MAR 20120021: AUDET LAKE

Audet Lake - A report on limestone exploration near Fort MacKay, Northeastern Alberta.

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Hammerstone Corporation
Assessment Report

Audet Lake Permit Block

Athabasca Region
Northern Alberta

November 29th, 2012

PART B TECHNICAL REPORT

Confidentiality Report End Date:
September 13th, 2013

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1.0. SUMMARY

The Devonian stratigraphy present in the Audet Lake Property comprises parts of the Beaverhill Lake Group and the Elk Point Group. The evaporite-bearing Fort Vermillion, Watt Mountain and Prairie Formations have been severely affected by anhydrite and gypsum dissolution, and only structurally disturbed, non-soluble remnants remain. Significant aggregate potential exists in the Methy Formation and Slave Point Formation, although the aggregate potential of the Slave Point Formation has been adversely affected by dissolution of underlying evaporites.

2.0. INTRODUCTION

This report describes the results of assessment exploration conducted on Hammerstone Corporation's Audet Lake Permit Block (Audet Lake Property) in northeastern Alberta during 2012. The two Metallic and Industrial Mineral Permits of this block, permit 9310091034 and 9310091035, are within Township 97 and 98, Range 5 and 6 west of the 4th meridian (Figure 2.1). Hammerstone holds these permits to retain the rights to aggregate production from the Devonian rock immediately underlying the oilsands. Suncor holds the overlapping oilsands over most of the property with Imperial/Exxon holding oilsands leases over the southwest and southeast corners. Suncor intends to develop an open-pit oilsands mine on their leases and similar mining projects in the region require large amounts of aggregate with Devonian rocks being an established source of these aggregates.

Because Devonian rocks do not outcrop within the Audet Lake Permit Block it was necessary for the exploration program to focus on subsurface geological information, primarily downhole geophysical logs and drill core from oilsand exploration. Much of the work utilized publicly available data from the Energy Resources Conservation Board.

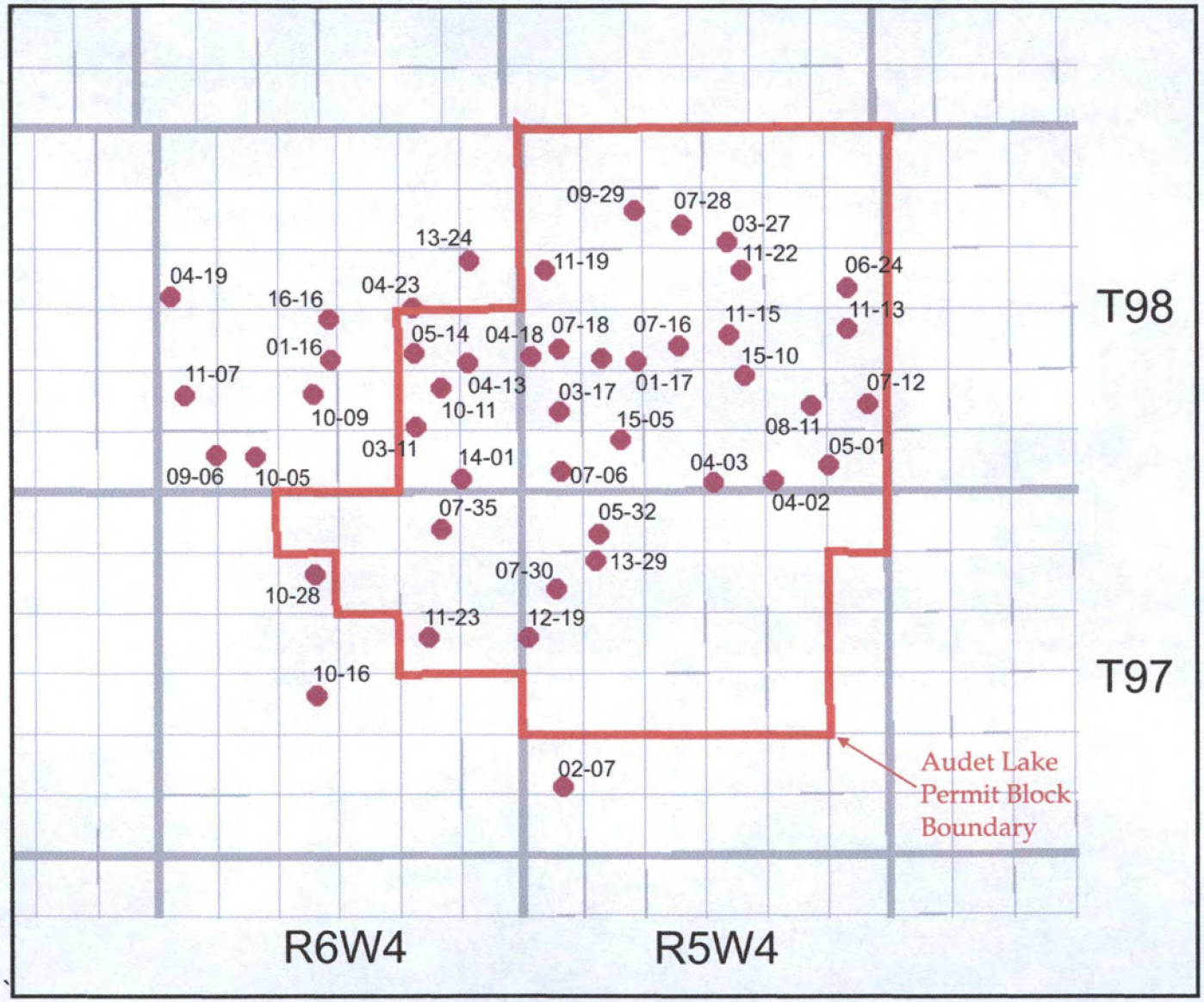


Figure 2.1. Location of drill cores logged in this assessment program.

3.0. MINERAL ASSESSMENT EXPENDITURE BREAKDOWN BY TYPE OF WORK

Estimated Expenditure (Statement of Intent to File)	$92,160.00
Actual Expenditure	$96,121.30
Downhole Geophysics Log Examination	$17,550.00
Drill Core Examination	$18,930.00
Field Work	$28,553.00
Data Compilation and Analysis	$22,400.00
Administration	$8,738.30
TOTAL	96,121.30

4.0. REGIONAL GEOLOGY

The Project Area is underlain by Quaternary deposits, Cretaceous and Devonian sedimentary rocks, and Precambrian crystalline rocks. The following is a stratigraphic column of the Audet Lake area, modified from Mossop and Shetson (1994), using information from this study.

Period	Group	Formation	Lithology		
Quaternary			Till, glacio-fluvial deposits		Stratigraphy Present at Audet Lake
Lower Cretaceous	Mannville	McMurray	Oilsand, shale.		
Upper Devonian	Beaverhill Lake	Waterways	Light green argillaceous limestone and light grey nodular limestone.		
		Slave Point	Light brown laminated to massive limestone		
		Fort Vermilion	Anhydrite, shale, limestone, dolomite	*Dissolution has removed all evaporites from these Formations in the Audet Lake area, leaving only non-soluble remnants.*	
Middle Devonian	Upper Elk Point	Watt Mountain	Green shale with anhydrite, dolomite and minor sandstone.		
		Prairie	Salt, anhydrite, gypsum, dolomite with minor shale.		
		Methy	Reefal to massive to bedded dolomite, dolomitic limestone, limestone, shale and minor anhydrite and gypsum.		
	Lower Elk Point	McLean River	Red to green fine grained sandstone, siltstone and shale with anhydrite beds and gypsum veins.		
		La Loche	Red coarse to medium grained arkosic sandstone with minor evaporites.		
Precambrian			Granitic Gneiss		

Figure 4.1. Stratigraphic column of the Audet Lake Project Area .

5.0 EXPLORATION

5.1 Introduction

Exploration of the Audet Lake Property focused on the aggregate potential of the Devonian stratigraphy immediately underlying the oilsands. Because there are no known outcrops of Devonian rocks on the property, it was necessary for the exploration program to focus on sub-surface geological information. The exploration program consisted of three main components:

- Examination of downhole geophysical well logs from the ERCB Database
- Examination of drill cores held at the ERCB core facility in Calgary
- Helicopter based examination of the Property

The geophysical well logs were used primarily to establish the regional geological setting of the Audet Lake Property as well as to identify those cores which would be useful to examine and log. Core logging focused on establishing the local stratigraphic succession for Audet Lake and identifying those intervals with potential for aggregate production.

5.2 Downhole Geophysical Logs

More than 200 downhole geophysical well logs were examined from the Audet Lake Property and surrounding area in order to establish the local geological setting of the property and to identify those cores which would be useful to examine and log. These geophysical logs are from a public database administered by the Energy Resources Conservation Board (ERCB) which holds information from oil and gas exploration wells in Alberta. In many cases the tops of geological units were re-interpreted from the "system picks" of the database.

5.3 Drill Core Examination

Of the more than 200 oilsand exploration drill holes in the Audet Lake Property and adjacent area, 51 were selected for lithological logging. A list of the core logged is given in Table 5.1. The location of these cores is given in Figure 2.1. The core logs are given in Appendix A. These holes were selected because, 1) core for them was available at the ERCB core facility in Calgary, 2) they represented the thickest Devonian core intervals available and, 3) the downhole geophysical logs indicated they may have intervals with aggregate potential. A number of cores from outside of the Audet Lake Property were also examined and in some cases logged in order to facilitate stratigraphic correlation through the Property.

The core logging focused on aggregate potential rather than utilizing standard carbonate rock description methods. For each core the entire Devonian interval was logged along with a short section of the overlying McMurray Formation. A rank of 1 to 5 was assigned to each Devonian interval, based on aggregate potential, with 1 being lower potential and 5 being excellent potential. In some cases the identity of the Formation was difficult to determine due to evaporite dissolution, especially for the Fort Vermilion, Watt Mountain and Prairie Formations.

Table 5.1. List of drill cores logged in this assessment report.

	Devonian Interval Examined		
Drill Core UWI	**From Formation**	**To Formation**	**Thickness (m)**
AA-01-16-098-06W4	Ft. Verm./Watt Mt.	Ft. Verm./Watt Mt.	11.70
AA-01-17-098-05W4	Firebag	Slave Point	15.00
AA-02-07-097-05W4	Firebag	Firebag	14.80
AA-02-34-097-06W4	Firebag	Firebag	8.50
AA-03-11-098-06W4	Ft. Verm./Watt Mt.	Prairie	8.85
AA-03-17-098-05W4	Firebag?	Slave Point?	28.50
AA-03-27-098-05W4	Firebag	Firebag	16.50
AA-04-01-098-06W4	Ft. Verm./Watt Mt.	Ft. Verm./Watt Mt.	9.30
AA-04-02-098-05W4	Firebag?	Slave Point?	16.40
AA-04-13-098-06W4	Watt Mountain	Prairie	23.90
AA-04-18-098-05W4	Methy	Methy	8.85
AA-04-19-098-06W4	Firebag	Firebag	13.15
AA-04-23-098-06W4	Firebag	Fort Vermilion	8.20
AA-05-01-098-05W4	Slave Point	Watt Mountain	16.30
AA-05-14-098-06W4	Prairie	Prairie	8.50
AA-05-20-098-05W4	Methy	Methy	10.00
AA-05-32-097-05W4	Methy	Methy	7.40
AA-06-24-098-06W4	Methy	Methy	15.00
AA-07-06-098-05W4	Firebag	Firebag	16.55
AA-07-07-098-05W4	Methy	Methy	7.60
AA-07-12-098-05W4	Watt Mountain?	Methy	15.40
AA-07-16-098-05W4	Fort Vermilion?	Methy	28.40
AA-07-18-098-05W4	Firebag	Slave Point	16.50
AA-07-22-099-05W4	Methy	Methy	11.65
AA-07-28-098-05W4	Prairie?	Methy	14.90
AA-07-30-097-05W4	Firebag	Firebag	12.95
AA-07-35-097-06W4	Firebag	Methy	66.15
AA-08-11-098-05W4	Prairie	Watt Mountain	21.25
AA-09-06-098-06W4	Firebag	Firebag	5.75
AA-02-29-098-05W4	Fort Vermilion?	Watt Mountain	12.80
AA-10-05-098-06W4	Firebag	Firebag	16.40
AA-10-09-098-06W4	Firebag	Fort Vermilion	15.50
AA-10-11-098-06W4	Slave Point?	Prairie?	22.20
AA-10-16-097-06W4	Firebag	Firebag	17.60
AA-10-22-098-05W4	Firebag	Slave Point	23.50
AA-10-28-097-06W4	Prairie?	Methy	47.30
AA-11-07-098-06W4	Firebag	Firebag	16.20
AA-11-13-098-05W4	Prairie?	Methy	20.70
AA-11-15-098-05W4	Prairie	Methy	16.80
AA-11-19-098-05W4	Firebag	Watt Mountain	26.40
AA-11-23-097-06W4	Firebag	Firebag	7.65
AA-12-19-097-05W4	Slave Point?	Prairie?	12.75
AA-13-24-098-06W4	Prairie	Methy	18.50
AA-13-29-097-05W4	Firebag	Firebag	10.35
AA-15-05-098-05W4	Firebag	Slave Point	15.40
AA-15-10-098-05W4	Prairie?	Methy	21.50
AA-16-16-098-06W4	Firebag	Firebag	15.75
		TOTAL	**795.25**

5.4 Helicopter Reconnaissance

A helicopter reconnaissance of the property was conducted on September 18th, 2012, to investigate surface conditions and access. The author, two geologists from Hammerstone Corporation, and the Senior Supervisor from the Muskeg Valley Quarry participated in the flight. A number of potential access routes were scouted and photographed (Figure 5.1). On September 19th an effort was made to access Methy Formation outcrops along the Clearwater River at Pine Rapids and Whitemud Falls by helicopter. This flight was undertaken because the Methy Formation provides excellent potential for aggregate within the Audet Lake Permit Block (see section 6 below), and the best outcrops of Methy in the area are these locations along the Clearwater River. Despite indications from other parties that landing sites were available at these locations, no landing was achieved, and the attempt to examine the outcrops was unsuccessful (Figure 5.1).

