

Tables 6.2 and 6.3, and Appendix 4 contain coal quality data and remain confidential under the terms of the *Coal Act Regulation*, Section 2(1). They have been removed from the public version.

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2013 Assessment Report for The Crown Mountain Area

Kootney Land District, Fort Steele Mining Division

NTS Map Sheets: 082G15, 082G10

Coal Tenure Numbers: 418150, 418151, 418152, 418153, 418154

British Columbia Map Reference: 082G077, 082G087

Latitude: 49.815 Longitude: 114.723

NOW 1630209 0528: Application Date 18 Jan 2013, Approval Date 29 May 2013

Coal Licences Owned by: NWP Coal Canada Ltd
Suite 800, 1199 West Hastings
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Exploration Program Operated by: NWP Coal Canada Ltd
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V6E 3T5

Work Conducted between June 1, 2013 and November 15, 2013

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Date Submitted: March 21, 2014



ASSESSMENT REPORT TITLE PAGE AND SUMMARY

TITLE OF REPORT: Assessment Report for The Crown Mountain Area 2013

TOTAL COST: \$3,079,455.79

AUTHOR(S): Art Palm

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NOTICE OF WORK PERMIT NUMBER(S)/DATE(S): 13-1630209-0528

STATEMENT OF WORK EVENT NUMBER(S)/DATE(S): 13/05/21 to 13/09/06

YEAR OF WORK: 2013

PROPERTY NAME: Crown Mountain

CLAIM NAME(S) (on which work was done):

Coal Tenure Numbers : 418150 418151

COMMODITIES SOUGHT: Coal

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN:

MINING DIVISION: Kootney Land District, Fort Steele Mining Division

NTS / BCGS: 082G15, 082G10

LATITUDE: 49.815°

LONGITUDE: 117.723 (at centre of work)

UTM Zone:11 EASTING:663221 NORTHING:5521546

OWNER(S): NWP Coal Canada Ltd

MAILING ADDRESS:

Suite 800, 1199 West Hastings Street, Vancouver, V6E 3T5

OPERATOR(S) [who paid for the work]: NWP Coal Canada Ltd

MAILING ADDRESS: Suite 800, 1199 West Hastings Street, Vancouver, V6E 3T5

REPORT KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude. **Do not use abbreviations or codes**)

Coking Coal, Drilling, Pre-Feasibility Study

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS:

Assessment Report for the Crown Mountain Area 2012, March 21 2013

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (in metric units)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)			
Ground, mapping	N/A		
Photo interpretation	N/A		
GEOPHYSICAL (line-kilometres)			
Ground	N/A		
Magnetic	N/A		
Electromagnetic	N/A		
Induced Polarization	N/A		
Radiometric	N/A		
Seismic	N/A		
Other	Down-hole surveys - all drill holes		
Airborne			
GEOCHEMICAL (number of samples analysed for ...)			
Soil	N/A		
Silt	N/A		
Rock	N/A		
Other	N/A		
DRILLING (total metres, number of holes, size, storage location)			
Core	856 m 7 holes 150mm diameter	418150 (2 holes)	418151 (5 holes)
Non-core	797 m 6 holes		418151 (6 holes)
RELATED TECHNICAL			
Sampling / Assaying	110 (Analysis Certificates – Birtley)		
Petrographic	30 (Coal tech & Pearson)		
Mineralographic	110 (Birtley)		
Metallurgic	9 (Canmet)		
PROSPECTING (scale/area)			
PREPATORY / PHYSICAL			
Line/grid (km)	N/A		
Topo/Photogrammetric (scale, area)	N/A		
Legal Surveys (scale, area)	N/A		
Road, local access (km)/trail	1.75km	418151	
Trench (number/metres)	N/A		
Underground development (metres)	N/A		
Other	N/A		
		TOTAL COST	

Crown Mountain Assessment Report

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1 INTRODUCTION

This report presents results of coal exploration activities conducted during the summer and fall of 2013 on the Crown Mountain property located in southeastern British Columbia (BC). Norwest Corporation (Norwest) was contracted by NWP Coal Ltd, a wholly owned subsidiary of Jameson Resources Limited (Jameson), to assist with this exploration program.

I. 2013 Project Objectives

- oversight of an exploration program involving the drilling of 6 large diameter core holes and 7 reverse circulation drill holes;
- carry out washability test work on the core samples to determine plant yield;
- develop a definitive understanding of the coking properties of the clean coal product;
- interpretation of the geological results from that work;
- further refine the computer generated geologic model from the drilling in the Crown Mountain area; and
- Re-estimation of the coal resources on the property through the preparation of a computer geologic model.

II. Property Description and Access

The property is located in a mountainous area at relatively high elevations about 13 km east of Sparwood, BC and about 150 km line-of-sight south southwest from Calgary, Alberta. The North Block and South Block of the property are located about 35 km by road from Sparwood. Similarly, the South Extension is a road distance of 20 km from the same location. The location of the property is shown on Figure 1-1. The property is divided up into three areas: the North Block, South Block and Southern Extension Block.

Access to the North and South Blocks is via British Columbia Highway 43, and the Line Creek Road, both of which are paved, and via a series of unpaved secondary roads and trails. Access to the Southern Extension Block is via Highway 3 and the gravel Alexander Creek Road. On the property, drill sites and other exploration locations require the use of suitable 4x4 vehicles for surface access due to the nature of the roads.

The main line of the Canadian Pacific Railroad lies adjacent to Highway 3 from Alberta to Sparwood and then trends south to Fernie before continuing on the ports on the west coast. A spur from this line extends to the north following the Elk Valley to service the Line Creek and other mines of that area.

The relief on the property is generally in the range from 2,200 m to about 1,850 m. However in Alexander Creek which drains the property it is typically in the range from 1,400 m to 1,500 m. On the top of Gaff Peak, located to the west of the licenses the elevation is as much as 2,479 m. For most of the property, topography consists of rugged ridges with moderate to steep-sloping sides at higher elevations and gentle slopes at lower elevations. The setting is truly mountainous, underlain mostly by structurally deformed sandstone, siltstone, mudstone and coal.

Alexander Creek drains the property and passes through the center of the southern part of the property, trending generally from north to south. Other important rivers in the area include the Elk River, the valley of which includes Highway 3 to the west of the property and the Crowsnest River to the south; Alexander Creek flows into the Crowsnest River. Water should be available from any of these sources or from several streams that are tributaries to these rivers. Power lines follow the route of Highway 3 and service the various communities in the area.

Records from the weather recording station indicate total average yearly precipitation is 105 cm with winter snowfall averaging 368 cm. The highest and lowest temperatures recorded at Fernie were 36°C and minus 40°C, respectively. Despite the temperature range, the open pit mines in the surrounding region operate through all seasons of the year.

During exploration in this general area snow depths in the higher elevations have been reported to exceed 4 m in places. Snow can cover the ground from late September to the end of May at higher elevations. The property, especially in the east, is vegetated by native vegetation that is typical of the Subalpine Forest zone of this area.

III. Property History

The history of exploration and development of this coal property extends back to coal development activities in southern Alberta and Southeast British Columbia of the late nineteenth century. At that time, the Crow's Nest Pass Coal Company was established in 1897 to develop the coal resources of the British Columbia side of the Crowsnest Pass. Several subsidiaries were created to operate ancillary activities. They included the Morrissey, Fernie and Michel Railway, and the Crows Nest Pass Electric Light and Power Company. Various mines were opened at Coal Creek, Natal, Michel and Morrissey. After the Second World War demand for coal dropped and the company diversified through a subsidiary, Crow's Nest Pass Oil and Gas Company. As the 1950s and 1960s progressed the mines were closed and the company moved into the forest products area.

In 1965 the name of the company was changed to Crows Nest Industries Ltd. In 1968 the company's coal resources were sold to Kaiser Steel and the assets of Crows Nest Pass Electric Light and Power were sold to British Columbia Hydro. However there are existing historic references to coal drilling exploration being completed by Crows Nest Industries Ltd. in the Crown Mountain area in 1969 and exploration data from that program has been used in the

present report. Thus either the date of the sale to Kaiser is incorrect or the Crown Mountain asset was never sold to Kaiser Steel. Either way, the Crown Mountain Coal Property was owned by Crows Nest Industries in 1976.

A change in the demand for coal resulted in the company reacquiring some coal lands from Kaiser in 1976. In 1977 Shell Canada purchased the company and renamed it Crows Nest Resources Limited. That company was sold in 1991 and ownership and responsibility for at least some of its coal assets were transferred with the sale.

Crows Nest Resources Limited explored the property for three field seasons from 1979 through 1981. In 1979 the property was mapped and drilled, the latter including both core and cuttings sampling of different holes. The program of 1980 was a relatively minor one only including geologic mapping. The program of 1981 consisted of further mapping, hand trenching of seam exposures and the construction of a mechanically excavated pit and the collection of a bulk sample. These activities appear to be the last exploration works performed on this property during the Crows Nest Resources/Shell Canada tenure. Eventually the property was relinquished and later acquired by Morris Geological. It appears that no further exploration work was conducted on the property until it was acquired by Jameson.

Jameson Resources Limited through its subsidiary NWP Coal undertook a major exploration program which included field mapping, trenching and drilling in 2012. All exploration was supervised by Norwest Corporation. Field mapping was completed to verify the geological observations reported from the 1979 and 1981 programs. A total of 12 trenches, in which the coal seams were well exposed, were constructed using a back hoe. Some, but not all, of these were permitted as “Deep Trenches” with a depth of 3 m. Roadside-cut shallow trenches were usually less than 1.2 m deep. When a trench intersected coal it was sampled as channels and this material was also sent to the laboratory for analysis. The drilling and coal sampling program included 41 holes for a total penetrated depth of 5,768 m. A total of nine angle holes and 31 vertical reverse circulation holes were drilled. All of the holes in the program were geophysically logged except where poor hole conditions prevented it.

IV. Property Location and Coal Tenure

The Crown Mountain Coal Property is located in the Elk Valley Coalfield in the East Kootenay region of southeast British Columbia. It is approximately 150 km line-of-sight and 300 km by road southwest of Calgary, Alberta. The center of the property is about 30 km northeast of Sparwood, British Columbia, at Latitude 1140 43.6'W, Longitude 490 48.4'N, as shown on Figure 2-1. The location and distribution of the coal licences is shown on Figure 1-2. According to the tenure records of the British Columbia Provincial Government, title to the coal licences is held by NWP Coal Canada Ltd. (NWP Coal) of Vancouver, British Columbia. NWP Coal holds

a 100% interest in five adjacent coal licences that cover a combined area of 2,588 ha. Table 1.1 is a reproduction of the government records concerning these titles.

TABLE 1.1
JAMESON RESOURCES LIMITED
CROWN MOUNTAIN COAL PROPERTY
COAL LICENCE TENURE DATA

Tenure Number	Map Reference	Work Recorded to	Status	Mining District	Area (ha)
418150	082G087	May 2, 2013	Good Standing Mar 21, 2014	Fort Steele	334
418151	082G077	May 2, 2013	Good Standing Mar 21, 2014	Fort Steele	1001
418152	082G087	May 2, 2013	Good Standing Mar 21, 2014	Fort Steele	167
418153	082G087	May 2, 2013	Good Standing Mar 21, 2014	Fort Steele	251
418154	082G087	May 2, 2013	Good Standing Mar 21, 2014	Fort Steele	835
418430	082G087	May 2, 2013	Good Standing Mar 21, 2014	Fort Steele	975

Jameson, acting through NWP Coal, originally acquired the coal licence rights to the Crown Mountain Coal Property from Robert J. Morris. The completion of that transaction led Jameson to acquire a 90% interest in the property, the remaining 10% being retained by Robert J. Morris as an undivided interest.

NWP Coal applied for an additional coal licence (418430) which adjoins the western margin of the existing tenure area. The application which covers 975 hectares was accepted by Mineral Titles BC on October 16th 2013.

V. 2013 Summary Of Work

Prior to mapping, drilling and trenching, numerous existing roads and trails were improved to allow 4x4 and drill rig access. In addition, a number of new roads, drill pads and sumps were constructed.

In 2013 NWP Coal Ltd conducted a drilling and coal sampling program on the property. The program was completed by Elk Valley drilling specialist Foraco Canada Ltd and included 13 holes for a total penetrated depth of 1,649 m. A total of seven LDC (150mm) holes ranging in depth from 71 to 151m (average 122m) for approximately 853 metres and six RC drill holes for approximately 796 metres were completed.

All of the holes in the program were surveyed and also geophysically logged except where poor hole conditions prevented it.

2 COSTS INCURRED

TABLE 2.1
JAMESON RESOURCES LIMITED
CROWN MOUNTAIN COAL PROPERTY
COSTS INCURRED

LICENCE NUMBER	Amount
Cost Centre	
Drilling	\$ 700,422.38
Data Administration	\$ -
Environmental & Rehabilitation	\$ 310,483.53
Economic Studies	\$ 539,397.95
Exploration - Technical Services including field costs	\$ 839,838.86
Laboratory and Coal Quality Testwork	\$ 240,214.10
Acquisition	\$ 100,000.00
Applications	\$ 6,850.00
Land Administration	\$ 14,547.88
First Nations	\$ 750.00
Rents/rates/permits	\$ 18,116.00
Geophysics and Remote sensing	\$ 57,668.35
Site Preparation	\$ 251,166.74
TOTAL	\$ 3,079,455.79

3 DRILLING

I. Description

In 2013 Jameson conducted a drilling and coal sampling program on the Crown Mountain property. The program included seven Large Diameter Core (LDC) (150mm) holes ranging in depth from 71 to 151m (average 122m) for a total of approximately 853 metres and six RC drill holes for approximately 796 metres. In total 13 holes were drilled for an advance of 1,649 m.

LDC holes were twinned from existing 2012 and 2013 reverse circulation pilot holes. Drill core and sampling methodologies are discussed in following sections of this report. A minimum of 3 metres and up to 30 metres of casing was used in every hole depending on ground stability. Casing was removed once wireline logging was complete. All LDC holes were drilled vertically on the same pad as an RC hole. Five of the LDC holes were twinned from a 2012 RC pilot hole and the other two LDC holes were twinned from a 2013 RC pilot hole. All LDC hole names have the same prefix as the RC pilot hole however are distinguished from these by the suffix “-CH”.

Construction for the 2013 drilling program began June 12, 2013. Construction of the new roads, drill pads and helicopter pads, as well as the filing of applications, permits and the Notices of Work, was carried out by Silenus Resource Management Inc. (Silenus). A summary of the work done by Silenus for the 2013 drilling program can be found in Appendix 1 of this report. Drill pads were constructed for all holes along with sumps to collect the waste water produced during drilling. Water used during the drilling was collected from a sump proximal to a minor intermittent stream along the Crown Mountain access road (Branch C – proximal to the 91 marker point).

Drilling services were contracted by Foraco Canada Ltd of Calgary, Alberta. The drill was a truck-mounted TH 100 drill rig capable of drilling with air or water. The drilling equipment and crews were mobilized on August 15, 2013. The drilling operations ran continuously on two 12 hour shifts per day from August 19 to September 9, 2013. The crew for each shift consisted of a driller and three driller’s helpers. During the day shift a drilling foreman from Foraco Drilling and mine manager from either Jameson or Silenus were also present and were on call during the night shift. A day shift and a night shift geologist were present at all times to supervise the coal sampling as well as to determine when total depth of the hole had been reached.

II. LDC Drilling (Coring)

The Elk Valley coalfield historically does not favor conventional core drilling. Typically, core recoveries are low, resulting in little if any reliable samples. To address these concerns, Jameson elected to use Large Diameter Core (LDC) (150mm). It was considered that the LDC holes were the key to acquiring adequate bulk samples to definitively establish plant yield and coking coal characteristics.

The 2013 drill program included seven LDC holes ranging in depth from 71 to 151m (average 122m) for a total of approximately 853 metres.

Drilling focused on the key North and South Blocks of the project area. Three holes CM12-01-CH, CM11-12-CH and CM11-11-CH were drilled on the North Block. Four holes CM11-22-CH, CM11-19-CH, CM13-25-CH and CM13-15-CH were drilled on the South Block.

Prior to coring a 10¾ inch casing was set using a casing advance system. All the LDC holes were drilled to core point using a 9½inch hammer or tricone bit pending the amount of water in the hole. Core samples were collected using a double split barrel and sample size was 5.95 inch (150mm).

Prognosis depth to coal seams was known from the geophysical log of the RC pilot hole. The driller was advised prior to reaching top of seam. Core catcher tools were used through less competent coal zones to ensure maximum recovery. The core recovery on the seven LDC holes was excellent: recovery averaged over 97 percent.

III. RC Drilling

The 2013 drill program included six RC drill holes ranging in depth from 54 to 194 metres (average 133 metres) for a total for approximately 796 metres. One hole CM13-06 was drilled in the south of the North Block to confirm the southern extension of the 2012 geological model. Two holes CM13-15 and CM13-17 were drilled in the northern extension of the South Block which is also referred to as the East Pit in the Preliminary Economic Assessment study.

The reverse circulation holes were drilled with a 5½ inch downhole hammer. A 5¼ inch tricone bit was occasionally used when hole was watered out or other drilling problems were encountered. The rig had a cyclone system for accumulating the mixture of air, water and drilling cuttings for sample collection. Wet samples were discharged over a high frequency shaker table with API 325 screen to decant water.

Prognosis depth to coal seams was interpreted from the 2013 geological model. The driller was advised prior to reaching top of seam. Samples were passed over a 325 mesh vibrating screen to ensure the vast majority of fine coal was retained and dewatered as much as possible. Overall sample recovery was good.

TABLE 3.1
JAMESON RESOURCES LIMITED
CROWN MOUNTAIN COAL PROPERTY
2013 DRILL HOLE SUMMARY

Hole Name	Northing (m)	Easting (m)	Elevation (m)	Total Depth (m)	Open Hole Log (m)	Pipe Log Depth (m)	Dip/Dir	Azm	Deviation (m)	Casing (m)	Completed	Hole Type	Year Drilled
CM11-11-CH	5521503	662704	2088	126	125.97	125.71	90	-	1.5	8.2	19/08/2013	LDC	2013
CM11-12-CH	5521641	662856	2171	73.5	73.15	73.44	90	-	1.5	8.7	21/08/2013	LDC	2013
CM11-19-CH	5518162	663409	1886	150.5	149.79	150.08	90	-	5.3	11.35	30/08/2013	LDC	2013
CM11-22-CH	5519710	663756	2121	126.5	126.09	125.95	90	-	0.6	11.5	27/08/2013	LDC	2013
CM12-01-CH	5522037	662429	2143	152	151.32	151.34	90	-	1.6	29.8	24/08/2013	LDC	2013
CM13-15-CH	5521545	663225	2132	124.5	124.04	124	90	-	11.1	11.3	8/09/2013	LDC	2013
CM13-25-CH	5517924	663769	1938	102.5	102.15	102.09	90	-	1.7	11.3	6/09/2013	LDC	2013
CM13-06	5521114	662823	1998	54.15	53.75	53.75	90	-	0.24	8.8	16/08/2013	RC	2013
CM13-15	5521546	663221	2132	139.5	138.94	138.94	90	-	27.54	8.8	4/09/2013	RC	2013
CM13-17	5520986	663621	2138	194.5	193.75	193.31	90	-	21.55	5.6	3/09/2013	RC	2013
CM13-19	5518852	663402	1929	136	51.06	127.4	90	-	0.7	8.6	1/09/2013	RC	2013
CM13-20	5518426	663264	1877	158	53.95	156.16	90	-	0.7	12	31/08/2013	RC	2013
CM13-25	5517927	663769	1938	115.2	114.27	114.62	90	-	3.2	11.7	2/09/2013	RC	2013

4 GEOPHYSICAL LOGGING

All of the geophysical logging in the 2013 drilling program was performed by Century Wireline Services Inc. of Red Deer County, Alberta. The wireline logging was done in four runs when hole conditions permitted. The first two runs were through the drill pipe, and the second two runs were open hole. The first run through the drill-pipes was with a Gamma-Neutron tool, the second run was a Gamma-Density. After the first two runs, the drill pipe was pulled out of the hole and a Gamma-Neutron tool without a live source was run down hole to obtain a deviation log and assess hole conditions. If the hole conditions were deemed to be favorable, a live source Gamma-Density was run. If hole conditions were determined to be unfavorable, the fourth run was not attempted to avoid the possibility of a live source from becoming stuck down the hole. All 13 holes were logged through the pipe and logged open hole. The wireline logs can be found in Appendix 4 of this report.

5 COAL SAMPLING

I. Core

All LDC holes were twinned from existing 2012 and 2013 RC pilot holes. Holes were drilled vertical and selected zones were cored. Certain sections of thick interburden (sandstone) were hammer drilled. Core recovery from the LDC was excellent - overall greater than 95%.

Prognosis depth to coal seams was known from the geophysical log of the RC pilot hole. The driller was advised prior to reaching top of seam. Core catcher tools were used through less competent coal zones to ensure maximum recovery.

All core was photographed immediately following separation of the split barrel at the rig and also following mark-up. Core was geologically and geotechnically logged before sampling and shipment to lab.

All coal seams ≥ 0.5 metres were sampled. The entire coal zone was sampled and bagged for analysis. Rock partings ≥ 0.5 metres were sampled and bagged separately in polywoven cloth bags. Each bag was labeled on the outside with the hole ID/sample number for identification purposes. Each bag also contained a paper sample tag containing this information. Zip ties were used to close each sample bag.

Samples were placed inside plastic tote bins and transported from the drill site to Sparwood in the back of a pickup truck after each hole was finished. Tote bins were kept in a storage facility until a large enough quantity was arranged to be transported. Rosenau Transport Ltd. of Sparwood transported the tote bins containing samples to GWIL –Birtley Coal Laboratory's in Calgary, Alberta for analysis and testing.

Roof and floor dilution samples were also collected and sent to laboratory for test work. All remaining core sample (non-coal) was retained in wooden boxes and has been retained on pallets at each drill site within project area.

II. RC Samples

The drilling and sampling for each drill hole was primarily done utilizing continuous water injection. The rig had a cyclone system for accumulating the mixture of air, water and drilling cuttings for sample collection. Wet samples were discharged over a high frequency shaker table with API 325 screen to decant water.

Prognosis depth to coal seams was interpreted from the 2013 geological model. The driller was advised prior to reaching top of seam. Samples were passed over a 325 mesh vibrating screen to ensure the vast majority of fine coal was retained and dewatered as much as possible. Overall sample recovery was good.

When a coal interval was penetrated during reverse circulation drilling, cuttings samples were collected from the return shoot as the base of the shaker table. Samples were collected on 0.5 metre intervals as soon as coal zones were reached. Drilling was stopped between each sample for dewatering and to allow accurate interval separation.

The entire coal zone was sampled and bagged for analysis. Rock partings ≥ 0.5 metres were sampled and bagged separately in polywoven cloth bags. Each bag was labeled on the outside with the hole ID/sample number for identification purposes. Each bag also contained a paper sample tag containing this information. Zip ties were used to close each sample bag.

Samples were placed inside plastic tote bins and transported from the drill site to Sparwood in the back of a pickup truck after each hole was finished. Tote bins were kept in a storage facility until a large enough quantity was arranged to be transported. Rosenau Transport Ltd. of Sparwood transported the tote bins containing samples to GWIL –Birtley Coal Laboratory in Calgary, Alberta for analysis and testing.

6 COAL ANALYSIS

Laboratory analysis was distributed amongst several facilities in North America as follows:

- Birtley Coal and Minerals Laboratory, Calgary, Alberta, Canada: Birtley was responsible to receive all samples and perform the initial lab preparation, which included air drying and size reduction.
- SGS Labs, Beckley, West Virginia, United States: Birtley forwarded splits of processed coal to SGS for the purpose of performing the Sapoznikof test.
- CoalTech, Murrysville, Pennsylvania, United States: CoalTech performed petrographic analyses on selected prepared samples received from Birtley.
- Pearson Coal Petrography, Inc, Victoria, British Columbia, Canada: The Pearson lab performed petrographic analyses on duplicate samples, for check and comparison versus CoalTech.
- CanMet, Ottawa, Canada: This facility received 13kg prepared samples from Birtley and performed sole heated oven (SHO) testing to determine coke strength after reaction (CSR). CanMet also performed petrographic analyses.

Per the coal testing flow sheet (Table 6.1), all samples were shipped directly from the field to Birtley for initial preparation. Birtley logged in receipt of the samples and performed initial processing. For core, this involved size reduction and screening. For RC samples the first step was air drying.

Light transmittance (LT) tests were performed to determine oxidation. If no or little oxidation was present, the sample was processed as a potential coking coal. Where oxidation was significant, a suite of tests to evaluate thermal coal quality was performed.

A secondary screen was free swelling index (FSI). The initial intent of the FSI test was to process only coals above a certain FSI through the entire coking coal testing suite, but due to the desire for completeness, all non-oxidized coal was processed further regardless of FSI.

Core material was attrited to simulate the size reduction caused by mining, transportation and handling, and plant processing. This involved Birtley performing drop shatter testing and dry and wet tumbler processing. After attrition, size fractions were determined by screening, and any oversize was hand-knapped to pass a 25mm screen.

The sized material was then split, and an appropriate fraction subjected to float/sink testing (washability testing) at a range of gravities *generally 1.3 to 1.8). Four size fractions were utilized, and percent float was determined on an individual and cumulative basis, for each gravity in each size fraction.

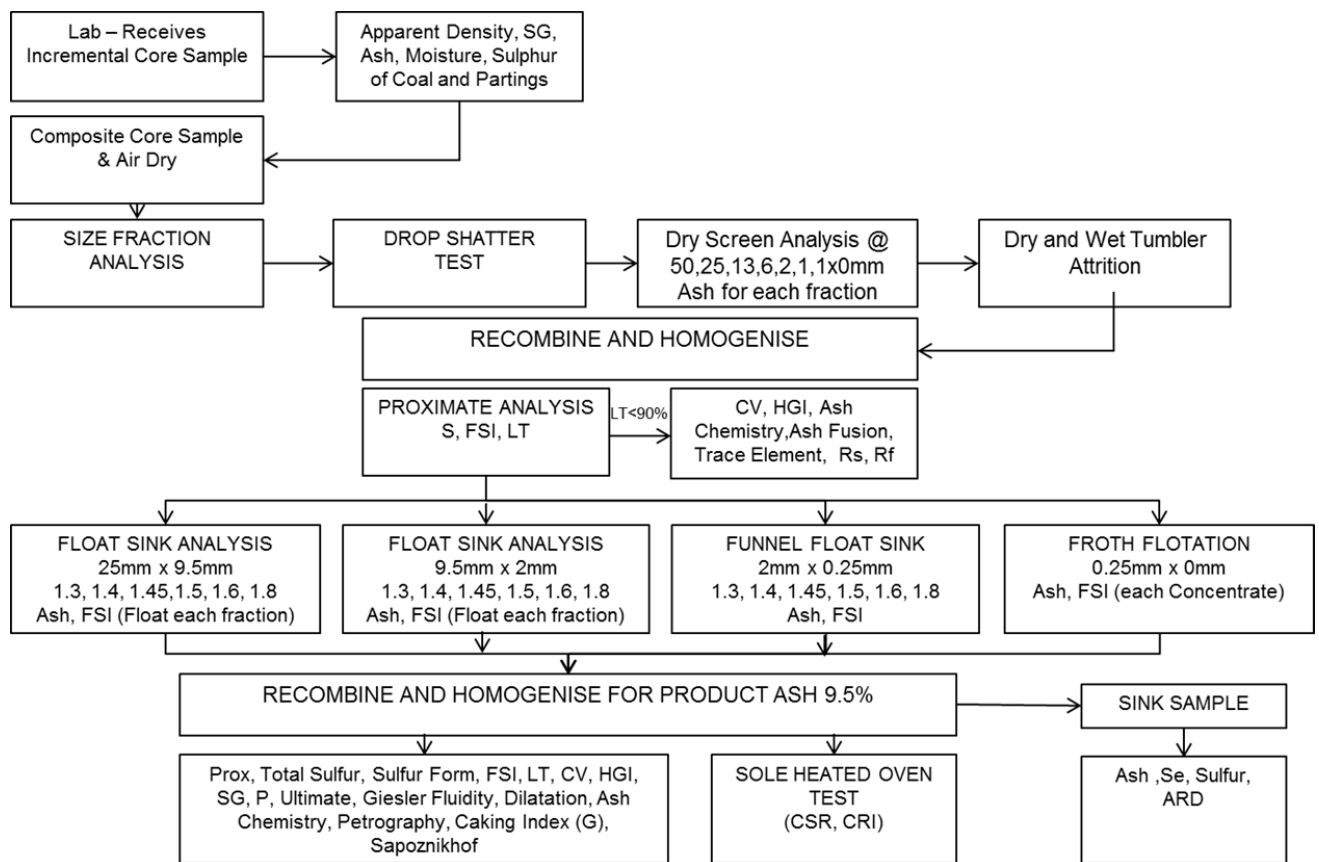
For the finest size fraction (minus 0.25mm) froth flotation was employed as a recovery method instead of the heavy media liquid used for the coarser fractions.

After washability, Birtley combined selected fractions to best represent what an actual wash plant product from the core hole's area of influence would be, with a target dry ash of approximately 8.5 to 9.5 percent (the range for typical competing products on the international market). This was done for each major seam (8, 9, 10), for rider seams (8R, 9R) where present in adequate amounts, and for a blend of seams. The blending was directed by Norwest Corporation and intended to represent the estimated portions of the resource present in the immediate area. After Birtley created the representative samples, several additional tests were performed. All tests identified on the flow sheet were done by Birtley with the exception of those tests identified by lab at the start of this section (ie: CanMet performed CSR test, etc).

The procedure for evaluating RC samples was considerably less broad than the core sample processing. After sample preparation, RC samples were run through a float/sink at 1.50 gravity, and limited additional testing (FSI, and selected petrography) was then performed.

The objective of the coal analysis program was to gain as much information as possible on the recovered core. As a result, no intact core samples remain, and any leftover material that remains is stored at Birtley and will be disposed of in due course.

TABLE 6.1
JAMESON RESOURCES LIMITED
CROWN MOUNTAIN COAL PROPERTY
2013 LABORATORY FLOW SHEET



7 GEOLOGICAL SETTING

I. Regional Stratigraphy

The general stratigraphic succession is summarized on Figure 7-1. The Jurassic-Cretaceous Kootenay Group includes, from top to base, the Elk Formation, the Mist Mountain Formation, and the Morrissey Formation (Grieve and Ollerenshaw, 1989-2). The major coal bearing unit is the Mist Mountain Formation. The Kootenay Group conformably overlies the Fernie Formation. The regional geology of the property is shown on Figure 7-2.

The Fernie Formation

Grieve and Kilby state that: “The marine Fernie Formation, of Jurassic age, is the oldest stratigraphic unit in the block. It is primarily a recessive unit, in contrast to the overlying Kootenay Group. Its base is marked by a thin band of phosphorite and phosphatic shale, which gives way to dark gray shale, overlain by the Rock Creek Member, which is composed of brownish silty shale with thin black limestone beds. The overlying Grey Beds consist of medium brownish grey shale with interbeds of calcareous sandstone and impure limestone (Price, 1962). A glauconitic sandstone or shale unit (Green Beds) immediately underlies the uppermost unit, the Passage Beds, which is a coarsening-upward sequence of interbedded shale and sandstone transitional to the Morrissey Formation of the overlying Kootenay Group”.

The Morrissey Formation

The base of the overlying Late Jurassic to Early Cretaceous Kootenay Group is marked by the Morrissey Formation which is resistant and easily mapped in most areas of its occurrence. It averages 40 m in thickness in the area, and consists of two members (Gibson, 1985). The lower Weary Ridge Member is predominantly a fine-grained, quartzose, argillaceous, calcareous and ferruginous sandstone. The upper Moose Mountain Member is the more resistant and consists predominantly of medium-grained quartz-chert sandstone. Thin interbeds of carbonaceous shale and coal occur locally within the Moose Mountain Member.

The Mist Mountain Formation

The economically important Mist Mountain Formation conformably overlies the Morrissey Formation. It is moderately recessive to moderately resistant depending on the proportion of resistant sandstone or conglomerate beds it contains. It averages 500 m in thickness in the Crowsnest coalfield. Mist Mountain Formation in the Crowsnest coalfield consists of an interbedded sequence of siltstone, sandstone, mudstone, shale, coal and conglomerate of predominantly nonmarine origin. Fine-grained clastic rocks tend to be dark grey because of their carbonaceous content, while the sandstones, which contain grains of quartz, chert and quartzite (Gibson, 1985), tend to be somewhat lighter in color.

The depositional environment for the Mist Mountain Formation is that of an interbedded sequence of sandstone, siltstone, mudstone, shale, and coal, with rare conglomerate. It represents sediment deposition on a non-marine delta plain which prograded eastward into the inland Fernie Sea, and which received terrigenous clastic material eroded from tectonically active uplands to the west (Gibson, 1977; Jansa, 1972). Sediments are believed to have been deposited on lower delta coastal plains and upper delta alluvial plains, with the former being restricted to the basal part of the section (Gibson, 1977; Jansa, 1972). Deposition in alluvial channels and flood plains is generally inferred, with the latter environment represented by deposits typical of levee, crevasse, splay, flood-basin and swamp or marsh settings (Gibson and Hughes, 1981). No marine or brackish water deposits have been identified within the section.

The Elk Formation

The Elk Formation, which gradationally overlies the Mist Mountain Formation, is the uppermost formation in the Kootenay Group. It is a relatively resistant nonmarine unit dominated by coarse clastic rocks and in the Crowsnest coalfield it varies in thickness from a maximum of 482 m on Sparwood Ridge (Gibson, 1985) to 155 m near McLatchie Creek (Grieve and Ollerenshaw, 1989). Thicknesses of 327 m (Grieve and Ollerenshaw, 1989) and 253.5 m (Gibson, 1985) have been recorded at Flathead Ridge and Mount Taylor, respectively. In general it decreases in thickness from west to east. It is composed of sandstone, siltstone, mudstone, shale, coal and, locally, conglomerate. Sandstone units tend to be more numerous and laterally continuous than those in the Mist Mountain Formation. Conglomerates are associated with sandstone units, and achieve greatest concentration and thickness within the thickest sections, that is, at the western edge of the coalfield. Siltstone is generally similar to that in the Mist Mountain Formation, with the exception of the light grey weathering, well-indurated "needle siltstones" (Gibson, 1977).

The Blairmore Group

The contact with the overlying Lower Cretaceous Blairmore Group occurs at the base of the Cadomin Formation, the basal unit of the nonmarine Blairmore Group. In the Crowsnest coalfield this contact is abrupt and scoured, but may be conformable, at least in the western part of the coalfield (Gibson, 1979; Ricketts and Sweet, 1985). The Cadomin Formation in the Crowsnest coalfield consists of one or more thick cliff-forming chert-pebble to cobble conglomerate beds separated by recessive greenish and maroon mudstone units with a locally developed thin bed of light grey, nodular-weathering micrite. The Cadomin Formation is gradationally overlain by the Lower Blairmore, which in the Crowsnest coalfield is a 455 m thick recessive sequence of greenish grey, grey and maroon mudstone, with interbedded siltstone, cherty sandstone, conglomerate and minor limestone (Ollerenshaw, 1981a). The conformably overlying Beaver Mines-Mill Creek Formation in the Crowsnest coalfield is a sequence of greenish grey and maroon mudstone, sandstone and conglomerate 1,875 m thick.

Unconformably overlying the Blairmore Group are two marine shale sequences of the Blackstone and Wapiabi Formations. These are separated by nonmarine sandstone and shale of the Cardium Formation of the Alberta Group.

The Mist Mountain Formation of the Jurassic-Cretaceous Kootenay Group is the primary coal-bearing unit on the property and encompasses all of the economic coal seams. It conformably overlies the Moose Mountain Member of the Morrissey Formation. Except where controlled by faulting in the northernmost part of the South Block, the Mist Mountain Formation is the formation which crops out at the surface. The Morrissey Formation conformably overlies the Fernie Formation; these units are separated by a transitional zone of interbedded shale and sandstone with the former having the same characteristics as those of the Fernie Formation. A marker bed, normally found 5 m to 10 m below the base of the Moose Mountain Member, was found in all drill holes on the property that penetrated to that depth.

Based on results from the 2012 drilling campaign, the North Block has a preserved thickness in the range from 43 m to 145 m of Mist Mountain Formation strata. The equivalent values for the South Block are from 72 m to 162 m. Similarly, on the Southern Extension the Mist Mountain sequence is from 55 m to 110 m thick.

The top of the underlying Morrissey Formation is located from about 2 m to 13 m below the 10 Seam Lower which is the deepest coal unit on the property. The contact is readily identifiable because the Morrissey Formation is a distinct, weathering-resistant unit. Above the 10 Seam is the 9 Seam; the roof of this seam in the North Block, and occasionally in the South Block, is a weathering-resistant blocky unit of fine-to-medium grained sandstone that commonly displays an orange weathering color, it is locally referred to as the Ridge Sandstone. Both the Ridge Sandstone and the sandstone of the Moose Mountain Formation are mapped at the surface at various locations throughout the property.

II. Regional Structure

The tectonic history of this region has produced structural deformation on every scale. Southeast British Columbia coalfields are part of the Lewis Thrust plate. This plate is characterized by features associated with the compressional Laramide tectonic regime during deformation of the Rocky Mountain front ranges in late Cretaceous and early Tertiary time, namely flexural slip folds with north to northwest trending axes, and west-dipping thrust faults. A period of extensional faulting followed in late Eocene and early Oligocene time (Price, 1965), some of which occurred on earlier thrust fault surfaces.

According to Grieve (1993):

“The Lewis Thrust Sheet in the Elk Valley Coalfield is bounded to the east by the outcrop of the Lewis Thrust Fault and to the west by the Bourgeau Thrust Fault. The

plane of the Lewis Thrust Fault has been folded by movement on a younger underlying thrust. Outcrop expressions of subsurface folds in the Lewis Thrust include the Alexander Creek Syncline and the Fording Mountain Anticline. The Alexander Creek Syncline underlies the entire length of the coalfield and encompasses the Line Creek Mine and the Eagle Mountain component of the Fording Coal Operation.

The Alexander Creek Syncline is the dominant structure in the Elk Valley Coalfield as it underlies the main body of the coalfield throughout its entire 97 km length. The syncline is generally upright but is locally steeply inclined. It is mainly an asymmetric fold, with the west limb being shorter in most cases.” Grieve maps the Alexander Creek Syncline as being the large syncline that forms the mineable structure on the North Block of Crown Mountain.

A second significant structure on the Crown Mountain Coal Property appears to be the Ewin Pass Fault. Again, according to Grieve (1993) “The Ewin Pass Fault occurs in the east limb of the Alexander Creek Syncline throughout much of the south half of the coalfield. It may also continue southward from Line Creek to Crown Mountain, assuming that the Crown Mountain Fault is the same structure, although there is no direct evidence for this. Throughout its length it has had the effect of thickening the east limb by causing a repetition of strata. The Ewin Pass Fault has been depicted in the subsurface by Price and Grieve as a listric, west-dipping splay of the Lewis Thrust.

The Crown Mountain Fault has placed west dipping Fernie formation strata in the east limb of the Alexander Creek Syncline over west dipping strata of the lower part of the Mist Mountain Formation.”.

III. Property Stratigraphy

The Mist Mountain Formation of the Jurassic-Cretaceous Kootenay Group is the primary coal-bearing unit on the property and encompasses all of the economic coal seams. It conformably overlies the Moose Mountain Member of the Morrissey Formation. Except where controlled by faulting in the northernmost part of the South Block, the Mist Mountain Formation crops out at the surface. The Morrissey Formation conformably overlies the Fernie Formation; these units are separated by a transitional zone of interbedded shale and sandstone with the former having the same characteristics as those of the Fernie Formation. A marker bed, normally found 5 m to 10 m below the base of the Moose Mountain Member, was found in all drill holes on the property that penetrated to that depth.

Based on results from the 2012 drilling campaign, the North Block has a preserved thickness in the range from 43 m to 145 m of Mist Mountain Formation strata. The equivalent values for the

South Block are from 72 m to 162 m. Similarly, on the Southern Extension the Mist Mountain sequence is from 55 m to 110 m thick.

The top of the underlying Morrissey Formation is located from about 2 m to 13 m below the 10 Seam Lower which is the deepest coal unit on the property. The contact is readily identifiable because the Morrissey Formation is a distinct, weathering-resistant unit. Above the 10 Seam is the 9 Seam and the roof of this seam in the North Block, and occasionally in the South Block, is a weathering-resistant blocky unit of fine-to-medium grained sandstone that commonly displays an orange weathering color, it is locally referred to as the Ridge Sandstone. Both the Ridge Sandstone and the sandstone of the Moose Mountain Formation are mapped at the surface at various locations throughout the property.

IV. Property Structure

Grieve (1993) has suggested that the major structures, the Alexander Creek Syncline and the Ewin Pass Fault associated with and located to the east of it, both extend south onto the Crown Mountain Coal Property. The presence of the syncline on the Crown Mountain property has been recognized for a long time and the Crown Mountain Fault, Grieve's suggestion for the extension of the Ewin Pass Fault, has been well located by historic mapping on the property. These features cause the property to be broken into separate structural domains each with separate mining attributes or geological characteristics. These domains are referred to as the North Block, the South Block and the Southern Extension Block. The North Block lies west of the Crown Mountain Fault and occupies the Alexander Creek Syncline axial region. The South Block is located on the east side of the Crown Mountain Fault and is generally located somewhat further south than the North Block. The Southern Extension is the natural strike extension of the South Block and is contiguous with it.

The location of the North Block is shown to the west of the Crown Mountain Fault on the illustration of Figure 8-3. The North Block is thus situated on the hanging wall side of the fault as shown on the example cross-sections of Figures 8-5 and 8-6. On the property, the syncline is asymmetric with the west limb having a steeper dip than the east limb. The dip of the west limb is typically 55° while that of the east limb is 44°. The fold axis has a north-northwest trend.

The South Block is shown in the central and southern portions of Figure 8-3, on the east side of the Crown Mountain Fault. The South Block is thus located in the footwall sequence below this fault, as shown on the example cross-sections of Figures 8-7 and 8-8. In the past the structure of this part of the property was that of a monocline. However the 2012 drill hole data and reexamination of the outcrop data, show that the dip of the beds "flatten-out" as they approach the fault toward the southwest. This indicates that the original structure of these beds was a syncline that has been truncated by the thrust fault and only the east limb of the syncline remains. This interpretation is consistent with the regional observation of Grieve referred to previously.

The Southern Extension, as with the South Block lies to the east of the Crown Mountain Thrust Fault in the footwall sequence below the fault as shown on Figure 8-4. There is an erosional break between the structure of the South Block and the Southern Extension. Besides the Crown Mountain Fault, field mapping indicates the presence of at least one small scale thrust fault splay that appear to be developed from the Crown Mountain Thrust, as shown on the example cross-sections for the Southern Extension of Figures 8-9 and 8-10. However, the Southern Extension has not been explored to the same extent as has the North and South Blocks. More exploration in the Southern Extension is needed to fully define the structure of this area.

9 COAL GEOLOGY

I. Deposit Type

The definition of “Deposit Type” for coal properties is different from that applied to other types of geologic deposits. Criteria applied to coal deposits for the purposes of determination of coal resources and reserves include both “Geology Type” as well as “Deposit Type”. For coal deposits this is an important concept because the classification of a coal deposit as a particular type determines the range of limiting criteria that may be applied during the estimation of Reserves and Resources.

“Geology Type” for coal deposits is a parameter that is specified in Geological Survey of Canada Paper 88-21, which is a reference for coal deposits as specified in NI 43-101. Coal “Geology Type” is a definition of the amount of geological complexity, usually imposed by the tectonic history of the area, and the classification of a coal deposit by “Geology Type” determines the approach to be used for the Resource/Reserve estimation procedures and the limits to be applied to certain key estimation criteria. The identification of a particular “Geology Type” for a coal property defines the confidence that can be placed in the extrapolation of data values away from a particular point of reference such as a drill hole.

The classification scheme of GSC Paper 88-21 is similar to many other international coal reserve classification systems but it has one significant difference. This system is designed to accommodate differences in the degree of tectonic deformation of different coal deposits in Canada. Four classes are provided for:

1. “Low” which is for deposits of the Plains type with low tectonic disturbance.
2. “Moderate” which is for deposits affected to some extent by tectonic deformation.
3. “Complex” which is for deposits subjected to relatively high levels of tectonic deformation.
4. “Severe” for Rocky Mountain type deposits which have been subjected to extreme levels of tectonic deformation.

The coal deposits of the Elk Valley Coalfield are typical of those for Inner Foothills and Rocky Mountain areas which have been subjected to a relatively high tectonic deformation. From place to place coal deposits of this type may be characterized by tight folds, some with steeply inclined or overturned limbs. These features can be seen in different parts of the coalfield but they are far from being universal.

The Crown Mountain Coal Property is divided into two distinct structural domains separated by a northerly trending thrust fault that is named the Crown Mountain Thrust Fault. These two domains exist as two distinct Geology Types.

On the northwest side of the thrust, located in the part of the property that is referred to as the North Block, there is a large syncline that is angular and tightly appressed. The axis of this fold is

oriented at a shallow angle to the fault trend such that the fold axis and fault approach each other from the north boundary of the property in a southerly direction. The structure of this area is clearly more disturbed tectonically than other parts of the property and it has the features that cause it to be categorized as a Complex Geology Type.

The structure of the sequence on the east side of the fault is significantly different from this. There the structure is simply a westerly dipping monocline. This area is referred to as the South Block. The lower level of tectonic disturbance for this area allows it to be categorized as a Moderate Geology Type. There is a third portion of the property that is the strike extension of the South Block. This area is referred to as the South Extension. At present the South Extension area has been explored to a much lesser extent than has both of the other two blocks. At present this area is categorised the same as the area that it adjoins to the north. Thus the South Extension is categorised as a Moderate Geology type.

“Deposit Type” as defined in GSC Paper 88-21 refers to the extraction method most suited to the coal deposit. There are four categories, which are:

- surface;
- underground;
- non-conventional; and
- sterilized.

Crown Mountain is close to important infrastructure including major roads, rail, power and a mining town site. These features will be important for the development of the property. Because of the nature of the terrain and the geology of the area Crown Mountain is suitable for the planning of development using surface mining methods. However, investigations are presently being undertaken to determine whether some forms of underground mining may also be applicable.

II. Coal Occurrence and Mineralization

For coal deposits, “mineralization” refers to coal development and coal seam stratigraphy.

According to Grieve and Kilby (1989), within a complete stratigraphic section, “Coals in the Mist Mountain Formation are almost exclusively humic. Original banding has often been destroyed by shearing associated with Laramide deformation. They form an average of 10 % of the total thickness of the formation in seams which range from less than 1.0 m to greater than 15.0 m in thickness. Coal seams do not tend to cluster in any part of the stratigraphic section, and the only horizon which is consistently coal-bearing is the basal 20.0 m to 25.0 m of the formation”.

However it must be noted that the Mist Mountain Formation section in the Crown Mountain area is an erosional remnant. The whole of the section is not present on this property. The sequence on the property is known to include, in the most complete stratigraphic section, only Seam 8, at the

top, through Seam 10 at the base and the various plies and splits of these seams. The seam nomenclature that is used corresponds with that at the Line Creek Mine to the north. The coal seam sequence for the property is shown on Figure 9-1.

Drilling has penetrated three principal seams on the property. The principal seams are named 8 Seam, 9 Seam and 10 Seam but 8 Seam and 10 Seam have been found to consist of three plies in each case. These plies are generally persistent across the property and each ply has thus been recognized as a separate seam. The term “Major Seam” has been defined to include all seven of these seams in order to distinguish them from other coal horizons, referred to as “Rider Seams” which also occur in the sequence. Thus there are a total of seven major seams and these are named the 8 Upper, 8 Middle, 8 Lower, 9, 10 Upper, 10 Middle, and 10 Lower Seams. These names are presented in descending stratigraphic order. Table 9.1 is a summary of the net coal average thicknesses for the major seams.

TABLE 9.1
JAMESON RESOURCES LIMITED
CROWN MOUNTAIN COAL PROPERTY
SUMMARY OF MAJOR SEAM AVERAGE NET COAL THICKNESS

Seam Name	North Block Average Thickness (m)	South Block Average Thickness (m)	Southern Extension Average Thickness (m)
8 Upper	12.47	-	-
8 Middle	4.27	-	-
8 Lower	3.74	3.3	-
9	4.68	3.06	10.1
10 Upper	7.56	3.09	3.29
10 Middle	1.08	3.97	1.4
10 Lower	1.52	1.62	-
Combined Average	35.32	15.04	14.79

As Table 9.1 shows there is a significant difference in the combined net coal thickness for the North and South Blocks. However this is due to the fact that the upper plies of 8 Seam are eroded in that area, as they appear to be in the Southern Extension.

It has also been found that several of the seams have splits or “Rider Seams” associated with them from place-to-place. These riders are typically thinner and usually not as laterally continuous as the seams with which they are associated; the rider seams have been named with a prefix according to their overlying seam. From place-to-place the rider seams achieve mineable

thickness. Table 9.2 shows the typical average net coal thickness for the rider seams on the property.

TABLE 9.2
JAMESON RESOURCES LIMITED
CROWN MOUNTAIN COAL PROPERTY
SUMMARY OF RIDER SEAM AVERAGE NET COAL THICKNESS

Seam Name	North Block Average Thickness (m)	South Block Average Thickness (m)	Southern Extension Average Thickness (m)
8 Rider	0.98	2.10	-
9 Rider	1.85	0.85	2.52
10 Middle Rider	-	0.78	-
Combined Average	2.83	3.73	2.52

10 COAL RESOURCE ESTIMATES

An estimate of coal resources for the property was made in compliance with the requirements of the CIM definitions in January 2013 and the results are shown in Table 10.1.

Please refer to the 2013 NI43-101 Technical Report for Crown Mountain for a more detailed description of the methods used to estimate the resources.

TABLE 10.1
JAMESON RESOURCES LTD.
CROWN MOUNTAIN COAL PROPERTY
IN-PLACE COAL RESOURCES SUMMARY (KTONNES)
SUITABLE FOR SURFACE MINING (MINIMUM THICKNESS 0.5 M)
AS AT JANUARY 21, 2013

Area	Seam	ASTM Group	In-Place Coal Resources (k tonnes)		
			Measured	Indicated	Inferred
North Block	8U	Low to Medium Volatile Bituminous	1,032.9	204.3	0
	8M		375.6	125.7	0
	8L		466.5	178.9	0
	8 Rider		83.1	33.7	0
	9		1,644.1	1,052.5	0
	9 Rider		537.4	450.8	0
	10U		2,912.4	3,672.3	0
	10M		330.5	483.5	0
	10L		527.3	904.8	0
Sub-Total			7,909.8	7,106.5	0
South Block	8L	Low to Medium Volatile Bituminous	1,089.6	0	0
	8 Rider		3,707.1	0	0
	9		12,314.1	0	0
	9 Rider		36.2	0	0
	10U		11,943.2	0	0
	10M		15,975.8	0	0
	10L		6,197.7	0	0
Sub-Total			51,263.7	0	0
South Extension	8L	Low to Medium Volatile Bituminous	0	0	51.4
	9		0	0	14,485
	9 Rider		0	0	3,185.3
	10U		0	0	4,553
	10M		0	0	1,407.6
Sub-Total			0	0	23,682.3
Total			66,280.0		23,682.3

Norwest completed a re-estimate of coal resources for the property in compliance with the requirements of the CIM definitions based on the 2013 drilling. Results are shown in Table 10.2.

TABLE 10.2
JAMESON RESOURCES LTD.
CROWN MOUNTAIN COAL PROPERTY
IN-PLACE COAL RESOURCES SUMMARY (KTONNES)
SUITABLE FOR SURFACE MINING (MINIMUM THICKNESS 0.5 M)
AS AT MARCH 14 2014

RESOURCE AREA	Measured (Mt)	Indicated (Mt)	Measured & Indicated (Mt)	Inferred (Mt)	Measured, Indicated & Inferred (Mt)
North Block	8.0	5.8	13.8	0	13.8
South Block	60.9	0	60.9	0	60.9
Southern Extension	0	0	0	23.7	23.7
TOTAL	68.9Mt	5.8Mt	74.7Mt	23.7Mt	98.4Mt

11 PRELIMINARY ECONOMIC ASSESSMENT

A Preliminary Economic Assessment (“PEA”) to evaluate the commercial potential of the project was completed by Norwest in April 2013. The scope of work was as follows;

- Develop a mine plan for the resource, based on incremental breakeven analysis.
- Estimate capital and operating costs (on a ROM basis) for a production rate of at least 1.0Mtpa clean tonnes of coal.
- Determine project economics (IRR and NPV10) over a range of potential plant yields.
- Perform sensitivity analysis on several major parameters, including shipping port, coal sales price, operating cost, and capital cost.

Assumptions that formed the basis for the PEA are listed in Table 11.1:

TABLE 11.1
JAMESON RESOURCES LTD.
CROWN MOUNTAIN COAL PROPERTY
PRELIMINARY ECONOMIC ASSESSMENT PARAMETERS
AS AT APRIL 17, 2013

Preliminary Economic Assessment - Parameters	
Mine Life	Through to exhaustion of economic resources
Clean Coal Production Rate	At least 1.0 million tonnes per annum (Mtpa)
Plant Yield	Varying within a range of 40 to 60%
Coal Price - Hard Coking Coal (“HCC”)	US\$202.97/tonne
Coal Price - Pulverised Coal Injection (“PCI”)	US\$141.58/tonne
Coal Price – Thermal	US\$108.91/tonne
Shipping Port	Westshore Terminals (+ sensitivity to alternate Ridley Terminals)
Capital	All start-up and equipment costs capitalised

Note - The coal pricing assumptions and marketing review for the PEA was prepared by an independent marketing consultant, Koornhof Associates Inc. of Vancouver, British Columbia, a subcontractor to Norwest.

All costs discussed in the PEA are in US and Canadian dollars. For the purposes of the PEA, Norwest has assumed a CAD:USD exchange rate of 1.00 which at the time of reporting was in-line with the spot foreign exchange rate.

Based on assumptions employed by Norwest in the PEA, the clean coal product mix is estimated as follows:

- Coking coal 89.87%
- PCI coal 6.35%
- Thermal coal 3.78%

As reported in the Technical Report (January 2013), Norwest and other independent consultants have expressed that the majority of Crown Mountain coal is expected to be hard coking coal similar to that shipped from neighbouring mines. Norwest also identified the need to perform additional exploration, including bulk sampling, before definitive clean coal quality (and plant yield) can be determined. Since the Crown Mountain seams appear to have more non-separable partings than nearby mines, plant yield may be below the prevailing yields of 60 to 70% in the Elk Valley. The assumptions made by Norwest in the PEA are subject to change once additional exploration is completed and laboratory results evaluated.

The mining method selected for Crown Mountain in the PEA is open pit. Mining equipment includes excavators, front end loaders, and haul trucks, supported by dozers, backhoes, and blasthole drills.

As with all Canadian metallurgical coals, a wash plant is required. The PEA locates the plant proximate to the mine site. This accomplishes multiple goals: (a) it reduces trucking costs for the (run-of-mine) ROM material, (b) it allows plant reject disposal to occur at or near the mine site, and (c) the opportunity exists to evaluate using the fine plant reject (slurry) to contain coarser reject and some mine spoil with the potential to significantly mitigate any water quality issues. As plant yield has yet to be determined, the PEA sizes the plant to process approximately 3.2Mtpa of ROM per year, which results in the production of 1.3Mtpa to 1.9Mtpa of clean coal per year (based on a yield range of 40% to 60%).

Washed coal would then be trucked approximately 14 km to a stockpile/loadout area where the product would ultimately be loaded onto railcars on a new side track to be located parallel to Canadian Pacific's existing common-user railway. The load-out facility includes silo storage and a bulk loading system.

Once loaded onto rail, it has been assumed railway carrier Canadian Pacific ("CP") will transport the coal to Westshore Terminals ("Westshore") near Vancouver, a distance of 1,000km, where it

would be loaded into ships. Westshore is the terminal of choice for Crown Mountain coal, with an estimated transportation cost (combined rail and port) of \$40/tonne.

Expansions are currently underway at the two main Vancouver ports (Westshore and Neptune) and it is believed Westshore will have available capacity when the first coal from Crown Mountain is available to be shipped.

As an alternative, Norwest also evaluated financial performance for shipping the longer distance to Ridley Terminals (at a combined \$60/tonne transportation cost). With two rail carriers involved (CP and Canadian National) additional costs have been included for interchange. There are no capacity constraints with either of the railway carriers.

All clean coal production from Crown Mountain (coking, PCI, thermal) is assumed to be exported.

The mine plan developed by Norwest encompasses 76M tonnes of the 90M tonne resource equating to approximately 84% of the resource base. The life-of-mine (LOM) is estimated at 24 years, with annual clean coal sales ranging from 1.3 to 1.9Mtpa based on plant yields varying between 40 and 60 %, resulting in LOM sales ranging from 30 to 45M clean tonnes.

Primary outputs from the PEA are listed in the Table 11.2. Norwest also evaluated alternate scenarios which consider leasing all mobile equipment and leasing the plant and operating it on a contract basis which would significantly reduce start-up capital.

TABLE 11.2
JAMESON RESOURCES LTD.
CROWN MOUNTAIN COAL PROPERTY
PRELIMINARY ECONOMIC ASSESSMENT (PRE-TAX BASIS)
AS AT APRIL 17, 2013

Plant Yield	Strip Ratio (Raw)	Strip Ratio (Clean)	Clean Coal Production Mtpa	FOB US\$/tonne	IRR %	NPV10 US\$M
40%	4.3	10.77	1.263	\$138.91	20.52	\$232.5
50%	4.3	8.61	1.578	\$120.07	31.66	\$543.5
60%	4.3	7.18	1.894	\$107.51	41.11	\$845.4

Note – The outputs from the PEA do not include taxes and royalties. The royalty (British Columbia Mineral Tax) is a two part royalty payment to the provincial government. The first part being 2% of annual revenue from coal sales less operating costs, and the second part requiring a payment of 13% of net revenue once all initial capital, a new mine allowance and a return on investment has been recovered.

The mine operating cost estimate has been developed from first principles and considers all aspects of the mining operation, including coal processing, coal and waste loading and haulage, topsoil salvage and replacement, road maintenance, water management, reclamation and site administration. Norwest included a 10% contingency to the total operating cost estimate. Operating costs are summarised in Table 11.3.

TABLE 11.3
JAMESON RESOURCES LTD.
CROWN MOUNTAIN COAL PROPERTY
PRELIMINARY ECONOMIC ASSESSMENT
OPERATING COSTS
AS AT APRIL 17, 2013

Cost Category	Cost per Clean Tonne (40% yield)	Cost per Clean Tonne (50% yield)	Cost per Clean Tonne (60% yield)
Mining	\$70.92	\$57.59	\$48.71
Processing	\$11.08	\$8.86	\$7.38
Sustaining Capital (Overheads etc)	\$7.93	\$6.34	\$5.28
Contingency	\$8.99	\$7.28	\$6.14
Total Costs - Site	\$98.91	\$80.07	\$67.51
Rail and Port Costs	\$40.00	\$40.00	\$40.00
Total Costs – FOB (pre-tax and royalty)	\$138.91	\$120.07	\$107.51

Start-up capital expenditure to support a 3.2Mtpa mining and processing operation has been estimated by Norwest to be \$283.9 million as detailed in Table 11.4. The use of leasing has the potential to significantly reduce this up-front capital investment to as low as \$109.7 million.

TABLE 11.4
JAMESON RESOURCES LTD.
CROWN MOUNTAIN COAL PROPERTY
PRELIMINARY ECONOMIC ASSESSMENT
PRE-PRODUCTION CAPITAL
AS AT APRIL 17, 2013

Pre-Production Capital	
Major Mobile Equipment	\$92,450,000
Minor Mobile Equipment	\$7,910,000
Wash Plant	\$65,900,000
Infrastructure (rail load-out, roads, power, offices, shop etc)	\$63,440,000
Pre-Strip	\$28,354,000
SUBTOTAL – CAPITAL	\$258,053,000
Contingency @ 10%	\$25,806,000
TOTAL CAPITAL	\$283,859,000

Alternate financing scenarios have also been examined by Norwest designed to reduce start-up capital whilst preserving the overall performance of the project.

The PEA has identified several of the operating parameters at Crown Mountain. There remain, however, certain risks in the project, which include:

- **Market Risk:** While the Norwest economics are based on pricing forecasts from reputable and respected sources, there is no guarantee these forecasts will prove accurate.
- **Coal Quality:** A definitive understanding of coal quality at Crown Mountain is dependent upon further exploration, including the collection and analysis of bulk samples. Jameson intends to conduct the required work in summer 2013.
- **Plant Yield:** As with coal quality, plant yield has not yet been defined. Project economics are highly sensitive to plant yield. While the range of yield examined in the PEA, 40-60%, is believed to be reasonable, there is no guarantee actual yield will fall into this range. The proposed summer drilling program is designed to evaluate what plant yields can be expected.
- **Environmental:** Any mining operation must be engineered and operated to meet existing environmental standards, including but not limited to air and water quality. While the summer exploration program will collect additional data on critical environmental parameters (ie: selenium, ARD, etc), Jameson is not in a position at this time to accurately determine the cost of environmental compliance or the government's reaction to what environmental and mining permits Jameson may in the future submit.
- **Port:** At this time, it appears likely that port capacity will exist once Crown Mountain commences operation. However, there are several other coal projects under evaluation in western Canada which also contemplate export. Jameson does not at this time hold a contract for port capacity (a topic that will be considered should a positive PFS occur).

12 CONCLUSIONS

The 2013 drilling program was designed to gather the information required to quantify the coking characteristics of the Crown Mountain coal, and to allow a more accurate estimate of wash plant yield. To accomplish these goals, large diameter coring was selected as the preferred sampling method to acquire adequate bulk samples to perform the required coal quality testwork. The core recovery on the seven LDC holes was excellent: recovery averaged over 97 percent. .

Results to-date for the LDC holes generally support the major PEA assumptions, confirm the majority of the resource should be hard coking coal, and indicate additional evaluation work is warranted to determine the potential viability of the Crown Mountain project. Norwest has been awarded the contract to commence a Prefeasibility Study on the Crown Mountain Project. Results will be reported in the 2014 Coal Assessment report.

12 AUTHOR'S QUALIFICATIONS

I, John S Holmes BSc (Geology) (MAIG), do hereby certify that:

1. I am currently employed as an Executive by Jameson Resources Ltd, Level 2 79 Hay Street, Subiaco, 2008, Western Australia.
2. I graduated with a Bachelor of Science degree in Geology from the Curtin University of Technology, Western Australia, in 1985.
3. I am a member of the Australian Institute of Geoscientists.
4. I have worked as a geologist for a total of twenty six years since my graduation from university. My work experience includes twenty-six years of exploration and mining support on a variety of mineral properties (including coal) around the world.
5. I assisted with the supervision of exploration drilling programs at the Crown Mountain coal project in 2012 and 2013.
6. I have sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity that I am undertaking to qualify as a Competent Person as defined in the 2004 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves.

Dated at Perth, Western Australia this day of March ____, 2014.

“ORIGINAL SIGNED AND SEALED BY AUTHOR”

John Holmes BSc MAIG

NWP Coal Canada Ltd

I, Mr Art Palm, P.Eng., do hereby certify that:

1. I am a Mining Engineer and have been employed by Jameson Resources Ltd, Suite 800, 1199 West Hastings Street, Vancouver, Canada V6E 3T5, since August 2009.
2. I received a B.S. Mining Engineering from the Colorado School of Mines in 1976, and a Master of Business Administration from the University of Wyoming in 1983.
3. I have worked as a Mining Engineer since 1976.
4. I am a registered Professional Engineer - United States of America (AL,AR,AZ,CA,CO,GA,ID,IL,KY,MD,OH,PA,NM,NV,UT,VA,WA,WV,WY). and British Columbia, Canada
5. I was directly involved with the 2013 exploration drilling program on the Crown Mountain property.
6. I have read the definition of “qualified person” set out in National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
7. I satisfy the requirements of a Competent Person as defined under the JORC Code, International Reciprocity of Competent Persons, as I am a member of APEGBC, which is listed by JORC as current ROPO/RPO’s. As required by JORC, I satisfy the other code requirements of a Competent Person.

Dated at Vancouver, Canada this day of March ____, 2014.

“ORIGINAL SIGNED AND SEALED BY AUTHOR”

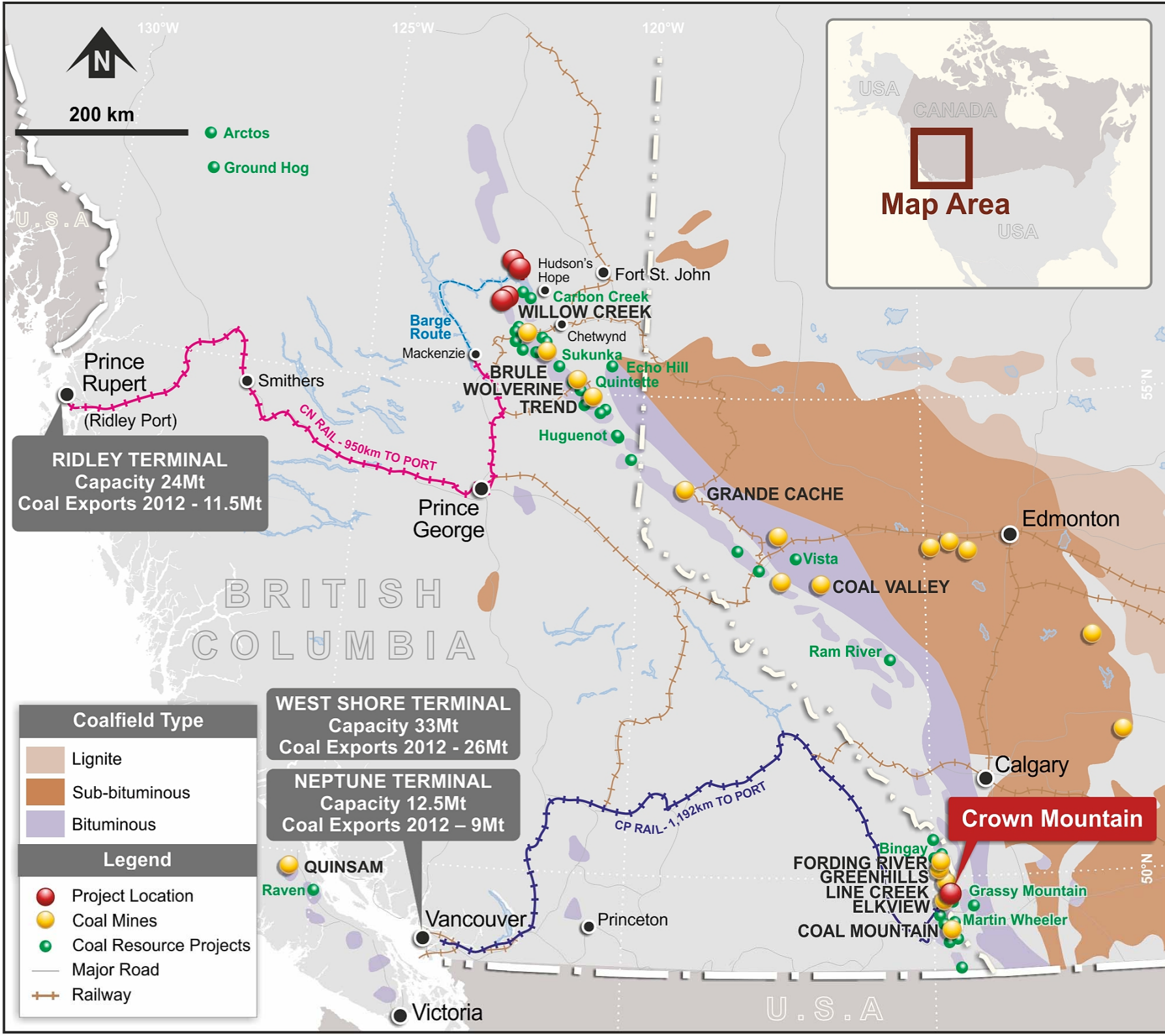
Art Palm, P.Eng.

