

# Summary Report on the Loop Ridge Property – 2013 Exploration Program

# **Michel Creek Coking Coal Project**



5,501,000N and 661,500E (UTM NAD 83)

CanAus Coal Ltd.

**Robert J. Morris, M.Sc., P.Geo. Albert G. (Glen) Stockey, B.Sc.** Moose Mountain Technical Services

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BC Geological Survey Coal Assessment Report 923





#### ASSESSMENT REPORT TITLE PAGE AND SUMMARY

TITLE OF REPORT: Geological and Drilling, Report on the Loop Ridge Coal Property

TOTAL COST: \$3,373,588.41

AUTHOR(S): Robert J. Morris, M.Sc., P.Geo. and Glen Stockey, B.Sc.

SIGNATURE(S):

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S): Mines Act Permit CX-5-019, Approval #13-1630615-0711, issued July 11, 2013

YEAR OF WORK: 2013 PROPERTY NAME: Michel Creek Coking Coal Project, Loop Ridge Property CLAIM NAME(S) (on which work was done): Coal Licence #418319

**COMMODITIES SOUGHT: Coal** 

MINING DIVISION: FORT STEELE NTS / BCGS: 82G/10W LATITUDE: 49° 38' 30" N LONGITUDE: 114° 46' 30" W (at centre of work) UTM Zone: 11 EASTING: 661,500m NORTHING: 5,501,000m

**OWNER(S):** CanAus Coal Limited

MAILING ADDRESS: #5000 Hwy 43, Sparwood, BC V0B 2G1

OPERATOR(S) [who paid for the work]: CanAus Coal Limited

**REPORT KEYWORDS: Jurassic/Cretaceous, Mist Mountain Formation, Coal** 

**REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS:**  Part of Section 2, part of Section 4, part of Section 5, Section 6, and Appendix D remain confidential under the terms of the Coal Act Regulation, and have been removed from the public version.

http://www.bclaws.ca/civix/document/id/complete/statreg/25 1 2004



### **Statement of Costs**

Name	Cost
ALS Coal Total	\$23,720.00
Birtley Coal & Minerals Testing Total	\$7,610.00
Boart Longyear Total	\$157,697.50
Borealis Environmental Consulting Total	\$6,402.17
Century Wireline Services Total	\$173,806.15
Cdn Culvert	\$9,708.00
Dillon Consulting Total	\$24,360.34
Elk Valley Environmental Services Total	\$51,515.00
Fiorentino Bros Contracting Ltd. Total	\$1,446.30
Good Earth Drilling Services Total	\$1,321,680.66
Guardian First Aid Service Total	\$99,414.00
Hurley Contracting Ltd. Total	\$984.00
Johnston Construction Total	\$34,719.91
Keefer Ecological Services Ltd. Total	\$3,385.00
Lorax Environmental Total	\$3,718.75
Lotic Environmental Total	\$1,640.00
Moose Mtn Technical Services Total	\$834,025.69
Nohels Group Total	\$149,968.39
Orbit Garant Drilling Total	\$150,178.89
Pearson & Associates Ltd Total	\$1,350.00
Rosenau Transport	\$5,204.00
Silenus Resources Management Inc. Total	\$144,733.30
Sphere Drilling Supplies Total	\$7,409.02
T E R Construction Total	\$80,149.01
Tembec Total	\$41,890.70
Tipe Mountain Total	\$2,269.87
Total Resource Managment Total	\$637.50
Trucut Logging Ltd. Total	\$32,677.00
Wilson's Drill & Blast Service Total	\$2,637.26
Grand Total	\$3,373,588.41



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## **1 SUMMARY**

The Michel Creek Coking Coal Project is comprised of three properties held by CanAus Coal Ltd. (CanAus) in the Michel Creek area. This report describes the exploration work conducted on the most northerly Loop Ridge property.

The Loop Ridge property was geologically mapped by Crow's Nest Pass Coal Company in 1964. Seven trenches, two adits, and at least 12 coal exploration drillholes were completed with this program. In 1969 the Crow's Nest Pass Coal Co. mined the McGillivray Pit at the north end of the Loop Ridge property. It is estimated that between 60,000t to 100,000t of coal was mined and trucked to the Michel preparation plant. In 1993 McGillivray Mining Ltd. completed an agreement with Tembec to mine at the old McGillivray site. Environmental studies were completed and a bulk sample permit obtained by the spring of 1995. The same year, approximately 20,000t of coal was mined and trucked to Teck's Elkview plant near Sparwood. In 1996, Fording Coal purchased McGillivray's property and rights from Tembec and mined a further 30,000t. The second bulk sample was trucked to the Coal Mountain mine, approximately 19km to the southeast. Fording Coal completed two drill programs on the entire Loop Ridge property, one in 1998 (18 holes) and another in 1999 (18 holes). A historic resource estimate by Crow's Nest Pass Coal Co. Ltd. indicated a total of 153.6Mt within 460m of surface with a further 13.3Mt between the depths of 460m and 760m.

The 2013 Exploration Program included 37 reverse circulation geology drillholes, four reverse circulation pilot drillholes for coring, and eight large diameter core holes on Loop Ridge. Samples were taken during the reverse circulation geology drilling which were used to map coal seam rank variability. The large diameter holes are currently being analyzed for detailed washability and coking coal characteristics. At the time of this report, laboratory testing is still ongoing, and coal quality data is being compiled. Therefore no coal quality data is included in this report.



# 2 INTRODUCTION AND SCOPE

The Loop Ridge property is located southeast of the town of Sparwood in the Michel Creek valley in the Front Ranges of the Rocky Mountains physiographic region. The property is accessed via the Crowsnest Highway (Highway 3) and Corbin Road. Logging and exploration trails are used for drilling access. Exploration in the area dates back to the late nineteenth century. In 1964 Crowsnest Pass Coal Co. explored the property and completed a test pit in 1969, mining between 60,000t and 100,000t. Further test mining was completed by McGillivray Mining and Fording Coal in 1995 and 1996 with another 50,000t of coal removed. Fording completed two drill programs on the property for a total of 36 holes.

The 2013 program was designed as an in-fill exploration program with closer spaced (125m to 300m) drilling and coal sampling. In 2013, 37 reverse circulation geology drillholes, four reverse circulation pilot drillholes for coring and eight large diameter core holes were drilled on the Loop Ridge property.



# **3 PROPERTY DESCRIPTION ACCESSIBILITY, CLIMATE, INFRASTRUCTURE**

The approximate centre point of the Loop Ridge property is 5,501,000N and 661,500E (UTM NAD 83). The Loop Ridge property, held by CanAus, represents one coal licence 418319 (Table 3-1). A location map shows information on the licence (Figure 3-1).

#### Table 3-1Loop Ridge Property; Coal Licence

**Noose Mountain** Technical Services

Coal Licence	Property Name	Approx. Area (ha)
418319	Loop Ridge	409

At this time there are no environmental liabilities identified on the property.

The Michel Creek Coking Coal Project is located southeast of the town of Sparwood in the Michel Creek valley, southeast British Columbia. Primary road access to the general area is via the Crowsnest Highway (Highway 3), which is an all-weather paved major highway connecting Sparwood with Fernie in the west and communities of the Crowsnest Pass in the east. The project area is accessed by driving east from Sparwood along Highway 3 for 11km and turning south onto Corbin Road. From Corbin Road, access to the Loop Ridge property is a further 4km.

The property is situated in the northwest trending Front Ranges of the Rocky Mountains physiographic region, which is characterized by a series of steep mountains running to the northwest, incised by west flowing streams. Figure 3-1 shows the Loop Ridge property as the red area. Elevations range from ~1,400m along Michel Creek to a height of 1,680m at Loop Ridge. Detailed location maps show information on licenses and applications in Figure 3-1 and Figure 3-2.

The Loop Ridge property is located between two open pit coal mines owned and operated by Teck Coal Ltd. Their Elkview Operations produce metallurgical coal ~10km north from the center of the Loop Ridge property and their Coal Mountain Operations produce both thermal and PCI coal ~19km south from the centre of the Loop Ridge property.

The climate is characterized by long, cold winters and short, cool to hot summers. In Sparwood, the temperature ranges from a record high of 39°C in the summer to a record low of -39.8°C in the winter, with a mean maximum in August of 23.6°C and a mean minimum in December of -11.6°C. Temperatures at the higher altitudes of the property would be slightly lower. The average amount of precipitation in Sparwood is 603mm with an equivalent of 248cm of that falling as snow. Loop Ridge generally has dense forest cover of pine and spruce; however, a portion of the property was logged within the past several years.

Surface rights are held by Tembec Inc. as part of their free-hold Tent Mountain Block 21. There are no oil and gas drilling activities on the property. However, the TransCanada Pipeline, which carries natural gas from wells in Alberta and transports it south across the Canada-United States border, cuts the property in half east to west.



Michel Creek Coking Coal Project – Loop Ridge CanAus



Figure 3-1 Regional Location Map



Michel Creek Coking Coal Project – Loop Ridge CanAus



Figure 3-2 Claim Map





### **4 GEOLOGY**

#### 4.1 Stratigraphy

The Jurassic-Cretaceous Kootenay Group occupies part of a northwest trending belt of predominantly non-marine rocks comprising part of the Rocky Mountain Foothills and Front Ranges of southwestern Alberta and southeastern British Columbia. The Kootenay Group extends from just north of the United States border in the south to the North Saskatchewan River in the north (Gibson, 1985).

The Kootenay Group of the Rocky Mountain Foothills and Front Ranges encompasses the stratigraphic interval between the Jurassic Fernie Group below and the Lower Cretaceous Blairmore Group above (Gibson, 1985).

Three formations are recognized within the Kootenay Group, including the basal sandstone, Morrissey Formation, the coal-bearing Mist Mountain Formation, and the upper Elk Formation, Figure 4-1.

Knowledge and definition of the stratigraphic column is necessary prior to any correlation and structural work. Figure 4-2 has been compiled from the drilling and interpretation of the geology to date at Loop Ridge. The section shows 20 coal seams within a section that is slightly more than 500m thick. The basal Morrissey Formation has not been identified in any of the holes drilled to date. On the east side of the Loop Ridge property, 22 drillholes have located limestone below the coal measures. The limestone represents the footwall side of the major, regional, Erickson normal fault which juxtaposes Mississippian limestone and the Kootenay Group. The fault has a minimum, west side down, displacement of 1,200m.

Drilling on Loop Ridge has identified 20 coal seams with an average cumulative thickness of 70m in a 504m section, with the coal representing approximately 14% of the section, generally typical for the area. Table 4-1 lists the seams, the number of intercepts, as well as the minimum, maximum, and mean thickness of each.



abic +1	Average Seam True Thermess, Loop Ruge Troperty									
Seam	Intercepts	Minimun (m)	Minimun (m) Maximum (m)							
21	5	1.17	3.60	1.8						
20	11	2.10	14.94	8.2						
19	12	1.27	9.91	3.7						
18	9	0.93	5.15	2.6						
17	9	1.23	8.25	3.8						
16	11	1.06	5.81	2.7						
15	20	0.86	11.23	3.8						
14	14	0.94	6.65	2.0						
13	11	0.58	2.44	1.6						
12	24	0.66	5.45	2.4						
11	35	0.91	10.02	3.6						
10	42	1.92	56.16	14.8						
9	7	0.84	4.68	2.5						
8	7	1.17	6.48	2.6						
7	4	1.06	2.06	1.7						
6	3	1.00	6.35	3.2						
5	4	0.89	4.12	2.5						
4	2	1.57	1.59	1.6						
3	1			1.4						
2	1			4.7						

#### Table 4-1 Average Seam True Thickness; Loop Ridge Property

Note: Seam thickness is net coal, excluding all rock partings and non-mineable coal (<1.0m)





Figure 4-1Stratigraphic Section



Michel Creek Coking Coal Project – Loop Ridge CanAus



Figure 4-2 Stratigraphic Column; Loop Ridge Property



#### 4.2 Structure

The East Kootenay coalfields lie in the Front Ranges of the Rocky Mountains which are characterized by north to northwest trending concentric folds and west dipping thrust faults. Tertiary normal faults, some of which are listric and probably occupy earlier thrust surfaces, are also a major feature.

The Crowsnest coalfield is a complex synclinorium in the Lewis thrust sheet. The major compressional features of the basin are the synclines linked en echelon by low-amplitude anticlines. A series of west dipping thrust faults dominate the structure of the north half of the basin. The major extensional feature is the Erickson fault system, which juxtaposes Mississippian limestone and the Kootenay Group. The fault has a minimum, west side down, displacement of 1,200m.

#### 4.3 Resource Model Sections

This section shows the interpreted coal seams which form the basis of the resource estimate.

The following cross-sections, Figure 4-4 to Figure 4-14, show the topography profile along the section line, the interpolated overburden thickness (marked as red at the top of the drillholes), the drillholes, the coal seams and their interpolated thickness, the interpreted faults (the limestone contact has been interpolated from drillhole intercepts to form a surface which separates the coalbearing from the Mississippian strata on the east), the 20:1BCM waste/tonne raw coal pit is outlined as a blue dashed line. Cross-section 28 (Figure 4-4) is at the south end of the project area and Cross-section 130 (Figure 4-14) is at the north end of the resource area. Figure 4-3, next, shows the locations of the Loop Ridge Cross-sections.