6.0 GEOLOGY OF THE AUDET LAKE PERMIT BLOCK.

The stratigraphy present within the Audet Lake permit block comprise the interval from the lower part of the Firebag Member of the Waterways Formation down to the Methy Formation. This interval includes, from top down, the Firebag Formation, The Slave Point Formation, the Fort Vermilion Formation, the Watt Mountain Formation, the Prairie Formation and the Methy Formation (see Figure 4.1).

The lithology of the Firebag Member and Slave Point Formation is similar to that observed by the author elsewhere in the oilsands region, with the Firebag Member comprised primarily of light green argillaceous limestone and the Slave Point Formation comprised of the light brown laminated to massive limestone. There is little structural disturbance of the Firebag Member but the Slave Point Formation was often brecciated, with abundant bitumen staining on the fractures, and in some places altered.

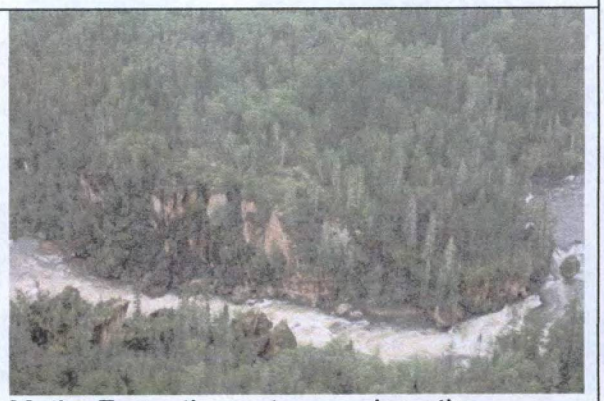
There were no evaporites (salt, anhydrite, gypsum) observed in drill core within the Fort Vermilion Formation, Watt Mountain Formation or Prairie Formation, indicating that these lithologies had been entirely removed by dissolution. The lithology of these three Formations comprise non-soluble components including limestone, dolomite, shale and unconsolidated mud, clay and sand. The bedding is highly contorted and brecciated with both healed (fully cemented) and un-healed (not cemented) breccias present. There is often lenses and pockets of oilsands mixed in with the breccias.

The Methy Formation comprises light brown to white laminated to fossiliferous dolomite and limestone. It was porous and bitumen stained in some cores, but generally was quite solid and massive. The Methy Formation showed little or no structural disturbance.

Creek crossing along possible access route

Firebag River crossing along possible access route.

Typical ground conditions on the Audet Lake Permit Block.



Methy Formation outcrops along the Clearwater River near Whitemud Falls.

Figure 5.1. Photographs taken during the helicopter reconnaissance flights.

7.0 AGGREGATE POTENTIAL

A qualitative ranking, from 1 to 5, was assigned to the aggregate potential of each Devonian interval in the drill cores logged, with 1 being lower potential and 5 being excellent potential (see Appendix A). The best aggregate potential is found in the Methy Formation, with its ranking typically being 4 or 5. The Methy Formation is a very competent dolomite that is similar to units in the Muskeg Valley Quarry that have excellent aggregate properties. Samples of the Methy Formation taken by Hammerstone geologists a number of years ago from an outcrop along the Firebag River were tested for L.A. Abrasion and Magnesium Sulfate Soundness and the results showed the rock to be suitable for concrete aggregate and railway ballast (personal communication, Gerald Kozdial, Hammerstone geologist, 2012).

The Slave Point Formation is a competent limestone that has good aggregate potential. However, it was often found to be brecciated, heavily bitumen stained and altered, likely as a result of collapse associated with dissolution of the underlying evaporites (see Figure 4.1). This effect can be expected to be irregularly distributed throughout the Audet Lake Permit Area, and local areas of undisturbed rock with excellent aggregate potential should be expected.

The argillaceous limestone of the Firebag Formation will not be suitable for most aggregate applications but probably could be used to make low permeability liners. There is likely very little aggregate potential in the Fort Vermilion, Watt Mountain and Prairie Formations.

8.0 CONCLUSIONS

The stratigraphy present within the Audet Lake Permit Block comprise the interval from the lower part of the Firebag Member of the Waterways Formation down to the Methy Formation. This interval includes, from top down, the Firebag Formation, The Slave Point Formation, the Fort Vermilion Formation, the Watt Mountain Formation, the Prairie Formation and the Methy Formation. There is excellent aggregate potential in the Methy Formation and the Slave Point Formation, although the aggregate potential of the Slave Point Formation has been adversely affected by dissolution of underlying evaporites. The argillaceous limestone of the Firebag Formation will not be suitable for most aggregate applications but probably could be used to make low permeability liners. There is likely very little aggregate potential in the Fort Vermilion, Watt Mountain and Prairie Formations.

9.0 QUALIFICATIONS

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I, Glen De Paoli, P.Geol., am a member in good standing of the Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA), member number 58493. I am the Responsible Member for Palliser Geoscience Ltd., Permit number 10892.

I hold a Bachelor of Science (1988) and a Masters of Science (1994) from the University of Calgary, Alberta.

I have been working in the geological field since 1981. My areas of experience and expertise include base and precious metal exploration, diamond exploration, oil and gas exploration, electron microscopy, regulatory and technical reports and open pit mine planning and aggregate production.

I have been working on the geology of Northeastern Alberta for more than 15 years and have examined hundreds of drill cores and well logs. I have been working on the Muskeg Valley Quarry project since 2001.

Signed [redacted]
Glen De Paoli, P.Geol

Date November 29th, 2012

10.0 REFERENCES

Mossop, G and Shetson, I, 1994 (Compilers). Geological Atlas of the Western Canada Sedimentary Basin. The Canadian Society of Petroleum Geologists and The Alberta Research Council.

Hammerstone Corporation
Assessment Report

Audet Lake Permit Block

Athabasca Region
Northern Alberta

November 29th, 2012

PART C APPENDIX

Drill Core Logs

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Audet Lake Drill Core Lithological Log

UWI: AA/01-16-098-06W4/0

From	to	Thickness	Unit	Lithology	Description	Aggregate Potential
104.10	109.80	5.70	McMurray	Oilsand	V.c.g. oilsands. Low angle cross bedding. Bedding slightly disturbed.	n.a.
109.80	112.00	2.20	Ft. Verm/Watt Mt.	Breccia	Contorted mixture of chalky white (altered) dolomite and dolomitic limestone and light grey slightly calcareous shale matrix. 20 cm oilsand interval 111.70-117.90.	1
112.00	112.70	0.70	Ft. Verm/Watt Mt.	Dolomitic Limestone	White to light tan laminated dolomitic limestone. Evidence of both healed and unhealed deformation. Core angle 20 - 40 degrees.	4
112.70	112.95	0.25	Ft. Verm/Watt Mt.	Calcareous Shale	Medium grey calcareous shale.	1
112.95	121.50	8.55	Prairie?	Breccia	Highly contorted mixture of clasts of sub-rounded light grey limestone and chalky white dolomitic limestone in a light to medium grey calcareous shale matrix. T.D. @ 121.50.	1

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Audet Lake Drill Core Lithological Log

UWI: AA/01-17-098-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
45.50	48.30	2.80	McMurray	Oilsand	V.c.g. oilsands. Minor light grey shale lamina.	n.a.
48.30	54.45	6.15	Firebag	Argillaceous Limestone	Light to medium green argillaceous limestone, becoming darker in colour downward. Decalcified over top 20cm only. Minor light grey limestone beds to 1 cm. Bedding at 30 degrees but not brecciated.	1
54.45	55.70	1.25	Slave Point	Limestone	Light grey nodular to bedded limestone.	5
55.70	56.10	0.40	Slave Point	Limestone	Light grey to light white-tan (alteration) bitumen stained limestone.	5
56.10	63.30	7.20	Slave Point	Limestone	Tan-white laminated limestone. Abundant heavily bitumen stained intervals to 30 cm. T.D. @ 63.30m.	4

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Audet Lake Drill Core Lithological Log

UWI: AA/02-07-097-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
61.00	66.50	5.50	McMurray	Oilsand	Black m.g. to c.g. bitumen saturated oilsand.	n.a.
66.50	68.60	2.10	Firebag	Interbedded Argillaceous Limestone/Limestone	Light green argillaceous limestone and light grey limestone interbedded in beds 5mm - 3cm. Slight chalky alteration over top 30cm but little or no decalification. Core moderately fractured.	1
68.60	74.50	5.90	Firebag	Argillaceous Limestone	Light green argillaceous limestone. 95% A.M. Core relatively undisturbed at top of interval, becoming increasily fractured downward.	1
74.50	81.30	6.80	Firebag	Brecciated Argillaceous Limestone	Brecciated argillaceous limestone with occasional angular light grey limestone clast to 5 cm. 85% A.M. T.D. @ 81.30.	1

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Audet Lake Drill Core Lithological Log

UWI: AA/02-34-097-06W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
74.00	75.40	1.40	McMurray	Shale	Light grey shale	n.a.
75.40	81.80	6.40	McMurray	Oilsand	Black m.g. to c.g. Bitumen saturated oilsand.	n.a.
81.80	83.00	1.20	Firebag	Decalcified Argillaceous Limestone	Light green-grey de-calcified argillaceous limestone. Scattered v.f.g. sulphide nodules to 1 cm.	1
83.00	90.30	7.30	Firebag	Argillaceous Limestone	Light green argilaceous limestone. 90% A.M. T.D. @ 90.30.	1

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Audet Lake Drill Core Lithological Log

UWI: AA/03-11-098-06W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
97.35	101.65	4.30	McMurray	Oilsand	Black c.g. oilsands. 10cm pebbly interval at base.	n.a.
101.65	102.65	1.00	McMurray	Shale	Medium grey shale with minor oilsand intervals.	n.a.
102.65	103.60	0.95	McMurray	Oilsand	Black c.g. oilsands.	n.a.
103.60	104.05	0.45	Ft. Verm.Watt Mt.	Shale	Medium brown-green silty shale	1
104.05	104.70	0.65	Ft. Verm.Watt Mt.	Altered Dolomitic Limestone	White chalky laminated dolomitic limestone. Contorted and brecciated.	1
104.70	106.30	1.60	Ft. Verm.Watt Mt.	Shale	Medium green to medium grey shale. Bedding relatively undisturbed.	1
106.30	106.65	0.35	Prairie	Dolomite	Light tan laminated dolomite. Solid core but bedding at 40 degrees.	4
106.65	112.45	5.80	Prairie	Breccia	Contorted and brecciated mixture of clasts/beds of light tan laminated dolomitic limestone and light grey limestone with a light grey calcareous shale matrix. T.D. @ 112.45m.	1

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Audet Lake Drill Core Lithological Log