13 REFERENCES

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REPORT FIGURES



200 km

- Arctos
- Ground Hog



RIDLEY TERMINAL
Capacity 24Mt
Coal Exports 2012 - 11.5Mt

WEST SHORE TERMINAL
Capacity 33Mt
Coal Exports 2012 - 26Mt

NEPTUNE TERMINAL
Capacity 12.5Mt
Coal Exports 2012 - 9Mt

Crown Mountain

Coalfield Type	
	Lignite
	Sub-bituminous
	Bituminous

Legend	
●	Project Location
●	Coal Mines
●	Coal Resource Projects
—	Major Road
—+—	Railway

BRITISH COLUMBIA

U.S.A

U.S.A

Prince Rupert
(Ridley Port)

Smithers

Prince George

Hudson's Hope
Fort St. John

Carbon Creek
WILLOW CREEK

Chetwynd
Sukunka
ECHO HILL
WOLVERINE TREND
Quintette

Huguenot

GRANDE CACHE

Edmonton

Vista
COAL VALLEY

Ram River

Calgary

QUINSAM
Raven

Vancouver

Princeton

Bingay
FORDING RIVER
GREENHILLS
LINE CREEK
ELKVIEW
COAL MOUNTAIN

Grassy Mountain
Martin Wheeler

Victoria

130°W

125°W

120°W










55°N

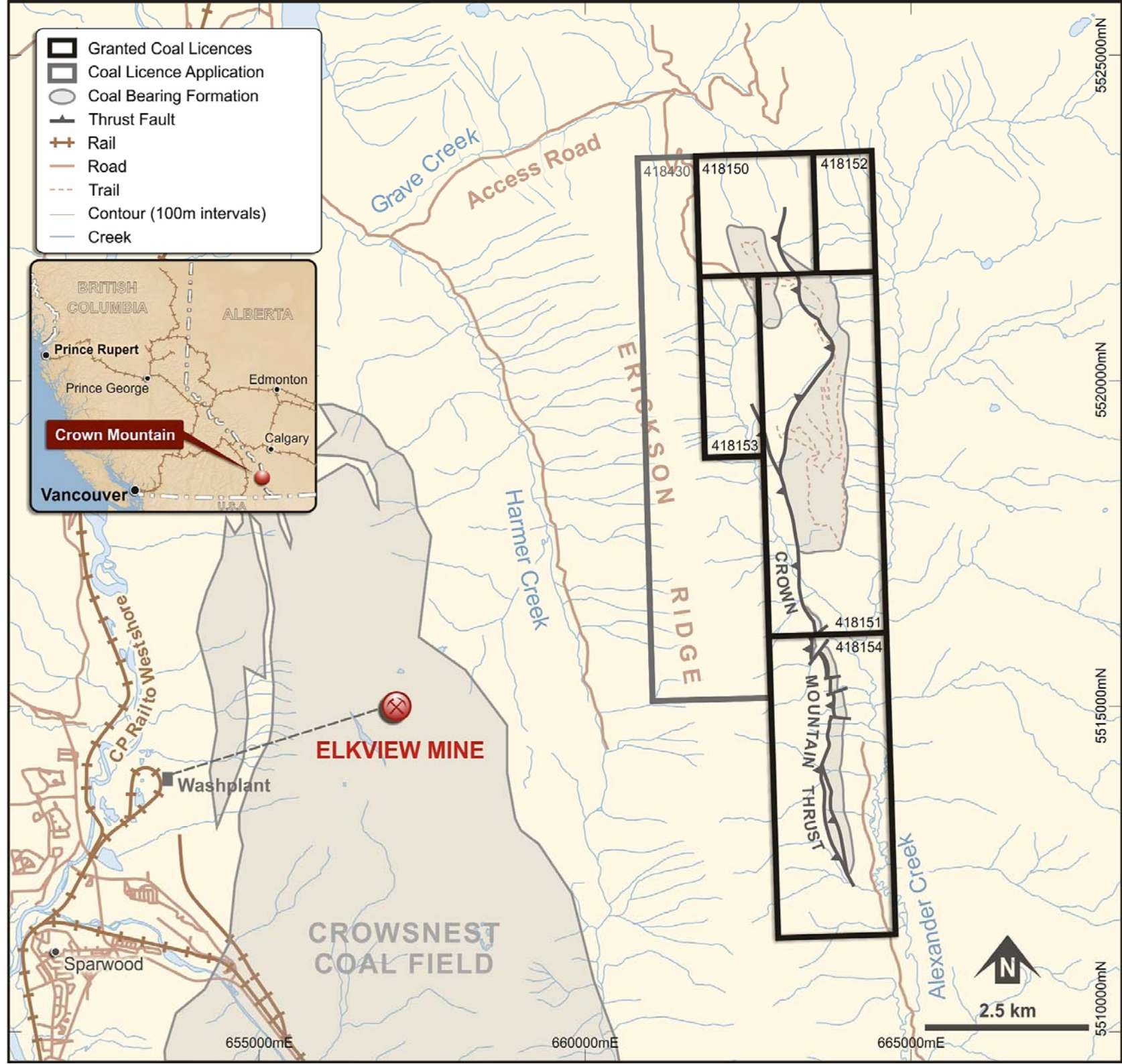
50°N

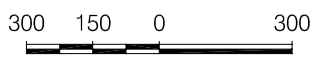
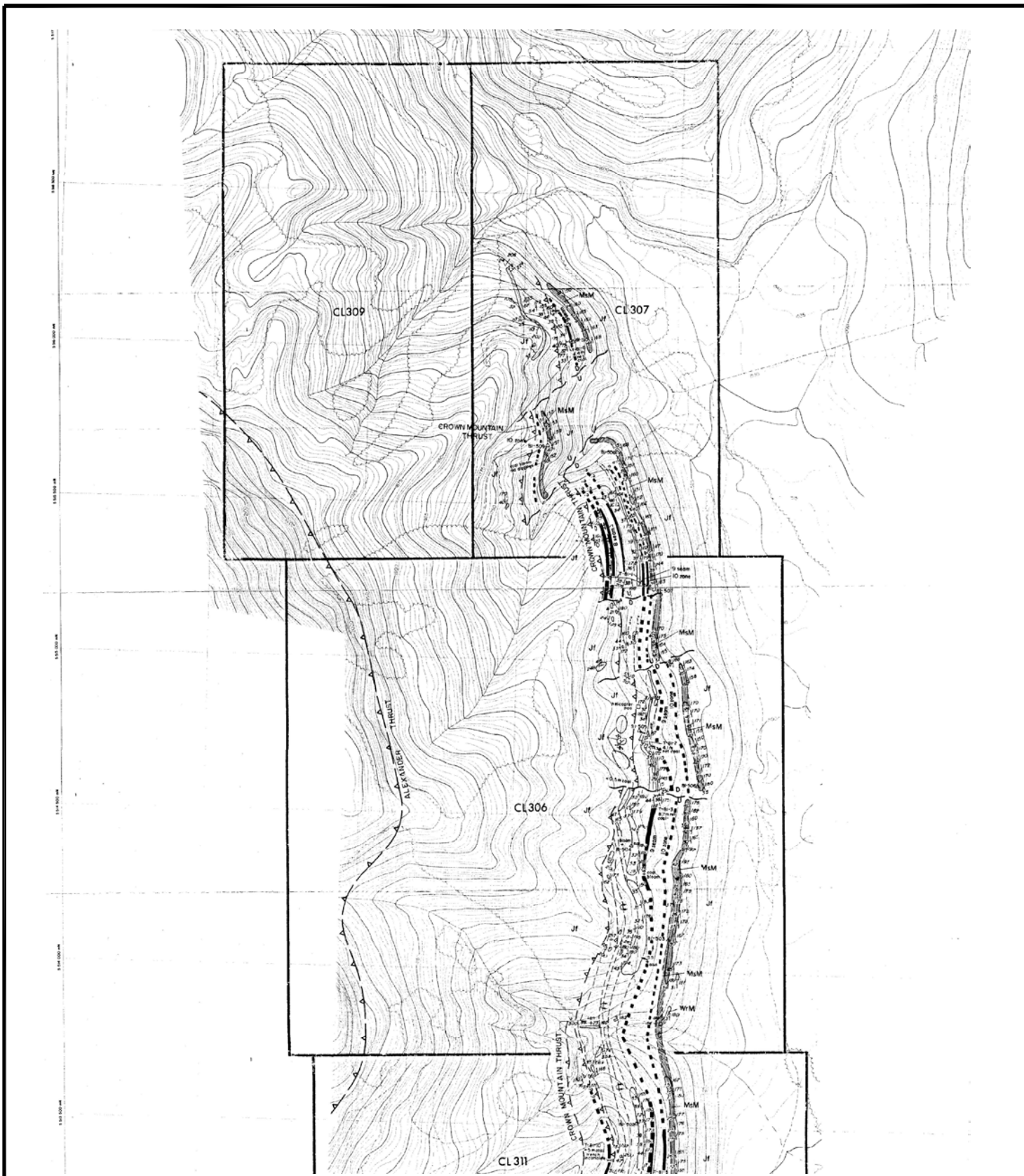
Barge Route

CN RAIL - 950km TO PORT

CP RAIL - 1,192km TO PORT

-  Granted Coal Licences
-  Coal Licence Application
-  Coal Bearing Formation
-  Thrust Fault
-  Rail
-  Road
-  Trail
-  Contour (100m intervals)
-  Creek





Metres



ASSESSMENT REPORT
CROWN MOUNTAIN COAL PROPERTY

HISTORIC GEOLOGY MAP Southern Extension Block

FIGURE 7-2

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DATE: 13 03 28

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PERIOD	GROUP	FORMATION MEMBER	ROCK TYPES
Lower Cretaceous	BLAIRMORE GROUP	Upper Blairmore (Undivided)	Massive bedded sandstones and conglomerates
		Cadomin Formation	
Lower Cretaceous to Upper Jurassic	KOOTENAY GROUP	Elk Formation	Sandstone, siltstone, shale, mudstone, chert pebble conglomerate and minor coal seams.
		Mist Mountain Formation	Sandstone, siltstone, shale, mudstone, and thick coal seams.
		Morrissey Formation	Medium to coarse grained, slightly ferruginous quartz-chert sandstone.
Jurassic	FERNIE GROUP	Fernie Formation	Shale, siltstone, fine-grained sandstone.



ASSESSMENT REPORT
CROWN MOUNTAIN COAL PROPERTY

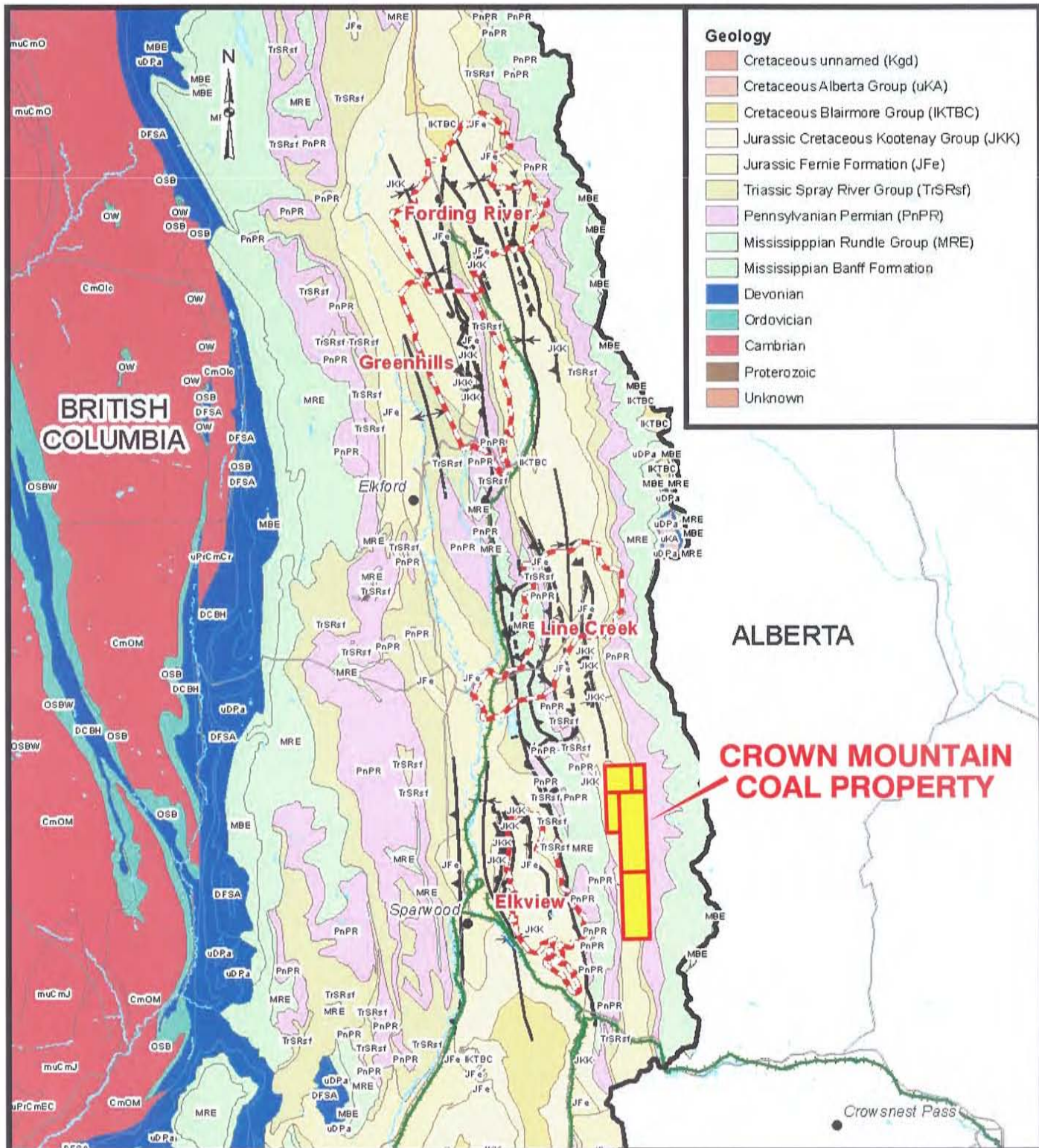
TABLE OF FORMATIONS

FIGURE 8-1

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CHK'D BY: M.E.
DATE: 13 03 28

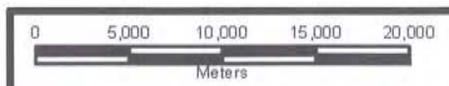
FILE: Fig 8-1 Table of Formations.dwg
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- Geology**
- Cretaceous unnamed (Kgd)
 - Cretaceous Alberta Group (uKA)
 - Cretaceous Blairmore Group (IKTBC)
 - Jurassic Cretaceous Kootenay Group (JKK)
 - Jurassic Fernie Formation (JFe)
 - Triassic Spray River Group (TrSRsf)
 - Pennsylvanian Permian (PnPR)
 - Mississippian Rundle Group (MRE)
 - Mississippian Banff Formation
 - Devonian
 - Ordovician
 - Cambrian
 - Proterozoic
 - Unknown

- Jameson Coal License
- Thrust Fault
- City/Town
- Normal Fault
- Railway
- Thrust Fault Projected
- Road
- Anticline
- Major Drainage
- Syncline

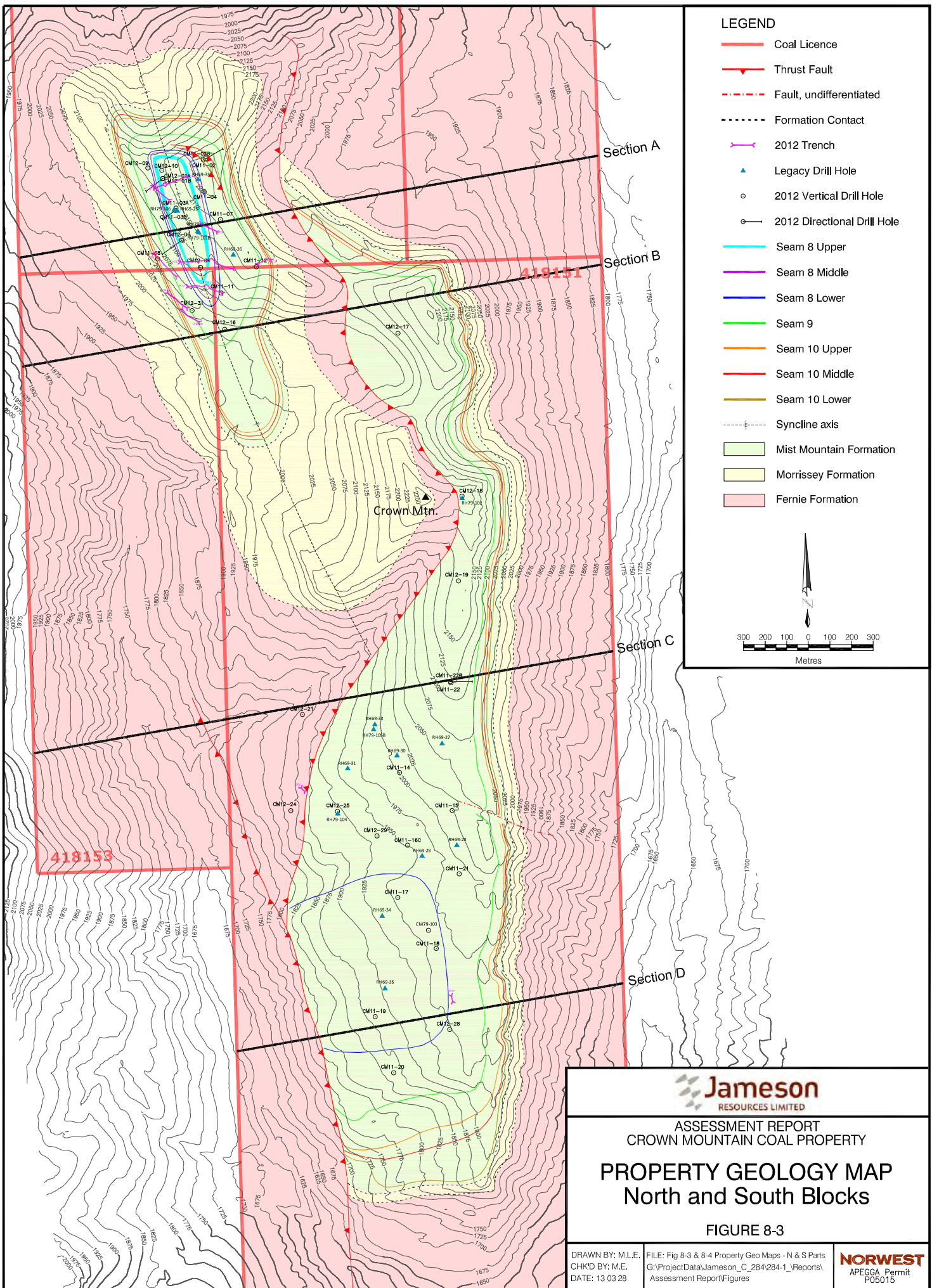


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CROWN MOUNTAIN COAL PROPERTY

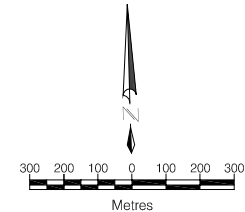
REGIONAL GEOLOGY MAP


FIGURE 8-2

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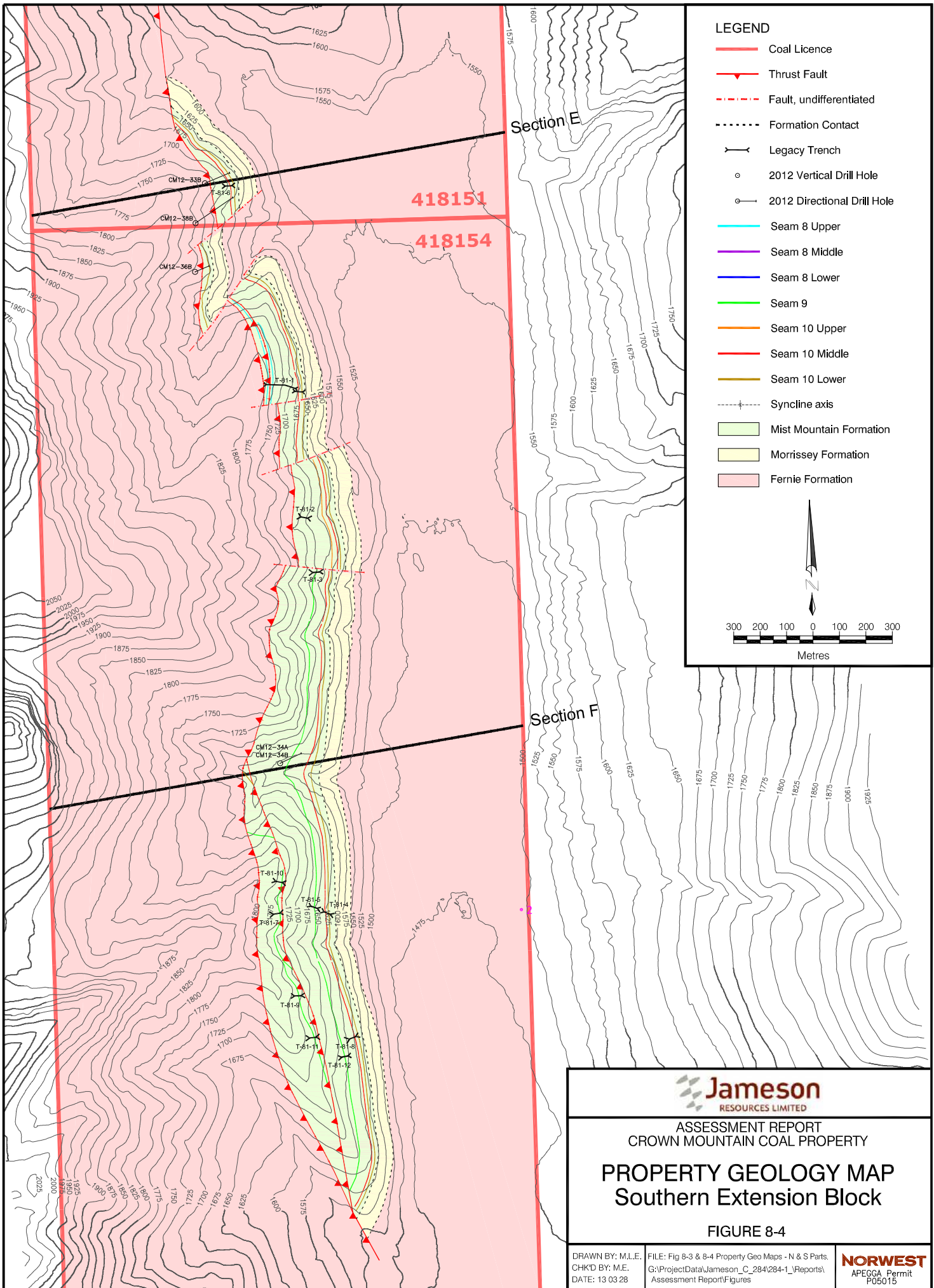


- LEGEND**
- Coal Licence
 - ▲— Thrust Fault
 - - - Fault, undifferentiated
 - - - Formation Contact
 - 2012 Trench
 - ▲ Legacy Drill Hole
 - 2012 Vertical Drill Hole
 - 2012 Directional Drill Hole
 - Seam 8 Upper
 - Seam 8 Middle
 - Seam 8 Lower
 - Seam 9
 - Seam 10 Upper
 - Seam 10 Middle
 - Seam 10 Lower
 - - - Syncline axis
 - Mist Mountain Formation
 - Morrissey Formation
 - Fernie Formation

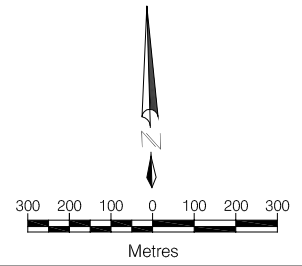




 ASSESSMENT REPORT
 CROWN MOUNTAIN COAL PROPERTY
PROPERTY GEOLOGY MAP
 North and South Blocks
FIGURE 8-3

DRAWN BY: M.L.E. CHK'D BY: M.E. DATE: 13 03 28	FILE: Fig 8-3 & 8-4 Property Geo Maps - N & S Parts. G:\ProjectData\Jameson_C_284\284-1\Reports\Assessment Report\Figures	NORWEST APEGA Permit P05015
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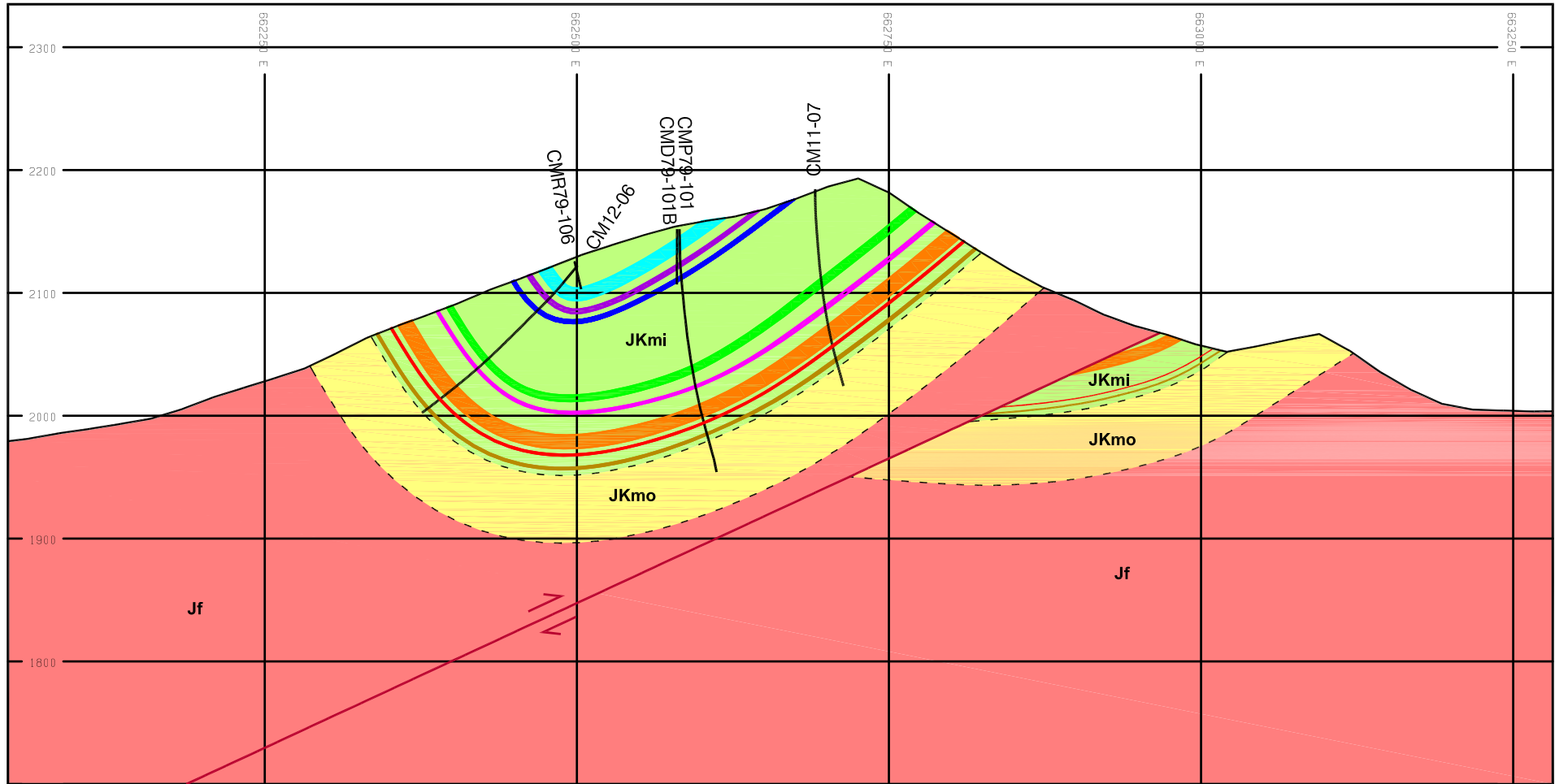


- LEGEND**
- Coal Licence
 - ▶ Thrust Fault
 - - - Fault, undifferentiated
 - · - · - Formation Contact
 - ↔ Legacy Trench
 - 2012 Vertical Drill Hole
 - ⊖ 2012 Directional Drill Hole
 - Seam 8 Upper
 - Seam 8 Middle
 - Seam 8 Lower
 - Seam 9
 - Seam 10 Upper
 - Seam 10 Middle
 - Seam 10 Lower
 - · - · - Syncline axis
 - Mist Mountain Formation
 - Morrissey Formation
 - Fernie Formation




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 RESOURCES LIMITED
 ASSESSMENT REPORT
 CROWN MOUNTAIN COAL PROPERTY
PROPERTY GEOLOGY MAP
Southern Extension Block
 FIGURE 8-4

DRAWN BY: M.L.E. CHK'D BY: M.E. DATE: 13 03 28	FILE: Fig 8-3 & 8-4 Property Geo Maps - N & S Parts. G:\ProjectData\Jameson_C_284\284-1_Reports\Assessment Report\Figures	NORWEST APEGA Permit P05015
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LEGEND

- | | | | |
|---------------------------|---------------|----------------------|-------------------------|
| — (solid black line) | Topography | — (orange line) | Seam 10 Upper |
| - - - (dashed black line) | Contact | — (red line) | Seam 10 Middle |
| — (cyan line) | Seam 8 Upper | — (blue line) | Seam 10 M Rider |
| — (purple line) | Seam 8 Middle | — (brown line) | Seam 10 Lower |
| — (dark blue line) | Seam 8 Lower | — (light green fill) | Mist Mountain Formation |
| — (orange-brown line) | Seam 8 Rider | — (yellow fill) | Morrissey Formation |
| — (green line) | Seam 9 | — (red fill) | Fernie Formation |
| — (magenta line) | Seam 9 Rider | | |



ASSESSMENT REPORT
CROWN MOUNTAIN COAL PROPERTY

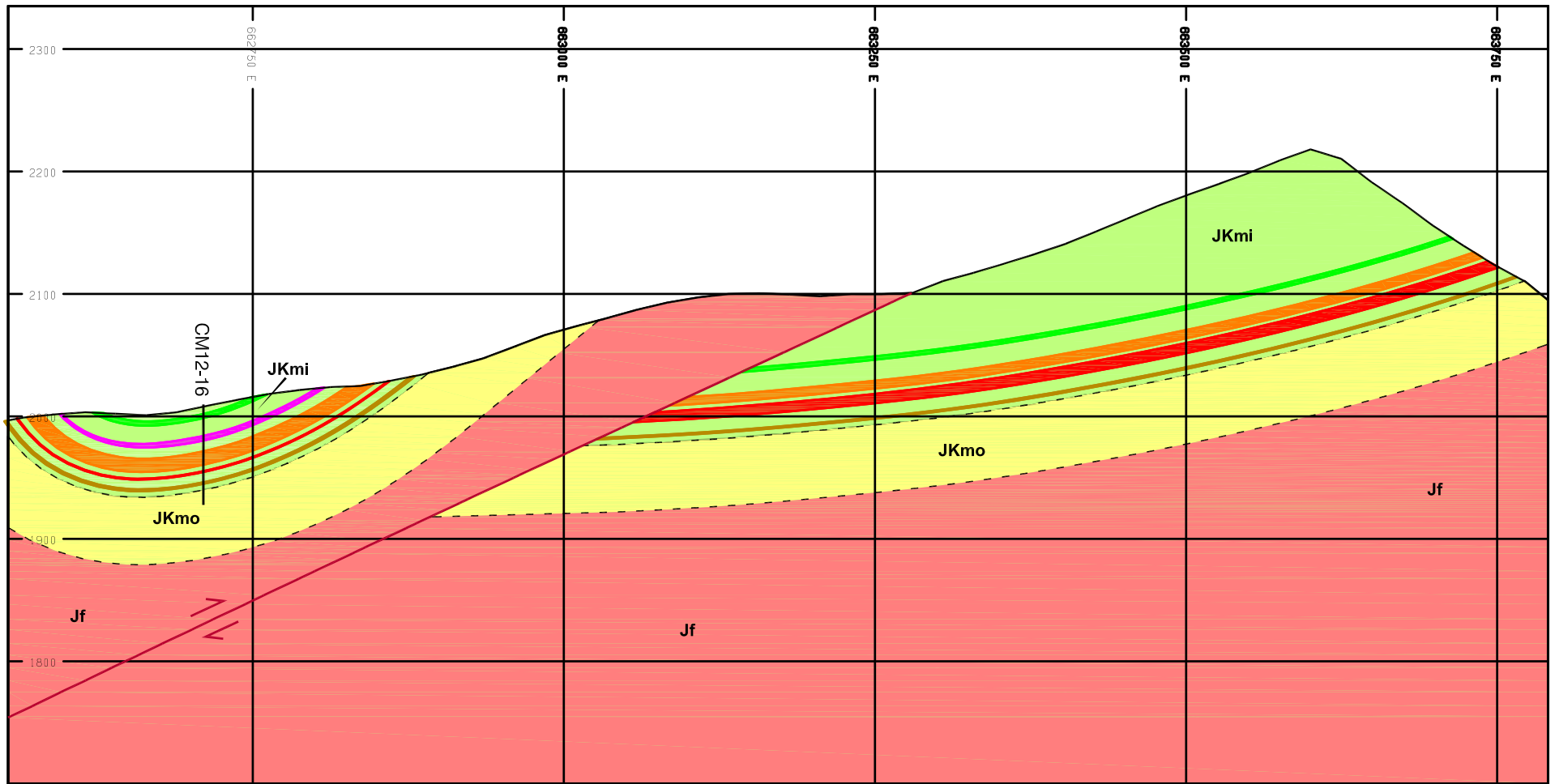
CROSS SECTION A-A'

FIGURE 8-5

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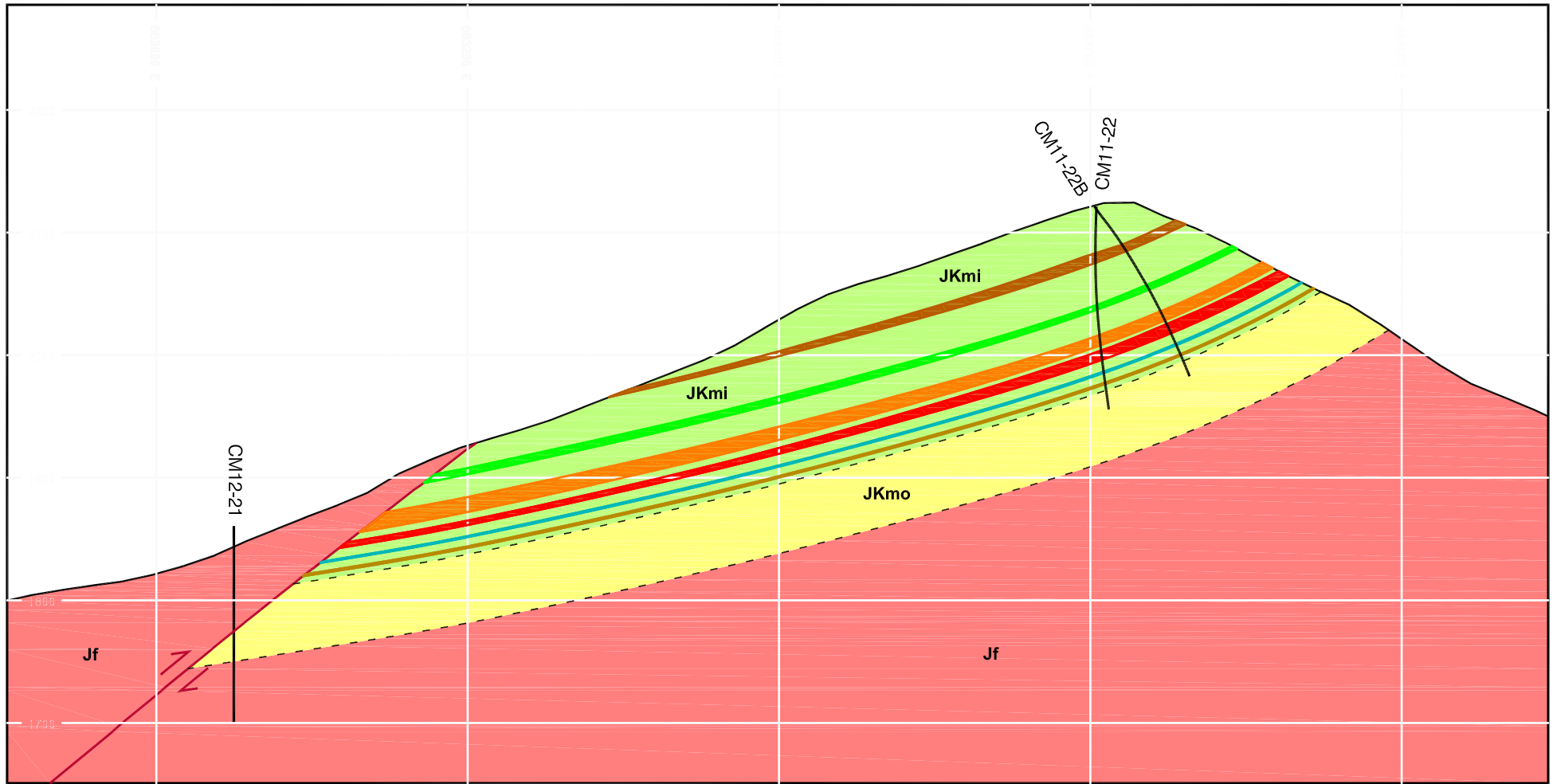




LEGEND



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|-----------------|---------------------------|
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| — Seam 8 Upper | — Seam 10 M Rider |
| — Seam 8 Middle | — Seam 10 Lower |
| — Seam 8 Lower | — Mist Mountain Formation |
| — Seam 8 Rider | — Morrissey Formation |
| — Seam 9 | — Fernie Formation |
| — Seam 9 Rider | |

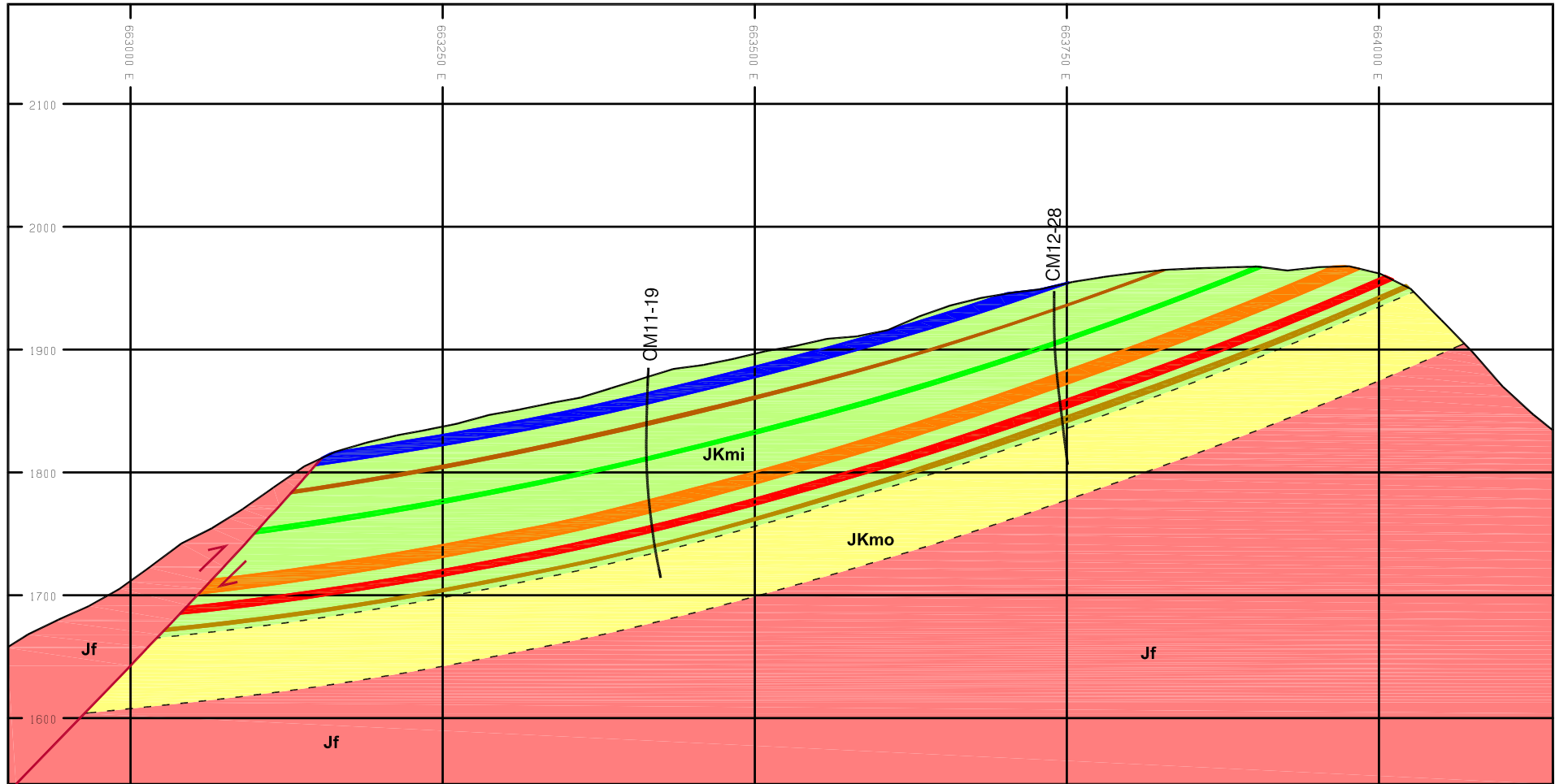
 ASSESSMENT REPORT CROWN MOUNTAIN COAL PROPERTY	
<h2>CROSS SECTION B-B'</h2>	
FIGURE 8-6	
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LEGEND

- | | |
|-----------------|---------------------------|
| — Topography | — Seam 10 Upper |
| - - - Contact | — Seam 10 Middle |
| — Seam 8 Upper | — Seam 10 M Rider |
| — Seam 8 Middle | — Seam 10 Lower |
| — Seam 8 Lower | — Mist Mountain Formation |
| — Seam 8 Rider | — Morrissey Formation |
| — Seam 9 | — Fernie Formation |
| — Seam 9 Rider | |

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ASSESSMENT REPORT CROWN MOUNTAIN COAL PROPERTY	
<h2>CROSS SECTION C-C'</h2>	
FIGURE 8-7	
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LEGEND

- | | |
|-----------------|---------------------------|
| — Topography | — Seam 10 Upper |
| - - - Contact | — Seam 10 Middle |
| — Seam 8 Upper | — Seam 10 M Rider |
| — Seam 8 Middle | — Seam 10 Lower |
| — Seam 8 Lower | — Mist Mountain Formation |
| — Seam 8 Rider | — Morrissey Formation |
| — Seam 9 | — Fernie Formation |
| — Seam 9 Rider | |



ASSESSMENT REPORT
CROWN MOUNTAIN COAL PROPERTY

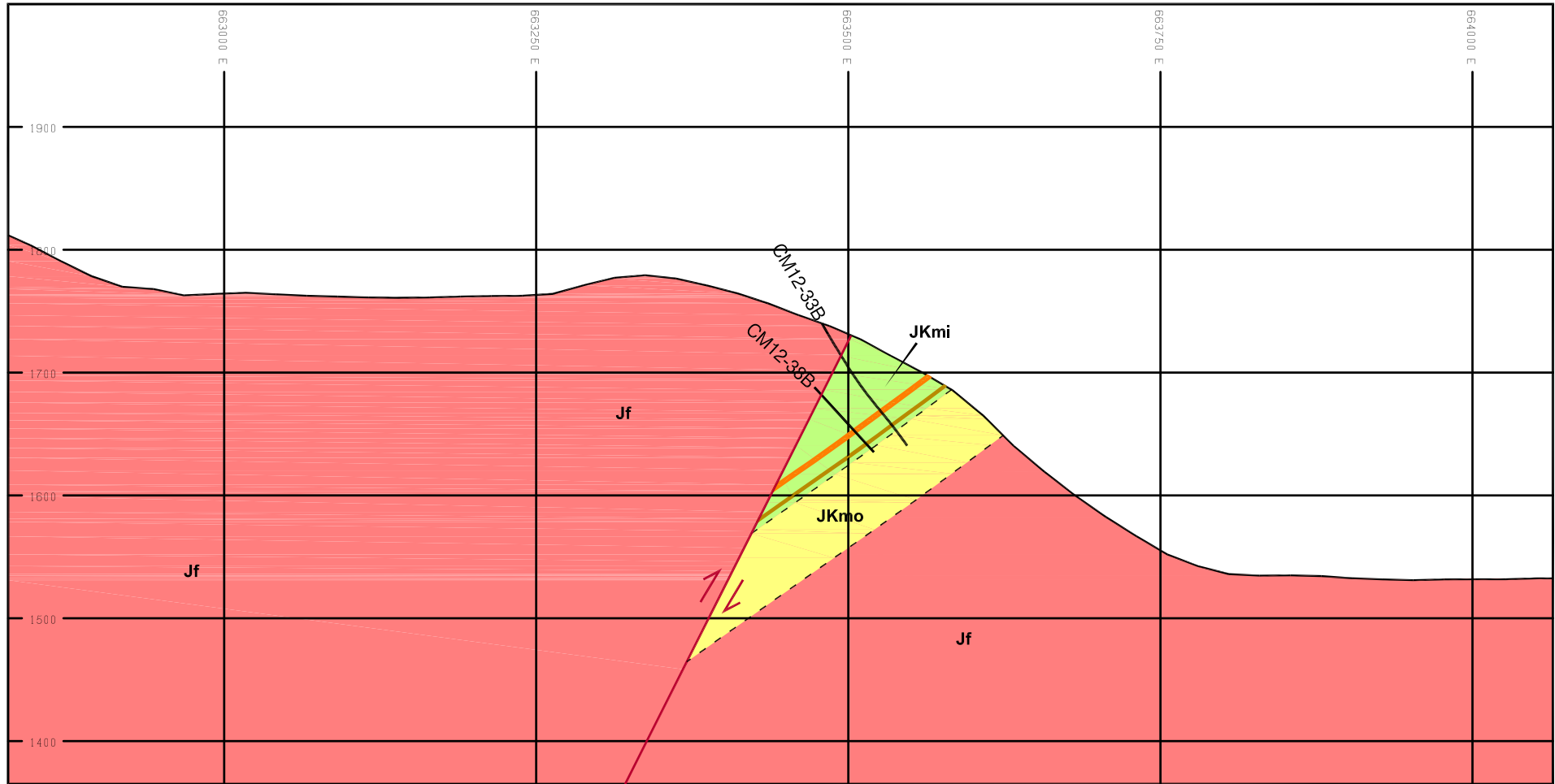
CROSS SECTION D-D'

FIGURE 8-8

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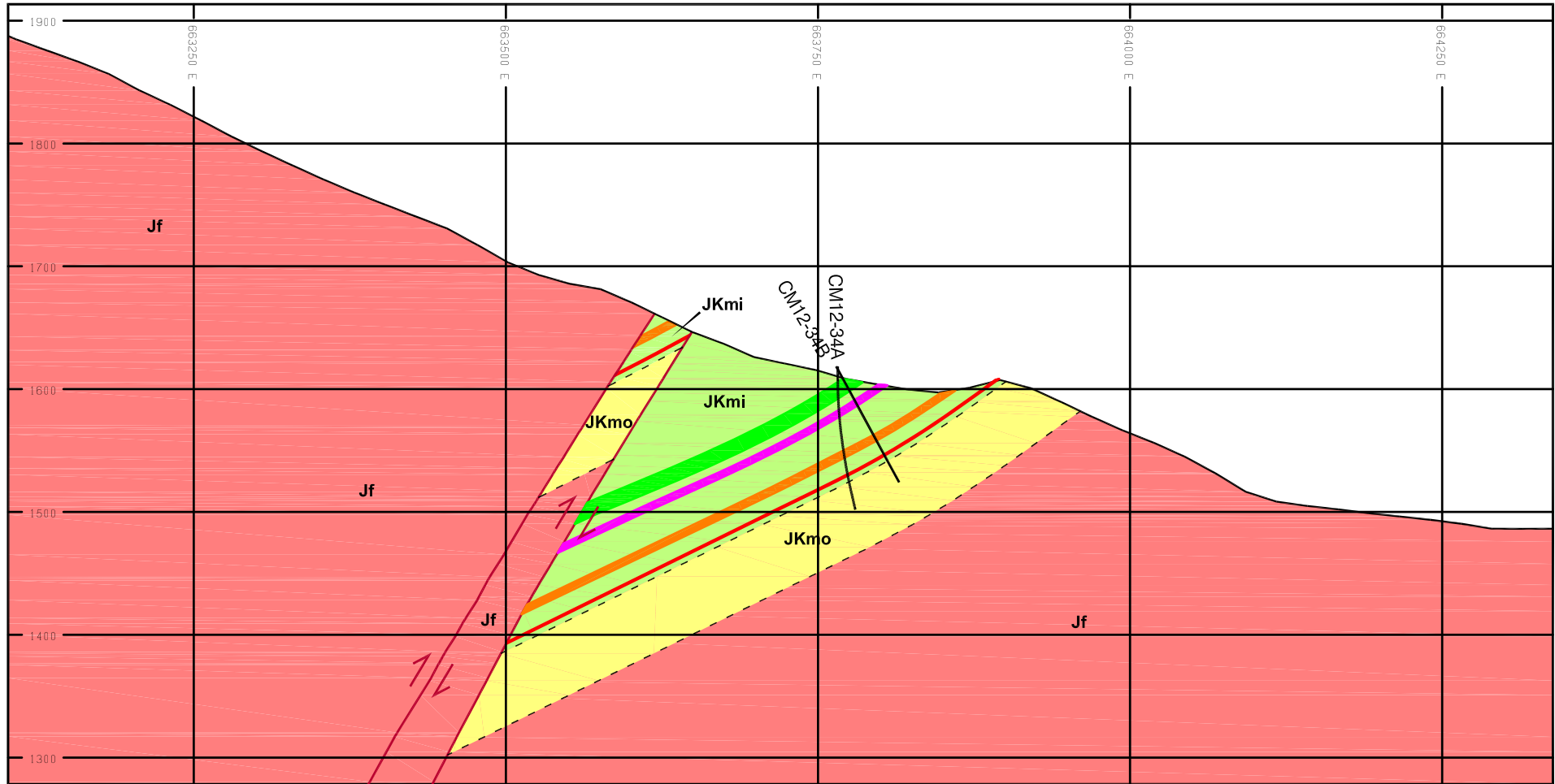




LEGEND



- | | | | |
|-----------------------------|---------------|-----------------|-------------------------|
| — (solid black line) | Topography | — (orange line) | Seam 10 Upper |
| - - - - (dashed black line) | Contact | — (red line) | Seam 10 Middle |
| — (cyan line) | Seam 8 Upper | — (blue line) | Seam 10 M Rider |
| — (purple line) | Seam 8 Middle | — (brown line) | Seam 10 Lower |
| — (dark blue line) | Seam 8 Lower | ■ (light green) | Mist Mountain Formation |
| — (orange line) | Seam 8 Rider | ■ (yellow) | Morrissey Formation |
| — (green line) | Seam 9 | ■ (red) | Fernie Formation |
| — (magenta line) | Seam 9 Rider | | |

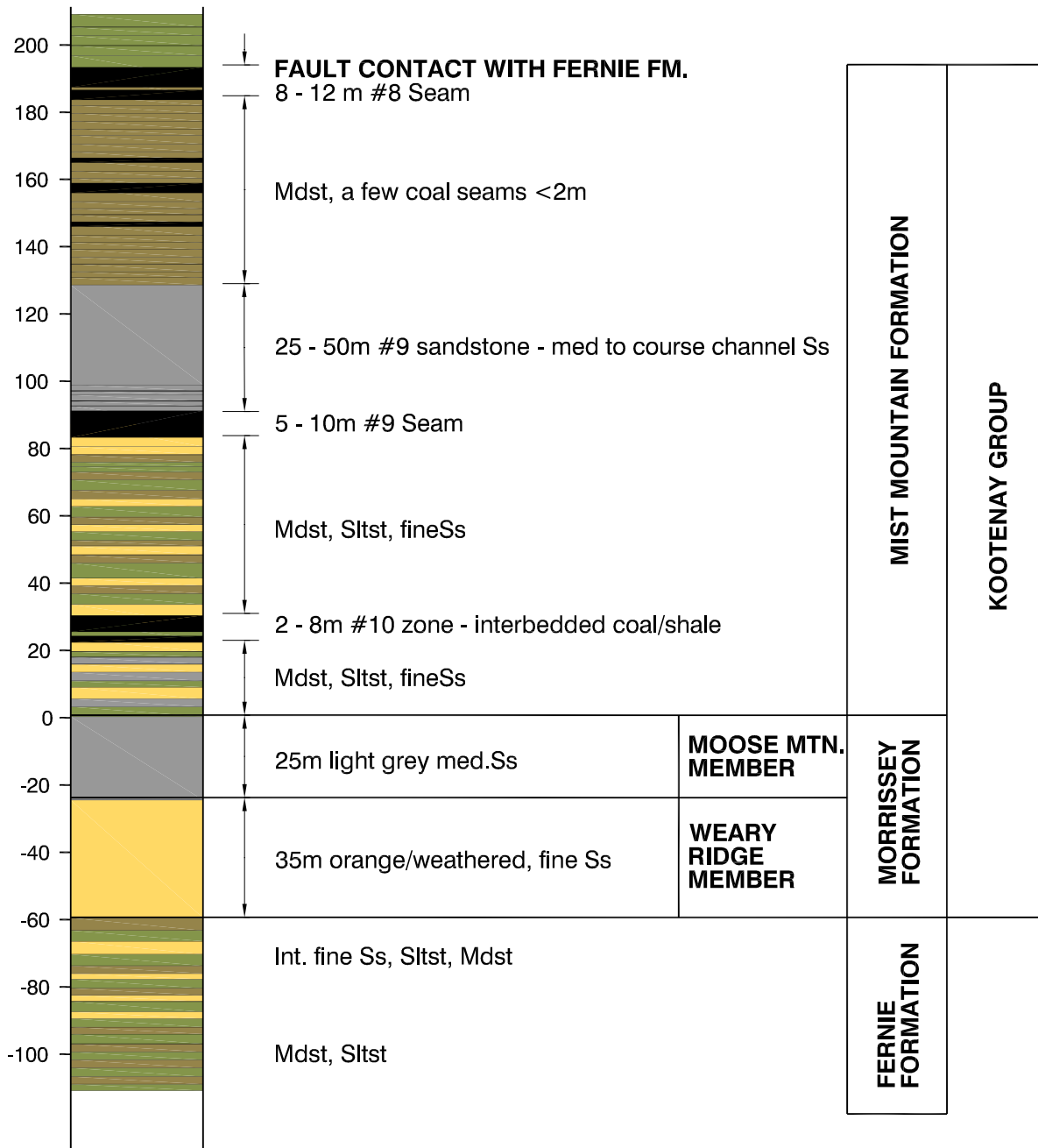
 ASSESSMENT REPORT CROWN MOUNTAIN COAL PROPERTY	
<h2>CROSS SECTION E-E'</h2>	
FIGURE 8-9	
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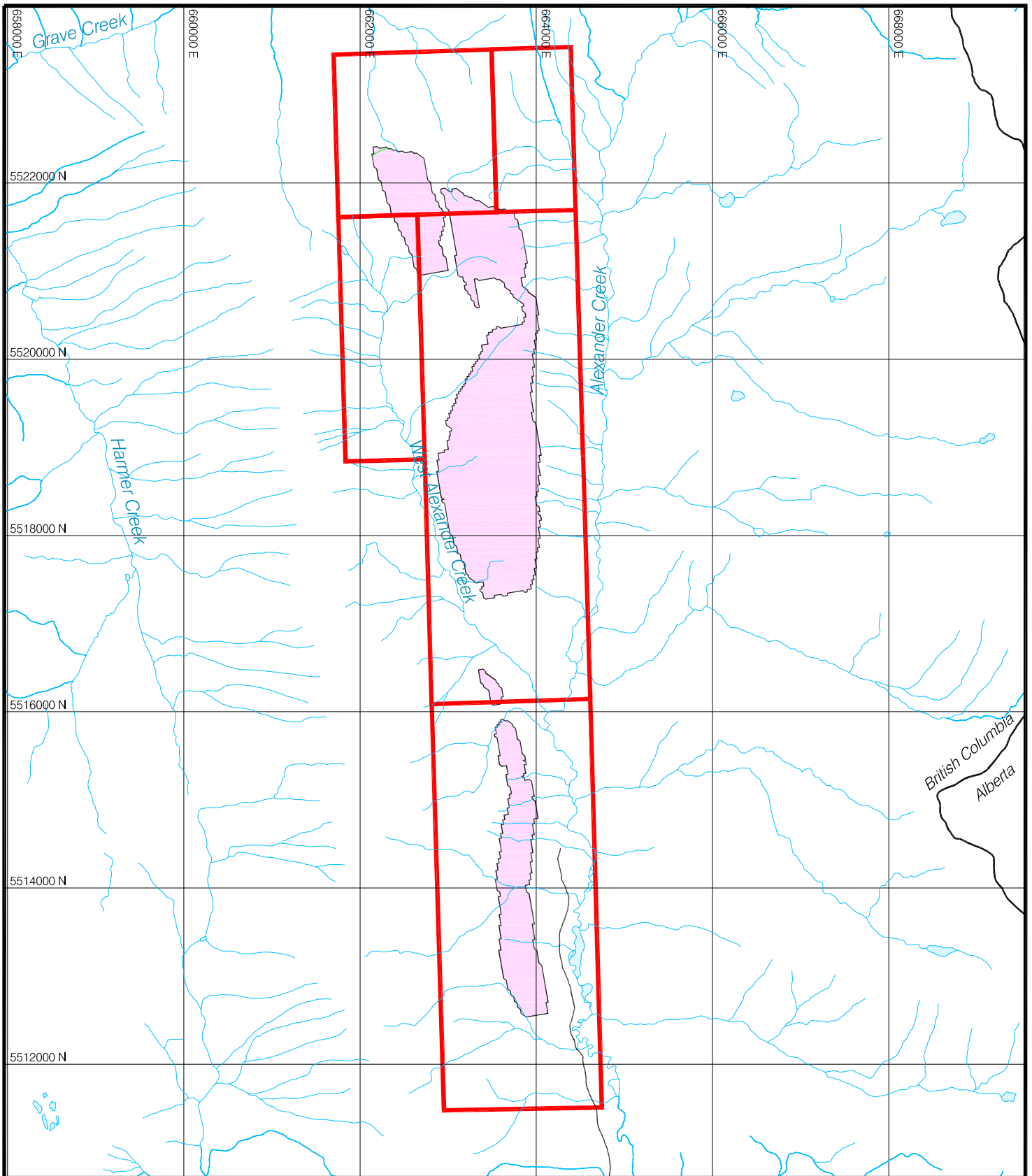
LEGEND



- | | |
|-----------------|---------------------------|
| — Topography | — Seam 10 Upper |
| - - - Contact | — Seam 10 Middle |
| — Seam 8 Upper | — Seam 10 M Rider |
| — Seam 8 Middle | — Seam 10 Lower |
| — Seam 8 Lower | — Mist Mountain Formation |
| — Seam 8 Rider | — Morrissey Formation |
| — Seam 9 | — Fernie Formation |
| — Seam 9 Rider | |

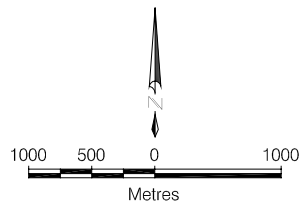
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<h2>CROSS SECTION F-F'</h2>	
FIGURE 8-10	
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 Jameson RESOURCES LIMITED	
ASSESSMENT REPORT CROWN MOUNTAIN COAL PROPERTY COAL SEAM STRATIGRAPHY	
FIGURE 9-1	
DRAWN BY: M.L.E. CHK'D BY: M.E. DATE: 13 03 28	FILE: Fig 9-1 Coal Seam Stratigraphy.dwg G:\ProjectData\Jameson_C_284\284-1_Reports\ Assessment Report\Figures
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-  JAMESON COAL LICENSE
-  RESOURCE DISTRIBUTION AREA



ASSESSMENT REPORT
CROWN MOUNTAIN COAL PROPERTY

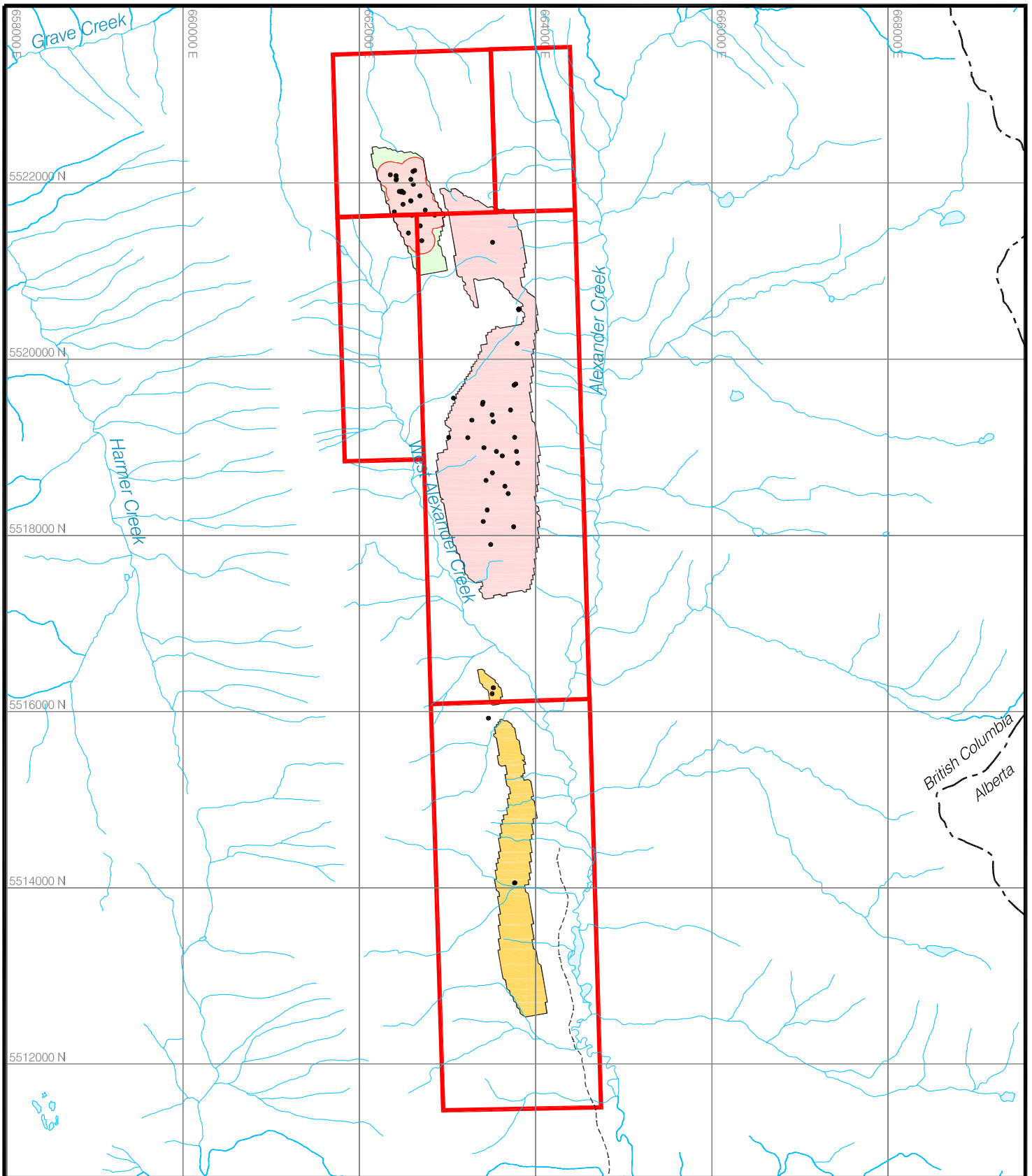
COAL RESOURCE DISTRIBUTION MAP

FIGURE 10-1

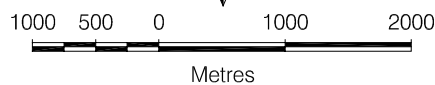
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CHKD BY: M.E.
DATE: 13 03 28

FILE: Fig 10-1 Coal Resource Distribution.dwg
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P05015



- JAMESON COAL LICENSE
- MEASURED RESOURCE
- INDICATED RESOURCE
- INFERRED RESOURCE
- DRILL HOLE



ASSESSMENT REPORT
CROWN MOUNTAIN COAL PROPERTY

COAL RESOURCE CLASSIFICATION MAP

FIGURE 10-2

DRAWN BY: M.L.E.
CHKD BY: M.E.
DATE: 13 03 28

FILE: Fig 10-2 Coal Resource Classification.dwg
G:\ProjectData\Jameson_C_284\284-1_Reports\Assessment Report\Figures

NORWEST
APEGGA Permit
P05015

APPENDIX 1
SILENUS WORK REPORT

Date: February 24, 2014
Mine No.: 1630209
Permit Number: CX-5-14

 Name of Property/Project: Crown Mountain Exploration

 Annual Work Approval Number: 13-1630209-0528
Permittee

 Name: NWP Coal Canada Ltd

 Address: Suite 800, 1199 West Hastings

 City: Vancouver Province: BC

 Postal Code: V6E 3T5 Bus. Phone: 435.650.1122 Fax: 60.719.1718
Duration of Exploration Program for reported year.

 Start date (Year/Month/Day) 2013/05/21 Finish date (Year/Month/Day) 2013/09/06

Attach a map at a scale of 1:10,000 or better showing as built: trails, roads, drill sites, trenches, test pits, core storage, other developments and reclaimed sites.

Surface Exploration Work Completed on Property

Exploration Surveys

Type	Total Length (km)
Line Cutting	N/A
IP	
EM	
Other _____	

Type	Total Length (km)
VLF	N/A
Max-Min	
Mag	

Geochem.

Type	# Samples
Grid Soil	N/A
Contour Soil	

Type	# Samples
Detailed Silt	N/A
Other _____	

Mechanized Work

	# Sites	Total Length (m)	Width (m) (includes sidecast)	Disturbance (ha)
Trenching				
Test Pits				
Access				
Excavated Trail		1,749 m	12 m (average)	2.1 ha
Excavated Road				

	Core Size	# Sites	# Holes	Metres (m)	Total Disturbance (ha)
Diamond Drilling		8	7	856	0.7
Percussion Drilling		4	6	797	0.4
Other Drilling					
Bulk Sample			Tonnes		

Core Location (NAD 83) *

Lat/Long	°	°	ZONE
UTM	663221	5521546	11

*coordinates for site 13-15 shown. Core is also stored at drill pads 12-01, 11-12, 11-22, 13-25, 11-19 coordinates on attached map



Underground Exploration Work Completed on Property This Year

	# Holes	Total Metres Drilled	New Development	(m)
Diamond Drilling	N/A		Drifts	N/A
Percussion Drilling			Raises	
			Declines & Ramps	
Bulk Sample	m ³	Tonnes	Rehab Workings	(m)
Ore Mined	N/A		Drifts	N/A
Waste Mined			Raises	
Totals			Declines & Ramps	

Are underground openings closed in compliance with Section 10.6.5 of the Code? Yes No

Surface Disturbances and Reclamation Completed on Property This Year

	Surface Disturbance (ha) 1ha = 10,000m ²	Reclamation Completed (ha) 1ha = 10,000m ²
Cut grids, camps, helicopter pads	0.0	
Mechanical trenches/test pit	0.0	
Surface drill sites/settling ponds/sumps	1.1	
Excavated Trail construction/modification	2.1	
Excavated Road construction/modification	0.0	
Bulk sample overburden/waste dumps	0.0	
Portal sites, ore/waste dumps	0.0	
Other: _____	0.0	
Totals	3.2	

Reclamation Summary

Area of new surface disturbance this year:	3.2	ha
Add disturbance from previous years:	+ 1.5	ha
Subtract disturbance reclaimed this year:	- 0.04	ha
Balance of unreclaimed surface disturbance:	= 4.7	ha

CONFIDENTIAL (Information not for routine release)

Deposit Type: _____ Exploration Expenditure: _____

Estimated total person/days worked 350

Do you expect to be working on this property within one year? Yes No

Do you wish to close this permit and have the reclamation security returned? Yes No

If yes, submit Notice of Mine Closure (Part 10.6 of the Code)

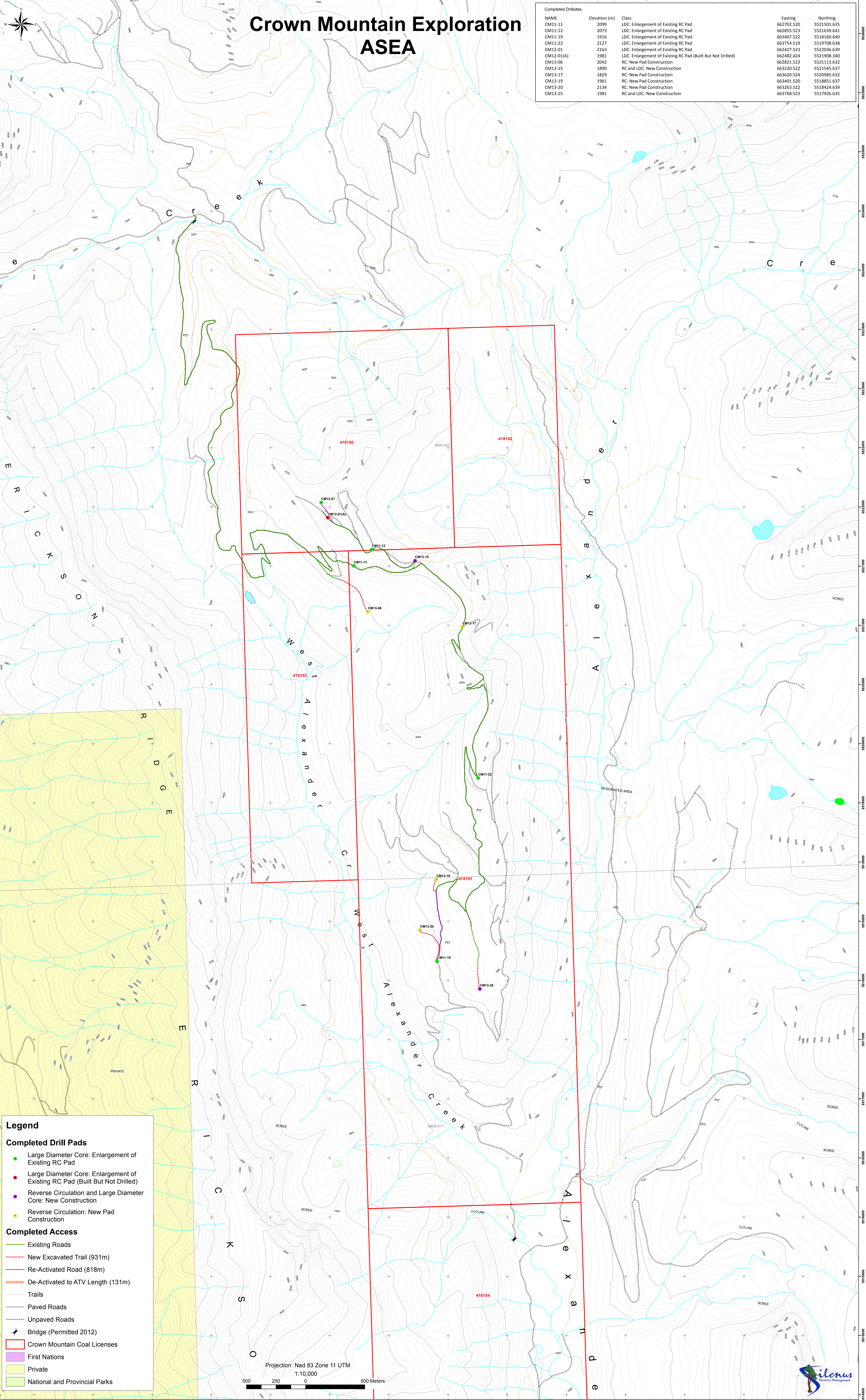
Manager Signature Art Palm

21 MAR 2014
Date

The *Mines Act* of British Columbia authorizes the collection of the requested information on this form. The completed form is routinely available to the public, except as noted, and is covered by the *Freedom of Information and Protection of Privacy Act*.