660000 661000 662000 Legend 1480 N Loop Ridge - C.L. 418319 Loop Ridge 20:1 LG Pit Outline Loop - 2013 Collar Surveys 1400 Loop Ridge 1440 YEAR, TYPE C.L. 418319 O 2013 RC 5503000 5503000 2013 Sonic 01A SECTION 130 5502950N A 2013 Core 03 0 03A X 2013 Pilot 03B SECTION 123 5502775N Historical Holes Upgraded Excavated Trail OSA O - New Excavated Trail 09B A9A 09 0 Forestry Road 1560 Highway 0 SECTION 109 5502425N - Local - Paved 11A 0 0 - POWER LINE - PIPELINE 5 134 400 0 SECTION 99 000 5502175N 5502000 5502000 SECTION 92 5RO 5502000N 158 15A 15C 500 SECTION 78 5501650N 0 C 1320 33B 330 SECTION 66 5501350N 36 36B 369 0 SECTION 56 0 5501100N 80 38 1000 5501000 03 1720 38B 1800 +5501 7 SECTION 47 5500875N 290 1400 1680 29A 1680 1840 31D 310 31B 31A SECTION 35 31D 5500550N Corbih Rd 1 SECTION 28 5500400N 1880 1920 chel Creek 5500000 5500000 0 500 750 250 Meters **CanAus Coal Limited** Michel Creek Coking Coal Project Loop Ridge Section Plan Date: 12/13/2013 Moose Mountain Technical Services CanAus **Coal Limited** 

Figure 4-3Loop Ridge Cross-section Location Plan



Michel Creek Coking Coal Project – Loop Ridge CanAus



Figure 4-4 Loop Ridge Cross-section 28



Figure 4-5 Loop Ridge Cross-section 35



Michel Creek Coking Coal Project – Loop Ridge CanAus



Figure 4-6 Loop Ridge Cross-section 47



Figure 4-7 Loop Ridge Cross-section 56



Michel Creek Coking Coal Project – Loop Ridge CanAus



Figure 4-8 Loop Ridge Cross-section 66



Figure 4-9 Loop Ridge Cross-section 78



Michel Creek Coking Coal Project – Loop Ridge CanAus



Figure 4-10 Loop Ridge Cross-section 92



Figure 4-11 Loop Ridge Cross-section 99



Michel Creek Coking Coal Project – Loop Ridge CanAus



Figure 4-12 Loop Ridge Cross-section 109



Figure 4-13 Loop Ridge Cross-section 123



Michel Creek Coking Coal Project – Loop Ridge CanAus



Figure 4-14 Loop Ridge Cross-section 130



# 5 EXPLORATION PROGRAM 2013

The 2013 CanAus drill program included 37 reverse circulation geology drillholes, four reverse circulation pilot drillholes for coring, and eight large diameter core holes on the Loop Ridge property (Table 5-1). Reverse circulation drilling was completed by both Drift Exploration Drilling Inc./Orbit Garant Drilling Services Inc., with a Schramm T450 drill and by Good Earth Drilling Services, with a Novamac Explor-Track drill. The sonic core drilling was completed by Boart Longyear, with an IR TH-100 drill; while Good Earth completed five large diameter core holes using a conventional mud-rotary drill.

#### Table 5-1 Summary of Drillhole Types and Depths Drilled - Loop Ridge Property

Drillhole Type	Number of Drillholes	Total Depth Drilled (m)
Reverse Circulation Geology	37	8,099.46
Reverse Circulation Pilot	4	527.7
Large Diameter Core	8	633.37

All reverse circulation holes were geophysically logged through the rods using the gammaneutron and gamma-density method. If the hole remained open after the rods were pulled, the holes were logged for hole deviation and gamma-density/compensated density. Geophysical logging was conducted by Century Geophysical Corporation.

Coal samples from the reverse circulation drilling were collected in 0.5m increments through each intersected coal zone and composited into representative seam samples using the down hole geophysical log. Each composite was cataloged and sent to either the Elk Valley Environmental Services Lab in Sparwood or to Birtley Labs in Calgary.

The three sonic cores and five conventional cores were drilled on sites with a pre-existing, geophysically logged pilot hole to ensure accurate field measurements of recovery. The cores were logged on site, split into representative seam plies, and sealed in plastic bags for shipment. The core samples were shipped to ALS Labs in Vancouver.

Access roads and drill sites were built by Nohels Group and TER Construction with minor assistance from Fiorentino Bros Contracting Ltd. Drillhole collar surveying was completed by Total Resource Management, Ray Biech.

The map in Figure 5-1 shows the location of the drillholes within the coal licence. Detailed collar locations are included in the Drillhole Data Appendix A.



Michel Creek Coking Coal Project – Loop Ridge CanAus



Figure 5-1 Loop Ridge Drillhole Location Map



The strike length of the Loop Ridge area is approximately 3.7km, while the width is approximately 1.4km.





# **6** SUMMARY AND CONCLUSIONS

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## 7 REFERENCES

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# **8 CERTIFICATE AND SIGNATURE PAGES**

### **CERTIFICATE OF QUALIFICATIONS: ROBERT J. MORRIS**

I Robert J. Morris, Principal Geologist, Moose Mountain Technical Services hereby certify that:

- 1. This certificate applies to the assessment report titled *Summary Report on the Loop Ridge Property –2013 Exploration Program - Michel Creek Coking Coal Project.*
- 2. I am independent of the CanAus and work as a consultant geologist.
- 3. That I graduated as a geologist from the University of British Columbia, Vancouver, with a degree of Bachelor of Science in 1973.
- 4. That I graduated as a geologist from Queen's University, Kingston, Ontario, with a degree of Master of Science in 1978.
- 5. That I am a member in good standing of the Association of Professional Engineers and Geoscientists of the Province of British Columbia (Registration #18,301).
- 6. That I have been involved in the mining exploration projects since my graduation in 1973.
- 7. That I am familiar with the subject area from fieldwork since 1973 and that I personally wrote and supervised the preparation of this report.

### Dated this 13<sup>th</sup> day of March 2014; in Fernie, British Columbia

"Signed and Sealed"

R.J. Morris, M.Sc., P.Geo.



#### **CERTIFICATE OF QUALIFICATIONS: Albert G. Stockey**

# I Albert G. (Glen) Stockey, Geologist-in-Training, Moose Mountain Technical Services hereby certify that:

- 1. This certificate applies to the assessment report titled *Summary Report on the Loop Ridge Property –2013 Exploration Program - Michel Creek Coking Coal Project.*
- 2. I am independent of the CanAus and work as a consultant geologist.
- 3. That I graduated as a geologist from the University of Calgary, with a degree of Bachelor of Science in 2011.
- 4. That I am a member in good standing of the Association of Professional Engineers and Geoscientists of the Province of Alberta (Registration #189,749).
- 5. That I have been involved in the mining exploration projects since my graduation in 2011.
- 6. That I am familiar with the subject area from fieldwork since 2013 and that I personally wrote and supervised the preparation of this report.

### Dated this 13<sup>th</sup> day of March 2014; in Fernie, British Columbia

"Signed and Sealed"

Albert G. (Glen) Stockey, B.Sc.



# **Appendix A** Drillhole Data

Moose Mountain — Technical Services —

Hole ID	Easting	Northing	Elev.	Azimuth	Dip	Seam	From	То	Thickness
LR13-01A	661322.122	5502969.042	1366.729	70	-55	10	34.36	36.80	2.44
LR13-01A						10	36.92	40.99	4.07
LR13-01A						10	41.34	46.90	5.56
LR13-01A						10	47.12	47.72	0.60
LR13-01A						6	91.41	91.80	0.39
LR13-01A							124.63	125.06	0.43
LR13-01A							126.00	126.54	0.54
LR13-01A						5	126.73	128.84	2.11
LR13-01A						5	129.10	129.52	0.42
LR13-01A						5	129.66	130.26	0.60
LR13-01A							130.67	130.95	0.28
LR13-03	661193.675	5502762.173	1351.807	90	-50	11	34.50	36.00	1.50
LR13-03						12	74.00	77.50	3.50
LR13-03						11	133.50	139.50	6.00
LR13-03						11	142.20	144.50	2.30
LR13-03						10	208.80	210.20	1.40
LR13-03						10	211.50	213.50	2.00
LR13-03						10	216.50	218.00	1.50
LR13-03						10	219.80	221.50	1.70
LR13-03						10	223.00	224.00	1.00
LR13-03						10	225.00	229.50	4.50
LR13-03A	661349.453	5502761.301	1369.511	90	-55	10	46.62	48.38	1.76
LR13-03A						10	48.72	56.14	7.42
LR13-03A						10	56.24	60.48	4.24



Hole ID	Easting	Northing	Elev.	Azimuth	Dip	Seam	From	То	Thickness
LR13-03A							61.80	62.52	0.72
LR13-03A							77.17	77.61	0.44
LR13-03A						5	94.80	96.04	1.24
LR13-03A						4	110.92	113.13	2.21
LR13-03A							113.24	113.44	0.20
LR13-03A						3	127.25	128.69	1.44
LR13-09	661166.037	5502564.611	1366.906	90	-55	13	77.40	80.00	2.60
LR13-09						12	87.80	88.90	1.10
LR13-09						11	106.00	107.00	1.00
LR13-09						12	142.50	143.20	0.70
LR13-09						11	192.70	194.00	1.30
LR13-09						11	195.50	196.50	1.00
LR13-09A	661427.034	5502575.369	1437.542	90	-55	10	86.46	87.20	0.74
LR13-09A						10	87.60	89.12	1.52
LR13-09A						10	89.38	94.58	5.20
LR13-09A						10	94.71	94.94	0.23
LR13-09A						10	95.36	98.68	3.32
LR13-09A						10	98.82	101.04	2.22
LR13-11	661300.649	5502392.225	1402.192	90	-70		21.33	21.73	0.40
LR13-11							22.09	22.40	0.31
LR13-11						12	32.04	33.12	1.08
LR13-11						11	75.76	76.50	0.74
LR13-11						11	77.78	78.72	0.94
LR13-11						10	131.24	131.50	0.26
LR13-11						10	131.88	136.52	4.64



Hole ID	Easting	Northing	Elev.	Azimuth	Dip	Seam	From	То	Thickness
LR13-11						10	136.84	140.34	3.50
LR13-11						10	141.28	143.44	2.16
LR13-11						10	143.90	144.14	0.24
LR13-11						10	144.30	145.19	0.89
LR13-11						10	147.18	148.88	1.70
LR13-11							149.99	150.19	0.20
LR13-11A	661428.965	5502420.491	1437.245	90	-55	11	10.54	12.42	1.88
LR13-11A							12.84	13.72	0.88
LR13-11A						10	74.68	78.31	3.63
LR13-11A						10	78.44	79.46	1.02
LR13-11A						10	79.67	83.80	4.13
LR13-11A						10	84.18	84.82	0.64
LR13-11A							86.18	86.58	0.40
LR13-11B	661051.201	5502399.051	1364.534	90	-55	13	66.50	68.00	1.50
LR13-11B						12	85.50	87.00	1.50
LR13-11B						11	177.75	179.50	1.75
LR13-11B						10	213.80	221.20	7.40
LR13-11B						10	222.75	224.30	1.55
LR13-11B						10	226.50	228.00	1.50
LR13-11B						10	229.60	237.30	7.70
LR13-13	661213.182	5502176.139	1414.9	90	-65	11	66.20	67.30	1.10
LR13-13						11	69.20	74.30	5.10
LR13-13						10	152.80	158.00	5.20
LR13-13						10	159.00	160.00	1.00
LR13-13						10	162.50	167.00	4.50



Hole ID	Easting	Northing	Elev.	Azimuth	Dip	Seam	From	То	Thickness
LR13-13						11	216.90	225.00	8.10
LR13-13A	661446.71	5502227.653	1458.465	90	-50	10	53.90	56.20	2.30
LR13-13A						10	56.60	58.80	2.20
LR13-13A						10	71.50	74.80	3.30
LR13-15A	661314.4	5501927.181	1485.102	90	-55		69.21	69.44	0.23
LR13-15A							71.90	72.06	0.16
LR13-15A						99	72.34	73.14	0.80
LR13-15A						8	91.50	93.50	2.00
LR13-15A							122.30	123.00	0.70
LR13-15A						7	124.00	126.00	2.00
LR13-15A						6	176.50	177.50	1.00
LR13-15A						5	189.50	191.00	1.50
LR13-15A						12	211.00	213.20	2.20
LR13-15A						12	213.50	214.80	1.30
LR13-15A						11	222.80	225.50	2.70
LR13-15A						11	225.70	227.10	1.40
LR13-15B	660913.343	5501924.828	1396.556	90	-60	19	16.38	21.06	4.68
LR13-15B						18	48.20	49.22	1.02
LR13-15B						17	82.10	85.26	3.16
LR13-15B							89.84	90.46	0.62
LR13-15B							95.82	96.53	0.71
LR13-15B						16	96.87	98.13	1.26
LR13-15B						15	133.08	135.24	2.16
LR13-15B						14	139.42	141.04	1.62
LR13-15B							202.62	202.86	0.24



Hole ID	Easting	Northing	Elev.	Azimuth	Dip	Seam	From	То	Thickness
LR13-15B							230.80	231.14	0.34
LR13-15C	660772.535	5501914.091	1355.559	90	-75	20	84.72	86.48	1.76
LR13-15C						20	86.66	95.06	8.40
LR13-15C						20	95.18	95.88	0.70
LR13-15C						20	96.20	97.30	1.10
LR13-15C						20	97.58	100.02	2.44
LR13-15C						20	100.38	104.74	4.36
LR13-15R	661053.059	5501996.933	1406.01	90	-60	15	20.82	22.22	1.40
LR13-15R						15	22.62	23.64	1.02
LR13-15R						15	24.34	25.58	1.24
LR13-15R							30.80	31.22	0.42
LR13-15R						99	38.30	39.30	1.00
LR13-15R							59.26	59.76	0.50
LR13-15R							60.26	61.02	0.76
LR13-15R							65.46	66.28	0.82
LR13-15R						14	70.78	72.50	1.72
LR13-15R						13	124.52	125.66	1.14
LR13-15R							126.50	126.66	0.16
LR13-15R							128.34	128.48	0.14
LR13-15R						12	131.72	132.36	0.64
LR13-15R						12	132.90	135.16	2.26
LR13-15R							147.80	148.02	0.22
LR13-15R						11	150.04	151.80	1.76
LR13-15R						10	160.70	161.86	1.16
LR13-15R						10	162.30	169.38	7.08
LR13-15R						10	170.72	172.48	1.76



Hole ID	Easting	Northing	Elev.	Azimuth	Dip	Seam	From	То	Thickness
LR13-15R						10	176.28	181.88	5.60
LR13-15R						10	182.42	187.46	5.04
LR13-15R						10	188.70	190.64	1.94
LR13-15R						10	190.88	196.40	5.52
LR13-50C	660969.782	5501660.434	1374.766	90	-55	16	18.80	19.40	0.60
LR13-50C						16	19.60	23.80	4.20
LR13-50C							28.10	28.60	0.50
LR13-50C						15	32.40	33.00	0.60
LR13-50C						15	33.30	34.20	0.90
LR13-50C						14	69.80	72.50	2.70
LR13-01	661169.239	5502904.306	1342.36	90	-70	10	83.50	89.00	5.50
LR13-01						10	90.00	96.00	6.00
LR13-01						10	99.00	101.50	2.50
LR13-01						10	207.50	228.50	21.00
LR13-03B	661011.814	5502766.338	1334.265	90	-65		51.32	51.78	0.46
LR13-03B						14	57.50	60.52	3.02
LR13-03B						13	210.92	213.26	2.34
LR13-03B						12	217.40	218.90	1.50
LR13-03B						11	222.00	225.20	3.20
LR13-03B						10	266.00	288.10	22.10
LR13-09B	661001.699	5502580.39	1344.728	90	-60		46.78	47.06	0.28
LR13-09B							113.28	113.44	0.16
LR13-09B							118.32	119.00	0.68
LR13-09B						15	125.62	128.22	2.60
LR13-09B						14	163.00	165.00	2.00