UWI: AA/03-17-098-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
59.15	63.60	4.45	McMurray	Oilsand	Black c.g. oilsands with thin (1 cm) flushed intervals. Bedding inclined 0-10 degrees. Numerous pebbley beds to 2 cm, coarser ones with angular lithic clasts. Lost core at basal contact.	n.a.
63.60	73.20	9.60	McMurray?	Shale, Siltstone, Oilsand	Black silty shale, medium to light grey siltstone and m.g. Oilsand in chaotic collapse breccia. Finely interlaminated medium to light grey siltstone fragments. Soft sediment deformation prevalent. Becoming lighter in colour and more silty downward.	1
73.20	75.95	2.75	Firebag?	Calcareous Mud/lms clasts	Light green calcareous shale with abundant light grey angular lms clasts and brachiopod shells. Bedding inclined to 90 degrees and contorted. Numerous bitumen stained sandy lenses and black shale intervals over top metre.	1
75.95	84.20	8.25	McMurray Slump?	Shale, Siltstone, Oilsand	Black silty shale, medium to light grey siltstone and m.g. Oilsand in chaotic collapse breccia. Finely interlaminated medium to light grey siltstone fragments. Rare angular coal fragment. Ductile deformation prevalent. Becoming darker in colour and less silty downward.	1
84.20	94.10	9.90	McMurray Slump?	Shale, Siltstone	Very light grey shale and medium to dark grey silty shale in a chaotic collapse breccia. Finely interlaminated medium to light grey siltstone fragments. Numerous bitumen stained sandy lenses. Slight reddish hue to a number of f.g. subrounded sandstone clasts. No calcareous component observed. F.g. pyrite nodules to 5mm.	1
94.10	101.70	7.60	Slave Point?	Calcareous Shale Hosting Lms Clasts	Light green to light grey calcareoous shale matrix hosting angular clasts of light green argillaceous lms, light grey lms and light tan laminated lms (Slave Point?). No dolomite clasts observed. Differs from collapse breccia units above in that there are distinct angular clasts in this interval whereas unts above were more contorted/ductile deformation. Devonian @ 94.10?? T.D. @ 101.70.	1

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Audet Lake Drill Core Lithological Log

UWI: AA/03-27-098-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
49.70	54.60	4.90	McMurray	Oilsand	Black m.g. to c.g. Bitumen saturated oilsand. Low angle cross bedded. 5 cm nodular v.f.g.sulphides at base.	n.a.
54.60	57.20	2.60	Firebag	Argillaceous Limestone	Light green argillaceous limestone. 85% A.M. Decalcification over top 20cm only.	1
57.20	58.70	1.50	Firebag	Argillaceous Nodular Limestone	Light green argillaceous nodular limestone. 50% A.M. Moderately brecciated throughout.	2
58.70	59.40	0.70	Firebag	Argillaceous Limestone	Light green argillaceous limestone. 90% A.M.	1
59.40	61.00	1.60	Firebag	Argillaceous Nodular Limestone	Light green argillaceous nodular limestone. 50% A.M. Moderately brecciated throughout.	2
61.00	65.00	4.00	Firebag	Interbedded Argillaceous Limestone and Limestone	Light green argillaceous nodular limestone interbedded with light grey limestone beds to 2 cm. 80% A.M.	1
65.00	71.10	6.10	Firebag	Argillaceous Limestone	Light to medium green argillaceous limestone. 90% A.M. Darker colour and fissile nature near base of core indicates basal Firebag, within 5 metres of Slave Point.	1

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Audet Lake Drill Core Lithological Log

UWI: AA/04-01-098-06W4_0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
106.55	114.60	8.05	McMurray	Oilsand	C.g. oilsands with minor light grey shale beds. Bedding highly contorted.	n.a.
114.60	117.20	2.60	McMurray	Shale	Light grey shale with minor m.g. oilsand beds. Bedding highly contorted. Contact with Devonian is very indistinct.	n.a.
117.20	123.80	6.60	Ft. Verm./Watt Mt.	Breccia	Angular clasts of light grey limestone, light tan laminated limestone and light brown sideritized limestone in a light grey fine grained calcareous matrix.	1
123.80	125.80	2.00	Ft. Verm./Watt Mt.	Breccia	Angular clasts of light grey limestone, light tan laminated limestone and light brown sideritized limestone in a light grey fine grained calcareous matrix.	1
125.80	126.50	0.70	Ft. Verm./Watt Mt.	Breccia	Angular clasts of light grey limestone and light tan laminated limestone in a light grey-brown fine grained calcareous matrix. T.D. @ 126.50.	1

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Audet Lake Drill Core Lithological Log

UWI: AA/04-02-098-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
105.40	109.50	4.10	McMurray	Oilsand	Black c.g. to v.c.g. oilsand. Very minor shale. Bedding undisturbed.	n.a.
109.50	111.10	1.60	Firebag? Watt Mt?	De-calcified Argillaceous Limestone	Light green-grey de-calcified argillaceous limestone. Massive f.g sulfides 109.80 - 110.00 Actual burn marks on box lid from oxidation!	1
111.10	115.50	4.40	Firebag? Prairie?	Altered limestone and oilsand	Mixture of light green-grey argillaceous limestone (altered, partly decalcified), angular chalky white limestone clasts to 5 cm and oilsand lenses and beds to 3 cm. Well laminated in places.	1
115.50	124.80	9.30	Firebag? Prairie?	Altered Limestone	Finely laminated chalky white altered lms and light green partly de-calcified argillaceous lms. Several light green lms intervals. Bedding disturbed throughout.	1
124.80	125.90	1.10	Slave Point? Methy?	Bitumen/Limestone	Massive solid bitumen hosting angular clasts of white laminated lms to 3 cm. T.D. @ 125.90.	1

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Audet Lake Drill Core Lithological Log

UWI: AA/04-03-098-05W4/0

From	to	Thickness	Unit	Lithology	Description	Aggregate Potential
79.40	85.40	6.00	McMurray	Oilsand	Black m.g. to c.g. bitumen saturated oilsand.	1
85.40	87.60	2.20	Watt Mt??	Shale, Siltstone	Finely laminated Light green-purple silty shale and light brown (bitumen stained) siltstone. Sporatic reaction to HCl. Bedding @ 10 - 25 degrees.	1
87.60	96.80	9.20	Prairie??	Dissolution Breccia	Chaotic brecciated mixture of sub-rounded light grey/white lms and dolomite clasts to 3cm in a light green-grey calcareous shale matrix. Minor bitumen staining near top. Gradual change in colour downward from light green to light tan	1
96.80	99.90	3.10	Prairie??	Dissolution Breccia	Chaotic brecciated mixture of sub-rounded white dolomite clasts to 3cm in a light brown calcareous shale matrix.	1
99.90	101.55	1.65	Methy	Bitumen and Calcaeous Shale	10 - 20cm intervals of solid bitumen interbedded with 20 - 40cm intervals of light brown calcareous shale. Several white chalky intervals to 20cm (dolomite).	1
101.55	102.70	1.15	Methy	Strom. Dolomite	Light tan strom. to finely laminated dolomite. Abundant bitumen staining. T.D. @ 102.70	5

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Audet Lake Drill Core Lithological Log

UWI: AA/04-13-098-06W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
88.60	93.10	4.50	McMurray	Oilsand	Black m.g. to v.c.g. oilsand with 10 - 20cm light grey shale beds.	1
93.10	98.00	4.90	Watt Mountain	Shale	Light grey to light green, to light brown shale and siltstone. Bedding highly contorted, inclined, and brecciated. Several f.g. sulphide lenses to 5cm (inclined).	1
98.00	105.60	7.60	Prairie	Collapse Breccia	Angular clasts of light tan to light grey dolomite in a light tan to light grey dolomitic shale matrix. Larger dolomite clasts show fine laminations. Both brittle and ductile deformation evident.	1
105.60	108.85	3.25	Prairie	Collapse Breccia	Interval is alternating 20-30cm sections of solid light grey dolomite with wispy dark grey lamina (inclined) and breccia consisting of angular to sub-rounded clasts of white to light tan to light grey dolomite in a light green to light grey shale matrix.	1
108.85	111.10	2.25	Prairie	Collapse Breccia	Breccia consisting of angular to sub-rounded clasts of white to light tan to light grey dolomite in a light green to light grey shale matrix.	1
111.10	112.60	1.50	Prairie	Collapse Breccia	Light grey dolomite clasts in a light grey matrix. Difficult to distinguish clast/matrix.	1
112.60	113.20	0.60	Prairie	Collapse Breccia	Breccia consisting of angular to sub-rounded clasts of white to light tan to light grey dolomite in a light green to light grey shale matrix.	1
113.20	114.10	0.90	Prairie	Collapse Breccia	Angular to clasts of white to light tan dolomite in a black (bituminous?) sandy matrix. Possible carbonaceous clasts (coal from McMurray?).	1
114.10	117.00	2.90	Prairie	Collapse Breccia	Breccia consisting of angular to sub-rounded clasts of white to light tan to light grey dolomite in a light green to light grey shale matrix. T.D @ 117.00.	1

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Audet Lake Drill Core Lithological Log

UWI: AA/04-18-098-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
118.90	124.25	5.35	McMurray	Shale	Light grey shale with minor m.g. oilsand. Bedding highly contorted.	n.a.
124.25	127.20	2.95	McMurray	Oilsand/Shale	C.g. oilsand and medium grey shale.	n.a.
127.20	128.25	1.05	McMurray	Oilsand with Dolomite Clasts	Caotic mixture of c.g. oilsand and angular chalky white dolomite clasts to 5 cm.	n.a.
128.25	129.90	1.65	Methy	Laminated Dolomite	Light tan bituminous laminated dolomite. Some short healed brecciated intervals, otherwise core undisturbed. Core angle is horizontal.	4
129.90	137.10	7.20	Methy	Dolomite	Light tan fossiliferous dolomite. Abundant crinoid and brachs. Bedding is characterized by thin, dark, discontinuous, undulating lamina. Bitumen staining on fractures only. No structural disturbance. Very homogeneous unit. Very solid core. T.D. @ 17.10	5

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Audet Lake Drill Core Lithological Log

UWI: AA/04-19-098-06W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
64.15	72.90	8.75	McMurray	Oilsand	F.g. partly flushed oilsand. Bedding slightly disturbed. Unconformity is an undulating contact. One 3cm sub-rounded de-calcified lms clast hosted in McMurray 20 cm above unconformity.	n.a.
72.90	78.00	5.10	Firebag	De-calcified Argillaceous Limestone.	Light green de-calcified argilaceous limestone. Abundant f.g. spherical sulphide nodules to 4 cm.	1
78.00	86.05	8.05	Firebag	Argillaceous Limestone	Light green argillaceous limestone. 85% A.M. T.D. @ 86.05.	1

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Audet Lake Drill Core Lithological Log

UWI: AA/04-23-098-06W4/0

From	to	Thickness	Unit	Lithology	Description	Aggregate Potential
89.90	91.60	1.70	McMurray	Oilsand	F.g. partly flushed oilsand. Bedding slightly disturbed.	n.a.
91.60	92.20	0.60	McMurray	Shale	Light grey-green shale. Bedding slightly disturbed.	n.a.
92.20	93.10	0.90	McMurray	Oilsand	M.g. to v.c.g partly flushed oilsand. Bedding slightly disturbed.	n.a.
93.10	98.30	5.20	McMurray	Shale	Light grey-green shale. Bedding slightly disturbed.	n.a.
98.30	99.10	0.80	McMurray	Oilsand	M.g. to v.c.g oilsand. Bedding slightly disturbed.	n.a.
99.10	99.60	0.50	McMurray	Shale	Light grey-green shale. Bedding slightly disturbed.	n.a.
99.60	101.45	1.85	McMurray	Oilsand	M.g. to v.c.g oilsand. Bedding slightly disturbed.	n.a.
101.45	101.60	0.15	McMurray	Shale	Light grey-green shale. Bedding slightly disturbed. 1-2 cm sulphide cemented qtz pebbles to 3mm at base.	n.a.
101.60	103.35	1.75	Firebag	De-calcified Argillaceous Limestone	Light green de-calcified argillaceous limestone. Bedding relatively undisturbed and horizontal.	1
103.35	106.90	3.55	Slave Point	Breccia	Angular to sub-rounded clasts of white to light tan finely laminated limestone to 30cm in a matrix of light green to dark green argillaceous shale. Soft sediment (fully re-cemented) breccia in larger clasts. Some qtz grit present in breccia matrix.	1
106.90	109.80	2.90	Fort Vermilion	Breccia	Angular to sub-rounded clasts of white to light tan finely laminated limestone to 30cm in a light grey calcareous pebbly (sub-rounded clasts to 3 cm) to sandy calcareous matrix. T.D. @ 109.80.	1