Crown Mountain Exploration ASEA

Completed Drillites	Name	Elevation (m)	Class	Easting	Northing
	CM11-11	2099	LDC: Enlargement of Existing RC Pad	662702.520	5521501.635
	CM11-12	2073	LDC: Enlargement of Existing RC Pad	662855.523	5521639.641
	CM11-19	1916	LDC: Enlargement of Existing RC Pad	663407.522	5518160.640
	CM11-22	2127	LDC: Enlargement of Existing RC Pad	663754.519	5519708.638
	CM12-01	2163	LDC: Enlargement of Existing RC Pad	662427.523	5522036.639
	CM12-01(A)	1981	LDC: Enlargement of Existing RC Pad (Built But Not Drilled)	662482.424	5521908.340
	CM13-06	2042	RC: New Pad Construction	662821.523	5521113.632
	CM13-15	1890	RC and LDC: New Construction	663220.522	5521545.637
	CM13-17	1829	RC: New Pad Construction	663620.524	5520985.632
	CM13-19	1961	RC: New Pad Construction	663401.520	5518851.637
	CM13-20	2134	RC: New Pad Construction	663263.522	5518424.639
	CM13-25	1981	RC and LDC: New Construction	663768.523	5517926.635



Legend

Completed Drill Pads

- Large Diameter Core: Enlargement of Existing RC Pad
- Large Diameter Core: Enlargement of Existing RC Pad (Built But Not Drilled)
- Reverse Circulation and Large Diameter Core: New Construction
- Reverse Circulation: New Pad Construction

Completed Access

- Existing Roads
- New Excavated Trail (931m)
- Re-Activated Road (818m)
- De-Activated to ATV Length (131m)
- Trails
- Paved Roads
- Unpaved Roads
- Bridge (Permitted 2012)

Other Features

- Crown Mountain Coal Licenses
- First Nations
- Private
- National and Provincial Parks

Projection: Nad 83 Zone 11 UTM
1:10,000
500 250 0 500 Meters



APPENDIX 2
DESCRIPTIVE LOGS

PROJECT: *Crown Mountain*

HOLE No *CM 11-11-CH*

LOCATION:

DRILLER / RIG: *FORACO / 104*

DATE: *Aug. 17/13*

CLIENT: *NWP Coal*

LOGGED BY: *Michelle E. / Lindsey P*

Drilled:

Core Dia:

2130 hrs

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
57.45	1	1.04 / 1.05 / 99%	SILTSTONE: DKgr-y-blk, 57.45-57.99 R4 , 57.99-58.5 fractured, Fractures have iron staining tr coal frag in bottom 20cm	.77 / 1.05 / 73%						1	N/A
58.5	2	1.65 / 1.8 / 92%	SILTSTONE: med-dkgr, 58.5-58.94 shaley SS w coal fragments, iron stain, 58.94-60.3 R4, Frac @ 59.2, 59.74, 59.96	1.02 / 1.8 / 57%						2	N/A
60.3	3	1.73 / 1.7 / 100%	COAL: BLK, bright w tr dull, 60.3-60.8 washed frac, stain, frac throughout, Pyrite @ 61.73m, SILK @ 61.8m	0			60° @ 61.08m 50° @ 61.26m 55° @ 61.35 61.89-62.0m: SILTSTONE, BLK, sheny, sil, carb. frac			1	3 BAGS
62	4	2.05 / 2.0 / 103%	COAL: BLK, bright w dull, Fractured in last 0.50m. SILK @ 1.67m	0			620-62.15 SAMPLE #2 Carbonaceous SILTSTON.	50° @ 62.24m 60° @ 62.45m 50° @ 62.69m 30° @ 63.2m 45° @ 63.29m		2	1 bag
64	5	2.27 / 2.3 / 99%	64-64.60m COAL, BLK, bright w dull, fract, same as above but softer 64.60-66.30 mudstone w interbedded coal seams R4	1.0 / 2.3 / 44%			SAMPLE #3 (62.15-64.60) 64.60-66.30 mudstone interbedded w coal seams. dk grey-BLK, R4 trace pyrite @ top of mudstone 64.60-64.90m	70° @ 63.44m 70° @ 64.64m 70° @ 64.78m 70° @ 64.96m 65° @ 65.0 60° @ 65.15 60° @ 65.25 65° @ 65.42 65° @ 65.68 70° @ 65.79		3	8 bags
66.3	6	1.54 / 1.7 / 111%	MUDSTONE: DKgrayish blk-blk, R5, trace silk @ 67.40m, 67.3-67.45 FRAC, crumbly.	0.89 / 1.7 / 52%				60° @ 66.76 55° @ 66.95 80° @ 67.54m.		6	7
68											

0100 hrs

- Conglomerate
- Sandstone
- Siltstone
- Mudstone
- Shale
- Coal - Bright
- Coal - Dull & Bright
- Coal - Dull
- Bone Coal
- Carb Sh

- F = Fault
- Sh = Shear
- J = Joint
- B = Bedding
- Sm = Smooth, R = Rough

- Pl = Planar, St = Stepped
- U = Undulating (wavy)
- C = Curved, SI = Slickensided
- Pc = Polished
- Broken Co

- U = Unisat
- SD = Stake
- PLT = PLT
- Q = Quality

PROJECT: CROWN MOUNTAIN

HOLE No CM11-11-CH

LOCATION:

DRILLER / RIG: FORALCO 104 DATE: AUG 18/2013

CLIENT: NWP COAL LOGGED BY: Lynsey P./

Drilled:

Core Dia:

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
68	7	2.0% 2 101%	MUDSTONE: DK greyish blk-blk, RS, shale @ 69.58m, FRAC @ 69.58m.	1.9% 2 96%				25° @ 69.17m 45° @ 69.6m		8+9 2/3 5	
70	8	2.4% 2.3 104%	MUDSTONE: DK greyish blk-blk, RS, 70.9-71.1m frac, 70.9-71.1m tr. siltstone tr. carbonaceous debris in first 0.4m	0.9% 2.3 43%				90°-70.2m 85°-70.73m 50°-71.5m		10, 11, 12 3/3 5	
72.3	9	1.9% 1.7 112%	MUDSTONE: DK greyish blk-blk, RS, FRAC in top 0.3m core sampled in shoe: carb debris coal frag, crumbly w mudstone silt @ bot	1.4% 1.7 82%				350°-72.8m 60°-73.3m 70°-73.8m		13+14 2/2 7	
74	10	2.4% 105% 105%	MUDSTONE: med brownish gray-blk, R2-R4, siltstone crumbly in part, carb debris @ 75.54m, FRAC.	0				65° @ 74.15m		15+16 15 16	
76	11	2.4% 2.3 106%	MUDSTONE: DK greyish blk-blk, R2-R4, 76.3 carb debris shale + 76.54m. silt @ 77.57m FRAC in part	0.4% 2.3 21%				60°-76.26 70°-76.5 60°-77.0 90°-77.05 70°-77.26 90°-77.86		17, 18, 19 3/3 9	
78.3	12	1.8% 1.7 106%	MUDSTONE: DK greyish blk-blk, R2-R4, carb, Frac gradational contact 79.84 COAL: blk, bright w dull, frac, sheer	0.7% 1.7 46%				70°-79.69 50°-79.72 90°-79.72 60°-79.74 60°-79.66 55°-80.03		20, 21 2/2 5	

300 hrs

440 hrs

- Conglomerate
- Sandstone
- Siltstone
- Mudstone
- Shale
- Coal - Bright
- Coal - Dull & Bright
- Coal - Dull
- Bone Coal
- Carb Sh

- F = Fault
- Sh = Shear
- J = Joint
- B = Bedding
- Sm = Smooth, R = Rough

- Pl = Planar, St = Stepped
- U = Undulating (wavy)
- C = Curved, SI = Slickensided
- Po = Polished
- Broken Co

- U = Uniaxial
- SD = Stake
- PLT = PLT
- Q = Quality

.43
.24
.2
.24

23.28

PROJECT: CROWN MOUNTAIN
 LOCATION: CM11-11-CH
 DRILLER/RIG: FORACO 104 DATE: AUG 18/13
 CLIENT: NWP COAL LOGGED BY: L. PETERSON

HOLE No CM11-11-CH
 Drilled:
 Core Dia:

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
80	13	2.15 / 2 / 108%	COAL: BLK, bright w dull, FRAC, crumble, sheen within fractures 81.7 - 51.7 82m Carb mudstone w coal interbeds							13	4 5 bags
82	14	2.22 / 2 / 117%	MUDSTONE: B BLK, silty w coal beds, Coal 83.3-83.6 - Frac, bright w dull, crumble 83.6-83.9 mudstone, shale	1.61 / 2 / 81%			53.9-84 COAL-BLK, bright w dull, frac	550 82.1 750 82.65 650 82.76 400 83.4 500 83.60		23 24	5 1 bag
84	15	1.98 / 1.7 / 116%	MUDSTONE: DK grey - DK greyish black, R3-R4, FRAC 84-85.5	0.8 / 1.7 / 47%				650 84.45 600 84.9 900 85.6		25 26	
86	16	1.9m / 2 / 95%	Mudstone: DK grey, 86-87.95 Coal 87.85-88	1.77 / 2 / 88.9%	R3		55° @ 86.25 58° @ 87.53 Sample # 505 87.85			27 28	5 1 bag
88	17	1.4 / 1.4 / 100%	88-88.6m MST DK grey, coal stringer @ 88.36m 88.61-89.4m SS f-m gr, 1 tag com. mud lam. inc w/ depth. coal stringer @ 89.27m	9.0 / 1.4 / 64%	R3 R5		65° @ 88.36m 25° @ 88.7m 30° @ 88.9m 80° @ 89.27m			28 29	No Sample
89	18	1.0 / .9 / 111%	89.4-89.65 SS f-m gr. 1+ ss mud st. gradual etc. 89.65-89.68 MST 90.3 dk grey w/ SS st. ↑	.64 / .9 / 71%	R6 R4					30	

530 hrs

87.86m

9.4

Conglomerate	Coal - Bright	F = Fault	Pl = Planar, St = Stepped	U = Unmixed
Sandstone	Coal - Dull & Bright	Sh = Shear	U = Undulating (wavy)	SD = Strike
Siltstone	Coal - Dull	J = Joint	C = Curved, Sl = Slickensided	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Po = Polished	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	Broken Co	

18
23

34.43

PROJECT: Crown Mountain

HOLE No CM11-11-CH

LOCATION: CM11-11-CH

DRILLER / RIG: Force DATE:

CLIENT: NWP Coal LOGGED BY :

Drilled:
Core Dia:

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
90	18		89.65-90.3 <u>MST.</u>								
90.3	19	1.75 / 1.9	90.3-90.6 <u>MST</u> dk gy, sharp etc	1.0			55° @ 90.97m			31	6
		103%	90.6-90.97m <u>SS/ST</u> fine grained	1.7			90° @ 91.3m 75° 91.56m-91.63				1082
91			90.97-91.3 <u>MST</u> dk gy trace coal st.				Sample #6: 91.7-92m lot 2				
			91.3-91.7m <u>Carb SH</u> Dk gy-blk abnt coal lam. grad etc.	50%						32	
92			91.7-92m <u>Coal</u> abnt bright bands traced								
	20	1.95	92-92.55 <u>Coal</u>				Sample #6: 92-92.55 local 2 of 2			32	5
		2	92.55-92.8m <u>MST</u> Dk gy w/ minor ss lam	1.01 / 2			75° @ 92.8				2 of 2
93			92.8-93.03 <u>coal</u> , bright				70° @ 93.15m 45° @ 93.5m				7
			93.03-93.75m Intbed <u>SS & MST</u> (MST on top)	50%			75° 93.66m				NA
			93.75-94 <u>Coal</u>				Sample #7: 92.55-93.03m ~50% MST/50% coal				
94	22	2.25	94-94.8 <u>Coal</u> bright common vitreous				cleats in coal: 55° @ 94.2m 45° @ 94.35m				8
		2.3	94.8-95.11m <u>Siltstn</u> w/ ss lam.				Sample #8: 94-94.8 to coal			33	3 bags
95			95.11-95.88m <u>Carb SH</u> coal @ 95.14-95.19m 95.40-95.43	92 / 2.3			70° @ 94.8m 60° @ 95.14m 65° @ 95.4m				NA
		98%	below 95.43m abnt coal laminae.	40%			Sample #9: 95.11-95.88m to Carb SH & coal				9
96			95.88-96.3m <u>Coal</u>				Sample #10: 95.88-96.3 to coal				10

Flip Core Run
1/2 20

core slipped

Conglomerate	Coal - Bright	F = Fault	PI = Planar, St = Stepped	U = Unsorted
Sandstone	Coal - Dull & Bright	Sh = Shear	U = Undulating (wavy)	SD = Siltstone
Siltstone	Coal - Dull	J = Joint	C = Curved, Sl = Slickensided	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Po = Polished	Q = Quality
Shale	Carb SH	Sm = Smooth, R = Rough	Broken Co	

PROJECT: Crown Mountain

HOLE No CM11-11-C14

LOCATION:

DRILLER / RIG: Fornco DATE: Aug.

CLIENT: NWP Coal LOGGED BY: Michele E.

Drilled:

Core Dia:

96.3
97
98
98.3
99
100
100.3
101
102

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
96.3-98.3	21	1.95 / 2	Coal bright, 97.6-27.85m (27.80?) is a Carb Shale parting	0	R0		Cleats @ 25°, 45° & 70° throughout core. Sample #10: 96.3-96.55m (2 of 6) 96.55-97 (3 of 6) 97-97.35 (4 of 6) 97.35-97.6 (5 of 6) 97.6-98.3 (6 of 6) contains 25cm Carb Shale parting				#10 6 bags
98.3-99.56	23	2.05 / 2	Coal Dull + Bright "Bony Coal" @ 98.45-98.60m 99.55-99.75m Carb SH 99.75-100.3m Coal, bright	76 / 2 38%	R0 R3 R0		55° @ 98.45-98.6m 35° @ 98.81m 55° @ 99.17m 50° @ 99.59m Sample #11: 98.3-100.3m bag 10 contains bony coal bag				#11 6 bags
100.3-102.3	24	1.9 / 2	Coal bright, v. brittle & broken up.	0	R0						#12 4 bags

Conglomerate	Coal - Bright	F = Fault	Pl = Planar, St = Stepped	U = Undulating (wavy)	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	U = Undulating (wavy)	SD = Shale	SD = Shale
Siltstone	Coal - Dull	J = Joint	C = Curved, Sl = Slickensided	PLT = PLT	Q = Quality
Mudstone	Bone Coal	B = Bedding	Po = Polished	Broken Coal	
Shale	Carb Sh	Sm = Smooth, R = Rough			

46.28

PROJECT: Crown Mountain

HOLE No CM11-11-CH

LOCATION:

DRILLER / RIG: Foruco DATE: Aug, 18 / 13

CLIENT: NUP Coal LOGGED BY: Michelle

Drilled:

Core Dia:

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
02.3	24	25	102.3-103.2m Carb SH 4 Sh DK - med gg Coal @ 102.94-103.2m inclined etc ↓		R3		65° @ 102.93m 65° @ 103.02m 55° @ 103.20m 50° @ 103.63m 50° @ 104.08m			33	#13 #4 #15
103		100%	103.2-103.50m SH Lt gg, massive Sharp, inclined etc w/ly		R5		sample # 13: 102.94-103.2 ↳ coal				
			103.50-104m Coal Dull w/ corner vitreous streaks	31%	R2		sample # 14: 103.2-103.55 ↳ shale parting				
104			104-104.3m SM Lt gg, com. coal straggles.		R5		sample # 15: 103.5-104m (coal)			34	
04.3		26	104.3-106.3 SH Med. gg abundant coal laminar (up to 5cm thick) @ 104.79-105.41m	1.16 / 2 58%	R6					34 35 36	
105											
106											
06.3		27	Carbaceous SHALE Med-dk gray, interbedded. blk coal, bright band, etc.	0.34 / 2 17%	R4		60° @ 106.6m 45° @ 107.14m 65° @ 107.70m			37 38	
107											
108											
108.3											

Conglomerate	Coal - Bright	F = Fault	Pl = Planar, St = Stepped	U = Undulating (wavy)	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	U = Undulating (wavy)	SD = Slate	SD = Slate
Siltstone	Coal - Dull	J = Joint	C = Curved, Sl = Slickensided	PLT = PLT	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Po = Polished	Q = Quality	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	Broken Co		

52.33

PROJECT: CROWN MOUNTAIN

HOLE No CM11-11-CH

LOCATION:

DRILLER / RIG: FORACO DATE: AUG 18/13

CLIENT: NWP COAL LOGGED BY: L. PETERSON

Drilled:

Core Dia:

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
108.3	28	2.23/2	MUDSTONE: dk greyish black to blk, interbedded, coal seams, bright to dull, sharp contact. COAL 109.22-110.3m	0	R2- R4		65° @ 108.78 65° @ 109.25 SAMPLE #16 109.22-109.51m 90° @ 109.55m SAMPLE #17 109.57-109.92 65° @ 109.85 SAMPLE #18 109.92-110.19 70° @ 110.1 SAMPLE #19 110.19-110.45			39	#16 1081 #17 1091 #18 1091 #19 1091
0.3	29	1.97/2 99%	MUDSTONE: med-dk grey, silty, fr. carb debris. top 15cm blk COAL, frag, crumbly, bright to dull, # added 15cm of coal to sample #19.	0.64/2 32%	R5		70° @ 110.7m 60° @ 111.3m 60° @ 111.4m 60° @ 111.7			40 41	
12.3 2130 hrs	30	2.19/2 110%	MUDSTONE: med-dk grey, tr. carbonaceous debris, silty near btm.	1.35/2 68%	R5 R6		350° @ 113.1 65° @ 113.3 60° @ 113.72 65° @ 114.01m			42 43	

Conglomerate	Coal - Bright	F = Fault	PI = Planar, St = Stepped	U = Unfilled
Sandstone	Coal - Dull & Bright	Sh = Shear	U = Undulating (wavy)	SD = Slate
Siltstone	Coal - Dull	J = Joint	C = Curved, Sl = Slickensided	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Po = Polished	Q = Quantity
Shale	Carb Sh	Sm = Smooth, R = Rough	Broken Co	

108.3

0.3

12.3
2130 hrs

114.3

127
13
11
122

58.72

PROJECT: CROWN MOUNTAIN

HOLE No CMI11-11-CH

LOCATION:

DRILLER / RIG: FORACO

DATE: AUG 14/13

CLIENT: NWP COAL

LOGGED BY: L. PETERSON

Drilled:

Core Dia:

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
114.3	31	228/2 114%	MUDSTONE: med-DK grey, v. hard, & silty, slightly frac in top 0.35m	1.83/2 92%	R5- R6		65° @ 114.55			44	
						70° @ 114.77		45			
						75° @ 114.85		46			
116	32	206/2 103%	MUDSTONE: DK grey, v. hard, frac @ 117.65m to SILT SAND.	1.76/2 88%	R5- R6		45° @ 117.45			47	
						60° @ 117.73m		48			
118.3	33	20/20 100%	MUDSTONE: DK grey, Hony high angle laminations, v. hard, Carb debris @ top	7/2 100%	R5- R6		55° @ 118.9m			49	
						60° @ 119.6m		50			
120.3										51	

- Conglomerate
- Sandstone
- Siltstone
- Mudstone
- Shale

- Coal - Bright
- Coal - Dull & Bright
- Coal - Dull
- Bone Coal
- Carb Sh

- F = Fault
- Sh = Shear
- J = Joint
- B = Bedding
- Sm = Smooth, R = Rough

- Pl = Planar, St = Stepped
- U = Undulating (wavy)
- C = Curved, Sl = Slickensided
- Po = Polished
- Broken Co

- U = Uniaxial
- SD = Strike
- PLT = PLT
- Q = Quality

PROJECT: **CROWN MOUNTAIN**

HOLE No **CM11-11-CH**

LOCATION:

DRILLER / RIG: **FORACO** DATE: **AUG 19/13**

CLIENT: **NWP COAL** LOGGED BY: **L. PETERSON**

Drilled:
Core Dia:

120.3

223

124.3

126.4

0220
115

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
120.3	34	100%	COAL: 120.3-121.45m Blk, FRAC, crumbles, bright to dull, silty part Sharp contact.	0.78 2	R4- R5		SAMPLE #20 120.3-120.7m SAMPLE #21 120.7-121.1m 60° @ 120.3m SAMPLE #22 121.1-121.45m SRK SAMPLE #11 Box 1 of 121.45-122.3		#11		#20 1 of 1 #21 1 of 1 #22 1 of 1
121		100%	MUDSTONE: 121.45-122.3m DK grey - Blk, carb debris	39%							
122											
123	35	100%	SANDSTONE: med- DK grey, med grey tan, v. Hard, f-med grained	1.90 2 95%	R5- R6		50° @ 122.45m 55° @ 123.17m 55° @ 123.85m SRK SAMPLE #12 122.3-123.2m		#12	52	53
124											
125	36	100%	SANDSTONE: DK grey - blk, v. hard, tr carb debris @ 125.95	2/2.1 95%	R5- R6		40° @ 124.6 60° @ 125 55° @ 125.4 50° @ 125.84 50° @ 126.05			54 55	
126											

TD 126.4m
AUG 19/13 @ 0220 hrs

Conglomerate	Coal - Bright	F = Fault	PI = Planar, St = Stepped	U = Unisized
Sandstone	Coal - Dull & Bright	Sh = Shear	U = Undulating (wavy)	SD = Slate
Siltstone	Coal - Dull	J = Joint	C = Curved, Si = Slickensided	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Po = Polished	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	Broken Co	

123
133

123.86

PROJECT: CROWN MOUNTAIN

HOLE No CM11-12-CH

LOCATION: _____ DATE: AUG 20

DRILLER/RIG: FORACO 104 LOGGED BY: L. PETERSON

Drilled: _____

CLIENT: NWP COAL

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
12	1	1.4/1.5	COAL: blk, frac, crumbly, oxidized throughout, bright to dull	0			SAMPLE #1 11.0-11.60m SAMPLE #2 11.60-12.0m SAMPLE #3 12.0-12.55m				1 bag left 2 3 bag left
13	2	2/2	COAL: blk, frac in top 30cm, bright to dull, oxidized throughout, dense and higher oxidation between 13.1-13.5m	0			40° @ 13.2m 40° @ 13.62m 60° @ 13.92m 70° @ 14.23m 70° @ 14.38m SAMPLE #4 12.55-13.3m SAMPLE #5 13.3-13.7 SAMPLE #6 13.7-14.1 SAMPLE #7 14.1-14.5m				4 left 5 left 6 left 7 left
15	3	2/2	COAL: blk, frac throughout, bright to dull, oxidized throughout.				200° @ 15.1m SAMPLE #8 14.5-14.9 SAMPLE #9 14.9-15.3 SAMPLE #10 15.3-15.7 SAMPLE #11 15.7-16.1 SAMPLE #12 16.1-16.5m				8 left 9 left 10 left 11 left 12 left

Conglomerate	Coal - Bright	F = Fault	PI = Planar, St = Stepped	U = Unisized
Sandstone	Coal - Dull & Bright	Sh = Shear	U = Undulating (wavy)	SD = State
Siltstone	Coal - Dull	J = Joint	C = Curved, Sl = Slickensided	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Po = Polished	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	Broken Col	

.10
17

4

PROJECT: CROWN MOUNTAIN

HOLE No CMW-12-CH

LOCATION:

DRILLER / RIG: FORACO 104

DATE: AUG 20 / 2013

CLIENT: NWP COAL

LOGGED BY: L. PETERSON / M. ESKRICK

Drilled:

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
17	4	1.82 / 2 = 91%	SHALE: Brownish orange to blk, weathered, Frag, Carbonaceous debris in part.	0	R3		SRK Sample 2 box 1 16.5-17.5m box 2 17.5-18.5m (SRK Sample 1 bag)		2 Box Zof	2	
18											
Hammer 18.5-33m → No core											
33	5	1.5 / 1.5 = 100%	33-33.55m Carb SH De ag to blk, Rubble 33.55-34.5 Coal black, bright, Occ. carb sh beds @ 33.85m 34m. bottom 30cm is rubble.	40 / 1.5 = 26%	R3 R20		Cleats 65° @ 33.65-33.75m SRK Sample 3: 33-33.55m (bagged) (cont. sample 2 bags) Sample # 13: 33.55-34m L coal (1 parting) Sample # 14: 34-34.5m L coal (1 parting)		3		
34											
35	6	2.0 / 2.0 = 100%	34.5-35.25m Coal blk friable, mixed etc. 35.25-36.20m SH orange weathering along fracture planes, DK ag, coal lam. throughout. 36.2-36.5 Coal + SH Coal is v. broken up, likely all coal but got mixed w	24 / 2 = 12%	R20 R2 R10		Cleats in coal: 65°, 40° 40° @ 35.3m 25° @ 35.29-35.58m 55° @ 35.5m 60° @ 35.7m 0-50° @ 36m Sample # 15: 34.5-34.85m Coal Sample # 16: 34.85-35.25m Coal			3	
36											

Conglomerate	Coal - Bright	Shale from above.
Sandstone	Coal - Dull & Bright	
Siltstone	Coal - Dull	
Mudstone	Bone Coal	
Shale	Carb Sh	

F = Fault	Pl = Planar, St = Stepped	U = Uniaxial
Sh = Shear	U = Undulating (wavy)	SD = Strike
J = Joint	C = Curved, Sl = Slickensided	PLT = PLT
B = Bedding	Po = Polished	Q = Quality
Sm = Smooth, R = Rough	Broken Col.	

PROJECT: Crown Mountain

HOLE No CM11-12-CL1

LOCATION:

DRILLER / RIG: Foraco/104

DATE: Aug. 20/13

CLIENT: NUP Coal

LOGGED BY: Michelle E.

Drilled:

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
6							Sample #17: 36.2-36.5m coal + shale				
7		1.00/2	36.5-37.15m: Shale dk gy com - abnt. coal stringers. highly fractured, inclined etc w/b	36/2	R3		55° @ 36.9m 70° @ 37.05m			4	
37		94% (1st from top)	37.15-37.60m: Coal black v. friable	18%	R0		50° @ 37.8-37.92m (multiple joints)				
38			37.6-38.5: Shale med. gy w/ abnt coal laminae/beds				45° 35° @ 38.05m 60° @ 38.30m Sample #18: 37.15-37.6m				
39		2.05/2	38.5-39.5 (MST) dk gy w/ orange weathering along abnt. fractures. inclined etc.	1.15/2	R25		65°-55° @ 38.82-39.05 55° @ 39.52m			5	
40		102.5%	39.5-40.03m: Siltstn dk gy w/ occ. MST lam. grad etc w/b	57.5%	R6		45° @ 40.17 50° @ 40.3-40.5m			6	
40			40.03-40.5m: SS interbed w/ siltstn + MST. fg. light gray. wavy/inter-ter bedding.		R5	T broke along bdy etc				7	
41		2.0/2.0	40.5-41.75 (SS) interbed w/ MST, fg, lt gy wavy bdy	1.2/2	R6		50° @ 40.85m 15° @ 40.9-41.15			8	
42		100%	41.75-42.2 SH/Carb silt dk gy. fractured, inclined etc w/b com. coal lam.	60%	R5		50° @ 41.2m 50° @ 41.27m 60° @ 41.65m				
42			42.2-42.5 Coal black, bright, friable		R0		sample #19: 42.2-42.5m Coal			9	

- Conglomerate
- Sandstone
- Siltstone
- Mudstone
- Shale
- Coal - Bright
- Coal - Dull & Bright
- Coal - Dull
- Bone Coal
- Carb Coal

- F = Fault
- Sh = Shear
- J = Joint
- B = Bedding
- Sm = Smooth, R = Rough
- Pl = Planar, St = Stopped
- U = Undulating (wavy)
- C = Curved, St = Stick-sided
- Po = Polished
- Broken Col.
- U = Unrated
- SD = State
- PLT = PLT
- Q = Quality

PROJECT: Crown Mountain

HOLE No CM11-12-CH

LOCATION: _____
 DRILLER / RIG: Foraco 104 DATE: Aug 20/13
 CLIENT: NWP Coal LOGGED BY: M. Eskrick

Drilled: _____
 Core Dia: _____

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
9											
43	10	2.0 / 2.0 / 100%	42.5-42.95m <u>Coal</u> bright, friable		20						
			42.95-43.98m <u>SH</u> dk gy, common coal lam/beds	103 / 2	24					10	
44			43.98-44.5m <u>Coal</u> bright, blk, friable	51.5	20						
45	11	2.0 / 2.0 / 100%	44.5-45.20m <u>Coal</u> bright, friable 5cm shale parting @ 46.5m	0.76 / 2	20					11	
			45.2-46.35m <u>Shale</u> dk gy w/ coal beds up to 2cm thick	38%	24						
46			46.35-46.5m <u>Coal</u> , bright blk, friable		20						
										12	
47	12	1.9 / 2.0 / 95%	46.5-48.2m <u>Coal</u> dominantly bright w/ dull bands trace pyrite or cleats	0	20						
48											

Conglomerate	Coal - Bright	F = Fault	PI = Planar, St = Stepped
Sandstone	Coal - Dull & Bright	Sh = Shear	U = Undulating (wavy)
Siltstone	Coal - Dull	J = Joint	C = Curved, Sl = Slickensided
Mudstone	Bone Coal	B = Bedding	Po = Polished
Shale	Carb Sh	Sm = Smooth, R = Rough	Broken Co
			U = Unsorted
			SD = Strike
			PLT = PLT
			Q = Quality

PROJECT: Crown Mountain

HOLE No CMW-2-11

LOCATION:

DRILLER / RIG: Foraco 104

DATE: Aug. 20/13

CLIENT: NWP Coal

LOGGED BY: M. Eskrick

Drilled:

Core Dia:

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
49	12										
49	13	1.65 / 2.0	48.5-50.5m (50.1) [Coal] carb shale parting @ 49-49.18m friable, below 49.7 coal is v. friable + powdery. (50.1-50.5 LC)	0	R0						
50		80% Core lost from bottom									
51	14	1.3 / 2.0	50.5-52.5m (coal) (50.5-51.1 LC) 51.1-52.25. very bright, very friable coal sandy coal in places. 52.25-52.5m	0	R0						
51		65% Coal lost from top									
53	15	2.0 / 2.0	52.5-53.0m: [MST] massive, dk gy 53.0-53.32m [Coal] bright & dull band. structural etc w/ ↓ 53.32-54.5m [MST] dk gy carbonaceous in places, abnt. coal beds/laminar up to 2cm thick	25 20 26%	R5 R0 R4						
54		100%									

Sample # 31: 48.5 - 49.0
Sample # 32: 49 - 49.5
↳ Contains shale parting
Sample # 33: 49.5 - 50.1
(50.1 - 50.5 LC)

(50.5 - 51.1 LC)
Sample # 34: 51.1 - 51.65
Sample # 35: 51.65 - 52.25
Sample # 36: Cuttings
taken from cleaning hole (attempted recovery at 50.5 - 51.1m)

Sample # 37: 53.0 - 53.32m
↳ coal
SRK Sample # 4:
53.32 - 54.35m
Box 13
54.35 - 54.5m
Box 14

Conglomerate	Coal - Bright	F = Fault	Pl = Planar, St = Stepped	U = Unmet
Sandstone	Coal - Dull & Bright	Sh = Shear	U = Undulating (wavy)	SD = Slaty
Siltstone	Coal - Dull	J = Joint	C = Curved, St = Stickensider	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Po = Polished	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	Broken Co	

PROJECT: Crown Mountain

HOLE No CM11-12-CH

LOCATION: _____
 DRILLER / RIG: Forced 100 DATE: Aug. 20/13
 CLIENT: NWP Coal LOGGED BY: M. Eskridge

Drilled: _____
 Core Dia: _____

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
15											
55	15	2.0 / 2.0	54.5 - 56.5m [SH] Occ. beds of carb sh. dk gy, fractured	0.4 / 2.0	R6		70° @ 55.11m 15° & 25° @ 55.7-56m				
56	16	100%		20%			SRK sample #4: 54.5m - 55.25m Box 14 55.25 - 56.25m Box 15				
57	17	2.15 / 2.0	56.5 - 56.75m [SS] Med. gravel, lt gy Sharp etc w/d		R6		45° @ 56.85m 50° @ 57m 65° @ 57.11m			16	
58	18	107.5%	56.75 - 58.45m [SH] dk gy, orange weathering on fracture surfaces, comm. coal to sharp etc w/d	0.4 / 2.0	R3		45° @ 57.55m 55° @ 57.8m			17	
			58.45 - 58.55m [Coal] Dull to bright, yellow substance on clasts		R0		Sample # 38: 58.45 - 58.55m			18	
59	18	1.85 / 2.0	58.5 - 59.55m (Coal) top 40cm of core contacts shale				60° @ 59.55m 60° @ 59.75m			18	
		92.5%	59.55 - 60.5m [Carb] Shale, fractures exhibit orange weathering on surface.				55° @ 59.97m 55° @ 60.35m Sample # 39: 58.5- Coal + shale 58.9 (root?) Sample # 40: 58.9-59.15 Coal			19	19

Conglomerate	Coal - Bright	F = Fault	PI = Planar, St = Stepped	U = Unsorted
Sandstone	Coal - Dull & Bright	Sh = Shear	U = Undulating (wavy)	SD = Stake
Siltstone	Coal - Dull	J = Joint	C = Curved, Sl = Slickensided	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Po = Polished	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	Broken Co	

PROJECT: Crown Mountain
 LOCATION:
 DRILLER / RIG: Foraco / 104 DATE: Aug, 20/13
 CLIENT: WWP Coal LOGGED BY: M. Eskow / L. PETERSON

HOLE No CMT-12CH
 Drilled:
 Core Dia:

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
18							sample 41: 59.15 - 59.55 Coal				
61	19	20/200	60.5 - 60.6m Coal bright, v. friable 60.6 - 61m Carb SH, DK gray-BLK; bottom 20cm is Shale.	1.2/2.0 60%	R3		60° @ 60.75m 40° @ 60.85m 40° @ 61.43m 60° @ 61.65m 45° @ 62m 30° @ 62m			20 21	
62			61 - 62.5 SH brownish grey, slight orange weathering on fracture plane		R2		Sample #42: 60.5 - 60.6				
63	20	21/2 105%	SLT: brownish grey, slight orange color throughout, Frac impart.	0.52/2 26%	R4 R5		35° @ 63.3m 65° @ 64.1m 35° @ 64.28m 60° @ 64.38m			21 22 23	
64											
65	21	2/2 100%	SLT stone, med-DK grey, br. Fg sand in top 0.5m, Frac @ top 0.4m	1.86/2 23%	R5		65° @ 64.9m 50° @ 65.75m			23 24 25	
66											

Conglomerate	Coal - Bright	F = Fault	Pl = Plener, St = Stepped	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	U = Undulating (wavy)	SD = Slate
Siltstone	Coal - Dull	J = Joint	C = Curved, St = Slickensided	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Po = Polished	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	Broken Coal	

PROJECT: CROWN MOUNTAIN

HOLE No CM11-12-CH

LOCATION:

DRILLER/RIG: FORACO/104 DATE: AUG 29/13

CLIENT: NWP COAL LOGGED BY: L. PETERSON

Drilled:
Core Dia:

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
67	22	1.95 / 2 98%	SLTSTONE: DK grey- DK greyish blk, u hard, FRAC in last 0.5m.	102% 2	R5 R6		50° @ 67.5m 55° @ 67.66 50° @ 67.94m			26 27	
68											
69	23	2 / 2 100%	SLTSTONE: DK grey to DK greyish brown, u hard, FRAC @ 70.07m weathered orange stain @ 69.5m	2 / 2 100%	R5 R6		35° @ 70.05m			28 29	
70											
71	24	2 / 2 100%	SLTSTONE: DK greyish blk, (70.5 - 70.85m) — sharp — COAL (70.85 - 72.35m) blk, bright to dull, frag, brittle, 70.85-71.45m a yellowish brown color in part SHARP — SHALE: (72.35-72.5m) blk, frag.	0.2 / 2 10%	R4- R5 R3		SAMPLE # 43 70.85-71.25m SAMPLE # 44 71.25-71.65m SAMPLE # 45 71.65-72.05m SAMPLE # 46 72.05-72.35m SRK # 72.35-73.15m 55° @ 70.7m 55° @ 71.0m 60° @ 71.2m + 71.35m 50° @ 72.11m		5	30 43	
72											

Conglomerate	Coal - Bright	F = Fault	Pl = Planar, St = Stepped	U = Unsorted
Sandstone	Coal - Dull & Bright	Sh = Shear	U = Undulating (wavy)	SD = Slate
Siltstone	Coal - Dull	J = Joint	C = Curved, Sl = Slickensided	PLT - PLT
Mudstone	Bone Coal	B = Bedding	Po = Polished	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	Broken Col	

20
27
513

PROJECT: CROWN MOUNTAIN

HOLE No CM11-12KH

LOCATION:

DRILLER / RIG: FORACO 104 DATE: AUG 20/13


CLIENT: NWPCOAL LOGGED BY: L. PETERSON

Drilled:

Core Dia:

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	RQD %	Strength	DISCONTINUITIES		Fractures	SRK Sample	Core Box #	SAMPLE #
						Graphic & Dip TCA	Type & Description				
2.9	25	100%	SHALE: blk, br. carbaceous,	95% 1 95%	S R5		SRK SAMPLE #5 72.35-73.15m 55° @ 72.9m 55° @ 73.15m 55° @ 73.4m		5	31	
			TD 73.5m NUS 20 @ 2230 2013								

-  Conglomerate
-  Sandstone
-  Siltstone
-  Mudstone
-  Shale
-  Coal - Bright
-  Coal - Dull & Bright
-  Coal - Dull
-  Bone Coal
-  Carb Sh

- F = Fault
- Sh = Shear
- J = Joint
- B = Bedding
- Sm = Smooth, R = Rough
- Pl = Planar, St = Stepped
- U = Undulating (wavy)
- C = Curved, Sl = Slickensided
- Po = Polished
- Broken Co 
- U = Uniaxial
- SD = Slake
- PLT = PLT
- Q = Quality

Well No. <u>CM11-12-CH</u>	Geologist: <u>L. PETERSEN</u>	Additional Notes (site conditions, adverse weather, drilling conditions etc.)
	Surface Elev. (m):	
	Hole Drilled To (m):	
	Casing Set at (m): <u>9m</u>	
Drilling Contractor: <u>FORACO</u>	Total Depth (m):	
Rig # <u>104</u>	Spud Date & Time: AUG 19/13 @ <u>AUG 20/13 @</u>	T.D. Date & Time: <u>AUG 20/2013 @ 2230</u>
Driller:		

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
			1	0	3	SRK SANDY TILL: DK grey, silty, fr. clay, f-med grained, poorly sorted. Subang-subrad pebbles.
			2	18.5	20.2	SRK: SHALE: DK grey-bk, stony fractured, mud, sand f-Cap. Subang-subrad.
						1 SAMPLE 2 is + 2 core boxes and 1 bag.
0525			3	30	33	SRK: SHALE+mud: dk grey, subang-subrad, sand, f-Capined.
			3	33.0	33.55	3 cont. in core → bagged not boxed
			4	53.32	54.35	Box 13 Run 15
				54.35	54.5	Box 14 - Run 15
				54.5	55.25	Box 14 - Run 16
				55.25	56.25	Box 15 - Run 16
			5	72.35	73.15	

WATER

* DRILLER REPORTED 2-3 gal/min water below 140m, dry above

NORWEST CORPORATION Geotechnical - Rock Core Log

PROJECT: **CROWN MTN**

HOLE No: **CM11-19-CH**

LOCATION:

12m CASING

DRILLER / RIG: **FORACO 104** LOGGED BY: **LAUREN B.**

Drilled:

CLIENT: **NWP COAL** DATE: **AUG 28/13**

Core Dia: **6"**

20

22

23

24.5

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Despth			
20-22	1	1.5 / 2.0	MDST carbonaceous, fr. coal, dkgy-blk, occ. med brn weathered sections, very broken/rubbly throughout except 21-21.2m which is intact but fractured	R4 (on solid piece)	0	15° @ 21.13m			1
22-23m	2	1.0 / 1.0	MDST carbonaceous, dkgy-blk, occ. med brn weathering, very fractured/rubbly	R4 (on more solid piece)	0	50° @ 22.9m	* Photos are labelled w/ wrong depths (20-21) *		2 3
23-23.5	3	1.25 / 1.50	MDST BROKEN/RUBBLE, as above		0.45 / 1.5 30%	90° @ 23.9m 70° @ 24.3m	Sample #1: 23-24.1m (COAL) Sample #2: 24.1-24.5m (COAL)		
23.5-24.5			COAL dull, occ. bright bands, some high density, intact						
(LOST CORE LIKELY @ TOP)	4	1.7 / 2.0	24.5-26.5: COAL DULL TO BRIGHT, MOSTLY BROKEN		0.4 / 2.0 20%		Sample #3: 24.5-25.17m (COAL) Sample #4: 25.17-25.35m (MDST PTG) Sample #5: 25.35-25.9m (COAL) Sample #6: 25.9-26.5m (COAL)		
25.17-25.35			MDST COALY/CARB, DKGY-BLK w/O WEATHERING, MOSTLY BROKEN						
25.35-26.5			COAL DULL TO BRIGHT, OCC. MDST INTERBEDS UP TO 5cm, top 50cm compact, broken below						

- Conglomerate
- Sandstone
- Siltstone
- Mudstone
- Shale

- Coal - Bright
- Coal - Dull & Bright
- Coal - Dull
- Bone Coal
- Carb Sh

- F = Fault
- Sh = Shear
- J = Joint
- B = Bedding
- Sm = Smooth, R = Rough

- U = Uniaxial
- SD = Stake
- PLT = PLT
- Q = Quality

PROJECT: CROWN MTN

HOLE No: CM11-19-CH

LOCATION:

DRILLER / RIG: FORACO 104 LOGGED BY: LAUREN B. JEREMYL.

CLIENT: NWP COAL DATE: AUG 28/13

CASING: 12 m

Drilled:

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Despth		
26.5	5	1.7 2.0	26.5-26.6: COAL DULL TO BRIGHT 26.6-28.5: MDST DK GR-BLK, COMMON ORG-BRN WEATHERING, 3cm COAL INTERBED @ 27.67m, OCC. Carb., MOSTLY BROKEN + RUBBLY		0		Sample #7: 26.5-26.6m Sample #8 26.6-27.1m (FLOOR, SAME AS ROOF-WHICH WASNT SAMPL)	4
28.5	6	1.8 2.0	28.5-29.9 m SS clay grey some weathered colour. Coal string @ 29.25 29.6m 2-3 cm 29.9 ~ 30.3 CM black fracture bedding top some chert, coal interval LC. 30.3 ~ 30.5 0.2m.	R3	0.5 2.0	80' @ 28.8 20' @ 28.9 80' @ 29.3 80' @ 29.4 50' @ 29.7	#9 30.0-30.30 (roof MS)	4 5 6
30.5								

Conglomerate
 Sandstone
 Siltstone
 Mudstone
 Shale

Coal - Bright
 Coal - Dull & Bright
 Coal - Dull
 Bone Coal
 Carb Sh

F = Fault
 Sh = Shear
 J = Joint
 B = Bedding
 Sm = Smooth, R = Rough

U = Uniaxial
 SD = Stake
 PLT = PLT
 Q = Quality

PROJECT: *Crown Mountain*

HOLE No: *CM11-19-CH*

LOCATION:

12m casing

DRILLER / RIG: *FORACO 104* LOGGED BY: *Jeremy Liu*

Drilled:

CLIENT: *NWP Coal* DATE: *August 28/13*

Core Dia: *6"*

30.5

32.5

34.5

36.5

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Despth		
30.5 - 31.46	7	1.8 / 2.0	Coal, black bright friable dull @ top shark contact 31.46 - 32.30 MS dark grey fractures LC 32.30 ~ 32.50 0.20	R3 1 0	0.5 / 2.0 25%	60 @ 31.0 65 @ 31.2 20 @ 32.0	#10 Coal 30.5 ~ 30.90 #11 Coal 30.90 - 31.30 #12 Coal 31.30 - 31.46 #13 (floor) 31.46 ~ 31.86	6
32.5 ~ 33.5	8	1.4 / 2.0	MS grey brown weathered colour Coal string @ 31.10m 33.5 ~ 33.8 Coal black fracture dull 33.9 - 34.5 LC	R2 0	0.34 / 2.0 17%	50 @ 33.0 70 @ 33.10 20 @ 33.10 fault?	#14 coal 33.5 ~ 33.9	7
34.5 ~ 35.85	9	1.35 / 2.0	MS dark grey weathered colour debris rock	0	0			7 8

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: Crown MTN

HOLE No: _____

LOCATION: _____

12 m

DRILLER / RIG: ZORACO 104 LOGGED BY: Jony Liu

Drilled: _____

CLIENT: NWP coal DATE: August 28/13

Core Dia: _____

36.5

38.5

40.2

42.5

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Depth		
36.5 - 38.5	10	1.5 75%	36.5-38.0 m MS: multi Colours fractures debris 38.0-38.5 LC 0.50m	0	0		#4 SRK Sample 36.5-38.0 (4) 38.0-39.3 (10) 39.3-40.2 (11)	9 SRK
38.5 - 40.1	11	1.6 1.7 94%	38.5-40.1 MS Dark grey weathered colour fractures some coal mixed @ 39.10 40.1-40.2 LC	0	0			10 SRK 11 SRK
40.2 - 42.2	12	2.0 2.3 86.9%	40.2-42.2 m SS: dark grey yellow colours fractures debris 42.2-42.5 LC	0	0			8 12

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: Crown MTN

HOLE No: _____

LOCATION: _____

12 Casins

DRILLER / RIG: FORACO LOGGED BY: Jeremy Liu

Drilled: _____

CLIENT: NWP Coal DATE: August 29/13

Core Dia: 6"

42.5

44.5

46.5

48.5

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Despth		
42.5 - 43.5	13	2.05 / 2.0	SS dark grey fracturing mudstone interbed.		0.4 / 2.0	75° @ 42.8	#15 (roof) 43.0 - 43.5 m	
43.5 - 43.8			Coal				#16 Coal 43.5 - 43.8 m	
43.8 - 44.0			black folable fragment MS dark grey	R0	20%		#17 (parting) 43.8 - 44.0 m	
44.0 - 44.5			Coal black fragment dull				#18 (Coal) 44.0 - 44.5 m	
44.5 - 46.5	14	2.05 / 2.0	Coal black dull bright interbed. some parting 5m	R1	100%		#19 Coal 44.5 - 44.9 m	
							#20 Coal 44.9 - 45.3 m	
							#21 Coal 45.3 - 45.7 m	
							#22 Coal 45.7 - 46.1 m	
							#23 Coal 46.1 - 46.5 m	
46.5 - 47.7	15	1.9 / 2.0	Coal black dull same bright sharp contact	R1		60° @ 47.80	#24 Coal 46.5 - 46.9 m	
47.7 - 48.4			Siltstone dark grey dense some fracture				#25 Coal 46.9 - 47.3 m	
		95%		R4			#26 Coal 47.3 - 47.7 m	
48.4 - 48.5			LC				#27 Floor siltstone 47.7 - 48.1 m	13

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: Crown MTN

HOLE No: _____

LOCATION: _____

12 m casing

DRILLER / RIG: FORACO 104 LOGGED BY: Jeremy L. / Lauren B.

Drilled: _____

CLIENT: NWP Coal DATE: August 29 / 13

Core Dia: 6"

48.5

50.5

70

71

72.5

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Despth		
48.5 - 49.6	16	2.0 / 2.0	48.5 - 49.6 m SS grey fine-medium well sorted dense hard sharp contact	R4	1.8	70° @ 48.7 m 15° @ 49.3 m 80° @ 50.3 m		14
49.6 - 50.5		100%	49.6 - 50.5 MS dark grey - grey Some coal strings		9%			15
50.5 - 70			50.5 - (HAMMER 50.5-70 m)				SRK Sample #5 (CUTTINGS)	
70 - 71 m	17	1.0 / 1.0	70 - 71 m: MDST dk gy - blk, sl. carb., massive, occ. org-brn weathering + filled fractures (which don't usually go through core axis)	R4	1.0 / 100%	65° @ 70.63 m 85° @ 70.74 m		16
71 - 72.1 m	18	1.5 / 1.5	71 - 72.1 m: MDST dk gy w/org-brn weathering, common fract-occ. coal-filled, massive for most part	R4	1.2 / 1.5	65° @ 71.28 m 70° @ 71.44 m 60° @ 71.65		17
72.1 - 72.5 m		100%	72.1 - 72.5: SS fg, medgy, massive to 72.2 then broken w/ common org-brn weathering below	R5	80%	80° @ 71.70 65° @ 71.71 60° @ 72.06 55° @ 72.18 50° @ 72.30		
72.5 - 73 m	19	2.0 / 2.0	72.5 - 73: SS fg, Medgy, abundant fractures, common org-brn weathering on fract. surfaces	R5				18

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: **CROWN MTN**

HOLE No: **CM11-19-CH**

LOCATION:

DRILLER / RIG: **FORACO 104** LOGGED BY: **LAUREN B.**

CASING: **12m**

CLIENT: **NWP COAL** DATE: **AUG 29/13**

Drilled:
Core Dia: **6"**

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Despth			
74	19 (cont'd)	2.0 / 2.0	(CONT'D) 73 - 73.30: MDST DKGY, occ. fractures 73.30 - 74.50: SS fg, med gy, occ. massive with abundant fractures. V. fract + broken 74-74.3m, muddy toward basal 0.1m	R4 R5	0.32 / 2	85° @ 72.65 85° @ 72.90 85° @ 73.0 85° @ 73.05 85° @ 73.26 85° @ 73.49 85° @ 73.73 30° @ 73.96 85° @ 74.34		19 20	
74.5	20	1.5 / 2.0	74.5 - 76: MDST - SILTY - FG SANDY, MED - DK GY, COMMON FRACTURING, TOP 0.35m RUBBLY, MASSIVE BELOW W/ FRACT.	R4-R5	0.52 / 2.0 26%	5° @ 74.78-75.20 20° @ 75.17m 40° @ 75.40m 70° @ 75.90m	Sample # 28 75.6 - 76.5m (Roof of 9 seam)	21	
76.5	21	1.5 / 2.0	LOST CORE: 76-76.5 (likely coal, driller said) tagged (LOST CORE 76.5 - 77m) 77.0 - 77.05: MDST (Possible interbedding seam), dkgy, weathered 77.05 - 77.43: COAL, BROKEN, BRIGHT 77.43 - 77.58: CARB MDST, massive, high density, dull, blk 77.58 - 78m: COAL, compact to broken, dull-bright 77.58 - 78m: MDST, dkgy - blk, occ. carb, broken		0		Sample # 29: 77.05 - 77.43 (coal) Sample # 30: 77.43 - 77.58 (PTG) Sample # 31: 77.58 - 78m (coal) Sample # 32: 77.58 - 78m (FBSR)		
78.5	22	2.0 / 2.0	78.5 - 78.7: COAL + MUDST, WEATHERED, BLK w/ Org. Weathering, compact but falls apart easily		1.60 / 2.0 80%		Sample # 33 78.5 - 78.7m		

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: CROWN MTN

HOLE No: cm11-19-CH

LOCATION:

DRILLER / RIG: FORACO 104 LOGGED BY: LAUREN B.

CLIENT: NWP COAL DATE: AUG 29/13

CASING: 12m

Drilled:

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Despth			
			(cont'd) 78.7-80.5: SS Vfg-fg, med-dk gy, massive w/occ. fractured w/or. weathering	R5		75°@79.07m 75°@79.10m 85°@79.21 80°@79.88 70°@79.95			22 23
80.5			Hammer 80.5 to 103m					SRK #6 96-99m (CUTTINGS)	
103			103-103.10 CM black friable	R1	05/20	60°@103.10 70°@103.40			24
	23	1.4/1.5	103.10-104.40 SS grey-dark grey fractures @ 103.5 ~103.9m	↓ R4	25%				25
		93%	104.4-104.50 LC						
104.5			104.5-106.4 SS grey-dark grey fine-medium well sorted some bedding string coal.	R2 R3	1.4/2.0	65°@105m 65°@105.02m 80°@105.20m 80°@105.30m 55°@104.50m 60°@106.0m 70°@106.30		SRK #7 105-105.92m 105.9-106.7 (27)	25 26 SRK 27 SRK
	24	1.9/2.0	106.4-106.50 LC						
106.5									

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: Crown MTN

HOLE No: CM11-19-CH

LOCATION:

LASING 1219

DRILLER / RIG: FORACO 104 LOGGED BY: Jeremy Lim

Drilled:

CLIENT: NWP Coal DATE: AUG 29/12

Core Dia: 6"

106.5

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Despth		
106.5 ~ 106.98	25	1.8 / 2.0	SS grey-dark grey fine-medium	R3	0.43 / 2.0	85° @ 106.7	SRK #7	27 SRK
106.98 ~ 108.30 m		90%	CM dark grey-black fracture coal strings	R0	21%		③ 106.7 ~ 107.7 (28)	28 SRK
108.3 ~ 108.5 LC							④ 107.7 - 108.3 (29)	29 SRK
							SRK #7	41.00m

108.5

108.5 ~ 110.3 m	26	1.8 / 2.0	MS CM grey dark grey-black fracture coal strings	R2	0.20 / 2.0	40° @ 109 70° @ 109.1	#34 (roof)	
109.0 ~ 110.3		90%	Coal black friable	R0	10%		109 ~ 109.5 m	30
110.3 ~ 110.5 LC							#35 coal	
							109.5 - 109.9 m	
							#36 coal	31
							109.9 - 110.3 m	

110.5

110.5 ~ 111.85	27	2.0 / 2.0	Coal black fracture dull with bright	R0	0.46 / 2.0	75° @ 121.1	#37 coal	
111.85 ~ 112.32		100%	SS grey fine-medium				110.5 ~ 110.9	
112.32 ~ 112.5			Coal black friable	R4	23%		#38 coal	
							110.9 - 111.3 m	
							#39 coal	
							111.3 ~ 111.85 m	
							#40 parting?	
							111.85 ~ 112.32 m	
							#41 parting	
							112.16 - 112.32 m	
							#42 coal	
							112.32 - 112.50 m	

112.5

	Conglomerate
	Sandstone
	Siltstone
	Mudstone
	Shale

	Coal - Bright
	Coal - Dull & Bright
	Coal - Dull
	Bone Coal
	Carb Sh

F = Fault
Sh = Shear
J = Joint
B = Bedding
Sm = Smooth, R = Rough

U = Uniaxial
SD = Stake
PLT = PLT
Q = Quality

PROJECT: Crown MTN

HOLE No: CM 11-19-CH

LOCATION:

Casing 12M

DRILLER / RIG: FORACO 104 LOGGED BY: Jeremy Liu

Drilled:

CLIENT: NWP Coal DATE: August 29 / 13

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Despth		
112.5	28	2.10 / 2.0	112.5 ~ 113.20 m MS dark grey coal strings.	R4	1.0 / 2.0	60° @ 112.9 m	#43 floor 112.5 ~ 113.0 m	
			113.20 ~ 114.0 m SS grey dense hard.			60° @ 113.2 m	#44 roof 113.5 ~ 114.0	
		105%	114.0 ~ 114.5 Coal black bright friable.	R0	50%	75° @ 113.5 m	#45 Coal 114.0 ~ 114.30	
						70° @ 113.7 m	#46 Coal 114.3 ~ 114.50	
						70° @ 113.75 m		
						80° @ 114.10		
114.5	29	2.0 / 2.0	114.5 ~ 115.1 m Coal black bright friable.		0.45 / 2.0	45° @ 114.7	#47 Coal 114.5 ~ 114.9 m	
			115.1 ~ 116.5 SS grey-dark grey fine-medium dense	R3	28.5%	65° @ 114.8	#48 Coal 114.9 ~ 115.1 m	
		100%				80° @ 115.3	#49 Floor 115.1 ~ 115.6 m	31
						60° @ 115.5		
						90° @ 115.8		
116.5	30	2.0 / 2.0	116.5 - 118.5 m SS grey fine-medium limonite some fractur	R4	2.0 / 2.0	80° @ 116.8		32
			Coal trace @ 118.3		100%	20° @ 117.5		
		100%				70° @ 117.6		
						70° @ 117.8		33
						70° @ 117.9		

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: Crown MTN

HOLE No: CM11-19-CH

LOCATION:

Cas's 12m

DRILLER / RIG: TOPACO 104 LOGGED BY: Jeremy Liu

Drilled:

CLIENT: NWIP Coal DATE: 09/30/13

Core Dia: 6"

118.5

120.5

122.5

124.5

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Despth		
118.5	31	1.3 / 2.0	118.5 ~ 118.7 MS dark grey dense hard. constant coal sharp	R4	12 / 20	55° @ 118.7m	#50 roof 118.2 - 118.7m	
		65%	118.7 ~ 119.8 Coal black, bright fragment	↓ 0	6%		#51 Coal 118.7 ~ 119.1m	
			119.8 ~ 120.5 LC				#52 Coal 119.1 - 119.5m	
							#53 Coal 119.5 - 119.8m	
120.5	32	1.7 / 2.0	120.5 - 122.2 m Coal, black bright with dull fragment	0	0		#54 Coal 120.5 - 120.9	
		85%	122.2 - 122.5 LC				#55 Coal 120.9 - 121.4	
							#56 Coal 121.4 - 121.8	
							#57 Coal 121.8 - 122.2m	
122.5	33	1.8 / 2.0	122.5 ~ 123.3 m Coal black	0	0 / 20		#58 Coal 122.5 - 122.9 m	
		90%	123.3 ~ 123.7 m partly MS carb.		20 / 20		#59 Coal 122.9 - 123.3 m	
			123.7 ~ 124.3 m Coal black fractures		10%		#60 Partly 123.3 - 123.7m	
			124.3 ~ 124.5 LC				#61 Coal 123.7 - 124.1m	
							#62 Coal 124.1 - 124.3m	

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: Crown MTN

HOLE No: CM11-19-CH

LOCATION:

DRILLER / RIG: FORACO 104 LOGGED BY: Jeremy Liu

CLIENT: NWP Coal DATE: August 30/13

Casing 12m
Drilled:
Core Dia: 6"

124.5

126.5

128.5

130.5

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Despth		
124.5 - 126.5	34	2.0 / 2.0 100%	MS grey-dark grey dense hard coal string @ 125.6m Some fractures	R4	1.3 / 2.0 65%	80° @ 125.2 70° @ 125.3 80° @ 125.4 80° @ 125.45	# 63 Floor 1245-125.0 SRK 48 125-126(34) 126-127(35) 127-128(36) 128-129(37)	34 SRK
126.5 - 128.5	35	2.0 / 2.0 100%	MS grey-dark grey silty top some fractures	R4	1.5 / 2.0	40° @ 127.1 20° @ 127.1 90° @ 127.3 35° @ 127.9 70° @ 128.3		36 SRK 37 SRK
128.5 - 130.5	36	2.0 / 2.0 100%	MS grey-dark grey dense coal string		1.8 / 2.0 90%	80° @ 128.8 60° @ 129.25 60° @ 129.30 40° @ 129.60		37 SRK 38 39

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

ORWEST CORPORATION Geotechnical - Rock Core Log

PROJECT: CROWN MTN

LOCATION:

DRILLER RIG: FORACO 104 LOGGED BY: JEREMY

CLIENT: NVP COAL DATE: AUG 30/13

HOLE No: CM10-19-CH

CASING: 10m

Drilled:

Core Dia: 6"

Depth	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Depth		
37		1.7 / 2.0	130.5-131.0 MDST DK Gy 131-132.2m: COAL BLK, FRACTURED 132.2-132.5 LC	R3 RO	0.5 / 2.0 35%	#64 (Roof) 130.5-131.0 m #65 (Coal) → 131-131.4 m #66 Coal 131.4-131.80m #67 Coal 131.8-132.2m		
132.5								
38		1.8 / 2.0 90%		RO	0	#68 COAL 132.5-132.9m #69 COAL 132.9-133.3m #70 COAL → 133.3-133.7m #71 COAL 133.7-134.3m		
134.5								
39		1.6 / 2.0 80%	134.5-136.0 COAL, BLK, DEBRIS 136.0-136.1 MS, dense, hard 136.1-136.5 LC	RO	0	SRK#9 134.5-135m (COAL PTG) #72 COAL 135-135.4m #73 COAL → 135.4-135.8m #74 COAL 135.8-136.0m		
136.5								

- Longmont slate
- Sandstone
- Siltstone
- Mudstone
- Shale

- Coal - Bright
- Coal - Dull & Bright
- Coal - Dull
- Bone Coal
- Carb Sh

- F = Fault
- Sh = Shear
- J = Joint
- B = Bedding
- Sm = Smooth, R = Rough

- U = Uniaxial
- SD = Slake
- PLT = PLT
- Q = Quality

ORWEST CORPORATION Geotechnical - Rock Core Log

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PROJECT: CROWN MTN.

HOLE No: CM11-19-CH

LOCATION:

DRILLER RIG: FORACO 104

LOGGED BY: LAUREN B.

CLIENT: NWP COAL

DATE: AUG 30/13

CASING: 12m

Drilled:

Core Dia: 6"

Depth	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
40		$\frac{2.0}{2.0}$	136.5-137.68: MDST DK GY, MASSIVE	R5	$\frac{137}{2.0}$	80° @ 137.21	SRK #10: BX 40: 136.5 to 137.4	40 (SRK)	
			137.68-138.5: SS VFG-FG, MASSIVE, BROKEN/ RUBBLE BELOW 137.55m	R5	69%	70° @ 137.30 80° @ 137.40 80° @ 137.50 80° @ 137.65 75° @ 137.84 75° @ 137.96			BX 41: 137.4-138.5
138.5			138.5-140.5: SS JFG, MED GY, MASSIVE EXCEPT TOP ~0.3m, OCC. FRACTURES, TRACE V. THIN COALY/ CARB STRINGERS	R5	$\frac{153}{2.0}$	75° @ 138.88 15° @ 138.95 75° @ 139.03 80° @ 139.59 80° @ 139.75 70° @ 139.86 60° @ 139.89	SRK #10 BOX 42: 138.5-139.58	42 (SRK)	
	41	$\frac{2.0}{2.0}$			77%			43	
140.5			140.5-141.70: SS FG, MED GY, MASSIVE, TOP 0.3m BIT BROKEN + FRACTURED	R5	$\frac{16}{2.0}$	80° @ 141.27 65° @ 141.58 80° @ 142.09 85° @ 142.15		44	
	42	$\frac{2.0}{2.0}$						45	
			141.70-142.5: MDST to SILTST, DK GY, MASSIVE w/ OCC. FRACTURES	R5	80%				

conglomerate
sandstone
siltstone
limestone
shale

Coal - Bright
Coal - Dull & Bright
Coal - Dull
Bone Coal
Carb Sh

F = Fault
Sh = Shear
J = Joint
B = Bedding
Sm = Smooth, R = Rough

U = Uniaxial
SD = Stake
PLT = PLT
Q = Quality

WEST Geotechnical - Rock Core Log

PROJECT: CROWN MTN

LOCATION:

DRILLER RIG: FORACO 104

LOGGED BY: LAUREN B.

CLIENT: NWP COAL

DATE: AUG 30/13

HOLE No: CM11-19-CH

CASING: 12m

Drilled:

Core Dia: 6"

Depth	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
142.5	43	2.0 / 2.0	142.5-144.5 - SILTST, MUDDY, DK BR-GY, MASSIVE, TR. CARB., VERY HARD	R5	1.91 / 2.0	85° @ 143.17 70° @ 143.60 70° @ 143.69		46 47	
144.5	44	2.0 / 2.0	144.5-144.94: SILTST, MUDDY, DK GY, MASSIVE, V. HARD 144.94-146.5: Interbedded SS + SILTST, SILTST IS MUDDY, MASSIVE, V. HARD	R5	2.0 / 2.0	65° @ 144.75m 70° @ 145.55		48 49	
146.5	45	2.0 / 2.0	146.5-147.63: Siltst, muddy, massive, 147.63-147.48: BONE COAL, HIGHER DEN, MASSIVE 147.48-146.5: COAL DULL TO BRIGHT, COMPACT, OCC. BROKEN, BRKA FRIABLE		0.98 / 2	80° @ 146.74 80° @ 147.09 10° @ 147.17 88° @ 147.55 80° @ 147.66	Sample # 75: 147.13-147.38 (ROOF) Sample # 76: 147.38-147.63 (ROOF) Sample # 77: 147.63-147.48 (BONE COAL)	49 50	

CONT'D
NEXT PAGE

- conglomerate
- sandstone
- siltstone
- shale

- Coal - Bright
- Coal - Dull & Bright
- Coal - Dull
- Bone Coal
- Carb Sh

- F - Fault
- S_n - Shear
- J - Joint
- B - Bedding
- Sm - Smooth, R - Rough

- U - Uniaxial
- SD - Strike
- PLT - PLT
- Q - Quality

ORWEST CORPORATION Geotechnical - Rock Core Log

PROJECT: _____
 LOCATION: _____
 DRILLER/RIG: _____
 CLIENT: _____
 LOGGED BY: LAUREN B.
 DATE: AUG 30/13

MOLE No: CMI1-19-CH
 CASING: 12m
 Drilled: _____
 Core Dia: 6"

Depth	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQP %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle	Depth		
148.5			148.5-148.95: COAL dull to bright, very crumbly, compacted together					Sample # 78 147.48-148m (coal) Sample # 79 148-148.5m (coal)	
	4-6		148.95-150.5: SS fg, med gy, massive, sl. carb @ top					SRK Sample # 80 148.5-148.95m (coal)	50
150.5			TD @ 13:00 150.50m					SRK # 11 148.95-150 m	S1 (SRK) BOX 51

- Conglomerate
- Sandstone
- Siltstone
- Mudstone
- Shale
- Coal - Bright
- Coal - Dull & Bright
- Coal - Dull
- Bone Coal
- Carb Sh

- F = Fault
- Sh = Shear
- J = Joint
- B = Bedding
- Sm = Smooth, R = Rough

- U = Uniaxial
- SD = Stake
- PLT = PLT
- Q = Quality

SRK samples

Well No. CM11-19

August 28/2013 Spud time 4:50 AM

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
			1.	0	3	SS grey wellsorted cutting sample
			2.	6	9	Cuttings (wet, fr hammering casing)
			3	9	12	Cuttings (wet, fr. hammering casing)
			4	36.5	40.1	MS fragment (debris) grey multi colour. BOX 9. BOX 10 BOX 11
			5	65.0	68.0	CUTTINGS
			6	96	99	CUTTINGS
			7	103	108	SS grey-dark grey BOX 26 BOX 27 BOX 28 BOX 29
			8	125.0	128.9	MS grey-dark grey dense BOX 34 BOX 35 BOX 36 BOX 37
			9	134.5	135	Coal-PTG?
			10	136.35	13	MDST + SS BOXES 40, 41, 42
			11	145.95		SS BOX 51

PROJECT: Crown Mountain

HOLE No: CM11-22-CH

LOCATION:

DRILLER / RIG: Force 109 LOGGED BY: L. PETERSON

CLIENT: NWP Coal DATE: Aug. 25/13

Casing 12m

Drilled:

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle	Depth		
33.6	1	0.9 / 0.9 100%	COAL: blk, frac, bright with dull, Crumbles more easily between 33.95-34.5m					SAMPLE #1 33.6-34m SAMPLE #2 34-34.5m	
34.5	2	1.95 / 2 98%	COAL: blk, frac, Crumbles, bright with dull. between 35.6-35.8m with Carb siltstone.			65°@ 34.8m 90°@ 35.01m 60°@ 35.53m 85°@ 35.68m 75°@ 35.78m 90°@ 35.95m 65°@ 36.01m		SAMPLE #3 34.5-35m SAMPLE #4 35-35.5m SAMPLE #5 35.5-35.8m SAMPLE #6 35.8-36.2 SAMPLE #7 36.2-36.5m	
36.5 319.55 h.s	3	2.15 / 2 108%	36.5-37m SILTSTONE: med-dk grey, carb debris, v. hard, frac 37-37.22m COAL: blk, frac, crumbles, & bright with dull 37.22-38.05m SILTSTONE: med-dk black grey, frac, carb debris, 38.05-38.25m COAL: blk, frac, crumbles, bright with dull. 38.25-38.5m SILTSTONE: frag, med-dk grey,	R3	0.69 / 2 35%	90°@ 36.89m 75°@ 37.27m 80°@ 37.57m 90°@ 37.85m 80°@ 38.04m		SAMPLE #8 37.0-37.22m SAMPLE #9 38.05-38.25m	1 2
38.5									

Conglomerate	Coal - Bright	F = Fault	U = Unisocal
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = State
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

33.6
34.5
36.5
319.55
h.s
37
38.5

17-13
24
35.6
35.5
15-67

NORWEST CORPORATION Geotechnical - Rock Core Log

PROJECT: CROWN MOUNTAIN

HOLE No: C.M/1-22-CH

LOCATION:

Casing 12m

DRILLER / RIG: FORACO 104 LOGGED BY: L. PETERSON

Drilled:

CLIENT: NWPCOAL DATE: AUG 25/13

Core Dia: 6"

44.5

46.5

76.0

76.5

0400 hrs

78.5

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Despth		
44.5 - 45.8	7	1.95 / 2	SANDSTONE: orangish brown to dk grey, frac, B.	R3	0	70° @ 45.2m 80° @ 45.77m	SAMPLE # 16 45.8 - 46.13m	6
46.0 - 46.13	7	98%	COAL + SS. orangish brown SS, bit coal, cumbles, bright to dull.					7
46.13 - 46.5			SANDSTONE: orangish brown to dk grey, frac.					
46.5 - 76.0			HAMMER 46.5 - 76m					
76.0 - 76.5	8	0.55 / 0.5	SANDSTONE: orangish brown to dk grey, frac, rubble.	R3	0			8
76.5 - 76.80	9	2 / 2	* Coal barrel streak 76.5 - 76.80m (SH) w/ siltstone interbeds, orangish weathering on fracture surfaces	R3	2 / 20	65° @ 76.6m 85° @ 76.7m cleats in coal	Sample # 17: coal 76.80 - 77.25m	8
76.80 - 78.5	9	100%	76.80 - 78.5m Coal Dull to bright, solid.	R1	10%	60° - 65° throughout section.	Sample # 18: coal 77.25 - 77.55m Sample # 19: coal 77.55 - 77.9m Sample # 20: coal 77.9 - 78.5	

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slate
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

1.3.16.3.

42. 3.