Hole ID	Easting	Northing	Elev.	Azimuth	Dip	Seam	From	То	Thickness
LR13-09B						14	167.00	170.00	3.00
LR13-09B						13	205.20	206.30	1.10
LR13-09B						12	220.20	221.00	0.80
LR13-09B						11	233.10	234.20	1.10
LR13-09B						10	275.20	282.00	6.80
LR13-09B						10	283.20	287.10	3.90
LR13-17	660948.129	5502180.002	1355.794	90	-60		19.54	19.72	0.18
LR13-17						16	36.10	37.94	1.84
LR13-17						15	62.06	62.74	0.68
LR13-17						15	63.44	64.86	1.42
LR13-17						15	65.84	66.66	0.82
LR13-17							70.18	70.62	0.44
LR13-17						99	78.94	80.08	1.14
LR13-17							105.14	105.42	0.28
LR13-17							113.40	114.06	0.66
LR13-17						14	117.98	119.82	1.84
LR13-17							135.22	135.54	0.32
LR13-17							136.10	136.14	0.04
LR13-17							137.26	137.40	0.14
LR13-17							138.88	139.18	0.30
LR13-17						13	139.48	141.62	2.14
LR13-17						12	193.30	196.00	2.70
LR13-17						11	220.40	222.90	2.50
LR13-17						11	224.50	225.60	1.10
LR13-50D	660736.569	5501607.97	1351.896	90	-70		29.50	30.00	0.50
LR13-50D						21	87.30	88.80	1.50



Hole ID	Easting	Northing	Elev.	Azimuth	Dip	Seam	From	То	Thickness
LR13-50D						20	119.00	124.10	5.10
LR13-50D							129.20	130.10	0.90
LR13-50D						15	270.00	276.50	6.50
LR13-50D						14	282.50	283.70	1.20
LR13-50D						13	286.30	288.80	2.50
LR13-50D						12	313.30	315.60	2.30
LR13-33C	660706.936	5501374.476	1355.54	90	-75		9.84	10.22	0.38
LR13-33C						20	12.02	12.54	0.52
LR13-33C						20	12.62	21.00	8.38
LR13-33C						19	50.66	52.82	2.16
LR13-33C						19	53.28	53.52	0.24
LR13-33C						18	85.00	89.80	4.80
LR13-33C						99	95.00	96.40	1.40
LR13-33C							103.30	104.10	0.80
LR13-33C						99	105.70	107.50	1.80
LR13-33C						99	138.00	140.20	2.20
LR13-33C						17	142.80	145.20	2.40
LR13-33C							250.00	250.60	0.60
LR13-33C						16	256.00	260.20	4.20
LR13-33C						15	267.00	273.00	6.00
LR13-33	660915.283	5501360.072	1405.158	120	-60	18	56.78	61.26	4.48
LR13-33						17	76.46	78.44	1.98
LR13-33						16	102.50	106.12	3.62
LR13-33							108.06	108.40	0.34
LR13-33						99	113.10	114.10	1.00
LR13-33						15	127.80	129.60	1.80



Hole ID	Easting	Northing	Elev.	Azimuth	Dip	Seam	From	То	Thickness
LR13-33						14	134.00	135.60	1.60
LR13-33						13	142.50	143.60	1.10
LR13-33						12	148.00	149.50	1.50
LR13-33B	661121.246	5501409.427	1416.042	90	-60	10	152.84	162.16	9.32
LR13-33B						10	162.36	175.80	13.44
LR13-33B							189.88	190.24	0.36
LR13-36C	660793.652	5501176.483	1424.82	90	-65		51.14	51.48	0.34
LR13-36C							72.82	73.06	0.24
LR13-36C						20	80.56	87.32	6.76
LR13-36C						20	87.62	93.74	6.12
LR13-36C						20	93.88	95.22	1.34
LR13-36C							109.08	109.70	0.62
LR13-36C							115.68	115.82	0.14
LR13-36C							115.88	116.12	0.24
LR13-36C						19	128.60	130.54	1.94
LR13-36C						18	159.42	161.98	2.56
LR13-36C							166.00	166.02	0.02
LR13-36C							167.10	167.22	0.12
LR13-36C							172.04	172.46	0.42
LR13-36C						15	176.46	177.90	1.44
LR13-36B	660996.776	5501227.135	1439.758	90	-55		35.60	36.50	0.90
LR13-36B						13	62.10	63.80	1.70
LR13-36B						12	97.40	100.40	3.00
LR13-36B							104.75	105.70	0.95
LR13-36B							108.55	108.95	0.40



Hole ID	Easting	Northing	Elev.	Azimuth	Dip	Seam	From	То	Thickness
LR13-36B							225.85	226.75	0.90
LR13-36B						11	253.67	260.30	6.63
LR13-36	661207.715	5501245.936	1459.959	90	-60	99	95.00	96.00	1.00
LR13-36						10	119.05	126.14	7.09
LR13-36						10	128.10	136.19	8.09
LR13-36						9	169.12	171.10	1.98
LR13-36							219.90	220.75	0.85
LR13-36						10	235.65	239.50	3.85
LR99-03PILOT	661407.324	5501096.263	1496.782	123	-90	11	16.06	16.56	0.50
LR99-03PILOT						11	16.86	18.52	1.66
LR99-03PILOT						11	19.02	20.58	1.56
LR99-03PILOT						11	21.16	21.34	0.18
LR99-03PILOT						11	21.84	22.66	0.82
LR99-03PILOT						11	23.02	25.78	2.76
LR99-03PILOT							28.04	28.40	0.36
LR99-03PILOT						10	108.30	108.44	0.14
LR99-03PILOT						10	110.60	111.38	0.78
LR99-03PILOT						10	111.92	121.84	9.92
LR99-03PILOT						10	122.12	122.94	0.82
LR99-03PILOT						10	124.38	130.28	5.90
LR99-03PILOT						10	130.40	135.72	5.32
LR99-03PILOT						10	136.70	137.28	0.58
LR99-03PILOT						10	138.84	147.30	8.46
LR99-03PILOT						10	147.56	148.66	1.10
LR99-03PILOT						10	149.76	151.38	1.62



Hole ID	Easting	Northing	Elev.	Azimuth	Dip	Seam	From	То	Thickness
LR99-03PILOT						10	151.50	151.54	0.04
LR13-15CPILOT	660750.801	5501845.704	1357.33	21	-90		16.44	16.54	0.10
LR13-15CPILOT							28.50	28.66	0.16
LR13-15CPILOT							52.08	52.30	0.22
LR13-15CPILOT						21	52.64	54.64	2.00
LR13-15CPILOT						20	142.38	142.54	0.16
LR13-15CPILOT						20	142.86	144.66	1.80
LR13-15CPILOT						20	145.60	148.12	2.52
LR13-3APILOT	661358.704	5502757.165	1369.587	156	-90	10	62.02	68.48	6.46
LR13-3APILOT						10	69.32	72.20	2.88
LR13-3APILOT						10	72.64	75.66	3.02
LR13-29D	660868.513	5500800.323	1505.027	90	-65	21	9.40	9.60	0.20
LR13-29D						21	9.80	10.00	0.20
LR13-29D						21	10.20	10.60	0.40
LR13-29D						21	10.70	10.90	0.20
LR13-29D						20	53.20	67.70	14.50
LR13-29D						19	124.88	129.64	4.76
LR13-29D						19	130.04	130.44	0.40
LR13-29D						17	162.08	163.34	1.26
LR13-29D							168.24	169.08	0.84
LR13-29D						16	176.42	176.72	0.30
LR13-29D						16	177.34	178.56	1.22
LR13-31D	660936.107	5500633.127	1519.888	90	-65		27.22	27.32	0.10
LR13-31D						20	42.62	52.14	9.52
LR13-31D						19	85.58	85.70	0.12



Hole ID	Easting	Northing	Elev.	Azimuth	Dip	Seam	From	То	Thickness
LR13-31D						19	86.60	94.80	8.20
LR13-31D						19	95.18	95.50	0.32
LR13-31D							140.08	140.24	0.16
LR13-31D							174.60	175.40	0.80
LR13-31D							177.80	178.40	0.60
LR13-31D							183.18	183.64	0.46
LR13-31D							184.48	185.20	0.72
LR13-31D						16	196.70	197.76	1.06
LR13-31D							203.76	203.88	0.12
LR13-31D						15	210.16	211.74	1.58
LR13-31D							231.54	231.86	0.32
LR13-31D							234.10	235.04	0.94
LR13-31D							237.82	238.20	0.38
LR13-31D						14	241.96	243.42	1.46
LR13-31B	661305.782	5500582.623	1638.349	100	-50	15	34.72	36.16	1.44
LR13-31B						15	36.46	37.72	1.26
LR13-31B						15	38.66	38.86	0.20
LR13-31B						15	39.68	42.26	2.58
LR13-31B							45.32	45.80	0.48
LR13-31B							49.96	50.08	0.12
LR13-31B							53.64	53.86	0.22
LR13-31B						10	249.42	258.50	9.08
LR13-31B						10	259.55	261.10	1.55
LR13-31B						9	265.50	268.00	2.50
LR13-31A	661428.438	5500566.647	1634.369	90	-50	10	157.02	159.78	2.76
LR13-31A						10	160.90	161.72	0.82



Hole ID	Easting	Northing	Elev.	Azimuth	Dip	Seam	From	То	Thickness
LR13-31A						10	162.28	165.62	3.34
LR13-31A						10	165.84	166.90	1.06
LR13-31A						10	168.18	176.10	7.92
LR13-31A						10	177.22	179.54	2.32
LR13-31A						10	179.58	180.96	1.38
LR13-31A						10	181.84	183.90	2.06
LR13-31A						10	184.04	185.04	1.00
LR13-31A						10	185.14	185.26	0.12
LR13-38B	661003.643	5500993.345	1511.898	90	-55		12.74	12.84	0.10
LR13-38B							13.62	14.28	0.66
LR13-38B						18	35.18	36.46	1.28
LR13-38B						19	67.34	69.14	1.80
LR13-38B						19	69.42	72.52	3.10
LR13-38B						17	100.52	101.02	0.50
LR13-38B						17	101.10	102.26	1.16
LR13-38B						17	102.48	106.52	4.04
LR13-38B							114.18	114.86	0.68
LR13-38B							119.08	119.74	0.66
LR13-38B						16	125.02	127.66	2.64
LR13-38B							178.82	179.02	0.20
LR13-31C	661099.783	5500590.69	1605.467	90	-50	17	76.04	84.46	8.42
LR13-31C						99	113.76	115.58	1.82
LR13-31C						16	122.08	122.76	0.68
LR13-31C						16	123.14	123.36	0.22
LR13-31C						16	123.48	127.94	4.46
LR13-31C							132.94	133.10	0.16



Hole ID	Easting	Northing	Elev.	Azimuth	Dip	Seam	From	То	Thickness
LR13-31C						99	136.08	137.44	1.36
LR13-31C						15	170.02	172.22	2.20
LR13-31C						15	172.46	172.98	0.52
LR13-31C						15	174.80	179.30	4.50
LR13-31C						15	179.44	181.26	1.82
LR13-31C							187.30	187.48	0.18
LR13-31C							189.58	189.86	0.28
LR13-31C						99	193.22	194.94	1.72
LR13-29A	661379.091	5500738.758	1570.61	90	-50		56.84	57.24	0.40
LR13-29A							68.48	68.88	0.40
LR13-29A							71.82	72.06	0.24
LR13-29A						11	81.88	84.40	2.52
LR13-29A						10	158.66	166.94	8.28
LR13-29A							171.00	171.14	0.14
LR13-29A							171.54	171.64	0.10
LR13-36A	661449.611	5501314.271	1491.721	90	-55	10	5.00	7.20	2.20
LR13-36A						8	76.90	80.00	3.10
LR13-38C	660821.589	5501054.883	1462.275	90	-65	21	43.00	44.00	1.00
LR13-38C						21	45.00	46.60	1.60
LR13-38C						20	88.60	99.60	11.00
LR13-38C						19	118.60	121.00	2.40
LR13-38C						18	154.10	156.80	2.70
LR13-38C							161.05	161.46	0.41
LR13-38C							165.00	165.35	0.35
LR13-38C							167.30	167.55	0.25



Hole ID	Easting	Northing	Elev.	Azimuth	Dip	Seam	From	То	Thickness
LR13-38C						15	172.20	173.20	1.00
LR13-38A	661448.908	5501019.719	1520.855	90	-50	10	51.00	60.40	9.40
LR13-38A						9	70.10	71.80	1.70
LR13-38	661253.001	5501035.062	1511.601	90	-55		77.09	77.48	0.39
LR13-38						12	124.10	125.20	1.10
LR13-38						12	128.50	130.00	1.50
LR13-38						11	143.00	147.00	4.00
LR13-38						10	205.00	207.50	2.50
LR13-38						10	208.92	209.08	0.16
LR13-38						10	209.78	210.15	0.37
LR13-38						10	211.60	216.40	4.80
LR13-38						10	217.40	219.00	1.60
LR13-38						10	220.85	221.30	0.45
LR13-38						10	224.80	227.30	2.50
LR13-31DPILOT	660937.486	5500634.308	1519.988	90	-90	20	35.40	45.52	10.12
LR13-31DPILOT						19	100.35	104.05	3.70
LR13-31DPILOT							105.00	105.30	0.30



# Appendix B Geophysical Logs

Geophysical logs are available upon request from the Ministry of Energy and Mines of British Columbia Assessment Reports division.