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Audet Lake Drill Core Lithological Log

UWI: AA/05-01-098-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
86.90	89.70	2.80	McMurray	Oilsand	V.c.g. oilsand	n.a.
89.70	92.50	2.80	Slave Point?	Brecciated Limestone	Angular clasts of bitumen saturated light grey to chalky white limestone in a light grey calcareous matrix. Breccia is unhealled. Abundant f.g. disseminated sulphides.	1
92.50	94.00	1.50	Slave Point	Brecciated Limestone	Angular clasts of tan and laminated light grey limestone in a light grey calcareous matrix. Breccia is mostly healled. Bitumen staining on porous matrix patches only.	3
94.00	94.65	0.65	Slave Point	Massive Bitumen	Bitumen saturated limestone. Host chalky white limestone visible in a few places.	0
94.65	99.00	4.35	Slave Point	Limestone	Light grey to light tan (light brown where bitumen stained) well laminated limestone. Occasional healled and unhealled breccia. Minor bitumen staining in unhealled breccia, along porous lamina and in fractures. Bedding at 15 degrees.	1
99.00	101.20	2.20	Slave Point	Brecciated Limestone	Angular clasts of tan and laminated light grey limestone in a light grey calcareous matrix. Breccia is partly healed. Bitumen staining on porous matrix patches only.	2
101.20	102.30	1.10	Ft. Verm.	Brecciated Shale/Limestone	Angular clasts of light green calcareous shale and light grey laminated limestone in a light green calcareous matrix.	1
102.30	103.00	0.70	Ft. Verm.	Limestone	Brecciate light grey laminated silty limestone. Breccia is mosty healled.	1
103.00	106.00	3.00	Watt Mt.	Calcareous shale	Light green (typical Watt Mt.) to light brown calcareous silty shale. Bedding slightly brecciated and contorted. T.D. @ 106.00.	1

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Audet Lake Drill Core Lithological Log

UWI: AA/05-14-098-06W4/0

From	to	Thickness	Unit	Lithology	Description	Aggregate Potential
112.95	119.50	6.55	McMurray	Oilsand	Black c.g. oilsands. Bedding undisturbed.	n.a.
119.50	122.10	2.60	Prairie	Breccia	Caotic mixture of chalky white dolomitic limestone clasts in a medium to dark grey-brown shale matrix. Increasing reaction to HCl downward suggests possible de-calcification at unconformity.	1
122.10	122.35	0.25	Prairie	Breccia	Chaotic mixture of finely laminated light grey to light tan limestone and white dolomitic limestone in a matrix of light grey calcareous shale and calcite-cemented sandstone. Interval is well healled.	3
122.35	123.45	1.10	Prairie	Breccia	Brecciated light tan to light grey limestone. Light tan limestone shows abundant soft sediment deformation. Moderate bitumen staining on fractures.	3
123.45	127.95	4.50	Prairie	Breccia	Chaotic mixture of finely laminated light grey to light tan limestone and white dolomitic limestone in a matrix of light grey calcareous shale. Interval is well healled. T.D. @ 127.95.	3

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Audet Lake Drill Core Lithological Log

UWI: AA/05-20-098-05W4/0

From	to	Thickness	Unit	Lithology	Description	Aggregate Potential
88.35	100.45	12.10	McMurray	Shale	Light grey to light brown shale with minor m.g. oilsand. Bedding highly contorted. Abundant rounded qtz pebbles to 1 cm.	n.a.
100.45	110.45	10.00	Methy	Dolomite	Light tan fossiliferous dolomite. Upper contact is at an almost vertical angle. Alteration 100.45-101.60, with the core a bleached white colour and with increasing reaction to HCl upward. (calcification at unconformity??) Abundant crinoid and brachs. Bedding is characterized by thin, dark, discontinuous, undulating lamina. Bitumen staining on fractures only. No structural disturbance. Very homogeneous unit. Very solid core. T.D. @ 110.45	5

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Audet Lake Drill Core Lithological Log

UWI: AA/05-32-097-05W4/0

From	to	Thickness	Unit	Lithology	Description	Aggregate Potential
78.95	84.60	5.65	McMurray	Oilsand	Black c.g. oilsands with thin (1 cm) light grey shale intervals and clasts. Bedding inclined 0-10 degrees. Numerous pebbley beds to 10 cm.	n.a.
84.60	89.20	4.60	McMurray	Shale	Very light green-grey shale. 7cm f.g. pyrite @ 85.45m. Abundant f.g. pyrite nodules to 1 cm. Rare lighter coloured silty lamina to 5mm.	1
89.20	100.70	11.50	McMurray	Shale	Black to very dark grey shale. Abundant sandy lamina. Rare coal lamina to 1 cm. C.g. shaley bitumen-stained sandstone interval 98.00 - 98.70. Contorted bedding in sandy interval over bottom 50cm.	1
100.70	108.10	7.40	Firebag	Nodular Lms	Light green-grey nodular to interbedded lms. 25% Argillaceous material. Brecciated intervals 101.05 - 102.00 and 103.50 - 106.00. Decalcified over top 35cm. T.D. @ 108.55.	3

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Audet Lake Drill Core Lithological Log

UWI: AA/06-24-098-06W4/0

From	to	Thickness	Unit	Lithology	Description	Aggregate Potential
75.30	78.50	3.20	McMurray	Oilsand	Black m.g. to c.g. oilsand. Very minor finey lamined medium grey silty beds. Bedding undisturbed.	n.a.
78.50	79.70	1.20	McMurray	Shale	Medium grey shale.	n.a.
79.70	80.50	0.80	McMurray	Oilsand	Black m.g. to c.g. oilsand. Very minor finey lamined medium grey silty beds. Bedding undisturbed.	n.a.
80.50	80.90	0.40	McMurray	Coal	Black coal.	n.a.
80.90	81.35	0.45	McMurray	Oilsand	Black m.g. to c.g. oilsand.	n.a.
81.35	81.30	- 0.05	cave	n.a.	n.a.	n.a.
81.30	82.40	1.10	McMurray	Shale	Medium grey to black shale.	n.a.
82.40	83.00	0.60	McMurray	Coal	Black coal.	n.a.
83.00	83.50	0.50	McMurray	Shale	Medium grey to black shale.	n.a.
83.50	84.60	1.10	McMurray	Coal	Black coal.	n.a.
84.60	87.80	3.20	McMurray	Shale	Medium grey to black shale.	n.a.
87.80	88.10	0.30	McMurray	Siltstone	very light grey siltstone. Minor bitumen staining.	n.a.
88.10	89.60	1.50	McMurray	Shale	Medium grey to black shale.	n.a.
89.60	89.80	0.20	McMurray	Siltstone	very light grey siltstone. Minor bitumen staining.	n.a.
89.80	92.10	2.30	McMurray	Shale-Siltstone	Interbedded medium grey siltstone/shale. Contorted bedding.	n.a.
92.10	96.50	4.40	McMurray	Oilsand/shale	Interbedded m.g. oilsand and medium grey shale. Bedding highly contorted.	n.a.
96.50	105.40	8.90	Methy	Dolomite	Very light tan to light blue-grey dolomite. Poorly laminated, undulated bedding. Abundant very large (2 cm) crinoid fragments. Rare bulbous strom. Fossiliferous peloidal-rich intervals 97.30 - 97.60 and 102.20 - 102.60. Minor bitumen staining on fractures. Very minor pinhole porosity.	5
105.40	111.50	6.10	Methy	Dolomite	As above but predominance of light blue-grey coloured dolomite. Contorted, wavey and inclined bedding throughout. Abundant crinoid fragments. T.D. @ 111.50.	5

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Audet Lake Drill Core Lithological Log

UWI: AA/07-06-098-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
77.50	78.00	0.50	McMurray	Shale	Light grey shale, grading downward into coal	n.a.
78.00	82.20	4.20	McMurray	Coal	Black coal. Minor native sulphur staining	n.a.
82.20	86.45	4.25	McMurray	Oilsand	M.g to v.c.g. oilsand. Moderately flushed 82.20 - 83.80.	n.a.
86.45	90.00	3.55	Firebag	Interbedded Limestone/Argillaceous Limestone	Interbedded light grey lms and light green argillaceous limestone. Decalcified 86.45 - 87.50. Moderate chalky alteration 87.50 - 88.50. 60% A.M. Bedding at 25 degrees.	2
90.00	93.80	3.80	Firebag	Argillaceous Limestone	Light green argillaceous Lms. 80% A.M.	2
93.80	95.20	1.40	Firebag	Interbedded Limestone/Argillaceous Limestone	Interbedded light grey lms and light green argillaceous limestone. 45% A.M. Bedding at 25 degrees. Abundant whole brachs. Hardground @ 95.20.	3
95.20	95.90	0.70	Firebag	Argillaceous Limestone	Light green argillaceous Lms. 80% A.M.	2
95.90	99.10	3.20	Firebag	Brecciated Lms	Brecciated to highly fractured light grey lms and light green argillaceous limestone. Bedding inclined to 90 degrees in places.	1
99.10	103.00	3.90	Firebag	Argillaceous Limestone	Light green argillaceous Lms. Brecciated in places. 85% A.M. T.D. @ 103.00	2

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Audet Lake Drill Core Lithological Log

UWI: AA/07-07-098-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
129.90	135.50	5.60	McMurray	Oilsand/Shale	Chaotic mixture of c.g. oilsand and medium grey shale.	n.a.
135.50	137.00	1.50	McMurray	Oilsand with dolomite clasts	Chaotic mixture of c.g. oilsand and angular chalky white dolomite clasts to 5 cm.	n.a.
137.00	138.30	1.30	Methy	Laminated Dolomite	Light tan bituminous laminated dolomite. Some short healed brecciated intervals, otherwise core undisturbed. Core angle is horizontal.	4
138.30	144.60	6.30	Methy	Dolomite	Light tan fossiliferous dolomite. Abundant crinoid and brachs. Bedding is characterized by thin, dark, discontinuous, undulating lamina. Bitumen staining on fractures only. No structural disturbance. Very homogeneous unit. Very solid core. T.D. @ 144.60.	5

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Audet Lake Drill Core Lithological Log

UWI: AA/07-12-098-05W4/0

From	to	Thickness	Unit	Lithology	Description	Aggregate Potential
98.90	107.60	8.70	McMurray	Oilsand	C.g. to v.c.g. oilsand.	n.a.
107.60	110.40	2.80	Watt Mt.?	Calcareous Breccia	Subangular clasts of light green bitumen stained siltstone, light green bitumen stained limestone, finely laminated light green and white limestone and light tan limestone to 10 cm in a light green silty calcareous matrix.	1
110.40	112.80	2.40	Prairie	Calcareous Breccia	Subangular clasts of light grey limestone, light tan limestone, finely laminated light grey and white limestone and light grey dolomitic limestone to 10 cm in a light grey calcareous matrix. Breccia is partly healed.	1
112.80	117.55	4.75	Prairie	Dolomitic Breccia	Angular clasts of light grey to light brown finely laminated dolomite and light tan massive dolomite in a light brown to light grey fine grained non-calcareous matrix. Breccia is partly healed.	3
117.55	118.00	0.45	Prairie	Calcareous Breccia	Subangular clasts of light green siltstone, finely laminated light green and white limestone and light tan limestone to 2 cm in a light green silty calcareous matrix.	1
118.00	120.00	2.00	Prairie	Calcareous Breccia	Light to medium brown contorted brecciated mixture of finely laminated light brown and white limestone, white laminated limestone in a calcareous light brown fine grained matrix.	1
120.00	120.10	0.10	Methy	Calcareous Shale	Medium brown finely laminated calcareous shale.	1
120.10	121.20	1.10	Methy	Strom. Dolomitic Limestone	Bitumen saturated dolomitic strom. limestone.	2
121.20	122.00	0.80	Methy	Calcareous Shale	Medium brown finely laminated calcareous shale.	1
122.00	123.00	1.00	Methy	Strom. Dolomitic Limestone	Bitumen saturated dolomitic strom. limestone.	2

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Audet Lake Drill Core Lithological Log