PROJECT: Copun Mountain

HOLE No: Cm11-22-01

LOCATION:

DRILLER / RIG: Foraco 104 LOGGED BY: M. Eskrick

CLIENT: NVP Coal DATE: AA Aug. 26 / 13

Casing 12m

Drilled:

Core Dia: 6"

78.5

80.5

82.5

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Depth		
78.5 - 80.45	10	2.0 / 2.0 / 100%	78.5-80.45m: (coal) bright to dull, somewhat splid. com. pyrite on cleat surfaces 80.45-80.5m: Carb SH	R0 R2-R3	0.21 / 2.0 / 10%	65° @ 79.0m 70° @ 79.05m 65° @ 79.15m 65° @ 79.35m 80° @ 79.93m 50° @ 80.20m	Sample # 21: coal 78.5 - 79.0m Sample # 22: coal 79.0 - 79.35 Sample # 23: coal 79.35 - 79.8m Sample # 24: coal 79.8 - 80.2 Sample # 25: coal 80.2 - 80.45m Sample # 26: 80.45-80.5m Carb Shale	
80.5 - 81.46	11	2.0 / 2.0 / 100%	80.5-80.93m (coal), broken up bright, w/ 5cm of carb shale 80.93-81.05m Carb SH + SH OK qtz to BIK 81.05m-81.46m (Coal) Dull w/ bright bands carb sh @ 81.29-81.36m 81.46-82.5m Sh + Carb SH DK gy - brownish gy. orange stain along fractures. com. coal laminae	R0 R2-R3	0.87 / 2 / 43.5%	65° @ 81.45m 85° @ 81.55m 85° @ 81.82m 70° @ 82.1m 75° @ 82.22m 75° @ 82.32m	Sample # 27: coal w/ shale parting 80.5-80.93m Sample # 28: Carb SH + SH 80.93-81.05m Sample # 29: coal	9
Cont. on Next Page								

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Shale
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: Crown Mountain

HOLE No: C111-22-01

LOCATION:

DRILLER / RIG: Foraco 104 LOGGED BY: M. Eskrick

CLIENT: NWP Coal DATE: Aug. 26/13

Corey 12m

Drilled:

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
32.5		2.1 / 2.0	82.5 - 83.37m [SH] dk gy w/ com. coal beds up to 5cm thick orange weathering on fracture planes	R2	1.00 / 2.0	75° @ 82.75m			10
	12	105%	83.37 - 84.35m [SLT] stn hard, med. ungy. s.	R3		80° @ 82.95m 75° @ 83.11m 75° @ 83.38m 65° @ 83.55m 80° @ 83.67m 80° @ 83.82m 80° @ 84.17m	← 20° @ 83.37 - 85.54m		11
			84.35 - 84.5m [SS] hard, lt gy, fine gravel	R6					
84.5		1.25 / 1.2	84.5 - 85.7m [SS] Lt gy common shale laminae throughout. laminae exhibit wavy bedding sand is X bedded carb sh/coal bed @ 85.56 - 85.62m	R6 (R3 along laminae planes)	1.18 / 2.0	5° @ 84.5 - 85.2m 75° @ 85.2 (BP) 75° @ 85.4m (BP) 75° @ 85.57m (BP)			12
		104%	Orange weathering on fracture planes		59%	5° @ 85.62 - 85.7m			13
85.7m		0.75 / 0.7	85.7 - 85.95m [SS] lt gray, fine gravel w/ SH lam. cross bedding. orange weathering on	R6	0.6 / 0.7	70° @ 85.95m 55° @ 85.95 + 86.03m	* Photos say 86.4 should be 86.5		13
		107%	85.95 - 86.5m [SH] dk gy w/ coal beds 2cm thick c 85.5 + 86.5m	R3-R4	85%				14
86.5		1.95 / 2.0	86.5 - 88.2m [SS] lt gray, sgy. interbedded w/ [SH] beds up to 15cm thick grad. etc w/ coal bed @ 87.73 - 87.88m com. coal beds w/ lam. thick	R6	1.15 / 2.0	65° @ 86.7m 70° @ 87.03m 60° @ 87.37 (coal bed) 75° @ 87.88m (11) 75° @ 87.70 (11) 75° @ 87.76m (11) 60° @ 88.0m (11) 60° @ 88.05m (11) 80° @ 88.2m (ok)	SRK sample # 6 85.95 - 87m Box 14 87 - 88.05m Box 15 ← 0° @ 87.9 - 88.02m	14 15	
		97.5%	88.2 - 88.4m [SH] gray, occ siltstn lam.	R3					16
88.5									

	Conglomerate
	Sandstone
	Siltstone
	Mudstone
	Shale

	Coal - Bright
	Coal - Dull & Bright
	Coal - Dull
	Bone Coal
	Carb Sh

F	Fault
Sh	Shear
J	Joint
B	Bedding
Sm	Smooth, R = Rough

U	Unintended
SD	Slake
PLT	PLT
Q	Quality

PROJECT: Crown Mountain

HOLE No: CMI1-22-CH

LOCATION:

Casing 12m

DRILLER / RIG: Forno 104 LOGGED BY: M. E. Sklar / J. Lau

Drilled:

CLIENT: NWP coal DATE: Aug. 26/13

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Despth		
88.5	16	1.7 / 1.6 106.5%	88.5 - 88.65m [SH] dk gy, shupete	R3	1.4 / 1.6 88%	65° @ 88.77m		16
			88.65 - 88.77m [SS] as SS above	R6		70° @ 88.88m		
			88.77 - 90.15m [Carb SH] dk gy comm coal laminae	R3		70° @ 89.25m		
			90.05 - 90.1m [SS] Hgy fine ground	R6		70° @ 89.70m 75° @ 89.75m 75° @ 89.80m		
90.1	17	35% / 94%	90.1 - 90.5 [SS] + gy	R6	35% / 87%	75° @ 90.3		18
90.5				dk SH laminae				
91.0	18	0.7 / 0.5 140%	90.5 - 90.85m SANDSTONE: orange sh. brown to dk grey, frag, rubble.	R4	0.16 / 0.5 32%			18
			90.85 - 91.0m SILTSTONE: H-dolomite, hard, fr carb debris.					
92.4	19	1.35 / 1.4 96%	91.0 - 92.4 SS, grey-dark grey fine to medium laminated @ 91.20m, 91.40m, Carb trace @ 91.23m fracture parallel Aix - weathered	R4	1.30 / 1.40 93%	75° @ 91.25 60° @ 91.37 65° @ 92.15		19

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: Crown maintain

HOLE No: CM11-22-CH

LOCATION:

Casing 12 m

DRILLER / RIG: FORACO 104 LOGGED BY: Jeremy Liu

Drilled:

CLIENT: NWP Coal DATE: August 26 / 13

Core Dia: 6"

92.4

94.5

96.5

98.5

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle	Depth		
92.40 - 92.76	R20	2.35 / 2.1 = 112%	SS gray good well sorted fracture filled	R4	2.1 / 2.1 = 100%	92.52 @ 70°		7# SRK	20
92.76 - 94.50			MS. Dark gray Carb trace dense bottom some SS. hard			92.71 @ 70°		92.7-93.3m	21 SRK
						92.90 @ 70°			22
						93.05 @ 66°			23
						93.60 @ 73°			23
						93.80 @ 83°			23
						93.90 @ 73°			23
						94.00 @ 73°			23
						94.30 @ 65°			23
94.5 - 96.5	21	1.95 / 2.0 = 97.5%	MS clark grey dense occasionally silty parts Coal trace @ 95.4m	R4 - R5	1.95 / 2.0 = 97.5%	70° @ 95.8			23
			LC 0.05m			75° @ 95.96			24
									25
96.5 - 98.5	R22	0.6 / 2.6 = 3%	MS clark grey fractures pieces 96.80 ~ 97.10 silty MS Brown debris weathered muddy LC: 97.10 - 98.5 m 1.4m	R3 - R0	0			96.5 ~ 99.5 SRK #8	26

Conglomerate	Coal - Bright	F = Fault	U = Unconformity
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

0.10 cm

NORWEST CORPORATION Geotechnical - Rock Core Log

PROJECT: Crown Mountain

HOLE No: CM11-22-CH

LOCATION:

Casing 12M

DRILLER / RIG: Zoraco 104 LOGGED BY: Jeremy Liu

Drilled:

CLIENT: NWP Coal DATE: August 27/13

Core Dia: 6"

98.5

100.5

102.5

104.5

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle	Depth		
98.5	R23	2.0 / 2.0 100%	98.5 ~ 99.45m SS multi Colours fine-medium fragment (debris) weathered colour. filled fracture	TOP R0	1.05 / 2.0 52.5%			SRK #8	25 26 SRK
			99.45 ~ 100.5 MS dark grey laminae. Coal trace @ 100.35m	R5					27 SRK
100.5	R24	2.0 / 2.0 100%	100.5 - 101.48m MS dark grey fracturing some weathered colour	R4	0	70° @ 101.10		SRK #9 100.5 ~ 101.15	28 SRK
			101.48 - 102.5m Coal: black, dull with bright fracture friable			70° @ 101.30		#30 101.48 - 101.88	29
								#31 101.88 - 102.32	
								#32 102.32 - 102.5	
102.5	R25	2.0 / 2.0 100%	102.5 ~ 104.5m Coal: black 102.5 ~ 103.30 dull fracture 103.30 - 104.5m bright coal, friable Some bone coal @ bottom		0	73° @ 103.30		#33 102.5 ~ 102.90	
						67° @ 104.27		#34 102.90 - 103.30	
								#35 103.30 - 103.70	
								#36 103.70 - 104.10	
								#37 104.10 - 104.5	

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slate
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

15cm

PROJECT: Crown main

HOLE No: CM11-22-CH

LOCATION:

Casing 12M

DRILLER / RIG: FORACO 104 LOGGED BY: Jeremy Liu

Drilled:

CLIENT: NWP Coal DATE: August 27/13

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle	Depth		
104.5	R26	1.90 / 2.0 95%	104.5 ~ 105.6 Coal black fractures friable bright dull band sharp contact 105.6 ~ 106.40 SS dark grey, dense hard 106.40 ~ 106.5m LS: 0.10m	R5	0.8 / 2.0 40%	65° @ 104.70 70° @ 105.40 75° @ 107.80	#38 104.5 ~ 104.9 #39 104.9 ~ 105.3 #40 105.3 ~ 105.6 SRK #10 105.6 ~ 106.40	30 SRK	
106.5	R27	0.70 / 0.70 100%	Core barrel stuck 106.5 ~ 107.2 siltstone grey dense hard laminated	R5	0.7° / 0.7° 100%	65° @ 106.7	#41 siltstone 20cm 106.5 ~ 106.7	29	
107.2	R28	1.2 / 1.3 92%	107.20 ~ 108.2 SS + MS grey-dark grey top SS fracture MS interbed gradully 108.20 ~ 108.40 Coal black bright fracture 108.40 ~ 108.5 LC	R4	0.7° / 1.3 54%	60° @ 107.20 60° @ 107.30 65° @ 107.40 68° @ 107.60 60° @ 107.90 55° @ 108.10	#42 108.2 ~ 108.6m	31 32	

- Conglomerate
- Sandstone
- Siltstone
- Mudstone
- Shale

- Coal - Bright
- Coal - Dull & Bright
- Coal - Dull
- Bone Coal
- Carb Sh

- F = Fault
- Sh = Shear
- J = Joint
- B = Bedding
- Sm = Smooth, R = Rough

- U = Uniaxial
- SD = Strike
- PLT = PLT
- Q = Quality

26 cm shoes

22

PROJECT: Crown Mountain

HOLE No: CM11-22-CH

LOCATION:

Casing 12m

DRILLER / RIG: FORACO 104 LOGGED BY: Jeremy Liu/M. Eshelk

Drilled:

CLIENT: R/W P Coal DATE: August 27/13

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle	Depth		
108.5	R29	2.0 / 2.0	108.5-108.98 Coal, black bright fracture bright dull	R4	1.25 / 2.0	70° @ 109.60m		#43	
		100%	108.98-109.18 MS dark grey		62.5%	70° @ 109.85m		108.6-108.98m	
			109.18-109.36 Coal black fracture			65° @ 110.0m			32
			109.36-110.5 MS grey-dark grey dense barrel bottom 20cm silty MS. coal string @ 109.85m						33
10.5	30	1.95 / 2.0	110.5-111.23m [SS] dk gy, fg, w/occ sh laminae. Sharp cte w/d	R6	1.44 / 1.25	60° @ 110.9m		Sample #44: D.M. coal	33
		97.5	111.23-111.50m [SH] dk gy w/occ coal laminae, becomes carbonaceous towards base.	R3	76%	30° @ 111.05m (g. & filled claystone)		111.50-111.75m	
			111.50-112.5m [Coal] Top 25cm is dull, below is bright.			70° @ 111.45m (coal bed)		Sample #45: coal	
						60° @ 111.60m		111.75-112.2	
						70° @ 112.5m		Sample #46: coal	
								112.2-112.5m	
112.5	31	2.0m / 2.0	112.5-112.95m [MS] dk gy occ. coal stringos sharp cte w/d	R3	1.5 / 2.0	60° @ 112.77m			35
		100%	112.95-113.35m [SLTstr] dk gy w/ Lt grey SS beds.	R6		60° @ 112.7m			
			113.35-114.5m [MSI] dk gy, massive, o.c.o. SS stringos below 114.15m	R5		70° @ 112.95			
						60° @ 113.3m			36
						60° @ 113.65m			
						80° @ 114.25m			37

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

NORWEST CORPORATION Geotechnical - Rock Core Log

PROJECT: Crown Mountain

HOLE No: CM11-22-CH

LOCATION:

Core Log: 12m

DRILLER / RIG: Foraco 109 LOGGED BY: Michelle E. / Lauren B.

Drilled:

CLIENT: NWP Coal DATE: Aug. 27/13

Core Dia: 6"

114.5

116.5

118.5

120.5

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Depth		
114.5 - 116.5	32	1.55 / 2.0	114.5-116.5m MDST, DKGY, MASSIVE, BUT BROKEN 114.7-115m	R5	1.0 / 2.0 50%	90° @ 114.70 85° @ 114.90 80° @ 115.0 85° @ 115.08 80° @ 115.64 30° @ 115.83	SRK #11 115.1-116.0m Box 38	37 58 SRK
			(LOST CORE 116-116.5m) CD LIKELY COAL SEAM U/BELW					
116.5 - 117.27	33	2.0 / 2.0	116.5-117.27 COAL, blk very broken 116.5-117.17, bright	R5	1.18 / 2.0 59%	40° @ 117.40 85° @ 117.45	Sample #47: COAL 116.5-116.95m	39
117.27 - 118.20			CARB/COAL MDST dk gy-brn-blk common coal stringers VP to 0.5cm, broken					
117.50 - 117.67			basal 0.15m coal					40
117.67 - 118.5			MDST, dk-med gy-brn basal 0.15m silty coal stringers top 0.15m,	R5				
118.5 - 118.80	34	1.70 / 2.0	SS, med gy, vfg, massive	R6	1.65 / 2.0	85° @ 118.7 95° @ 119.18	Sample #49: COAL 120.15-120.15m	40
118.80 - 119.67			MDST, dk gy-brn, oec. coal-filled fractures,	R5	83%	40° @ 119.24 80° @ 119.31		
119.67 - 119.85			CARB MDST, dk br-blk, coal-filled fractures	R4		70° @ 119.51 85° @ 119.66 35° @ 119.74	Sample #50: MDST, CARB 120.15-120.30m	
119.85 - 120.5			COAL, dull to bright,				Sample #51: COAL 120.30-120.50	41
120.5 - 120.30			MDST PTG					

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

NORWEST CORPORATION Geotechnical - Rock Core Log

PROJECT: CROWN MOUNTAIN

HOLE No: CM11-22-CH

LOCATION:
 DRILLER / RIG: FORACO 104 LOGGED BY: MICHELLE E. / LAUREN B.
 CLIENT: NWP COAL DATE: AUG 27 / 13

CASING: 12m
 Drilled: TD: 126.5
 Core Dia: 6" / 11

120.5

122.5

124.5

126.5

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Despth			
120.5 - 122.5	35	2.0 / 2.0	120.5 - 120.95: MDST dk gy-brn, broken top 0.30m 120.95 - 121.65: COAL bright, massive, base 0.2 sl. broken 121.65 - 122: BONY COAL blk, fairly bright, massive, heavier than above 122 - 122.2: CARB MDST DK gy-blk, coal stringers, massive	R2	1.14 / 2.0	70° @ 121.20 85° @ 121.30 70° @ 121.80 80° @ 122.10 85° @ 122.20	Sample #52 coal 120.95 - 121.3m Sample #53 coal 121.3 - 121.65m Sample #54 Bone Coal 121.65 - 122m Sample #55 Carb MDST 122 - 122.2m Sample #56 coal 122.2 - 122.5m	412	
122.5 - 123.65	36	2.0 / 2.0	122.2 - 122.5: COAL bright, heavier than above 122.5 - 122.85: MDST, sl. carb, siltst interbeds up to 0.5cm near base 122.85 - 123.65: COAL BLK, bright, crushed + broken 122.85 - 123.5m 123.65 - 123.90: MDST, dk gy brn, minor coal filled fractures 123.9 - 124.5: SS, med gy, massive	R4 R6	1.15 / 2.0	85° @ 123.77 90° @ 124.10	Sample #57: MDST 122.5 - 122.85m Sample #58: coal 122.85 - 123.25m Sample #59: coal 123.25 - 123.65m	42	
124.5 - 126.5	37	2.0 / 2.0	124.5 - 126.5: SS vfg-fg, med gy, massive, occ. carb + qtz-filled fractures	R6	2.0 / 2.0	75° @ 125.33 40° @ 125.38 80° @ 125.81 70° @ 126.06	SRK #12 124 - 124.62m Box 43 124.62 - 125.65m Box 44 125.65 - 126.5m Box 45		

<ul style="list-style-type: none"> Conglomerate Sandstone Siltstone Mudstone Shale 	<ul style="list-style-type: none"> Coal - Bright Coal - Dull & Bright Coal - Dull Bone Coal Carb Sh 	<ul style="list-style-type: none"> F = Fault Sh = Shear J = Joint B = Bedding Sm = Smooth, R = Rough 	<ul style="list-style-type: none"> U = Uniaxial SD = Stake PLT = PLT Q = Quality
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Well No. CM11-22-CH
Geologist: M. B. Beck / L. Patterson
Surface Elev. (m):
Hole Drilled To (m):
Casing Set at (m): 12m
Total Depth (m):

Additional Notes (site conditions, adverse weather, drilling conditions etc.)
 SRK Samples

Drilling Contractor: Feraco
Rig # 104
Driller:
Spud Date & Time: Aug. 25/13
T.D. Date & Time:

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
			1	24	27m	cuttings sample
			2	58	61	Cuttings Samples
			3	64	68	Cuttings Samples
			4	68	71	Cuttings Samples
			5	76	76.8	Core, Sheet Box 8
			6	85.95	87	SS + SH Core Box 14
				87	88.05	1" " " Box 15
			7	92.7	93.3	Core, Box 21 MS
			8	96.5	99.0	Core, Box 26 Mudstone (97.1-98.5m Lc)
				94.0	99.5	Core, Box 27 Mudstone
			9	100.5	101.15	Core, Box 29 MS
			10	105.6	106.4	Core, Box 30 SS
			11	115.1	116.0	Core, Box 38 MS

NORWEST Geotechnical - Rock Core Log

PROJECT: Crown Mountain
 LOCATION:
 DRILLER / RIG: Forsco 104 LOGGED BY: L. PETERSON
 CLIENT: NWP coal DATE: Aug 21/13

HOLE No: CM12-01-CH
 Casing: 12m
 Drilled:
 Core Dia: 6"

13.35

15.4

15.7

2016 hrs

17.5

18.4

2014

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Despth		
13.35	1	1/205 49%	SHALE: orangish brown to dk grey, frac, subang-subrad, dk grey-blk carbonaceous debris in last 20cm. & clay in last 20cm.	R2	0			1
15.4	2	cut 30cm	*NO Recovery & chip sample. # was not told this by driller. Photos & depths will not match RUN 2*				*Sample depths are correct*	
15.7	3	1.7 1.8 94%	SHALE (15.7-16.75m) orangish brown to dk grey, frac, weathered, trace clay in gradational contact COAL: (16.75-17.5m) blk, frac, dull to bright,	R2	0	90° @ 15.9m	SAMPLE #1 16.75-17.15 SAMPLE #2 17.15-17.5m	2
17.5	3	1.35 0.9 150%	SHALE: in top 0.45m. (looks like shale) COAL: 17.5-18.4m blk, fractured, crumbly, bright to dull - sil in part.	R2	0		SAMPLE #3 17.5-17.9m SAMPLE #4 17.9-18.4	2
18.4	4	1.22 2 60%	SHALE: in top 0.15m. (likes like soap) COAL: 18.55-19.6m blk, frac, crumbles, bright to dull. LC: 19.6-20.4m	R2	0	60° @ 18.9m 40° @ 19.1m	SAMPLE #5 18.55-18.95m SAMPLE #6 18.95-19.35m SAMPLE #7 19.35-19.6m	

Conglomerate	Coal - Bright	F = Fault	U = Unisolated
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

18.55

1.15 0.17

5.27

NORWEST Geotechnical - Rock Core Log

PROJECT: CROWN MOUNTAIN N
 LOCATION:
 DRILLER / RIG: FORACO 104 LOGGED BY: L.PETERSON
 CLIENT: NWP COAL DATE: AUG 21 / 2013

HOLE No: CM12-01-CH
Casing 12m
 Drilled:
 Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Despth		
20.4	5	1.3 / 2 65%	COAL: blk, frac, rubble, crumbles, bright w dull, L.C 21.7 - 22.4				SAMPLE #8 20.4 - 20.8m SAMPLE #9 20.8 - 21.2m SAMPLE #10 21.2 - 21.7m	
22.4	6	1.46 / 2 73%	COAL: blk, frac, rubble, crumbles, bright w dull L.C: 23.86 - 24.4				SAMPLE #11 22.4 - 22.8m SAMPLE #12 22.8 - 23.2m SAMPLE #13 23.2 - 23.6m SAMPLE #14 23.6 - 23.86m	
24.4	7	1.84 / 1.7 108%	COAL: blk, frac, crumbles, bright w dull, friable			25° @ 24.66m 30° @ 24.81m 40° @ 25.4m	SAMPLE #15 24.4 - 24.8m SAMPLE #16 24.8 - 25.2m SAMPLE #17 25.2 - 25.6 SAMPLE #18 25.6 - 26.1m	

20.4
22.4
24.4
26.1
2450
kg

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

15
21
211

4.6

NORWEST Geotechnical - Rock Core Log

PROJECT: CROWN MOUNTAIN

HOLE No: CM1201-CH

LOCATION:

DRILLER / RIG: FORACO 104 LOGGED BY: L. PETERSON

CLIENT: NWP COAL DATE: AUG 22 / 2013

Casing 12m
Drilled:
Core Dia: 6"

26.1

8.4
0130 hrs

30.4

32.4

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Depth		
26.1 - 27.1	8	2.3 / 2.3 100%	COAL: blk, frag, more frac + crumbly between 27.5 - 28.4m, 0.04m thick dk brown shale seam @ 27.46m. Last 1m feels like a vf-fg rained sand mixed w coal.			40° @ 27.12m	SAMPLE # 19 26.1 - 26.5m SAMPLE # 20 26.5 - 26.9m SAMPLE # 21 26.9 - 27.3m SAMPLE # 22 27.3 - 27.7m SAMPLE # 23 27.7 - 28.1m SAMPLE # 24 28.1 - 28.4m	
28.4 - 30.4	9	1.7 / 2 85%	LC: 28.4 - 28.7m COAL: blk, frag, (28.7 - 30m) Crumbles, bright w dull, Top 0.8m feels like vf-fg sand. 30 - 30.4m Carb siltstone: dk grey-blk, "	R2	0	55° @ 30.05m	SAMPLE # 25 28.7 - 29.35m SAMPLE # 26 29.35 - 30.0m	3
30.4 - 32.4	10	2.27 / 2 114%	CARB SILTSTONE: DK greyish blk-blk, Coal seams interbedded throughout. Carb debris increases between 31.81 - 32.2m	R4- RS	0.94 / 2 47%	55° @ 30.7m 55° @ 30.9m 90° @ 31.2m 40° @ 31.62m		3 4 5

- Conglomerate
- Sandstone
- Siltstone
- Mudstone
- Shale
- Coal - Bright
- Coal - Dull & Bright
- Coal - Dull
- Bone Coal
- Carb Sh

- F = Fault
- Sh = Shear
- J = Joint
- B = Bedding
- Sm = Smooth, R = Rough

- U = Unrated
- SD = Slope
- PLT = PLT
- Q = Quality

18
23

6.27

NORWEST CORPORATION Geotechnical - Rock Core Log

PROJECT: CROWN MOUNTAIN
 LOCATION:
 DRILLER / RIG: FORACO 104 LOGGED BY: L. PETERSON
 CLIENT: NWP COAL DATE: AUG 22 / 2013

HOLE No: CM12-01-CH
 Leg 12m
 Drilled:
 Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Despth		
32.4 - 34.4	11	1.75 / 20 88%	32.4-32.85m <u>Carb SHALE</u> Dk greyish blk - blk - gradational COAL: 32.85-34.15m blk, frac, friable, brittle, crumbles, bright to dull. L. 34.15-34.4m	R2	0	75° @ 32.7m 35° @ 33.0m 35° @ 33.75m	SAMPLE #27 32.85-33.25m SAMPLE #28 33.25-33.65m SAMPLE #29 33.65-34.15m	6
34.4 - 36.4	12	2/2 100%	COAL 34.4-35.1m blk, frac, bright to dull - gradational - CARB SHALE 35.1-36.4m dk greyish black - blk,	R4	0.5 / 2 25%	90° @ 34.98m 45° @ 35.1m 60° @ 35.21m 85° @ 35.8m	SAMPLE #30 34.4-35.1m * Floor Sample #30	6 7
36.4 - 38.4	13	2/2 100%	36.4-37.62m MUDSTONE: med to dk grey, frac in part. - sharp - 37.62-38.4m COAL: blk. frac, crumbles, bright to dull. Carb shale @ 38m (0.3m)	R4	0.5 / 2 26%	70° @ 36.75m 85° @ 36.93m 65° @ 37.02m 85° @ 37.02m 70° @ 37.57m 75° @ 38.28m	SAMPLE #31 37.62-38.02m SAMPLE #32 38.02-38.4m	7 8

32.4
33
34
34.4
35
36
36.4
37
38
38.4
04/15
h/s

Conglomerate	Coal - Bright	F = Fault	U = Untested
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Strike
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	O = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

0.15 0.30 1.55 0.70 0.15 5.75

NORWEST Geotechnical - Rock Core Log

PROJECT: CROWN MOUNTAIN
 LOCATION:
 DRILLER / RIG: FORACO 104 LOGGED BY: L. PETERSON
 CLIENT: NWP COAL DATE: AUG 22/13

HOLE No: CM12-01-CH
 Casing 12m
 Drilled:
 Core Dia:

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Despth		
38.4	14	2/2 100%	dk grey, blk CARB SHALE: blk, frac, carb debris throughout, coal seam 39.37-39.7m blk, friable, bright with dull.	R4- R5	0.46 2	55° @ 38.94m 75° @ 39.4m 40° @ 39.93m 65° @ 40.04m	SAMPLE # 33 39.37-39.71m SRK # 3 39.71-41.27m Box 10	9
40.4	15	1.65 2 83%	40.4-41.27m CARB SHALE with MISTNE blk, frac, COAL 41.27-42.05m blk, friable, crumbles, frac. LC 42.05-42.4m	R3- R4	0	75° @ 41.03m	SAMPLE # 34 41.27-41.67m SAMPLE # 35 41.67-42.05m	10
42.4	16	1.7 2 85%	COAL: blk, frac, crumbles, interbedded, hard carb shale in part. L.C. 44.1-44.4m			55° @ 42.75m 75° @ 43.13m	SAMPLE # 36 42.4-42.8m SAMPLE # 37 42.8-43.2m SAMPLE # 38 43.2-43.6m SAMPLE # 39 43.6-44.1m	
44.4								

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

350 hrs

40.4

42.4

44.4

PROJECT: **CROWN MOUNTAIN**

HOLE No: **CM12-01-CH**

LOCATION: _____

Casey 12m

DRILLER / RIG: **FORACO 104** LOGGED BY: **W. Peterson M. Lyshnick**

Drilled: _____

CLIENT: **NWP COAL** DATE: **AUG 22/13**

Core Dia: **6"**

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #			
						Angle & Despth						
44.4	17	1.5 / 2 75%	44.4-45.9m Coal shiny to dull, dominantly solid, (45.9-46.4m LC)	R0	.25 / 1.7 5%	Cleats		Sample #40: coal 44.4-44.85m Sample #41: coal 44.85-45.3m Sample #42: coal 45.3-45.5m Sample #43: coal 45.5-45.9m				
45						70° @ 44.8m						
						70° @ 44.87m						
							30° @ 44.95m					
							35° @ 45.05m					
							55° @ 45.55m					
46.4	18	1.8 / 2 90%	46.6-47.7m Coal dominantly bright	R0	.15 / 1.6 8%	Cleats @		Sample # 44: coal 46.6-47.05m Sample # 45: coal 47.05-47.3m Sample # 46: coal 47.3-47.7m Sample # 47: Carb SH 47.7-47.95m Sample # 48: coal 47.95-48.4m				
						47.7-47.95m Carb SH - SH, DK brown	R3				60° @ 47.05m	
						47.95-48.4m Coal bright, friable w/ carb SH bed @ 48.2-48.26m						60° @ 47.3m
			(LC: 46.6-48.4m)				65° @ 47.75m					
							60° @ 47.90m					
48.4	19	1.95 / 2.0	48.4-49m Coal bright, friable, carb sh bed @ 49.65-49.74m sharp cte w/d	R0	1.0 / 1.95 51%	85° @ 49m		Sample #49: Coal & carb shale parting 48.4-48.75m Sample #50: coal 48.75-49m				
						49-50.4m Carb SH DK gry-blk, abnt Coal beds up to Ben thick (50.07-50.15m)	R3				85° @ 49.27m	
												70° @ 49.45m
							85° @ 49.8m					
							85° @ 50.07m	SRK # 4 49m-50.05m Box 11				
							85° @ 50.15m					
							all fractures are associated w/ coal beds.					

Conglomerate	Coal - Bright	F = Fault	U = Unisol
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Strike
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

44.4
45
46.4
46.4
48.4
50.4m

about 107.

PROJECT: Crown Mantain

HOLE No: CR12-01-04

LOCATION:

DRILLER / RIG: Faraco 104 LOGGED BY: M. Eskrick

CLIENT: NWP Coal DATE: Aug. 22/13

Casing: 12m

Drilled:

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Despth			
50.4	19		50.4-50.85m [SH] dk gy, masses gradual etc. w/	R3				SRK #4 49m-50.05m	11
51	20	2.1 / 2.0 105%	50.85-52.4 [SS] H-SS1 intbd w/ dk gy SH common qtz filled closed sh. wavy bdg w/ sh, Swaley xbdy in SS	R6	105 / 105 100%	80° @ 50.6m Qtz filled closed fractures @ 15° @ 50.85-51.75m 90° @ 51.75m (bedding plane) Qtz filled closed fracture @ 25° @ 51.9-52.1m @ 52.25-52.3m		SRK #4 50.05-51.2 Box 12 51.2-52.2 Box 13	12 13
52									14
52.4	21		52.4-52.75m [SS] H-SS intbd w/ SH grad. etc. w/ b	R5-R6 (cracks along mud beds)	1.0 / 2.05 87.8%	75° @ 52.65m 85° @ 52.82m 55° @ 53.16m 65° @ 53.5m			14 15 16
53		2.05 / 2.0 102%	52.75-54.4m [SH] dk gy, occ. coal laminae/beds up to 2cm thick broken up coal from shoe bit @	R3					17
54			54.4-54.95m [SH] dk gy w/ common coal laminae/stringers						17
55	22	1.85 / 2.0 92.5%	54.95-55.75m [COAL] bright & dull bands dominantly solid			75° @ 54.7 75° @ 55.65m 40° @ 55.91m		Sample # 51: coal 54.95-55.3m Sample # 52: coal 55.3-55.75m	17
56			55.75-56.1m [SH/Carb SH] dk gy w/ common coal beds up to 3cm thick bottom 2cm is coal.						

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: Crown Mountain

HOLE No: CM12-01-01

LOCATION:

DRILLER / RIG: Foraco 104 LOGGED BY: M. GSKRACK / L. PETERSON

CLIENT: NWP Coal DATE: AUG 22/13

Casey 12m

Drilled:

Core Dia: 6"

56.4

57

58

101

102

102.4

104.24

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle	Depth		
56.4 - 57.55	23	1.53m / 1.6m 95.6%	56.4 - 57.55m SH DK gy w/ comm. coal beds up to 5cm thick 57.55 - 57.82m Coal bright, friable (Not mmabk.: not supplied) 57.82 - 58m SH DK gy, carbonaceous			85° @ 56.5m 85° @ 56.75m 70° @ 57.15m 85° @ 57.45m 80° @ 57.55 (cleat) 80° @ 57.83		17 18 19	
58 - 101			HAMMER FROM 58 - 101 m					SRK 5 SRK 6 SRK 7 * chips samples	
101 - 102	24	1.4 / 1.4 100%	SHALE: DK grey, frac, rubble in part, carb in part Last 40m silt increases like a siltstone.	R4- R5	0.5 1.4 36%	55° @ 101.2 90° @ 102m		19 20	
102 - 102.4	25	2 1/2 100%	102.4 - 104.2m MUDSTONE: DK grey - blackish grey, frac @ 103.3 - 103.8m Sharp - 104.2 - 104.24m COAL: blk, frac, fissile, dull with bright.	R5	1.6/2 80%	80° @ 103.3 70° @ 103.8m 80° @ 104.15m	SAMPLE # 53 104.2 - 104.6m	20 21	

Conglomerate	Coal - Bright	F = Fault	U = Unfused
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

104.3 - 102.4

PROJECT: CROWN MOUNTAIN

HOLE No: CM12-014

LOCATION:

Casing: 12m

DRILLER / RIG: FORACO 104 LOGGED BY: L. PETERSON

Drilled:

CLIENT: MWP COAL DATE: AUG 23/13

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #	
						Angle & Depth				
104.4	26	2/2 100%	COAL: blk, frac, fissile near btm,	R4	0	90° @ 104.45m	SAMPLE #54	22		
105			carb shale between 104.55-104.75m frac.			70° @ 104.55m	104.6 - 105m		SAMPLE #55	
						85° @ 104.68m	105 - 105.4m		SAMPLE #56	
106						70° @ 104.78m	105.4 - 105.8m		SAMPLE #57	
						75° @ 105.65m	105.8 - 106.41m			
106.4	27	2/2 100%	106.4-107.45m MUDSTONE: DK gray- blk, frac in part	R4	0.69 2.0 35%	75° @ 106.79	SAMPLE #58	22		
107						85° @ 107	107.45 - 107.85m		SAMPLE #59	
						85° @ 107.6m	107.85 - 108.25m		SAMPLE #60	
108						107.45-108.2m COAL: blk, frac, crumbles, bright to dull	85° @ 107.28m		108.25 - 108.4m	
							80° @ 107.53m			
							85° @ 107.92			
						50° @ 108.04				
						35° @ 108.17				
						85° @ 108.2m				
108.4	28	2/2 100%	108.4-109.5m COAL: blk, frac, crumbles, bright with dull.	R4	0.35 2 18%	75° @ 108.85m	SAMPLE #61	22		
109						65° @ 109.16m	108.4 - 108.8m		SAMPLE #62	
						65° @ 109.68m	108.8 - 109.2m		SAMPLE #63	
						70° @ 109.77m	109.2 - 109.5m			
110						109.5-110.4m MUDSTONE: dk brownish grey to greyish black, carb debris in part.	90° @ 109.95m			

Conglomerate	Coal - Bright	F = Fault	U = Unmodel
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

618
22m 1.05
.75

NORWEST Geotechnical - Rock Core Log

PROJECT: **CROWN MOUNTAIN**
 LOCATION:
 DRILLER/RIG: **FORACO 104** LOGGED BY: **L. PETERSON**
 CLIENT: DATE: **AUG 23/13**

HOLE No: **CMI2-01-CH**
 Casing: **12m**
 Drilled:
 Core Dia: **6"**

110.4
 112.4
 114.4
 116.4
 118.4

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Depth		
110.4	29	2/2 100%	MUDSTONE: dk grey - grey blackish grey, interbedded coal seams in part, slight frac, carb debris	RS	1.49 2 75%	75° @ 110.76m 90° @ 110.89m 85° @ 110.98m 85° @ 111.27m 85° @ 111.68m		23 24
112.4	30	2.1/2 105%	MUDSTONE: dk grey - greyish black, slight frac. tr. carb debris, v. hard.	RS	1.2 2 60%	90° @ 112.87m 75° @ 113.26m 65° @ 113.48m 75° @ 113.63m 90° @ 114.01m 80° @ 114.12m 65° @ 114.22m		25 26
114.4	31	2.1/2 100%	MUDSTONE: dk grey to greyish black, frac, v. hard, carbonaceous debris throughout, like a carb shale in some parts.	R4- RS	0.9 2 45%	80° @ 114.95m 90° @ 115.03m 85° @ 115.29m 90° @ 116.03m		27 28

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Strike
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

NORWEST CORPORATION Geotechnical - Rock Core Log

PROJECT: CROWN MOUNTAIN

HOLE No: CM12-01-CH

LOCATION:

DRILLER / RIG: FORALD 104 LOGGED BY: LPETERSON

CLIENT: RWP COAL DATE: AUG 23/13

Casing 12m
 Drilled:
 Core Dia: 6"

116.4

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Despth			
117	32	1.83 / 2.0 91%	116.4-116.95m [SH] dk gy → R3 116.95-118.23 [coal] → R0 bright, friable. (LC: 118.23-118.4) recovered in run below		0.2 / 1.83 10%	85° @ 116.6m 85° @ 116.75-116.9m (→ frags)	Sample 64: 116.95-117.45m ↳ coal Sample 65: 117.45m-117.75m ↳ coal Sample 66: 117.75-118.23 ↳ coal	29	
118.4	33	2.17 / 2.0	118.4-120.28m [SH] dk gy w/ common coal beds up to 5cm thick 120.28-120.4m [coal] Dull to bright, solid. Not friable, not sapid.	R4 R3	1.85 / 2.17 85%	85° @ 118.7m 90° @ 118.88m 90° @ 118.95m 80° @ 119.12m } coal beds 85° @ 119.33m 65° @ 119.4m 85° @ 119.71m 70° @ 119.78m (coal bed) 80° @ 120.28m		30 31	
120.4	34	2.0 / 2.0 100%	120.28-121.35m [Cab SH] Dk gy to blk w/ com. coal beds up to 8cm thick, gradational etc w/b 121.35-122m [SH] med. dk gy, massive, hard, sharp etc w/b 122-122.4m [SS] lt gy intbd w/ comm SH/silt up to 2cm thick. occ. qtz filled closed fractures	R3 R5 R5 (CS along qtz frags)	1.73 / 2.0 86.5%	70° @ 120.75m (coal bed) 90° @ 121m (coal bed) 0° @ 122-122.12m (closed, qtz filled)	Sample #67: 122.3-122.4m (partial core piece) SS for floor.	31 32	
122.4									

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slate
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	O = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: Crown Mountain

HOLE No: CM12-01-CH

LOCATION:

DRILLER / RIG: Fornco 109 LOGGED BY: M. Eskrick

Casing: 17-30m

CLIENT: NWP Coal DATE: Aug. 23/13

Drilled:

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #	
						Angle & Depth			
<u>22.4</u>			<u>122.4 - 123.98m [SS]</u>	<u>RL6</u>					
		<u>2.0 / 2.0</u>	<u>lt. gg. w/ siltstn + sh lam. throughout, tan, w/ depth wavy to sandy. x bedding. grad. etc w/d</u>		<u>2.0 / 2.0</u>	<u>80° @ 122.95m fracture along Beddy plane</u>		<u>33</u>	
<u>123.9</u>	<u>35</u>	<u>100%</u>	<u>123.98 - 124.4m [SLTsh]</u>	<u>RS</u>	<u>100%</u>			<u>34</u>	
			<u>dk gy w/ occ. SS lam.</u>					<u>35</u>	
<u>24.4</u>	<u>36</u>	<u>2.05 / 2.0</u>	<u>124.4 - 126.4m [SS]</u>	<u>RL6</u>	<u>2.03 / 2.05</u>	<u>70° @ 124.9m</u>	<u>SRK Sample #8</u>		
		<u>102.5%</u>	<u>lt gg w/a 2cm coal bed @ 124.9m, fracture along bed. near vertical closed Fract. filled w/ qtz in top 60cm</u>		<u>99%</u>		<u>124.7 - 125.7 Box 36</u>	<u>36</u>	
							<u>125.7 - 126.45m Box 37</u>	<u>37</u>	
<u>126.4</u>			<u>Core barrel stuck in hole</u>				<u>SRK #8</u>		
			<u>add Casing.</u>				<u>126.45 - 129m cuttings.</u>		
			<u>Casing total 30m</u>						
			<u>HAMMER to 137m.</u>						
<u>128.4</u>			<u>Depths out by 40cm, subtract 40cm from depths below this point</u>						

Conglomerate
 Sandstone
 Siltstone
 Mudstone
 Shale

Coal - Bright
 Coal - Dull & Bright
 Coal - Dull
 Bone Coal
 Carb Sh

F = Fault
 Sh = Shear
 J = Joint
 B = Bedding
 Sm = Smooth, R = Rough

U = Uniaxial
 SD = Strike
 PLT = PLT
 Q = Quality

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NORWEST CORPORATION Geotechnical - Rock Core Log

PROJECT: CROWN MOUNTAIN

HOLE No: CM12-01-CH

LOCATION:

CLUSTY: 30m

DRILLER / RIG: FORAKO 104 LOGGED BY: L. PETERSON / M. ESKRICK

Drilled:

CLIENT: MWPCOAL DATE: AUG 24/13

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Despth		
137	37	1.4/1.4 100%	MUDSTONE: med grey to dk grey, v. hard, shale seams @ 137.2, 137.44m, trace quartz @ 137.2m	RS	1.07 1.4 76%	90° @ 137.40m 85° @ 138.01m 85° @ 138.33m		38
138.4	38	2/2 100%	138.4 - 138.95m SILTSTONE: med-dk grey, v. hard. 138.95 - 139.54m COAL: blk, frac, fissile, 139.54 - 140.4m SILTSTONE: med to dk grey, v. hard, trace SS in botm 20m.	R3-R4	1.11 2 56%	65° @ 138.99m 90° @ 139.15m 80° @ 139.58m 80° @ 140.2m	SAMPLE # 68 138.95 - 139.35m SAMPLE # 69 139.35 - 139.54m	39
140.4	39	2.03 2.0 101.5%	140.4 - 140.9m SLTSTN w/ oco SS beds, closed fractures etc 140.9 - 142.25m SH top 12cm is fractured coal + SH, dk gy, massive gradational etc w/ ↓ (2cm coal bed @ 142.13m) 142.25 - 142.4m SS Fg, lt gy w/ com siltstn + msd beds	R5-R6 R3 R6	1.66 2.03 81.0%	30° @ 140.85m 55° @ 140.6m 85° @ 140.77m 90° @ 141.38m 75° @ 141.63m		40 41 42
142.4						cont. on next page		

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slate
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: Crown Mountain

HOLE No: CM17-01-CH

LOCATION:

DRILLER / RIG: Furaco 104 LOGGED BY: M. Estwick

CLIENT: NWP Coal DATE: Aug. 24/15

Casing: 30m

Drilled:

Core Dia: 6"

142.4

144.4

146.4

148.4

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
142.4 - 142.6m	40	1.00 / 2.0 95%	SLTstr Dk gy w/ carb debris, sharp etc w/ v	R5		50° @ 142.75m	Sample # 70: 142.6 - 142.9m	42	
142.6 - 143.42m			Coal, dominantly bright w/ dull bands	R0		80° @ 143.09-143.22 80° @ 143.38m 85° @ 143.65m 80° @ 143.98m	Sample # 71: 142.9 - 143.42	43	
143.42 - 145.6m			SS+SLTstr lt - Dk gy interbedded	R5			Sample # 72: 144.2 - 144.4m		
143.6 - 144.2m			SH / Dk gy	R3					
144.2 - 144.4			w/ coal beds up to 1cm max						
144.4 - 146.4m	41	2.0 / 2.0 105%	Coal bright w/ dull bands and occ carb SM beds @ 145.36 - 145.38 & 146.06 - 146.19m	R1	0%	75° @ 144.5m 85° @ 144.9m 60° @ 145.0m 60° @ 145.32m 90° @ 145.40m 65° @ 146.19m Sample # 77 145.7 - 146.76m Sample # 78 146.06 - 146.19m (Carb st) Sample # 79: 146.19 - 146.4	Sample # 73: 144.4 - 144.75m bright w/ dull bands (Coal) Sample # 74: 144.75 - 145.1m bedded, dominantly bright Sample # 75: 145.1 - 145.35 bright coal (SMs etc) Sample # 76: 145.35 - 145.70 Coal		
146.4 - 146.55m	42	2.04 / 2.0 102%	Coal bright w/ dull bands. SH 146.68 - 147.80m Coal bright w/ dark bands. SH @ 146.8 - 147.0m SH 147.80 - 147.92m SH Coal 147.92 - 148.4m Coal Dull w/ bright streaks, SH bed @ 148.23 - 148.35m			75° @ 146.58m 75° @ 146.88m 75° @ 146.76m 80° @ 147.27m 80° @ 148.56m 75° @ 148.04m 85° @ 148.25m	Sample # 80: Coal 146.4 - 146.55m Sample # 81: SH + Coal 146.55 - 147.0m Sample # 82: Coal 147.0 - 147.3m Sample # 83: Coal 147.3 - 147.8 Sample # 84: SH 147.8 - 147.92m Sample # 85: Coal 147.92 - 148.4		

- Conglomerate
- Sandstone
- Siltstone
- Mudstone
- Shale

- Coal - Bright
- Coal - Dull & Bright
- Coal - Dull
- Bone Coal
- Carb Sh

- F = Fault
- Sh = Shear
- J = Joint
- B = Bedding
- Sm = Smooth, R = Rough

- U = Unzoned
- SD = Stake
- PLT = PLT
- Q = Quality

NORWEST Geotechnical - Rock Core Log

PROJECT: ~~CM12-01-04~~ Crown Mountain

HOLE No: CM12-01-04

LOCATION:
 DRILLER / RIG: Franco 104 LOGGED BY: M. ESKINAKI

Core Log: 30m

CLIENT: NWP Coal DATE: Aug 29/13

Drilled:
 Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle	Depth		
48.4	43	2/5 107.5%	148.4-149.68m Coal bright & dull banded. Cleats @ 55° & 85° Sharp etc w/ l 149.68-150.28m Carb SH DK gy to blk v. broken up + blocky coal beds/lin 150.28-150.4m Coal		0%	85° @ 148.35m 85° @ 148.88m 80° @ 149.0m 65° @ 149.15m 80° @ 149.41m 85° @ 150.3 55° @ 150.35m		Sample # 86: banded coal 148.4-148.55m Sample # 87: banded coal 148.55-148.95m Sample # 88: Coal 148.95-149.3m Sample # 89: Coal 149.3-	43
50.4	44	1.6 1.6 100%	150.4-152m (SH) DK gy shale w/ common coal interbeds up to 8cm thick.			65° @ 150.5m 80° @ 150.65m 75° @ 150.8 @ 150.9 65° @ 151.05 90° @ 151.2 65° @ 151.5 90° @ 151.55 80° @ 151.7 90° @ 151.85m			44 47
152			TD @ 152m @ B:45						45

Conglomerate	Coal - Bright	F = Fault	U = Unisetal
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb SH	Sm = Smooth, R = Rough	

015.000211-17m
5521543
2131m

NORWEST Geotechnical - Rock Core Log

PROJECT: CROWN MOUNTAIN

HOLE No: CM13-15-CH

LOCATION:

CASING: 12m

DRILLER / RIG: FORACO 104 LOGGED BY: LAUREN B.

Drilled:

CLIENT: NNP COAL DATE: SEPT 7/13

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
			HAMMER TO 60m						
60	1	0.45 / 0.5	60-60.5: CARB MS, DKGy-BLK, MASSIVE, BROKEN 60.14-60.19m, GLOSSY @ fract. QZ MIN. @ BTM END (LC?)	R3	0.4 / 0.5	65° @ 60.14 65° @ 60.19	broken dw	1	
60.5	2	2.15 / 2.0	60.5-62.5: MS DKGy, MASSIVE w/ OCC. BREAKS/FRACT. denser/harder below 62.23m, many partial fractures, TOP 1.0m carbonaceous	R4	1.34 / 2.0	40° @ 60.7m 40° @ 60.75m 65° @ 61.05m 65° @ 61.32m 70° @ 61.60 85° @ 61.65m 65° @ 61.92m 80° @ 61.16m 80° @ 61.28m	(Sample out of order)	2 3	
62.5	3	2.0 / 2.0	62.5-63.18: MS, MED-DKGy, MASSIVE 63.18-63.30: COAL, SL. SHALY, BROKEN, DULL-BR. 63.30-63.40: CARB. SH/BONY COAL, DULL, DENSE 63.40-63.86: CARB. MS, DKGy-BLK, DENSE, GLOSSY SURFACES 63.86-64.02: COAL, SL. SHALY, BLK, BROKEN-CRUSHED 64.02-62.50: BONY COAL, BLK, DENSE, GLOSSY SURFACES @ breaks	R4 R3	0.54 / 2.0	75° @ 63.76m 70° @ 63.92 65° @ 63.10 65° @ 63.20 80° @ 63.67 70° @ 63.75 80° @ 63.89 70° @ 64.10 70° @ 64.15 70° @ 64.18	#1 63.18-63.30 (COAL, BR, BROKEN) + SH. #2 63.30-63.40 (CARB. SH. / SL. Bony) #3 63.40-63.86 (CARB. MDST) #4 63.86-64.02 (COAL, BROKEN) #5 64.02-62.50 (BONY COAL)		
64.5									

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

* NOTE: COULDN'T GET CORE BARREL APART AFTER CUTTING RUN 4, therefore SAMPLE COMPROMISED (THREADS WRECKED ON BTM OF BARREL = SHOE STUCK) SAMPLE WAS SHUFFLED OUT OF TUBE BUT MOST IS MIXED UP / OUT OF ORDER EXCEPT ~TOP 1m which is ~IN ORDER & TAKES UP 3m of SPACE FOR 2m RUN (NO OUT. PHOTO F/RUN) - VERY BROKEN UP, USED HAMMER TO REMOVE FRNT BARREL

NORWEST CORPORATION Geotechnical - Rock Core Log

PROJECT: CROWN MOUNTAIN

HOLE No: CM13-15-CH

LOCATION:

CASING: 12m

DRILLER / RIG: FORACO 104 LOGGED BY: LAUREN B.

Drilled:

CLIENT: NWP COAL DATE: SEPT 7/13

Core Dia: 6"

64.5

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #	
						Angle	Depth			
	4	2.0 2.0	<p>* NOT RELIABLE DEPTHS FOR THIS RUN, SPREAD OVER 2.75m</p> <p>64.5-64.9m: BONY COAL, DENSE, BROKEN (Fr. Removal)</p> <p>64.9-65.20: COAL, BROKEN, BRIGHT</p> <p>65.2-65.38: BONY COAL-MDST BLK, DENSE</p> <p>65.38-65.58: COAL + BONY, CRUSHED TO BROKEN, MUDDY</p> <p>65.58-65.74: BONY TO COAL, BROKEN, DULL TO BR.</p> <p>(Compressed depths to fit 2.0m)</p>						<p>Samples Contam. due to unknown depth & contact points + unreliable</p> <p>#7 ~ 64.5-64.9m (BONY COAL)</p> <p>#8 ~ 64.9-65.2 (COAL, BROKEN)</p> <p>#9 ~ 65.2-65.38 (PTG-BONY?)</p> <p>#10 ~ 65.38-65.58 (COAL-BONY)</p> <p>#11 ~ 65.58-65.74m (BONY COAL)</p> <p>#12 65.74-66 (BONY COAL)</p>	<p>(Tried to comp broken int. to fit into 2m)</p>
			<p>65.74-66: COAL w/ BONY COAL? + POSSIBLE SH, crushed in part, blk</p> <p>66-66.5: CRUSHED COAL + SHALE, BLK + MED BRN, POWDERY (MIXED) - OUT OF ORDER BADLY</p>						<p>#13 66-66.5 (MIXED COAL + SH.)</p>	
	5	1.17 2.0	<p>LC: 66.5-67.33m</p> <p>67.33-67.77: BONY COAL / MDST, COAL-FILLED FRACT. + QTZ-FILLED</p> <p>67.77-68.09: COAL, BLK + BROKEN, BRIGHT</p> <p>68.09-68.50: BONY COAL-CARB MDST, COAL-FILLED FRACT, dense, glossy fract. surf. Basal 0.2 broken, massive above</p>				<p>45° @ 67.55</p> <p>45° @ 67.65</p> <p>35° @ 68.26</p>	<p>#14 67.33-67.77 (BONY COAL) - L</p> <p>#15: 67.77-68.09 (COAL)</p> <p>#16 68.09-68.50 (BONY)</p>		

66.5

66.5

68.5

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: CROWN MOUNTAIN

HOLE No: CM13-15-CH

LOCATION: 1211

CASING: 12m

DRILLER / RIG: FORACO 104 LOGGED BY: LAUREN B.

Drilled:

CLIENT: NWP COAL DATE: SEPT 7/13

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
68.5	6	1.60 2.0 80%	COAL: BLK, crushed, solid pieces @ 68.5 + 69.2 of 10cm dull to bright LOST CORE: 70.1 - 70.5	/	/			Sample 17 (coal) 68.5 - 69m Sample 18 (COAL) 69.0 - 69.4m Sample 19 (COAL) 69.4 - 69.8m Sample 20 (COAL) 69.8 - 70.1m	
70.5	7	2.1 2.0 105%	70.5 - 71.08 - COAL BLK, bright to dull, fractured fissile, crushed at top. 71.08 - 72.1 - MDST Dark grey, some lt grey, hard. Some carb debris in top 10cm, fractured. 72.1 - 72.5 - MDST becomes more sandy near bottom, dk grey, fractured.	R4	1.2 2.0 60%	85° @ 70.83 60° @ 71.18 70° @ 71.98 80° @ 72.24		#21 COAL 70.5 - 70.8m #22 COAL 70.8 - 71.08m #23 MDST some carb debris 71.08 - 71.5m (FLOOR)	4
72.5	8	1.95 2.0 97.5%	72.5 - 73.10 SS DK-lt grey, Occ fracture, coarse grains 73.10 - 73.84 MDST/SHALE DK grey to black, quartz veins 73.84 - 73.94 Carb shale w/ MDST w/ quartz grains, lots of carb debris, silty, soft 73.94 - 74.45 - MDST/shale DK grey - blk, fractured, trace quartz veins.	R4 R3 R4	1.28 2.0 64%	65° @ 72.98 80° @ 73.2 70° @ 73.17 90° @ 73.54 55° @ 74.08		#24 Carb shale/mdst 73.84 - 73.94 (some coal, silty, shale)	5 6

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: CROWN MTN

HOLE No: CM13-15-CH

LOCATION:

CASING: 12m

DRILLER / RIG: FORACO 104 LOGGED BY: JORDAN Z.

Drilled:

CLIENT: NWP COAL DATE: SEPT. 7 2013

Core Dia: 6"

74.5

76.5

78.5

80.5

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
74.5 - 76.4	9	2.05 2.0 102.5%	74.5 - 76.4 MDST DK grey, hard, occ fractures becomes little more sandy near bottom Mult fractures @ 75.8	R4	1.80 2.0 90%	50° @ 75.5 35° @ 75.95		7 8	
76.5 - 76.9	10	1.9 2.0 95%	Lost core - 76.4 - 76.5 76.5 - 76.9 Carb Shale Blk, fractured, dull to bright	R4	.70 2	85° @ 77.23 40° @ 77.91	#25 carb shale 76.5 - 76.9 (roof)	9	
76.9 - 77.23			76.9 - 77.23. COAL w carb shale. Blk, rubble, bright w dull	R4			#26 COAL w carb shale 76.9 - 77.23		
77.23 - 78.10			77.23 - 78.10 SS DK grey, some quartz @ 77.73. mult fractures @ 77.9 m. gets more sandy near bottom.	R4 R3	35%		#27 SS 77.23 - 77.53 (floor) Parting #28 MDST/Carb shale (lots of carb debris) 78.10 - 78.4 (roof)		
78.10 - 78.4			78.10 - 78.4 MDST w carb shale, carb debris, rubble, blk to dk grey						
78.5 - 79.22	11	2.6 2.0 100%	78.5 - 79.22 COAL Blk, bright w dull, easily broken, fractured	R4	.95 2 47.5%	70° @ 79.22 90° @ 79.35 75° @ 79.83 75° @ 80.24	#29 COAL 78.5 - 78.9 #30 COAL 78.9 - 79.22 #31 MDST 79.22 - 79.47	9 10	
79.22 - 79.47			79.22 - 79.47 MDST carb debris, dk grey, fractured						
79.47 - 79.72			79.47 - 79.72 COAL w MDST, crushed, blk, bright w dull,						
79.72 - 80.5			79.72 - 80.5 MDST dk-lt grey, occ fracture, occ spots of quartz in top 10cm.	R5- R4			#32 COAL w MDST 79.47 - 79.72		

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: CROWN MOUNTAIN

HOLE No: CM 13-15-CH

LOCATION:

CASING 12 m

DRILLER / RIG: FORACO 104 LOGGED BY: JORDAN Z

Drilled:

CLIENT: NWP COAL DATE: Sept 8, 2003

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
80.5	12	2.0 2.0 100%	80.5 - 81.6 COAL maybe some carb shale within Blk, bright some dull	R2-R0	40 20	35° @ 81.00		#33 COAL	
			40° @ 81.36			#34 COAL			
			81.6 - 81.9 CARB shale carb debris, dk grey, fractured small band coal @ 81.69, smooth	R2-R0	20%	90° @ 81.63		#35 COAL	
			81.9 - 82.1 COAL Blk, bright, fissile, Broken			90° @ 82.14		#36 CARB SHALE	
			82.1 - 82.25 CARB shale bright, blk, smooth,					#37 COAL	
			82.25 - 82.5 COAL some shale, bright to dull, crushed					#38 CARB shale	
82.5	13	2.0 2.0 100%	82.5 - 83.2 MOST DK grey, mult fractures @ 82.7, Some carb debris @ 82.7-82.8	R4	1.45 2.0 72.5%	50° @ 82.65		#39 COAL (crushed)	
			83.2 - 84 shale DK grey - dk grey, broke at 90° angle	R3		70° @ 82.89		#40 MOST / CARB shale	
			84 - 84.5 CARB shale			90° @ 83.12		#41 CARB SHALE	
			DK grey - blk, bright w dull, crushed, fissile.			60° @ 83.49		#42 CARB shale	
						60° @ 83.70		82.5 - 82.9 (Floor)	
			84.5 - 86.5 MOST DK grey, blk, carb debris (minor) Coal band @ 85.23 (2cm thick)			55° @ 84.4		82.9 - 83.1	11
	14	2.0 2.0 100%			1.80 2.0 90%	60° @ 84.8			
						70° @ 85.03			
						75° @ 85.24			
						40° @ 85.37			
						75° @ 85.94			
						65° @ 86.26		84 - 84.5	12
									13

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

80.5

82.5

84.5

86.5

NORWEST CORPORATION Geotechnical - Rock Core Log

PROJECT: CROWN MOUNTAIN

HOLE No: CM 13-15-CL

LOCATION:

CASING 12m

DRILLER / RIG: FORACO 104 LOGGED BY: JOE BAWZ

Drilled:

CLIENT: NWP COAL DATE: Sept 8, 2013

Core Dia: 6

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
86.5	15	2.1 2.0 105%	86.5 - 87.24 MDST DK grey, fractured, Carb debris coal band @ 86.95 - 87.05	R4- R3	60 20 30%	65° @ 87.02	#49 COAL 86.95 - 87.05		
			87.24 - 88.0 COAL BLK, bright w dull,			60 @ 87.23	#45 MDST 87.05 - 87.24		
			88.0 - 88.2 CARB Shale BLK,	R2		70 @ 87.97	#46 COAL 87.24 - 87.60 (shale parting 5cm)		
			88.2 - 88.5 COAL bright w dull, BLK			70 @ 88.06	#48 COAL 87.60 - 88.0		
88.5	16	2.1 2.0 105%	88.5 - 89.0 COAL / Carb shale BLK, broken, bright w dull	R4- R3	150 20 75%	75° @ 88.99	#49 COAL 88.2 - 88.5		
			89.0 - 89.4 MDST Carb debris			45° @ 89.21	#50 COAL 88.5 - 89		
			89.4 - 89.9 COAL 5cm MDST Parting @ 89.5m				#51 MDST 89.0 - 89.4		
			89.9 - 90.5 MDST DK grey, massive, band of carb @ 90.4m (3cm thick)	R4			#52 COAL parting 89.4 - 89.7	14	
							#53 COAL 89.7 - 89.9		
90.5	17	2.0 2.0 100%	90.5 - 91.5 MDST DK grey, massive, mult fractures @ 91.15m	R4	140 20 70%	55° @ 91.28	#55 MDST 91.25 - 91.55 (roof)		
			91.5 - 91.85 COAL black, crushed from 91.5 - 91.6m dull to bright			60 @ 91.41	#56 COAL 91.5 - 91.85		
			91.85 - 92.5 MDST DK grey, occ Fractures.			75 @ 91.93	#57 MDST 91.85 - 92.15 (floor)	15	

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: CROWN MOUNTAIN

HOLE No: CM13-15-CH

LOCATION:

CASING: 12m

DRILLER / RIG: FORACO 104 LOGGED BY: LAUREN B.

Drilled:

CLIENT: NWP COAL DATE: SEPT 8/13

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
92.5	18	2.25 2.0	92.5-93.82: MDST MED GY-DK GY, MASSIVE	R4	1.8 2.0	60° @ 92.7m 30° @ 93m 70° @ 94.3m	(NO ROOF-SS TOO HARD TO BREAK)	16	
			93.82-94.38: SS, lg + med gy, massive						
			94.38-94.45: BONY COAL TO COAL, DK GY-BLK, DENSE, DULL W/ MINOR BRIGHT						
			94.45-94.50m: COAL, BRIGHT, BROKEN						
94.5	19	2.08 2.0	94.5-95.35: BONY COAL, GLOSSY FRACT. SURF., DENSE, MINOR BRIGHT COAL (MUDDY) Fr/UBOVE LIKELY	0	80° @ 96.22m 70° @ 96.32m 40° @ 96.35m	#60 - BONY COAL 94.5-94.70m #61 - BONY COAL 94.7-94.9m #62 - BONY 94.9-95.35m #63 - COAL 95.35-95.70 #64 - BONY COAL 95.7-95.75m #65 - COAL 95.75-96.2 #66 - BONY COAL 96.2-96.3 #67 - MDST (FLOOR) 96.3-96.5			
			95.35-95.7: COAL, BLK, BROKEN, BRIGHT						
			95.7-95.75: BONY COAL, BLK, DENSE						
			95.75-96.2: COAL, BLK, BROKEN, BRIGHT						
			96.2-96.3: BONY COAL, BLK, DENSE, GLOSSY FRACT SURF. 96.3-96.5: CARB MS, DK GY-BLK						
96.5	20	2.0 2.0	96.5-96.84: MDST DK GY-BLK, BASAL 0.15 CARBONACEOUS	R5	0.48 2.0	80° @ 96.65m 70° @ 97.44m 60° @ 97.90m 50° @ 98m 50° @ 98.05m 40° @ 98.27m	#68 - MDST 96.5-96.84m #69 - 96.84-97.26m COAL #70 - SS (FLOOR?) 97.26-97.56m #71 - BONY COAL 97.56-97.64m #72 - BONY COAL 97.64-97.86m #73 - MS (FLOOR?) 97.86-98.25m		
			96.84-97.26: COAL, top 0.10 mac dense, bright, friable, BROKEN						
			97.26-97.56: SS, fa, carb. stringers, lg + y-med gy, qtz filled fract. occ.						
			97.56-97.64: BONY COAL, DK GY-BLK, BROKEN						
			97.64-97.86: BONY COAL, DENSE, BLK, GLOSSY FRACT SURFACES						
98.5			97.86-98.5: MS, dk gy-blk, minor coal filled fract.	R4					

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

NORWEST CORPORATION Geotechnical - Rock Core Log

PROJECT: CROWN MTN

HOLE No: CM13-15-CH

LOCATION:

CASING: 12m

DRILLER / RIG: FORACO 104 LOGGED BY: LAUREN B.

Drilled:

CLIENT: NWP COAL DATE: SEPT 8/13

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
98.5			98.5-98.85: SS Vfg-fg, lgt-med gy, massive, many coaly/carb stringers (mm)	R5		50° @ 98.78 (QTZ-FILLED)			
			98.85-100.5: MURDY SILTSS, fg MED-DK GY, MASSIVE w/ OCC. FRACTURES COMMON MM CARB/ COALY STRINGERS	R5	1.7 2.0	80° @ 99.20 60° @ 99.80 35° @ 99.88 40° @ 99.97 40° @ 100.3m			158
	21	2.2 2.0							
			HAMMER						
			100.5-118m						

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

NORWEST CORPORATION Geotechnical - Rock Core Log

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PROJECT: CROWN MTR

HOLE No: CM13-15-CH

LOCATION:

CASING: 12m

DRILLER / RIG: FORACO 104 LOGGED BY: LAUREN B.

Drilled:

CLIENT: NWP COAL DATE: SEPT 8/13

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
118			118-119.26: MDST, CARB. DK Gy - BLK, common 50° fractures, carb. appearance/glossy @ fractures + some coal. Filled fract. - looks like coal on sur but too dense + fresh = MS look			55° @ 118.06		#75 MDST/BONE	
						55° @ 118.15		118.76 - 119.26 (ROOF?)	21
						50° @ 118.36		#76 Bony COAL	
						50° @ 118.45		COAL	
						50° @ 118.53		119.26 - 119.75	
						50° @ 118.61		#77 MDST	
						50° @ 118.69		BONY PTG	
						80° @ 118.84m		119.75 - 119.95	
						80° @ 119.29m		#78 COAL	
								119.95 - 120.5	
			DOESN'T LOOK LIKE W LOWER					(OUT OF ORDER)	
								#79 BONY COAL	
								118.50 - 118.76	

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

NORWEST CORPORATION Geotechnical - Rock Core Log

Page 0 of 10

PROJECT: CROWN MTN

HOLE No: CM13-15-CH

LOCATION:

12m CASING

DRILLER / RIG: FORACO 104 LOGGED BY: LAUREN B.

Drilled:

CLIENT: NWP COAL DATE: SEPT 8/13

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
120.5	23	2.1 2.0	120.80-120.88: BONY COAL TO MS, PARTLY BROKEN, DK GY-BLK	R5	1.42 2.0	50° @ 120.9	S# 80 120.5-120.88 (BONY COAL-MS)	21	
			120.88-122.5: SS, vfg-fg, muddy, occ. coaly-carb. filled fract., Qtz cemented fract. & veins			90° @ 121.0 90° @ 121.12 70° @ 121.60 60° @ 121.95 70° @ 122.25			S# 81 (FLOOR) 120.88-121.18
122.5	24	2.0	122.5-123.41: SS, vfg-fg, muddy, med-dk gy	R5		75° @ 122.86		23	
			123.41-124.5: SS, vfg-fg, lgt gy, common con coaly/carb stringers + coal filled fract. + Qtz filled fractures cemented			90° @ 123.30 45° @ 123.70 65° @ 123.85 70° @ 123.97 65° @ 124.20			24
124.5	TD 124.5m @ 16:20								

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

GPS: 663764
5517920
R77m

NO SRK SAMPLES

NORWEST CORPORATION **Geotechnical - Rock Core Log**

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PROJECT: Crown MTN

HOLE No: CM13-25-CH

LOCATION:

DRILLER / RIG: FORACO 104 LOGGED BY: LAUREN B.

12m CASING

Spud @ 01:30 Sept 5/13

CLIENT: NWP Coal DATE: Sept 5/13

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
			Hammer to 27m						
27.0	1	1.5 / 1.5	27-28.5 - MDST MED-DKY w/occ. DRG. WEATHERING, LOCALY CARB INTERBED @ 27.4m, COMMON FRACT. + RUBBLE TOP 50cm + bottom ~30cm, most comp. MAT FR/27.50-28.4m	R4	0	65° @ 27.52 55° @ 27.62 55° @ 27.66 70° @ 27.87m 70° @ 28.02m		1	2
28.5	2	2.0 / 2.0	28.5-29.86 - MDST, MEDGY, COMMON FRACT, DRG WEATHERING TRACE COAL 29.1-29.13m 29.86-30.06, CARB MDST, MEDGY-BRN-DK G-3, TRACES COAL / STRINGERS 30.06-30.24m: COAL (BONY) denser than below, hard, dull to bright 30.24-30.5: COAL, bright, broken	R4	0.33 / 20 17%	80° @ 28.80 80° @ 29.03 75° @ 29.50 85° @ 29.68 90° @ 29.75	Sample #1: 29.56-29.88 (ROOF) Sample #2: 29.88-30.06 (ROOF) Sample #3: 30.06-30.24 (bony coal) Sample #4: 30.24-30.5m (COAL)	3	
30.5	3	2.0 / 2.0	30.05-30.73: COAL, BLK, BROKEN, BLK, DULL 30.73-31.23: BONY COAL, DKGY-BLK, DENSE, SOME DRG. WEATH (MINOR) 31.23-31.48: COAL, DULL TO BRIGHT 31.48-31.58: MDST, PTG, MED BKN 31.58-32.5: COAL, BLK, BROKEN, DULL, MINOR BRIGHT		0.6 / 2.0 30%		Sample #5: 30.05-30.73 Sample #6: 30.73-30.97 Sample #7 (30.97-31.23) - BONY COAL Sample #8: 30.23-31.48 - COAL Sample #9: 31.48-31.58 (PTG)		

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	Quality

PROJECT: CROWN MTN

HOLE No: C

LOCATION:

DRILLER / RIG: FORACO 104 LOGGED BY:

CLIENT: NWP COAL DATE: SEPT 5/13

CASING: 12m

Drilled:

Core Dia: 6"

32.5

34.5

36.5

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle	Depth		
32.5 - 34.5	4	1.8 / 2.0	32.5-32.63: COAL - MUDDY, CRUSHED, WET 32.63-33.53: MDST MED-DK GY, VERY FRACTURED, BROKEN, TR. CARB/COALY STREAKS, COMMON ORG. WEATHERING 33.53-33.63: COAL, TOP 0.08 IS CRUSHED + WET, DULL 33.63-33.80: BONY COAL to MDST, DK GY-BLK, BROKEN 33.80-34.3: MDST MED-DK GY, BROKEN, TR. COALY/CARB, ORG. WEATHERING (LC 34.3-34.5m - MAY WANT TO ADD LC TO TOP LATER)					Sample #10 31.58-32.5m (coal) Sample #11: 32.5-32.63m (CRUSHED COAL) Sample #12: 32.63-33.13m (PTG) Sample #13: 33.13-33.63m (PTG CONT.) Sample #14: 33.53-33.63 (coal) Sample #15: 33.63-33.80m (Bony Coal/MDST) Sample #16: 33.80-34.3m (MDST-FLOOR?)	
34.5 - 36.5	5	2.0 / 2.0	34.5-34.9: MDST w/Coal MED-DK GY, TOP 8cm solid, broken chunks coal + mdst below 34.58m 34.9-34.96: MDST MED GY, HARD, TR. COALY STRINGERS 34.96-35.14: Siltst, lgt-med gy, hard, massive 35.14-36.5m: SS, MED, BRN-GY, COMMONLY BROKEN + FRACT, TR. COAL STRINGERS (v. THIN), ORG. WEATHERING + Fractures usu. don't int. ore axis)		(All SS is fr. broken in some way)			Sample #17: 34.5-34.58 (MDST w/COAL STR.) Sample #18: 34.58-34.9 (MIXED CHUNKS COAL) + MDST Sample #19: 34.9-35 (MDST + SILST - FLOOR?) Sample #20: 35-35.25m (Siltst/SS - FLOOR?) Sample #21: 35.25-35.5m (SS - Floor?)	4
36.5 - 57.7			HAMMER 36.5 - 57.7m					*Because of broken chunks of coal mixed w/ mdst @ 34.58-34.9m, it was sampled but likely not part of a seam (floor samples below not necessary but taken in case*)	

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Slake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

PROJECT: CROWN MTN.

HOLE No: CM-25-CH

LOCATION:

CASING: 12m

DRILLER / RIG: FORACO 104 LOGGED BY: LAUREN B.