# Appendix C Core Logs



Culture -	Mo	oose Technik	Mo	unto	ain	Corehole Log		<u>I</u> Ho	late:		Oc	t. 2-3	/ 20 -01A	013	
1							10								
Loca	ation: NAD83	E	Lat.	6613	322.12	/* N Long /* W Northing: 5502969.04 Elev: 1366.7:	3	-	DLS	Qtr	Lsd	Sec	Twp	Rge	Mer
Cored	Interva	- Units	(m)	Rec	overd	Description	lori	entatio			Sar	Sar	w		ELog
BoxCu	From	То	Toti.	Sec.	Totl.	Lithology, Color, Size, Texture, Hardness, Shearing, Contacts	No	Joint	Bedding	(%)	nple II	npie II	eam	(%)	(m)
1 1		0.91	0.91		0.91	Bedding Angle, Alteration, Wetness, Contamination		S			0.5	0			
_				0.91		Siltstone: overburden, first cut = 3' due to 7' stick up	-						_		
2 2	0.91	3.96	3.05		3.05										
				1.52		Siltstone: light brown pulverized hosting angular grey fragments - hard siltstone									
				1.02			1								
3				1.53		onitstorie: as above, calcite verniets in rock tragments	+	-			#2384	(1.0m	/		
4 3	3.96	7.01	3.05	1.50	3.05	Siltetage: an above	-	-							
-				1.52		Sinstone: as above	+	-		-			-		
5				1.50		Siltstone: as above, however last 60 cm rocky not pulverized									
			-	1.53	-		-								
6 4	7.01	10.06	3.05	1.52	3.05	Siltstone: as above, mixture of pulverized and caked	-	-			-	-			
			_	TIOL			1								
7				1.53		Siltstone: very fine grain rock fragments <15% pulverized material angular - subangular siltstone fragments					#2384	8 (1.0m	)		
8 5	10.06	13.11	3.05		3.05		+	-	-						
				1.52		Siltstone: light brown >90% pulverized rock powder some coarser fragments - dry									
9						Siltstone: as above last 60 cm muddy, abundant rock	+	-				-			
	-			1.53	-	inaginanta thiooghoot	+	-				-			
10 6	13.11	16.16	3.05	0.33	2.72	Core Loss: no recovery	-	-						$\mathbb{N}$	
-	-			0.00			-							$\wedge$	
				1.19		Carbonaceous Shale: dark brown muddy - rocky, noticeably darker colour muddy matrix hosting dark gre shaley fragments - "smelly" organic smell	y				#2384	9 (1.0m	)		
11		-				Carbonaceous Shale: as above very sharp lower contain	t	-		-	-	-		-	
	-		_	0.96		defined by abrupt colour change	-	-	-	-	-	-		-	
			_	0.57		Siltstone: light brown pulverized as above	-								
12 7	16.16	19.21	3.05		1,99		-	-		-	-	-		-	
	10.10	TOTAL 1	0.00	0.76		Core loss: no recovery								V	
						Siltstone: rock, very fine grain broken solid rock calcite	+	-		-	-	0.00		P	-
				0.76		veinlets throughout, pyrite - marcasite in veinlets	+	-		-	#2385	n0.1) U	1	-	
13	-			0.30		Core loss: no recovery	+							×	
						Shale: Siltetone? - dark brown muddy with gray siltetor	e			-					
				1.23		fragments but also darker grey shale - fissile fragments	1	-							
14	8 19.21	22.26	3.05		1.23		+	+-		-	-	-	-		-
				1.52		Core loss: no recovery	1							XI	
15	-			0.30		Core loss: no recovery	+	-		-	-	-		$\langle \rangle$	1-
						Olivations and an above of the last the last	-	-			-		-		
				1.23		planes and in calcite veinlets									



E.	pul	Mo	oose	Mo	unto	ain	Corehole	Log			D	ate:		Oc	t. 2-3	/ 20	013	
-	~		Techni	cal Ser	vices						Hol	e No:			LR13	-01A	•	
L	ocat	tion:		Lat.		°/'	/" N Long, º/	_'/	_* W			DLS	Qtr	Lsd	Sec	Twp	Rge	Mer
UT	MN	AD83	Ea	asting:	6613	22.12	Northing: 5502969.04	Elev:	1366.73	-			-	(0.0	0		-	FLog
Cor	red	Interva	- Units	s(m)	Rec	overd	Descriptio	n		Orie	Intation	(°TCA)	RQD	Geoch	Coa	Sear	Rec.	Depth
Зох	Cut	From	То	Totl.	Sec.	Totl.	Bedding Angle, Alteration, Wet	ness, Snear ness, Conta	ng, contacts, mination	No.	S	Bedding	(70)	e ID	0	3	(70)	(m)
_					0.62		Siltstone: brown - grey muddy - o siltstone fragments	akey conta	aining grey		-							
					0.40		Silt: mudstone? Grey very distinct rock fragments	tive grey p	owder with									
					0.50		Shale: light brown pulverized pov fragments	vder with fi	ssile shale									
17					1.52		Shale: light brown pulverized with fragments	abundant	fissile shale									
					1.00													
18	10	25.31	28.36	3.05	1.52	3.05	Core loss: no recovery; * driller h water i.e., in through top of core be explained by very fine shales, completely pulverized by sonic b	as been dri barrel the N ' muds bei it and then	lling with IC zones can ng washed out									
19					1.53		Siltstone: Shale, rock more fissile pyrite throughout on bedding pla fragmented than massive siltstor	than abov nes more t e entries a	e, dark grey, proken bove					#0000	1 (1.0m	n)		
20	11	28.36	31.41	3.05		3.05				+					-	-		
					0.24		Carbonaceous Shale: dark brown fissile shale fragments	n mud with	dark grey									
					1.28		Shale: light brown pulverized ma dark grey rock fragments - dry	rix with fis	sile grey -									
21	-				1.53		Shale: as above, more rocky! - p	rite abund	ant - dry					#0000	2 (1.0m	1)		
22	12	31.41	34.46	3.05		3.05				+	-		-	-	-		-	-
	12	0	0.1.10	0.00	1.52		Shale: light - medium brown con	pletely pul	verized - dry									
23				-	0.47		Shale: as above - dry		-	-	-		3	#0000	3 (1.0m	1)	-	
					0.86		Coal: "shaley", interbedded blad carbonaceous shale - dry	k shiny co	al with brown									34.36
	-				0.20		Coal: black, shiny - pulverized an	id dry							1			
24	12	34 46	37.51	3.05		3.05				-			-	-				-
2.4		04.40	07.01	0.00	0.77	0.00	Coal: black, massive crumbly ap within dull matrix - dry	prox. 10%	shiny vitrinite						(4.0m)	oper		
					0.57		Coal: carbonaceous shale partin pulverized distinctive colour cha	g - brown t nges withir	o black i - dry						R1A-001	10 - Up		
					0.10		Coal: as above - dry			-	-	-		-	-			-
					0.18													
25					1.30		Coal: Carbonaceous Shale - mix coal pulverized with pulverized b shale 50:50 - dry	ed zone of rown carb	DIACK Shiny DIACEOUS									
-	-				0.23		Coal: as above, black, shiny - dr	/		-	-		-					36.80
		0.7.5			0.60										3.16m	9		
26	14	37.51	40.56	3.05		3.05	Coal: 70 black : 30 brown shaley	coal; pulv	erized very	-	1		-		-002 (3	0 - Ma		



Location:         Lat* // * N_ Long           UTM NAD83         Easting:         661322.12         Northing:         55025           Cored Interval - Units (m)         Recoverd         Itending, Color, Size, Te Bedding, Ange, Att         Itending, Ange, Att           8ox/cut         From         To         Totl.         Sec.         Totl.         Utthology, Color, Size, Te Bedding, Ange, Att           27         0.90         Very dull tacks shiny co         very dull tacks shiny co	^ / " W 169.04 Elev: 1366.73 Description xture, Hardness, Shearing, Contacts, ration. Wetness. Contamination	Orienta	DLS	Qtr	Lsd	Sec	Twp	Rge	Mer
Cored Interval - Units ( m )         Recoverd         Itthogy, Color, Size, Te Badding Angle, All.           BoxCut         From         To         Totl.         Sec.         Totl.         Lithology, Color, Size, Te Badding Angle, All.           27         0         0.90         Coat: black-oull - darl         Very dull lacks shiny co	Description xture, Hardness, Shearing, Contacts, ration. Wetness, Contamination	Orienta	tion ( <sup>o</sup> TCA)		10 -	A 100 100 100			
Box Cut From To Tott. Sec. Tott. Lithology, Color, Ster, Te Bedding Angle, Altr 27 0.90 Color black - dull - dar 0.90 very dull lacks shiny co	xture, Hardness, Shearing, Contacts, eration, Wetness, Contamination	1.1.		RQD	Geog	Samp	Se	Rec.	ELog
27 Coal: black - dull - darl 0.90 very dull lacks shiny co		No. Jo	Bedding	(%)	shem ble ID	bal ble ID	m	(%)	(m)
	k brown pulverized fine powder omponent - dry					02	in	%	
Coal: black shiny beco prominent 10-15%; dr	mes crumbly bit sticky - virtrinite					(3.16n	10 - Me	100	
									40.9
Carbonaceous Shale:	parting - brown pulverized very arent coal				#0000	4 (0.44	m)		
	e te black publicited dull colour		_						41 3
1.08 very minor shiny coal f	ragments <5% - dry								
29 Coal: as above last 30	cm shiny more coal than shale -								-
1.53 dry						13m)	(E)		
30 16 43.61 46.66 3.05 3.05 0.38 Coal: as above						03 (4.	Lower		
Carbonaceous Shale: 0.47 fragments in dark brow	Coal - parting? Shaley (rocky) m pulverized matrix - dry					LR1A-0	10 -		
Coal: black, pulverized fragments throughout	alternating black : brown shiny - dry								
31 Coal: better developer	than above, less brown, shiny				1		6		45.7
1.53 vitrinite 10% - dry		$\vdash$	-	-		A-004 (3m)	ower (S		
32 17 46.66 49.71 3.05 3.05					1	LB11 (2.4	10 - Lo		17.7
	Obela dada basun basun uith								47.7
0.62 Carbonaceous Shale: minor coal?, crumbly,	noticeable contact with coal - dry				#0000	5 (2.15	m)		
33 Shale: Carbonaceous	Shale - brown - dark brown as		-						
1.07 worke, pumver zeu mit	warized carbonaceous shale @								_
0.45 very end of entry - dry	werken of Donaceons snille &								_
	Cored Total x 100 - 93 5%	Recov	erv	To	tal Drill	Depth:			49.7
Total: 49.71 46.50 Rec. Total /	50/60 10/al x 100 = 1 50.0 /r		0.71						



13	in the	Mo	ase	Mou	Inta	in	Corehole Log			Date:			Oct	tober	15/2	013	
-		Te	chnic	al Serv	rices	-			H	ole No	<u>):</u>			LR1	3-3A		
1	ocati	ion:			Lat.	•/_	' /* N Long */* W			DIE	L	sd		Sec	Twp	Rge	Mer
U	TM NA	AD83	Easti	ng:	66134	9.45	Northing: 5502761.3 Elevation: 1369.	51		DLS							
C	ored I	Interval	- Units	(m)	Reco	verd	Description	0	rientati	on ( ° Ti	CA)	00	Geo	San		Rec	ELog
x	Cut	From	То	Totl.	Sec.	Totl.	Lithology, Color, Size, Texture, Hardness, Shearing, Contac Bedding Angle, Alteration, Wetness, Contamination	ts, N	lo. Joir	ts Bedd	ing (	%)	ple ID	ple ID	Seam	(%)	(m)
	1	60.30	61.00	0.70		0.70		_	_	-	-	-	_		_		
							Shale: dark grey fine grain massive - weakly tissile slickensided fractures, joint planes, pyrite on fractures / join planes	it		20		100					
-	2	61.00	62.00	1.00	0.70	1.00		-	-	30	-	100					
	-						Shale: as above, dark grey fissile carbonaceous, sharp con with coal at 45° TCA	tact			45			LR3A- 01		100%	
-					0.10		Coal: black, shiny black, fine grain massive dull black matri with shiny bits, strong H <sub>2</sub> S smell, crumbly, sharp upper	×			40			LR3A- 02			62.0
-	3	62.00	63.50	1.50	0.90	1.50	contact, shiny joint surfaces	-	-	-	+	-		(0.9m)			-
-	-	02.00	00.00	1.00	1.50		Coal: as above, smelly, massive 1.5m chunk of core, broke bedding at 70° TCA, very shiny	on			70			03 (1.5m)	~	960	
	4	63.50	65.00	1.50	1.00	1.50	Manufactor States and States					100			DEF	100	
					1.50		Coal: as above, hard section @ 64.1-64.4m, core came out tube in 3 solid chunks/pieces, hard section light not dense parting?, or solid hard coal, entire run very compact not crumbly core	of						LR3A- 04 (1.5m)	10 - UF		
								-	_	-	-	-	_			-	
-	5	65.00	66.50	1.50		1,20	Coal: as above, massive and softer than above, crumbly ve	ry	-	-	-	-		LR3A- 05 (1,1m)		80%	
-					1.10		Lost Core: no recovery	+	-	-	-						68.4
1					0.00												
		00.50		1.50	0.10	1.60	Shale: parting, probably jammed the core bit resulting in th core loss	e	_	-	-			LR3A-		80%	
-	b	66.50	68.00	1.50	0.00	1.50	Shale: parting, fine grain hard massive, lower contact @ 40 TCA and sharp	•			40			(0.3m)		%0	
					0.20	- 21	Coal: black, predominantly shiny lustrous bedding @ 30° a joint sets at 80° TCA, strong smell of H <sub>2</sub> S	nd						LR3A- 07		9	69.3
-	7	68.00	69.50	1.50	1.30	1.40		-	-	80	30		-	(1.3m)		-	
-		00.00	05.50	1.00	1.00		Coal: hard, black shiny softening down hole massive lustro coal - no discernible bedding	us				100		LR3A- 08 (1.4m)	0	93%	
					0.40		Coal: softer than above, strong smell, more crumbly			-			_		W -	-	-
-	8	69.50	71.00	1.50	1.00	1.50	Coal: massive, as above varying hard and soft sections, ve strong smell	ry	-	+	+			LR3A- 09 (1.5m)	10		
-	9	71.00	72.50	1.50	1.50	1.50		-						LR3A-			
					1.50		Coal: as above softer, thin parting? @ 71.7-71.8m, coal ver massive, lustrous well consolidated and smelly	у				100		10 (1.5m)		9600	
	10	72.50	74.00	1.50		1.50	5							LR3A-	œ	1	72.0
					1.50		Coal: as above, bedding at 60° smelly	-	-	-	60	100	-	11 (1.5m)	OWE		-
	11	74.00	74.70	0.70		0.70	Coal: as above very noticeable contact with carbonaceous shale at 65° TCA, typical shiny black coal			-	+			LR3A- 12	10-10		-
_					0.40		Onderstanding Challes having and fail and the	-			65		-	(0.4m)			75.
-	-				0.30		Carbonaceous Shale: brown, greasy teel - crumbly							13 (0.3m)		100%	
	12	74.70	75.50	0.80		0.80	D	-			-			-		-	-
					0.00		Carbonaceous Shale: massive core very hard, dark grey-					100					