UWI: AA/07-16-098-05W4/0

From	to	Thickness	Unit	Lithology	Description	Aggregate Potential
78.50	88.90	10.40	McMurray	Oilsand	Black m.g. oilsands with 15cm thick dark grey shale beds. Core appears structurally undistrurbed. Lost core at basal contact.	n.a.
88.90	90.60	1.70	McMurray?	Dissolution Breccia, Shale	Light grey non-calcareous shale. Lithologically a fairly homogeneous unit - bedding difficult to discern but very contorted and brecciated, abundant vertical bedding. "Phyllitic" slickensided surfaces throughout.	n.a.
90.60	91.10	0.50	McMurray?	Dissolution Breccia, Oilsand & Shale	Contorted mixture of black m.g. Oilsand and light grey non-calcareous shale.	n.a.
91.10	93.45	2.35	Fort Vermilion?	Dissolution Breccia, Shale	Light grey non-calcareous shale. Lithologically a fairly homogeneous unit - bedding difficult to discern but very contorted and brecciated, abundant vertical bedding. "Phyllitic" slickensided surfaces throughout.	1
93.45	94.30	0.85	Fort Vermilion?	Dissolution Breccia, laminated Shale	Finely laminated light grey to white to light tan to dark grey (bituminous) shale. Occasionallight grey angular siltstone clast to 1 cm. Bedding much more defined than units above but still contorted and brecciated.	1
94.30	94.60	0.30	Fort Vermilion?	Dissolution Breccia, Oilsand & Shale	Contorted mixture of black m.g. Oilsand and light grey non-calcareous shale.	1
94.60	95.10	0.50	Fort Vermilion?	Dissolution Breccia, calcareous shale	Light green finely laminated calcareous shale. White chalky alteration over top 10 cm.	1
95.10	96.00	0.90	Watt Mt.?	Dissolution Breccia, laminated Shale	Finely laminated light grey to white to light tan to dark grey (bituminous) shale. Bedding well defined and sub-horizontal.	1
96.00	96.20	0.20	Watt Mt.?	Dissolution Breccia, oilsand & shale	Contorted mixture of black m.g. Oilsand and light grey non-calcareous shale.	1
96.20	96.80	0.60	Watt Mt.?	Dissolution Breccia, Shale	Light green non-calcareous shale. Lithologically a fairly homogeneous unit - bedding difficult to discern but very contorted and brecciated, abundant vertical bedding.	1
96.80	103.00	6.20	Prairie Fm.?	Dissolution Breccia, Calcareous Shale & Limestone	Highly contorted mixture of light grey-green calcareous shale, light tan chalky de-dolomite (?) and white chalky bituminous limestone. The light tan and chalky component has a very vigorous response to HCl. Light tan colour and bitumen staining suggests material was dolomite.	1

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103.00	106.00	3.00	Prairie Fm.?	Massive Bitumen/Altered Dolomite	Black massive solid bitumen (75% of interval) hosted in a white chalky very porous matrix (altered dolomite?).	1
106.00	109.00	3.00	Prairie Fm.?	Dissolution Breccia, calcareous shale & de-dolomite?	Highly contorted mixture of light grey-green calcareous shale and white chalky material. White chalky material has no response to HCl.	1
109.00	115.50	6.50	Prairie Fm.?	Dissolution Breccia, Shale & Siltstone	Highly contorted mixture of medium grey to medium green finely laminated shale and siltstone. Becoming sandy over bottom 2 metres. Numerous angular low density black carboniferous clasts throughout, becoming more abundant over bottom metre (coal?).	1
115.50	116.35	0.85	Methy?	Dolomite	Light tan nodular dolomite. Rare crinoid.	5
116.35	118.30	1.95	McMurray slump?	Shale & Oilsand	Contorted mixture of medium grey to medium brown shale and black m.g. Oilsand. Numerous angular low density dark brown to black carboniferous clasts throughout (coal?).	1
118.30	119.50	1.20	Methy	Dolomite	Light tan nodular dolomite. Rare crinoid. T.D. @ 119.50.	5

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Audet Lake Drill Core Lithological Log

UWI: AA/07-18-098-05W4/0

From	to	Thickness	Unit	Lithology	Description	Aggregate Potential
47.50	57.60	10.10	McMurray	Oilsand	V.c.g. oilsands. Minor light grey shale lamina. Occasional coal fragment.	n.a.
57.60	58.85	1.25	Firebag	De-calcified argillaceous limestone	Medium green de-calcified argillaceous limestone.	1
58.85	61.80	2.95	Firebag	Argillaceous nodular limestone	Argillaceous nodular limestone. 50% A.M. Slight brecciation.	2
61.80	62.25	0.45	Firebag	Argillaceous Limestone	Light green argillaceous limestone. 90% A.M. Moderately fractured.	1
62.25	64.50	2.25	Firebag	Argillaceous nodular limestone	Argillaceous nodular limestone. 50% A.M. Slight brecciation.	2
64.50	74.00	9.50	Firebag	Argillaceous Limestone	Medium green argillaceous limestone. 90% A.M. Slightly fractured.	1
74.00	74.10	0.10	Slave Point	Limestone	Only a few fragments of light tan laminated limestone at base of core - but definitely Slave Point	4

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Audet Lake Drill Core Lithological Log

UWI: AA/07-22-099-05W4/0

From	to	Thickness	Unit	Lithology	Description	Aggregate Potential
42.81	45.00	2.19	McMurray	Oilsand	Black m.g oilsands with numerous medium grey shale beds to 4cm.	n.a.
45.00	62.20	17.20	McMurray	Coal	Coal with occasional pyrite nodule.	n.a.
62.20	62.80	0.60	McMurray	Shale	Dark grey to black carbonacious shale.	n.a.
62.80	66.20	3.40	McMurray	Oilsand	Black c.g. to m.g oilsands with numerous medium grey shale beds to 4cm.	n.a.
66.20	78.15	11.95	McMurray	Shale/siltstone	White to light grey to light brown shale/clay. Highly contorted bedding. Occasional light brown siltstone bed to 20cm.	n.a.
78.15	79.30	1.15	McMurray	Oilsand/coal	Black c.g. to m.g oilsands with numerous black coal fragments. Highly contorted bedding.	n.a.
79.30	82.20	2.90	McMurray	Shale/siltstone	White to light grey to light brown shale/clay. Highly contorted bedding. Occasional light brown siltstone bed to 20cm.	n.a.
82.20	89.20	7.00	McMurray	Oilsand	Black c.g. to m.g oilsands. 50% light grey shale over top 2 m. Highly contorted bedding.	n.a.
89.20	96.90	7.70	McMurray	Sandy shale	Light grey sandy shale (clasts to 1 mm) intermixed with black f.g. shaley oilsand. High contorted bedding.	n.a.
96.90	98.40	1.50	McMurray	Oilsand	Black c.g. to m.g oilsands. Highly contorted bedding.	n.a.
98.40	108.90	10.50	McMurray	Sandy shale	Light grey sandy shale (clasts to 1 mm) intermixed with black f.g. shaley oilsand. High contorted bedding.	n.a.
108.90	109.40	0.50	Methy	Shale	Black to dark grey very finely laminated shale. Becoming lighter in colour downward.	1
109.40	111.00	1.60	Methy	Crinoid-rich shale	light brown shale with abundant (15%) crinoid fragments to 5mm. No reaction to HCl from either the shale or crinoid fragments, altered interval??	1
111.00	114.60	3.60	Methy	Dolomite	Light grey nodular crinoid-rich dolomite. Looks similar to clean Moberly nodular inervals. Bitumen staining only in fractures. Gradational lower contact.	5
114.60	115.00	0.40	Methy	Dolomite	Medium grey/blue massive dolomite	5
115.00	115.50	0.50	Methy	Shale breccia	Angular clasts of light grey shale in a light brown shale matrix.	1
115.50	120.55	5.05	Methy	Calcareous shale	Finely laminated white to light brown to light grey calcareous shale. Number of m.g. fossil hash/calcite sand beds to 2 cm near base. T.D. @ 120.55	2

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Audet Lake Drill Core Lithological Log

UWI: AA/07-28-098-05W4/0

From	to	Thickness	Unit	Lithology	Description	Aggregate Potential
89.50	97.00	7.50	McMurray	Watersand/shale/oilsand	Mixture of c.g. watersand, oilsand and medium grey shale. Bedding highly contorted throughout.	n.a.
97.00	106.85	9.85	Prairie?	Breccia	Angular clasts of light grey to light tan limestone (Slave Point?) to 10 cm in a light grey calcareous shaley matrix. Sandy bitumen-stained interval 97.00 - 100.00 with sub-rounded qtz clasts to 5 mm. Breccia is un-cemented.	1
106.85	110.50	3.65	McMurray Slump?	Oilsand/shale	Mixture of v.c.g. oilsand and medium grey shale. Bedding highly contorted throughout. No reaction to HCl through interval.	n.a.
110.50	111.80	1.30	Methy	Laminated Dolomite	Finely laminated very light tan and dark brown dolomite/dolomitic limestone. Laminations are mostly disturbed, broken up into mm-long "laths" and then re-cemented. Bedding shows evidence of slumping. Minor bitumen staining in fractures at base. Light grey "sandy" bed 111.60 - 111.65.	3
111.80	111.90	0.10	McMurray Slump?	Oilsand	V.g.c. oilsand. T.D. @ 111.90.	n.a.

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Audet Lake Drill Core Lithological Log

UWI: AA/07-30-097-05W4/0

From	to	Thickness	Unit	Lithology	Description	Aggregate Potential
74.05	77.25	3.20	McMurray	Oilsand	Black v.c.g. oilsands. Pebbles to 1cm at base. Coal fragments over bottom 60 cm.	n.a.
77.25	79.60	2.35	Firebag	Argillaceous Limestone	Light green argillaceous limestone. 85% A.M. Bedding at 15 degrees. De-calcified over top 75cm.	1
79.60	80.00	0.40	Firebag	Argillaceous Nodular Limestone	Light green argillaceous nodular limestone. 50% A.M. Bedding at 15 degrees. Abundant brachs.	2
80.00	82.25	2.25	Firebag	Argillaceous Limestone	Light green argillaceous limestone. 85% A.M. Bedding at 25 degrees.	1
82.25	82.50	0.25	Firebag	Argillaceous Nodular Limestone	Light green argillaceous nodular limestone. 50% A.M. Bedding at 25 degrees. Abundant brachs.	2
82.50	85.30	2.80	Firebag	Argillaceous Limestone	Light green argillaceous limestone. 85% A.M. Bedding at 25 degrees.	1
85.30	85.50	0.20	Firebag	Nodular Limestone	Light green argillaceous nodular limestone. 30% A.M. Bedding at 25 degrees.	2
85.50	86.80	1.30	Firebag	Argillaceous Limestone	Light green argillaceous limestone. 85% A.M. Bedding at 25 degrees.	1
86.80	90.20	3.40	Firebag	Nodular Limestone	Light green argillaceous nodular limestone. 35% A.M. Bedding at 25 degrees. T.D. @ 90.20m.	2
	12.95					

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Audet Lake Drill Core Lithological Log

UWI: AA/07-35-097-06W4/0

From	to	Thickness	Unit	Lithology	Description	Aggregate Potential
38.20	45.15	6.95	McMurray	Oilsand	Black m.g. to c.g. bitumen saturated oilsand.	n.a.
45.15	48.00	2.85	Firebag	Argillaceous Limestone	light grey-green argillaceous Lms. 80% A.M. Occasional whole brach. Highly fractured. Slight de-calcification over top 30cm.	1
48.00	49.50	1.50	Firebag	Interbedded Limestone/Arg.Limestone	Interbedded light grey lms and light green argillaceous lms beds. Bedding averages 1 - 2cm. Highly fractured.	1
49.50	61.65	12.15	Firebag	Argillaceous Limestone	Light grey-green argillaceous lms. 80% A.M. Occasional whole brach. Highly fractured.	1
61.65	65.90	4.25	Slave Point	Brecciated Limestone	Light tan brecciated laminated Lms. 50% recovery. Breccia is un-healed with bitumen matrix. Interval is 20% bitumen.	3
65.90	78.60	12.70	Ft. Verm./ Watt. Mt.	Dissolution Breccia	Angular clasts of light tan dolomite and light grey Lms in a light grey calcareous shale matrix. A number of large (30cm) finely laminated dolomite clasts.	1
78.60	81.00	2.40	Prairie	Brecciated Dolomite	Light brown-tan brecciated dolomite	4
81.00	81.30	0.30	Prairie	Cemented Breccia	Cemented breccia comprising angular lenticular clasts of tan dolomite and light grey Lms.	3
81.30	82.00	0.70	Prairie	Dissolution Breccia	Angular clasts of light tan dolomite and light grey Lms in a light grey calcareous shale matrix.	1
82.00	82.30	0.30	Prairie	Laminated Dolomite	Light tan finely laminated dolomite	5
82.30	93.50	11.20	Prairie	Dissolution Breccia	Angular clasts of light tan dolomite and light grey lms in a light grey calcareous shale matrix. Lms clast look like Firebag Member. Abundant bitumen staining 90.50-91.90.	1
93.50	100.00	6.50	Methy	Bedded Strom. Dolomitic Lms	Light tan strom. dolomitic Lms. Bitumen staining on fine vuggy porosity within stroms.	5
100.00	101.00	1.00	Methy	Bedded Strom. Dolomitic Lms	As above with less porosity and less bitumen staining.	5
101.00	103.60	2.60	Methy	Dolomite	Light tan massive to laminated dolomite. Bitumen staining on vuggy porosity developed along fractures.	5
103.60	111.30	7.70	Methy	Strom. Dolomitic Lms	Light tan strom. dolomitic lms. Minor bitumen staining on fine vuggy porosity within stroms. Possible peloids in places. Branching stroms. 105.00-106.80 and 110.60-111.30. T.D. @ 111.30.	5