Drilled:

CLIENT: NWP COAL DATE: SEPT 5/13

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
58	6	2.5 / 2.5	58-60.5: MDST MED GY-DK GY, TOP 0.3m broken, some coaly carb mdst, broken 58.67-58.82m, 59.17-59.55m, common fractures v parallel + perp. to core axis, occ. org weathering	R3	0.45 / 2.5	5° @ 58.54-58.66m 5° @ 59.02m 65° @ 59.66m 5° @ 59.66-59.82m 85° @ 59.82m 5° @ 59.82-59.96m 5° @ 59.96-60.15m 75° @ 60.15		4 5 6	
60.5	7	2.0 / 2.0	60.5-61.82: MDST med-dk gy, occ. thin coal/carb stringers, top 60cm broken, solid below w/ common breaks/fract., occ. org weath	R3	0.72 / 2.0	90° @ 61.30m 40° @ 61.42m 79° @ 62.39m		7	
			61.82-62.5: MDST med-dk gy/blk, coarse carb top 15cm, occ. org. weathering	R3				8	
62.5	8	2.0 / 2.0	62.5-63.20: MDST, DK GY, OCC. OR. WEATH. 63.2-63.25: COAL (CRUSHED) + CARB MDST, BLK, COMPACT, WET 63.25-64.5: CARB MDST, DK GY, VERY RUBBLY, COMMON ORG. WEATHERING, SL. MORE CARB/COALY + MORE CRUSHED @ BASE	R4	-	85° @ 62.7m 25° @ 62.7-62.9 65° @ 62.9	*Sample # out of order but is correct Sample # 32: 64-64.5m (roof)	9 10	

Conglomerate
 Sandstone
 Siltstone
 Mudstone
 Shale

Coal - Bright
 Coal - Dull & Bright
 Coal - Dull
 Bone Coal
 Carb Sh

F = Fault
 Sh = Shear
 J = Joint
 B = Bedding
 Sm = Smooth, R = Rough

U = Uniaxial
 SD = Slake
 PLT = PLT
 Q = Quality

NORWEST Geotechnical - Rock Core Log

CORPORATION

PROJECT: CROWN MTN

HOLE No: CM13-25-CH

LOCATION:

CASING: 12m

DRILLER / RIG: FORACO 104 LOGGED BY:

Drilled:

CLIENT: NWP COAL DATE:

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #	
						Angle & Depth				
64.5	9	2.0 / 2.0	64.5-65.20: BONY COALISH, DKGy-BLK, BROKEN, DULL 65.2-65.31: COAL, BLK, BROKEN TO CRUSHED, COMPACTED 65.31-65.39: COAL/BONY COAL, BROKEN, DULL, BLK 65.39-65.62: COAL, blk, dull to bright, massive 65.62-65.79: COAL, dull-br, massive 65.79-65.9: COAL, bright, crushed, broken, blk, massive 65.9-66.05: mdst, med-dk gy, broken 66.05-66.15: COAL, blk, crushed/broken, bright (likely fell fr. above) 66.15-66.50: MDST, med-dk gy, broken					* Samples 25-27 should likely be put together ** no sample # 29 (tag lost)	#22: 64.5-65.20 (BONY/SH) #23: 65.2-65.31 (COAL) #24: 65.31-65.39 (COAL) #25: 65.39-65.62 (COAL) #26: 65.62-65.79 (COAL) #27: 65.79-65.9 (COAL) #28: 65.9-66.05 (MDST) #30: 66.05-66.15 (COAL) #31: 66.15-66.5 (MDST)	
65.5	10	2.0 / 2.0	66.5-68.5: MDST DKGy-BLK, CARB., OCC. COAL INTERBEDS UP TO 0.75cm (large one @ 67.4-67.43m), common fractures	R3			70° @ 66.8m 90° @ 68.32m 10° @ 68.37m 85° @ 68.4m		11	
68.5										

<ul style="list-style-type: none"> Conglomerate Sandstone Siltstone Mudstone Shale 	<ul style="list-style-type: none"> Coal - Bright Coal - Dull & Bright Coal - Dull Bone Coal Carb Sh 	<ul style="list-style-type: none"> F = Fault Sh = Shear J = Joint B = Bedding Sm = Smooth, R = Rough 	<ul style="list-style-type: none"> U = Uniaxial SD = Slake PLT = PLT O = Quality
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NORWEST Geotechnical - Rock Core Log

PROJECT: CROWN MTN

HOLE No: CM13-25-CH

LOCATION:

DRILLER / RIG: FORACO 104 LOGGED BY: Jeremy Liu

CLIENT: NWP COAL DATE: SEPT 5/13

12 m CASING

Drilled:

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
68.5	11	2.10 / 2.0 / 105%	68.5-69.27 m Siltstone dark grey-grey. sharp contact.	R ₂	1.4	70°@68.95m	#33 Roof	12	
			69.27-70.5 Coal black dull + bright friable. some partings @ bottom	↓ 0	2.0	65°@70.4	#34 Coal 69.27-69.70 #35 Coal 69.70-70.10 #36 Coal (parting) 70.10-70.5m		
70.5	12	2.1 / 2.0 / 105%	70.5-71.0 MS dark grey. Carbons	R ₂	0.76 / 2.0	85°@71.20m 60°@71.23m 70°@71.50m	#37 floor 70.5~71.0m MS-Carb. debris	13	
			71.0~72.5 SS grey-dark grey fine-medium well sorted fractures		18%	80°@71.75m 30°@72.0m 70°@72.05m 30°@72.10m			
72.5	13	2.0 / 2.0 / 100%	72.5~74.5 m SS: grey-dark grey fine fractures top and bottom	R ₄	0.86 / 2.0	85°@73.3m 85°@73.9m 85°@73.05m		14	
					43%		15		
74.5								16	

Conglomerate
 Sandstone
 Siltstone
 Mudstone
 Shale

Coal - Bright
 Coal - Dull & Bright
 Coal - Dull
 Bone Coal
 Carb Sh

F = Fault
 Sh = Shear
 J = Joint
 B = Bedding
 Sm = Smooth, R = Rough

U = Uniaxial
 SD = Slake
 PLT = PLT
 Q = Quality

PROJECT: Crown TMTN

HOLE No: CM13-25-CH

LOCATION:

DRILLER / RIG: FORACO 104 LOGGED BY: Jeremy Liu

CLIENT: NWP Coal DATE: Sept 5/13

Drilled:

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
74.5	14	1.95 / 2.0	74.5-75.10 MS Silty mudstone grey weathered colour limonite. 75.10-75.64 m Coal black dull bright friable 75.64-76.45 m MS. dark grey dense 76.45-76.50 LC 0.05m	R4	0.80 / 2.0	70°@75.75m 80°@76.13m		#38 roof 74.5-75.10m #39 Coal (partings) 75.10-75.30m #40 Coal 75.30-75.64m #41 floor 75.64-76.14m (75.6-76.0 tools)	16
76.5	15	2.1 / 2.0	76.5-76.75 MS dark grey (shale) 76.75-77.65 m Coal black bright 77.65-78.5 MS dark grey fractures Coal trace	0 R1	1.0 / 2.0			#42 roof 76.2-76.75m #43 Coal 76.75-77.15m #44 Coal 77.15-77.40m #45 Coal 77.40-77.65m #46 Floor MS 77.65-78.15m	16 17
78.5	16	2.1 / 2.0	78.5-80.5 MS grey-dark grey fractures some coal trace	R0	0				17 18
80.5		105%							

Conglomerate
 Sandstone
 Siltstone
 Mudstone
 Shale

Coal - Bright
 Coal - Dull & Bright
 Coal - Dull
 Bone Coal
 Carb Sh

F = Fault
 Sh = Shear
 J = Joint
 B = Bedding
 Sm = Smooth, R = Rough

U = Uniaxial
 SD = Slake
 PLT = PLT
 Q = Quality

PROJECT: Crown MTN

HOLE No: CM13-25-CH

LOCATION:

DRILLER / RIG: FORACO 104 LOGGED BY: Jeremy Liu

CLIENT: NWP Coal DATE: sept 6 / 13

Drilled:

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Depth		
80.5	17	1.7 / 2.0	80.5-82.2 m MS grey-darkgrey dense fracture @ top and bottom some Coal trace @ bottom	R3	26% 2.0	75° @ 81.05m 85° @ 81.3m 85° @ 81.4m		19
		85%	82.2-82.5 LC		30%			20
82.5	18	2.0 / 2.0	82.5-84.5 MS grey-darkgrey some silty mudstone fracture, weathered colour. all debris	0	0			20
		100%						21
84.5	19	1.4 / 2.0	84.5-84.65m MS. dark grey fracture 84.65-85.80 Coal black dull bright friable. 85.9-86.5 LC	0	0		#147 roof MS 84.15-84.65 #148 Coal 84.65-85.05 #149 Coal 85.05-85.45 #150 Coal 85.45-85.90m	
86.5								

Conglomerate
 Sandstone
 Siltstone
 Mudstone
 Shale

Coal - Bright
 Coal - Dull & Bright
 Coal - Dull
 Bone Coal
 Carb Sh

F = Fault
 Sh = Shear
 J = Joint
 B = Bedding
 Sm = Smooth, R = Rough

U = Uniaxial
 SD = Slake
 PLT = PLT
 Q = Quality

PROJECT: Crown MTN

HOLE No: CM13-25-CH

LOCATION:

DRILLER / RIG: FORACO 104 LOGGED BY: Jeremy Liu

CLIENT: NWP Coal DATE: Sept 6 / 13

Drilled:

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
86.5	20	1.8 / 2.0 90%	86.5-88.3m Coal black dull powder fractures friable @87.5 more silty 88.3-88.5 LC	0	0			#51 Coal 86.5-86.9m #52 Coal 86.9-87.2m #53 Coal (powder) 87.2-87.5m #54 Coal (powder) 87.5-87.9m #55 Coal 87.9-88.3m	
88.5	21	1.8 / 2.0 90%	88.5-89.55 Coal black dull + bright friable fractures debris sharp contact 89.55-90.3m MS grey dense smooth face 90.3-90.5 LC	0 ↓ R4		60°@89.55m 70°@89.85m 85°@89.0m 60°@90.2m		#56 Coal 88.5-88.90m #57 Coal 88.90-89.3m #58 Coal 89.3-89.55m #59 Floor 89.55-89.85m	22
90.5	22	2.0 / 2.0 100%	90.5-91.6m MS grey-dark grey dense gradually changed to SS. 91.6-92.15 SS grey fine-medium laminar. 92.15-92.5m MS grey.	R5 R4	1.53 / 2.0 76%	40°@90.7m 70°@90.9m 87°@90.95m 40°@91.25m 75°@91.37m 65°@90.5m 75°@91.9m 80°@92.02m 65°@92.15m			23 23 24
92.5									

Conglomerate
 Sandstone
 Siltstone
 Mudstone
 Shale

Coal - Bright
 Coal - Dull & Bright
 Coal - Dull
 Bone Coal
 Carb Sh

F = Fault
 Sh = Shear
 J = Joint
 B = Bedding
 Sm = Smooth, R = Rough

U = Uniaxial
 SD = Stake
 PLT = PLT
 Q = Quality

PROJECT: Crown MTN

HOLE No: CM13-25-CH

LOCATION:

CASING: 12m

DRILLER / RIG: FORACO 104 LOGGED BY: Jeremy Liu

Drilled:

CLIENT: NWP Coal DATE: Sept 6 / 13

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES	Sample # and Type	Core Box #
						Angle & Depth		
92.5	23	2.05 / 2.0	92.5-94.5 m MS grey-dark grey dense coal string @ 92.8 m friable	R4	1.69 / 2.0	70°@ 92.6 m 75°@ 92.65 m 65°@ 93.30 m 50°@ 93.50 m 84.5°@ 93.70 m 55°@ 93.98 m 55°@ 94.20 m		24 25 26
94.5	24	2.2 / 2.0	94.5-96.5 m MS grey-dark grey dense hard some sandstone @ 95.6 m Laminar wave bedding	R4	2.0 / 2.0	68°@ 94.6 m 70°@ 94.8 m 70°@ 95.5 m 75°@ 95.75 m 70°@ 96.0 m 70°@ 96.20 m		26 27 28
96.5	25	2.0 / 2.0	96.5-99.5: MDST-SILTST, MED-DK GY, HARD, MASSIVE	R4	2.0 / 2.0	75°@ 97.09 m 85°@ 97.30 m 80°@ 97.44 m 85°@ 97.95 m		29 30
98.5								

Conglomerate	Coal - Bright	F = Fault	U = Uniaxial
Sandstone	Coal - Dull & Bright	Sh = Shear	SD = Stake
Siltstone	Coal - Dull	J = Joint	PLT = PLT
Mudstone	Bone Coal	B = Bedding	Q = Quality
Shale	Carb Sh	Sm = Smooth, R = Rough	

NORWEST CORPORATION Geotechnical - Rock Core Log

PROJECT: CROWN MTN.

HOLE No: CM13-25-CH

LOCATION:

CASING: 12m

DRILLER / RIG: FORACO 104 LOGGED BY:

Drilled:

CLIENT: NWP. COAL DATE:

Core Dia: 6"

Depth (m)	Core Run	Recovery	LITHOLOGIC DESCRIPTION	Strength	RQD %	DISCONTINUITIES		Sample # and Type	Core Box #
						Angle & Depth			
98.5	26	2.0 / 2.0	98.5-98.73 MDST med-dark gray, massive,	R4	0.73 / 2.0	70° @ 98.70	#60 98.5-98.73 (MDST - Roof)		
			98.73-98.98 Coal/Bone coal denser than below Black			60° @ 99.45			#61 98.73-98.98 (Coal/Bone coal)
			98.98-99.12 coal, bright, black, crushed			60° @ 99.59			
			99.12-99.20 coal, bright, black, crushed			60° @ 99.64			
			99.20-99.40 coal, bright, black, crushed			60° @ 99.75			
	99.40-99.85 coal black bright denser, compact	70° @ 100.00	#62 98.98-99.2 coal, bright						
	99.85-100 coal bony denser, dull with bright streaks	65° @ 100.10							
		65° @ 100.20		#63 99.20-99.40 coal, bright					
100.5	27	2.05 / 2.0	100-100.5 MDST dk gray-black, massive slightly carbonaceous	R4			#66 100-100.5 (Floor, MDST)		
			100.5-102.5: SS MED Gy, top 0.3 msl. muddy, OC, mm-scale blk Coaly/ carb stringers, massive - fractures upper carb/glossy black ~ stickensided	R5	1.67 / 2.0	85° @ 100.84	#64 99.40-99.85 Coal, dull-bright	#65 99.85-100 coal (bony)	31
				85° @ 101.12					
				90° @ 101.20					
				80° @ 101.52					
				85° @ 102.13					
				85° @ 102.17					
				85° @ 102.30					
				90° @ 102.37					
				90° @ 102.40					
102.5									

TD 102.5 m @ 09:00

- Conglomerate
- Sandstone
- Siltstone
- Mudstone
- Shale

- Coal - Bright
- Coal - Dull & Bright
- Coal - Dull
- Bone Coal
- Carb Sh

- F = Fault
- Sh = Shear
- J = Joint
- B = Bedding
- Sm = Smooth, R = Rough

- U = Uniaxial
- SD = Stake
- PLT = PLT
- Q = Quality

Well No. **CM13-06**
 Geologist: **Michelle E.**
 Surface Elev. (m):
 Hole Drilled To (m): **54.15**
 Drilling Contractor: **Foraco**
 Casing Set at (m): **9m**
 Rig # **104**
 Total Depth (m): **54.15**
 Driller: **Jason**
 Spud Date & Time: **Aug. 16th @ 16:15** T.D. Date & Time:

Additional Notes (site conditions, adverse weather, drilling conditions etc.)

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
		3m				bank SS SS & Siltstn, minor shale
						carb shale @ ~4m
	5m	~5.5	0.3m	5m	5.3m	coal (sampled while OPEX'ing)
	5.5	6m	0.05m	5.5	6	coal (" " ")
	6	6.5		6	6.5	coal
	6.5	7		6.5	7	coal
	7	7.5		7	7.5	coal w/ carb shale
	7.5	8		7.5	8	carb shale w/ minor coal
		9m				shale dk gy-blk
		15m				orangeish siltstone & mudstone
		17.5				shale dk gy minor trace coal (string coal)
			7	18.5	19	coal & shale
			8	19	19.5	shale w/ minor coal
			9	19.5	20	shale & coal
			10	20	20.5	shale
			11	20.5	21	shale
		26				shale
			11	28	28.5	coal
			12	28.5	29	coal w/ minor shale
			13	29	29.5	coal w/ shale
			14	29.5	30	shale w/ siltstone
			15	30	30.5	siltstone & shale

Well No. <u>CM13-15</u>	Geologist: <u>Jeremy Liu</u>	Additional Notes (site conditions, adverse weather, drilling conditions etc.) <u>GPS: 66 3218 Elev: 2132m</u> <u>55 21574</u> <u>hammer to 60m then P.Dc drill down</u>
	Surface Elev. (m): <u>2132</u>	
	Hole Drilled To (m): <u>139.5m</u>	
	Casing Set at (m): <u>9m</u>	
Drilling Contractor: <u>FORACO</u>	Total Depth (m): <u>139.5</u>	
Rig # <u>104</u>	Spud Date & Time: <u>Sept 3 23:00</u>	T.D. Date & Time: <u>Sept 4/13 @ 13:30</u>
Driller: <u>Jason Whitton</u>		

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
	0	3				Mudstone: grey-dark grey friable, muddy
	3	6				Mudstone: grey-dark grey friable muddy
	6	9				Mudstone: grey-dark grey
	9	12				Mudstone: grey-dark grey dense muddy
	12	15				Mudstone: grey-dark grey muddy
	15	18				Mudstone: grey-dark grey muddy
	18	21				Mudstone: grey-dark grey muddy
	21	24				Mudstone: grey-dark grey muddy some sandstone
	24	27				Mudstone: grey-dark grey muddy
	27	30				Mudstone: grey-dark grey muddy
	30	33				Mudstone: grey-dark grey muddy
	33	36				Mudstone: grey-dark grey muddy (shale)
	36	39				Mudstone: grey-dark grey

Well No.

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
	39	42				Mudstone, grey-dark grey
	42	45				Mudstone grey-dark grey (shale)
	45	48				Mudstone grey-dark grey (shale)
	48	51				cutting came out not steady Mudstone, grey-dark grey dense
	51	54				Mudstone, grey-dark grey shale dense
	54	57				Mudstone, grey-dark grey dense
	57	60				Mudstone, grey-dark grey dense changed bit. PDC drill down
	60	62				Mudstone, grey-dark grey dense (shale)
	62	66				Mudstone, dark grey dense hard (shale) Coal trace string @ 65.0 m
	66.		1	66.2	66.5	Coal, black dull
			2	66.5	67.0	Coal, black dull + bright
			3	67.0	67.5	Coal black dull + shade dark grey
			4	67.5	68.0	Coal black dull + bright
			5	68.0	68.5	Coal black dull

Well No. CM13-15

LOGGED BY: JEREMY/LAUREN

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
			6	68.5	69.0	Coal, black dull.
			7	69.0	69.5	Coal black dull
			8	69.50	70.0	Coal black dull.
			9	70		Coal w/ Shale (sm. sample)
			10	70	70.5	Coal, blk, dull-bright
			11	70.5	71	Coal, blk, dull-bright (sm. sample)
			12	71	71.5	Coal, blk, dull-bright (sm. sample)
			13	71.5	72	Coal, blk, dull-bright w/ some shale
			14	72	72.5	Shale w/ Minor Coal
			15	72.5	73	mdst + siltst,
				73	73.5	mdst + siltst, no sample taken
	74					mdst to siltst, dk gy, occ. white (qtz) mineralization
	76					siltst, med gy, sl. muddy, occ. white (qtz) mineralization
			16	76.5	77	Siltst, as above, minor coal top half of sample
			17	77	77.5	Siltst, med gy, occ. white (qtz) mineralization
			18	79	79.5	Siltst w/ Minor Coal (Coal in middle mostly)
			19	79.5	80	Siltstone w/ Minor Coal (coal near top)
			20	80	80.5	Siltstone, dk gy
				80.5	81	Siltst, dk gy, no sample taken
			21	81.5	82	Siltst, minor coal
			22	82	82.5	Siltst, minor coal
			23	82.5	83	Siltst, dk gy

↓ slower drilling rates

Well No. 1

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
			24	82.5	83	Coal, bright, minor shale
			25	83	83.5	Coal w/shale
			26	83.5	84	Coal and shale
			27	84	84.5	Shale, minor coal
			28	84.5	85	Shale
				85	85.5	Shale, no sample taken
				87		Shale + Siltst, sl. carb, dk gy
			29	89.5	90	Carb Shale + coal, dull to bright
			30	90	90.5	Carb Sh + coal, dull to bright
			31	90.5	91	Coal, minor Carb Sh., dull to bright
			32	91	91.5	Coal + shale (shale in middle)
			33	91.5	92	Carb Shale, minor coal (coal @ top)
			34	92	92.5	Coal w/Carb shale (Coal @ base)
			35	92.5	93	Mixed Carb Sh + Coal
			36	93	93.5	Carb Shale
		95				siltst, med dk gy
		97				"
			37	99.5	100	Coal, minor shale
			38	100	100.5	siltst - ss, vfg, trace coal @ top
				100.5	101	siltst - ss, vfg, med gy, no sample taken
		103				SS, vfg - fg, med gy, slower drilling ↓
		106				"
		109				"

Well No. CM13-15

LOGGED BY: LAUREN B.

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
	112					siltst - vfg ss, med gy, occ. white (qtz) mineralization
	114					siltst - vfg ss, med gy, occ. qtz min, occ. org weathering
	116					"
	119					"
			39	121.5	122	Coal, some sh @ top
			40	122	122.5	Coal w/ minor shale throughout
			41	122.5	123	Coal + Shale (sh. through)
			42	123	123.5	Shale, dk gy
				123.5	124	Shale, no sample taken
	~125					SS, Pg, lgt gy
	128					SS, Pg - mg, lgt gy
	~130					Carbonaceous shale + SS, dk gy
	133					SS, Pg - mg, lgt gy
						TD @ 139.5 Sept 4/13 @ 13:30

slow drilling

Well No. <u>CM13-17</u>	Geologist: <u>Jeremy Liu</u>	Additional Notes (site conditions, adverse weather, drilling conditions etc.) GPS: <u>663619</u> Elev. <u>2121m</u> <u>5520991</u> Note: Used Hammer to 93m, PDC below
	Surface Elev. (m): <u>2121</u>	
	Hole Drilled To (m): <u>194.5</u>	
Drilling Contractor: <u>FORACO</u>	Casing Set at (m): <u>6m</u>	
Rig # <u>104</u>	Total Depth (m): <u>194.5</u>	
Driller: <u>Ken</u>	Spud Date & Time: <u>Sept 2 20:45</u>	T.D. Date & Time: <u>Sept 3 @ 13:45</u>

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
	0	3				Mudstone: grey - dark grey friable.
	3	6				Mudstone: dark grey (shade) friable muddy.
	6	9				Mudstone: grey - dark grey
	9	12				Mudstone: grey - dark grey
	12	15				Mudstone: dark grey.
	15	18				Mudstone: dark grey
	18	21				Mudstone: grey dark-grey mottled colours weathered
	21	24				Mudstone: grey - dark grey.
	24	27				Mudstone: grey - dark grey. some local trace
	27	30				Sandstone: grey medium sub rounded
	30	33				Sandstone: grey medium sub rounded + mudstone grey
	33	36				Sandstone: grey fine - medium sub rounded
	36	39				Mudstone: grey - dark grey dense

Well No. CM13-17

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
	39	42				Mudstone: grey-dark grey dense.
	42	45				Sandstone: grey fine-medium quartz sub rounded well sorted
	45	48				Sandstone: grey fine-medium
	48	51				Mudstone: grey-dark grey
	51	54				Mudstone: dark grey some coal trace
	54	57				Mudstone dark grey
	57	60				Mudstone dark grey coal string @ 58m
	60	63				Mudstone grey-dark grey
	63	66				Mudstone grey-dark grey
	66	69				Mudstone grey-dark grey coal trace
	69	72				Mudstone grey-dark grey + sandstone grey fine-medium quartz sub rounded
	72	75				Mudstone: grey dark grey coal trace
	75		1	76	76.5	Coal black dull
	76.0	76.9	2	76.5	77	shale dark grey
						sample taken
	76.9	78				shale-mudstone dark grey grey

Well No. CM13-17

LOGGED BY: JEREMY L. / LAUREN B.

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
	78	81				Mudstone, grey dense
	81	84				Mudstone: grey-dark grey dense
	84	87				Mudstone: grey-dark grey
	87	90				Mudstone: grey-dark grey dense
	90	93			changed bit	Mudstone: grey-dark grey
	93	96				Mudstone grey dense
	96	99				Mudstone grey
	99	102				Mudstone: grey-dark grey dense
	102	105				Mudstone: grey-dark grey (shale)
	105	108				Mudstone: grey-dark grey (shale)
	108	111				Mudstone: dark grey
	111	114				"
	114					Siltst, med-dk gy, hard (white @ 115-117m)
	117					Sandstone, v-fg, med gy, hard
	120					"
	123					"
	126					"

Well No. Cm13-25

LOGGED BY: LAUREN B.

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
			3	126.5	127	COAL, MINOR SHALE THROUGH
			4	127	127.5	COAL, ^{MINOR} SHALE @ TOP
			5	127.5	128	COAL, DULL TO BRIGHT, ^{MINOR} SHALE THROUGH
			6	128	128.5	COAL, DULL TO BRIGHT, MINOR SH.
			7	128.5	129.0	SHALE, TR. COAL
				129	129.5	SHALE, NO SAMPLE TAKEN
	130					SHALE, MED-DK GY
	133					SHALE, MED-DK GY
	136					SHALE, DK GY
	139					SHALE, DK GY
			8	142.5	143	Shale: w/ Minor Coal through
				143	143.5	Shale - No sample taken
	142.5	144				Shale
			9	144	144.5	Coal, minor shale @ top
			10	144.5	145	Shale, minor coal @ top
			10	145	145.5	Shale, no sample taken
	148					Siltst + Mdst, med-dk gy, fairly hard
			11	151.5	151.5	Siltst/sh w/ Coal, ss @ base (coal in middle)
				151.5	152.5	Siltst - vfg ss, med gy (no sample - sample missed)
	152					Siltst - ss, vfg, med gy
	155					Mdst - Siltst, dk gy, bcc. qtz (white)
	156					"
	159					Mdst Siltst, tr. conly

Well No. Cm13-17

LOGGED BY: LAUREN B.

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
			12	159	159.5	Shale/siltst + coal (coal @ base) -small sample
			13	159.5	160	Coal + Shale (coal @ top)
			14	160	160.5	Shale, dk gy
				160.5	161	Shale, no sample taken
						↳ sl. coaly/carb blw 161 + 161.5
			15	161	161.5	Coal, minor shale
			16	161.5	162	Coal, minor shale
			17	162	162.5	Coal, tr shale, bright
			18	162.5	163	Coal w/shal
			19	163	163.5	Shale, trace coal
				163.5	164	Shale, no sample taken
	165					SS, med-lgt gy, fg-fg
	~166					SS, med gy, fg, occ. white (qtz) weathering
	169					Shale + siltst, med-dk gy
	170					SS, vfg-fg, lgt-med gy, hard, sl. silty
	171.5		20	172.5	173	shale, minor coal (coal in middle)
	173		21	173	173.5	shale
	174					Siltst to vfg ss, med gy
	177					Siltst to SS, vfg, med gy, common white (qtz) cement
	180					siltst to vfg ss, med gy,
	180.5					SS, fg-mg,

↓ slower drilling rate

faintly
↓ slow
drilling

NOTE: LOGGER DIDN'T HAVE TEMPERATURE TOOL TO LOG THIS HOLE WITH

Rotary Hole Field Log

Well No. CR13-19

Geologist: Jeremy Liu

Additional Notes (site conditions, adverse weather, drilling conditions etc.)

Surface Elev. (m): 1927

Hole Drilled To (m):

- Stuck in hole @ 136m, PDC bit switched over to tricone to TD
5518848(N) Elevation: 1927
663392 (E)

Drilling Contractor: FORACO

Casing Set at (m): 9m

Rig # 104

Total Depth (m):

- Ground v. fractured, will not use PDC bit due to tend. to plug up in fract. ground

Driller: Ken

Spud Date & Time: Sept 1 3:00 AM

T.D. Date & Time: Sept 1/13 @ 4:30

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
	0	3				MS. grey. dark grey. fracture weathered
	3	6				SS. grey fine-medium quartz well sorted
	6	9				MS. Dark grey dense + SS grey medium quartz subrounded well sorted
	9	12				MS: grey
	12	15				SS: grey fine-medium quartz subrounded
	15	18				SS grey fine-medium quartz subrounded.
	18	21				MS: dark grey shale
	21	24				MS + SS mixed. grey + dark grey
	24	27				MS. dark grey.
	27	30				Mudstone dark grey.
	30	33				SS: yellow (buff) medium + mudstone grey + fault?
	33	36				MS. dark grey dense
	36	39				MS grey

Well No. CM13-19

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
	39	42				MS, grey
	42	45				MS dark grey - grey
	45	48				Siltstone, grey - dark grey rounded, well sorted some mudstone mixed
	48					SS, Vfg, light grey
	51					"
	54					"
			1	58.5	59	Siltst. + shale, minor coal (coal @ top)
				59	59.5	Siltst + shale, no sample taken
	60					Siltst + Sh, med - dk gy - brn
	63					"
	66					" - med - co
	69					SS Siltst, sh, dk gy, abundant org-brn weathering
	72					"
	75					" minor qtz
	78					Mixed Sh + siltst, dk gy, abundant org weathering
	81					
			2	86	86.5	Coal + shale
			3	86.5	87.5	Coal + shale
			4	87.5	87.5	Coal, w/shale
			5	87.5	88.5	Shale, tr. coal
			6	88.5	88.5	"

(Handwritten signature/initials)

Well No. Cm13-19

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
				88.5	89	Shale, tr. coal - no sample taken
	90					Shale, dk gy
	93					Shale, dk gy
	96					Shale, dk gy, occ. org weathering, trace carb/coaly
	99					"
	102					Shale, minor ss, dk gy, ss med gy-brn, trace carb, tr. weathered org-brn
	105					"
	108					Siltst to ss, fg-fg, med gy
	111					Siltst + sh, med-dk gy, occ. org weathering, tr. carb.
	114					SS, siltst-sh, med-dk gy, occ. org. weathering, ss fg
	117					"
	120					"
	121.5					Shale, dk gy, occ. org weathering
	123					Shale, dk gy, tr. coal
	126	126.5	7			Coal
	126.5	127	8			Coal
	127	127.5	9			Coal
	127.5	128	10			Coal, tr. shale
	128	128.5	11			Coal, tr. shale
	128.5	129	12			Coal, minor shale (shale fr. bottom)
	129	129.5	13			Coal w/shale
	129.5	130	14			Shale, tr. coal
	130	130.5				Shale, tr. coal
	132					Carb shale, minor ss, trace coal, dk gy, med brn ss

SAMPLES

Well No. CM13-20

Geologist: Jeremy Liu

Additional Notes (site conditions, adverse weather, drilling conditions etc.)

Surface Elev. (m): 1884m

GPS: 0663262 1884m
55 18427

Hole Drilled To (m): 158m

Casing Set at (m): 12m

Note: Hole Diameter larger to 98.2 (hammer bit), smaller below (PDC bit)

Drilling Contractor: FORACO

Total Depth (m): 158m

Rig # 104

Driller: Ken

Spud Date & Time: AUGUST 31/13 2:15 T.D. Date & Time: 158m @ 19:00 AUG 31/13

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
	0	3				mudstone dark grey
	3	6				Mudstone grey - dark grey with sandstone
	6	9				Sandstone grey mix some mudstone
	9	9.8				SS. + Coal
			1	10	10.5	Coal, black dull (powder)
			2	10.5	11.0	Coal, black
			3	11.0	11.5	Coal: black
		12	4	11.5	12.0	Coal: black
	12	16	5	12.0	12.5	shale/MS dark grey
	16	17	6	16.0	16.5	Coal
			7	16.5	17.0	Coal
	17		8	17.0	17.5	mudstone
	17	20				Mudstone grey
	20	23				Mudstone

Well No. CM13-20

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
	23	26				MS grey
	26	29				MS dark grey some coal trace
	29	32				SS yellow fine-medium
	32	35				MS grey
	35	38				MS grey dark grey
	38	41				MS grey-dark grey
	41	44				MS grey
	44	47				" , trace org. weathering
	47	50				"
	50	53				siltstone + SS
	53	56.5				MS
	56.5	59				" , trace coal
	59	62				MS, grey
	62	65				MS, gy
	65	68				MS, gy
	68	72				MS, gy
	72	75				MS, grey, trace coal
	75	78				SS, gy
	78	81				"
	81					"
			9.5	82	82.5	Coal w/ tr. MS
			10	82.5	83	"
			11	83	83.5	"
			12	83.5	84	"
			13	84	84.5	"
			14	84.5	85	Coal + Shale
			15	85	85.5	Shale, dk gy

Well No. Om 13-20
 Geologist: Lauren B.
 Surface Elev. (m):
 Hole Drilled To (m):
 Drilling Contractor: FORACO
 Casing Set at (m): 10m
 Rig # 104
 Total Depth (m):
 Driller: JASON
 Spud Date & Time:

Additional Notes (site conditions, adverse weather, drilling conditions etc.)
 T.D. Date & Time:

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
			/	85.5	86	Must - no sample taken
	88	91				SS, med gy
	91	93				Shale, dk gy
	93	901				SS, med gy
						TRIP OUT @ 98.2 to change to PDC BIT
11:30	100					Siltst, med gy
	103					SS, fg, med gy, occ. org weathering
	106					"
	109					"
	112					"
	114.5					Siltst + shale, sh, med-dk gy
	115					Shale, carb, dk gy
			16	117	117.5	Coal
			17	117.5	118.5	Coal
			18	118	118.5	Coal, sm. sample (118.5)
			19	118.5	119	Shale, tr. coal
				119	119.5	Shale, no sample taken
			20	120.5	121	Coal
			21	121	121.5	Shale + Coal
				121.5	122	Shale - no sample taken

Well No. Cm13-20

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
	124					siltst, med gy
	125.5	126	22	125.5	125.5	Shale, tr. coal
				125.5	126	Shale, no sample taken
			23	126	126.5	Coal + Shale
			24	126.5	127	Sh, minor coal (driller says sh. poss. fr/uphole)
KD KD				127	127.5	Shale, no sample taken
	130					siltst/ss, med gy, vfg
	133					carb shale
			25	133.5	134.5	Shale + coal (shale @ top)
			26	134.5	134.5	Carb Shale and coal
			27	134.5	135	Carb Shale, no sample taken
	137					*shale inc. carb. @ 137m, traces coal * - 8 middle?
			28	138.5	139	Carb Shale, minor coal
			29	139	139.5	Carb. Shale, dk gy
	142					Carb Sh, traces of coal, dk gy, traced org-brn weathering
	145					Shale, med-dk gy, occ. org. brn weathering
	146					<input checked="" type="checkbox"/> COAL - NO sample - No returns - Decided to stop at TD hole conventionally - SAMPLES CONTAM. Fr/Uphole, grab samp.
	147		30	147	147.5	COAL MIXED w/shale, ss (contaminated)
			31	147.5	148	"
			32	148	148.5	"
			33	148.5	149	"
						(Driller said he's in shale again at 149)

Well No. <u>CM13-25</u>	Geologist: <u>Jeremy Liu</u>	Additional Notes (site conditions, adverse weather, drilling conditions etc.)	
	Surface Elev. (m): <u>1925</u>	GPS: <u>66 3769</u> Elev. <u>1925m</u>	*9 BINS OF SAMPLES
	Hole Drilled To (m): <u>114.95</u>	<u>551 7930</u>	
Drilling Contractor: <u>FORACO</u>	Casing Set at (m): <u>12m</u>	(USED PDC BIT FROM 12m to TD)	
Rig # <u>104</u>	Total Depth (m): <u>115m</u>		
Driller: <u>Ken</u>	Spud Date & Time: <u>Sept 2/13 0:15</u>	T.D. Date & Time: <u>Sept 2/13 @ 12:30</u>	

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
	0	3				Mudstone: grey-dark grey some weathered
	3	6				Mudstone: grey-dark grey dense some sandstone
	6	9				Mudstone + Sandstone buff fine-medium
	9	12				Mudstone, grey-dark grey some sandstone, grey fine-medium quartz subrounded.
	12	15				Mudstone grey-dark grey some coal trace
	15	18				Mudstone: grey-dark grey
	18	21				Shale: dark grey
	21	24				Sandstone: buff medium mixed with mudstone grey
	24	27				Mudstone: dark grey (shale)
	27	29.5				Mudstone dark grey
	29.5		1	29.5	30.0	Coal black dull
			2	30.0	30.5	Coal black dull
			3	30.5	31.0	Coal black dull

Well No. CM13-25

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
			4	31.0	31.5	Coal black dull + Bright
			5	31.5	32.0	Coal black, dull bright mixed
			6	32.0	32.5	Coal black dull
			7	32.5	33.0	Coal black dull
			8	33.0	33.5	Coal black dull
	29.5	34.0	9	33.5	34.0	Coal black dull + shale
			10	34.0	34.5	Shale dark grey - grey mudstone
	34	37				Mudstone, dark grey
	37	40				Mudstone, grey - dark grey
	40	43				Mudstone, grey
	43	46				Sandstone: grey fine-medium, quartz sub rounded well sorted
	46	49				Mudstone dark grey - grey (shale)
	49	52				Mudstone dark grey (shale) coal trace
	52	55				Mudstone dark grey

Well No. OM13-25

Logged by: Lauren B.

Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
	55	58				Mudstone - grey - dark grey Coal trace.
	58	61				Mudstone - grey - dark grey (shale)
	61	63				Mudstone - grey.
						Trace coal @ 63m P (Driller says may have been in coal bit earlier but was getting plugged up)
		64.5	11	63.5	64	COAL, DULL TO BRIGHT, CLEAN (sm. sample)
	64.5	65	12	64	64.5	COAL + SHALE (coal @ top)
	65	65.5	13	64.5	65	COAL, TR. SHALE (sm. sample)
	65.5	66	14	65	65.5	COAL w/ SHALE (coal @ top)
	66	66.5		65.5	66	SHALE (VERY LITTLE SAMPLE RET - PLUGGED UP, NO SAMPLE TAKEN)
	68					TR. COAL w/ SHALE
	68.5	69	15	69	69.5	SHALE, MINOR COAL
	69	70	16	69.5	70	SHALE, TR. COAL (COAL @ TOP)
	71					SHALE, DK GY, OCC. ORG WEATHERING
	74					CARB SHALE, DK GY
			17	75	75.5	Coal + Shale (Mixed)
			18	75.5	76	Shale, minor coal
			19	78.5	79.5	Coal w/ Shale (Shale @ top)
			20	79.5	79.5	Coal, minor shale
			21	80	80	Shale, tr. coal
				80.5	80.5	Shale - no sample taken

Well No. Om13-25

Logged by: Lauren B.

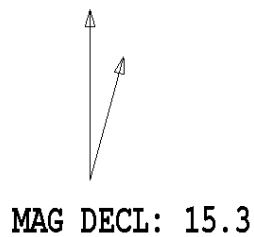
Time	Depth		Sample No.	Sampling		Cuttings Sample Description / Comments
	From (m)	To (m)		From (m)	To (m)	
	81		22			mdst, carb, dk gy
	84					mdst + siltst/ss, dk gy + med brn (CD becomes sl. more carb/coaly @ 85)
			22	86	86.5	Mdst, tr. coal - minor coal throughout
			23	86.5	87	Mdst, tr. coal
			24	87	87.5	mdst, no sample taken
	90					mdst, carb, dk gy
			24	94	94.5	Shale w/ minor coal
			25	94.5	95	Coal w/ shale (shale @ bot.)
			26	95	95.5	Coal w/ shale (shale @ top + base)
			27	95.5	96	Shale, tr. coal
	97					SS, fg, med gy, lgt gy - drills slow
	98					shale - carb., dk gy, occ. ora. weathering - drills fairly slow
	99					Siltst/SS/shale, fg, occ. white quartzite?, drilling v. slow
	100					
			28	100	100.5	Siltst/sh, minor coal
			29	100.5	101	Siltst/shw/coal (Coal on top)
				101.5	101.5	Siltst/shale, no sample taken
	102					SS, fg-mg, med-lgt gy BASAL SS
	105					shale, med-dk gy
			30	106	106.5	Coal (minor) w/ shale (Moose Mtn. Marker likely)
	108					SS, fg-mg, lgt-med gy
	111					"
	114					"

TD @ 115m 12:30 Sept 2/13

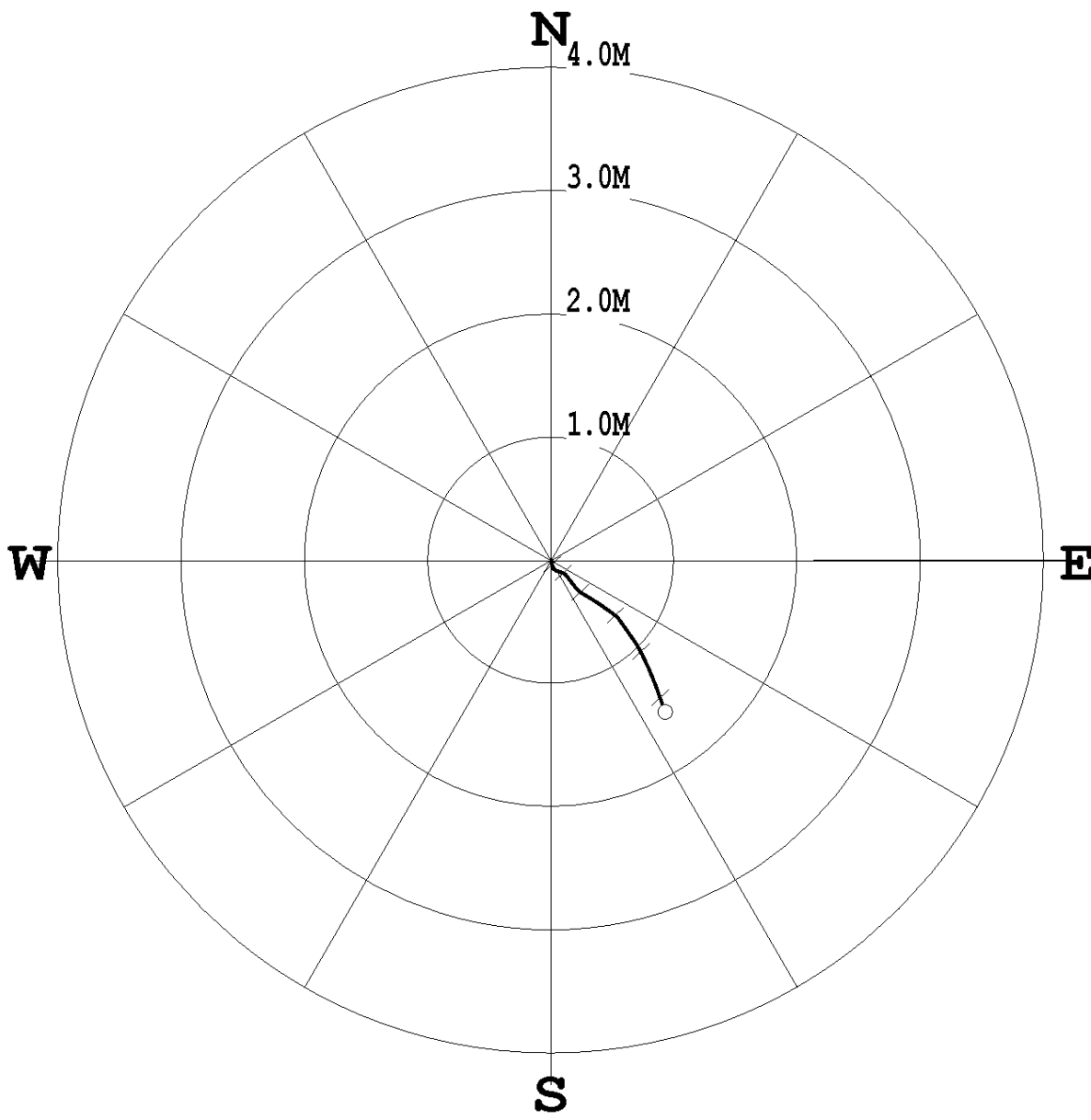
APPENDIX 3
GEOPHYSICAL LOGS

PLAN VIEW COMPU-LOG DEVIATION

CLIENT: NWP COAL CANADA LTD
 LOCATION: N/A
 HOLE ID: CM11-11-CH
 DATE OF LOG: 08/19/13
 PROBE: 9057A 4430



SCALE: 1 M/CM
 TRUE DEPTH: 125.71 M
 AZIMUTH: 143.1
 DISTANCE: 1.5 M
 + = 20 M INCR
 ○ = BOTTOM OF HOLE



* * * * * COMPU-LOG - VERTICAL DEVIATION * * * * *

CLIENT : NWP COAL CANADA LTD HOLE ID. : CM11-11-CH
 FIELD OFFICE : CENTURY DATE OF LOG : 08/19/13
 DATA FROM : N/A PROBE : 9057A , 4430
 MAG. DECL. : 15.300 DEPTH UNITS : METERS
 LOG: CM11-11-CH_08-19-13_12-09_9057A_.02_11.00_125.88_DEVI.log

CABLE DEPTH	TRUE DEPTH	NORTH DEV.	EAST DEV.	DISTANCE	AZIMUTH	SANG	SANGB
11.00	11.04	-0.00	0.00	0.0	101.7	0.2	105.2
12.00	12.00	-0.00	0.00	0.0	101.2	0.2	82.8
13.00	13.00	-0.00	0.01	0.0	126.9	0.4	166.1
14.00	14.00	-0.01	0.01	0.0	147.3	0.5	167.1
15.00	15.00	-0.02	0.01	0.0	154.6	0.2	180.4
16.00	16.00	-0.02	0.01	0.0	157.7	0.1	176.5
17.00	17.00	-0.02	0.01	0.0	160.5	0.1	239.4
18.00	18.00	-0.02	0.01	0.0	164.4	0.1	204.3
19.00	19.00	-0.03	0.01	0.0	165.5	0.3	165.6
20.00	20.00	-0.03	0.01	0.0	166.5	0.3	174.6
21.00	21.00	-0.04	0.01	0.0	166.2	0.5	153.8
22.00	22.00	-0.04	0.01	0.0	165.6	0.3	169.2
23.00	23.00	-0.05	0.01	0.0	166.5	0.3	164.7
24.00	24.00	-0.05	0.01	0.1	166.4	0.3	165.8
25.00	25.00	-0.06	0.02	0.1	165.3	0.3	153.3
26.00	26.00	-0.07	0.02	0.1	163.0	0.5	137.0
27.00	27.00	-0.07	0.03	0.1	159.9	0.5	131.7
28.00	28.00	-0.08	0.03	0.1	156.8	0.4	127.2
29.00	29.00	-0.08	0.04	0.1	154.0	0.3	114.0
30.00	30.00	-0.08	0.04	0.1	152.0	0.2	93.3
31.00	31.00	-0.08	0.05	0.1	149.7	0.2	76.6
32.00	32.00	-0.08	0.05	0.1	147.6	0.5	117.8
33.00	33.00	-0.09	0.06	0.1	145.3	0.5	116.5
34.00	34.00	-0.09	0.07	0.1	143.3	0.5	116.5
35.00	35.00	-0.09	0.07	0.1	141.7	0.2	86.8
36.00	36.00	-0.09	0.08	0.1	140.5	0.2	83.5
37.00	37.00	-0.09	0.08	0.1	139.3	0.4	118.5
38.00	38.00	-0.10	0.09	0.1	138.0	0.3	110.4
39.00	39.00	-0.10	0.09	0.1	136.9	0.3	116.3
40.00	40.00	-0.10	0.10	0.1	135.9	0.2	114.5
41.00	41.00	-0.10	0.10	0.1	135.1	0.3	121.6
42.00	42.00	-0.11	0.11	0.2	134.4	0.5	113.9
43.00	43.00	-0.11	0.11	0.2	134.0	0.3	125.3
44.00	44.00	-0.12	0.12	0.2	133.9	0.4	142.1
45.00	45.00	-0.12	0.12	0.2	134.1	0.6	140.6
46.00	46.00	-0.13	0.13	0.2	134.4	0.6	134.9
47.00	47.00	-0.13	0.14	0.2	134.8	0.5	148.9
48.00	48.00	-0.14	0.14	0.2	135.2	0.4	150.9
49.00	49.00	-0.15	0.14	0.2	135.5	0.4	140.2
50.00	50.00	-0.15	0.15	0.2	135.9	0.6	146.4
51.00	51.00	-0.16	0.16	0.2	136.2	0.5	141.5
52.00	52.00	-0.17	0.16	0.2	136.5	0.8	145.1
53.00	53.00	-0.18	0.17	0.3	136.7	0.7	138.4
54.00	54.00	-0.19	0.18	0.3	137.0	0.7	141.9
55.00	55.00	-0.20	0.19	0.3	137.3	0.7	150.1
56.00	56.00	-0.21	0.19	0.3	137.5	0.8	137.8
57.00	57.00	-0.22	0.20	0.3	137.6	0.9	145.5
58.00	58.00	-0.24	0.21	0.3	137.7	0.9	140.6
59.00	59.00	-0.25	0.22	0.3	137.8	1.0	139.1
60.00	60.00	-0.26	0.24	0.3	137.3	0.7	119.1
61.00	61.00	-0.26	0.25	0.4	136.7	0.9	122.0
62.00	62.00	-0.27	0.26	0.4	136.0	0.9	121.3
63.00	63.00	-0.28	0.28	0.4	135.5	0.9	120.6
64.00	64.00	-0.29	0.29	0.4	134.9	0.8	120.1
65.00	65.00	-0.30	0.30	0.4	134.4	0.8	120.6
66.00	66.00	-0.30	0.32	0.4	133.9	0.9	120.2
67.00	67.00	-0.31	0.33	0.5	133.4	0.9	120.5
68.00	68.00	-0.32	0.34	0.5	133.0	1.1	122.9
69.00	69.00	-0.33	0.36	0.5	132.7	1.0	123.9
70.00	70.00	-0.34	0.37	0.5	132.3	1.0	120.5
71.00	71.00	-0.35	0.39	0.5	132.0	1.0	125.5
72.00	72.00	-0.36	0.40	0.5	131.8	1.0	124.4
73.00	73.00	-0.37	0.42	0.6	131.5	1.1	126.1
74.00	74.00	-0.38	0.43	0.6	131.3	1.1	123.8
75.00	75.00	-0.39	0.45	0.6	131.1	0.7	121.8
76.00	76.00	-0.40	0.46	0.6	131.0	0.9	125.1
77.00	77.00	-0.41	0.47	0.6	130.8	0.9	124.1
78.00	78.00	-0.42	0.49	0.6	130.7	1.2	127.5
79.00	79.00	-0.43	0.51	0.7	130.6	1.2	122.5
80.00	80.00	-0.44	0.52	0.7	130.5	0.9	129.5
81.00	81.00	-0.46	0.53	0.7	130.5	0.9	131.7
82.00	82.00	-0.47	0.54	0.7	130.7	1.0	140.5
83.00	82.99	-0.48	0.55	0.7	130.9	0.9	135.8
84.00	83.99	-0.49	0.56	0.8	131.2	1.2	146.9
85.00	84.99	-0.51	0.57	0.8	131.5	0.9	145.7
86.00	85.99	-0.52	0.58	0.8	131.8	1.0	146.2
87.00	86.99	-0.54	0.59	0.8	132.1	1.0	138.1
88.00	87.99	-0.55	0.61	0.8	132.4	1.0	143.9
89.00	88.99	-0.57	0.62	0.8	132.6	1.2	143.8
90.00	89.99	-0.58	0.63	0.9	132.9	1.0	145.6
91.00	90.99	-0.60	0.64	0.9	133.2	1.0	145.3
92.00	91.99	-0.61	0.65	0.9	133.4	1.1	144.5
93.00	92.99	-0.63	0.66	0.9	133.6	0.9	144.4
94.00	93.99	-0.64	0.67	0.9	133.8	1.1	146.6
95.00	94.99	-0.66	0.68	0.9	134.0	0.9	147.2
96.00	95.99	-0.67	0.69	1.0	134.3	1.0	149.8
97.00	96.99	-0.69	0.70	1.0	134.5	1.1	151.5
98.00	97.99	-0.70	0.71	1.0	134.8	1.1	151.2
99.00	98.99	-0.72	0.72	1.0	135.1	1.1	151.8
100.00	99.99	-0.74	0.73	1.0	135.5	1.2	154.3
101.00	100.99	-0.76	0.74	1.1	135.8	1.2	152.5
102.00	101.99	-0.77	0.75	1.1	136.1	1.1	154.7
103.00	102.99	-0.79	0.75	1.1	136.4	1.1	155.0
104.00	103.99	-0.81	0.76	1.1	136.8	1.2	155.3
105.00	104.99	-0.83	0.77	1.1	137.1	1.2	154.5
106.00	105.99	-0.85	0.78	1.2	137.4	1.2	156.1
107.00	106.99	-0.87	0.79	1.2	137.7	1.2	155.8
108.00	107.99	-0.88	0.80	1.2	138.0	1.1	155.8
109.00	108.99	-0.90	0.80	1.2	138.3	1.0	157.8
110.00	109.99	-0.92	0.81	1.2	138.6	1.1	156.8
111.00	110.99	-0.94	0.82	1.2	138.8	1.0	158.9
112.00	111.99	-0.95	0.82	1.3	139.1	1.2	158.8
113.00	112.99	-0.97	0.83	1.3	139.4	1.3	159.5
114.00	113.99	-0.99	0.84	1.3	139.7	1.2	158.0
115.00	114.99	-1.01	0.85	1.3	140.0	1.1	159.4
116.00	115.99	-1.03	0.85	1.3	140.3	1.1	162.7
117.00	116.99	-1.05	0.86	1.4	140.6	1.2	160.0
118.00	117.99	-1.07	0.87	1.4	140.9	1.2	159.1
119.00	118.99	-1.09	0.88	1.4	141.2	1.3	162.4
120.00	119.99	-1.11	0.88	1.4	141.5	1.4	159.8
121.00	120.99	-1.13	0.89	1.4	141.8	1.2	159.1
122.00	121.99	-1.15	0.90	1.5	142.0	1.1	164.4
123.00	122.99	-1.17	0.90	1.5	142.3	1.2	161.9
124.00	123.99	-1.19	0.91	1.5	142.6	1.3	161.9
125.00	124.99	-1.22	0.92	1.5	142.9	1.3	161.0
125.72	125.71	-1.23	0.93	1.5	143.1	1.7	169.3

COMPANY	NWPC COAL CANADA LTD	OTHER SERVICES	
WELL	CM11-11-CH	DEN-TP	
FIELD	N/A	DEV-TP	
COUNTRY	CANADA	NEU-TP	
PROVINCE	ALBERTA		

SECTION	N/A	LOG MEASURED FROM	GL
TOWNSHIP	N/A	ELEVATION KG	N/A
RANGE	N/A	ELEVATION DF	N/A
LICENSE NO.	N/A	DRL ELEVATION GL	N/A
UNIQUE WELL ID	N/A		

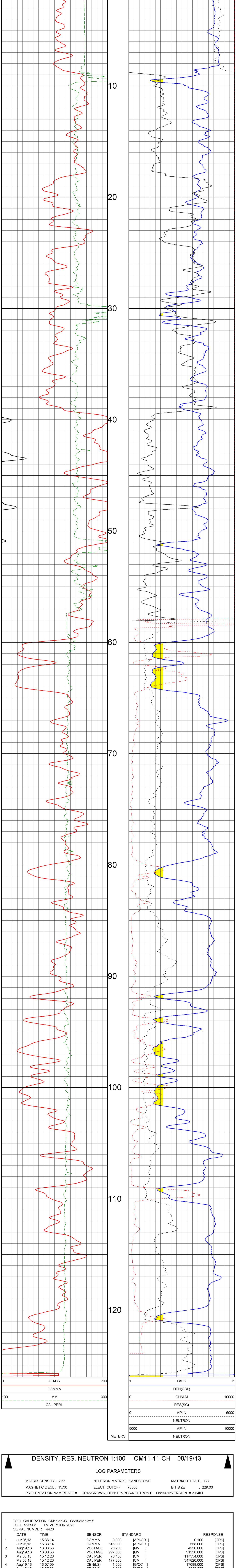
DATE	08/19/13	RIG NUMBER	N/A
DEPTH DRILLER	:126.40	LOGGER TD	:126.26
BIT SIZE	:229.00	ARRIVAL TIME	:02:15
LOG TOP	:0.00	DEPARTURE TIME	:14:00
LOG BOTTOM	:125.87	CIRC STOPPED	N/A

CASING LOGGER	:8.20		
CASING DRILLER	:9.00		
CASING TYPE	:SURFACE		
BOREHOLE FLUID	:H2O		
RT TEMPERATURE	N/A		
MUD RES	N/A		
MUD WEIGHT	:1.00		
WITNESSED BY	M. ESKRICK		
RECORDED BY	C. JOHNSTON		
REMARKS 1	:NORTHING 5621515 EASTING 662691.66		
REMARKS 2			

DENSITY, RES, NEUTRON 1:100 CM11-11-CH 08/19/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
 MAGNETIC DECL. : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 229.00
 PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT



DENSITY, RES, NEUTRON 1:100 CM11-11-CH 08/19/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
 MAGNETIC DECL. : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 229.00
 PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT

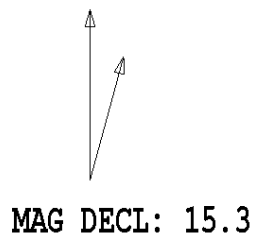
DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Jun25,13 15:33:14	GAMMA	0.000 [API-GR]	0.100 [CPS]
1	Jun25,13 15:33:14	GAMMA	545.000 [API-GR]	558.000 [CPS]
2	Aug19,13 13:06:53	VOLTAGE	26.200 [MV]	43550.000 [CPS]
2	Aug19,13 13:06:53	VOLTAGE	227.600 [MV]	31550.000 [CPS]
3	Mar06,13 15:12:26	CALIPER	76.400 [CM]	117554.000 [CPS]
3	Mar06,13 15:12:26	CALIPER	177.800 [CM]	347820.000 [CPS]
4	Aug19,13 13:07:09	DEN(LS)	1.620 [G/CC]	17088.000 [CPS]
4	Aug19,13 13:07:09	DEN(LS)	2.612 [G/CC]	2263.000 [CPS]
5	Aug19,13 13:07:26	DEN(SS)	1.590 [G/CC]	6450.000 [CPS]
5	Aug19,13 13:07:26	DEN(SS)	2.590 [G/CC]	26130.000 [CPS]
6	Aug19,13 13:07:41	CALIPERL	100.000 [CM]	112529.000 [CPS]
6	Aug19,13 13:07:41	CALIPERL	200.000 [CM]	217210.000 [CPS]
7	Aug19,13 13:08:07	CURRENT	28.200 [UA]	8769.000 [CPS]
7	Aug19,13 13:08:07	CURRENT	227.600 [UA]	26334.000 [CPS]
8	Feb14,10 11:28:44	F	Default	
9	Feb14,10 11:28:44	X	Default	

TOOL CALIBRATION CM11-11-CH 08/19/13 13:15
 TOOL 9239C1 TM VERSION 2025
 SERIAL NUMBER 4428

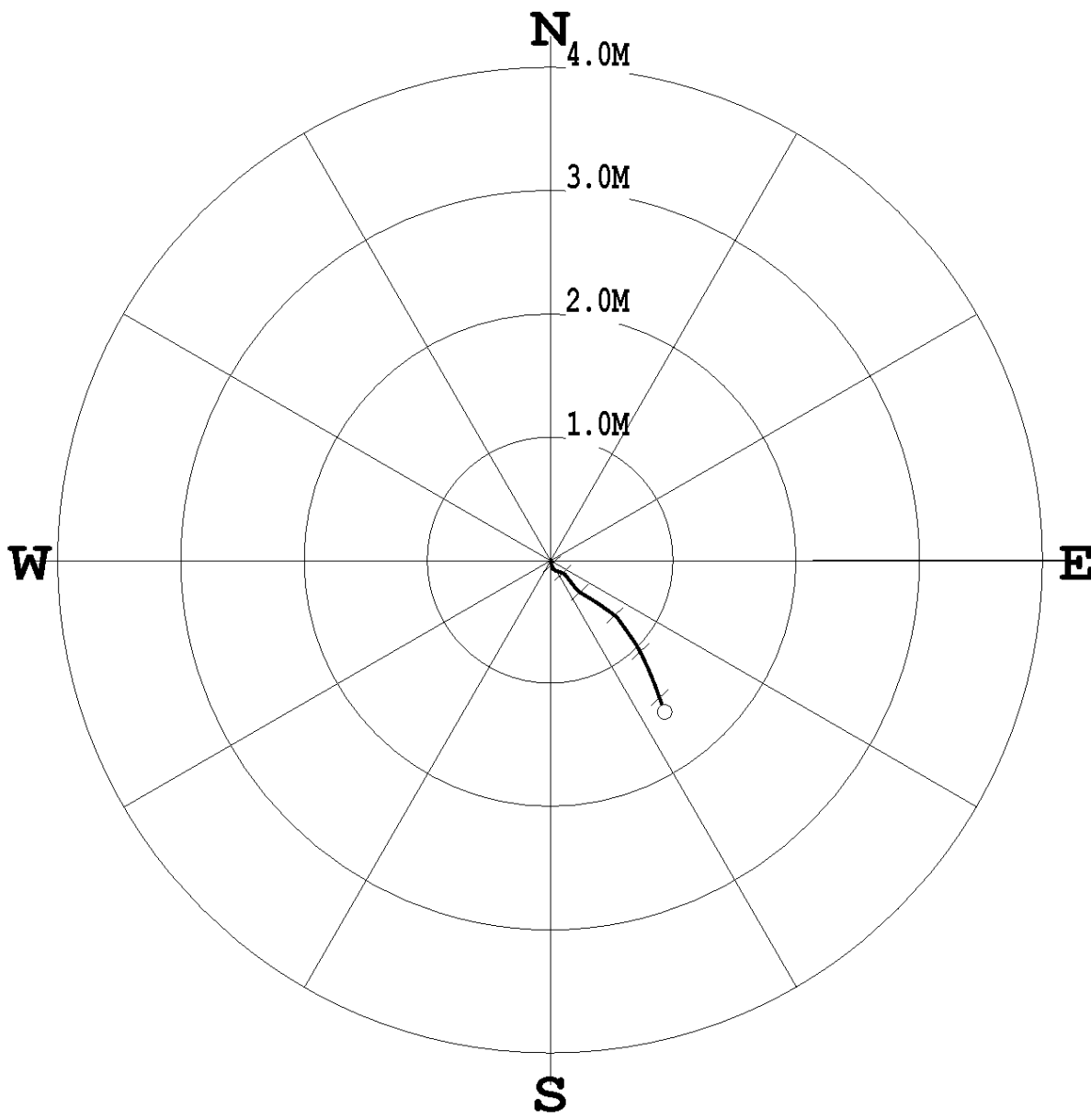
ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

PLAN VIEW COMPU-LOG DEVIATION

CLIENT: NWP COAL CANADA LTD
 LOCATION: N/A
 HOLE ID: CM11-11-CH
 DATE OF LOG: 08/19/13
 PROBE: 9057A 4430



SCALE: 1 M/CM
 TRUE DEPTH: 125.71 M
 AZIMUTH: 143.1
 DISTANCE: 1.5 M
 + = 20 M INCR
 ○ = BOTTOM OF HOLE



* * * * * COMPU-LOG - VERTICAL DEVIATION * * * * *

CLIENT : NWP COAL CANADA LTD HOLE ID. : CM11-11-CH
 FIELD OFFICE : CENTURY DATE OF LOG : 08/19/13
 DATA FROM : N/A PROBE : 9057A , 4430
 MAG. DECL. : 15.300 DEPTH UNITS : METERS
 LOG: CM11-11-CH_08-19-13_12-09_9057A_.02_11.00_125.88_DEVI.log

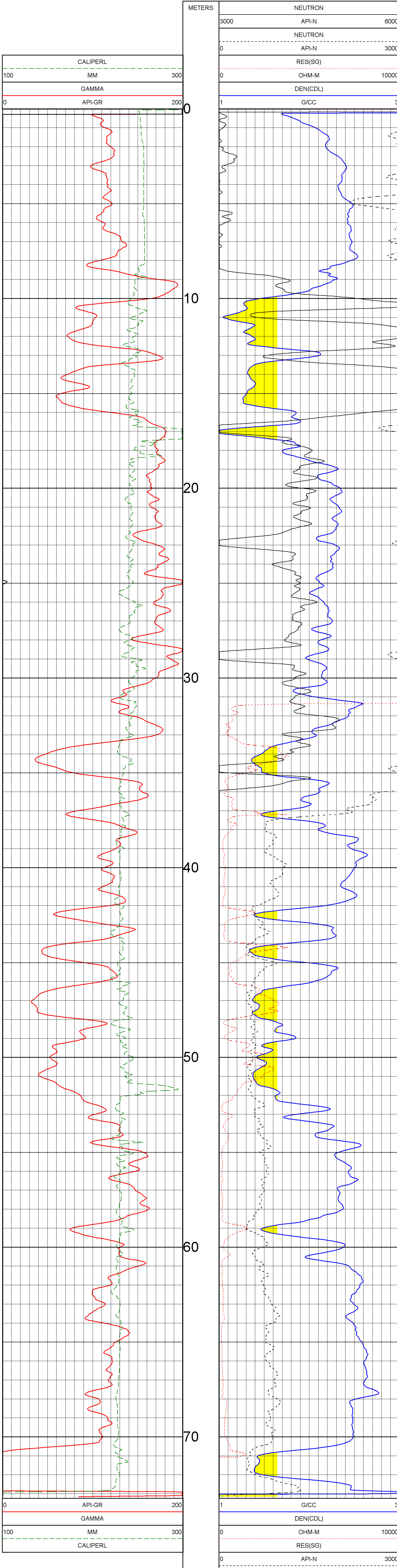
CABLE DEPTH	TRUE DEPTH	NORTH DEV.	EAST DEV.	DISTANCE	AZIMUTH	SANG	SANGB
11.00	11.04	-0.00	0.00	0.0	101.7	0.2	105.2
12.00	12.00	-0.00	0.00	0.0	101.2	0.2	82.8
13.00	13.00	-0.00	0.01	0.0	126.9	0.4	166.1
14.00	14.00	-0.01	0.01	0.0	147.3	0.5	167.1
15.00	15.00	-0.02	0.01	0.0	154.6	0.2	180.4
16.00	16.00	-0.02	0.01	0.0	157.7	0.1	176.5
17.00	17.00	-0.02	0.01	0.0	160.5	0.1	239.4
18.00	18.00	-0.02	0.01	0.0	164.4	0.1	204.3
19.00	19.00	-0.03	0.01	0.0	165.5	0.3	165.6
20.00	20.00	-0.03	0.01	0.0	166.5	0.3	174.6
21.00	21.00	-0.04	0.01	0.0	166.2	0.5	153.8
22.00	22.00	-0.04	0.01	0.0	165.6	0.3	169.2
23.00	23.00	-0.05	0.01	0.0	166.5	0.3	164.7
24.00	24.00	-0.05	0.01	0.1	166.4	0.3	165.8
25.00	25.00	-0.06	0.02	0.1	165.3	0.3	153.3
26.00	26.00	-0.07	0.02	0.1	163.0	0.5	137.0
27.00	27.00	-0.07	0.03	0.1	159.9	0.5	131.7
28.00	28.00	-0.08	0.03	0.1	156.8	0.4	127.2
29.00	29.00	-0.08	0.04	0.1	154.0	0.3	114.0
30.00	30.00	-0.08	0.04	0.1	152.0	0.2	93.3
31.00	31.00	-0.08	0.05	0.1	149.7	0.2	76.6
32.00	32.00	-0.08	0.05	0.1	147.6	0.5	117.8
33.00	33.00	-0.09	0.06	0.1	145.3	0.5	116.5
34.00	34.00	-0.09	0.07	0.1	143.3	0.5	116.5
35.00	35.00	-0.09	0.07	0.1	141.7	0.2	86.8
36.00	36.00	-0.09	0.08	0.1	140.5	0.2	83.5
37.00	37.00	-0.09	0.08	0.1	139.3	0.4	118.5
38.00	38.00	-0.10	0.09	0.1	138.0	0.3	110.4
39.00	39.00	-0.10	0.09	0.1	136.9	0.3	116.3
40.00	40.00	-0.10	0.10	0.1	135.9	0.2	114.5
41.00	41.00	-0.10	0.10	0.1	135.1	0.3	121.6
42.00	42.00	-0.11	0.11	0.2	134.4	0.5	113.9
43.00	43.00	-0.11	0.11	0.2	134.0	0.3	125.3
44.00	44.00	-0.12	0.12	0.2	133.9	0.4	142.1
45.00	45.00	-0.12	0.12	0.2	134.1	0.6	140.6
46.00	46.00	-0.13	0.13	0.2	134.4	0.6	134.9
47.00	47.00	-0.13	0.14	0.2	134.8	0.5	148.9
48.00	48.00	-0.14	0.14	0.2	135.2	0.4	150.9
49.00	49.00	-0.15	0.14	0.2	135.5	0.4	140.2
50.00	50.00	-0.15	0.15	0.2	135.9	0.6	146.4
51.00	51.00	-0.16	0.16	0.2	136.2	0.5	141.5
52.00	52.00	-0.17	0.16	0.2	136.5	0.8	145.1
53.00	53.00	-0.18	0.17	0.3	136.7	0.7	138.4
54.00	54.00	-0.19	0.18	0.3	137.0	0.7	141.9
55.00	55.00	-0.20	0.19	0.3	137.3	0.7	150.1
56.00	56.00	-0.21	0.19	0.3	137.5	0.8	137.8
57.00	57.00	-0.22	0.20	0.3	137.6	0.9	145.5
58.00	58.00	-0.24	0.21	0.3	137.7	0.9	140.6
59.00	59.00	-0.25	0.22	0.3	137.8	1.0	139.1
60.00	60.00	-0.26	0.24	0.3	137.3	0.7	119.1
61.00	61.00	-0.26	0.25	0.4	136.7	0.9	122.0
62.00	62.00	-0.27	0.26	0.4	136.0	0.9	121.3
63.00	63.00	-0.28	0.28	0.4	135.5	0.9	120.6
64.00	64.00	-0.29	0.29	0.4	134.9	0.8	120.1
65.00	65.00	-0.30	0.30	0.4	134.4	0.8	120.6
66.00	66.00	-0.30	0.32	0.4	133.9	0.9	120.2
67.00	67.00	-0.31	0.33	0.5	133.4	0.9	120.5
68.00	68.00	-0.32	0.34	0.5	133.0	1.1	122.9
69.00	69.00	-0.33	0.36	0.5	132.7	1.0	123.9
70.00	70.00	-0.34	0.37	0.5	132.3	1.0	120.5
71.00	71.00	-0.35	0.39	0.5	132.0	1.0	125.5
72.00	72.00	-0.36	0.40	0.5	131.8	1.0	124.4
73.00	73.00	-0.37	0.42	0.6	131.5	1.1	126.1
74.00	74.00	-0.38	0.43	0.6	131.3	1.1	123.8
75.00	75.00	-0.39	0.45	0.6	131.1	0.7	121.8
76.00	76.00	-0.40	0.46	0.6	131.0	0.9	125.1
77.00	77.00	-0.41	0.47	0.6	130.8	0.9	124.1
78.00	78.00	-0.42	0.49	0.6	130.7	1.2	127.5
79.00	79.00	-0.43	0.51	0.7	130.6	1.2	122.5
80.00	80.00	-0.44	0.52	0.7	130.5	0.9	129.5
81.00	81.00	-0.46	0.53	0.7	130.5	0.9	131.7
82.00	82.00	-0.47	0.54	0.7	130.7	1.0	140.5
83.00	82.99	-0.48	0.55	0.7	130.9	0.9	135.8
84.00	83.99	-0.49	0.56	0.8	131.2	1.2	146.9
85.00	84.99	-0.51	0.57	0.8	131.5	0.9	145.7
86.00	85.99	-0.52	0.58	0.8	131.8	1.0	146.2
87.00	86.99	-0.54	0.59	0.8	132.1	1.0	138.1
88.00	87.99	-0.55	0.61	0.8	132.4	1.0	143.9
89.00	88.99	-0.57	0.62	0.8	132.6	1.2	143.8
90.00	89.99	-0.58	0.63	0.9	132.9	1.0	145.6
91.00	90.99	-0.60	0.64	0.9	133.2	1.0	145.3
92.00	91.99	-0.61	0.65	0.9	133.4	1.1	144.5
93.00	92.99	-0.63	0.66	0.9	133.6	0.9	144.4
94.00	93.99	-0.64	0.67	0.9	133.8	1.1	146.6
95.00	94.99	-0.66	0.68	0.9	134.0	0.9	147.2
96.00	95.99	-0.67	0.69	1.0	134.3	1.0	149.8
97.00	96.99	-0.69	0.70	1.0	134.5	1.1	151.5
98.00	97.99	-0.70	0.71	1.0	134.8	1.1	151.2
99.00	98.99	-0.72	0.72	1.0	135.1	1.1	151.8
100.00	99.99	-0.74	0.73	1.0	135.5	1.2	154.3
101.00	100.99	-0.76	0.74	1.1	135.8	1.2	152.5
102.00	101.99	-0.77	0.75	1.1	136.1	1.1	154.7
103.00	102.99	-0.79	0.75	1.1	136.4	1.1	155.0
104.00	103.99	-0.81	0.76	1.1	136.8	1.2	155.3
105.00	104.99	-0.83	0.77	1.1	137.1	1.2	154.5
106.00	105.99	-0.85	0.78	1.2	137.4	1.2	156.1
107.00	106.99	-0.87	0.79	1.2	137.7	1.2	155.8
108.00	107.99	-0.88	0.80	1.2	138.0	1.1	155.8
109.00	108.99	-0.90	0.80	1.2	138.3	1.0	157.8
110.00	109.99	-0.92	0.81	1.2	138.6	1.1	156.8
111.00	110.99	-0.94	0.82	1.2	138.8	1.0	158.9
112.00	111.99	-0.95	0.82	1.3	139.1	1.2	158.8
113.00	112.99	-0.97	0.83	1.3	139.4	1.3	159.5
114.00	113.99	-0.99	0.84	1.3	139.7	1.2	158.0
115.00	114.99	-1.01	0.85	1.3	140.0	1.1	159.4
116.00	115.99	-1.03	0.85	1.3	140.3	1.1	162.7
117.00	116.99	-1.05	0.86	1.4	140.6	1.2	160.0
118.00	117.99	-1.07	0.87	1.4	140.9	1.2	159.1
119.00	118.99	-1.09	0.88	1.4	141.2	1.3	162.4
120.00	119.99	-1.11	0.88	1.4	141.5	1.4	159.8
121.00	120.99	-1.13	0.89	1.4	141.8	1.2	159.1
122.00	121.99	-1.15	0.90	1.5	142.0	1.1	164.4
123.00	122.99	-1.17	0.90	1.5	142.3	1.2	161.9
124.00	123.99	-1.19	0.91	1.5	142.6	1.3	161.9
125.00	124.99	-1.22	0.92	1.5	142.9	1.3	161.0
125.72	125.71	-1.23	0.93	1.5	143.1	1.7	169.3