wi	-		010	Mou	nta	in	Corehole Log		D	ate:		Sep.	25 - 0	Oct. 1	/ 201	3
A		T	echnic	al Servi	ces				Hol	e No:			LR1	3-09/	4	
	Loca	tion:			Lat	_°/	_'/* N Long9/*W			DLS	Qtr.	Lsd	Sec	Twp	Rge	Mer
U	ITM N	AD83	Eas	ting:	6614	27.03	Northing: 5502575.37 Elevation: 1437.54	Ori	entation	n (deg	-	80	so.	-		ELog
	ore	interva	I - Units	(m)	Hec	overa	Lithology, Color, Size, Texture, Hardness, Shearing, Contacts,	-	TC	Y	RQD (%)	eoche umple	Coal	Seam	Rec. (%)	Depth
iox 1	Cut 1	From	0.91	0.91	Sec.	0.91	Bedding Angle, Alteration, Wetness, Contamination	IND.	JOINS	becomig		EB	ō			(in)
					0.91		Shale: brown to dark grey with up to fists size shale fragment hosted in brown mud	5								
2	2	0.91	3.96	3.05		3.05	in other strong stored	+								
					1.52		Shale: brown, predominantly mud containing shale fragments									
3	-				1.53		Shale: as above	-				#23828	3 (1.0m)			
4	3	3.96	7.01	3.05		3.05						-				
					1.52		Shale: grey-brown containing larger ball size fragments within muddy matrix									
5	-		_		1.53		Shale: brown-grey mud with rock fragments	-								
6	4	7,01	10.06	3.05		2.82	And the second se	-								
-					1.52		Shale: as above brown mud host to rock fragments	-				#23829	9 (1.0m)			
7					0.30		Shale: as above, poor recovery assume rock - crushed and washed out									
-	-						Siltstone: grey, massive interval consists of consistent rock	F								
					1.00		fragments no mud, very noticeable change from above entry									
8	5	10.06	13.11	3.05		1.99		-	-						V	1
-	-				1.06		Lost Core: no recovery	-						-		
-	-				0.46	_	Siltstone: grey massive unit as above	-				-		-		
9					1,53		Siltstone: grey massive as above, slightly smaller fragments									
10	6	13,11	16.16	3.05		3.05		-			-	#2383	0 (1.0m)			
-	_				1.06		Siltstone: as above, smaller fragments	-								
					0.46		Siltstone: shale - brown mud host to shaley rock fragments									
-	-						Siltstone: dark brown mud with smaller rock fragments -	+					-			
11					1.53		transition zone - grey siltstone transition to more fissile brown shaley fragments									
12	7	16.16	19.21	3.05		3.05		-				#2383	1 (1.0m)			
					1.52		Shale: dark grey brown mud hosting friable - fissile shale fragments									
-	-					-	Shale: dark brown, mud, interval solid - cored mud containin	1	-	-				-	-	-
13		-	-	-	1.53	-	small rock fragments	-	-						-	
14	8	19.21	22.26	3.05	1.52	1.52	Shale: as above	-				#2383	2 (1.2m)	-		
15		-			1.53		Lost Core: no recovery	+					-			-
16	9	22.26	25.30	3.04		3.05		-	-	-					$\square$	-
					1.52		snale: light brown, completely pulverized powder, small shale fragments - dry									-
17					0.97		Shale; as above, dry	-		-			-		-	-
	-				-		Shale: dark brown - cakey - paste, completely pulverized wit	1	-					1		-
					0.56		very nne uny dark grey - brown shale tragments - moist	-					-	-	-	
18	10	25.30	28.35	3.05	5	3.05		-	-	-			-	-	-	-
					1.52		snale: dark brown mud, consolidated - cored mud containing broken shale fragmenrs - moist	1	-					-	-	-
19	-				0.40		Shale: as above, mud (broken) - moist	+	-	-	-		-	-		-
-	-						Shale: mudstone? - light brown powder hosting up to fist siz					#2383	3 (1.0m	0		
							angular rock tragments - shale - mudstone? Very fine grain grey very sharp contact (abrupt) with above unit - dry									



E,	100	Mo	osel	Mou	ntai	in	Corehole Log			ate:		Sep.	25 - 0	Oct. 1	/ 201:	3
-	1	- /	echnic	ui sei vi	Les				1101	5 140.						
	Loca	tion:			Lat.		_' /* N Long' /*W	-	D	LS	Qtr.	Lsd	Sec	Twp	Rge	Mer
	IMN	AD83	East	ing:	6614	27.03	Northing: 5502575.37 [Devalion: 1437.34	Orie	entation	(deg		S Q	Sa			ELog
	ore	a interva	- Units	(m)	Heck	overa	Lithology, Color, Size, Texture, Hardness, Shearing, Contacts,	No	TCA	Bedding	RQD (%)	mple	Coal	Seam	Rec. (%)	Depth
Box	Cut	From	То	Toti.	Sec.	loti.	Bedding Angle, Alteration, Wetness, Contamination	NO.	Joints	Bedding		63	D	-		Quig
					0.36		Sitale, as to above sitale dist - moday - consolicated - mode			-						
20	11	28.35	31.39	3.04		3.04						-		_		_
-	-				1.52		Shale: dark brown consolidated mud - moist			-			-			
21	_				0.42		Shale: as above	-					-	-		-
					0.64		Shale: light brown, dry not muddy with fists size very fine grain shale - siltstone - mudstone?. Fragments - dry					#2383	(2.5m)			
_					0.46		Shale: as to muddy entry - moist					ME COLO		-		-
22	12	31.39	34.44	3.05		3.05										
					1.52		Shale: light brown completely pulverized, tiny fragments throughout - dry									
22					1.30		Shale: as above dry	-								
23					1.50		Shale: darker brown then shown weak cakey texture hit more	-								
1					0.23		consolidated - not rocky but packed mud	-	-						-	
24	13	34.44	37.49	3.05		2.82										
					0.38		Shale: darker brown, more consolidated unit not rock but consolidated less wet mud!									
					1.14		Shale: light brown completely pulverized containing tiny shale fragments - dry									
25					1.30		Shale: as above bit mixed between cakey and pulverized - dry									
00	14	27.40	40.54	3.05		3.05	the second se	-			-		-		$\geq$	
20	14	51.48	40.04	0.00	1.52	0.00	Shale: massive, light brown - brown pulverized shale with shale fragments - dry									
27					1.53		Shale: as above, bit more cakey fists size fissile rock fragments									
28	15	40.54	43.59	3.05	5	3.05									-	
-					1.52		Shale: as above, predominantly pulverized dry									
29					1.53		Shale: dry pulverized light brown powder with some shale fragments									
90	16	43 59	AR RA	3.05		3.05		-	-			#2383	5 (1.0m)			
		40.00	10.0		1.52		Shale: as above - dry	-	-						-	
31					1.53		Shale: as above dry	-								-
32	17	46.64	49.69	3.05	5	3.05		-			-	-		-		-
-					1.52		Shale; as above dry	+	-		-		-			
33					1.03	8	Shale: as above dry	1		-	-					
					0.50		Shale: siltstone, brown dry mud at start, transition to coarse massive ball size fragments of siltstone - very fine grain grey with carbonate veinlets									
34	18	49.60	52.74	3.04	5	3.04		-	-		-					
04	10	40.08	32.14	5.0	1.52	2	Shale: dark brown to light brown dry mud at start gives way to typical pulverized shale	2								
35					1.08	3	Shale: light brown, pulverized dry	-	-		-	#2383	6 (1.0m	)	-	-
-	-						Shale & siltstone: dark brown shaley mud transition to coarse	-	1		1					-
					0.45	5	fragments of siltstone (grey - dark grey) rock fragments									
36	10	52.74	55.70	30	5	2.5		-	-					-	K	
			00.10		0.50		Lost Core: no recovery	-	-	-	-	-	-	-	X	
-	1						Siltstone: grey dark grey rock fragments, coarse fragments no	1				#2383	87 (1.0m	))		1
-	-				1.03	1	powder or mud	-			-				-	
37	7				0.5	3	Siltstone: as above				-	-	-	-	-	-



A.E	W.															
A.A.	- and the second						Orantisti Lea		Da	ate:		Sep.	25 - C	Oct. 1	/ 201	3
	7	MO	ose I echnic	<b>MOU</b> al Servio	nfal ces	n	Corenole Log		Hole	e No:			LR1	3-09A	•	
	Locat	ion:	Fred	1	_at		· /* N Long9/'/*W		C	ILS	Qtr.	Lsd	Sec	Twp	Rge	Mer
0	TM N	Interval	East	(m)	Bec	overd	Northing: 5502575.37 Elevation: 1437.34 Description	Orie	entation	(deg		Sal Q	Sar		0	ELog
Зох	Cut	From	То	Totl.	Sec.	Toti.	Lithology, Color, Size, Texture, Hardness, Shearing, Contacts, Bedding Angle, Alteration, Wetness, Contamination	No.	Joints	Bedding	(%)	nple ID	Doal nple ID	eam	(%)	(m)
38	20	55.79	58.84	3.05	0.67	3.05	Shale: light brown pulverized									
					0.60		Shale & siltstone: interbedded as above transition from powder with shale fragments to less fissile more massive siltstone fragments - dry									
-	-				0.25		Shale: dark brown mud	-								
39					1.14		Shale: mud as above shaley fragments in mud more pronounced at end of interval									
					0.39		Siltstone: grey, massive broken rock fragments with minor mud									
40	21	58.84	61.89	3.05	1.52	3.05	Shale: light brown powder hosting minor friable fragments - dry completely pulverized					#23838	3 (1.0m)			
41					1.53		Shale: light brown powder covering more competent shale - fissile - dry									
42	22	61.89	64.94	3.05	1.00	3.05	Siltstone: grey, massive broken rock fragments covered in brown slime - very little rock powder					#23839	9 (1.0m)			
-	-	_			0.52		Shale: pulverized as above									
43					0.34		Shale: as above gradually changing to a darker colour									
	00	64.04	67.00	2.05	1.19	2.06	Carbonaceous Shale: darker brown pulverized rock powder with fissile darker grey - black shale fragments				-	#2384	0 (1.0m)			
44	20	04.94	07.99	3,00	0.38	3.04	Siltstone: dark brown mud hosting large fragments of siltstone									
_	-				1.14		Siltstone & Shale: light brown pulverized rock consisting of mixed siltstone and shale fragments.				-					
45					0.96		host	-	-		-			-		
		07.00	71.01	0.00	0.57	0.00	Siltatone: light brown powder hosting angular massive sitston fragments	e								-
46	24	67,99	/1.04	3,05	0.87	3.00	Siltstone: brown consolidated mud hosting angular siltstone fragments - wet									
_					0.65		Shale: brown, shaley fissile fragments within pulverized host - dry Sittstone: light brown pulverized host - hosting angular	+			-					
47	_				1.20		siltstone fragments - dry Shale: darker brown cakey fissile shale hosted in partly	+				#2384	1 (1.0m)			-
40	25	71.04	74.00	3.05	0.33	3.0	consolidated core	-	-		-				-	
40	2.0	71.04	74.08	0,00	0.90	0.0	Shale: as above, medium brown pulverized with shale fragments - dry									
					0.62		Siltstone: light brown powder hosting hard angular siltstone fragments								-	-
49					0.90		Siltstone: as above dry	-		-	-	-		-		-
					0.63		Shale: medium brown powder - a bit cakey, fissile soft shale frsagments grey - dry									
50	26	74.09	75.62	1.53	1.53	1.5	Siltstone: dark brown mud consolidated hosting larger angula fragments of grey siltstone - wet	r								



W	pul,	.2					0		Di	ate:		Sep.	25 - 0	Oct. 1	/ 201	3
-		Mo	ose l echnic	MOU al Servi	nta ces	in	Corehole Log		Hol	e No:			LR1	3-094	•	
	Locat	ion:			Lat.	_*/_	'/" N Long'/"W		6	OLS	Qtr.	Lsd	Sec	Тур	Rge	Mer
L	JTM N/	AD83	East	ing:	6614	27.03	Northing: 5502575.37 Elevation: 1437.54	Orie	entation	(deg		80	(c)	-		ELog
	Cored	Interva	- Units	(m)	Hec	overd	Description Lithology, Color, Size, Texture, Hardness, Shearing, Contacts,		TCA	1	RQD (%)	ample	Coal	Seam	Rec. (%)	Depth
Box	Cut	From	10	loti.	Sec.	toti.	Bedding Angle, Alteration, Wetness, Contamination Siltstone: medium brown pulverized powder hosting hard	INO.	Joints	Becang		0 3	ō	-		(m)
-	-		_	_	1.53		angular siltstone fragments - dry			-		#2304	(1.011)			
52	28	77.15	80.19	3.04		3.04	Shale & Siltstone: brown mud hosting shale fragments	+						-		
-			_		0.86		possibly siltstone fragments - wet								-	
			-		0.66		Sittstone & Shale: light brown pulverized rock with more sittstone fragments than shale									
53					1.30		Siltstone & Shale: as above									
_					0.22	-	Shale: brown, cakey hosting shale fissile fragments	-						-	-	
54	29	80.19	83.24	3.05		2.62	LOPT COPE, as assume paritian in hole where eace barrel -	1				-		-		-
							casing sanded in - eventually retrieved - note casing did not advance to depth of core harrel due to jamming in hele								IV	
					0.43		normos o colui o cole onnei das lo familia di 1008	-	-			-			$\wedge$	-
					0.88		Shale; dark brown slime - mud hosting shale + some siltstone? Fragments - wet									
-		-					Shale: light to dark brown drier - pulverized albeit weaker than	-				#2384	3 (1.0m)	-		
-	+				0.21		above - shaley fragments throughout							-		
55					0.30		Shale: as above				-					
							Carbonaceous Shale: very dark brown well consolidated mud with abundant shale fragments locally matrix is almost black						n			86.4
-					0.85								Partin			_
							Coal: black pulverized but consolidated in a dry cakey texture sharp contact very noticeable change in colour from brown -						Shale			
					0.38		black, 5-10% vitrinite in dull black matrix	-					Carb			
56	30	83.24	86.29	3.05		3.08	Carbonaceous Shale: coal? - Parting? - Very dark brown -		ranne	ontivo es	mole	.0m)	dudes	- HW7		
			_	-	0.92		noticeable shiny vitrinite coal fragments - wet	-	Topres	T	I I	5 <u></u>	n - Inc	10		-
					0.60		Coal/Carbonaceous Shale: as above however some shiny coa	6					(2.49			
-		_			0.00		Carbonaceous Shale: coal - Parting? - very dark brown - black	<	-	-	-		A-001			
57					0.59		less homogenous, noticeable shale fragments but noticeable coal fragments as well - drier - moist						LR9			
-							Coal: black - lustrey black sharp contact with above entry,	-								87.6
							massive dull black matrix hosting 5-10% shiny vitrinite fragments - cored well as a sticky consolidated paste - moist									
-		00.00	00.0.	0.00	0.94	2.0	ID WEL	1								
58	31	86.29	89.34	3.05	0.65	3.0	Coal: black, pulverized, shiny fragments, vitrinite 5-10%	-	-		-	-	Ê			-
	H						Coal & Carbonaceous Shale: Parting? - very fine grain						(3.79	pper		
1			_		0.87		fragments <5%	-	-				A-002	10 - 01		-
-							Coal & Carbonaceous Shale: Parting? - as above mixed brown + black pulverized powder appears to exhibit bedding i.e.:	n					LR9			
59					1.33		interbedded unit, last 20 cm well developed coal - shiny fragments									
-	H						Coal: black shiny black, fine grain pulverized powder	-	-							-
					0.20		containing fragments of lustrous vitrinite up to 10% - dry	+								89.1
60	32	89.34	92.39	3.05		3.0	Coal: as above, start of entry more fragment rich with shiny	+							960	-
					1.52		coal to first 56 cm remainder pulverized powder - black - dry						î		100	-
	H		-				Coal: as above dull black to locally hint of brown? - shaley	1	1				3 (4.36	Mid		-
61					1.53	8	coal? - remaining 17 cm fragmented shiny vitrinite, overall <10% shiny						1-000	10-		