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Audet Lake Drill Core Lithological Log

UWI: AA/08-11-098-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
100.20	103.75	3.55	McMurray	Oilsand	Black c.g. to v.c.g. oilsands. No structural deformation.	n.a.
103.75	104.60	0.85	Watt Mountain	Breccia	Angular clasts of light grey siltstone in a medium grey non-calcareous shale matrix.	1
104.60	105.40	0.80	Watt Mountain	Siltstone	Light green siltstone. Core very broken up.	1
105.40	106.05	0.65	Prairie	Breccia	Angular clasts of light tan dolomite and light green siltstone in a light green silty shale matrix.	1
106.05	107.20	1.15	Prairie	Brecciated Dolomite	Large (20cm) angular clasts of light tan dolomite along with smaller (5 cm) clasts of light green silstone in a light green silty shale matrix. Dolomite clasts are well laminated with pin-hole porosity and no bitumen staining.	3
107.20	111.50	4.30	Prairie	Breccia	Angular clasts of light grey-tan limestone (to 5 cm), white finely laminated limestone, brown siderite and green siltstone in a light green to white calcareous matrix.	1
111.50	116.80	5.30	Prairie	Breccia	Angular clasts of white finely laminated limestone, light tan finely laminated limestone in medium brown calcareous shale matrix.	1
116.80	116.40	- 0.40	Methy	Massive Bitumen	Black massive solid bitumen with angular clasts of light tan to white chalky dolomite to 3 cm.	1
116.40	119.30	2.90	Methy	Calcareous Shale/bitumen	Light brown finely laminated calcareous shale and black massive black massive bitumen in beds 10 -30 cm. Minor crinoids in shale.	1
119.30	120.00	0.70	Methy	Bituminous dolomite	Bitumen saturated strom. Dolomite. Chalky alteration in places.	2
120.00	120.35	0.35	Methy	Dolomite	Light tan laminated dolomite.	5
120.35	122.00	1.65	Methy	Bituminous dolomite	Bitumen saturated strom. Dolomite. Chalky alteration in places.	3
122.00	125.00	3.00	Methy	Dolomite	Light tan laminated and strom. dolomite. Bitumen saturated in strom. Intervals. T.D. @ 125.00.	5

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Audet Lake Drill Core Lithological Log

UWI: AA/09-06-098-06W4/0

From	to	Thickness	Unit	Lithology	Description	Aggregate Potential
99.40	104.45	5.05	McMurray	Oilsands	Black c.g. to v.c.g. oilsands. Difficult to determine if bedding is disturbed.	n.a.
104.45	110.20	5.75	Firebag	Brecciated Nodular Limestone	Highly brecciated (unhealed) light grey nodular limestone. 25% A.M. Abundant oilsand in breccia matrix over top metre. T.D. @ 110.20m.	2

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Audet Lake Drill Core Lithological Log

UWI: AA/09-29-098-05W4/0

From	to	Thickness	Unit	Lithology	Description	Aggregate Potential
50.20	51.70	1.50	Fort Vermillion?	Collapse Breccia	Angular to sub-rounded clast of light grey to light rose coloured lms in a light grey calcareous shale matrix.	1
51.70	56.50	4.80	Lost Core			
56.50	62.50	6.00	Fort Vermillion?	Collapse Breccia	Alternating 30-50cm intervals of moderately brecciated interbedded light grey lms/shale and highly brecciated Light tan to light grey lms in a light tan to light grey calcareous shale matrix.,	1
62.50	63.00	0.50	Watt Mountain	Shale	Light green to light grey shale. Some brecciation. T.D. @ 63.00	1

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Audet Lake Drill Core Lithological Log

UWI: AA/10-05-098-06W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
74.30	80.20	5.90	McMurray	Oilsands	Black c.g. to v.c.g. oilsands. Inclined bedding, 5-10 degrees.	n.a.
80.20	80.80	0.60	Firebag	De-calcified Limestone	Medium green de-calcified limestone.	1
80.80	81.40	0.60	Firebag	Argillaceous Limestone	Light green argillaceous limestone. 85% A.M. Slight chalky alteration.	1
81.40	84.00	2.60	Firebag	Argillaceous Nodular Limestone	Light grey argillaceous nodular limestone. 40% A.M. Core relatively undisturbed.	2
84.00	85.20	1.20	McMurray Karst Fill	Calcite Cemented m.g. Sandstone.	Light grey calcite cemented m.g. sandstone. No bitumen staining. Minor carbonaceous flecks. Bedding not well defined.	n.a.
85.20	85.70	0.50	Firebag	Argillaceous Limestone	Light green argillaceous limestone. 85% A.M.	1
85.70	87.00	1.30	Firebag	Nodular Limestone	Light grey nodular limestone. 30% A.M. Core highly fractured.	2
87.00	90.10	3.10	Firebag	Interbedded Argillaceous Limestone/Limestone	Light green argillaceous limestone interbedded with light grey limestone beds to 2cm. 65% A.M. Core moderately fractured.	1
90.10	94.00	3.90	Firebag	Interbedded Argillaceous Limestone/Limestone	Light green argillaceous limestone interbedded with light grey limestone beds to 1cm. 80% A.M. Core moderately fractured.	1
94.00	96.60	2.60	Firebag	Argillaceous Limestone	Light green argillaceous limestone. 90% A.M. T.D. @ 96.60. Slave Point likely 5-6m below T.D.	1

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Audet Lake Drill Core Lithological Log

UWI: AA/10-09-098-06W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
49.60	55.40	5.80	McMurray	Oilsand	Black m.g. to c.g. oilsand with minor shale	n.a.
55.40	58.00	2.60	Firebag	Argillaceous Limestone	Light green argillaceous limestone. Typical basal Firebag. Bedding at 30 degrees. 95% A.M. Contact with Slave Point is brecciated.	2
58.00	58.30	0.30	Slave Point	Brecciated Limestone	Brecciated light tan limestone with a light tan calcareous matrix.	2
58.30	0.60	- 57.70	Slave Point	Solid Bitumen with Limestone clasts	Massive solid black bitumen hosting angular clasts of light tan finely laminated lms to 3 cm.	2
0.60	59.80	59.20	Slave Point	Healed Brecciated Limestone	Angular clasts of light tan laminated limestone in a light tan calcareous shale matrix. Calcareous shale laminated in places with bedding inclined to 20 degrees. Breccia fully healed.	2
59.80	63.10	3.30	Slave Point	Laminated Limestone	Light tan finely laminated Lms. Abundant bedding parallel bitumen staining. Bedding sub-horizontal.	4
63.10	65.00	1.90	Slave Point	Brecciated Limestone	Angular clasts of light tan finely laminated Lms in a light tan chalky calcareous matrix.	2
65.00	67.00	2.00	Slave Point	Healed Brecciated Limestone	Angular clasts of light tan laminated limestone in a light tan calcareous (non shaley) matrix. Breccia fully healed.	5
67.00	70.90	3.90	Ft. Vermilion	Brecciated Limestone	Angular clasts of light tan finely laminated Lms (Slave Point clasts) in a medium brown to medium grey chalky calcareous matrix. Minor bitumen staining.	2

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Audet Lake Drill Core Lithological Log

UWI: AA/10-11-098-06W4/0

From	to	Thickness	Unit	Lithology	Description	Aggregate Potential
91.10	93.00	1.90	McMurray	Oilsand	Black c.g. oilsands. Rare 3cm thick dark grey shale beds. Core appears structurally undistrurbed.	n.a.
93.00	94.80	1.80	McMurray	Shale	Light grey shale. Bedding likely disturbed - slikensideds throughout.	n.a.
94.80	95.50	0.70	Slave Point?	Brecciated Limestone	Angular clasts of light tan lms in a light tan calcareous matrix. Modedrate bitumen staining in matrix.	2
95.50	96.20	0.70	McMurray Slump?	Oilsand/shale	Contorted mixture of m.g. oilsand and light grey shale.	n.a.
96.20	97.90	1.70	McMurray Slump?	Shale	Light grey shale. Bedding likely disturbed - slikensideds throughout.	n.a.
97.90	98.90	1.00	McMurray Slump?	Oilsand/shale	Contorted mixture of m.g. oilsand with minor light grey shale.	n.a.
98.90	100.00	1.10	McMurray Slump?	Shale	Light grey shale. Bedding likely disturbed - slikensideds throughout.	n.a.
100.00	101.50	1.50	Slave Point?	Brecciated Limestone	Angular clasts of light tan lms in a light tan calcareous matrix. Modedrate bitumen staining in matrix.	2
101.50	106.50	5.00	Slave Point?	Limestone	Light tan laminated limestone. Bedding inclined at 10 degrees. Soft sediment breccia in places. Good reaction to HCl throughout.	5
106.50	108.00	1.50	McMurray Slump?	Shale	Light grey shale. Bedding likely disturbed - slikensideds throughout.	n.a.
108.00	117.00	9.00	Prairie?	Calcareous breccia	Breccia consisting primarily of angular clasts of light tan limestone (Slave Point) in a light tan to light greyfine grained calcareous matrix. Whire chalky alteration on lms clasts near base. Very minor bitumen staining only on fractures in lms clasts. T.D. 117.00.	1

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Audet Lake Drill Core Lithological Log

UWI: AA/10-16-097-06W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
66.45	68.70	2.25	McMurray	Oilsand	Black c.g. oilsands.	n.a.
68.70	69.90	1.20	McMurray	Shale	Light grey shale. Minor m.g. bioturbated oilsand.	n.a.
69.90	72.70	2.80	McMurray	Coal	Coal.	n.a.
72.70	74.50	1.80	McMurray	Shale	Light grey shale. F.g. sulphide nodules to 1 cm at lower transitional contact.	n.a.
74.50	75.60	1.10	McMurray	Shale	Dark grey shale.	n.a.
75.60	76.30	0.70	McMurray	Oilsand	Black c.g. oilsands. Minor shale lamina.	n.a.
76.30	78.00	1.70	Firebag	De-calcified Argillaceous Limestone	Bright green de-calcified argillaceous limestone. No sulphides observed.	1
78.00	78.15	0.15	Firebag	Siderite	Rusty weathering sideritized argillaceous limestone.	3
78.15	78.45	0.30	Firebag	De-calcified Argillaceous Limestone	Bright green de-calcified argillaceous limestone. No sulphides observed.	1
78.45	78.90	0.45	Firebag	Siderite	Rusty weathering sideritized argillaceous limestone.	3
78.90	79.30	0.40	Firebag	De-calcified Argillaceous Limestone	Bright green de-calcified argillaceous limestone. Abundant sulphides across 1 cm at lower contact.	1
79.30	79.50	0.20	Firebag	Argillaceous Limestone	Finely interlaminated (1 -3mm) light green and white (kaolinized??) argillaceous limestone. 85% A.M.	1
79.50	83.00	3.50	Firebag	Argillaceous Limestone	Light green argillaceous limestone. Minor 5 - 10mm light grey limestone lamina. Very minor structural disturbance. Core angle at 10 degrees. 75% A.M.	1
83.00	83.20	0.20	Firebag	Nodular Limestone	Light grey nodular limestone. 45% A.M.	3
83.20	90.00	6.80	Firebag	Argillaceous Limestone	Light green argillaceous limestone. Minor 5 - 10mm light grey limestone lamina. Minor brach-rich lamina. Very minor structural disturbance. Core angle at 10 degrees. 85% A.M.	1
90.00	93.90	3.90	Firebag	Nodular Limestone	Light grey nodular limestone. 35% A.M. T.D. @ 93.90.	3