COMPANY	:NWP COAL CANADA LTD	OTHER SERVICES	
WELL	:CM11-12-CH	NEU-TP	
FIELD	:N/A	DEN-TP	
COUNTRY	:CANADA	DEV-TEM	
PROVINCE	:ALBERTA		
LSD	:N/A		
SECTION	:N/A		
TOWNSHIP	:N/A		
RANGE	:N/A		
LICENSE NO.	:N/A		
UNIQUE WELL ID.	:N/A		
PERMANENT DATUM	:GL	ELEVATION KB	:N/A
LOG MEASURED FROM	:GL	ELEVATION DF	:N/A
DRI MEASURED FROM	:GL	ELEVATION GL	:2171.20
DATE	:08/21/13	RIG NUMBER	:N/A
DEPTH DRILLER	:73.50	LOGGER TD	:73.44
BIT SIZE	:229.00	ARRIVAL TIME	:22.30
LOG TOP	:0.00	DEPARTURE TIME	:04.00
LOG BOTTOM	:73.15	CIRC STOPPED	:N/A
CASING LOGGER	:8.70		
CASING DRILLER	:9.00		
CASING TYPE	:SURFACE		
BOREHOLE FLUID	:H2O		
RM TEMPERATURE	:N/A		
MUD RES	:N/A		
MUD WEIGHT	:1.00		
WITNESSED BY	:M. ESKRICK		
RECORDED BY	:C. JOHNSTON		
REMARKS 1	:NORTHING 5521641 EASTING 682856		
REMARKS 2	:TOOL RESPONSE ABOVE 315M AFFECTED BY WATER LEVEL		

DENSITY, RES, NEUTRON 1:100 CM11-12-CH 08/21/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
 MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 229.00
 PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/2013 VERSION = 3.64KT



DENSITY, RES, NEUTRON 1:100 CM11-12-CH 08/21/13

LOG PARAMETERS

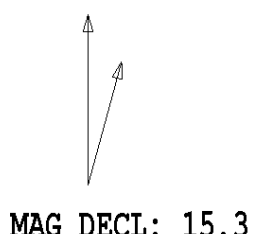
MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
 MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 229.00
 PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/2013 VERSION = 3.64KT

TOOL CALIBRATION CM11-12-CH 08/21/13 03:10
 TOOL 9239C1 TM VERSION 0825
 SERIAL NUMBER 4428

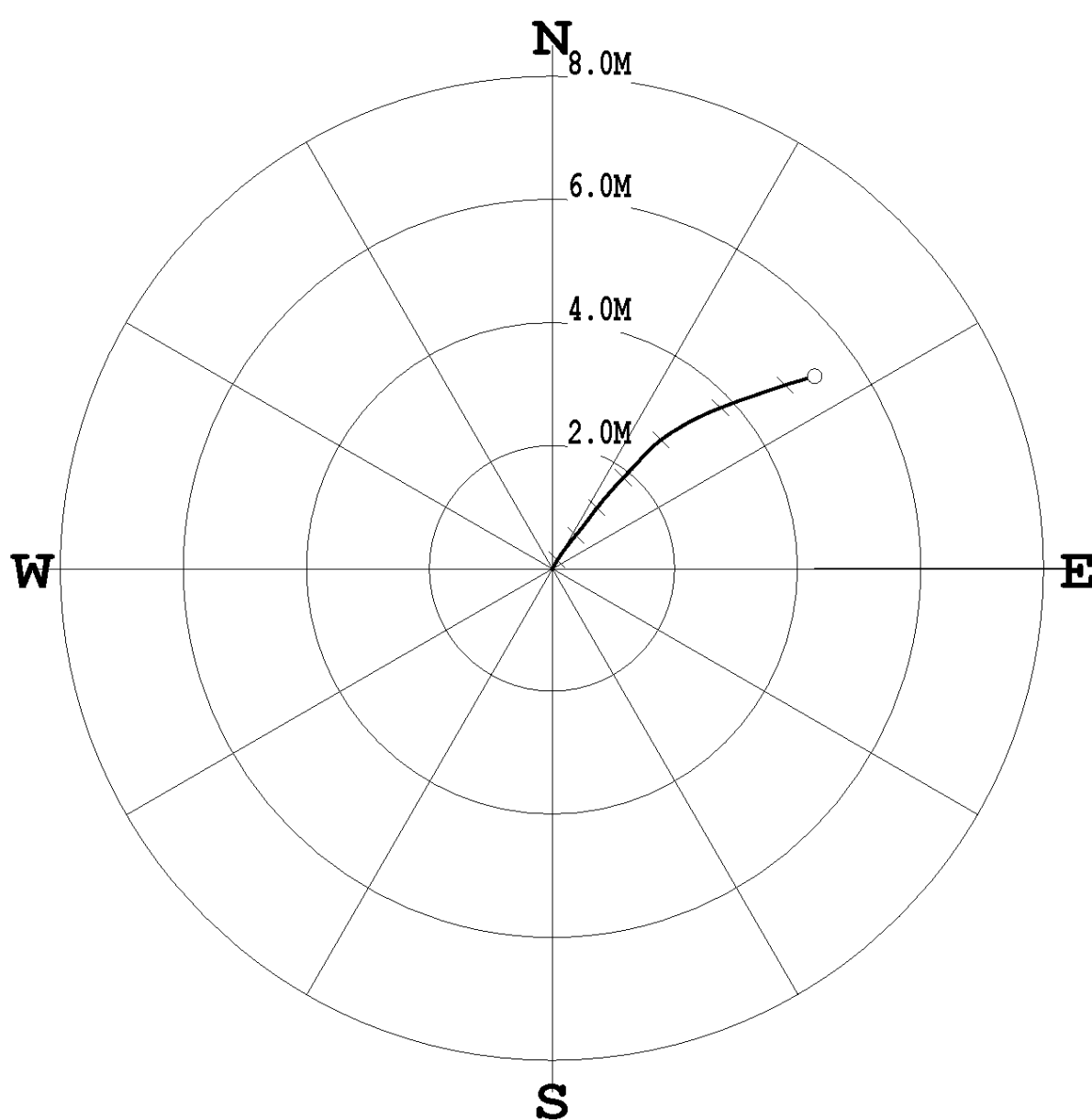
DATE	TIME	SENSOR	STANDARD	RESPONSE
1 Jun25,13	15:33:14	GAMMA	0.000 [API-GR]	0.100 [CPS]
1 Jun25,13	15:33:14	GAMMA	545.000 [API-GR]	558.000 [CPS]
2 Aug19,13	13:06:53	VOLTAGE	26.200 [MV]	4350.000 [CPS]
2 Aug19,13	13:06:53	VOLTAGE	227.600 [MV]	31550.000 [CPS]
3 Mar06,13	15:12:26	CALIPER	76.400 [CM]	117554.000 [CPS]
3 Mar06,13	15:12:26	CALIPER	177.800 [CM]	347820.000 [CPS]
4 Aug19,13	13:07:09	DEN(LS)	1.620 [G/CC]	17088.000 [CPS]
4 Aug19,13	13:07:09	DEN(LS)	2.612 [G/CC]	2263.000 [CPS]
5 Aug21,13	11:44:51	DEN(SS)	1.590 [G/CC]	68540.000 [CPS]
5 Aug21,13	11:44:51	DEN(SS)	2.580 [G/CC]	26130.000 [CPS]
6 Aug19,13	13:07:41	CALIPERL	100.000 [CM]	112529.000 [CPS]
6 Aug19,13	13:07:41	CALIPERL	200.000 [CM]	217210.000 [CPS]
7 Aug19,13	13:08:07	CURRENT	26.200 [UA]	8769.000 [CPS]
7 Aug19,13	13:08:07	CURRENT	227.600 [UA]	26334.000 [CPS]
8 Feb14,10	11:28:44	F	Default [CPS]	
9 Feb14,10	11:28:44	X	Default [CPS]	

PLAN VIEW COMPU-LOG DEVIATION

CLIENT: NWP COAL CANADA LTD
 LOCATION: N/A
 HOLE ID: CM11-19-CH
 DATE OF LOG: 08/30/13
 PROBE: 9058A 4565



SCALE: 1 M/CM
 TRUE DEPTH: 149.40 M
 AZIMUTH: 53.8
 DISTANCE: 5.3 M
 + = 20 M INCR
 ○ = BOTTOM OF HOLE



* * * * * COMPU-LOG - VERTICAL DEVIATION * * * * *

CLIENT : NWP COAL CANADA LTD HOLE ID. : CM11-19-CH
 FIELD OFFICE : CENTURY DATE OF LOG : 08/30/13
 DATA FROM : N/A PROBE : 9058A , 4565
 MAG. DECL. : 15.300 DEPTH UNITS : METERS
 LOG: CM11-19-CH_08-30-13_18-29_9058A_02_13.00_149.71_DEVI.log

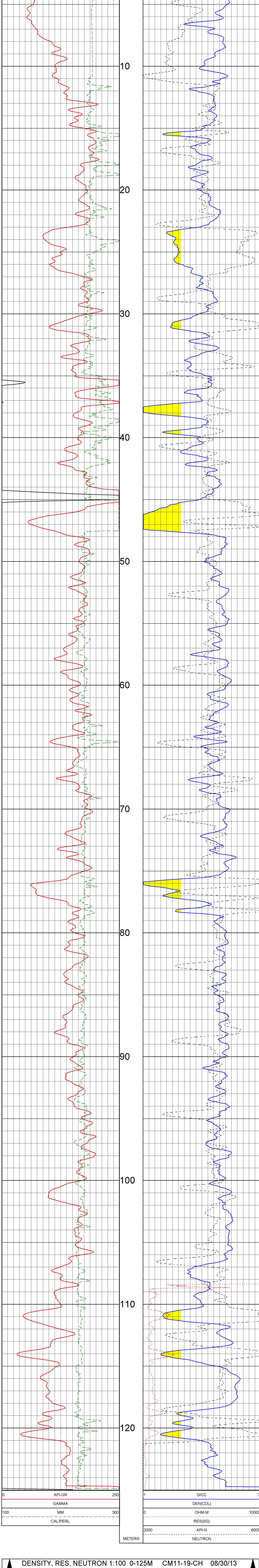
CABLE DEPTH	TRUE DEPTH	NORTH DEV.	EAST DEV.	DISTANCE	AZIMUTH	SANG	SANGB
13.02	13.02	0.00	0.00	0.0	28.0	1.3	28.0
14.00	14.00	0.02	0.01	0.0	29.4	1.1	25.1
15.00	15.00	0.04	0.02	0.0	29.4	1.0	31.8
16.00	16.00	0.06	0.03	0.1	29.2	1.2	31.5
17.00	17.00	0.07	0.04	0.1	29.5	1.5	29.1
18.00	18.00	0.09	0.05	0.1	29.7	1.3	31.4
19.00	19.00	0.12	0.07	0.1	29.8	1.1	31.3
20.00	20.00	0.14	0.08	0.2	29.9	1.7	32.4
21.00	21.00	0.16	0.09	0.2	30.2	1.5	32.7
22.00	22.00	0.18	0.11	0.2	30.5	1.4	33.8
23.00	23.00	0.20	0.12	0.2	30.8	1.3	31.9
24.00	24.00	0.22	0.13	0.3	31.1	1.5	32.1
25.00	25.00	0.24	0.15	0.3	31.4	1.3	37.9
26.00	26.00	0.26	0.16	0.3	31.7	1.8	37.9
27.00	27.00	0.28	0.18	0.3	32.1	1.8	35.5
28.00	28.00	0.31	0.19	0.4	32.4	1.3	38.9
29.00	29.00	0.32	0.21	0.4	32.7	1.3	37.4
30.00	29.99	0.34	0.22	0.4	32.9	1.5	40.0
31.00	30.99	0.36	0.24	0.4	33.2	1.3	40.9
32.00	31.99	0.38	0.25	0.5	33.5	1.8	33.7
33.00	32.99	0.41	0.27	0.5	33.7	1.8	35.9
34.00	33.99	0.43	0.29	0.5	33.9	1.2	39.0
35.00	34.99	0.45	0.30	0.5	34.0	1.6	35.8
36.00	35.99	0.47	0.32	0.6	34.2	1.4	39.5
37.00	36.99	0.49	0.33	0.6	34.3	1.0	38.1
38.00	37.99	0.50	0.34	0.6	34.5	1.3	44.6
39.00	38.99	0.52	0.36	0.6	34.9	1.6	39.7
40.00	39.99	0.54	0.38	0.7	35.1	1.6	33.4
41.00	40.99	0.56	0.40	0.7	35.2	1.3	43.6
42.00	41.99	0.58	0.41	0.7	35.4	1.5	33.9
43.00	42.99	0.60	0.43	0.7	35.5	1.8	39.6
44.00	43.99	0.63	0.45	0.8	35.7	1.5	40.8
45.00	44.99	0.65	0.47	0.8	35.8	1.2	38.6
46.00	45.99	0.66	0.48	0.8	35.9	1.3	61.2
47.00	46.99	0.67	0.49	0.8	35.9	1.0	36.9
48.00	47.99	0.70	0.51	0.9	36.0	2.2	38.0
49.00	48.99	0.72	0.53	0.9	36.0	1.8	35.5
50.00	49.99	0.75	0.54	0.9	36.0	1.6	27.4
51.00	50.99	0.77	0.56	0.9	36.0	1.3	31.3
52.00	51.99	0.79	0.57	1.0	36.1	1.7	36.2
53.00	52.99	0.81	0.59	1.0	36.1	1.8	33.9
54.00	53.99	0.84	0.61	1.0	36.1	2.1	37.1
55.00	54.99	0.87	0.63	1.1	36.1	1.7	33.1
56.00	55.99	0.89	0.65	1.1	36.1	1.8	35.7
57.00	56.98	0.92	0.67	1.1	36.1	1.9	36.1
58.00	57.98	0.94	0.69	1.2	36.1	1.5	32.5
59.00	58.98	0.96	0.70	1.2	36.2	1.8	47.3
60.00	59.98	0.99	0.72	1.2	36.3	1.8	37.9
61.00	60.98	1.01	0.74	1.3	36.3	1.9	35.4
62.00	61.98	1.04	0.77	1.3	36.4	2.2	37.5
63.00	62.98	1.06	0.79	1.3	36.5	1.6	41.4
64.00	63.98	1.09	0.81	1.4	36.5	2.0	39.7
65.00	64.98	1.11	0.83	1.4	36.6	1.7	38.0
66.00	65.98	1.14	0.84	1.4	36.6	1.5	42.7
67.00	66.98	1.16	0.87	1.4	36.8	2.1	38.8
68.00	67.98	1.19	0.89	1.5	36.8	1.8	44.2
69.00	68.98	1.21	0.91	1.5	36.9	2.0	42.7
70.00	69.98	1.24	0.93	1.5	37.0	1.9	43.5
71.00	70.98	1.26	0.95	1.6	37.1	2.0	31.4
72.00	71.98	1.29	0.98	1.6	37.2	1.9	43.5
73.00	72.98	1.31	1.00	1.6	37.3	2.1	41.4
74.00	73.98	1.34	1.02	1.7	37.4	2.0	46.3
75.00	74.98	1.36	1.04	1.7	37.5	1.6	43.2
76.00	75.97	1.38	1.06	1.7	37.6	1.8	42.7
77.00	76.97	1.41	1.09	1.8	37.7	1.8	41.3
78.00	77.97	1.43	1.11	1.8	37.8	2.1	42.7
79.00	78.97	1.46	1.13	1.8	37.9	2.0	44.9
80.00	79.97	1.48	1.16	1.9	37.9	1.6	39.6
81.00	80.97	1.51	1.18	1.9	38.0	2.0	45.2
82.00	81.97	1.53	1.20	1.9	38.2	2.1	46.5
83.00	82.97	1.56	1.23	2.0	38.3	2.4	41.4
84.00	83.97	1.59	1.26	2.0	38.4	2.4	41.6
85.00	84.97	1.62	1.29	2.1	38.5	2.6	49.1
86.00	85.97	1.65	1.32	2.1	38.6	2.4	42.0
87.00	86.97	1.68	1.35	2.2	38.7	2.6	52.9
88.00	87.97	1.71	1.37	2.2	38.8	2.5	41.5
89.00	88.97	1.74	1.40	2.2	38.8	2.8	41.5
90.00	89.96	1.77	1.43	2.3	38.9	2.1	37.8
91.00	90.96	1.80	1.46	2.3	38.9	2.6	47.2
92.00	91.96	1.84	1.49	2.4	39.0	2.7	45.1
93.00	92.96	1.87	1.52	2.4	39.1	2.7	42.2
94.00	93.96	1.91	1.56	2.5	39.2	3.2	45.7
95.00	94.96	1.94	1.59	2.5	39.3	2.4	43.1
96.00	95.96	1.97	1.62	2.6	39.5	2.5	44.6
97.00	96.96	2.00	1.66	2.6	39.6	2.7	49.8
98.00	97.96	2.04	1.70	2.7	39.8	2.9	48.3
99.00	98.95	2.07	1.73	2.7	39.9	2.2	54.2
100.00	99.95	2.09	1.77	2.7	40.2	3.0	55.8
101.00	100.95	2.12	1.81	2.8	40.5	3.3	54.0
102.00	101.95	2.16	1.86	2.8	40.7	3.2	54.0
103.00	102.95	2.19	1.90	2.9	41.0	3.0	54.1
104.00	103.95	2.22	1.94	2.9	41.2	3.1	52.4
105.00	104.95	2.24	1.99	3.0	41.6	3.3	61.3
106.00	105.94	2.27	2.04	3.1	41.9	3.6	57.7
107.00	106.94	2.30	2.09	3.1	42.2	3.3	57.7
108.00	107.94	2.33	2.13	3.2	42.5	2.8	60.9
109.00	108.94	2.36	2.18	3.2	42.8	3.1	59.0
110.00	109.94	2.38	2.22	3.3	43.0	3.2	63.6
111.00	110.94	2.41	2.27	3.3	43.4	3.2	58.4
112.00	111.94	2.43	2.32	3.4	43.7	3.1	63.3
113.00	112.93	2.46	2.37	3.4	44.0	3.4	66.1
114.00	113.93	2.48	2.43	3.5	44.3	3.4	60.7
115.00	114.93	2.51	2.48	3.5	44.6	3.0	64.9
116.00	115.93	2.53	2.53	3.6	45.0	3.2	67.9
117.00	116.93	2.55	2.58	3.6	45.3	3.3	65.5
118.00	117.93	2.57	2.63	3.7	45.6	3.3	66.7
119.00	118.92	2.59	2.68	3.7	46.0	3.3	64.1
120.00	119.92	2.61	2.73	3.8	46.3	3.0	67.9
121.00	120.92	2.63	2.78	3.8	46.6	3.1	67.4
122.00	121.92	2.65	2.83	3.9	46.9	3.1	71.4
123.00	122.92	2.67	2.88	3.9	47.2	3.1	69.2
124.00	123.92	2.69	2.94	4.0	47.5	3.2	69.8
125.00	124.92	2.71	2.99	4.0	47.8	3.2	71.7
126.00	125.91	2.73	3.04	4.1	48.1	3.3	69.1
127.00	126.91	2.75	3.10	4.1	48.4	3.0	69.7
128.00	127.91	2.77	3.15	4.2	48.7	3.1	68.6
129.00	128.91	2.78	3.20	4.2	49.0	3.0	74.8
130.00	129.91	2.80	3.25	4.3	49.2	3.2	69.3
131.00	130.91	2.82	3.30	4.3	49.5	3.4	71.3
132.00	131.90	2.84	3.36	4.4	49.8	3.5	71.0
133.00	132.90	2.86	3.41	4.5	50.0	3.3	71.0
134.00	133.90	2.88	3.46	4.5	50.3	3.1	70.6
135.00	134.90	2.89	3.51	4.6	50.5	3.3	73.6
136.00	135.90	2.91	3.57	4.6	50.8	3.1	69.8
137.00	136.90	2.93	3.62	4.7	51.0	3.0	71.2
138.00	137.90	2.95	3.67	4.7	51.2	2.9	70.8
139.00	138.89	2.96	3.72	4.8	51.5	3.1	75.1
140.00	139.89	2.98	3.77	4.8	51.7	3.3	71.5
141.00	140.89	3.00	3.83	4.9	52.0	3.3	73.8
142.00	141.89	3.01	3.88	4.9	52.1	2.9	73.1
143.00	142.89	3.03	3.93	5.0	52.4	3.0	76.6
144.00	143.89	3.04	3.98	5.0	52.6	3.1	73.8
145.00	144.88	3.06	4.03	5.1	52.8	3.2	73.2
146.00	145.88	3.07	4.08	5.1	53.0	3.1	72.5
147.00	146.88	3.09	4.13	5.2	53.2	3.1	75.3
148.00	147.88	3.10	4.19	5.2	53.5	3.1	72.6
149.00	148.88	3.12	4.24	5.3	53.7	3.2	76.5
149.52	149.40	3.12	4.27	5.3	53.8	3.3	74.9

COMPANY	INFP OIL/ CANADA LTD	OTHER SERVICES	NEU-PP
WELL	CM11-19-CH	DEH-TP	DEV/TBM
COUNTRY	CANADA	PROVINCE	ALBERTA
SECTION	N/A	LSID	N/A
TOWNSHIP	N/A	RANGE	N/A
RANGE	N/A	LICENSE NO.	N/A
UNIQUE WELL ID	N/A	PERMANENT DATUM	GL
ELEVATION K8	N/A	ELEVATION DIF	N/A
LOG MEASURED FROM GL	ELEVATION GL	DEL MEASURED FROM GL	ELEVATION GL
DATE	08/30/13	RIG NUMBER	N/A
DEPTH DRILLER	150.50	LOGGER TD	150.08
BIT SIZE	229.00	ARRIVAL TIME	11:30
LOG TOP	0.00	DEPARTURE TIME	19:45
LOG BOTTOM	148.79	CIRC STOPPED	N/A
CASING LOGGER	11.35	CASING DRILLER	12.00
CASING DRILLER	12.00	CASING TYPE	SURFACE
ROBOLITE FLUID	H2O	ROBOLITE FLUID	H2O
RHM TEMPERATURE	N/A	RHM TEMPERATURE	N/A
MUD WEIGHT	N/A	MUD WEIGHT	N/A
MUD WEIGHT	1.00	MUD WEIGHT	1.00
RECORDED BY	L. BOUTLIER	RECORDED BY	L. BOUTLIER
WITNESSED BY	C. JOHNSTON	WITNESSED BY	C. JOHNSTON
REMARKS 1	NORTING 531819.721 EASTING 85347.95	REMARKS 1	NORTING 531819.721 EASTING 85347.95
REMARKS 2		REMARKS 2	

DENSITY, RES, NEUTRON 1:100 0-125M CM11-19-CH 08/30/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT



DENSITY, RES, NEUTRON 1:100 0-125M CM11-19-CH 08/30/13

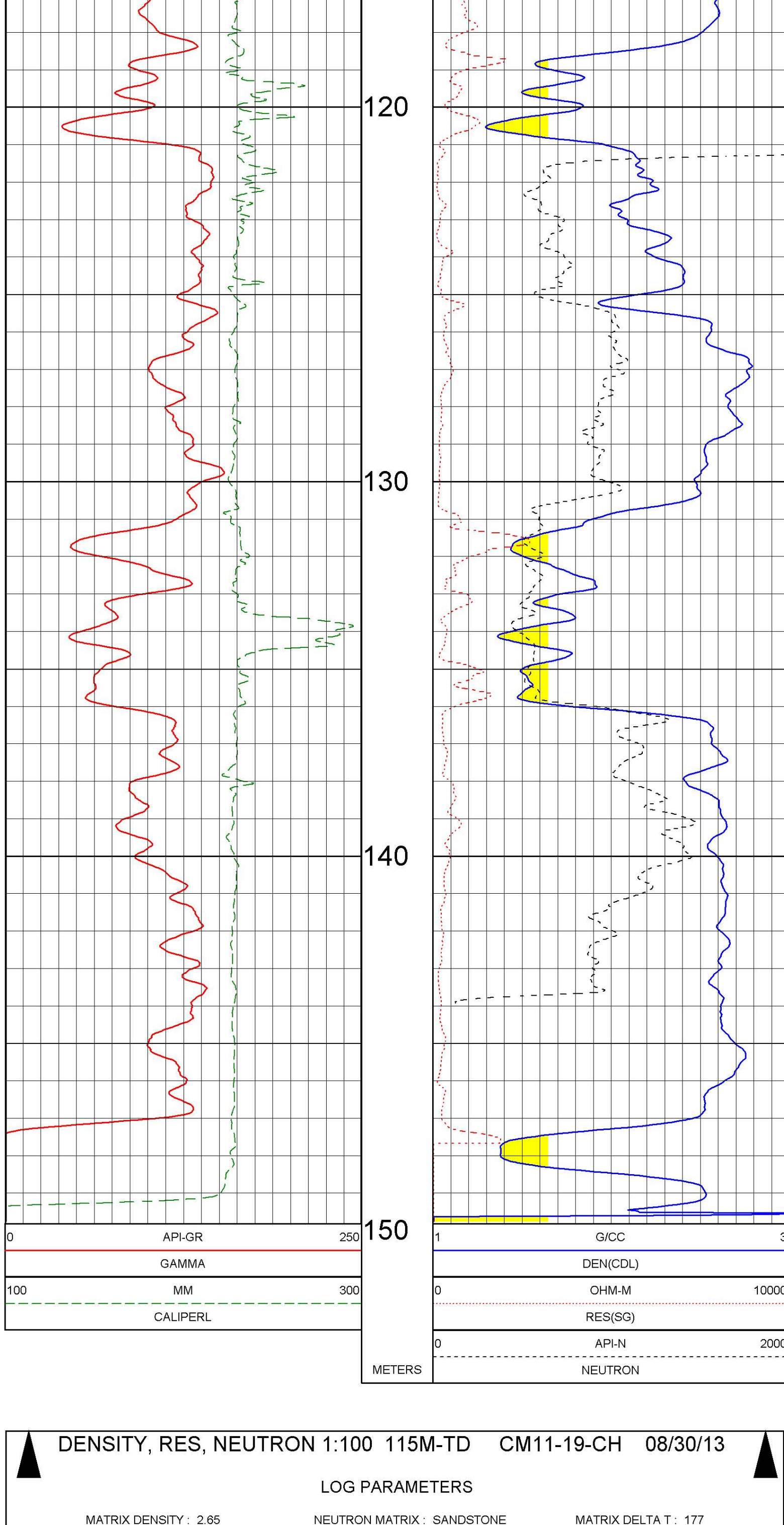
LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT

DENSITY, RES, NEUTRON 1:100 115M-TD CM11-19-CH 08/30/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT



DENSITY, RES, NEUTRON 1:100 115M-TD CM11-19-CH 08/30/13

LOG PARAMETERS

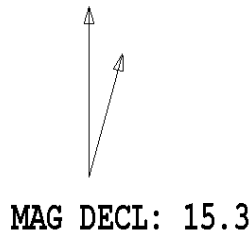
MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT

TOOL CALIBRATION CM11-19-CH 08/30/13 19:04
TOOL 9239C1 TM VERSION 2025
SERIAL NUMBER 4428

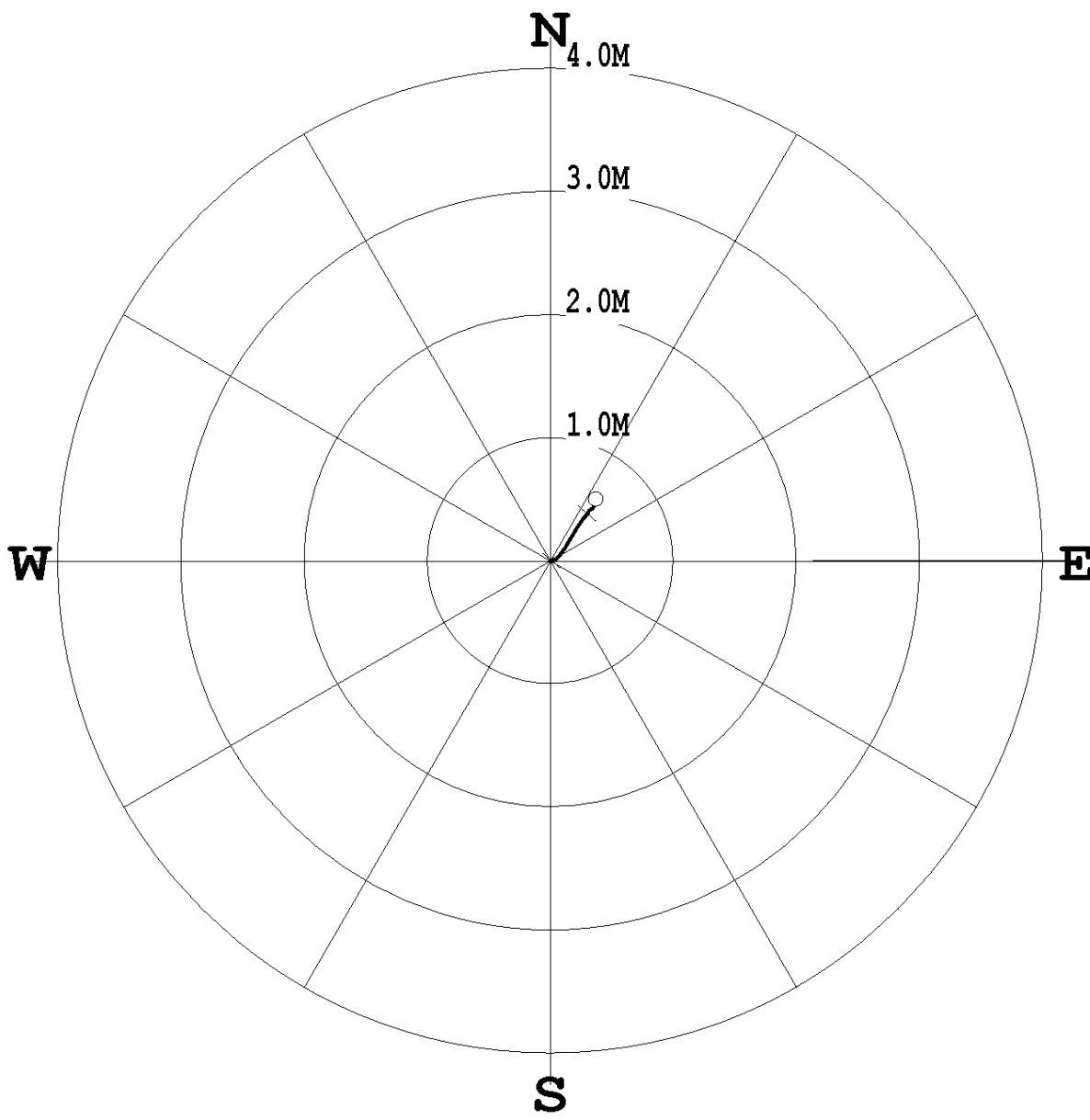
DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Jun25.13 15:33.14	GAMMA	0.000 [API-GR]	0.100 [CPS]
1	Jun25.13 15:33.14	GAMMA	545.000 [API-GR]	558.000 [CPS]
2	Aug19.13 13:06:53	VOLTAGE	26.200 [MV]	4350.000 [CPS]
2	Aug19.13 13:06:53	VOLTAGE	227.600 [MV]	31550.000 [CPS]
3	Mar08.13 15:12:26	CALIPER	76.400 [CM]	117554.000 [CPS]
3	Mar08.13 15:12:26	CALIPER	177.800 [CM]	347820.000 [CPS]
4	Aug19.13 13:07:09	DEN(LS)	1.620 [G/CC]	17088.000 [CPS]
4	Aug19.13 13:07:09	DEN(LS)	2.612 [G/CC]	2263.000 [CPS]
5	Aug27.13 18:24:35	DEN(SS)	1.590 [G/CC]	68540.000 [CPS]
5	Aug27.13 18:24:35	DEN(SS)	2.580 [G/CC]	26130.000 [CPS]
6	Aug19.13 13:07:41	CALIPERL	100.000 [CM]	112539.000 [CPS]
6	Aug19.13 13:07:41	CALIPERL	200.000 [CM]	217210.000 [CPS]
7	Aug19.13 13:08:07	CURRENT	26.200 [UA]	8769.000 [CPS]
7	Aug19.13 13:08:07	CURRENT	227.600 [UA]	26334.000 [CPS]
8	Feb14.10 11:28.44	F	Default [CPS]	
9	Feb14.10 11:28.44	X	Default [CPS]	

PLAN VIEW COMPU-LOG DEVIATION

CLIENT: NWP COAL CANADA LTD
 LOCATION: N/A
 HOLE ID: CM11-22-CH
 DATE OF LOG: 08/27/13
 PROBE: 9058A 4565



SCALE: 1 M/CM
 TRUE DEPTH: 125.76 M
 AZIMUTH: 36.7
 DISTANCE: 0.6 M
 + = 50 M INCR
 ○ = BOTTOM OF HOLE



* * * * * COMPU-LOG - VERTICAL DEVIATION * * * * *

CLIENT : NWP COAL CANADA LTD HOLE ID. : CM11-22-CH
 FIELD OFFICE : CENTURY DATE OF LOG : 08/27/13
 DATA FROM : N/A PROBE : 9058A , 4565
 MAG. DECL. : 15.300 DEPTH UNITS : METERS
 LOG: CM11-22-CH_08-27-13_17-54_9058A_.02_15.00_125.95_DEVI.log

CABLE DEPTH	TRUE DEPTH	NORTH DEV.	EAST DEV.	DISTANCE	AZIMUTH	SANG	SANGB
15.02	15.02	0.00	0.00	0.0	15.3	0.1	15.3
16.00	16.00	0.00	0.00	0.0	41.0	0.3	171.1
17.00	17.00	0.00	0.00	0.0	81.1	0.0	34.8
18.00	18.00	0.00	0.00	0.0	85.7	0.0	309.1
19.00	19.00	0.00	0.00	0.0	75.2	0.1	50.8
20.00	20.00	0.00	0.00	0.0	88.2	0.1	137.5
21.00	21.00	0.00	0.00	0.0	86.2	0.1	130.1
22.00	22.00	0.00	0.00	0.0	87.7	0.2	51.0
23.00	23.00	-0.00	0.01	0.0	101.2	0.1	90.1
24.00	24.00	-0.00	0.01	0.0	104.6	0.1	90.4
25.00	25.00	-0.00	0.01	0.0	105.4	0.3	112.2
26.00	26.00	-0.00	0.01	0.0	104.3	0.1	63.2
27.00	27.00	-0.00	0.01	0.0	104.4	0.1	179.0
28.00	28.00	-0.00	0.01	0.0	106.2	0.1	110.0
29.00	29.00	-0.00	0.02	0.0	103.7	0.1	68.8
30.00	30.00	-0.00	0.02	0.0	100.4	0.1	85.0
31.00	31.00	-0.00	0.02	0.0	96.3	0.1	52.9
32.00	32.00	-0.00	0.02	0.0	92.3	0.1	50.3
33.00	33.00	0.00	0.02	0.0	88.1	0.1	34.9
34.00	34.00	0.00	0.02	0.0	84.2	0.1	37.8
35.00	35.00	0.00	0.02	0.0	80.4	0.1	30.2
36.00	36.00	0.01	0.03	0.0	76.7	0.1	22.6
37.00	37.00	0.01	0.03	0.0	72.9	0.1	17.1
38.00	38.00	0.01	0.03	0.0	68.8	0.1	349.3
39.00	39.00	0.01	0.03	0.0	64.5	0.1	314.4
40.00	40.00	0.01	0.02	0.0	60.9	0.1	283.4
41.00	41.00	0.01	0.02	0.0	58.3	0.1	268.7
42.00	42.00	0.01	0.02	0.0	56.4	0.1	255.6
43.00	43.00	0.01	0.02	0.0	55.3	0.1	242.3
44.00	44.00	0.01	0.02	0.0	54.5	0.1	236.1
45.00	45.00	0.01	0.01	0.0	53.5	0.2	241.0
46.00	46.00	0.01	0.01	0.0	53.1	0.1	232.2
47.00	47.00	0.01	0.01	0.0	54.8	0.1	198.4
48.00	48.00	0.01	0.01	0.0	59.1	0.0	189.6
49.00	49.00	0.00	0.01	0.0	66.0	0.2	222.7
50.00	50.00	0.00	0.01	0.0	73.5	0.1	79.1
51.00	51.00	0.00	0.01	0.0	85.2	0.2	152.8
52.00	52.00	-0.00	0.01	0.0	91.8	0.1	152.5
53.00	53.00	-0.00	0.01	0.0	93.8	0.4	81.1
54.00	54.00	-0.00	0.02	0.0	95.5	0.2	119.3
55.00	55.00	-0.00	0.02	0.0	94.7	0.5	58.8
56.00	56.00	0.00	0.02	0.0	89.4	0.6	66.4
57.00	57.00	0.00	0.03	0.0	83.0	0.4	60.7
58.00	58.00	0.01	0.04	0.0	79.5	0.5	52.7
59.00	59.00	0.01	0.04	0.0	76.3	0.4	48.8
60.00	60.00	0.01	0.05	0.0	72.4	0.4	48.5
61.00	61.00	0.02	0.05	0.1	69.6	0.3	47.4
62.00	62.00	0.02	0.05	0.1	66.6	0.3	45.8
63.00	63.00	0.03	0.06	0.1	63.7	0.4	46.3
64.00	64.00	0.04	0.07	0.1	60.5	0.6	39.8
65.00	65.00	0.04	0.07	0.1	58.3	0.4	33.6
66.00	66.00	0.05	0.08	0.1	56.5	0.5	38.0
67.00	67.00	0.06	0.08	0.1	54.8	0.6	31.0
68.00	68.00	0.07	0.09	0.1	52.8	0.7	40.3
69.00	69.00	0.08	0.10	0.1	51.3	0.5	31.2
70.00	70.00	0.09	0.10	0.1	50.2	0.8	40.2
71.00	71.00	0.10	0.11	0.1	49.1	0.5	38.5
72.00	72.00	0.11	0.12	0.2	48.0	0.7	33.7
73.00	73.00	0.12	0.12	0.2	46.8	0.6	35.3
74.00	74.00	0.13	0.13	0.2	45.8	0.7	25.3
75.00	75.00	0.14	0.14	0.2	44.8	0.6	22.3
76.00	76.00	0.15	0.14	0.2	43.9	0.9	33.9
77.00	77.00	0.16	0.15	0.2	43.2	0.7	28.1
78.00	78.00	0.17	0.15	0.2	42.5	0.6	28.9
79.00	79.00	0.18	0.16	0.2	42.0	0.8	24.9
80.00	80.00	0.19	0.17	0.3	41.5	0.5	39.4
81.00	81.00	0.20	0.17	0.3	41.1	0.9	29.4
82.00	82.00	0.21	0.18	0.3	40.6	0.7	23.7
83.00	83.00	0.22	0.19	0.3	40.2	0.8	31.0
84.00	84.00	0.24	0.20	0.3	39.7	0.8	32.0
85.00	85.00	0.25	0.20	0.3	39.2	0.9	29.2
86.00	86.00	0.26	0.21	0.3	39.0	0.8	30.3
87.00	87.00	0.27	0.22	0.4	38.6	0.9	31.2
88.00	88.00	0.29	0.23	0.4	38.4	0.9	37.7
89.00	89.00	0.30	0.24	0.4	38.3	0.7	34.7
90.00	90.00	0.31	0.24	0.4	38.1	0.7	36.7
91.00	91.00	0.32	0.25	0.4	38.0	0.7	23.7
92.00	92.00	0.33	0.25	0.4	37.7	0.7	26.8
93.00	93.00	0.34	0.26	0.4	37.6	0.7	39.2
94.00	94.00	0.35	0.27	0.4	37.7	0.7	41.0
95.00	95.00	0.36	0.28	0.5	37.9	0.7	41.8
96.00	96.00	0.36	0.28	0.5	38.0	0.5	39.2
97.00	97.00	0.37	0.29	0.5	38.0	0.5	40.5
98.00	98.00	0.38	0.29	0.5	38.0	0.5	30.5
99.00	99.00	0.38	0.30	0.5	38.0	0.3	26.1
100.00	100.00	0.38	0.30	0.5	38.0	0.2	36.3
101.00	101.00	0.39	0.30	0.5	38.0	0.4	39.8
102.00	102.00	0.39	0.31	0.5	38.0	0.3	29.0
103.00	103.00	0.40	0.31	0.5	37.8	0.1	359.5
104.00	104.00	0.40	0.31	0.5	37.7	0.2	15.4
105.00	105.00	0.41	0.31	0.5	37.5	0.4	25.7
106.00	106.00	0.41	0.31	0.5	37.5	0.2	44.7
107.00	107.00	0.41	0.32	0.5	37.5	0.2	78.4
108.00	108.00	0.42	0.32	0.5	37.8	0.4	61.8
109.00	109.00	0.42	0.33	0.5	38.1	0.4	61.8
110.00	110.00	0.42	0.33	0.5	38.3	0.2	58.6
111.00	111.00	0.42	0.34	0.5	38.5	0.3	55.3
112.00	112.00	0.43	0.34	0.5	38.6	0.3	49.1
113.00	113.00	0.43	0.34	0.6	38.7	0.3	41.6
114.00	114.00	0.43	0.35	0.6	38.6	0.3	28.0
115.00	115.00	0.44	0.35	0.6	38.6	0.5	37.5
116.00	116.00	0.45	0.35	0.6	38.5	0.3	25.1
117.00	117.00	0.45	0.36	0.6	38.4	0.3	37.4
118.00	118.00	0.46	0.36	0.6	38.2	0.4	34.0
119.00	119.00	0.46	0.36	0.6	38.1	0.3	18.8
120.00	120.00	0.47	0.36	0.6	37.9	0.3	11.8
121.00	121.00	0.47	0.36	0.6	37.7	0.3	20.6
122.00	122.00	0.48	0.37	0.6	37.4	0.5	29.8
123.00	123.00	0.48	0.37	0.6	37.2	0.4	15.3
124.00	124.00	0.49	0.37	0.6	37.1	0.2	7.9
125.00	125.00	0.49	0.37	0.6	36.9	0.3	10.5
125.76	125.76	0.50	0.37	0.6	36.7	0.3	7.5

Century
WIRELINE SERVICES

**DENSITY - RES - NEUTRON
GAMMA - CALIPER
CM11-22-CH**

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>COMPANY</td> <td>NMP COAL CANADA LTD</td> </tr> <tr> <td>WELL</td> <td>CM11-22-CH</td> </tr> <tr> <td>FIELD</td> <td>CANADA</td> </tr> <tr> <td>COUNTRY</td> <td>ALBERTA</td> </tr> <tr> <td>PROVINCE</td> <td></td> </tr> <tr> <td>SECTION</td> <td>N/A</td> </tr> <tr> <td>TOWNSHIP</td> <td>N/A</td> </tr> <tr> <td>RANGE</td> <td>N/A</td> </tr> <tr> <td>LICENSE NO.</td> <td>N/A</td> </tr> <tr> <td>UNIQUE WELL ID</td> <td>N/A</td> </tr> </table>	COMPANY	NMP COAL CANADA LTD	WELL	CM11-22-CH	FIELD	CANADA	COUNTRY	ALBERTA	PROVINCE		SECTION	N/A	TOWNSHIP	N/A	RANGE	N/A	LICENSE NO.	N/A	UNIQUE WELL ID	N/A	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>OTHER SERVICES:</td> <td>DEV-TEM NEU-TP DEN-TP</td> </tr> </table>	OTHER SERVICES:	DEV-TEM NEU-TP DEN-TP
COMPANY	NMP COAL CANADA LTD																						
WELL	CM11-22-CH																						
FIELD	CANADA																						
COUNTRY	ALBERTA																						
PROVINCE																							
SECTION	N/A																						
TOWNSHIP	N/A																						
RANGE	N/A																						
LICENSE NO.	N/A																						
UNIQUE WELL ID	N/A																						
OTHER SERVICES:	DEV-TEM NEU-TP DEN-TP																						

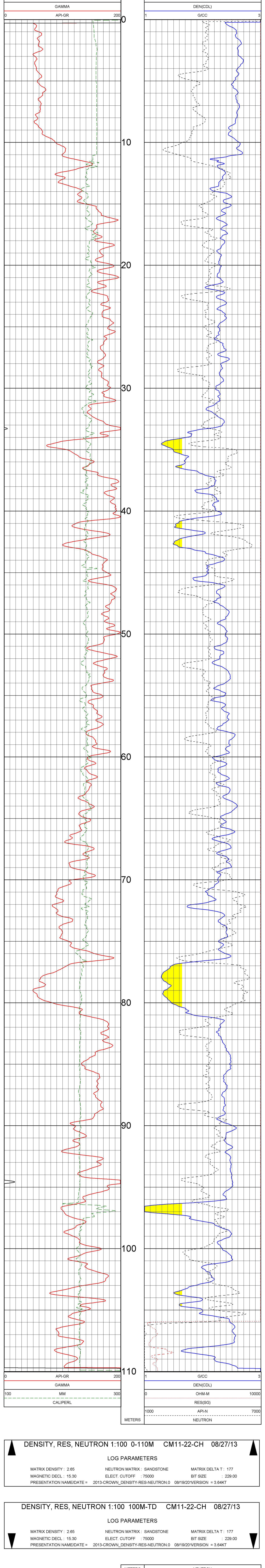
DATE	08/27/13	RIG NUMBER	N/A
DEPT/ DRILLER	12830	LOGGERS TO	12838
BIT SIZE	228/00	ARRIVAL TIME	12:30
LOG TOP	0.00	DEPARTURE TIME	19:00
LOG BOTTOM	128.09	CIRC STOPPED	N/A
CASING LOGGER	11.50		
CASING DRILLER	12.00		
CASING TYPE	SURFACE		
BOREHOLE FLUID	H2O		
RM TEMPERATURE	N/A		
MUD RES	N/A		
MUD WEIGHT	1.00		
WITNESSED BY	M. ESKRICK		
RECORDED BY	C. JOHNSON		
REMARKS 1	NORTHING 5619706.7 EASTING 66375.33		
REMARKS 2			

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS.

DENSITY, RES, NEUTRON 1:100 0-110M CM11-22-CH 08/27/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT



DENSITY, RES, NEUTRON 1:100 0-110M CM11-22-CH 08/27/13

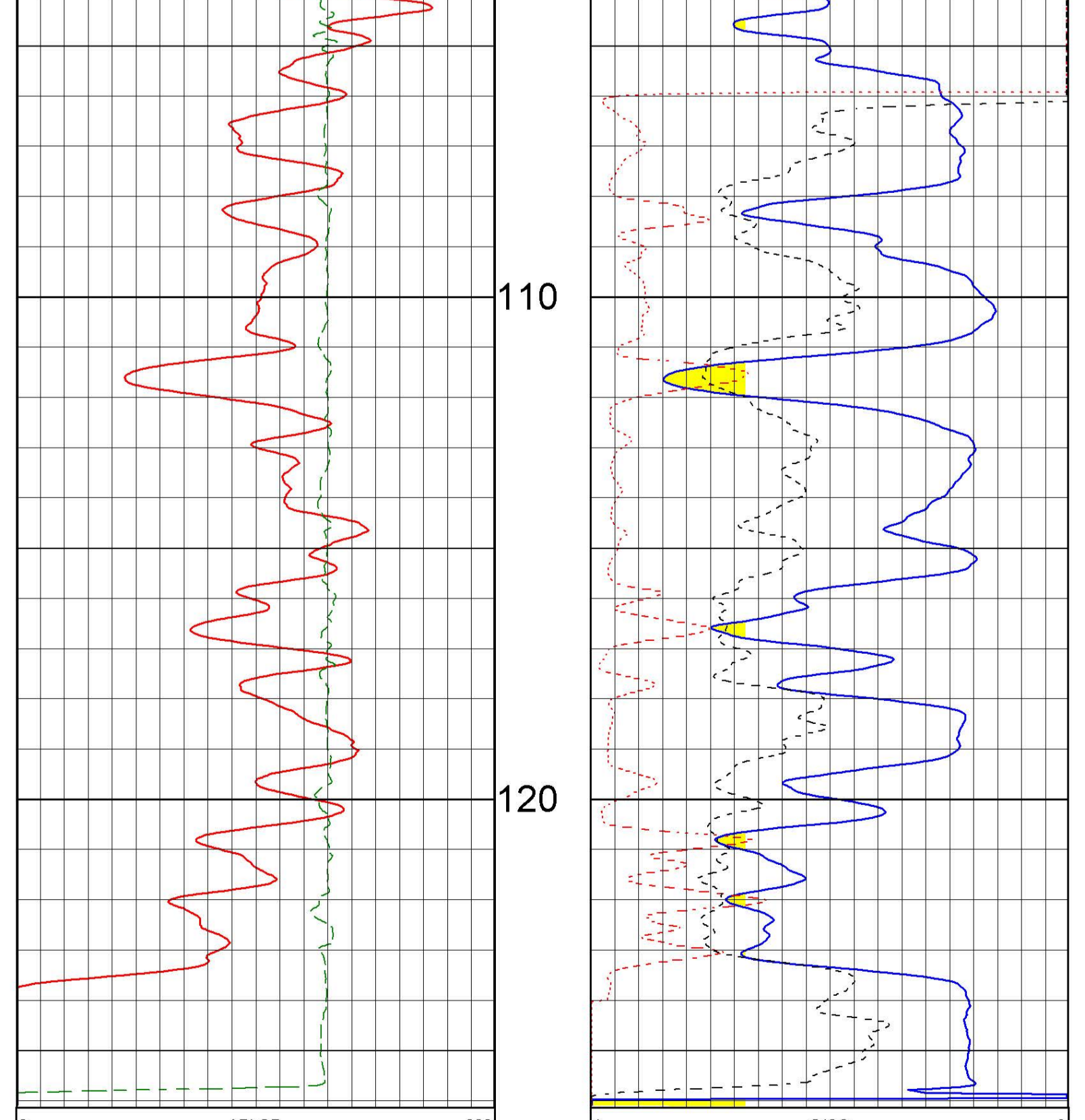
LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT

DENSITY, RES, NEUTRON 1:100 100M-TD CM11-22-CH 08/27/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT



DENSITY, RES, NEUTRON 1:100 100M-TD CM11-22-CH 08/27/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT

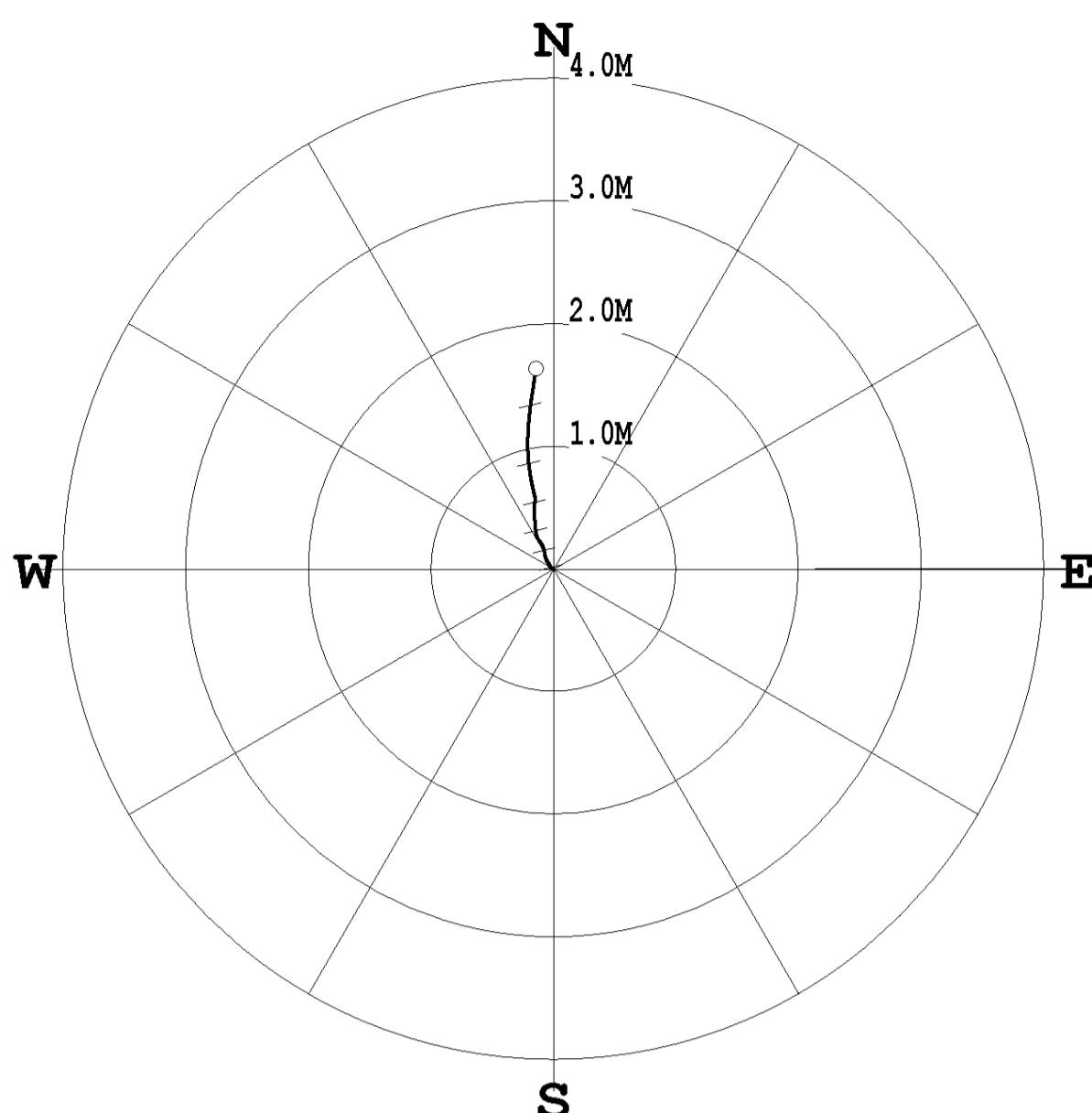
DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Jun25,13 15:33:14	GAMMA	0.000	0.100 [CPS]
	Jun25,13 15:33:14	GAMMA	545.000	558.000 [CPS]
2	Aug19,13 13:06:53	VOLTAGE	26.200	4350.000 [CPS]
	Aug19,13 13:06:53	VOLTAGE	227.600	3150.000 [CPS]
3	Mar06,13 15:12:26	CALIPER	76.400	11754.000 [CPS]
	Mar06,13 15:12:26	CALIPER	177.600	347620.000 [CPS]
4	Aug19,13 13:07:09	DEN(LS)	1.620	17088.000 [CPS]
	Aug19,13 13:07:09	DEN(LS)	2.812	2283.000 [CPS]
5	Aug27,13 18:24:35	DEN(SS)	1.590	6854.000 [CPS]
	Aug27,13 18:24:35	DEN(SS)	2.580	26130.000 [CPS]
6	Aug19,13 13:07:41	CALIPERL	100.000	112529.000 [CPS]
	Aug19,13 13:07:41	CALIPERL	200.000	217210.000 [CPS]
7	Aug19,13 13:08:07	CURRENT	28.200	8769.000 [CPS]
	Aug19,13 13:08:07	CURRENT	227.600	26334.000 [CPS]
8	Feb14,10 11:28:44	F	Default	
9	Feb14,10 11:28:44	X	Default	

PLAN VIEW COMPU-LOG DEVIATION

CLIENT: NWP COAL CANADA LTD
 LOCATION: N/A
 HOLE ID: CM12-01-CH
 DATE OF LOG: 08/24/13
 PROBE: 9058A 4565



SCALE: 1 M/CM
 TRUE DEPTH: 151.02 M
 AZIMUTH: 355.0
 DISTANCE: 1.6 M
 + = 20 M INCR
 ○ = BOTTOM OF HOLE



* * * * * COMPU-LOG - VERTICAL DEVIATION * * * * *

CLIENT : NWP COAL CANADA LTD HOLE ID. : CM12-01-CH
 FIELD OFFICE : CENTURY DATE OF LOG : 08/24/13
 DATA FROM : N/A PROBE : 9058A , 4565
 MAG. DECL. : 15.300 DEPTH UNITS : METERS
 LOG: CM12-01-CH_08-24-13_18-27_9058A_.02_35.00_151.24_DEVI.log

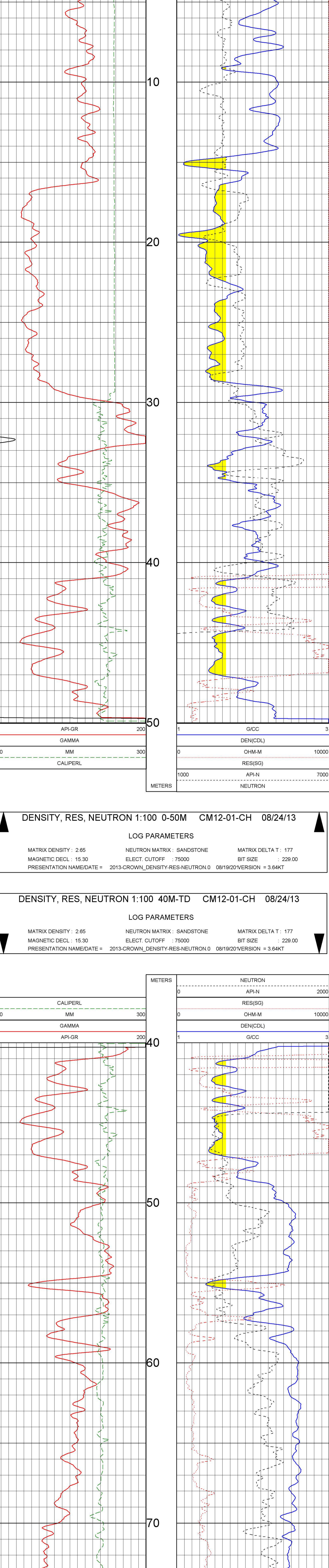
CABLE DEPTH	TRUE DEPTH	NORTH DEV.	EAST DEV.	DISTANCE	AZIMUTH	SANG	SANGB
35.02	35.02	0.00	-0.00	0.0	278.5	0.2	278.5
36.00	36.00	0.00	-0.00	0.0	279.9	0.3	273.1
37.00	37.00	0.00	-0.01	0.0	289.2	0.1	287.4
38.00	38.00	0.01	-0.01	0.0	294.2	0.2	293.9
39.00	39.00	0.01	-0.02	0.0	298.0	0.4	308.0
40.00	40.00	0.01	-0.02	0.0	300.6	0.5	328.9
41.00	41.00	0.02	-0.03	0.0	304.1	0.4	330.9
42.00	42.00	0.02	-0.03	0.0	308.4	0.4	325.5
43.00	43.00	0.03	-0.04	0.0	311.4	0.5	322.8
44.00	44.00	0.04	-0.04	0.1	313.5	0.5	333.7
45.00	45.00	0.05	-0.05	0.1	315.1	0.4	330.5
46.00	46.00	0.05	-0.05	0.1	316.4	0.3	329.4
47.00	47.00	0.06	-0.05	0.1	317.5	0.4	330.9
48.00	48.00	0.06	-0.06	0.1	318.9	0.5	331.6
49.00	49.00	0.07	-0.06	0.1	320.4	0.3	334.5
50.00	50.00	0.08	-0.06	0.1	321.7	0.5	339.2
51.00	51.00	0.09	-0.06	0.1	323.1	0.5	339.1
52.00	52.00	0.09	-0.07	0.1	324.4	0.5	334.1
53.00	53.00	0.10	-0.07	0.1	325.6	0.5	343.7
54.00	54.00	0.11	-0.07	0.1	327.0	0.3	2.1
55.00	55.00	0.12	-0.07	0.1	328.5	0.5	348.1
56.00	56.00	0.12	-0.07	0.1	330.0	0.3	356.2
57.00	57.00	0.13	-0.07	0.2	331.3	0.5	1.5
58.00	58.00	0.14	-0.07	0.2	332.2	0.4	307.4
59.00	59.00	0.15	-0.08	0.2	332.1	0.3	357.1
60.00	60.00	0.15	-0.08	0.2	332.9	0.3	347.2
61.00	61.00	0.16	-0.08	0.2	333.5	0.3	350.0
62.00	62.00	0.16	-0.08	0.2	333.9	0.5	330.3
63.00	63.00	0.17	-0.08	0.2	334.2	0.4	339.1
64.00	64.00	0.18	-0.09	0.2	334.3	0.5	354.4
65.00	65.00	0.19	-0.09	0.2	334.5	0.5	331.5
66.00	66.00	0.19	-0.09	0.2	334.6	0.5	335.2
67.00	67.00	0.20	-0.09	0.2	334.5	0.2	324.7
68.00	68.00	0.20	-0.10	0.2	334.3	0.3	315.8
69.00	69.00	0.21	-0.10	0.2	334.0	0.4	327.6
70.00	70.00	0.22	-0.11	0.2	333.6	0.5	321.6
71.00	71.00	0.23	-0.12	0.3	333.1	0.7	326.0
72.00	72.00	0.24	-0.12	0.3	332.8	0.7	326.3
73.00	73.00	0.25	-0.13	0.3	332.6	0.5	328.3
74.00	74.00	0.26	-0.13	0.3	332.7	0.5	329.2
75.00	75.00	0.26	-0.14	0.3	332.8	0.4	330.8
76.00	76.00	0.28	-0.14	0.3	333.3	0.7	344.0
77.00	77.00	0.29	-0.14	0.3	333.7	0.6	349.3
78.00	78.00	0.30	-0.14	0.3	334.2	0.4	354.4
79.00	79.00	0.30	-0.14	0.3	334.6	0.5	9.2
80.00	80.00	0.31	-0.15	0.3	335.1	0.7	356.9
81.00	81.00	0.33	-0.15	0.4	335.7	0.9	350.2
82.00	82.00	0.34	-0.15	0.4	336.2	0.6	356.2
83.00	83.00	0.35	-0.15	0.4	336.6	0.3	359.4
84.00	84.00	0.36	-0.15	0.4	337.1	0.6	351.3
85.00	85.00	0.37	-0.15	0.4	337.5	0.6	350.2
86.00	86.00	0.38	-0.15	0.4	338.0	0.5	26.2
87.00	87.00	0.39	-0.15	0.4	338.6	0.4	2.0
88.00	88.00	0.40	-0.15	0.4	338.9	1.0	352.2
89.00	89.00	0.42	-0.16	0.4	339.3	0.8	353.9
90.00	90.00	0.43	-0.16	0.5	339.8	0.9	357.0
91.00	91.00	0.44	-0.16	0.5	340.2	0.7	356.0
92.00	92.00	0.45	-0.16	0.5	340.6	0.4	2.0
93.00	93.00	0.46	-0.16	0.5	341.0	0.8	358.5
94.00	94.00	0.47	-0.16	0.5	341.4	0.4	3.2
95.00	95.00	0.48	-0.16	0.5	341.8	0.7	0.7
96.00	96.00	0.49	-0.16	0.5	342.1	0.8	10.9
97.00	97.00	0.51	-0.16	0.5	342.7	1.2	357.7
98.00	98.00	0.52	-0.16	0.5	343.3	0.7	4.6
99.00	99.00	0.53	-0.16	0.6	343.7	0.5	15.0
100.00	100.00	0.54	-0.15	0.6	344.2	0.7	10.9
101.00	101.00	0.56	-0.15	0.6	344.7	0.9	2.5
102.00	102.00	0.57	-0.15	0.6	345.0	0.7	5.8
103.00	103.00	0.58	-0.15	0.6	345.2	0.6	354.8
104.00	104.00	0.60	-0.16	0.6	345.4	0.7	355.3
105.00	105.00	0.61	-0.16	0.6	345.5	0.9	344.7
106.00	106.00	0.62	-0.16	0.6	345.4	0.7	342.0
107.00	107.00	0.64	-0.17	0.7	345.4	0.9	348.0
108.00	108.00	0.66	-0.17	0.7	345.5	1.1	349.6
109.00	109.00	0.67	-0.17	0.7	345.6	1.0	351.0
110.00	110.00	0.69	-0.18	0.7	345.6	0.8	343.9
111.00	111.00	0.70	-0.18	0.7	345.6	1.0	352.5
112.00	112.00	0.72	-0.18	0.7	345.8	1.0	346.8
113.00	113.00	0.74	-0.19	0.8	345.9	1.1	350.0
114.00	114.00	0.75	-0.19	0.8	346.0	0.8	344.1
115.00	115.00	0.77	-0.19	0.8	346.1	1.0	349.2
116.00	115.99	0.79	-0.19	0.8	346.2	1.1	352.1
117.00	116.99	0.81	-0.20	0.8	346.3	0.8	342.5
118.00	117.99	0.82	-0.20	0.8	346.3	0.8	6.4
119.00	118.99	0.84	-0.20	0.9	346.5	1.0	350.6
120.00	119.99	0.86	-0.20	0.9	346.7	1.1	353.7
121.00	120.99	0.88	-0.21	0.9	346.8	1.0	354.7
122.00	121.99	0.90	-0.21	0.9	346.9	1.1	355.3
123.00	122.99	0.91	-0.21	0.9	347.1	1.0	359.1
124.00	123.99	0.93	-0.21	1.0	347.3	1.5	358.2
125.00	124.99	0.96	-0.21	1.0	347.6	1.1	359.6
126.00	125.99	0.97	-0.21	1.0	347.7	1.2	356.4
127.00	126.99	1.00	-0.21	1.0	348.0	1.4	0.4
128.00	127.99	1.03	-0.21	1.0	348.3	1.6	359.7
129.00	128.99	1.05	-0.21	1.1	348.6	1.1	0.8
130.00	129.99	1.08	-0.21	1.1	348.9	1.4	2.3
131.00	130.99	1.10	-0.21	1.1	349.2	1.5	2.4
132.00	131.99	1.13	-0.21	1.1	349.6	1.7	3.8
133.00	132.99	1.16	-0.21	1.2	350.0	1.6	3.8
134.00	133.99	1.19	-0.20	1.2	350.2	1.2	4.5
135.00	134.99	1.21	-0.20	1.2	350.5	1.2	5.2
136.00	135.99	1.23	-0.20	1.2	350.8	1.5	5.8
137.00	136.99	1.26	-0.20	1.3	351.1	1.5	4.5
138.00	137.99	1.28	-0.19	1.3	351.4	1.5	6.0
139.00	138.99	1.31	-0.19	1.3	351.7	1.5	7.1
140.00	139.99	1.33	-0.19	1.3	352.0	1.6	7.1
141.00	140.99	1.36	-0.19	1.4	352.2	1.4	8.9
142.00	141.99	1.39	-0.18	1.4	352.5	1.5	9.2
143.00	142.99	1.41	-0.18	1.4	352.8	1.4	9.6
144.00	143.99	1.44	-0.17	1.4	353.1	1.5	7.3
145.00	144.99	1.47	-0.17	1.5	353.4	1.9	8.4
146.00	145.99	1.50	-0.17	1.5	353.7	1.7	7.5
147.00	146.99	1.52	-0.16	1.5	354.0	1.5	8.3
148.00	147.99	1.55	-0.16	1.6	354.2	1.3	7.2
149.00	148.99	1.57	-0.15	1.6	354.4	1.5	9.1
150.00	149.98	1.60	-0.15	1.6	354.7	1.8	10.2
151.00	150.98	1.63	-0.14	1.6	354.9	1.5	10.2
151.04	151.02	1.63	-0.14	1.6	355.0	1.5	10.4

COMPANY	NWP COIL CANADA LTD	OTHER SERVICES	DEN-TP
WELL	CM12-01-CH	DEN-TP	NEU-TP
COUNTRY	CANADA	NEU-TP	
PROVINCE	ALBERTA		
SECTION	N/A		
TOWNSHIP	N/A		
RANGE	N/A		
LICENSE NO.	N/A		
UNIT/LEVEL ID	N/A		
PERMANENT DATUM	GL	ELEVATION RIG	N/A
LOG MEASURED FROM GL		ELEVATION DIF	N/A
DATE	08/24/13	ELEVATION GL	2143.19
DEPT# DRILLER	152.00	RIG NUMBER	N/A
BIT SIZE	229.00	LOGGERS TD	151.61
LOG TOP	0.00	ARRIVAL TIME	10:00
LOG BOTTOM	151.32	DEPARTURE TIME	20:00
CASING DRILLER	28.80	CIRC STOPPED	N/A
CASING TYPE	SURFACE		
ROBOUT F LUID	H2O		
RHO TEMPERATURE	N/A		
MUD WEIGHT	1.00		
WITNESSED BY	M. EMBRIK		
RECORDED BY	C. JOHNSTON		
REMARKS 1	NORTHING 962437		
REMARKS 2	EASTING 962437		

DENSITY, RES, NEUTRON 1:100 0-50M CM12-01-CH 08/24/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT		



DENSITY, RES, NEUTRON 1:100 0-50M CM12-01-CH 08/24/13

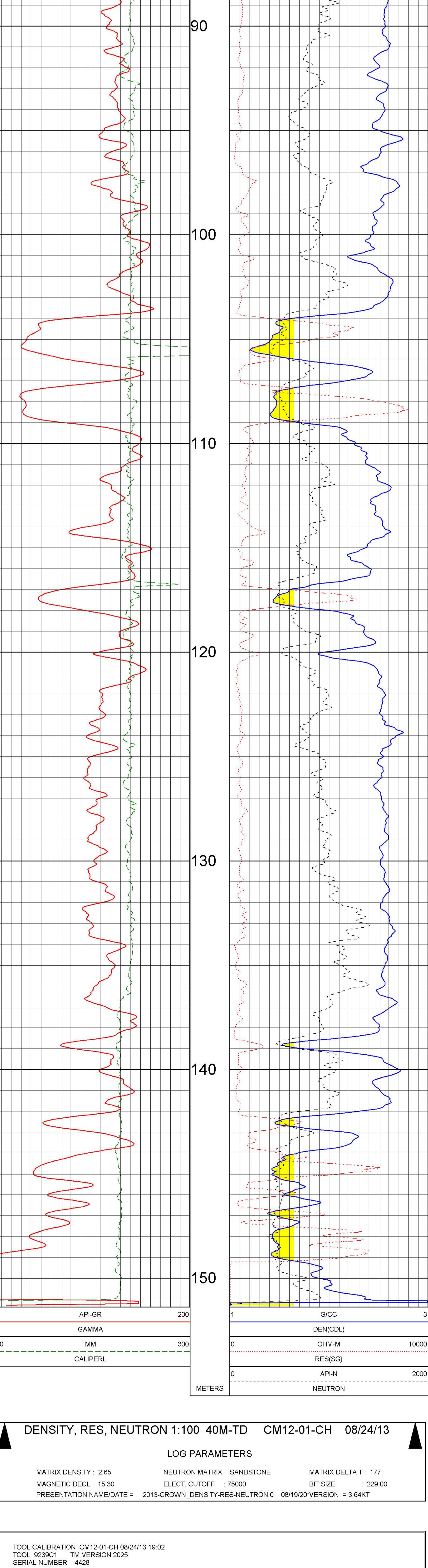
LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT		

DENSITY, RES, NEUTRON 1:100 40M-TD CM12-01-CH 08/24/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT		



DENSITY, RES, NEUTRON 1:100 40M-TD CM12-01-CH 08/24/13

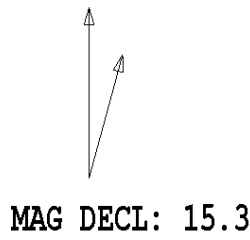
LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT		