UTM NODE         Lashing:         EXEMPTION         Northing:         Social/S171         Elevation:         143/24         Orientation         (dig         Rob         Rob <tht< th=""><th>F</th><th>Loca</th><th>ation:</th><th>echnic</th><th>al Servi</th><th>Lat.</th><th>_*/_</th><th>* N_Long*/*W</th><th></th><th></th><th>DLS</th><th>Qtr.</th><th>Lsd</th><th>LR1 Sec</th><th>3-094</th><th>Rge</th><th>Mer</th></tht<>	F	Loca	ation:	echnic	al Servi	Lat.	_*/_	* N_Long*/*W			DLS	Qtr.	Lsd	LR1 Sec	3-094	Rge	Mer
Ex         Cut         From         To         Tot.         See:         It.         Itelational orginal Antiger, Marking, Contacts, Marking, Contact, Marking, Marking, Marking, Contact, Marking, Marking, Contact, Marking, Marking, Marking, Contact, Marking, Ma	-	Core	d Interva	I - Units	(m)	Rec	overd	Description	Ori	ientatio	n (deg	POD	San	San	0	Pac	ELog
Image: space of the space	Box	Cut	From	То	Toti.	Sec.	Toti.	Lithology, Color, Size, Texture, Hardness, Shearing, Contacts, Bedding Angle, Alteration, Wetness, Contamination Coal: as above, end of well developed coal - beginning of	No.	Joints	Bedding	(%)	nple ID	Doal nple ID	- MAR	(%)	(m)
Image: Carbonacous Shale: Parting - frat 66 m dark brown gev, oblock transforms cone, remainder of interval dark brown gev, oblock transforms cone, remainder throw gev, oblock transforms dark brown gev, oblock transforms cone, remainder of interval dark brown gev, oblock transforms cone, remainder of interval dark brown gev, oblock transforms cone, remainder of interval dark brown gev, oblock transforms cone, remainder of interval dark brown gev, oblock transforms cone, remainder of interval dark brown gev, oblock transforms cone, remainder of interval dark brown gev, oblock transforms cone, remainder of interval dark brown gev, oblock transforms cone, remainder of interval dark brown gev, oblock transforms cone, shale transforms cone, remainder of interval dark brown gev, oblock transforms cone, remainder of interval dark brown gev, oblock transforms cone, shale transforms gev, oblock transforms g	L					1.00		parting within coal seam - FW contact not well defined - gradual?			-						94.5
Image: construction of the second state second state second state of the second state of the second sta						0.52		Carbonaceous Shale: Parting - first 65 cm dark brown grey - black transition zone, remainder of interval dark brown obviously not coal - unit ccompletely pulverized - "balled up" into some fragments - soft - dry									
ES         120         120           64         95.44         96.49         3.05         3.05           64         3.6         95.44         96.49         3.05         3.05           64         3.6         95.44         96.49         3.05         3.05           66         3.6         95.44         96.49         3.05         3.05           66         3.6         95.44         96.49         3.05         3.05           68         0         0.30         Coal: shaley - Carbonaceous Shale - as above, brown - dry         0         0           68         0         0.30         Coal: shaley - Carbonaceous shale - black with brown interbedded carbonaceous shale - black black black up ca	F							Carbonaceous Shale: Parting - as above alternating bands of brown - grey black - pulverized fairly sharp FW contact					#2384	5 (1.61n	n)		
64         34         95.44         96.49         3.05         3.05           Coal:         Coal:         Shaley J? - Parting?? Dark grey - black but noticeable brown tint - massive pulverized unit - carbonaceous shale - dry         100	6	-				0.33		Coal: black lustry, bit sticky @ end dry - moist			-						95.3
e8       0.30       Coal: Interbedded Carbonaceous Shale - as above, brown - dry       0       0       0         e8       0.30       Coal: Interbedded carbonaceous shale - black with brown interbedded       0       0       0       0         e6       35       98.49       101.54       3.05       Coal: Interbedded Carbonaceous Shale - black with brown interbedded       0       0       0       0         e6       35       98.49       101.54       3.05       Coal: Interbedded Carbonaceous Shale as above, noticeable fragments of Interbedded       0       0       0       0         e7       0.20       coat: continuation from above, this interval dominantly coal asample       0       0       0       0       0         e7       0.20       abare FW contact - dry - end of coal sample       0 <td< td=""><td>64</td><td>34</td><td>95.44</td><td>98.49</td><td>3.05</td><td></td><td>3.05</td><td>Coal: shaley? - Parting?? Dark grey - black but noticeable brown tint - massive pulverized unit - carbonaceous shale -</td><td></td><td></td><td></td><td></td><td></td><td>8m)</td><td></td><td></td><td>-</td></td<>	64	34	95.44	98.49	3.05		3.05	Coal: shaley? - Parting?? Dark grey - black but noticeable brown tint - massive pulverized unit - carbonaceous shale -						8m)			-
Cost: Interbedded carbonaceus shale - black with brown interbedde - lusty coel nobceable fragments of interbedded coal / shale in entry - dry (end of coal sample)         G         G         G         B           66         36         98.49         101.54         3.05         Coal: interbedded carbonaceus shale - black with brown interbedded         G         G         G         B         <	6	5				0.30		Coal: shaley - Carbonaceous Shale - as above, brown - dry						9A-004 (3.3	0 - Lower (		
66         25         98.49         101.54         3.05         3.05         (a)         (b)         (c)         (c						123		Coal: interbedded carbonaceous shale - black with brown interbeds - lustry coal noticeable fragments of interbedded coal / shale in entry - dry (end of coal sample)						8			
Coal:     Interverbed Caroniceous Snale as above, noticeous     Interverbed Caroniceous Snale as above, noticeous     Interverbed Caroniceous     Interverbed Caroniceous       67     1.52     -dry     -dry     Interverbed Caroniceous     Interverbed Caroniceous       67     0.20     Coal:     continuation from above, this interval dominantly coal     Interverbed Caroniceous       67     0.20     Coal:     continuation from above, this interval dominantly coal     Interverbed Caroniceous       67     0.20     Interverbed Caroniceous     Interverbed Caroniceous     Interverbed Caroniceous       67     0.20     Coal:     Continuation from above, this interval dominantly coal     Interverbed Caroniceous       67     0.20     Interverbed Caroniceous     Interverbed Caroniceous     Interverbed Caroniceous       67     0.20     Interverbed Caroniceous     Interverbed Caroniceous     Interverbed Caroniceous       67     0.20     Interverbed Caroniceous     Interverbed Caroniceous     Interverbed Caroniceous       67     101.54     TD; end of hole; 2:30 pm Oct. 1/13     Interverbed Caroniceous     Interverbed Caroniceous       101.54     101.54     97.57     Rec. Total / Cored Total x 100 =     196.1%     Total Dhil Depth:     101.54       Commenta:     101.54     101.54     101.54     101.54     101.54 <td>6</td> <td>35</td> <td>98.49</td> <td>101.54</td> <td>3.05</td> <td>1.20</td> <td>3.05</td> <td></td> <td>E</td> <td></td> <td></td> <td></td> <td></td> <td>Ê</td> <td>0</td> <td></td> <td>98.0</td>	6	35	98.49	101.54	3.05	1.20	3.05		E					Ê	0		98.0
67         0.20         Coal: continuation from above, this interval dominantly coal administry coal administrequadministry coal administry coal administrequadminist						1.52		Coal: Interbedded Carbonaceous Snaie as above, noticeaule change in colour brown / black 50:50 start of new coal sample - dry			_			A-005 (1.7	0 - Lower (		
1.33         shale, sharp upper contact - dry         III.2340 (1.34m)           101.54         101.54         TD; end of hole; 2:30 pm Oct. 1/13         III.33           Total:         101.54         97.57 Rec. Total / Cored Total x 100 =         96.1%         Recovery         Total Drill Depth:         101.54           Comments:         101.54         97.57 Rec. Total / Cored Total x 100 =         96.1%         Recovery         Total Drill Depth:         101.54	6					0.20		Coal: continuation from above, this interval dominantly coal sharp FW contact - dry - end of coal sample Shale: light brown pulverized very small fragments of fissile	-		-		-	LR9	=		101.
Introduction         Introduction<	F	-	101.54	101.54		1.33		shale, sharp upper contact - dry		-	-	-	112304	0 (1.541			-
Comments:	F	Treel	101.54	101.54	101.54		07.53	De Tetel / Cound Tetel = 100 - DE 195	Per		-	Total Dr	ill Deott		-	10	1.54
	Co	nmer	its:														-



and and	Mo	ose echnic	Mou	<b>inta</b>	in	Corehole Log		E Ho	eate: le No:		Oct	tober 1 13-150	4 / 20	13 RE)	
Locat	tion:		1.	t	0/	'/ "N Long. °/ '/ "W	-	-		0	1	6	Tur	Des	
UTM N	AD83	East	ina:	6614	27.03	Northing: 5502575.37 Elevation: 1437.54			DLS	Qu.	LSU	Sec	Twp	nge	Me
Corod	Internal	Unite	(m)	Door	word	Description	0	ontation	1° TCAL		SaG	Sa			ELo
	-	- Units	(111)	need	Tu	Lithology, Color, Size, Texture, Hardness, Shearing,				RQD (%)	mple	Coal	Seam	Rec. (%)	Dept
Sox Cut	From	lo	loti.	Sec.	Ioti.	Contacts, Bedding Angle, Alteration, Wetness,	NO.	Joints	Reaging		EB	ō	-	-	(m)
1	84.00	85.00	1.00		0.95	Sandstone: grey, fine grain, hard - transition to shale interbedded with fissile shale - carbonaceous shale				51					
+		-		0.48		Shale: fissile, muddy - carbonaceous shale interbeds,						I DISC	LDA		
				0.32		sharp lower contact with coal at 40° TCA			40			LNI5C-	HVV		
				0.15		Coal: shiny black crumbly						50			84.7
2	85.00	86.00	1.00		1.00	Coal: dull and shiny black massive predominantly dull		-				15C-			-
			5	1.00		black matrix, soft with shiny bits within <10%						LB.			
0	86.00	87 50	1 50	1.00	1.50							65			
-	00.00	07.00	1.00		1.00	Coal: massive, soft as above, slickensided fracture						15C-		%	
				1.50		surfaces, shiny no visible partings						EL E		100	
4	87.50	89.00	1.50		1.50							5			
						Goal: massive as above, first 50 cm hard and shiny fragmented crumbly very shiny shards throughout very						5C-(			
			19			light, dull black matrix in entire cut, very clean massive						LB1	10		
				1.50	-	Intersection	-		-			4			-
5	89.00	90.50	1.50		1.50	Coal: as above	-	-		-	-	D-O	_		-
						000. 03 0000				1		B15	EAN		
-	00.50	00.00	1.50	1.50	1.40		-	-	-			9	S-0		-
0	90.50	92.00	1.50		1.40	Coal: as above, more fragmented - crumbly, harder in	-		-			4m)	CU	3%	-
						sections, bedding / jointing more obvious much harder				1.11		R16		6	
-	00.00	00.50	4.50	1.40	4.00	man above, very idstrous simly coal	-	-	45	-		9	1.2.	-	-
	92.00	93.50	1.50		1.50	Coal: massive as above	-	-			-	5m)			-
				1 50								LB1			
8	93.50	95.00	1.50	1.00	1.50							01			
					-	Coal: as above, soft at top, massive shiny crumbly coal						50- 50-			
				1.50							2	E			
9	95.00	96.50	1.50		1.50							80			
				1.45		Coal: massive as above						5C-1			
				0.05		Shale parting?: more brown than black, shale fragments in coal matrix						ER L			05
10	96.50	98.00	1.50	0.05	1.50		1		1					1	- 30.
				1.50		Shale: Carbonaceous Shale parting - brown with thin interbeddded coal seams <10 cm, fissile shale fragments in brown - black matrix, approx. 10 cm coal at start of entry, large shale fragments with calcite in fractures						LR15C-05 (1.5m)			
11	98.00	98.30	0.30		0.30							Ê			
				0.90		Shale: as above, driller tripped out after cut - bit probably plunged up	1					(1.0			
12	98.30	99.50	1.20	0.30	1.20	hunddon gh	1					19		600	
12	00.00	00.00	1.20		1.44	Shale: as above - carbonaceous shale, crumbly at end						3150		1-	
				0.70		rocky at start						5			
						Shale: as above						315C-11 (0.5m)			
-			-	0.50	-		-	-				2 15	-		-
13	99.50	101.00	1.50		1.50	Shale: Carbonaceous Shale as above, interbedded coal	+	1				5m)	-	1	1
				0.50		at 99.75 - 100 m, remainder of interval carb shale						O.			
				0.00		Shale: Carbonaceous Shale as above, interbedded coal	1					-13		1	
						at 99.75 - 100 m, remainder of interval carb shale						15C			
				1.00			-	-	-			4 LB			-
14	101.00	102.50	1.50	-	1.50	Coal: shaley dirty mixed zone carb shale + coal	-	-			-	E-1	-		-
						fragmented, brown - black very irregular bedding angles						R15			