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Audet Lake Drill Core Lithological Log

UWI: AA/10-22-098-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
58.20	58.95	0.75	McMurray	Shale	Light grey shale.	n.a.
58.95	60.00	1.05	McMurray	Oilsand	Black c.g. oilsand.	n.a.
60.00	61.70	1.70	Firebag	Decalcified Argillaceous Lms	Medium green to light brown decalcified argillaceous lms. Brown coloured siderite nodules and lenses to 5 mm. Appears structurally undeformed. Yellow powder coating on core over top 70cm, sulphur from sulphides??	1
61.70	62.00	0.30	Firebag	Massive Sulphides	F.g. massive pyrite.	1
62.00	63.00	1.00	Firebag	Argillaceous Lms	Light green argillaceous lms with scattered whole brachs. 80% A.M.	1
63.00	64.40	1.40	Firebag	Nodular Lms	Light grey lms nodules in a light green argillaceous lms matrix. 50% A.M. Slightly brecciated.	2
64.40	65.30	0.90	Firebag	Argillaceous Lms	Light green argillaceous lms with scattered whole brachs. 80% A.M. Concentration of f.g. pyrite nodules 64.70-64.80.	1
65.30	70.10	4.80	Firebag	Nodular Lms	Light grey lms nodules in a light green argillaceous lms matrix. 50% A.M. Moderately brecciated. Minor c.g. oilsand patches.	2
70.10	72.00	1.90	Firebag	Brecciated Argillaceous Lms	Angular to sub-rounded clasts of light grey lms in a light green argillaceous lms matrix. 60% A.M.	2
72.00	76.70	4.70	Firebag	Brecciated Argillaceous Lms	Angular to sub-rounded clasts of light grey lms in a light green argillaceous lms matrix. 80% A.M.	1
76.70	77.30	0.60	Slave Point	Lms/Shale	Brecciated light tan laminated lms in a light brown (bituminous) shale matrix. Occasional whole brach.	1
77.30	78.00	0.70	Slave Point	Shale	light grey-brown calcareous shale.	1
78.00	83.50	5.50	Slave Point	Bituminous Brecciated Lms	Highly brecciated well laminated light tan lms in a black massive bitumen matrix. T.D. 83.50m.	2

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Audet Lake Drill Core Lithological Log

UWI: AA/10-28-097-06W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
106.70	107.80	1.10	McMurray	Oilsands	Black m.g to c.g. oilsands. Inclined bedding.	n.a.
107.80	108.05	0.25	McMurray	Calcite-cemented sandstone	White c.g. calcite-cemented sandstone. Inclined bedding.	n.a.
108.05	111.30	3.25	McMurray	Oilsands	Black m.g to c.g. oilsands. Inclined bedding. Occasional rounded clast to 1 cm.	n.a.
111.30	112.60	1.30	McMurray	Calcite-cemented sandstone	White c.g. calcite-cemented sandstone. Inclined bedding.	n.a.
112.60	114.00	1.40	McMurray	Sand/silt/shale	Light grey-brown contorted mixture of c.g. sandstone, siltstone and shale. Minor bitumen staining.	n.a.
114.00	114.85	0.85	McMurray	Oilsands	Black c.g. oilsands with rare 5mm light brown shale lamina. Inclined bedding.	n.a.
114.85	115.20	0.35	McMurray	Calcite-cemented sandstone	White to light grey c.g. calcite-cemented sandstone with light brown shale lamina.	1
115.20	124.00	8.80	Prairie Fm?	Dolomite-shale breccia	Light to medium grey shale/siltstone matrix hosting angular clasts of dolomite to 20cm. Dolomite clasts include very light tan finely laminated dolomite (bituminous lamina), white massive dolomite, dark brown bituminous dolomite.	1
124.00	127.50	3.50	Prairie Fm.	Dolomite-shale breccia	As above but matrix is light brown, there are less dolomite clasts, and there are scattered rounded "sand" clasts to 2mm.	1
127.50	135.10	7.60	Prairie Fm.	Dolomite-sand breccia	Light to medium brown shale/siltstone matrix hosting angular clasts of dolomite to 60cm. Dolomite clasts include very light tan finely laminated dolomite (including 40cm clast at 129.60 showing "flow" structure), white massive dolomite, dark brown bituminous dolomite. Matrix bedding is contorted and brecciated throughout. Increase in proportion and grain size of carbonate sand downward, in places reaching 100% over 20cm.	1
135.10	138.35	3.25	Prairie Fm.	Carbonate sand/shale breccia	Medium grey-brown shale/siltstone with intervals of carbonate sand to 50cm. Bedding contorted throughout. Bitumen staining over bottom 2m gives interval a very "McMurray-like" appearance. Bottom 20cm is black with abundant f.g. diss. sulphides.	1
138.35	140.75	2.40	Methy	Laminated dolomite	Light brown bituminous finely laminated dolomite. Bitumen content decreasing downward. Laminationas are more lenticular 139.70 - 140.10.	5
140.75	143.05	2.30	Methy	Massive dolomite	Light tan massive dolomite. Rare mm-scale bituminous lense.	5

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143.05	158.10	15.05	Methy	Fossiliferous dolomite	Light tan, vuggy, fossiliferous dolomite. Bitumen staining on vugs and fractures. Abundant crinoid fragments throughout including some large fragments 144.90 - 145.30. 2 cm wide sub-vertical sulphide vein at 150.80.	5
158.10	160.80	2.70	Methy	Strom. Dolomite	Light tan-brown dolomite with bulbous stroms to 2 cm.	5
160.80	162.50	1.70	Methy	Fossiliferous dolomite	As above 143.10 - 158.10. TD @ 162.50.	5

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Audet Lake Drill Core Lithological Log

UWI: AA/11-07-098-06W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
40.50	43.00	2.50	McMurray	Oilsand	Black m.g. to c.g. oilsand.	n.a.
43.00	44.50	1.50	Firebag	Argillaceous Limestone	Light green argillaceous limestone. 90% A.M. Abundant whole bracks. No decalcification at unconformity.	1
44.50	46.00	1.50	Firebag	Argillaceous Nodular Limestone	Light green braciopod-rich argillaceous nodular limestone. 50% A.M. Core slighty fractured.	2
46.00	46.60	0.60	Firebag	Argillaceous Limestone	Light green argillaceous limestone. 90% A.M. Rare light grey limestone nodule to 1 cm.	1
46.60	50.60	4.00	Firebag	Argillaceous Nodular Limestone	Light green argillaceous nodular limestone. 65% A.M. Core slighty fractured.	2
50.60	51.35	0.75	Firebag	Argillaceous Limestone	Light green argillaceous limestone. 90% A.M. Rare light grey limestone nodule to 1 cm.	1
51.35	53.20	1.85	Firebag	Argillaceous Nodular Limestone	Light green argillaceous nodular limestone. 65% A.M. Core slighty fractured.	2
53.20	59.20	6.00	Firebag	Argillaceous Limestone	Medium green argillaceous limestone. 95% A.M. Fissile habit and darker colour indicate within 4 - 5 metres of base of Firebag. T.D. @ 59.20m.	1

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Audet Lake Drill Core Lithological Log

UWI: AA/11-13-098-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
74.90	82.30	7.40	McMurray	Oilsand	Black c.g. oilsands. Rare 3cm thick dark grey shale beds. Core appears structurally undistrurbed.	1
82.30	83.05	0.75	Prairie??	Dissolution breccia	Angular clasts of white dolomite, light green shale and chalky altered dolomite (?) in a light grey-green silty laminated matrix.	1
83.05	84.50	1.45	McMurray Slump	Oilsand	Black c.g. oilsands. Rare 3cm thick dark grey shale beds. Core appears structurally undistrurbed.	1
84.50	86.00	1.50	Prairie??	Dissolution breccia	Light grey to light brown laminated shale and siltstone. Bedding angle at 20 - 90 degrees, locally brecciated. No response to HCl.	1
86.00	86.55	0.55	Prairie??	Dolomite	Light tan to light grey massive to nodular dolomite.	1
86.55	87.70	1.15	Prairie??	Shale/siltstone	Light grey to light green non-calcareous shale/siltstone. Very difficult to discern bedding.	1
87.70	90.30	2.60	Prairie??	Dissolution breccia	Angular clasts of white dolomite and light green shale/siltstone to 3 cm in a light grey-green silty laminated matrix. No reaction to HCl	1
90.30	98.10	7.80	Prairie??	Dissolution breccia	Chaotic mixture of large (20cm) angular light tan dolomite clasts, finely laminated light grey to light brown silty shale and chalky white calcareous clasts. Dark brown bituminous laminations. Original laminated texture still observable in places. Strong responce to HCl throughout (except large dolomite clasts).	1
98.10	99.95	1.85	Methy	Bituminous Brecciated Dolomitic lms	Angular clasts of very light grey dolomitic lms to 5 cm in a black solid bitumen matrix. 75% solid bitumen.	1
99.95	100.50	0.55	Methy	Calcareous shale	light brown finely laminated calcareous shale. Occasional shell fragment. Bitumen stained lammina to 2 cm, becoming penetrative over bottom 15 cm.	1
100.50	103.00	2.50	Methy	Dolomite	Light tan to light grey massive to bedded dolomite. Bedding is often defined by horizontal angular polygonal clasts to 1 cm. Abundant bitumen staining throughout. T.D. @ 103.00m	3

Hammerstone corporation

Audet Lake Drill Core Lithological Log

UWI: AA/11-15-098-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
90.20	93.50	3.30	McMurray	Oilsand/Shale	Interbedded/brecciated c.g. oilsand and medium grey to light green shale. Bedding contorted and brecciated. Abundant cave intervals. Contact with underlying prairie picked at first non-oilsand bearing calcareous interval.	n.a.
93.50	95.85	2.35	Prairie	Brecciated Limestone	Contorted and brecciated mixture of white, medium grey and brown finely laminated limestone in a calcareous matrix. Minor bitumen staining. Finely laminated dark grey-brown bitumen stained limestone over bottom 15 cm.	1
95.85	97.00	1.15	Methy	Dolomite	White to very light blue fossiliferous dolomite. Abundant brachs and branching stoms? Bedding contorted and brecciated but fully healed. Moderate bitumen staining.	4
97.00	103.60	6.60	Methy	Massive Bitumen	Black massive solid bitumen hosted in strom(?) dolomite. Bitumen nearly completely obscures bedding in places. Bedding undisturbed.	2
103.60	106.40	2.80	Methy	Strom Dolomite	Light tan strom-bearing dolomite. Moderate bitumen staining.	5
106.40	107.70	1.30	Methy	Strom Dolomite	As above but with a very light blue colour.	5
107.70	110.30	2.60	Methy	Strom Dolomite	Light tan strom-bearing dolomite. Moderate bitumen staining. T.D. @ 110.30	5

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Audet Lake Drill Core Lithological Log

UWI: AA/11-19-098-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
n.a.	51.20	n.a.	McMurray	Siltstone	Pick from logs	n.a.
51.20	57.00	5.80	Firebag	Argillaceous Limestone	Medium green argillaceous lms with rare light grey lms beds to 1 cm. 85% A.M. No fossils observed. Lost core across contact with Slave Point.	2
57.00	57.80	0.80	Slave Point	Limestone	Light tan to light grey laminated lms. Moderate bitumen staining. Bedding horizontal.	4
57.80	58.05	0.25	Slave Point	Bituminous Breccia	Brecciated light tan to light grey lms healed with massive bitumen matrix	2
58.05	58.20	0.15	Slave Point	Limestone	Light light grey laminated lms. Moderate bitumen staining.	4
58.20	59.30	1.10	Slave Point	Nodular Limestone	Light grey nodular to massive lms with a light grey silty matrix	3
59.30	64.00	4.70	Slave Point	Limestone	Light tan to light grey laminated lms. Moderate bitumen staining. Abundant lost core. Bedding horizontal.	4
64.00	66.00	2.00	Slave Point	Brecciated Limestone	Brecciated Light grey to light tan laminated Lms. Healed in places with bitumen.	4
66.00	66.90	0.90	Slave Point	Bituminous Brecciated Limestone	Light grey to light tan brecciated laminated Lms. Heavy bitumen staining throughout.	4
66.90	70.50	3.60	Fort Vermilion	Brecciated Shale/Limestone	Angular to sub-rounded clasts of light grey lms and light grey shale in a matrix of light grey to light brown calcareous shale and siltstone. Intense bitumen staining throughout, often healing breccias.	1
70.50	73.50	3.00	Fort Vermilion?	Calcareous Shale	Finely laminated light grey to light brown (bituminous), to light green calcareous shale. Some soft sediment deformation and bedding inclined to 10 degrees, but otherwise little structural disturbance.	1
73.50	74.10	0.60	Fort Vermilion?	Bituminous Brecciated Limestone	Light grey to light tan brecciated laminated Lms. Heavy bitumen staining throughout. Similar to interval 66.00-66.90.	2
74.10	77.60	3.50	Watt Mountain	Calcareous Shale	Finely laminated light grey to light brown (bituminous), to light green calcareous shale with bituminous brecciated light grey lms intervals to 30cm. Some soft sediment deformation and bedding inclined to 10 degrees Shale is bright green over bottom metre. T.D. @ 77.60.	1