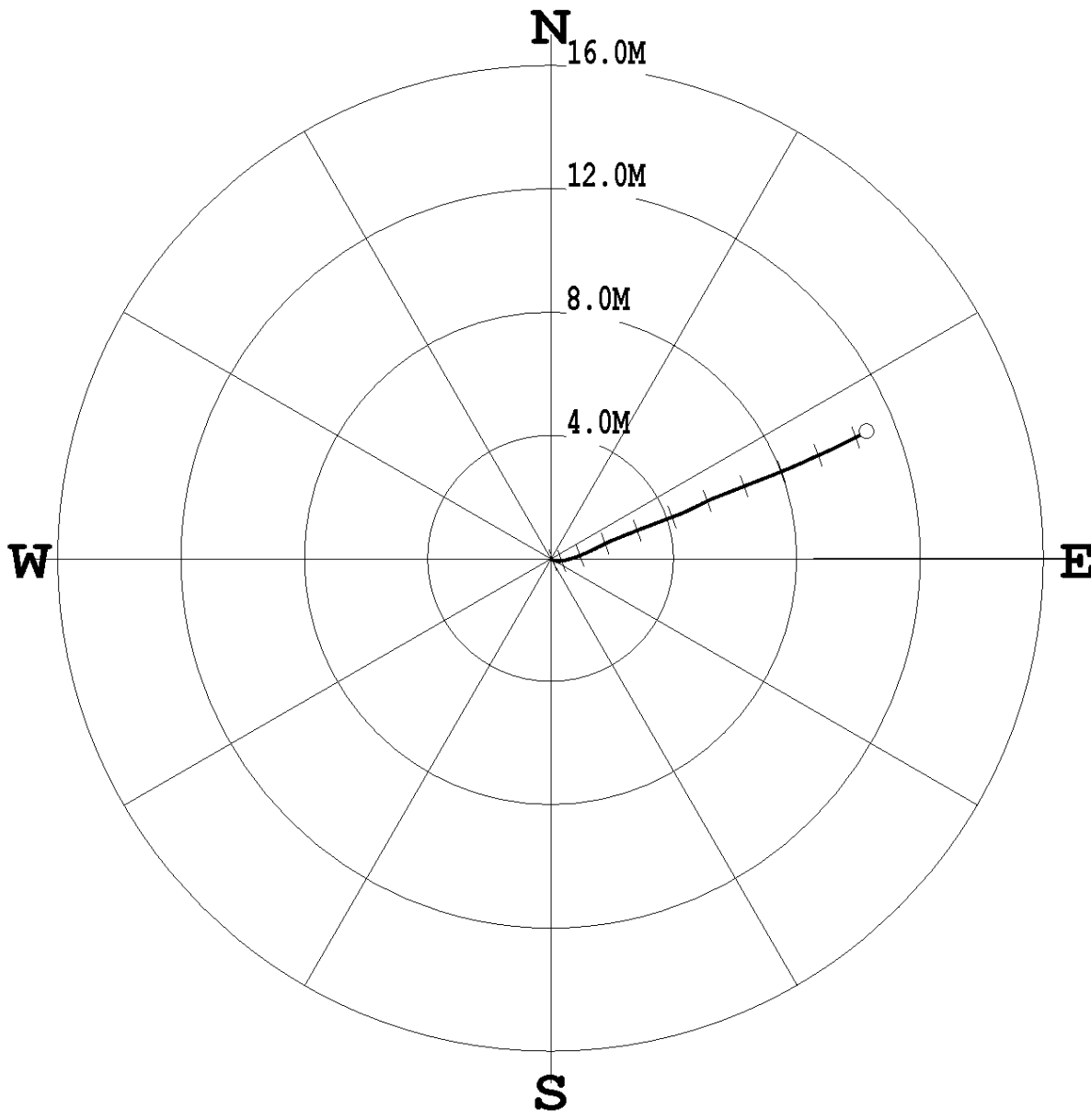
DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Jun25.13 15:33:14	GAMMA	0.000	[API-GR] 0.100 [CPS]
2	Jun25.13 15:33:14	GAMMA	545.000	[API-GR] 558.000 [CPS]
3	Aug19.13 13:06:53	VOLTAGE	26.200	[MV] 4350.000 [CPS]
4	Aug19.13 13:06:53	CALIPER	76.400	[CM] 117554.000 [CPS]
5	Mar08.13 15:12:26	CALIPER	177.800	[CM] 347820.000 [CPS]
6	Aug19.13 13:07:09	DEN(LS)	1.620	[G/CC] 17088.000 [CPS]
7	Aug19.13 13:07:09	DEN(SS)	2.612	[G/CC] 2263.000 [CPS]
8	Aug19.13 13:07:26	DEN(SS)	1.590	[G/CC] 64540.000 [CPS]
9	Aug19.13 13:07:26	DEN(SS)	2.580	[G/CC] 26130.000 [CPS]
10	Aug19.13 13:07:41	CALIPERL	100.000	[CM] 112529.000 [CPS]
11	Aug19.13 13:07:41	CALIPERL	200.000	[CM] 217210.000 [CPS]
12	Aug19.13 13:08:07	CURRENT	26.200	[UA] 8769.000 [CPS]
13	Aug19.13 13:08:07	CURRENT	227.600	[UA] 26334.000 [CPS]
14	Feb14.10 11:28:44	F	Default	
15	Feb14.10 11:28:44	X	Default	

PLAN VIEW COMPU-LOG DEVIATION

CLIENT: NWP COAL CANADA LTD
 LOCATION: N/A
 HOLE ID: CM13-15-CH
 DATE OF LOG: 09/08/13
 PROBE: 9057A 4430



SCALE: 2 M/CM
 TRUE DEPTH: 123.11 M
 AZIMUTH: 68.1
 DISTANCE: 11.1 M
 + = 10 M INCR
 ○ = BOTTOM OF HOLE



* * * * * COMPU-LOG - VERTICAL DEVIATION * * * * *

CLIENT : NWP COAL CANADA LTD HOLE ID. : CM13-15-CH
 FIELD OFFICE : CENTURY DATE OF LOG : 09/08/13
 DATA FROM : N/A PROBE : 9057A , 4430
 MAG. DECL. : 15.300 DEPTH UNITS : METERS
 LOG: CM13-15-CH_09-08-13_19-33_9057A_.02_14.00_123.96_DEVI.log

CABLE DEPTH	TRUE DEPTH	NORTH DEV.	EAST DEV.	DISTANCE	AZIMUTH	SANG	SANGB
14.00	14.00	-0.00	0.00	0.0	133.8	0.4	133.8
15.00	15.00	-0.01	0.01	0.0	131.2	0.7	118.2
16.00	16.00	-0.01	0.02	0.0	126.7	0.7	119.3
17.00	17.00	-0.02	0.03	0.0	126.4	0.7	124.9
18.00	18.00	-0.03	0.04	0.0	125.4	0.7	127.5
19.00	19.00	-0.03	0.05	0.1	124.5	0.8	119.7
20.00	20.00	-0.04	0.06	0.1	123.2	0.7	114.9
21.00	21.00	-0.05	0.08	0.1	121.4	0.8	117.9
22.00	22.00	-0.05	0.09	0.1	118.8	1.2	103.5
23.00	23.00	-0.06	0.12	0.1	116.8	1.2	105.3
24.00	24.00	-0.06	0.14	0.2	114.8	1.4	108.0
25.00	25.00	-0.07	0.16	0.2	113.0	1.7	96.6
26.00	26.00	-0.07	0.19	0.2	111.0	1.6	99.9
27.00	27.00	-0.08	0.22	0.2	108.9	1.8	91.7
28.00	28.00	-0.08	0.26	0.3	106.4	2.2	86.9
29.00	29.00	-0.07	0.30	0.3	103.8	2.4	86.0
30.00	29.99	-0.07	0.34	0.3	101.2	2.7	83.0
31.00	30.99	-0.06	0.39	0.4	98.7	2.7	80.4
32.00	31.99	-0.05	0.44	0.4	96.3	2.8	76.7
33.00	32.99	-0.04	0.50	0.5	94.3	2.7	77.6
34.00	33.99	-0.02	0.55	0.5	92.5	3.3	71.2
35.00	34.99	-0.01	0.60	0.6	90.9	3.4	77.2
36.00	35.99	0.01	0.67	0.7	89.3	3.8	73.5
37.00	36.98	0.03	0.73	0.7	87.9	3.3	67.8
38.00	37.98	0.05	0.80	0.8	86.4	4.4	66.8
39.00	38.98	0.07	0.86	0.9	85.1	4.6	67.6
40.00	39.98	0.11	0.94	0.9	83.6	4.8	67.7
41.00	40.97	0.14	1.02	1.0	82.3	5.2	67.6
42.00	41.97	0.17	1.10	1.1	81.1	4.7	67.2
43.00	42.96	0.20	1.17	1.2	80.1	4.8	65.9
44.00	43.96	0.24	1.25	1.3	79.2	4.5	65.8
45.00	44.96	0.27	1.32	1.3	78.3	5.2	62.7
46.00	45.95	0.31	1.40	1.4	77.4	5.3	63.6
47.00	46.95	0.35	1.48	1.5	76.7	5.0	65.8
48.00	47.94	0.40	1.57	1.6	75.8	5.9	63.4
49.00	48.94	0.44	1.66	1.7	75.1	5.8	55.3
50.00	49.93	0.49	1.75	1.8	74.5	5.9	66.3
51.00	50.93	0.54	1.85	1.9	73.8	6.4	64.8
52.00	51.92	0.58	1.94	2.0	73.4	5.6	69.0
53.00	52.92	0.62	2.03	2.1	73.2	6.3	69.2
54.00	53.91	0.66	2.14	2.2	72.9	6.7	68.6
55.00	54.90	0.70	2.24	2.4	72.7	6.1	67.7
56.00	55.90	0.74	2.35	2.5	72.5	6.5	68.1
57.00	56.89	0.78	2.45	2.6	72.3	6.2	69.6
58.00	57.89	0.82	2.56	2.7	72.1	7.0	68.0
59.00	58.88	0.87	2.67	2.8	72.0	7.0	67.5
60.00	59.87	0.91	2.78	2.9	71.8	6.9	68.1
61.00	60.86	0.96	2.89	3.0	71.7	6.6	67.7
62.00	61.86	1.00	3.00	3.2	71.6	6.7	69.6
63.00	62.85	1.04	3.11	3.3	71.5	6.9	71.9
64.00	63.84	1.08	3.22	3.4	71.4	6.8	68.9
65.00	64.84	1.13	3.34	3.5	71.3	7.3	70.8
66.00	65.83	1.17	3.45	3.6	71.3	7.0	69.2
67.00	66.82	1.21	3.57	3.8	71.2	6.9	69.1
68.00	67.81	1.26	3.68	3.9	71.1	6.8	69.2
69.00	68.81	1.30	3.79	4.0	71.1	7.2	67.6
70.00	69.80	1.34	3.91	4.1	71.0	7.0	68.9
71.00	70.79	1.39	4.02	4.3	71.0	7.1	69.5
72.00	71.78	1.43	4.14	4.4	70.9	7.2	70.1
73.00	72.78	1.48	4.25	4.5	70.9	7.2	64.8
74.00	73.77	1.53	4.36	4.6	70.7	7.0	66.7
75.00	74.76	1.58	4.47	4.7	70.6	7.1	60.8
76.00	75.75	1.63	4.59	4.9	70.4	7.4	63.9
77.00	76.74	1.69	4.70	5.0	70.2	7.0	63.6
78.00	77.74	1.74	4.81	5.1	70.1	7.1	61.2
79.00	78.73	1.80	4.92	5.2	69.9	7.4	64.4
80.00	79.72	1.85	5.04	5.4	69.8	7.4	63.9
81.00	80.71	1.91	5.15	5.5	69.7	7.0	64.5
82.00	81.70	1.96	5.26	5.6	69.6	8.1	72.3
83.00	82.70	2.01	5.39	5.7	69.6	7.6	68.6
84.00	83.69	2.05	5.51	5.9	69.5	7.4	68.2
85.00	84.68	2.10	5.63	6.0	69.5	7.4	69.1
86.00	85.67	2.15	5.75	6.1	69.5	7.7	68.6
87.00	86.66	2.19	5.87	6.3	69.5	7.4	67.8
88.00	87.65	2.24	5.98	6.4	69.5	7.4	68.2
89.00	88.65	2.29	6.10	6.5	69.5	7.5	68.3
90.00	89.64	2.33	6.22	6.6	69.4	7.2	67.5
91.00	90.63	2.38	6.34	6.8	69.4	7.3	68.9
92.00	91.62	2.43	6.46	6.9	69.4	7.3	67.0
93.00	92.61	2.47	6.57	7.0	69.4	7.2	68.1
94.00	93.61	2.52	6.69	7.1	69.4	7.4	69.7
95.00	94.60	2.57	6.81	7.3	69.3	7.5	69.3
96.00	95.59	2.61	6.93	7.4	69.3	7.4	68.9
97.00	96.58	2.66	7.05	7.5	69.3	7.2	69.9
98.00	97.57	2.71	7.18	7.7	69.3	7.9	68.8
99.00	98.56	2.76	7.30	7.8	69.3	7.6	67.4
100.00	99.55	2.81	7.42	7.9	69.3	7.5	68.0
101.00	100.55	2.86	7.55	8.1	69.3	7.5	67.7
102.00	101.54	2.91	7.67	8.2	69.2	7.4	68.0
103.00	102.53	2.96	7.78	8.3	69.2	7.2	65.6
104.00	103.52	3.01	7.90	8.5	69.2	7.8	65.7
105.00	104.51	3.06	8.02	8.6	69.1	7.7	67.0
106.00	105.50	3.11	8.14	8.7	69.1	7.4	66.8
107.00	106.50	3.16	8.26	8.8	69.0	7.3	64.7
108.00	107.49	3.22	8.37	9.0	69.0	7.6	65.7
109.00	108.48	3.27	8.49	9.1	68.9	7.0	65.2
110.00	109.47	3.33	8.60	9.2	68.9	7.6	64.7
111.00	110.46	3.38	8.73	9.4	68.8	7.8	68.0
112.00	111.45	3.43	8.85	9.5	68.8	7.5	65.3
113.00	112.44	3.49	8.97	9.6	68.8	7.3	66.0
114.00	113.43	3.54	9.08	9.7	68.7	7.4	64.8
115.00	114.43	3.60	9.20	9.9	68.7	8.1	64.5
116.00	115.42	3.65	9.32	10.0	68.6	7.3	65.5
117.00	116.41	3.71	9.44	10.1	68.5	7.5	63.7
118.00	117.40	3.77	9.56	10.3	68.5	7.5	62.2
119.00	118.39	3.83	9.68	10.4	68.4	8.0	63.5
120.00	119.38	3.90	9.80	10.6	68.3	8.1	62.3
121.00	120.37	3.96	9.93	10.7	68.2	7.9	63.3
122.00	121.36	4.02	10.04	10.8	68.2	7.5	62.5
123.00	122.35	4.08	10.16	11.0	68.1	7.9	61.4
123.76	123.11	4.13	10.25	11.1	68.1	7.8	63.2

Century WIRELINE SERVICES

DENSITY - RES - NEUTRON
GAMMA - CALIPER
CM13-15-CH

COMPANY	NMR COAL CANADA LTD	OTHER SERVICES:	
WELL	CM13-15-CH	DEN-TP	
FIELD	N/A	DEV TEM	
COUNTRY	CANADA	NEU-TP	
PROVINCE	ALBERTA		
LSD	N/A		
SECTION	N/A		
TOWNSHIP	N/A		
RANGE	N/A		
LICENSE NO.	N/A		
UNIQUE WELL ID	N/A		

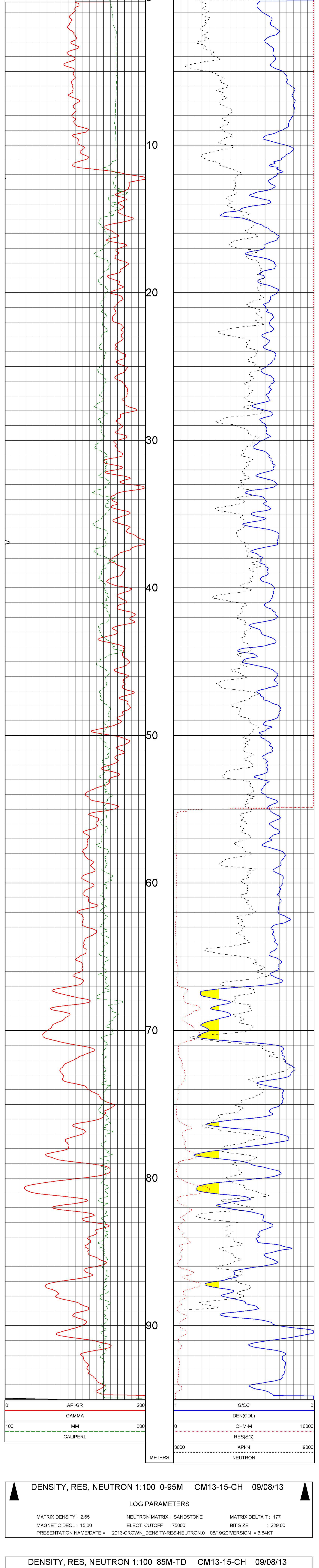
PERMITS	GL	ELEVATION RB	N/A
LOG MEASURED FROM	GL	ELEVATION OF	N/A
DATE	09/08/13	DLI MEASURED FROM	GL
DEPT	DRILLER	RIG NUMBER	N/A
BIT SIZE	228.00	LOGGERS TO	129.33
LOG TOP	0.00	ARRIVAL TIME	18:15
LOG BOTTOM	124.04	DEPARTURE TIME	20:30
CASING LOGGER	11.30	CIRC STOPPED	N/A
CASING DRILLER	12.00		
CASING TYPE	SURFACE		
BOREHOLE FLUID	H2O		
RM TEMPERATURE	N/A		
MUD RES	N/A		
MUD WEIGHT	1.00		
WITNESSED BY	L. BOUTILIER		
RECORDED BY	C. JOHNSON		
REMARKS 1	NORTHING 5621843 EASTING 963217		
REMARKS 2			

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS.

DENSITY, RES, NEUTRON 1:100 0-95M CM13-15-CH 09/08/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
MAGNETIC DECL : 15.30 ELECT_CUTOFF : 75000 BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20 VERSION = 3.64KT



DENSITY, RES, NEUTRON 1:100 0-95M CM13-15-CH 09/08/13

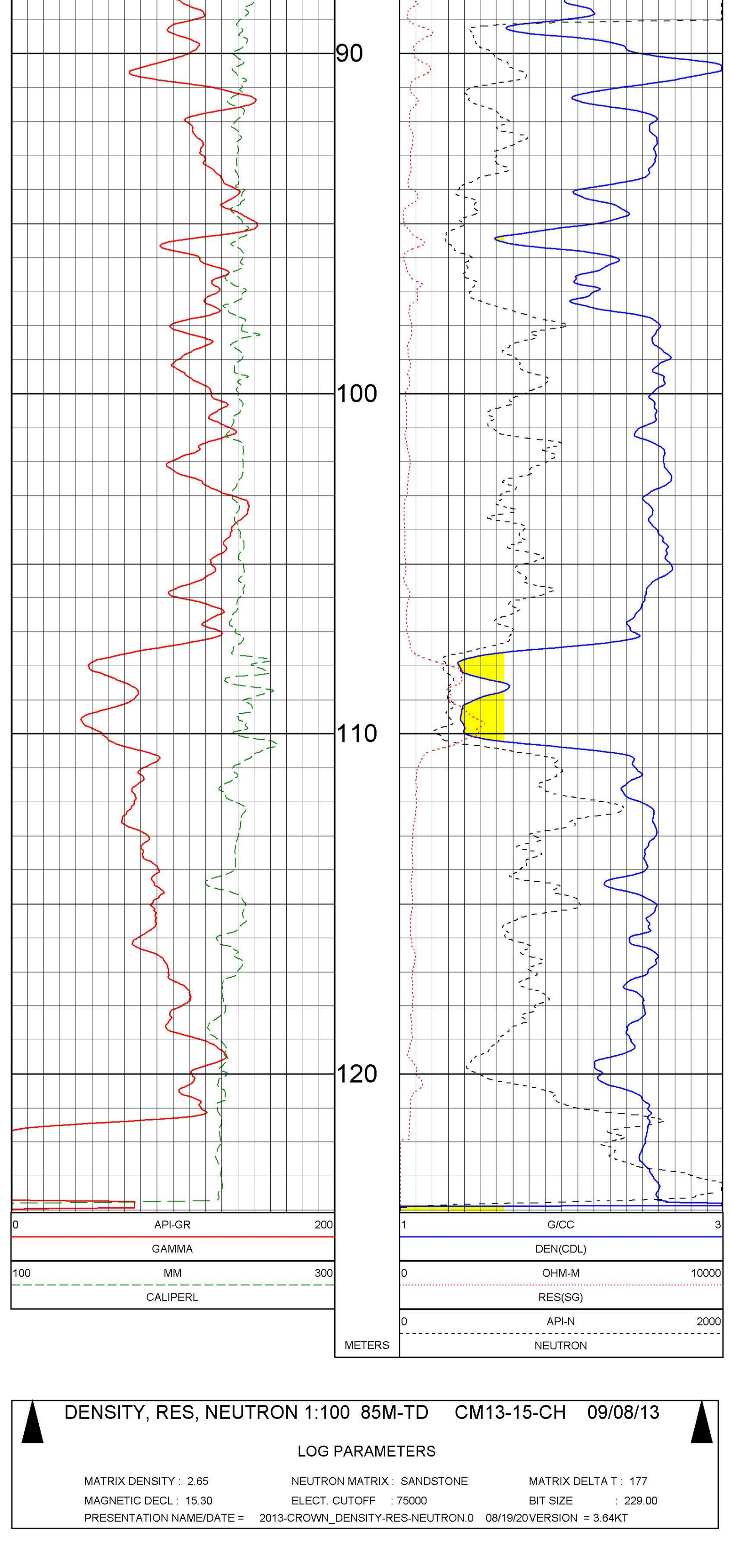
LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
MAGNETIC DECL : 15.30 ELECT_CUTOFF : 75000 BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20 VERSION = 3.64KT

DENSITY, RES, NEUTRON 1:100 85M-TD CM13-15-CH 09/08/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
MAGNETIC DECL : 15.30 ELECT_CUTOFF : 75000 BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20 VERSION = 3.64KT



DENSITY, RES, NEUTRON 1:100 85M-TD CM13-15-CH 09/08/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
MAGNETIC DECL : 15.30 ELECT_CUTOFF : 75000 BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20 VERSION = 3.64KT

TOOL CALIBRATION CM13-15-CH 09/08/13 20:02
TOOL 9239C1 TM VERSION 2025
SERIAL NUMBER 4428

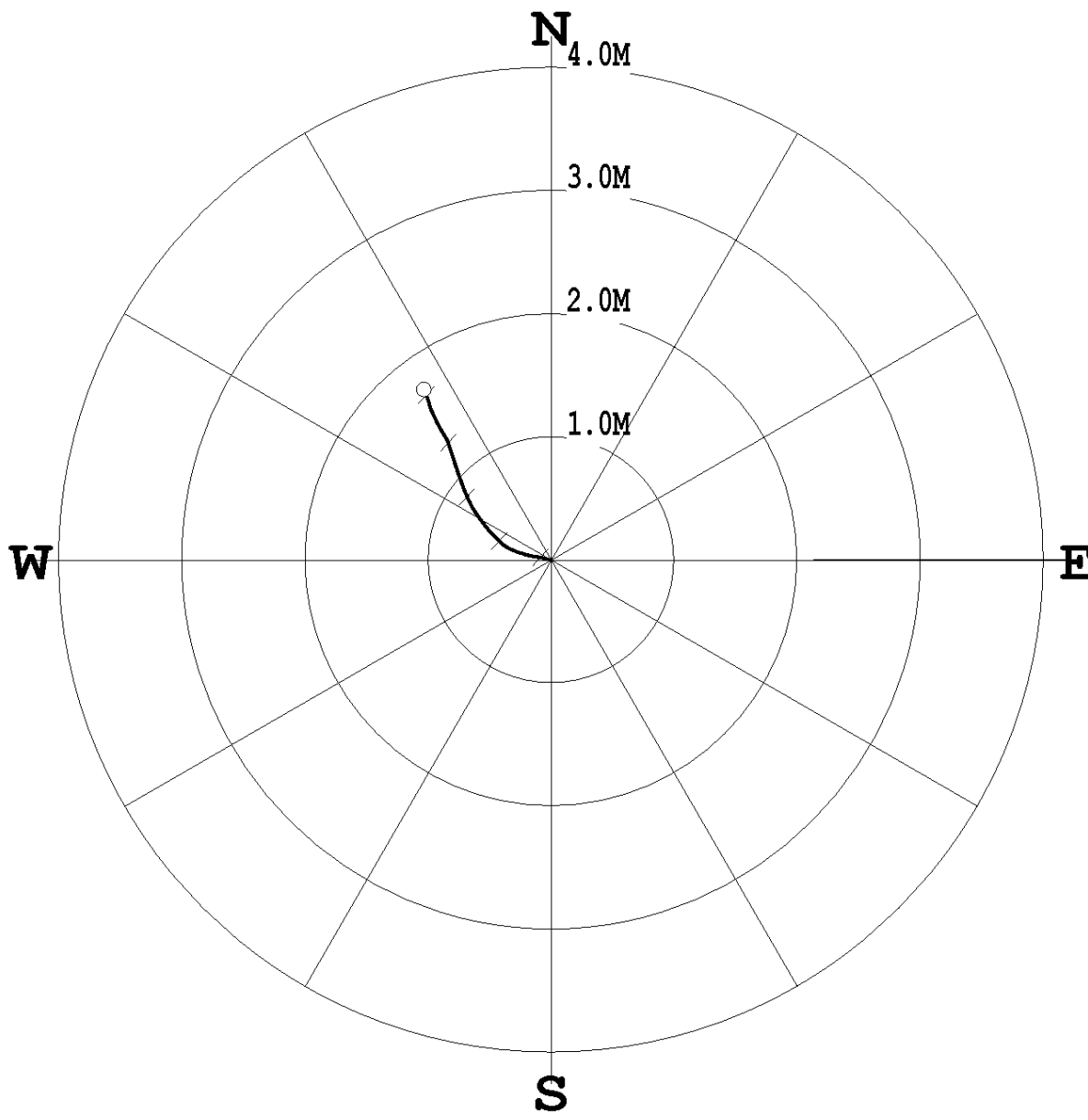
DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Jun25.13 15:33:14	GAMMA	0.000	0.100 [CPS]
2	Jun25.13 15:33:14	GAMMA	545.000	558.000 [CPS]
3	Aug19.13 13:06:53	VOLTAGE	26.200	3150.000 [CPS]
4	Aug19.13 13:06:53	CALIPER	227.600	4350.000 [CPS]
5	Mar06.13 15:12:26	CALIPER	76.400	11754.000 [CPS]
6	Aug19.13 13:07:09	DEN(LS)	1.620	347820.000 [CPS]
7	Aug19.13 13:07:09	DEN(LS)	2.612	17088.000 [CPS]
8	Aug27.13 18:24:35	DEN(SS)	1.590	2263.000 [CPS]
9	Aug27.13 18:24:35	DEN(SS)	2.580	68540.000 [CPS]
10	Aug19.13 13:07:41	CALIPER	100.000	26130.000 [CPS]
11	Aug19.13 13:07:41	CALIPER	200.000	112529.000 [CPS]
12	Aug19.13 13:08:07	CURRENT	26.200	217210.000 [CPS]
13	Aug19.13 13:08:07	CURRENT	227.600	8789.000 [CPS]
14	Feb14.10 11:28:44	F	Default	26334.000 [CPS]
15	Feb14.10 11:28:44	X	Default	

PLAN VIEW COMPU-LOG DEVIATION

CLIENT: NWP COAL CANADA LTD
 LOCATION: N/A
 HOLE ID: CM13-25-CH
 DATE OF LOG: 09/06/13
 PROBE: 9057A 4430



SCALE: 1 M/CM
 TRUE DEPTH: 101.84 M
 AZIMUTH: 323.3
 DISTANCE: 1.7 M
 + = 20 M INCR
 ○ = BOTTOM OF HOLE



* * * * * COMPU-LOG - VERTICAL DEVIATION * * * * *

CLIENT : NWP COAL CANADA LTD HOLE ID. : CM13-25-CH
 FIELD OFFICE : CENTURY DATE OF LOG : 09/06/13
 DATA FROM : N/A PROBE : 9057A , 4430
 MAG. DECL. : 15.300 DEPTH UNITS : METERS
 LOG: CM13-25-CH_09-06-13_13-07_9057A_.02_13.00_102.05_DEVI.log

CABLE DEPTH	TRUE DEPTH	NORTH DEV.	EAST DEV.	DISTANCE	AZIMUTH	SANG	SANGB
13.02	13.02	-0.00	-0.00	0.0	267.1	0.5	267.1
14.00	14.00	0.00	-0.01	0.0	279.2	0.8	278.7
15.00	15.00	0.00	-0.03	0.0	279.4	0.9	280.3
16.00	16.00	0.01	-0.04	0.0	280.8	0.5	289.6
17.00	17.00	0.01	-0.05	0.1	282.8	0.9	285.7
18.00	18.00	0.02	-0.06	0.1	283.8	0.8	284.1
19.00	19.00	0.02	-0.07	0.1	284.0	1.1	290.8
20.00	20.00	0.02	-0.09	0.1	283.3	0.7	275.9
21.00	21.00	0.02	-0.10	0.1	282.9	0.6	281.5
22.00	22.00	0.03	-0.11	0.1	282.6	1.2	273.6
23.00	23.00	0.03	-0.13	0.1	282.3	0.7	273.1
24.00	24.00	0.03	-0.14	0.1	281.9	0.5	281.6
25.00	25.00	0.03	-0.15	0.2	281.6	0.9	273.0
26.00	26.00	0.03	-0.17	0.2	281.8	1.0	288.3
27.00	27.00	0.04	-0.18	0.2	281.7	1.1	277.6
28.00	28.00	0.04	-0.20	0.2	281.9	1.2	289.2
29.00	29.00	0.05	-0.22	0.2	282.4	1.4	296.9
30.00	30.00	0.06	-0.24	0.2	282.8	1.0	285.0
31.00	31.00	0.06	-0.26	0.3	282.9	0.9	289.8
32.00	32.00	0.06	-0.27	0.3	283.3	0.9	290.8
33.00	33.00	0.07	-0.29	0.3	283.7	1.1	291.7
34.00	34.00	0.08	-0.31	0.3	284.4	1.4	298.8
35.00	35.00	0.09	-0.33	0.3	285.0	1.2	295.3
36.00	36.00	0.10	-0.35	0.4	285.4	1.0	287.0
37.00	37.00	0.10	-0.36	0.4	286.1	1.3	298.5
38.00	38.00	0.12	-0.38	0.4	287.3	1.7	310.7
39.00	39.00	0.14	-0.41	0.4	288.9	1.6	320.9
40.00	40.00	0.15	-0.42	0.5	290.1	1.3	313.3
41.00	41.00	0.17	-0.44	0.5	291.0	1.0	326.6
42.00	42.00	0.18	-0.45	0.5	292.1	1.3	312.0
43.00	43.00	0.20	-0.47	0.5	293.2	1.3	322.6
44.00	43.99	0.22	-0.48	0.5	294.1	1.4	313.5
45.00	44.99	0.23	-0.50	0.6	295.1	1.4	318.8
46.00	45.99	0.25	-0.52	0.6	296.0	1.3	320.5
47.00	46.99	0.27	-0.53	0.6	297.0	1.2	327.6
48.00	47.99	0.29	-0.54	0.6	297.9	1.3	326.4
49.00	48.99	0.31	-0.56	0.6	298.8	1.5	328.9
50.00	49.99	0.33	-0.57	0.7	299.7	1.3	322.5
51.00	50.99	0.34	-0.59	0.7	300.3	1.1	329.4
52.00	51.99	0.36	-0.60	0.7	301.1	1.5	325.4
53.00	52.99	0.38	-0.61	0.7	301.8	1.0	335.1
54.00	53.99	0.40	-0.62	0.7	302.6	1.4	329.4
55.00	54.99	0.42	-0.63	0.8	303.3	1.3	328.5
56.00	55.99	0.44	-0.65	0.8	304.1	1.2	338.9
57.00	56.99	0.46	-0.66	0.8	305.0	1.7	334.7
58.00	57.99	0.48	-0.67	0.8	305.7	1.2	333.9
59.00	58.99	0.50	-0.68	0.8	306.3	1.4	343.6
60.00	59.99	0.51	-0.68	0.9	306.9	1.3	335.2
61.00	60.99	0.54	-0.69	0.9	307.8	1.5	334.8
62.00	61.99	0.56	-0.70	0.9	308.4	1.2	338.0
63.00	62.99	0.58	-0.71	0.9	309.1	1.3	336.5
64.00	63.99	0.60	-0.72	0.9	309.9	1.4	341.2
65.00	64.99	0.62	-0.73	1.0	310.6	1.1	333.3
66.00	65.99	0.64	-0.73	1.0	311.2	1.3	344.9
67.00	66.99	0.67	-0.74	1.0	311.9	1.5	335.7
68.00	67.99	0.69	-0.75	1.0	312.6	1.3	344.2
69.00	68.99	0.71	-0.76	1.0	313.1	1.0	335.8
70.00	69.99	0.73	-0.76	1.1	313.7	1.1	339.7
71.00	70.99	0.75	-0.77	1.1	314.2	1.3	339.4
72.00	71.99	0.77	-0.78	1.1	314.7	1.0	342.4
73.00	72.99	0.79	-0.78	1.1	315.1	1.0	343.5
74.00	73.99	0.80	-0.79	1.1	315.5	1.3	353.2
75.00	74.99	0.82	-0.79	1.1	316.0	1.2	354.6
76.00	75.99	0.85	-0.80	1.2	316.6	1.6	339.4
77.00	76.99	0.87	-0.81	1.2	317.1	1.5	341.8
78.00	77.99	0.90	-0.82	1.2	317.6	1.5	341.3
79.00	78.99	0.92	-0.83	1.2	318.1	1.5	347.6
80.00	79.99	0.95	-0.84	1.3	318.7	1.6	341.0
81.00	80.98	0.98	-0.85	1.3	319.1	1.5	330.3
82.00	81.98	1.00	-0.86	1.3	319.3	1.4	328.6
83.00	82.98	1.02	-0.87	1.3	319.4	1.4	323.8
84.00	83.98	1.04	-0.89	1.4	319.6	1.5	329.6
85.00	84.98	1.06	-0.90	1.4	319.8	1.5	332.4
86.00	85.98	1.08	-0.91	1.4	320.0	1.5	331.0
87.00	86.98	1.11	-0.92	1.4	320.2	1.5	334.7
88.00	87.98	1.13	-0.93	1.5	320.4	1.4	336.4
89.00	88.98	1.15	-0.94	1.5	320.6	1.2	338.7
90.00	89.98	1.17	-0.95	1.5	320.8	1.4	335.3
91.00	90.98	1.19	-0.96	1.5	321.0	1.0	332.5
92.00	91.98	1.20	-0.97	1.5	321.1	0.9	334.8
93.00	92.98	1.22	-0.97	1.6	321.3	1.1	332.1
94.00	93.98	1.24	-0.98	1.6	321.5	0.9	343.1
95.00	94.98	1.25	-0.99	1.6	321.7	1.0	347.4
96.00	95.98	1.27	-0.99	1.6	322.0	1.2	342.7
97.00	96.98	1.29	-1.00	1.6	322.3	1.3	341.1
98.00	97.98	1.31	-1.00	1.6	322.5	0.9	342.4
99.00	98.98	1.32	-1.01	1.7	322.7	1.0	343.0
100.00	99.98	1.34	-1.01	1.7	323.0	1.2	343.4
101.00	100.98	1.36	-1.02	1.7	323.2	1.2	342.2
102.00	101.98	1.38	-1.03	1.7	323.3	0.0	0.0
101.86	101.84	1.38	-1.03	1.7	323.3	1.3	330.3

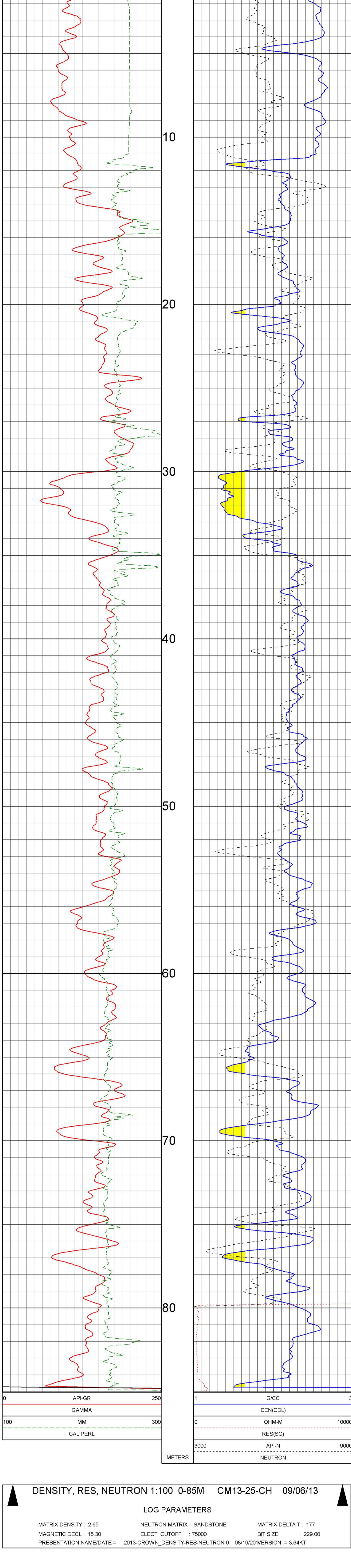
COMPANY	NMP COAL CANADA LTD	OTHER SERVICES:	NEU-TP
WELL	CM13-25-CH	DEB-TP	
FIELD	N/A	DEU-TEM	
COUNTRY	CANADA		
PROVINCE	ALBERTA		
LSD	N/A		
SECTION	N/A		
TOWNSHIP	N/A		
RANGE	N/A		
LICENSE NO.	N/A		
UNIQUE WELL ID.	N/A		

PERMANENT DATUM	GL	ELEVATION KB	N/A
LOG MEASURED FROM	GL	ELEVATION DF	N/A
DRL MEASURED FROM	GL	ELEVATION GL	1877.00
DATE	09/06/13	RIG NUMBER	N/A
DEPTH DRILLER	102.90	LOGGER TD	102.44
BIT SIZE	229.00	ARRIVAL TIME	10:00
LOG TOP	0.00	DEPARTURE TIME	14:30
LOG BOTTOM	102.15	CIRC STOPPED	N/A
CASING LOGGER	11.30		
CASING DRILLER	12.00		
CASING TYPE	SURFACE		
BOREHOLE FLUID	H2O		
RM TEMPERATURE	N/A		
MUD RES	N/A		
MUD WEIGHT	1.00		
WITNESSED BY	L. BOUTLIER		
RECORDED BY	C. JOHNSTON		
REMARKS 1	NORTHING 5517920 EASTING 863704		
REMARKS 2			

DENSITY, RES, NEUTRON 1:100 0-85M CM13-25-CH 09/06/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT		



DENSITY, RES, NEUTRON 1:100 0-85M CM13-25-CH 09/06/13

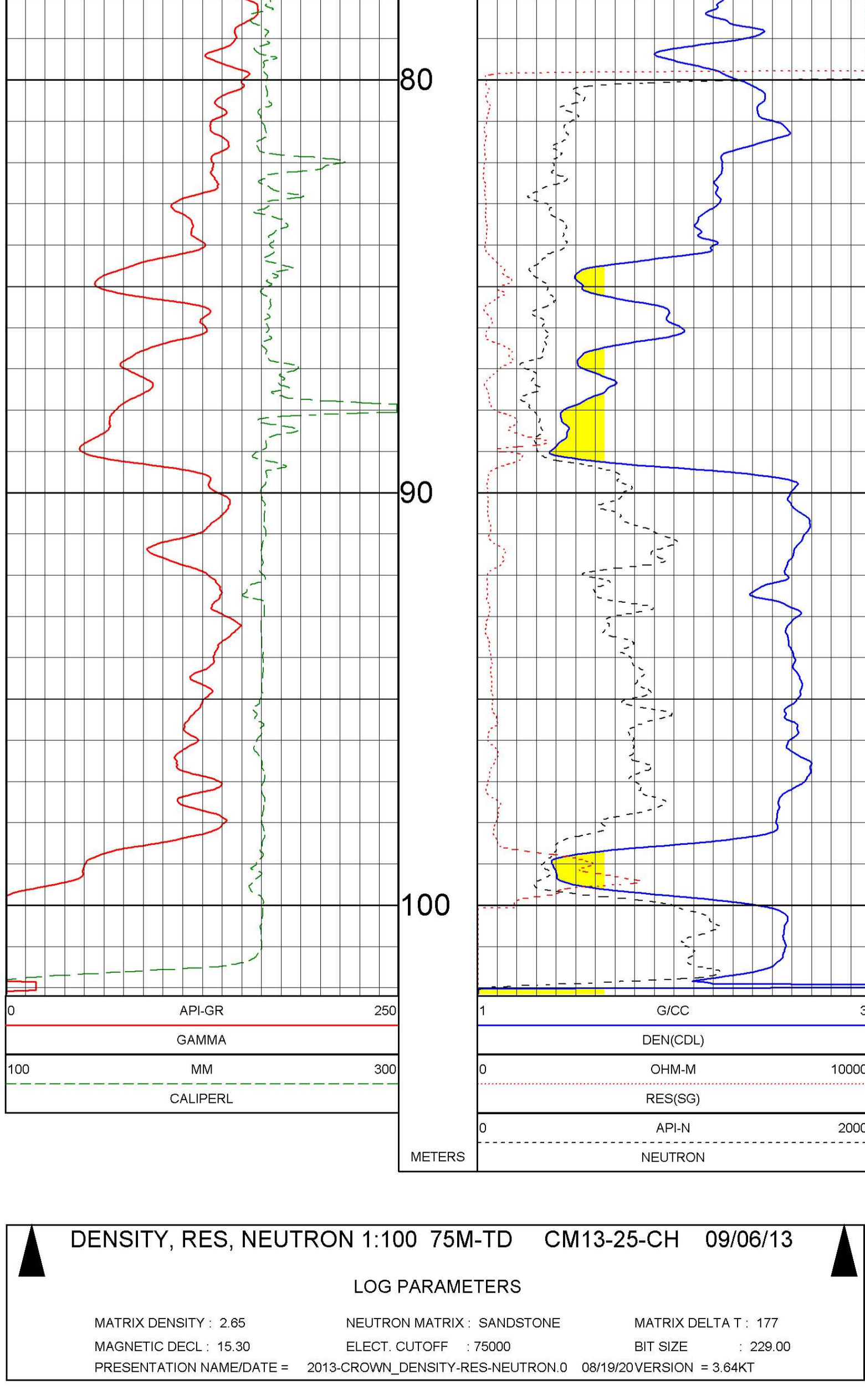
LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT		

DENSITY, RES, NEUTRON 1:100 75M-TD CM13-25-CH 09/06/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT		



DENSITY, RES, NEUTRON 1:100 75M-TD CM13-25-CH 09/06/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 229.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES-NEUTRON.0 08/19/20/VERSION = 3.64KT		

TOOL CALIBRATION CM13-25-CH 09/06/13 13:34
TOOL 9239C1 TM VERSION 2025
SERIAL NUMBER 4428

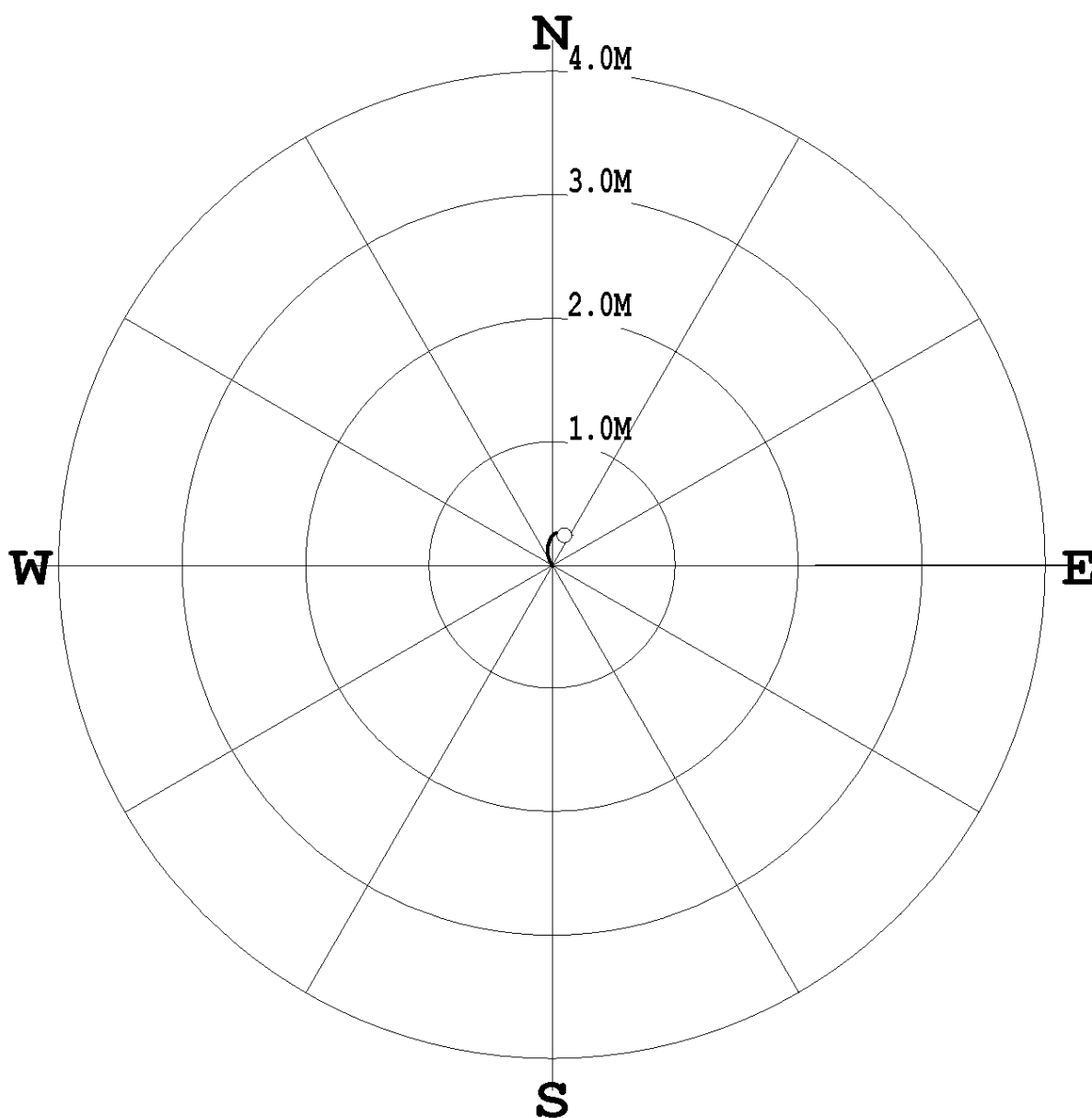
DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Jun25,13 15:33:14	GAMMA	0.000 [API-GR]	0.100 [CPS]
1	Jun25,13 15:33:14	GAMMA	545.000 [API-GR]	558.000 [CPS]
2	Aug19,13 13:06:53	VOLTAGE	26.200 [MV]	4350.000 [CPS]
2	Aug19,13 13:06:53	VOLTAGE	227.600 [MV]	31550.000 [CPS]
3	Mar06,13 15:12:26	CALIPER	76.400 [CM]	117554.000 [CPS]
3	Mar06,13 15:12:26	CALIPER	177.800 [CM]	347820.000 [CPS]
4	Aug19,13 13:07:09	DEN(LS)	1.620 [G/CC]	17088.000 [CPS]
4	Aug19,13 13:07:09	DEN(LS)	2.612 [G/CC]	2283.000 [CPS]
5	Aug27,13 18:24:35	DEN(SS)	1.590 [G/CC]	68540.000 [CPS]
5	Aug27,13 18:24:35	DEN(SS)	2.580 [G/CC]	26130.000 [CPS]
6	Aug19,13 13:07:41	CALIPERL	100.000 [CM]	112529.000 [CPS]
6	Aug19,13 13:07:41	CALIPERL	200.000 [CM]	217210.000 [CPS]
7	Aug19,13 13:08:07	CURRENT	28.200 [UA]	8769.000 [CPS]
7	Aug19,13 13:08:07	CURRENT	227.600 [UA]	26334.000 [CPS]
8	Feb14,10 11:28:44	F	Default	
9	Feb14,10 11:28:44	X	Default	

PLAN VIEW COMPU-LOG DEVIATION

CLIENT: NWP COAL CANADA LTD
 LOCATION: N/A
 HOLE ID: CM13-06
 DATE OF LOG: 08/16/13
 PROBE: 9057A 4430



SCALE: 1 M/CM
 TRUE DEPTH: 53.44 M
 AZIMUTH: 23.4
 DISTANCE: 0.3 M
 + = 50 M INCR
 ○ = BOTTOM OF HOLE



***** COMPU-LOG - VERTICAL DEVIATION *****

CLIENT : NWP COAL CANADA LTD HOLE ID. : CM13-06
 FIELD OFFICE : CENTURY DATE OF LOG : 08/16/13
 DATA FROM : N/A PROBE : 9057A , 4430
 MAG. DECL. : 15.300 DEPTH UNITS : METERS
 LOG: CM13-06_08-16-13_17-55_9057A_.02_12.00_53.63_DEVI.log

CABLE DEPTH	TRUE DEPTH	NORTH DEV.	EAST DEV.	DISTANCE	AZIMUTH	SANG	SANGB
12.02	12.02	-0.00	-0.00	0.0	245.3	0.0	245.3
13.00	13.00	0.00	-0.00	0.0	308.5	0.2	325.0
14.00	14.00	0.01	-0.01	0.0	318.1	0.3	311.8
15.00	15.00	0.01	-0.01	0.0	320.6	0.5	332.7
16.00	16.00	0.02	-0.01	0.0	324.7	0.6	339.3
17.00	17.00	0.03	-0.02	0.0	327.1	0.4	315.2
18.00	18.00	0.04	-0.02	0.0	329.7	0.5	334.9
19.00	19.00	0.05	-0.03	0.1	331.6	0.7	335.6
20.00	20.00	0.06	-0.03	0.1	333.3	0.7	341.7
21.00	21.00	0.07	-0.03	0.1	335.3	0.6	344.1
22.00	22.00	0.08	-0.04	0.1	335.5	0.4	328.8
23.00	23.00	0.09	-0.04	0.1	336.1	0.6	347.1
24.00	24.00	0.10	-0.04	0.1	338.0	0.9	350.6
25.00	25.00	0.12	-0.04	0.1	340.7	0.8	0.8
26.00	26.00	0.13	-0.04	0.1	342.8	0.7	1.3
27.00	27.00	0.14	-0.04	0.1	344.4	0.6	3.6
28.00	28.00	0.15	-0.04	0.2	345.8	0.5	12.9
29.00	29.00	0.16	-0.03	0.2	347.9	0.7	14.3
30.00	30.00	0.18	-0.03	0.2	350.0	0.8	19.9
31.00	31.00	0.19	-0.03	0.2	351.8	0.7	24.5
32.00	32.00	0.20	-0.02	0.2	353.3	0.7	24.0
33.00	33.00	0.21	-0.02	0.2	354.8	0.7	21.5
34.00	34.00	0.22	-0.01	0.2	356.2	0.5	22.9
35.00	35.00	0.23	-0.01	0.2	357.4	0.4	29.2
36.00	36.00	0.23	-0.01	0.2	358.5	0.5	29.0
37.00	37.00	0.24	-0.00	0.2	359.7	0.5	47.5
38.00	38.00	0.25	0.00	0.2	1.1	0.4	49.2
39.00	39.00	0.25	0.01	0.3	2.5	0.5	65.7
40.00	40.00	0.26	0.02	0.3	4.4	0.6	58.5
41.00	41.00	0.26	0.03	0.3	6.1	0.5	69.5
42.00	42.00	0.26	0.03	0.3	7.4	0.4	86.3
43.00	43.00	0.26	0.04	0.3	8.7	0.3	97.8
44.00	44.00	0.26	0.05	0.3	10.2	0.4	91.1
45.00	45.00	0.26	0.05	0.3	11.7	0.5	99.0
46.00	46.00	0.26	0.06	0.3	13.5	0.4	100.0
47.00	47.00	0.26	0.07	0.3	15.1	0.4	110.0
48.00	48.00	0.25	0.07	0.3	16.4	0.3	117.5
49.00	49.00	0.25	0.08	0.3	17.5	0.3	127.0
50.00	50.00	0.25	0.08	0.3	18.7	0.3	108.2
51.00	51.00	0.25	0.09	0.3	20.0	0.4	113.2
52.00	52.00	0.24	0.09	0.3	21.2	0.4	117.7
53.00	53.00	0.24	0.10	0.3	22.8	0.4	106.9
53.44	53.44	0.24	0.10	0.3	23.4	0.4	118.1

COMPANY	: NINE COAL CANADA LTD	OTHER SERVICES:	
WELL	: CM13-06	DEN	
FIELD	: N/A	DEN-TP	
COUNTRY	: CANADA	DEV TEMP	
PROVINCE	: ALBERTA		

LSD	: N/A
SECTION	: N/A
TOWNSHIP	: N/A
RANGE	: N/A
LICENSE NO.	: N/A
UNIQUE WELL ID.	: N/A

PERMANENT DATUM	: GL	ELEVATION KB	: N/A
LOG MEASURED FROM	: GL	ELEVATION DF	: N/A
DRL MEASURED FROM	: GL	ELEVATION GL	: N/A

DATE	: 08/16/13	RIG NUMBER	: N/A
DEPTH DRILLER	: 54.15	LOGGER TD	: 54.04
BIT SIZE	: 140.00	ARRIVAL TIME	: 11:30
LOG TOP	: 0.00	DEPARTURE TIME	: 20:00
LOG BOTTOM	: 53.39	CIRC STOPPED	: N/A

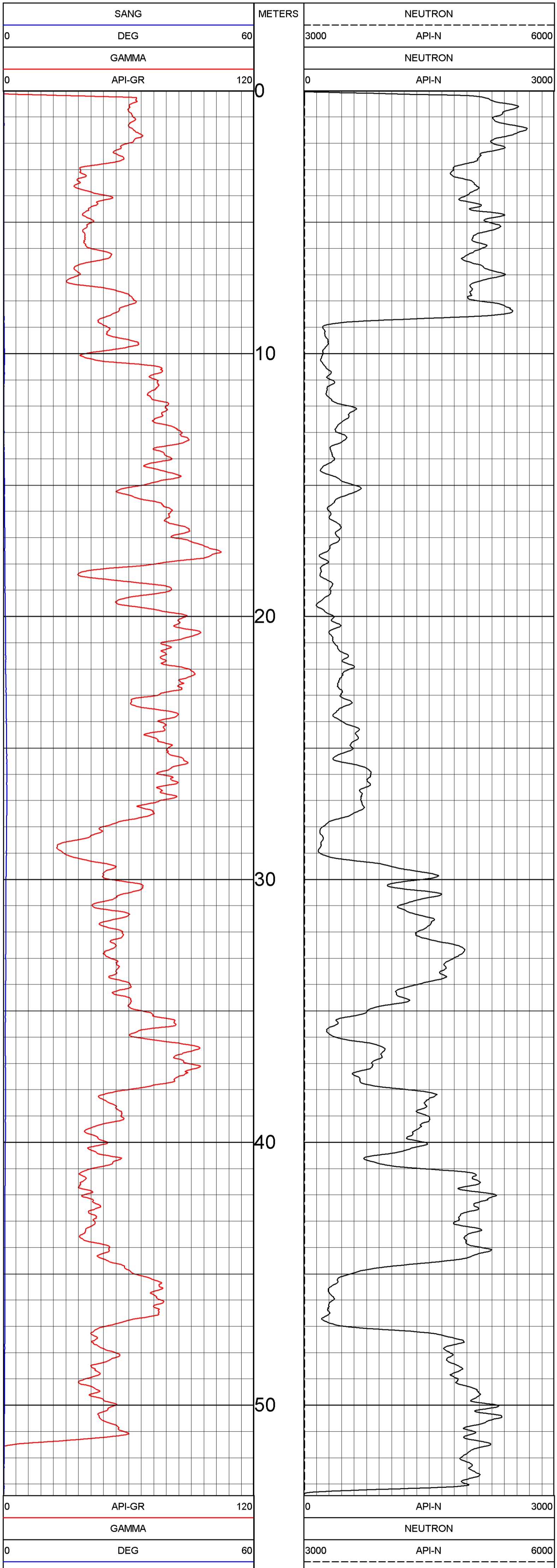
CASING LOGGER	: 8.80
CASING DRILLER	: 9.00
CASING TYPE	: SURFACE
BOREHOLE FLUID	: H2O
RM TEMPERATURE	: N/A
MUD RES	: N/A
MUD WEIGHT	: 1.00
WITNESSED BY	: M. ESKRICK
RECORDED BY	: C. JOHNSTON
REMARKS 1	: EASTING 662817.57
REMARKS 2	: NORTING 5521113.8

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

NEUTRON THROUGH RODS 1:100 CM13-06 08/16/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_NEUTRON-TR.0 08/18/2013		VERSION = 3.64KT



NEUTRON THROUGH RODS 1:100 CM13-06 08/16/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_NEUTRON-TR.0 08/18/2013		VERSION = 3.64KT

DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Jul31,13 11:08:47	GAMMA	0.000 [API-GR]	0.100 [CPS]
	Jul31,13 11:08:47	GAMMA	545.000 [API-GR]	608.000 [CPS]
2	Jul31,13 11:25:36	NEUTRON	0.000 [API-N]	1.000 [CPS]
	Jul31,13 11:25:36	NEUTRON	271.000 [API-N]	38.000 [CPS]
3	Apr30,08 14:54:38	SP	0.000 [MV]	325650.000 [CPS]
	Apr30,08 14:54:38	SP	97.000 [MV]	277560.000 [CPS]
4	Jul02,07 08:07:18	RES(16N)	0.000 [OHM-M]	3892.000 [CPS]
	Jul02,07 08:07:18	RES(16N)	1996.000 [OHM-M]	421781.000 [CPS]
5	Jul02,07 08:07:23	RES(64N)	0.000 [OHM-M]	3324.000 [CPS]
	Jul02,07 08:07:23	RES(64N)	1990.000 [OHM-M]	4263631.000 [CPS]
6	Jul31,13 13:32:13	TEMP	10.000 [DEG_F]	343298.000 [CPS]
	Jul31,13 13:32:13	TEMP	71.000 [DEG_F]	423631.000 [CPS]
7	Jul02,07 08:07:32	RES	0.000 [OHM]	4438.000 [CPS]
	Jul02,07 08:07:32	RES	989.000 [OHM]	162986.000 [CPS]
8	Jun26,07 14:31:00	POR(NEU)	Default [CPS]	Default [CPS]

COMPANY	: NWFP COAL CANADA LTD	OTHER SERVICES:	
WELL	: CM13-06	DEN-TP	
FIELD	: N/A	NEU-TP	
COUNTRY	: CANADA	DEV TEMP	
PROVINCE	: ALBERTA		

LSD	: N/A
SECTION	: N/A
TOWNSHIP	: N/A
RANGE	: N/A
LICENSE NO.	: N/A
UNIQUE WELL ID.	: N/A

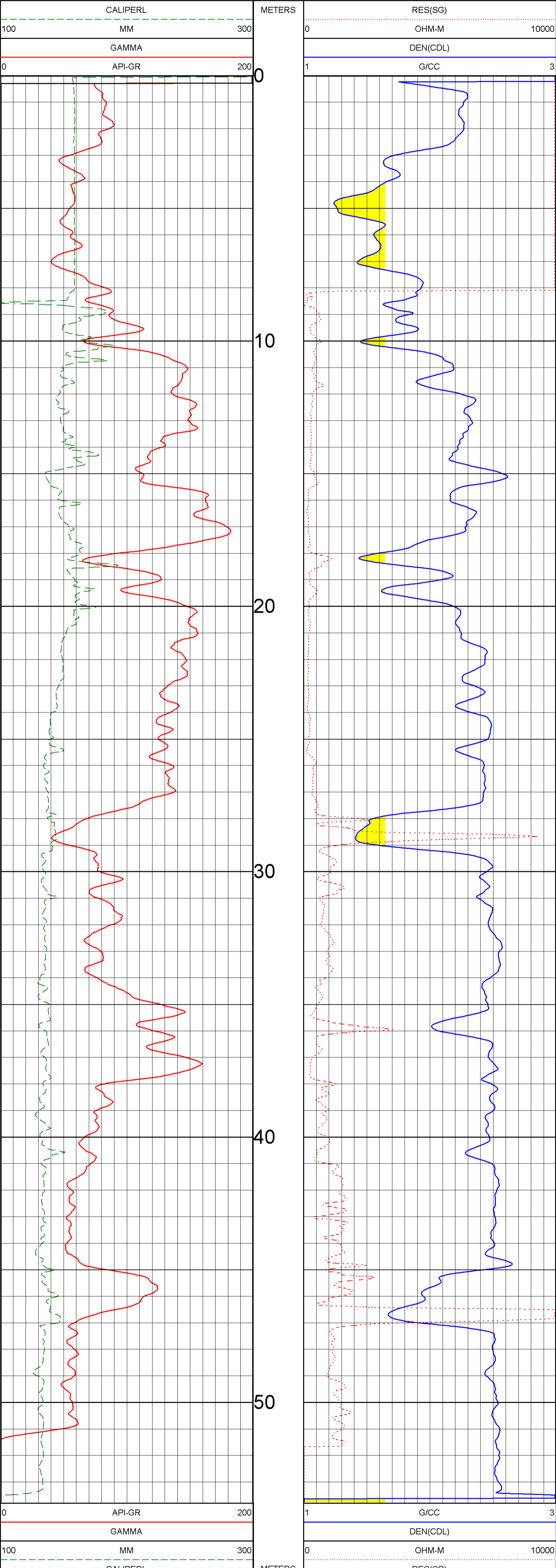
PERMANENT DATUM	: GL	ELEVATION KB	: N/A
LOG MEASURED FROM	: GL	ELEVATION DF	: N/A
DRL MEASURED FROM	: GL	ELEVATION GL	: N/A

DATE	: 08/16/13	RIG NUMBER	: N/A
DEPTH DRILLER	: 54.15	LOGGER TD	: 54.04
BIT SIZE	: 140.00	ARRIVAL TIME	: 11:30
LOG TOP	: 0.00	DEPARTURE TIME	: 20:00
LOG BOTTOM	: 53.75	CIRC STOPPED	: N/A
CASING LOGGER	: 8.80		
CASING DRILLER	: 9.00		
CASING TYPE	: SURFACE		
BOREHOLE FLUID	: H2O		
RM TEMPERATURE	: N/A		
MUD RES	: N/A		
MUD WEIGHT	: 1.00		
WITNESSED BY	: M. ESKRICK		
RECORDED BY	: C. JOHNSTON		
REMARKS 1	: EASTING 862817.57		
REMARKS 2	: NORTHING 5521113.8		

DENSITY 1:100 CM13-06 08/16/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES.0 08/18/2013		VERSION = 3.64KT



DENSITY 1:100 CM13-06 08/16/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES.0 08/18/2013		VERSION = 3.64KT

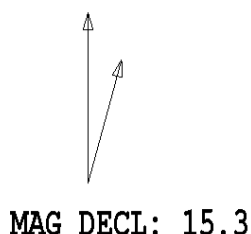
DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Jun26,13 09:33:44	GAMMA	0.100 [API-GR]	0.000 [CPS]
2	Jun26,13 09:33:44	GAMMA	545.000 [API-GR]	525.000 [CPS]
3	Jun26,13 09:36:10	VOLTAGE	26.200 [MV]	6460.000 [CPS]
4	Jun26,13 09:36:10	VOLTAGE	228.100 [MV]	33847.000 [CPS]
5	Jun26,13 08:58:34	CALIPER	Default [CPS]	Default [CPS]
6	Jun26,13 08:58:34	CALIPER	Default [CPS]	Default [CPS]
7	Jun26,13 10:03:50	DEN(LS)	1.620 [G/C]	16116.000 [CPS]
8	Jun26,13 10:03:50	DEN(LS)	2.612 [G/C]	2134.000 [CPS]
9	Aug18,13 01:25:04	DEN(SS)	1.590 [G/C]	65587.000 [CPS]
10	Aug18,13 01:25:04	DEN(SS)	2.580 [G/C]	26512.000 [CPS]
11	Jun26,13 09:32:15	CALIPERL	100.000 [MM]	120336.000 [CPS]
12	Jun26,13 09:32:15	CALIPERL	200.000 [MM]	220683.000 [CPS]
13	Jun26,13 09:36:46	CURRENT	26.200 [UA]	6401.000 [CPS]
14	Jun26,13 09:36:46	CURRENT	228.100 [UA]	23701.000 [CPS]
15	Jun26,13 08:58:34	F	Default [CPS]	
16	Jun26,13 08:58:34	X	Default [CPS]	

TOOL CALIBRATION CM13-06 08/16/13 18:13
 TOOL 9239C1 TM VERSION 2025
 SERIAL NUMBER 410

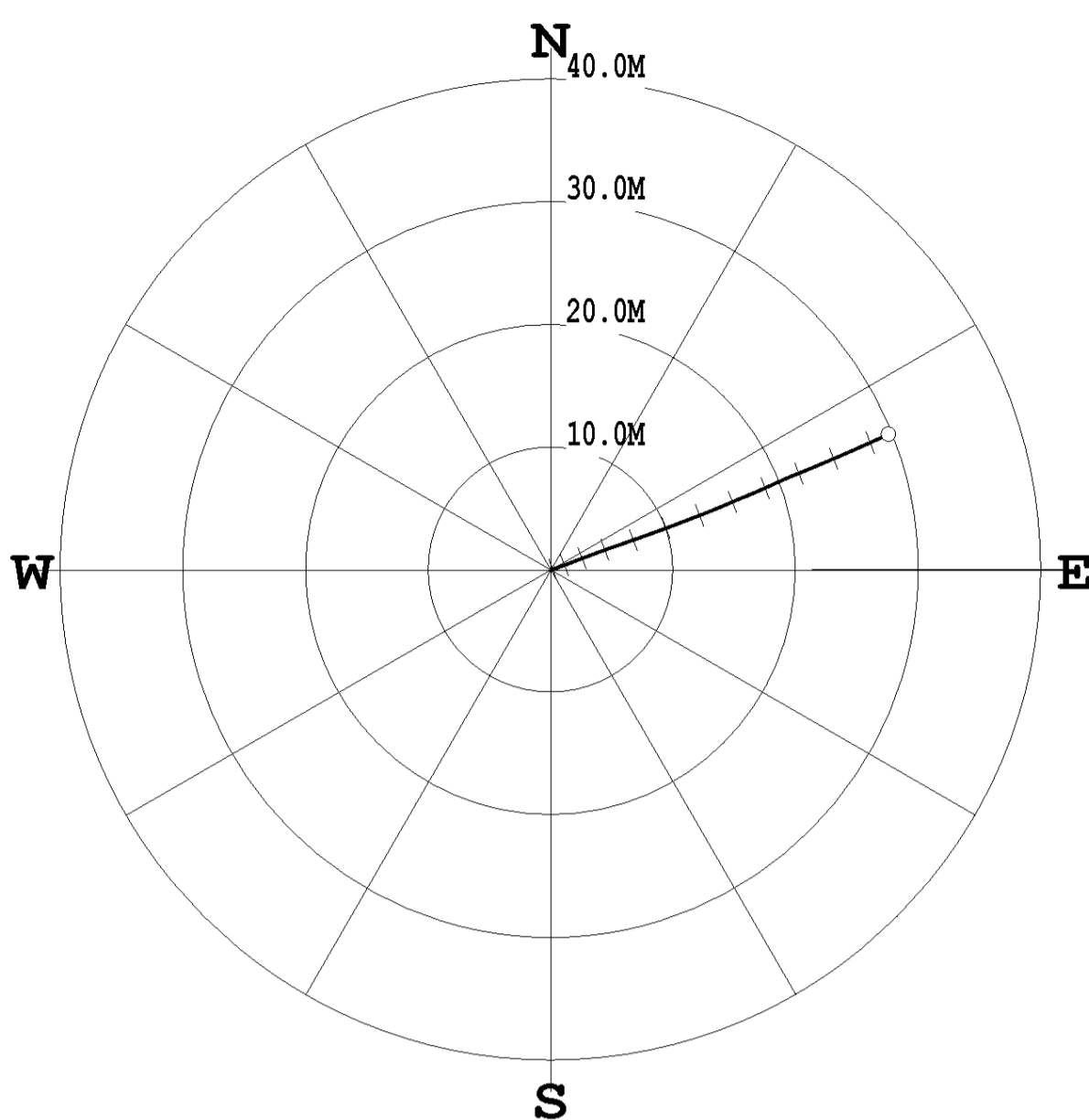
ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

PLAN VIEW COMPU-LOG DEVIATION

CLIENT: NWP COAL CANADA LTD
 LOCATION: N/A
 HOLE ID: CM13-15
 DATE OF LOG: 09/04/13
 PROBE: 9057A 4430



SCALE: 5 M/CM
 TRUE DEPTH: 134.78 M
 AZIMUTH: 68.2
 DISTANCE: 29.7 M
 + = 10 M INCR
 ○ = BOTTOM OF HOLE



* * * * * COMPU-LOG - VERTICAL DEVIATION * * * * *

CLIENT : NWP COAL CANADA LTD HOLE ID. : CM13-15
 FIELD OFFICE : CENTURY DATE OF LOG : 09/04/13
 DATA FROM : N/A PROBE : 9057A 4430
 MAG. DECL. : 15.300 DEPTH UNITS : METERS
 LOG: CM13-15_09-04-13_17-33_9057A_02_14.00_138.98_DEVI.log

