

3359-3375 ft	Mudstone: medium grey. Fine laminae and a few thin beds of silt.

Fina et al Earth d-71-E/94-H-11
Core 1: 3480 - 3530 ft. 11 boxes. Full diameter.
Examined 11th October 2001.

CHARLIE LAKE FM

3480-3484 ft	Mottled dolostone: moderately mottles in light yellowish grey and light brownish grey colours. Gradational basal contact.
3484-3486' 3"	Mottled dolostone: basal part of interval is intensely mottled to complete replacement, grading up into intensely mottled upper part. Abrupt basal contact.
3486' 3"-3492 ft	Dolostone: brownish grey. Weakly mottled in upper 1.5 ft; sandy in places.
3492-3506' 4"	Mottled dolostone: moderately to intensely mottled. Gradational basal contact.
3506' 4"-3511' 9"	Dolostone: light grey. Very finely crystalline. Incipient mottling.
3511' 9"-3516' 2"	Mottled dolostone: alternating weakly and moderately mottled intervals. Gradational basal contact - probably due to dolomitization of upper part of sandstone.

HALFWAY FM

3516' 2"-3530 ft	Sandstone: very fine grained. Incipient dolomite cement and replacement of sandstone. Vaguely bedded. Bedding best seen where there is some argillaceous intercalations.

Texaco Gulf Conroy c-18-A/94-H-12
Core 1: 1233-1251.25 m Rec. ? 13 boxes. Full diameter.
Core 2: 1251.25-1260 m Rec. ? 6 boxes. Full diameter.
Examined sometime between 21-24th September, 1999

CHARLIE LAKE FM

1233-1241.67 m	Dolomitic mudstone; complex mottled fabric due to dolomitization. Medium to dark grey. Scattered thin sandy beds. Basal contact masked by diagenetic overprint.
1241.67-1243 m	Sandstone: fine to medium grained. Dark grey. Coarse, planar bedding. Calcareous in medium grained parts. May consist of two units: a lower fine grained sandstone about 19 cm thick with ill-defined bedding and an upper bed that is predominantly medium grained and has better defined bedding. Contact between the units is not obvious. Basal contact is abrupt.
1243-1245.13 m	Dolostone: dark grey to black. Very finely crystalline with patches and lenses of coarse, recrystallized dolomite. Scattered small vugs. Argillaceous in lower two-thirds of bed.
1245.13-1256 m	Mudstone: medium to dark grey. Scattered lenses and laminae of silt. Scattered irregular patches, lenses, and blebs of dolomitized mudstone.
1256-1260 m	Dolomitic mudstone: extensively dolomitized resulting in a complex diagenetic fabric. Light yellowish grey to light grey.

Total Conroy Creek c-68-A/94-H-12
Core 1: 3720 - 3780 ft 13 boxes. Slabbed
Core 2: 3780 - 3804 ft 5 boxes. Slabbed
Examined sometime between 21-24th September, 1999

CHARLIE LAKE FM

3720-3724' 7"	Dolostone: very finely crystalline. Brownish grey. Incipient mottling. Gradational basal contact
3724' 7"-3726' 4"	Mottled dolostone: moderately to intensely mottled. Light yellowish grey and brownish grey. Gradational basal contact.
3726' 4"-3734' 5"	Dolostone: as above. Weakly mottled. Gradational basal contact.
3734' 5"-3740' 7"	Mottled dolostone: moderately mottled. Gradational basal contact.
3740' 7"-3752 ft	Mottled dolostone: intensely mottled. Gradational basal contact.
3752-3756' 5"	Dolostone: vaguely to moderately mottled. Abrupt basal contact.
3756' 5"-3758' 10"	Sandstone: very fine to fine grained. No visible sedimentary structures. Base is load deformed.
3758' 10"-3761' 11"	Mudstone-dolomitized mudstone: irregular beds. Some bed-parallel mottling. Gradational basal contact.

HALFWAY FM

3761' 11"-3766' 11"	Sandstone: very fine grained. Argillaceous in places. Bedding difficult to see - some vague indications of load deformation. Gradational basal

contact.

3766' 11"-3773' 6"	Argillaceous sandstone/sandy mudstone: irregular lenses of very fine grained sandstone within a mudstone. Appears to be intensely load deformed. Gradational basal contact.
3773' 6"-3782 ft	Sandstone: very fine to fine grained. Slight brownish hue. Cross bedded in lower 2 ft, slightly argillaceous in remainder. Some minor bed deformation in argillaceous part. Scattered pyrite. Basal contact not preserved but rapid lithological change suggests an abrupt contact.
DOIG FM	
3782-3804 ft	Interbedded mudstone-siltstone/sandstone: laminae to thin beds, a few thick beds. Some load deformed beds.

Encal Mercury d-51-B/94-H-12 (box indicates CanHunter was original operator)
Core 1: 1100 -1118.7 m 13 boxes. Slabbed.
Measured more than recorded length???
Measured sometime between 21-24th September, 1999

CHARLIE LAKE FM

1100-1102.1 m	Mottled dolostone: light to medium grey, some yellowish grey. Moderately mottled. Gradational basal contact.
1102.1-1103.33 m	Mottled dolostone: light yellowish grey and light brownish grey. Intensely mottled.
1103.33-1105.39 m	Mottled dolostone: moderately mottled.
1105.39-1105.54 m	Dolostone: brownish grey. Bedded. Contains a 1-cm thick, irregular lens of medium to coarse grained sandstone. Lowermost bed is deformed.
1105.54-1106.47 m	Mottled dolostone: yellowish grey mottles. Complete replacement by yellowish grey dolomite in lower 30 cm, rapidly overlain by moderately mottled interval. Abrupt basal contact.
1106.47-1106.62 m	Brecciated dolostone: brecciation appears to be due to bed disruption. Abrupt basal contact.
1106.62-1107.2 m	Mottled and laminated dolostone: moderately mottled dolostone with patches of laminated dolostone.
1107.2-1110.4 m	Mottled dolostone: moderately to intensely mottled. A few horizons where the yellowish grey dolomite has completely replaced the grey dolomite. Abrupt basal contact.
1110.4-1111.75 m	Mottled dolostone: mostly light and medium grey with a few short intervals of yellowish grey dolomite. Gradational basal contact.
1111.75-1113.16 m	Mottled dolostone: similar to overlying interval but with more yellowish grey dolomite. Abrupt basal contact.
1113.16-1115.36 m	Mottled dolostone: predominantly light and dark grey colours, with a few patches of yellowish grey. Basal contact appears to be abrupt but some dolomitization tends to mask it.
DOIG FM	
1115.36-1117.06 m	Mudstone: dark grey. Silt laminae and lenses.