Mo	ose echnic	Mol al Sen	vices	nin	Core	hole Log		He	ole No:		LR	13-15C	(COF	RE)	
Location:		La	at	_°/_	' /" N Long	_°/'/*W			DIS	Qtr.	Lsd	Sec	Twp	Rge	Me
UTM NAD83	East	ing:	6614	127.03	Northing: 5502575.3	7 Elevation:	1437.54		DLS						
Cored Interval	- Units	(m)	Rec	overd	Desci	ription		Orientatio	n ( ° TCA)	RQD	Geoc	Samp	Seam	Rec.	Dept
Box Cut From	То	Totl.	Sec.	Toti.	Lithology, Color, Size, Textur Contacts, Bedding Angle, Al Carbonaceous Shale & Coal	re, Hardness, Shearir Iteration, Wetness, I: 50:50, very clean o	ng, nal	No. Joint	s Bedding	(%)	hem le ID	al ID 9		(%)	(m)
					interbed within dirty shaley o	coal - carbonaceous	shale					115C-1			
15 102 50	104.00	1.50	0.70	0.4	0	al-lo tat d						16 LF			
13 102.30	104.00	1.00	1.10	0.4	Lost Core: no recovery							15C- 0.4m)		$\land$	
			0.40		Carbonaceous Shale: brown	n very fine grain very	fissile					LR		27%	
Total	~	20.00	×	10 -	5 Reg Total / Careed Total	(x 100 = 0	8%	Becourse		Tat		noth:		104.0	
comments:															



		e Mich		1400	Interi	-	Corebole Log		<u>u</u>	ale.			0011	5 / 201	3	
L		T	ose l echnic	al Serv	ices	in	<u>Corenoie Log</u>		Ho	le No:			LR1	3-31D		
UT	ocat	ion:		L	.at.	_°/_	' /* N Long*/* W	1			Otr	Lsd	Sec	Twp	Roe	Me
	MN	AD83	East	ing:	66093	36.11	Northing: 5500633.13 Elev: 1519.89		1 '	DLS						
Co	ored I	nterval	- Units	(m)	Reco	overd	Description	Ori	entation	( ° TCA)		Ge Sar	Sar	60		ELO
		_	_				Lithology, Color, Size, Texture, Hardness, Shearing,			la un	(%)	nple	Coal	eam	(%)	Dep
Box	Cut	From	10	Totl.	Sec.	Iotl.	Contacts, Bedding Angle, Alteration, Wetness,	NO.	Joints	Bedding		93	ō			(II
-	1	33.50	35.00	1.50	-	1.50	Sandstone- fine grained, med-lt grey some nisty staining	-			-	-	1 B31D-			-
							on fractures, abrupt contact with coal below						01			
-			-	-	0.20		Ccal- black, massive, 5-10% shiny black, dul matrix,	-	-	-	-		(0.2m) LR31D-		1	35
							sheared, v smelly- sulphur, polished surfaces, crumbly						02	14	100%	
-	2	35.00	36.00	1.00	1.30	1.00		-					(1.3m)			
	-	00.00	50.00				Ccal- dull, black, crumbly, massive, H <sub>2</sub> S smell, bedding						03	-		
					1.00		fractures at 60° TCA, clean			~60			(1.0m)			
	3	36.00	37.00	1.00		1.15							LR31D-			-
							Ccal- black, crumbly, massive, H <sub>2</sub> S smell, (same as above), no observable partings						04		115%	
_					1.15			-		-		-	(1.011)		-	-
-	4	37.00	38.00	1.00		1.10	Coal- same as above	-	-				05		110%	-
					1.10	-			1				(1.0m)			
	5	38.00	39.00	1.00		1.05	Cool, came as above 2 on rock parting (brown mudstone)	-					LR31D-			-
							38.42-38.44 m at 50° TCA						06 (1.0m)		105%	
-	e	20.00	40.00	1.00	1.05	0.05		-	-	50	-			AM	-	
-	0	39.00	40.00	1.00		0.30	Coal- black, same as above, no visible partings, some	1	17				LR31D- 07	SE	98%	
					0.98		brighter bands						(1.0m)	20-		
	7	40.00	41.00	1.00		1.02							LR31D-			
							Coal- same as above, 5 cm v hard coal w/ pyrite on fracute surface (fracture II to CA) at 41.2 m, fewer brighter bands						08		102%	
					1.02	-							(1.011)		-	-
-	8	41.00	42.00	1.00	-	1.03	Coal- black, same as above, soft, 3 cm It grev sst band	+					LR31D-		10394	-
							(parting) at 41.68 m	1					(1.0m)		103%	
-	0	42.00	43.00	1.00	1.03	1.00		+		60					-	
			45.50	1.50			Coal- same as above, no visible partings, (crumbly,	1					LR31D-		100%	
					1.00		massive, polished surfaces, 5-10% shiny w/ duli matrix)						10			
	10	43.00	44.00	1.00		1.08							(1.11)	1000		
-				-	0.10		Coal-same as above Coal-black, cumbly, massive, polished surfaces, few	-					LB31D			-
							shale/mud partings- soft brown						11		108%	
-				-	0.69		Mudstone-soft brown v fine grained sheared some	-			-	-	(0.69m)		-	4
							carbonaceous mud						12			
					0.29			-		60		-	(0.29m)		-	-
-	11	44.00	45.20	1.20	0.00	1.12	Sandstone- fine grained, it grey, hard	+	-		-	-	-	-	93%	-
-	-		-		0.35	-	Mudstone/shale- soft, dk grey-brown, v fien grained, 1 cm	1								



-		Mc	OSE Technik	Mou cal Servi	ices	in	Corehole Log		<u>Di</u> Hole	ate: e No:		00	LR1	3-330	2013	
L	.ocat	ion:		Lat	° /.		/" N Long*/' /" W		- C	LS	Qtr.	Lsd	Sec	Twp	Rge	Mer
U	TM N/	D83	East	ting:	6607	06.94	Northing: 5501374.48 Elevation: 1355.54	-	Orienta	tion		50	5			ELog
Box	Cut	From	To To	Totl.	Sec.	Toti.	Lithology, Color, Size, Texture, Hardness, Shearing,	No.	(deg T Joints	CA) Bedding	RQD (%)	eochen Imple II	Coal Imple I	Seam	Rec. (%)	Depth (m)
1	1	TTOM	1.52	1.52	Jour	1.52	Contacts. Bedding Angle. Alteration. Wetness.					03	0			
_					1.52		Overburden: cored mud, note first cut, 1.5m stick up									
2	2	1.52	4.57	3.05	0.80	2.25	Lost Core: no recovery, washed out overburden								$\times$	
_					0.72		Overburden: cored mud as above	-							$\sim$	
3					1.53	1	Overburden: cored mud as above		-		-					
4	3	4 57	7.62	3.05		3.05		-								
-		1.57	1.02	5.55	1.52	0.00	Overburden: cored mud as above	-						-		
5		-			0.30	1	Overburden: cored mud as above		-							
					1,23		Shale/Mudstone: light brown pulverized to broken rock some fragments angular friable light grey not completely fissile - very fine grain mudstone to siltstone fragments within									
6	4	7.62	10.67	3.05		3.05		-								
					0.50		Shale/Mudstone: brown cakey consolidated mud with angular to subangular rock fragments - grey mudstone									
					0.84		Shale/Siltstone: light brown pulverized broken core angular to subangular siltstone rock fragments		represe	intative s	ample	#0000	36 (1.0	(m)		
					0.18		Coal: black, dull pulverized, sharp contact with above unit, within coal shiny bits - fragments approx 10%									12.02
7					0.55		Coal: as above, shiny black component - vitrinite up to 20%									
					0.46		Coal: brown to black dull colour, completely pulverized to fine powder, <5% shiny coal fragments									
					0.52		Coal: noticeable change from above entry - sharp contact, black to shiny black 10% in dull compotent - caked dull black matrix						1 (4.76m)	Seam	960	
8	5	10.67	13.72	3.05		3.05							00-0	20 -	10	
					1.00		Coal: black, shiny black pulverized - weakly fragmented to chunky component - numerous vitrinite fragments up to 15% overall						LR33			
					0.52		Coal: black to brown, minor interbedded carbonaceous shale, completely pulverized						-			
9					1.53		Coal: completely pulverized shiny black with brown sections suggesting interbedded carb coal - carbonaceous shale? As above 50:50 black:brown									21.00
10	6	13.72	16.77	3.05		3.05						-	07/1 7			21.00
					1.20		Snale: brown, pulverized rock powder					#000	1.0	///		
		_		-	0.32	-	Shale: light brown as above									
11					1.53		Shale?: light brown - pulverized final 20 cm more fragmented - chunky with some rock fragments									
12	7	16.77	19.82	3.05		3.05										
					0.30		Carbonaceous Shale: possibly Coal? - dull black to brown, chunky with minor shiny black bits - fragments within nulverized matrix of "cakev" texture - wet									
		_			1.22		Carbonaceous Shale: brown mud, very wet	-				-				
13					0.77		Carbonaceous Shale: as above defenite shale fragments in wet muddy matrix									
					0.76		Carbonaceous Shale/Coal7: as above, however some coal bits and fragments - interbed? <30% of entry, hosted in carb shale - overall entry a consolidated brown to black									
-					00		11101									



W	M	oose	Mo	unta	in	Corehole Log		D	ate:		0	ctobe	r7/	2013	
-	P -	Techn	ical Serv	vices	-			Hol	e No:		_	LR1	3-330	0	
Loc UTM	ation: NAD83	Ea	Lat sting:	° /	06.94	' /' N Long' /' W Northing: 5501374.48 Elevation: 1355.5	4	1	ILS	Qtr.	Lsd	Sec	Twp	Rge	Mer
Core	d Interv	al - Unit	rs (m)	Rec	overd	Description		Orient (deg 1	ition CA)	RQD	Geoch	Coa Sampl	Sea	Rec.	ELog Dept
Box Cu	t From	То	Totl.	Sec.	Toti.	Contacts, Bedding Angle, Alteration, Wetness, Shearing, Shale: brown to light brown chunky hard packed mud -	No.	Joints	Bedding	(90)	e iD	0	3	(76)	(m)
				1.52		predominantly pulverized material but some shale fragments present within matrix									
				1.53		Shale: as above	+						_		
	22.87	22.87				TD: drill hole completed at end of shift October 4th and logged / sampled by IF on October 7th 2013									
Total:	>	<	22.87	X	22.07	Rec.Total / Cored Total x 100 = 96.5%	Rec	overy	Т	otal Dr	ill Dept	h:		22	.87



E	in the	Mo	ose A	lou	ntai	n	Corehole Log			ate:		OCT 24-25 / 2013						
-	W.	B - 10	chinea	I Selvk				_	HO	e NO:			LRIJ	50A-0				
L	ocat	tion:	5		Lat.	^/_	' /* N Long' /' W		D	LS	Qtr.	Lsd	Sec	Twp	Rge	Me		
01	MN	AD83	Easti	ng:	66082	21.59	Northing: 5501054.88 Elevation: 1462.28	-				00	0		-	ELo		
Col	red	Interval	- Units	(m)	Heco	vered	Description	One	ntation	( TCA)	RQD	ampl	Coa	Sear	Rec.	Dept		
Box	Cut	From	То	Totl.	Sec.	Toti.	Bedding Angle, Alteration, Wetness, Contamination	No.	Joints	Bedding	(20)	e ID	0	э	(70)	(m)		
	1	94.55	95.55	1.00	0.90	0.90	Shale/Carb Shale: with two 2 cm coal bands. Shale- brown to grey-brown, v soft w/carbonaceous zones, v fg. lower 10 cm or truin is fissile and sheared. Coal at base of run-contact with shale is steep- 15° TCA, coal is black, act, shiny-bright fragments in dull matrix, compacted- some coal that could be separated was added to coal sample below			55		#00006 (0.1 m)	20 cm roof sample)		101%			
_	2	06.65	07.25	1 70		1.9/					-	-	01 (3		-	-		
	2	95.55	97.25	1.70	0.10	1.04	Shale/Carb Shale: same as above		10	10			38A-		1	_		
_	_						Coal: black fine grained shiny/bright bits is dull matrix	-				-		-		95		
					1.74		bedding plane fractures, polished fracture surfaces, massive, few brighter bands, fissile, soft						38A-02 (1.6m)					
-	3	97.25	98.95	1.70		1.75		-			-		004.00			_		
_	_				1.75	1.577.6	Coal: same as above					-	(1.7m)					
-	4	98.95	100.65	1.70		1.66												
					1.66		Coal: black, shiny+bright bits throughout- same as above, minor pyrite on fracture surfaces, 40 cm in lower half of run is hard, rest is soft to med hard		5				38A-04 (1.7m)					
-	5	100.65	102.35	1.70		1.74												
							Coal: same as above, 2 cm parting at 102.10 m- brown v						38A-05					
					1.74		same as above			50			(1.7m)		9.1			
_	6	102.25	104.05	1 70		1.66		_								-		
	0	102.33	104.00	1.70	1.66	1.00	Coal: same as above, fracture at 45° TCA, ~10 cm carb shale parting- gradational contacts- poorly defined at 103.55 m, few mudstone fragments in shoe- likely 2-3		45				38A-06 (1.7m)					
	7	104.05	105 75	1.70		1 72		-							101%	-		
		104.00	100.10	1.10	1.72		Coal: same as above, few v bright bands, 2 possible carb shale partings < 5 cm each- black (dirty coal bands?), fractures at 45° TCA, hard		45				38A-07 (1.7m)					
-	0	105 75	107.45	1 70		1 76			-		-			W		-		
	0	105.75	107.45	1.70	1.76	1.79	Coal: same as above, fractures at 45° TCA, one 3 cm carb mudstone parting at 106.5m, 10 cm v hard band at 107.15 m- shinv black-brown		25				38A-08 (1.7m)	10 - SEA				
	_				1.10									10.1		-		
_	9	107.45	109.15	1.70	1 70	1.70	Coal: black, competent, massive, shiny/bright bits throughout in dull matrix, fracture at 30° TCA, no visible participe, policibard fracture surfaces, met hard		30				38A-09 (1.7m)					
							Per anger personal marticle and data filler					_						
	10	109.15	110.85	1.70	1.75	1.75	Coal: same as above		30				38A-10					
_	11	110.85	112 55	1 70		1.70		-	-				(1.711)					
-	-11	10.00	112.00	1.70		1.12	Coal: same as above, 5 cm parting at 113.02m- carb						38A-11					
-	-	-			1.72	-	mudstone- possibly 70°TCA, fractures at 30° TCA		30				(1.7m)					
	12	112.55	114.25	1.70		1.63	Coal: same as shows, bottom of sample (10am) is a set	-	-				38A-12			-		
_					0.90		ooal same as above, bottom of sample (10cm) is v soit	-	-			-	(0.9m)			-		
					0.80		Coal: same as above w/ mudstone partings throughout- possibly running ~ parallel TCA10° TCA (or dirty coal?) it brown, soft, vfg, appears as brown when scratched but lots coaly when broken up						38A-13 (0.8m)		96%			
-	13	114.25	115.95	1.70		1.70									-			
					1.50		Coal: same as above few thin partings throughout/dirty coal?, 2 cm parting at 30° TCA, gradational contact at base with mudstone			30			38A-14 (1.5m)		100%	140		
			-	-	-	-	Mudstone: hard, blocky/chunky, coal fragments at base	-	-			-	204 45	-		115.		
					0.20		of run						(0.2m)			L		