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Audet Lake Drill Core Lithological Log

UWI: AA/11-23-097-06W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
44.00	46.00	2.00	McMurray	Oilsand	Black c.g. oilsand. Abundant coal fragments and lamina.	n.a.
46.00	47.00	1.00	McMurray	Shale	Light grey silty shale. Rip-up clasts in c.g. oilsand over bottom 30 cm.	n.a.
47.00	50.85	3.85	McMurray	Oilsand	Black v.c.g. oilsand. Abundant coal fragments and lamina. Pebbly over bottom 40cm.	n.a.
50.85	58.50	7.65	Firebag	Interbedded Arg. Lms and Lms	Light grey lms and light green argillaceous limestone interbedded with bedding averaging 1-3 cm. Minor de-calcification over top 20cm. A.M. content = 40%. T.D. @ 58.50.	2

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Audet Lake Drill Core Lithological Log

UWI: AA/12-19-097-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
94.70	102.35	7.65	McMurray	Oilsand	Black m.g. to c.g. oilsand. V.c.g. 102.00-102.35	n.a.
102.35	106.05	3.70	McMurray	Oilsand/Shale	Black m.g. to c.g. oilsand and light grey shale. V.c.g. (1cm) 105.25-105.85.	n.a.
106.05	107.50	1.45	Slave Point?	Altered Lms	Medium brown to light grey altered lms. De-calcified over top 30cm. Two 1cm horizontal v.f.g.sulphide veins at 106.20. 5cm thick bleby v.f.g. Sulphide vein at 106.45.	1
107.50	108.10	0.60	Slave Point?	Altered Lms	Light grey to light brown bitumen saturated brecciated lms.	1
108.10	108.80	0.70	Slave Point?	Altered Lms	Light grey finely laminated dolomitic lms.	5
108.80	109.10	0.30	Slave Point?	Massive Sulphides	Black v.f.g. Sulphides. No rection to HCl.	1
109.10	110.30	1.20	Ft. Vermillion?	Dolomitic Lms	Light tan to light grey laminated dolomite and dolomitic lms, Bedding contorted	3
110.30	114.65	4.35	Watt Mt.	Shale	Light green to light tan finely laminated shale. Brecciated in places.	1
114.65	115.10	0.45	Watt Mt.	Brecciated Dolomite	Fully healed breccia comprising angular clast of light grey dolomitic lms in a light tan dolomitic lms matrix.	5
115.10	115.90	0.80	Watt Mt.	Shale	Light green to light tan finely laminated shale. Brecciated in places.	1
115.90	118.80	2.90	Prairie?	Dissolusion Breccia	Angular to sub-sounded clasts of light grey lms in a light grey fine grained calcareous matrix. T.D. @ 118.80.	1

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Audet Lake Drill Core Lithological Log

UWI: AA/13-24-098-06W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
51.00	53.50	2.50	McMurray	Oilsand	Black c.g. oilsands. Rare 3cm thick dark grey shale beds. Core appears structurally undistrurbed.	1
53.50	66.00	12.50	Prairie fm.	Dissolution breccia	Chaotic mixture of angular clasts of light tan to light grey dolomitic lms to 10cm, finely laminated light grey to light brown (bituminous) shale, chalky white limestone, along with light green to light grey/brown shale. Strong reaction to HCl throughout.	1
66.00	67.30	1.30	Methy	Dolomite	Light tan massive to finely laminated dolomite. Abundant bitumen staining.	4
67.30	67.50	0.20	Methy	Calcareous shale	light brown finely laminated calcareous shale. Occasional shell fragment.	1
67.50	68.35	0.85	Methy	Dolomite	Light tan laminated to brecciated dolomite. Abundant bitumen staining.	4
68.35	69.00	0.65	Methy	Calcareous shale	light brown finely laminated calcareous shale. Occasional shell fragment.	1
69.00	72.00	3.00	Methy	Dolomite	Light tan finely laminated to tabular strom-dominated dolomite. Abundant bitumen staining. T.D. @ 72.00m	4

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Audet Lake Drill Core Lithological Log

UWI: AA/13-29-097-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
80.60	85.05	4.45	McMurray	Oilsand	Black c.g. to v.c.g. oilsands (slightly flushed) with numerous medium grey shale clasts (contorted bedding). Very coarse grained over bottom 20cm with sub-rounded clasts to 5mm. 8cm f.g. pyrite bed @ 84.05.	n.a.
85.05	90.90	5.85	McMurray	Grey Shale	Light grey finely laminated to massive shale. Some contorted bedding. Rare coal fragment.	1
90.90	94.00	3.10	McMurray	Oilsand/Shale	Black m.g. oilsand interbedded with light grey shale. Bedding at 10-15 degrees. Abundant bioturbation.	1
94.00	105.25	11.25	McMurray	Oilsand	Black m.g. Oilsand. Occasional light grey shale lamina. Occasional f.g. pyrite nodule to 5 cm. V.c.g. over bottom metre with sub-rounded clasts to 1cm. Contact with Devonian is highly contorted.	1
105.25	115.60	10.35	Firebag	Breccia	Light grey-green calcareous matrix hosting angular clasts of light grey lms. De-calcified over top 2 metres. 75% A.M. Occasional 50cm interval showing original interbedded/nodular texture. Occasional 50cm interval of contorted dark grey shale and medium grey sand. T.D. @ 115.60m	1

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Audet Lake Drill Core Lithological Log

UWI: AA/15-05-098-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
72.30	78.80	6.50	McMurray	Oilsand	Black v.c.g. oilsand. Abundant coal clasts to 2 cm. Low angle cross bedding. Bedding undisturbed.	n.a.
78.80	82.90	4.10	McMurray	Oilsand/Shale	Contorted intermixing of v.c.g. oilsand and light grey shale with shale stringers often oriented vertically.	n.a.
82.90	83.45	0.55	McMurray	Oilsand	Black v.c.g. oilsand.	n.a.
83.45	87.15	3.70	Firebag	Argillaceous Limestone	Light green argillaceous limestone. Decalcification over top 20cm and bottom 30cm where in contact with oilsands. 85% A.M.	1
87.15	89.00	1.85	McMurray Karst Fill	Oilsand	Black v.c.g. oilsand. Abundant coal clasts to 2 cm. Bedding undisturbed, sub-horizontal. NOTE: this unit appears on the geophysical log, therefore not mis-labled core or some other core handling mistake.	n.a.
89.00	95.00	6.00	Firebag	Brecciated Argillaceous Nodular Limestone	Brecciated argillaceous nodular limestone, 60% A.M.	1
95.00	101.20	6.20	Firebag	Argillaceous Limestone	Medium green argillaceous limestone. Abundant inclined bedding and brecciation. 65% A.M.	1
101.20	104.40	3.20	Slave Point	Limestone	Brecciated light tan finely laminated limestone. Abundant bitumen in fractures. T.D. @ 104.40	4

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Audet Lake Drill Core Lithological Log

UWI: AA/15-10-098-05W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
75.00	77.70	2.70	McMurray	Oilsand	Black c.g. to v.c.g. oilsands. No structural deformation.	n.a.
77.70	80.40	2.70	McMurray	Oilsand/Shale	Black c.g. to v.c.g. Oilsands interbedded with medium grey shale in beds 20-50cm. Moderate soft sediment deformation towards bottom.	n.a.
80.40	84.30	3.90	McMurray	Shale	Medium grey to light green to light rose coloured shale. C.g. oilsand beds to 5cm. Moderate soft sediment deformation towards bottom.	n.a.
84.30	85.00	0.70	Prairie?	Calcareous Breccia	Healed breccia of contorted and broken well laminated light grey-blue to light tan lms	4
85.00	85.20	0.20	Prairie?	Calcareous Shale Breccia	Contorted lamina of light tan to light green calcareous shale.	1
85.20	85.60	0.40	McMurray Slump?	Oilsand	Black m.g. Oilsand with light grey shale lamina to 5mm. Bedding highly contorted. Highly bioturbated.	n.a.
85.60	88.20	2.60	Prairie?	Calcareous Shale Breccia	Moderately contorted lamina of white to light tan to light grey calcareous shale and siltstone. Irregular patches of m.g. Oilsand.	1
88.20	89.00	0.80	Prairie?	Dolomitic Lms	Very light tan finely laminated bituminous dolomitic lms. Bedding inclined at 20 degrees but mostly un-brecciated. Looks Slave Point like.	5
89.00	93.10	4.10	Prairie?	Calcareous Shale Breccia	Moderately contorted lamina of white to light tan to light grey calcareous shale and siltstone. Occasional angular clasts of light grey lms. Irregular patches of m.g. Oilsand.	1
93.10	94.40	1.30	Methy	Dolomite	Light tan massive to laminated dolomite. Heavy bitumen staining on pin-hole porosity and fractures.	5
94.40	94.70	0.30	Methy	Dolomite	Light tan laminated dolomite. No bitumen staining.	5
94.70	97.80	3.10	Methy	Dolomite	Light tan massive to laminated dolomite. Heavy bitumen staining on pin-hole porosity and fractures.	5
97.80	98.00	0.20	Methy	Dolomite	Light tan laminated laminated dolomite. No bitumen staining.	5
98.00	99.90	1.90	Methy	Dolomite	Light tan massive to laminated dolomite. Heavy bitumen staining on pin-hole porosity and fractures.	5
99.90	100.10	0.20	Methy	Dolomite	Light tan dolomite with abundant spherical blebs to 4mm, (branching stoms??)	5
100.10	100.80	0.70	Methy	Dolomite	Light tan massive to laminated dolomite. Heavy bitumen staining on pin-hole porosity and fractures.	5

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Audet Lake Drill Core Lithological Log

UWI: AA/16-16-098-06W4/0

From	To	Thickness	Unit	Lithology	Description	Aggregate Potential
59.60	64.75	5.15	McMurray	Oilsand	Black v.c.g. oilsand - subrounded clasts to 1 cm. Low angle cross bedding. Bedding undisturbed.	n.a.
64.75	66.55	1.80	Firebag	De-calcified Argillaceous Limestone	Light green de-calcified argillaceous limestone. Slight purple weathering over bottom 15 cm (less intense purple colour than lower de-calcified interval 78.20 - 80.50).	1
66.55	78.20	11.65	Firebag	Argillaceous Limestone	Light green argillaceous limestone (85% A.M.). Scattered light grey limestone beds to 1 cm. Core highly fractured, bedding angle 20 - 45 degrees, increasing downward.	1
78.20	80.50	2.30	Firebag	De-calcified Argillaceous Limestone	Purple weathering de-calcified argillaceous limestone. Bedding contorted but not brecciated, bedding angle 20 - 60 degrees. No sulphides observed. T.D. @ 80.60m.	1

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100.80	100.90	0.10	Methy	Dolomite	Light grey dolomite with abundant rip-up clasts/intraformational conglomerate.	5
100.90	102.00	1.10	Methy	Dolomite	Light tan massive to laminated dolomite. Heavy bitumen staining on pin-hole porosity and fractures.	5
102.00	103.00	1.00	Methy	Dolomite	Light grey finely laminated dolomite. Lamina show very fine undulations.	5
103.00	105.80	2.80	Methy	Dolomite	Light tan massive to laminated dolomite. Occasional branching and bedded Stroms. Heavy bitumen staining on pin-hole porosity and fractures. T.D. @ 105.80.	5