	Man	ose N	loun	tair	,	Coret	nole Log		Da	ate:		oc	T 24-2	25 / 2	013	
Location:         Lat.         */*/*         Noning         201004.83         Exercise         Led. Soc.         Tool         Right         Monthly           Cored Interval - Units (m)         Recovered         Description         Orientation (*TCA)         Root         Soc.         Root		echnical	Service	es	-				Hole	e No:		1	LR13-	38A-0	;	
UM NUDBO         Earling:         Evoluting:         Southing:         Southing: <th< th=""><th>Location:</th><th></th><th>L</th><th>Lat</th><th>_•/_</th><th>' /* N Long °</th><th>/*W</th><th></th><th>D</th><th>LS</th><th>Qtr.</th><th>Lsd</th><th>Sec</th><th>Тwp</th><th>Rge</th><th>M</th></th<>	Location:		L	Lat	_•/_	' /* N Long °	/*W		D	LS	Qtr.	Lsd	Sec	Тwp	Rge	M
Uncernance         Uncernace         Uncernace         Uncernanc	UTM NAD83	Eastin	g:	66082	1.59	Northing: 5501054.88	Elevation: 1462.28	10.		0		80	S			EL
Box Cut in them       Testing       Sec.       Net.       Bedding Anoge, Alteration, Witeress, Contamination       Net.       Net.       Sec.       Net.       Net.       Sec.       Sec.       Sec.       Net.       Sec.	Cored Interva	al - Units	(m) F	Recov	ered	Lithology, Color, Size, Texture, H	ption ardness, Shearing, Contacts,	Orie	ntation	TCA)	RQD (%)	ample	Coal	Seam	Rec. (%)	Dep
Image: state in the state	Box Cut From	To	Toti.	Sec.	Toti.	Bedding Angle, Alteration, Wetne	ess, Contamination	No.	Joints	Bedding	11	63	0			(m
1       1       1       1       0       1       0			-	1.73		above (top 1.5 m of run 13)	Shourd any coal. Sume as						(1.7m)		107%	
19       11/2 db       1.00       1.08       db				-											1	
u       u       1.66       u	15 117.6	119.15	1.50	-	1.68	Coal: w/ mudstone partings/c	ontamination						38A-17 (1.5m)			-
				1.68		throughout/dirty coal?- same vfg intermixed)	as above (coal+mudstone			50?			1			
Tatat 24.00 24.94 Rec Total / Cond Total x 100 - 101.4% Recovery Total Depter 119.2 Comments: TD 119.15 m								-								-
Comments: 1D 119.15 m	Total:	<	24.60	$\times$	24.94	Rec. Total / Cored Total x	100 = 101.4%	Reco	overy	1	lotal Dri	ill Depth	1:		11	9.2



A.E.	Nun -	Mo	ose i	Mou al Serv	inta ices	in	Corehole Log		D Hol	l <u>ate:</u> le No:		C	LR99	/ 20 <sup>-</sup>	13	
L	ocat	ion:			Lat.	•/	' /" N Long°/'/"W	-			Qtr.	Lsd	Sec	Twp	Rge	Mer
UT	MN	AD83	East	ing:	66112	20.26	Northing: 5500866.16 Elevation: 1585.5	_	1	DLS						
Co	red I	nterval	- Units	(m)	Reco	werd	Description	Orie	ntation	( ° TCA)	RQD	Geoc	Samp	Se	Rec.	EL.og Depti
Box	Cut	From	То	Totl.	Sec.	Totl.	Lithology, Color, Size, Texture, Hardness, Shearing, Contacts, Bedding Angle, Alteration, Wetness, Contamination	No.	Joints	Bedding	(%)	them the ID	le ID	m	(%)	(m)
	1	15.00	16.00	1.00	0.40	1.00	Possible sluff in hole, caving to 15.0 m- top of coal seam?, predominantly It brown siltstone with some rock fragments in brown cakey mud						9903-1 (0.4m)		100%	
					0.60		Coal: black, dull matrix with shiny bit-fragments, crumbly, no apparent texture/bedding						9903-2 (0.6m)			16.0
	2	16.00	16.70	0.70		0.70										_
					0.70		Coal: shiny black, crumbly, fragmented, very clean, vitrinite rich? *alimey- mudded up to get circulation back, minor silistone contamination with coal sample- cave in coal at silistone/coal contact						9903-3 (0.7m)			
-	3	16.70	18.00	1.30		1.30										
					1.30		Coal: mixed fine grained, soft, cakey-paste-consolidated, tiny bits of shiny coal throughout, fractures/bedding at 55° TCA						9903-4 (1.3m)			
	4	18.00	19.00	1.00		1.15					-			-		
		10.00	10.00	1.00	1.15		Coal: black, fine grained, shiny bits throughout w/ dull matrix, top 30 cm med hard, lower 70 cm soft, possible minor cleating (linear feature in one direction in cross section of core), it brown, v fg, soft mud band <1cm at 18.5 cm						9903-5 (1.0m)			
-	5	19.00	20.00	1.00	_	1.15								AM		_
					1.15		Coal: same as above, no visible partings, competent, chunky, hard						9903-6 (1.0m)	- SE	109%	
_	6	20.00	21.50	1.50		1.60			-		-			÷		_
	0	20.00	21.00	1.00	1.60	1.00	Coal: same as above, w/ few bright bands	1	25				9903-7 (1.5m)			
	7	21.50	23.00	1.50		1.59							0002.0			
					1.59		grained, medium hard at 30° TCA	1	30	30			(1.5m)			
	8	23.00	24.50	1.50		1.63										
					1.63		Coal: same as above, chunky to crumbly, polished fracture surfaces, one 2 cm parting at 23.1 m - brown mudstone at 20° TCA	2	20	20			9903-9 (1.5m)			
	9	24.50	26.20	1.70	_	1.72	Coal: came as above, y hard, chunky, no visible nartings, y		-				9903-			-
					1.72		shiny bright bands, some cleats in v shiny, bright bands	1	20	-			10 (1.7m)			-
	10	26.20	27.50	1.30		1.30	-			1			9903-			
-				-	1.15	-	Coal: same as above, gradational contact with shaly coal						11 (1.5m)			25.7
					0.15		Shaley Coal: black to dk grey-brown, v fg, soft, bright fragments in dull muddy matrix									
-	11	27.50	29.00	1.50		1.50							9903-12 (0.47m)			
-	-				0.32	-	Shaley Coal: same as above							-	100%	-
					1.15		Coal: black, med hard, w/ some hard bands, dull, chunky, crumbly, shiny bits throughout with dull matrix						9903-13 (1.15m)	3		27.3
					0.03		Few chunks at end of run- Silstone- dk grey-brown, vfg, med hard- added to FW sample 9903-14						9903-14	1		
_	12	29.00	30.50	1.50		1.45	Sätstone: dk grev-brown, med nard, u f.or, fractured, rollehed						floor		97%	
					1.45		surfaces, few carb shale bands w/ coaly fragments (<1 cm bands)						sample)			
_	13	92.50	94.30	1.80		1.05									-	
					1.05		Sandstone: fine-medium grained, med grey, fractures at 25° TCA, bedding plane fractures (?)	4	25			#0002	15		58%	
_	14	04 30	96.00	1 70		170		-	-	-	-		-	-	-	-



	0cati M N/ red I Cut 16 17 17 18 19	ion: AD83 nterval From 97.70 99.20	Eastii - Units To 99.20	ng: (m) Totl.	Lat 6611: Reco Sec.	°/_ 20.26	'/* N Long'/'/*W Northing: 5500866.16 Elevation: 158			Hol	e No:			LR99	-03C		
	0cat M NA red I Cut 16 17 18 18	ion: AD83 nterval From 97.70 99.20	Eastii - Units To 99.20 100.90	ng: (m) Totl. 1.50	Lat	°/° 20.26 overd	' /* N Long*/' W Northing: 5500866.16 Elevation: 158										
UTI Cor Box (	M N/ red I Cut 16 17 18 18	AD83 nterval From 97.70 99.20	Easti - Units To 99.20 100.90	ng: (m) Totl. 1.50	6611: Reco Sec.	20.26 overd	Northing: 5500866.16 Elevation: 158		1	r	21	Qtr.	Lsd	Sec	Twp	Rge	Mer
Cor Box (	red I Cut 16 17 18 19	nterval From 97.70 99.20 100.90	- Units To 99.20 100.90	( m ) Totl. 1.50	Reco	overd		5.5			1.0						
Box	Cut 16 17 18 19	From 97.70 99.20 100.90	To 99.20 100.90	Totl.	Sec.	_	Description		Orie	ntation	( ° TCA)	RQD	Geo Sam	Sam	Se	Rec.	ELog Depth
	16 17 18 19	97.70 99.20 100.90	99.20 100.90	1.50	1.70	Totl.	Lithology, Color, Size, Texture, Hardness, Shearing, Conta Bedding Angle, Alteration, Wetness, Contamination Sandstone: same as above	cts,	No.	Joints	Bedding	(%)	00026	ole ID	am	(%)	(m)
	10	99.20	100.90	1.50			Even by Control of										
	17 18 19	99.20	100.90			1.5	Sandstone: same as above, v fractured at base of run w/	oaly	-								
	17 18 19	99.20	100.90		1.50		fragments			25	-	-					
	18	100.90		1.70		1.40	Silty Sandstone: f gr, med grey, competent, med hard, co.	ly	-						-	000	-
	18	100.90			1.40		enses on fracture sufraces	-	3	60		-	#00027			82%	-
	19		101.60	0.70	0.00	0.54	Olite Constatence come on alcourt	-	0	40						77%	_
	19				0.54		Siny Sandstone; same as above	-	2	40						1170	
		101.60	103.00	1.40	1.40	1.40	Silty Sandstone: as above, consistent bedding? Fractue a TCA, jionts?	: 30°		30		53				100%	
	20	103.00	104.00	1.00		0.74			-			38	_				
					0.30		Silty Sandstone: as above, bedding appears parallel to co axis?	'e								74%	
					0.44		Shale: crackled, fractured, mot as hard as above and noti more fractured-fissile	ably									
	21	104.00	105.70	1.70	0.30	1.70	Shale: crackled as above	-	1			50					
					1.40		Silty Sandstone: massive, hard, less fractured, carbonate veinlets throughout, joint sets 2 orientations	-	2	70/30					-		
	22	105.70	107.00	1.30	1.30	1.30	Sity Sandstone: w/ shaley interbeds at 105.97-106.1m, 1 106.5 m, and last pieces from shoe- shaley- carb shale?, pyrite filed/lined fractures, as well as carbonate- shale sections fractured, sandstone massive, guesstimating be at 50° TCA	06.2-			50	65				100%	
-	23	107.00	108.50	1.50		1.50		-	-								
					0.50		Silty Sandstone: as above, massive and hard, irregular bu sharp contact w/ carb shale	-									
					0.60		Shale: carbonaceous shale, brown, muddy with some dar more carbonaceous shale	ker						9903-15 (0.6m)			
					0.40		Carbonaceous Shale: shaley coal interbedded thin coal w carb shale, sharp upper contact with shale unit at 50° TC	in (			50			9903-16 (0.4m)		100%	
	24	108.50	110.00	1.50	1.20	1.50	Carb Shale: shaley coal as above. Coal beds? Thin within brown muddy crab shale- mixed zone							9903-17 (1.2m)		1	
					0.30		Coal: black, shiny, massive, lacks the brown, fg mtrx of al entry	ove						9903-18 (0.3m)			110.60
	25	110.00	111.50	1.50	0.50	1.50	Coal: as above	-	-	-			-		S W		-
					0.50									00000	SEA	100%	
					0.10		Snare parting: finite fragments interbedded in coal							9903-19 (1.1m)	10-		
					0.50		Coal: dull black "ash" matrix with ver small shiny bits, ma homogeneous	sive-									111.38
					0.40		Shale parting- sharp contact at 40° TCA, carbonaceous t black shale, rocky but wekly fragmented	rown-			40			0003.00			
	26	111.50	112.10	0.60	0.60	0.60	Shale parting: as above, carbonacoues shale, possibly m coal, very dense, heavy	nor						(1.0m)			
	27	112.10	113.00	0.90		0.90	Shale parting: hard, massive, shale- softer, more crumbly		-					9903-21		1	_



Mo	ose Mo echnical Se	vices	IIII	Corenoie Log			Hol	e No:			LR99	9-03C		
Location: UTM NAD83	Easting:	Lat	°.	/' /* N Longº/' /' Northing: 5500866.16 Elevation:	* W 1585.5	_		LS	Qtr.	Lsd	Sec	Twp	Rge	Mer
Cored Interval	- Units ( m )	) Rec	overd	Description		Orie	ntation	° TCA)	RQD	Geoc	Samp	See	Rec.	ELog Depth
Box Cut From	To Toti	. Sec.	Toti.	Lithology, Color, Size, Texture, Hardness, Shear Bedding Angle, Alteration, Wetness, Contamina	ting, Contacts,	No.	Joints	Bedding	(%)	hem Ie ID	e 2 0 9903-22	ã	(%)	(m)
29 114.50	115.00 0.5	50	0.5	Snale; massvie snale parting					-	-	(1.5m)			
		0.5		Shale: carb shale as above, more fissile/fragme more carbonaceous	inted, possibly						9903-23 (0.5m)		1	
30 115.00	115.40 0.4	40	0.4	0 Shale (eithr shale): soft y fa, dk arey fissile, onu	mbly sheared						9903-24		1	-
		0.4		2 competent pieces 8 cm and 16 cm	moly, subared,				40		(0.4m)			
Total: Comments: Switc	ching back to	hammer	at 30.5	m to drill to second core point. Bit is plugging up	93.6% at 115.4 m- sof	Reco ft goug	very gey clay	- called h	notal Dri nole at 9	:30 am		-	1 11	15.4