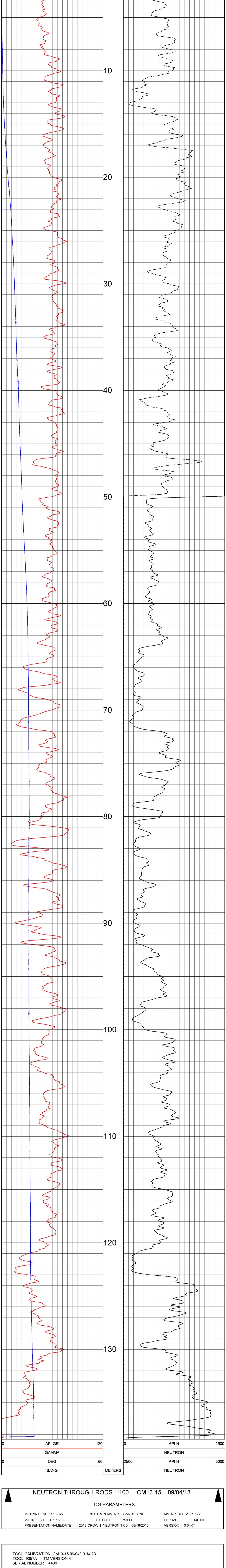
CABLE DEPTH	TRUE DEPTH	NORTH DEV.	EAST DEV.	DISTANCE	AZIMUTH	SANG	SANGB
14.00	14.00	-0.00	0.00	0.0	105.3	0.5	105.3
15.00	15.00	-0.00	0.01	0.0	91.7	0.8	88.5
16.00	16.00	0.00	0.03	0.0	86.8	1.2	81.9
17.00	17.00	0.01	0.05	0.0	82.3	1.7	75.3
18.00	18.00	0.01	0.08	0.1	79.8	1.7	76.1
19.00	19.00	0.02	0.11	0.1	77.3	2.3	71.1
20.00	20.00	0.04	0.15	0.2	75.3	2.9	64.3
21.00	21.00	0.06	0.20	0.2	73.6	3.7	65.4
22.00	21.99	0.08	0.27	0.3	72.2	4.2	64.6
23.00	22.99	0.11	0.34	0.4	71.5	4.8	73.8
24.00	23.99	0.14	0.42	0.4	71.4	5.7	71.0
25.00	24.98	0.17	0.52	0.5	71.6	6.1	74.0
26.00	25.97	0.21	0.63	0.7	71.5	6.7	69.0
27.00	26.97	0.25	0.74	0.8	71.4	7.0	71.3
28.00	27.96	0.29	0.86	0.9	71.2	7.3	69.5
29.00	28.95	0.34	0.98	1.0	71.1	7.6	69.9
30.00	29.94	0.38	1.11	1.2	70.9	7.8	70.5
31.00	30.93	0.43	1.23	1.3	70.7	8.0	68.7
32.00	31.92	0.48	1.37	1.4	70.6	8.1	69.3
33.00	32.91	0.53	1.50	1.6	70.4	8.1	69.5
34.00	33.90	0.58	1.63	1.7	70.3	8.1	69.6
35.00	34.89	0.64	1.77	1.9	70.2	8.4	68.5
36.00	35.88	0.69	1.91	2.0	70.1	8.9	70.2
37.00	36.87	0.75	2.05	2.2	70.0	9.2	67.7
38.00	37.85	0.81	2.20	2.3	69.9	9.5	68.9
39.00	38.84	0.87	2.36	2.5	69.8	9.8	67.6
40.00	39.83	0.93	2.52	2.7	69.7	10.0	69.9
41.00	40.81	0.99	2.69	2.9	69.7	10.4	70.9
42.00	41.79	1.05	2.86	3.0	69.7	10.5	70.4
43.00	42.78	1.12	3.03	3.2	69.8	10.6	69.8
44.00	43.76	1.18	3.20	3.4	69.7	10.8	70.0
45.00	44.74	1.25	3.38	3.6	69.8	10.8	70.5
46.00	45.72	1.32	3.56	3.8	69.7	11.3	69.4
47.00	46.70	1.38	3.74	4.0	69.7	11.2	69.8
48.00	47.68	1.46	3.93	4.2	69.7	11.9	70.3
49.00	48.66	1.53	4.13	4.4	69.7	12.0	69.6
50.00	49.64	1.60	4.32	4.6	69.7	12.1	69.7
51.00	50.62	1.67	4.52	4.8	69.7	12.3	69.6
52.00	51.59	1.75	4.72	5.0	69.7	12.4	70.0
53.00	52.57	1.82	4.93	5.3	69.8	12.9	72.0
54.00	53.54	1.89	5.15	5.5	69.8	13.3	71.6
55.00	54.52	1.96	5.37	5.7	69.9	13.7	71.0
56.00	55.49	2.04	5.59	6.0	70.0	14.3	70.7
57.00	56.46	2.12	5.82	6.2	70.0	14.4	70.2
58.00	57.42	2.21	6.06	6.5	70.0	15.1	69.9
59.00	58.39	2.29	6.31	6.7	70.0	15.4	69.8
60.00	59.35	2.38	6.56	7.0	70.0	15.2	70.2
61.00	60.32	2.47	6.80	7.2	70.0	15.5	70.0
62.00	61.28	2.56	7.05	7.5	70.1	15.5	70.9
63.00	62.24	2.65	7.31	7.8	70.1	15.8	70.9
64.00	63.21	2.74	7.57	8.0	70.1	15.7	70.6
65.00	64.17	2.83	7.82	8.3	70.1	16.0	69.8
66.00	65.13	2.92	8.08	8.6	70.1	16.0	70.0
67.00	66.09	3.01	8.34	8.9	70.2	15.8	70.2
68.00	67.06	3.10	8.59	9.1	70.2	15.9	70.1
69.00	68.02	3.20	8.85	9.4	70.1	16.0	69.9
70.00	68.98	3.29	9.11	9.7	70.1	16.1	69.6
71.00	69.94	3.39	9.37	10.0	70.1	16.1	68.9
72.00	70.90	3.49	9.63	10.2	70.1	16.2	68.6
73.00	71.86	3.59	9.89	10.5	70.1	16.1	71.0
74.00	72.82	3.68	10.15	10.8	70.1	16.1	68.7
75.00	73.78	3.79	10.41	11.1	70.0	16.5	68.0
76.00	74.74	3.89	10.67	11.4	70.0	16.4	68.5
77.00	75.70	3.99	10.94	11.6	70.0	16.3	69.8
78.00	76.66	4.09	11.20	11.9	70.0	16.5	69.0
79.00	77.62	4.19	11.46	12.2	69.9	16.5	68.9
80.00	78.58	4.29	11.73	12.5	69.9	16.5	68.9
81.00	79.54	4.39	11.99	12.8	69.9	16.4	69.6
82.00	80.50	4.49	12.26	13.1	69.9	16.3	69.0
83.00	81.46	4.59	12.52	13.3	69.8	16.3	68.5
84.00	82.42	4.70	12.78	13.6	69.8	16.3	68.3
85.00	83.38	4.80	13.04	13.9	69.8	16.3	68.0
86.00	84.34	4.91	13.30	14.2	69.7	16.2	67.8
87.00	85.30	5.01	13.56	14.5	69.7	16.2	67.8
88.00	86.26	5.12	13.81	14.7	69.7	16.2	66.8
89.00	87.22	5.23	14.07	15.0	69.6	16.1	67.1
90.00	88.18	5.33	14.32	15.3	69.6	16.0	66.2
91.00	89.14	5.45	14.58	15.6	69.5	16.1	66.4
92.00	90.10	5.56	14.83	15.8	69.5	16.1	67.1
93.00	91.06	5.66	15.09	16.1	69.4	16.2	67.3
94.00	92.02	5.77	15.34	16.4	69.4	16.0	67.5
95.00	92.98	5.88	15.60	16.7	69.4	16.0	67.7
96.00	93.94	5.98	15.86	16.9	69.3	16.4	67.9
97.00	94.90	6.09	16.12	17.2	69.3	16.3	67.5
98.00	95.86	6.20	16.37	17.5	69.3	16.0	67.0
99.00	96.83	6.30	16.62	17.8	69.2	15.8	66.8
100.00	97.79	6.41	16.87	18.1	69.2	15.9	66.3
101.00	98.75	6.53	17.13	18.3	69.1	16.2	65.5
102.00	99.71	6.64	17.38	18.6	69.1	16.5	65.8
103.00	100.67	6.76	17.64	18.9	69.0	16.5	66.3
104.00	101.63	6.87	17.90	19.2	69.0	16.7	65.7
105.00	102.58	6.99	18.16	19.5	69.0	16.7	65.1
106.00	103.54	7.11	18.43	19.8	68.9	16.8	65.6
107.00	104.50	7.23	18.69	20.0	68.9	16.7	66.1
108.00	105.46	7.35	18.95	20.3	68.8	16.6	65.9
109.00	106.41	7.46	19.21	20.6	68.8	16.7	67.3
110.00	107.37	7.57	19.48	20.9	68.8	16.8	67.2
111.00	108.33	7.68	19.75	21.2	68.7	16.9	67.1
112.00	109.29	7.79	20.01	21.5	68.7	16.9	68.2
113.00	110.24	7.90	20.28	21.8	68.7	16.8	68.2
114.00	111.20	8.01	20.55	22.1	68.7	16.8	67.6
115.00	112.16	8.12	20.82	22.3	68.7	16.7	68.3
116.00	113.11	8.23	21.09	22.6	68.7	17.3	67.4
117.00	114.07	8.34	21.36	22.9	68.7	17.2	66.8
118.00	115.02	8.46	21.64	23.2	68.6	17.2	67.4
119.00	115.98	8.57	21.91	23.5	68.6	17.3	67.0
120.00	116.93	8.69	22.18	23.8	68.6	17.1	67.0
121.00	117.89	8.80	22.45	24.1	68.6	17.0	67.0
122.00	118.85	8.92	22.72	24.4	68.6	17.2	66.3
123.00	119.80	9.03	22.99	24.7	68.5	17.3	66.8
124.00	120.76	9.15	23.27	25.0	68.5	17.3	67.6
125.00	121.71	9.27	23.54	25.3	68.5	17.6	66.6
126.00	122.66	9.39	23.82	25.6	68.5	17.8	66.4
127.00	123.62	9.51	24.10	25.9	68.5	17.7	65.9
128.00	124.57	9.63	24.38	26.2	68.4	17.8	66.3
129.00	125.52	9.76	24.66	26.5	68.4	18.1	66.1
130.00	126.47	9.89	24.95	26.8	68.4	18.4	65.8
131.00	127.42	10.01	25.24	27.1	68.4	18.4	66.4
132.00	128.37	10.14	25.52	27.5	68.3	18.4	66.6
133.00	129.32	10.27	25.81	27.8	68.3	18.6	66.2
134.00	130.26	10.40	26.11	28.1	68.3	19.0	65.2
135.00	131.21	10.54	26.41	28.4	68.2	19.0	65.8
136.00	132.15	10.67	26.70	28.8	68.2	18.7	66.8
137.00	133.10	10.80	27.00	29.1	68.2	19.0	66.4
138.00	134.04	10.93	27.30	29.4	68.2	19.2	66.2
138.78	134.78	11.03	27.54	29.7	68.2	19.3	67.0

COMPANY : NMP COAL CANADA LTD	OTHER SERVICES:
WELL : CM13-15	DEN
FIELD : N/A	DEV/TEM
COUNTRY : CANADA	DEV/FP
PROVINCE : ALBERTA	
SECTION : N/A	
TOWNSHIP : N/A	
RANGE : N/A	
LICENSE NO. : N/A	
UNIQUE WELL ID. : N/A	
PERMANENT DATUM : GL	ELEVATION AB : N/A
LOG MEASURED FROM : GL	ELEVATION DF : N/A
DRL MEASURED FROM : GL	ELEVATION GL : 2132.00
DATE : 09/04/13	RIG NUMBER : N/A
DEPTH DRILLER : 139.90	LOGGER TD : 139.23
BIT SIZE : 140.00	ARRIVAL TIME : 12:45
LOG TOP : 0.00	DEPARTURE TIME : 18:30
LOG BOTTOM : 139.40	CIRC STOPPED : N/A
CASING LOGGER : 8.80	
CASING DRILLER : 8.00	
CASING TYPE : SURFACE	
BOREHOLE FLUID : H2O	
RM TEMPERATURE : N/A	
MUD RES : N/A	
MUD WEIGHT : 1.00	
WITNESSED BY : L. BOUTILLER	
RECORDED BY : C. JOHNSTON	
REMARKS 1 : NORTHING 5521974 EASTING 063218	
REMARKS 2 :	

NEUTRON THROUGH RODS 1:100 CM13-15 09/04/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_NEUTRON-TR.0 08/18/2013		VERSION = 3.64KT



NEUTRON THROUGH RODS 1:100 CM13-15 09/04/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_NEUTRON-TR.0 08/18/2013		VERSION = 3.64KT

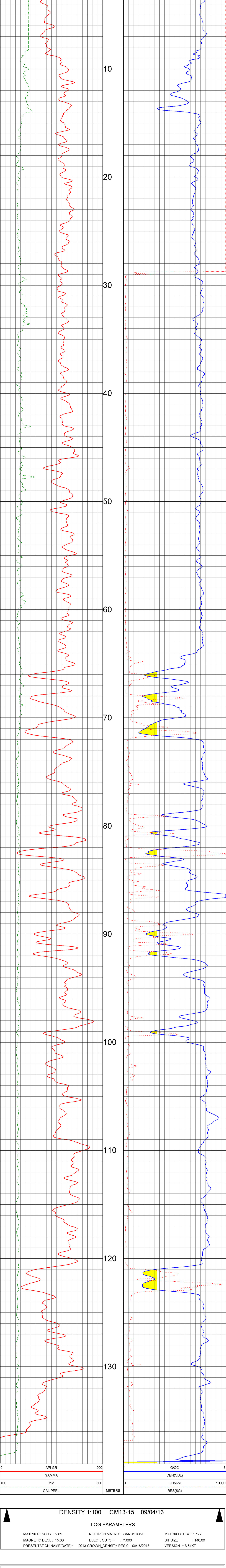
DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Jul31,13 11:08:47	GAMMA	0.000 [API-GR]	0.100 [CPS]
2	Jul31,13 11:08:47	GAMMA	545.000 [API-GR]	608.000 [CPS]
3	Jul31,13 11:25:36	NEUTRON	0.000 [API-N]	1.000 [CPS]
4	Jul31,13 11:25:36	NEUTRON	271.000 [API-N]	38.000 [CPS]
5	Apr30,08 14:54:38	SP	0.000 [MV]	325650.000 [CPS]
6	Apr30,08 14:54:38	SP	97.000 [MV]	277560.000 [CPS]
7	Jul02,07 08:07:18	RES(16N)	0.000 [OHM-M]	3892.000 [CPS]
8	Jul02,07 08:07:18	RES(16N)	1996.000 [OHM-M]	421781.000 [CPS]
9	Jul02,07 08:07:23	RES(64N)	0.000 [OHM-M]	3324.000 [CPS]
10	Jul02,07 08:07:23	RES(64N)	1990.000 [OHM-M]	426303.000 [CPS]
11	Jul31,13 13:32:13	TEMP	10.000 [DEG_F]	343298.000 [CPS]
12	Jul31,13 13:32:13	TEMP	71.000 [DEG_F]	423631.000 [CPS]
13	Jul02,07 08:07:32	RES	0.000 [OHM]	4438.000 [CPS]
14	Jul02,07 08:07:32	RES	989.000 [OHM]	162986.000 [CPS]
15	Jun26,07 14:31:00	POR(NEU)	Default [CPS]	Default [CPS]

COMPANY	INMP COAL CANADA LTD	OTHER SERVICES	DEV TEM
WELL	CM13-15	NEU-TP	DEN-TP
FIELD	N/A		
COUNTRY	CANADA		
PROVINCE	ALBERTA		
LSD	N/A		
SECTION	N/A		
TOWNSHIP	N/A		
RANGE	N/A		
LICENSE NO.	N/A		
UNIQUE WELL ID.	N/A		
PERMANENT DATUM	IGL	ELEVATION MGS	N/A
LOG MEASURED FROM	IGL	ELEVATION DF	N/A
DRL MEASURED FROM	IGL	ELEVATION GL	2132.00
DATE	09/04/13	LOG NUMBER	N/A
DEPTH DRILLER	:199.90	LOGGRTD	:199.23
BIT SIZE	:140.00	ARRIVAL TIME	:12.45
LOG TOP	:0.00	DEPARTURE TIME	:18.30
LOG BOTTOM	:198.94	CIRC STOPPED	N/A
CASING LOGGER	:8.90		
CASING DRILLER	:9.00		
CASING TYPE	:SURFACE		
BOREHOLE FLUID	:H2O		
RTM TEMPERATURE	N/A		
MUD RES	N/A		
MUD WEIGHT	:11.00		
WRITTEN BY	:L. BOUTILLER		
RECORDED BY	:C. JOHNSTON		
REMARKS 1	:NORTHING 5521974 EASTING 863218		
REMARKS 2			

DENSITY 1:100 CM13-15 09/04/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES.0 08/18/2013		VERSION = 3.64KT



DENSITY 1:100 CM13-15 09/04/13

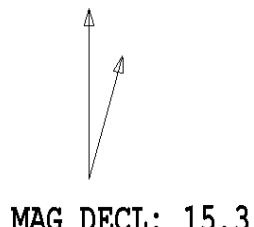
LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES.0 08/18/2013		VERSION = 3.64KT

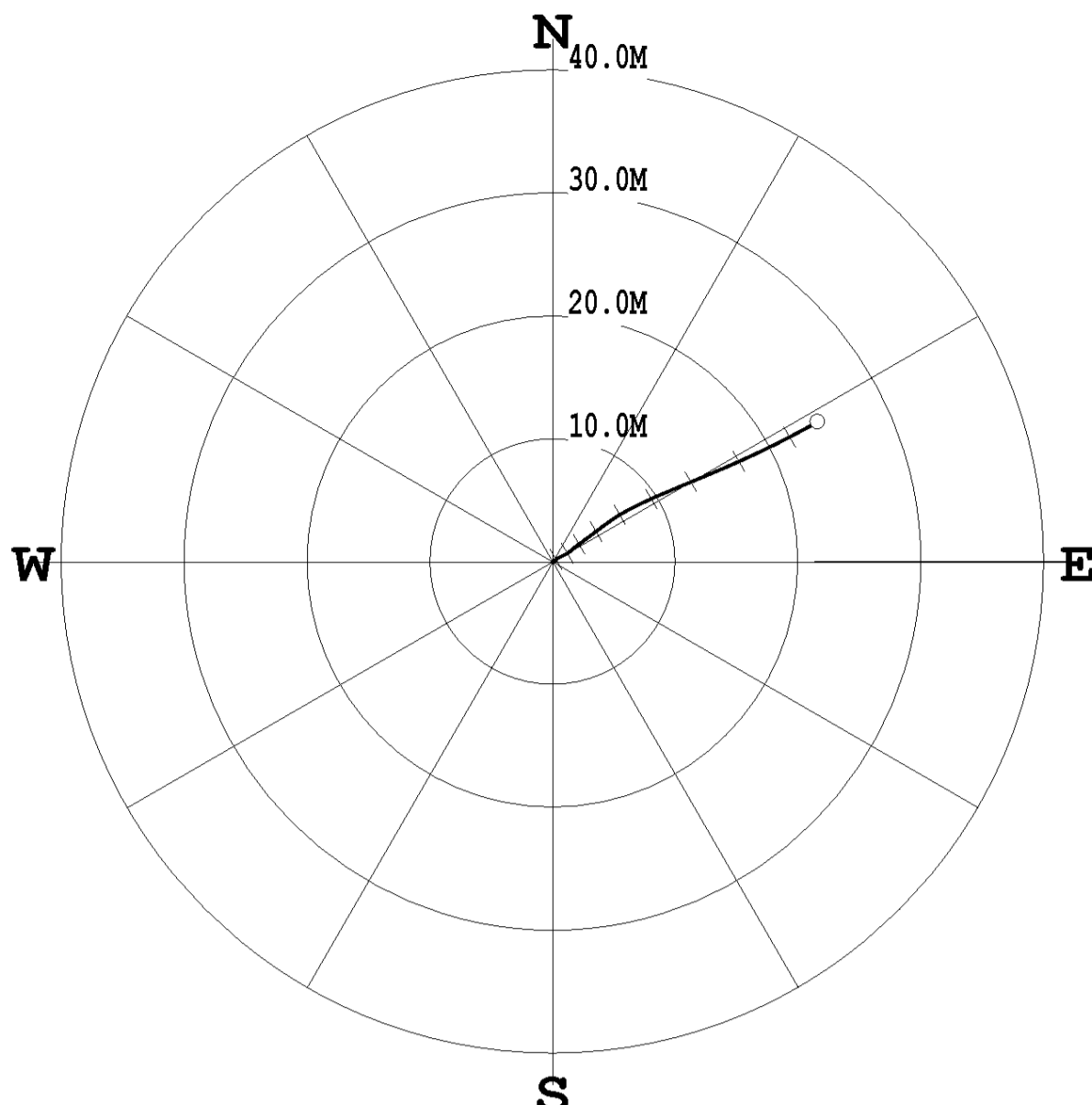
DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Jun25,13	GAMMA	0.000 [API-GR]	0.100 [CPS]
	Jun25,13	GAMMA	545.000 [API-GR]	558.000 [CPS]
2	Aug19,13	VOLTAGE	26.200 [MV]	4350.000 [CPS]
	Aug19,13	VOLTAGE	227.600 [MV]	31550.000 [CPS]
3	Mar06,13	CALIPER	76.400 [CM]	347820.000 [CPS]
	Mar06,13	CALIPER	177.800 [CM]	117554.000 [CPS]
4	Aug19,13	DEN(LS)	1.620 [G/CC]	17088.000 [CPS]
	Aug19,13	DEN(LS)	2.612 [G/CC]	2263.000 [CPS]
5	Aug27,13	DEN(SS)	1.590 [G/CC]	68540.000 [CPS]
	Aug27,13	DEN(SS)	2.580 [G/CC]	28130.000 [CPS]
6	Aug19,13	CALIPERL	100.000 [CM]	112529.000 [CPS]
	Aug19,13	CALIPERL	200.000 [CM]	217210.000 [CPS]
7	Aug19,13	CURRENT	29.200 [UA]	8769.000 [CPS]
	Aug19,13	CURRENT	227.600 [UA]	28334.000 [CPS]
8	Feb14,10	F	Default [CPS]	
9	Feb14,10	X	Default [CPS]	

PLAN VIEW COMPU-LOG DEVIATION

CLIENT: NWP COAL CANADA LTD
 LOCATION: N/A
 HOLE ID: CM13-17
 DATE OF LOG: 09/03/13
 PROBE: 9057A 4430



SCALE: 5 M/CM
 TRUE DEPTH: 191.37 M
 AZIMUTH: 62.2
 DISTANCE: 24.4 M
 + = 20 M INCR
 ○ = BOTTOM OF HOLE



* * * * * COMPU-LOG - VERTICAL DEVIATION * * * * *

CLIENT : NWP COAL CANADA LTD HOLE ID. : CM13-17
 FIELD OFFICE : CENTURY DATE OF LOG : 09/03/13
 DATA FROM : N/A PROBE : 9057A , 4430
 MAG. DECL. : 15.300 DEPTH UNITS : METERS
 LOG: CM13-17_09-03-13_17-34_9057A_02_10.00_193.61_DEVI.Log

CABLE DEPTH	TRUE DEPTH	NORTH DEV.	EAST DEV.	DISTANCE	AZIMUTH	SANG	SANGB
10.02	10.02	0.00	0.00	0.0	60.5	1.1	60.5
11.00	11.00	0.01	0.02	0.0	54.2	1.1	51.3
12.00	12.00	0.02	0.03	0.0	52.9	1.1	51.3
13.00	13.00	0.04	0.05	0.1	52.7	1.6	44.9
14.00	14.00	0.06	0.07	0.1	52.7	1.7	51.0
15.00	15.00	0.08	0.10	0.1	52.7	1.9	51.7
16.00	16.00	0.10	0.13	0.2	52.7	2.1	52.8
17.00	17.00	0.12	0.16	0.2	52.6	2.1	50.6
18.00	18.00	0.15	0.20	0.2	52.7	2.2	54.4
19.00	19.00	0.17	0.23	0.3	52.7	2.0	54.5
20.00	19.99	0.20	0.26	0.3	52.8	2.4	52.3
21.00	20.99	0.22	0.30	0.4	53.0	2.8	58.3
22.00	21.99	0.25	0.34	0.4	53.4	2.7	56.0
23.00	22.99	0.28	0.38	0.5	53.8	2.8	56.9
24.00	23.99	0.30	0.42	0.5	54.3	2.6	54.3
25.00	24.99	0.32	0.46	0.6	54.8	2.7	64.2
26.00	25.99	0.34	0.50	0.6	55.5	2.9	58.3
27.00	26.99	0.37	0.55	0.7	56.1	2.7	61.0
28.00	27.99	0.39	0.59	0.7	56.6	2.8	62.8
29.00	28.98	0.41	0.64	0.8	57.0	2.8	62.5
30.00	29.98	0.43	0.68	0.8	57.5	2.9	63.8
31.00	30.98	0.46	0.73	0.9	57.9	3.0	66.9
32.00	31.98	0.48	0.78	0.9	58.2	3.1	60.6
33.00	32.98	0.51	0.82	1.0	58.5	3.1	61.6
34.00	33.98	0.53	0.87	1.0	58.7	3.1	62.6
35.00	34.98	0.55	0.92	1.1	58.9	3.1	60.4
36.00	35.97	0.58	0.97	1.1	59.1	3.3	64.6
37.00	36.97	0.61	1.02	1.2	59.2	3.8	60.9
38.00	37.97	0.64	1.08	1.3	59.3	3.8	62.4
39.00	38.97	0.67	1.13	1.3	59.4	3.4	55.6
40.00	39.97	0.70	1.18	1.4	59.3	3.1	56.6
41.00	40.96	0.73	1.22	1.4	59.2	3.0	58.7
42.00	41.96	0.76	1.27	1.5	58.9	3.3	50.3
43.00	42.96	0.80	1.31	1.5	58.7	3.6	51.4
44.00	43.96	0.83	1.36	1.6	58.5	3.3	51.9
45.00	44.96	0.86	1.40	1.6	58.4	3.0	50.6
46.00	45.96	0.90	1.44	1.7	58.2	3.0	52.5
47.00	46.96	0.93	1.49	1.8	58.0	3.3	45.6
48.00	47.95	0.97	1.53	1.8	57.7	3.5	52.8
49.00	48.95	1.00	1.58	1.9	57.5	3.4	52.8
50.00	49.95	1.04	1.62	1.9	57.4	3.4	50.4
51.00	50.95	1.08	1.67	2.0	57.2	3.4	49.6
52.00	51.95	1.12	1.71	2.0	56.9	3.4	47.8
53.00	52.95	1.16	1.76	2.1	56.7	3.0	49.8
54.00	53.94	1.20	1.80	2.2	56.4	3.8	47.3
55.00	54.94	1.24	1.85	2.2	56.2	3.8	50.8
56.00	55.94	1.28	1.90	2.3	56.0	3.9	46.4
57.00	56.94	1.33	1.96	2.4	55.9	3.7	52.1
58.00	57.93	1.37	2.01	2.4	55.8	4.1	55.5
59.00	58.93	1.40	2.07	2.5	55.8	3.9	57.3
60.00	59.93	1.44	2.13	2.6	55.8	4.0	53.6
61.00	60.93	1.49	2.18	2.6	55.8	4.1	55.9
62.00	61.92	1.52	2.24	2.7	55.8	4.0	56.7
63.00	62.92	1.56	2.30	2.8	55.8	4.4	54.3
64.00	63.92	1.61	2.36	2.9	55.8	4.5	53.2
65.00	64.92	1.65	2.43	2.9	55.7	4.6	53.6
66.00	65.91	1.70	2.49	3.0	55.6	4.4	54.2
67.00	66.91	1.75	2.55	3.1	55.5	4.7	50.0
68.00	67.91	1.80	2.61	3.2	55.4	4.6	51.1
69.00	68.90	1.85	2.68	3.3	55.4	4.8	51.6
70.00	69.90	1.90	2.74	3.3	55.3	4.9	52.9
71.00	70.90	1.95	2.81	3.4	55.3	4.9	52.2
72.00	71.89	2.00	2.88	3.5	55.3	4.9	54.6
73.00	72.89	2.05	2.95	3.6	55.2	4.8	53.4
74.00	73.88	2.10	3.02	3.7	55.2	5.5	54.7
75.00	74.88	2.16	3.10	3.8	55.2	5.5	55.5
76.00	75.88	2.22	3.18	3.9	55.1	5.7	53.0
77.00	76.87	2.28	3.26	4.0	55.0	5.9	53.7
78.00	77.87	2.34	3.34	4.1	55.0	5.8	52.1
79.00	78.86	2.40	3.42	4.2	54.9	5.9	54.0
80.00	79.85	2.46	3.50	4.3	54.9	5.6	53.5
81.00	80.85	2.53	3.59	4.4	54.9	6.1	52.9
82.00	81.84	2.59	3.67	4.5	54.8	6.2	53.3
83.00	82.84	2.65	3.76	4.6	54.8	6.4	53.0
84.00	83.83	2.72	3.85	4.7	54.7	6.2	52.4
85.00	84.83	2.79	3.93	4.8	54.7	6.2	52.9
86.00	85.82	2.85	4.02	4.9	54.6	6.5	52.1
87.00	86.81	2.92	4.11	5.0	54.6	6.6	52.2
88.00	87.81	2.99	4.21	5.2	54.6	6.9	54.3
89.00	88.80	3.06	4.30	5.3	54.6	6.8	53.4
90.00	89.79	3.13	4.40	5.4	54.6	6.6	53.5
91.00	90.78	3.20	4.50	5.5	54.6	6.8	54.3
92.00	91.78	3.27	4.60	5.6	54.6	7.2	54.3
93.00	92.77	3.34	4.69	5.8	54.5	6.9	53.9
94.00	93.76	3.41	4.79	5.9	54.5	7.2	54.8
95.00	94.75	3.48	4.90	6.0	54.6	7.1	57.2
96.00	95.75	3.55	5.00	6.1	54.6	7.0	56.6
97.00	96.74	3.62	5.10	6.3	54.7	7.1	57.4
98.00	97.73	3.68	5.21	6.4	54.7	7.1	58.5
99.00	98.72	3.75	5.31	6.5	54.8	7.0	59.4
100.00	99.72	3.81	5.42	6.6	54.9	7.1	58.7
101.00	100.71	3.88	5.53	6.8	55.0	7.3	59.0
102.00	101.70	3.94	5.64	6.9	55.1	7.3	60.6
103.00	102.69	4.01	5.75	7.0	55.1	7.5	59.7
104.00	103.68	4.07	5.87	7.1	55.2	7.6	59.6
105.00	104.67	4.14	5.98	7.3	55.3	7.5	60.5
106.00	105.67	4.20	6.10	7.4	55.4	7.7	60.7
107.00	106.66	4.27	6.22	7.5	55.5	7.9	61.9
108.00	107.65	4.33	6.34	7.7	55.6	8.0	62.7
109.00	108.64	4.40	6.46	7.8	55.8	7.9	64.6
110.00	109.63	4.46	6.59	8.0	55.9	8.3	64.7
111.00	110.62	4.52	6.72	8.1	56.1	8.2	64.2
112.00	111.60	4.59	6.85	8.2	56.2	8.2	63.4
113.00	112.59	4.65	6.98	8.4	56.3	8.6	63.7
114.00	113.58	4.71	7.11	8.5	56.5	8.4	64.2
115.00	114.57	4.78	7.25	8.7	56.6	8.5	64.7
116.00	115.56	4.84	7.39	8.8	56.7	8.9	65.0
117.00	116.55	4.91	7.52	9.0	56.9	8.8	64.6
118.00	117.54	4.97	7.66	9.1	57.0	8.7	65.3
119.00	118.53	5.04	7.80	9.3	57.2	8.8	64.2
120.00	119.51	5.10	7.94	9.4	57.3	8.9	65.5
121.00	120.50	5.16	8.08	9.6	57.4	8.8	65.5
122.00	121.49	5.23	8.22	9.7	57.6	9.0	66.2
123.00	122.48	5.29	8.37	9.9	57.7	9.3	67.2
124.00	123.46	5.35	8.52	10.1	57.8	9.4	67.3
125.00	124.45	5.42	8.67	10.2	58.0	9.4	67.0
126.00	125.44	5.48	8.82	10.4	58.1	9.4	67.2
127.00	126.42	5.54	8.97	10.5	58.3	9.3	67.6
128.00	127.41	5.61	9.12	10.7	58.4	9.4	67.4
129.00	128.40	5.67	9.27	10.9	58.5	9.7	67.3
130.00	129.38	5.74	9.43	11.0	58.7	10.1	66.3
131.00	130.37	5.81	9.59	11.2	58.8	10.0	65.6
132.00	131.35	5.88	9.75	11.4	58.9	9.4	69.1
133.00	132.34	5.95	9.91	11.6	59.0	10.2	67.2
134.00	133.32	6.02	10.08	11.7	59.2	10.3	67.0
135.00	134.30	6.09	10.24	11.9	59.3	10.4	67.2
136.00	135.29	6.16	10.41	12.1	59.4	10.5	67.5
137.00	136.27	6.23	10.58	12.3	59.5	10.5	68.1
138.00	137.25	6.29	10.75	12.5	59.6	10.7	67.8
139.00	138.24	6.36	10.92	12.6	59.8	11.0	67.3
140.00	139.22	6.44	11.10	12.8	59.9	11.1	67.8
141.00	140.20	6.51	11.27	13.0	60.0	11.1	67.5
142.00	141.18	6.59	11.45	13.2	60.1	11.4	66.9
143.00	142.16	6.66	11.63	13.4	60.2	11.4	67.2
144.00	143.14	6.74	11.81	13.6	60.3	11.4	67.0
145.00	144.12	6.82	12.00	13.8	60.4	11.5	67.7
146.00	145.10	6.89	12.18	14.0	60.5	11.6	68.0
147.00	146.08	6.97	12.37	14.2	60.6	11.6	67.8
148.00	147.06	7.05	12.56	14.4	60.7	11.6	67.1
149.00	148.04	7.13	12.75	14.6	60.8	11.7	66.5
150.00	149.02	7.21	12.94	14.8	60.9	12.0	66.4
151.00	149.99	7.29	13.13	15.0	61.0	11.8	66.5
152.00	150.97	7.37	13.31	15.2	61.0	12.3	65.9
153.00	151.95	7.45	13.51	15.4	61.1	12.2	68.4
154.00	152.93	7.53	13.70	15.6	61.2	12.4	67.0
155.00	153.90	7.62	13.90	15.9	61.3	12.2	67.4
156.00	154.88	7.70	14.10	16.1	61.3	12.3	66.2
157.00	155						

Century
WIRELINE SERVICES

GAMMA - NEUTRON THROUGH RODS
CM13-17

COMPANY: NMP COAL CANADA LTD WELL: CM13-17 FIELD: N/A COUNTRY: CANADA PROVINCE: ALBERTA DIST: N/A SECTION: N/A TOWNSHIP: N/A RANGE: N/A LICENSE NO: N/A UNICOL WELL ID: N/A	OTHER SERVICES: DENY DENY DENY
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DATE: 09/03/13	ELEVATION RB: N/A	ELEVATION OF: 2121.00
DEPTH DRILLER: 194.90	LOG NUMBER: N/A	ELEVATION OF: 2121.00
LOGGERS TO: 194.04	LOGGERS FROM: 194.04	LOG MEASURED FROM: GL
BIT SIZE: 140.00	ARRIVAL TIME: 12:45	
LOG TOP: 0.00	DEPARTURE TIME: 10:00	
LOG BOTTOM: 193.25	CNC STOPPED: N/A	

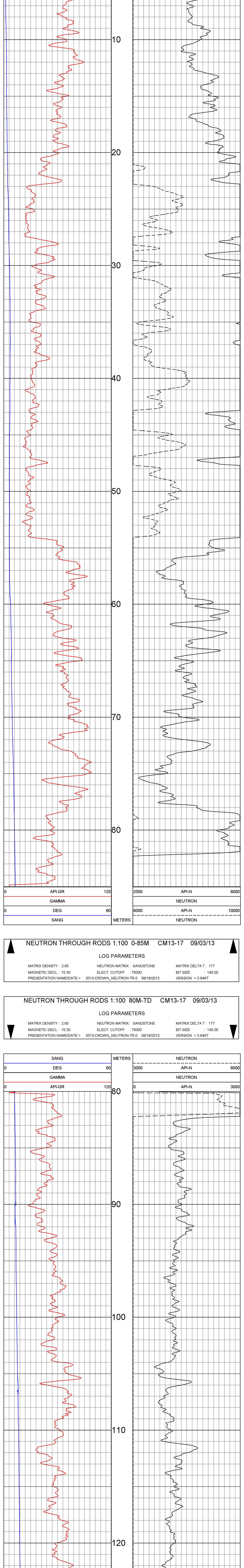
CASING DRILLER: 6.00	SURFACE	CASING TYPE: 6.00
ROD/POLE FLUID: H2O	ROD/POLE FLUID TEMP: N/A	ROD/POLE FLUID PRESS: N/A
ROD TEMP: N/A	ROD TEMP: N/A	ROD TEMP: N/A
MOI WGT: N/A	MOI WGT: N/A	MOI WGT: N/A
MOI WGT: 1.00	MOI WGT: 1.00	MOI WGT: 1.00
WITNESSED BY: L. BOUILLER	RECORDED BY: C. JOHNSTON	EASTING: 863919
REMARKS 1: NORTHING: 852091	REMARKS 2:	

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

NEUTRON THROUGH RODS 1:100 0-85M CM13-17 09/03/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
 MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 140.00
 PRESENTATION NAME/DATE = 2013-CROWN_NEUTRON-TR.0 08/18/2013 VERSION = 3.64KT



NEUTRON THROUGH RODS 1:100 0-85M CM13-17 09/03/13

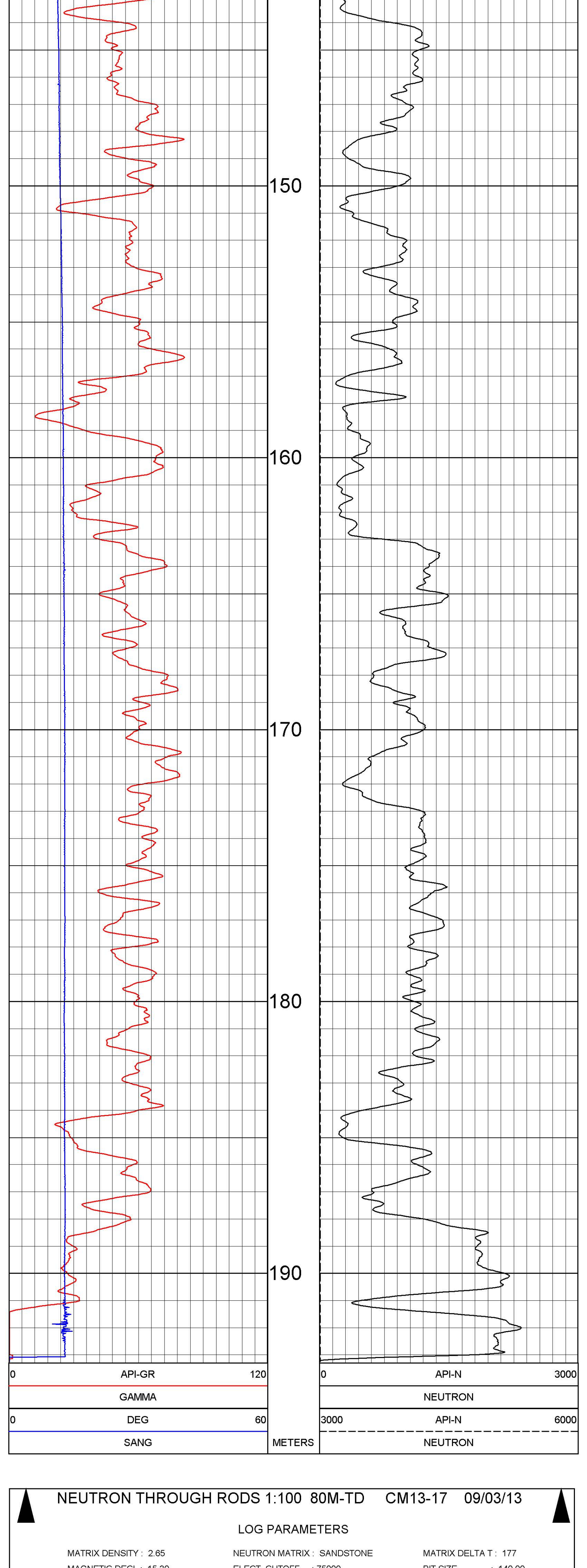
LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
 MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 140.00
 PRESENTATION NAME/DATE = 2013-CROWN_NEUTRON-TR.0 08/18/2013 VERSION = 3.64KT

NEUTRON THROUGH RODS 1:100 80M-TD CM13-17 09/03/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
 MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 140.00
 PRESENTATION NAME/DATE = 2013-CROWN_NEUTRON-TR.0 08/18/2013 VERSION = 3.64KT



NEUTRON THROUGH RODS 1:100 80M-TD CM13-17 09/03/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
 MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 140.00
 PRESENTATION NAME/DATE = 2013-CROWN_NEUTRON-TR.0 08/18/2013 VERSION = 3.64KT

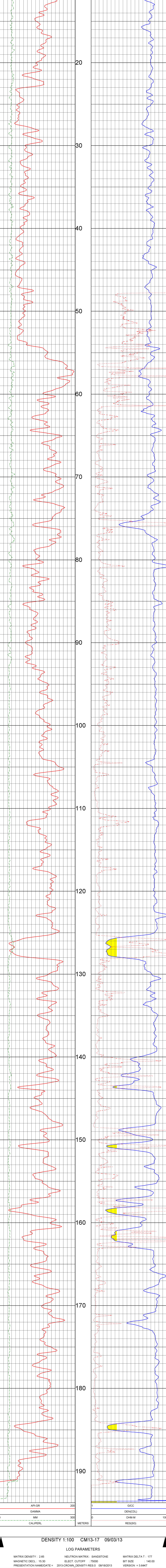
TOOL CALIBRATION CM13-17 09/03/13 14:59						
TOOL 9057A TM VERSION 4						
SERIAL NUMBER 4430						
DATE	TIME	SENSOR	STANDARD	RESPONSE		
1	Jul31,13	11:08:47	GAMMA	0.000	[API-GR]	0.100 [CPS]
	Jul31,13	11:08:47	GAMMA	545.000	[API-GR]	608.000 [CPS]
2	Jul31,13	11:25:36	NEUTRON	0.000	[API-N]	1.000 [CPS]
	Jul31,13	11:25:36	NEUTRON	271.000	[API-N]	38.000 [CPS]
3	Apr30,08	14:54:38	SP	0.000	[MV]	325650.000 [CPS]
	Apr30,08	14:54:38	SP	97.000	[MV]	277560.000 [CPS]
4	Jul02,07	08:07:18	RES(16N)	0.000	[OHM-M]	3892.000 [CPS]
	Jul02,07	08:07:18	RES(16I)	1996.000	[OHM-M]	421781.000 [CPS]
5	Jul02,07	08:07:23	RES(64N)	0.000	[OHM-M]	3324.000 [CPS]
	Jul02,07	08:07:23	RES(64I)	1990.000	[OHM-M]	426303.000 [CPS]
6	Jul31,13	13:32:13	TEMP	10.000	[DEG F]	343298.000 [CPS]
	Jul31,13	13:32:13	TEMP	71.000	[DEG F]	423631.000 [CPS]
7	Jul02,07	08:07:32	RES	0.000	[OHM]	4438.000 [CPS]
	Jul02,07	08:07:32	RES	989.000	[OHM]	162986.000 [CPS]
8	Jun26,07	14:31:00	POR(NEU)	Default	[CPS]	Default [CPS]

COMPANY	INWP O&M CANADA LTD	OTHER SERVICES	
WELL	CM13-17	DEN/PS	
COUNTRY	CANADA	DEV/TEM	
PROVINCE	ALBERTA	NEUT/P	
SECTION	N/A		
TOWNSHIP	N/A		
RANGE	N/A		
LICENSE NO.	N/A		
UNIQUE WELL ID	N/A		
PERMANENT DATUM (GL)		ELEVATION (FB)	N/A
LOG MEASURED FROM (GL)		ELEVATION OF	N/A
		ELEVATION SL	: 2121.00
DATE	09/03/13	RIG NUMBER	N/A
DEPTH (M)	: 194.50	LOGGERS TO	: 194.04
BIT SIZE	: 140.00	ARRIVAL TIME	: 12:45
LOG TOP	: 0.00	DEPARTURE TIME	: 18:00
LOG BOTTOM	: 193.79	CIRC STOPPED	N/A
CASINGS LOGGER	: 5.80		
CASINGS DRILLER	: 6.00		
CASING TYPE	: SURFACE		
ROSBOROLE FLUID	N/A		
RO TEMPERATURE	N/A		
RO TEMPERATURE	N/A		
MUD WEIGHT	: 1.00		
WITNESSED BY	: L. BOUTLIER		
RECORDED BY	: C. JOHNSTON		
REMARKS 1	NORTHING 5629091 EASTING 663919		
REMARKS 2			

DENSITY 1:100 CM13-17 09/03/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES.0	08/18/2013	VERSION = 3.64KT



DENSITY 1:100 CM13-17 09/03/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES.0	08/18/2013	VERSION = 3.64KT

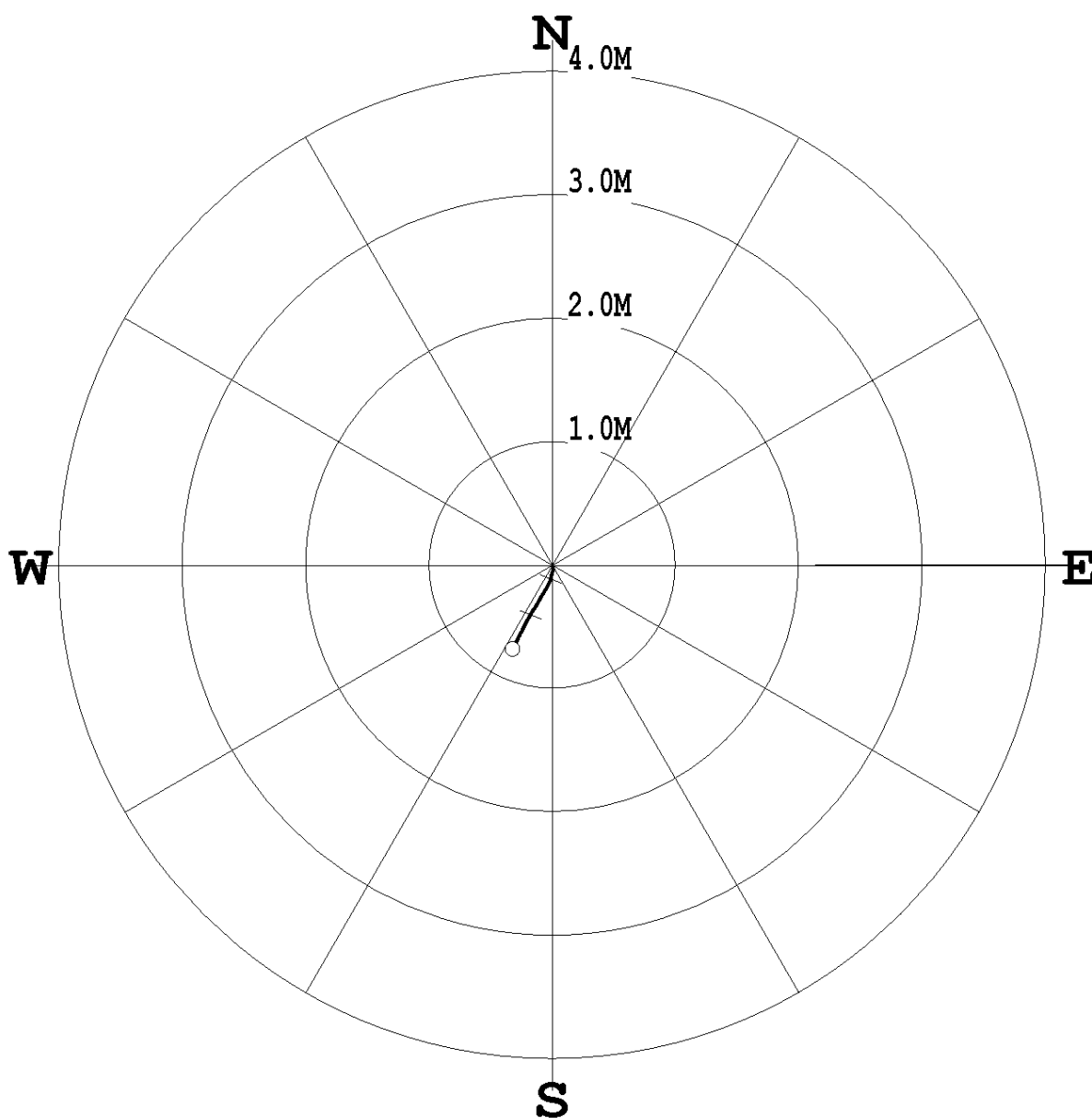
DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Jun25.13 15:33.14	GAMMA	0.000 [API-GR]	0.100 [CPS]
2	Jun25.13 15:33.14	GAMMA	545.000 [API-GR]	558.000 [CPS]
3	Aug19.13 13:06:53	VOLTAGE	26.200 [MV]	4350.000 [CPS]
4	Aug19.13 13:06:53	VOLTAGE	227.600 [MV]	31550.000 [CPS]
5	Mar06.13 15:12:26	CALIPER	76.400 [CM]	117554.000 [CPS]
6	Mar06.13 15:12:26	CALIPER	177.800 [CM]	347820.000 [CPS]
7	Aug19.13 13:07:09	DEN(LS)	1.620 [G/CC]	17088.000 [CPS]
8	Aug19.13 13:07:09	DEN(LS)	2.612 [G/CC]	2263.000 [CPS]
9	Aug27.13 18:24:35	DEN(S)	1.590 [G/CC]	66640.000 [CPS]
10	Aug27.13 18:24:35	DEN(S)	2.580 [G/CC]	26130.000 [CPS]
11	Aug19.13 13:07:41	CALIPERL	100.000 [CM]	112529.000 [CPS]
12	Aug19.13 13:07:41	CALIPERL	200.000 [CM]	217210.000 [CPS]
13	Aug19.13 13:08:07	CURRENT	26.200 [UA]	8769.000 [CPS]
14	Aug19.13 13:08:07	CURRENT	227.600 [UA]	26334.000 [CPS]
15	Feb14.10 11:28:44	F	Default	
16	Feb14.10 11:28:44	X	Default	

PLAN VIEW COMPU-LOG DEVIATION

CLIENT: NWP COAL CANADA LTD
 LOCATION: N/A
 HOLE ID: CM13-19
 DATE OF LOG: 09/01/13
 PROBE: 9057A 1071



SCALE: 1 M/CM
 TRUE DEPTH: 50.89 M
 AZIMUTH: 205.6
 DISTANCE: 0.8 M
 + = 20 M INCR
 ○ = BOTTOM OF HOLE



***** COMPU-LOG - VERTICAL DEVIATION *****

CLIENT : NWP COAL CANADA LTD HOLE ID. : CM13-19
 FIELD OFFICE : CENTURY DATE OF LOG : 09/01/13
 DATA FROM : N/A PROBE : 9057A , 1071
 MAG. DECL. : 15.300 DEPTH UNITS : METERS
 LOG: CM13-19_09-01-13_19-00_9057A_.02_10.00_51.10_DEVI.log

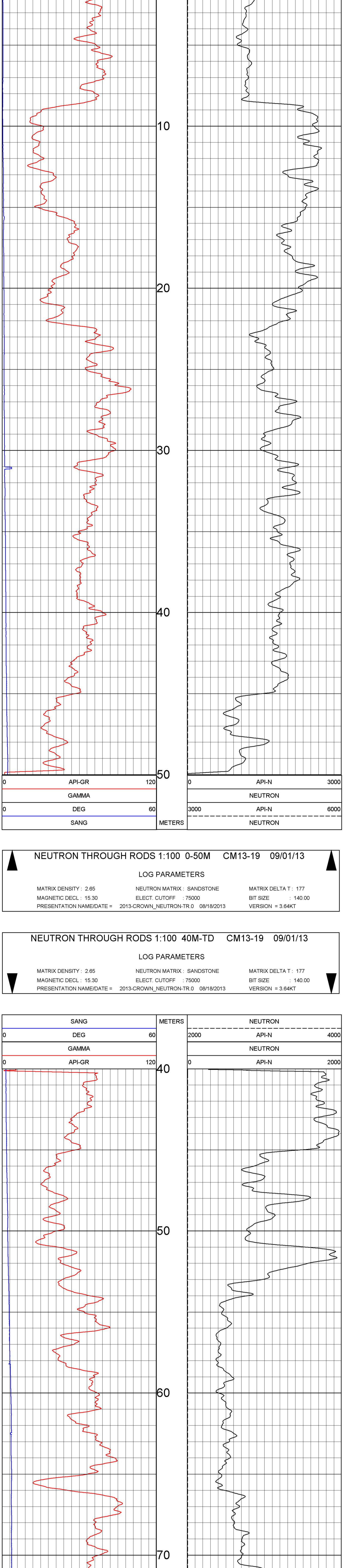
CABLE DEPTH	TRUE DEPTH	NORTH DEV.	EAST DEV.	DISTANCE	AZIMUTH	SANG	SANGB
10.02	10.02	-0.00	0.00	0.0	167.4	0.4	167.4
11.00	11.00	-0.01	0.00	0.0	166.9	0.6	166.8
12.00	12.00	-0.02	0.01	0.0	166.7	0.6	171.9
13.00	13.00	-0.03	0.01	0.0	169.6	0.5	189.5
14.00	14.00	-0.04	0.00	0.0	175.0	0.6	188.5
15.00	15.00	-0.05	0.00	0.1	178.5	0.6	195.6
16.00	16.00	-0.06	-0.00	0.1	181.6	0.6	207.9
17.00	17.00	-0.07	-0.01	0.1	184.1	0.8	199.4
18.00	18.00	-0.09	-0.01	0.1	185.6	0.7	192.0
19.00	19.00	-0.10	-0.01	0.1	186.8	0.7	193.8
20.00	20.00	-0.11	-0.02	0.1	187.9	0.8	185.9
21.00	21.00	-0.12	-0.02	0.1	188.5	0.7	198.5
22.00	22.00	-0.14	-0.02	0.1	189.8	0.8	206.5
23.00	23.00	-0.15	-0.03	0.1	191.0	0.7	214.2
24.00	24.00	-0.16	-0.03	0.2	192.1	0.8	207.6
25.00	25.00	-0.17	-0.04	0.2	193.3	0.9	214.1
26.00	26.00	-0.18	-0.05	0.2	194.4	0.9	214.6
27.00	27.00	-0.19	-0.05	0.2	195.5	0.6	218.7
28.00	28.00	-0.21	-0.06	0.2	196.6	0.9	210.2
29.00	29.00	-0.22	-0.07	0.2	197.4	0.8	207.8
30.00	30.00	-0.23	-0.08	0.2	198.4	0.9	206.8
31.00	31.00	-0.25	-0.09	0.3	199.3	1.3	195.9
32.00	32.00	-0.26	-0.09	0.3	199.8	1.3	203.1
33.00	33.00	-0.28	-0.10	0.3	200.4	1.1	214.0
34.00	34.00	-0.29	-0.11	0.3	201.1	1.0	217.5
35.00	35.00	-0.31	-0.12	0.3	201.4	1.1	218.7
36.00	36.00	-0.33	-0.13	0.4	202.0	0.9	220.7
37.00	37.00	-0.35	-0.14	0.4	202.6	1.1	211.2
38.00	38.00	-0.36	-0.15	0.4	203.2	1.4	208.0
39.00	39.00	-0.38	-0.17	0.4	203.6	1.3	207.5
40.00	40.00	-0.40	-0.18	0.4	203.9	1.4	182.8
41.00	41.00	-0.42	-0.19	0.5	204.1	1.5	202.1
42.00	42.00	-0.44	-0.20	0.5	204.5	1.2	198.4
43.00	43.00	-0.46	-0.21	0.5	204.8	1.3	212.0
44.00	44.00	-0.49	-0.23	0.5	204.8	1.5	205.9
45.00	44.99	-0.51	-0.24	0.6	204.9	1.6	204.2
46.00	45.99	-0.54	-0.25	0.6	204.9	1.6	211.6
47.00	46.99	-0.56	-0.26	0.6	205.2	1.8	203.2
48.00	47.99	-0.59	-0.28	0.7	205.2	1.9	204.0
49.00	48.99	-0.62	-0.29	0.7	205.2	1.9	197.1
50.00	49.99	-0.65	-0.31	0.7	205.3	1.7	215.9
51.00	50.99	-0.68	-0.32	0.7	205.6	0.0	0.0
50.90	50.89	-0.68	-0.32	0.7	205.6	2.3	213.4

COMPANY	NMP COAL CANADA LTD	OTHER SERVICES:	DEU
WELL	CM13-19	DEV	DEU
FIELD	N/A	DEH-1P	
COUNTRY	CANADA		
PROVINCE	ALBERTA		
SECTION	N/A		
TOWNSHIP	N/A		
RANGE	N/A		
LICENSE NO.	N/A		
LINE/LOG WELL ID	N/A		
PERMANENT DATUM	GL	ELEVATION RB	N/A
LOG MEASURED FROM	GL	ELEVATION DF	N/A
DLI MEASURED FROM	GL	ELEVATION DL	1927.00
DATE	09/01/13	RIG NUMBER	N/A
DEPT/ DRILLER	136.00	LOGSER TO	127.83
BIT SIZE	140.00	ARRIVAL TIME	14:45
LOG TOP	0.00	DEPARTURE TIME	19:45
LOG BOTTOM	127.86	CIRC STOPPED	N/A
CASING LOGGER	8.60		
CASING DRILLER	9.03		
CASING TYPE	SURFACE		
BOREHOLE FLUID	H2O		
RAM TEMPERATURE	N/A		
MUD RES	N/A		
MUD WEIGHT	1.00		
WITNESSED BY	L. BOUTILIER		
RECORDED BY	C. JOHNSTON		
REMARKS 1	NORTHING 561848 EASTING 663392		
REMARKS 2			

NEUTRON THROUGH RODS 1:100 0-50M CM13-19 09/01/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_NEUTRON-TR.0 08/18/2013		VERSION = 3.64KT



NEUTRON THROUGH RODS 1:100 0-50M CM13-19 09/01/13

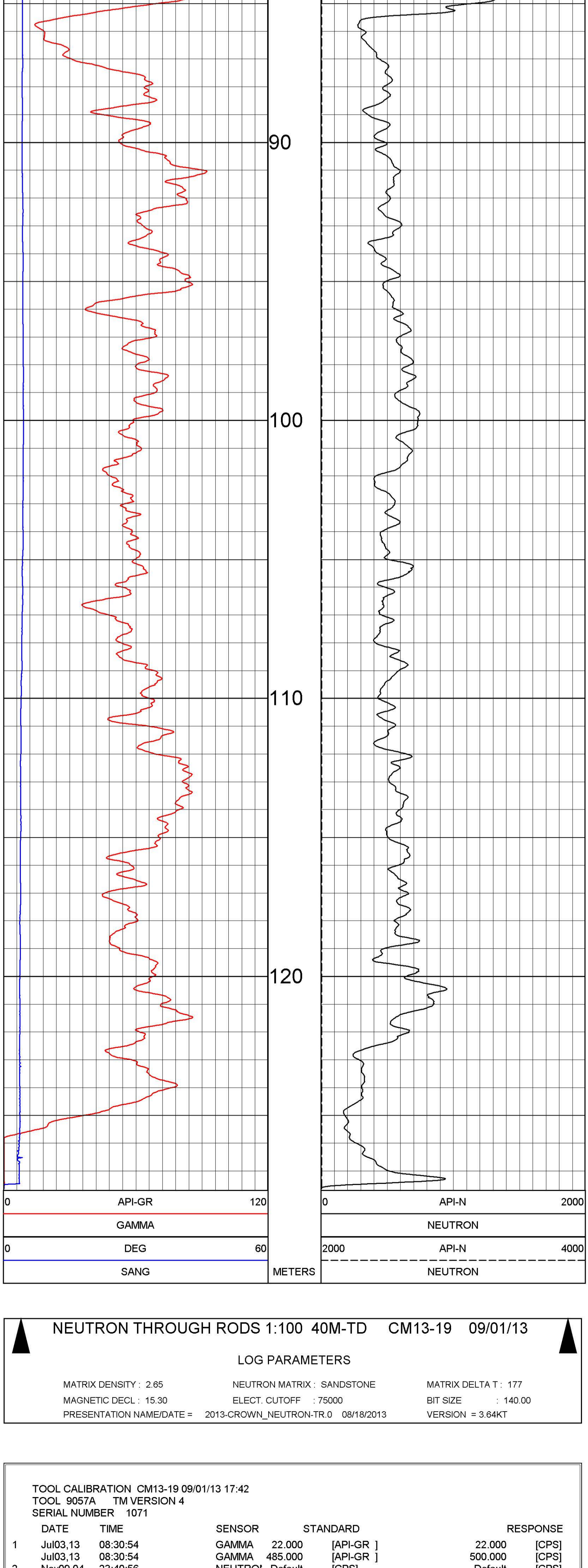
LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_NEUTRON-TR.0 08/18/2013		VERSION = 3.64KT

NEUTRON THROUGH RODS 1:100 40M-TD CM13-19 09/01/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_NEUTRON-TR.0 08/18/2013		VERSION = 3.64KT



NEUTRON THROUGH RODS 1:100 40M-TD CM13-19 09/01/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_NEUTRON-TR.0 08/18/2013		VERSION = 3.64KT

TOOL CALIBRATION CM13-19 09/01/13 17:42

DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Jul03,13 08:30:54	GAMMA	22.000 [API-GR]	22.000 [CPS]
1	Jul03,13 08:30:54	GAMMA	485.000 [API-GR]	500.000 [CPS]
2	Nov09,04 23:40:56	NEUTRON	Default [CPS]	Default [CPS]
2	Nov09,04 23:40:56	NEUTRON	Default [CPS]	Default [CPS]
3	Nov09,04 23:41:03	SP	0.000 [MV]	60330.000 [CPS]
3	Nov09,04 23:41:03	SP	400.000 [MV]	19880.000 [CPS]
4	Nov09,04 23:41:00	RES(16N)	0.000 [OHM-M]	3860.000 [CPS]
4	Nov09,04 23:41:00	RES(16N)	2000.000 [OHM-M]	103970.000 [CPS]
5	Aug20,04 09:47:47	RES(64N)	0.000 [OHM-M]	3800.000 [CPS]
5	Aug20,04 09:47:47	RES(64N)	2000.000 [OHM-M]	103682.000 [CPS]
6	Feb26,02 16:19:02	TEMP	35.500 [DEG_F]	101300.000 [CPS]
6	Feb26,02 16:19:02	TEMP	84.400 [DEG_F]	64850.000 [CPS]
7	Aug20,04 10:01:15	RES	0.000 [OHM]	10085.000 [CPS]
7	Aug20,04 10:01:15	RES	3000.000 [OHM]	152750.000 [CPS]
8	Feb26,02 13:02:01	POR(NEI)	1000.000 [PERCENT]	152.000 [CPS]

COMPANY : NWP COAL CANADA LTD
WELL : CM13-19
FIELD : N/A
COUNTRY : CANADA
PROVINCE : ALBERTA

OTHER SERVICES:
DEV
NEU-TP
DEN-TP

SECTION : N/A
TOWNSHIP : N/A
RANGE : N/A
LICENSE NO. : N/A
UNIQUE WELL ID. : N/A

PERMANENT DATUM : GL
LOG MEASURED FROM : GL
DRL MEASURED FROM : GL

ELEVATION KB : N/A
ELEVATION DF : N/A
ELEVATION GL : 1927.00

DATE : 09/01/13
DEPTH DRILLER : 136.00
BIT SIZE : 140.00
LOG TOP : 0.00
LOG BOTTOM : 51.06
CASING LOGGER : 8.80
CASING DRILLER : 9.00
CASING TYPE : SURFACE

BOREHOLE FLUID : H2O
FM TEMPERATURE : N/A
MUD RES : N/A
MUD WEIGHT : 1.00

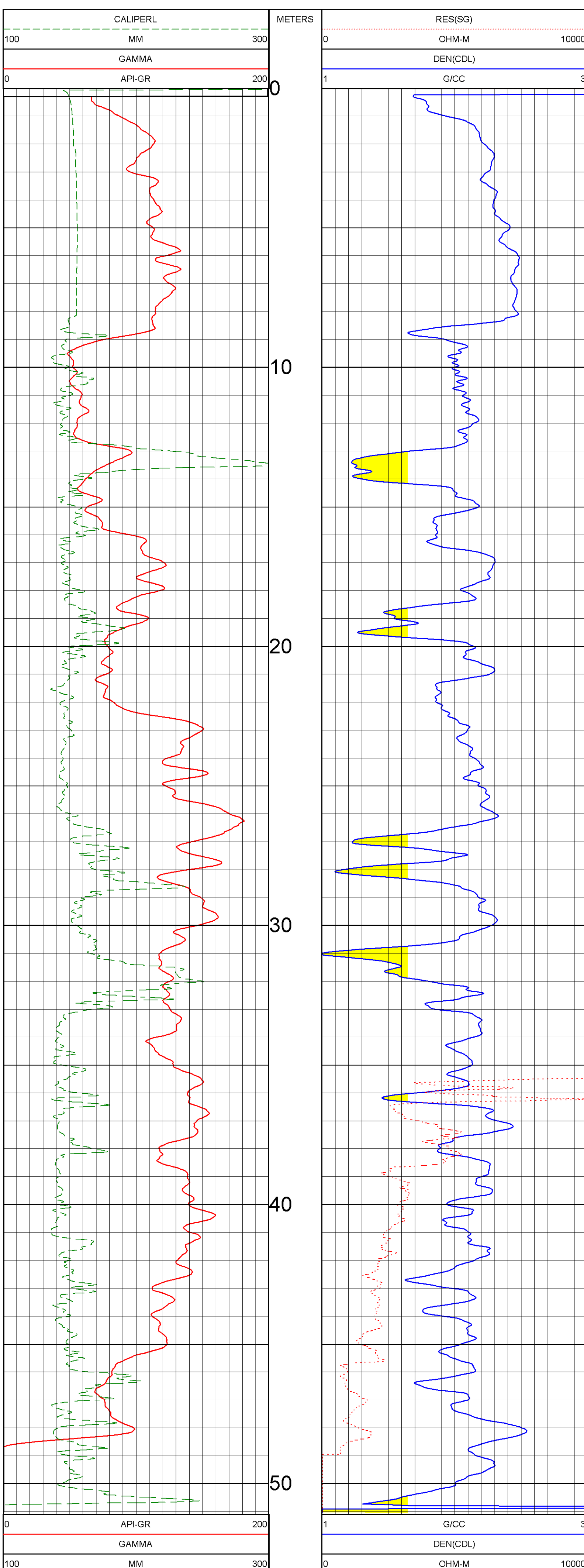
WITNESSED BY : L. BOUTILLIER
RECORDED BY : C. JOHNSTON
REMARKS 1 : NORTHING 5518848 EASTING 663392
REMARKS 2 : HOLE BRIDGED AT 51.35M

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

DENSITY 1:100 CM13-19 09/01/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES.0 08/18/2013 VERSION = 3.64KT



DENSITY 1:100 CM13-19 09/01/13

LOG PARAMETERS

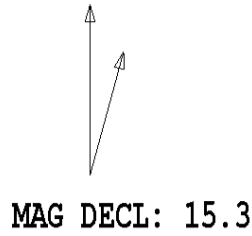
MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES.0 08/18/2013 VERSION = 3.64KT

TOOL CALIBRATION CM13-19 09/01/13 19:20
TOOL 9239C1 TM VERSION 2025
SERIAL NUMBER 4428

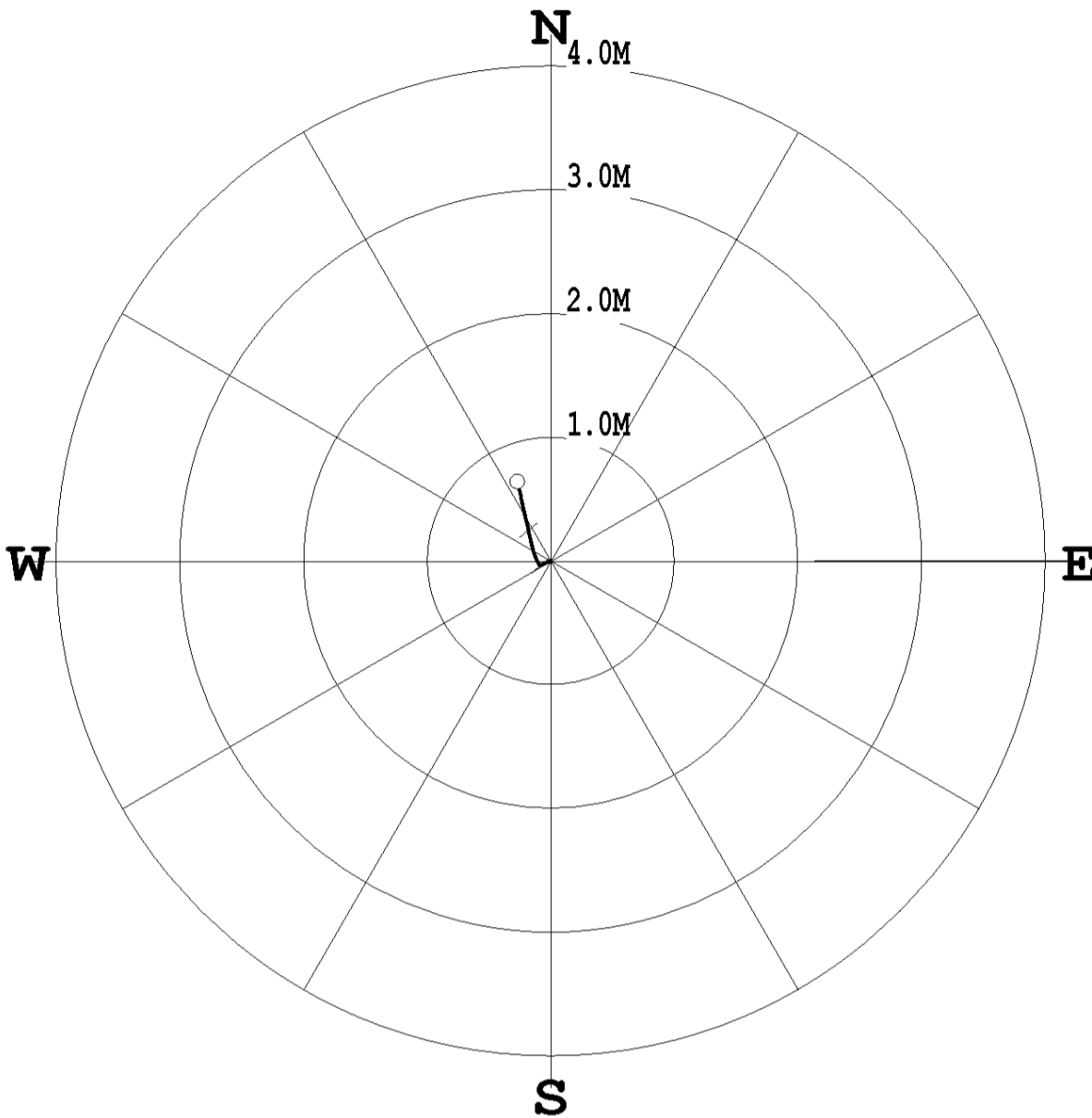
DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Jun25,13 15:33:14	GAMMA	0.000 [API-GR]	0.100 [CPS]
	Jun25,13 15:33:14	GAMMA	545.000 [API-GR]	558.000 [CPS]
2	Aug19,13 13:06:53	VOLTAGE	26.200 [MV]	4350.000 [CPS]
	Aug19,13 13:06:53	VOLTAGE	227.600 [MV]	31550.000 [CPS]
3	Mar06,13 15:12:26	CALIPER	76.400 [CM]	117554.000 [CPS]
	Mar06,13 15:12:26	CALIPER	177.800 [CM]	347820.000 [CPS]
4	Aug19,13 13:07:09	DEN(LS)	1.620 [G/CC]	17088.000 [CPS]
	Aug19,13 13:07:09	DEN(LS)	2.580 [G/CC]	2263.000 [CPS]
5	Aug27,13 18:24:35	DEN(SS)	1.590 [G/CC]	68540.000 [CPS]
	Aug27,13 18:24:35	DEN(SS)	2.580 [G/CC]	26130.000 [CPS]
6	Aug19,13 13:07:41	CALIPERL	100.000 [CM]	112529.000 [CPS]
	Aug19,13 13:07:41	CALIPERL	200.000 [CM]	217210.000 [CPS]
7	Aug19,13 13:08:07	CURRENT	26.200 [UA]	8769.000 [CPS]
	Aug19,13 13:08:07	CURRENT	227.600 [UA]	26334.000 [CPS]
8	Feb14,10 11:28:44	F	Default [CPS]	
9	Feb14,10 11:28:44	X	Default [CPS]	

PLAN VIEW COMPU-LOG DEVIATION

CLIENT: NWP COAL CANADA LTD
 LOCATION: N/A
 HOLE ID: CM13-20
 DATE OF LOG: 08/31/13
 PROBE: 9058A 4565



SCALE: 1 M/CM
 TRUE DEPTH: 53.67 M
 AZIMUTH: 337.4
 DISTANCE: 0.7 M
 + = 20 M INCR
 ○ = BOTTOM OF HOLE



* * * * * COMPU-LOG - VERTICAL DEVIATION * * * * *

CLIENT : NWP COAL CANADA LTD HOLE ID. : CM13-20
 FIELD OFFICE : CENTURY DATE OF LOG : 08/31/13
 DATA FROM : N/A PROBE : 9058A , 4565
 MAG. DECL. : 15.300 DEPTH UNITS : METERS
 LOG: CM13-20_08-31-13_22-27_9058A_.02_13.00_53.87_DEVI.log

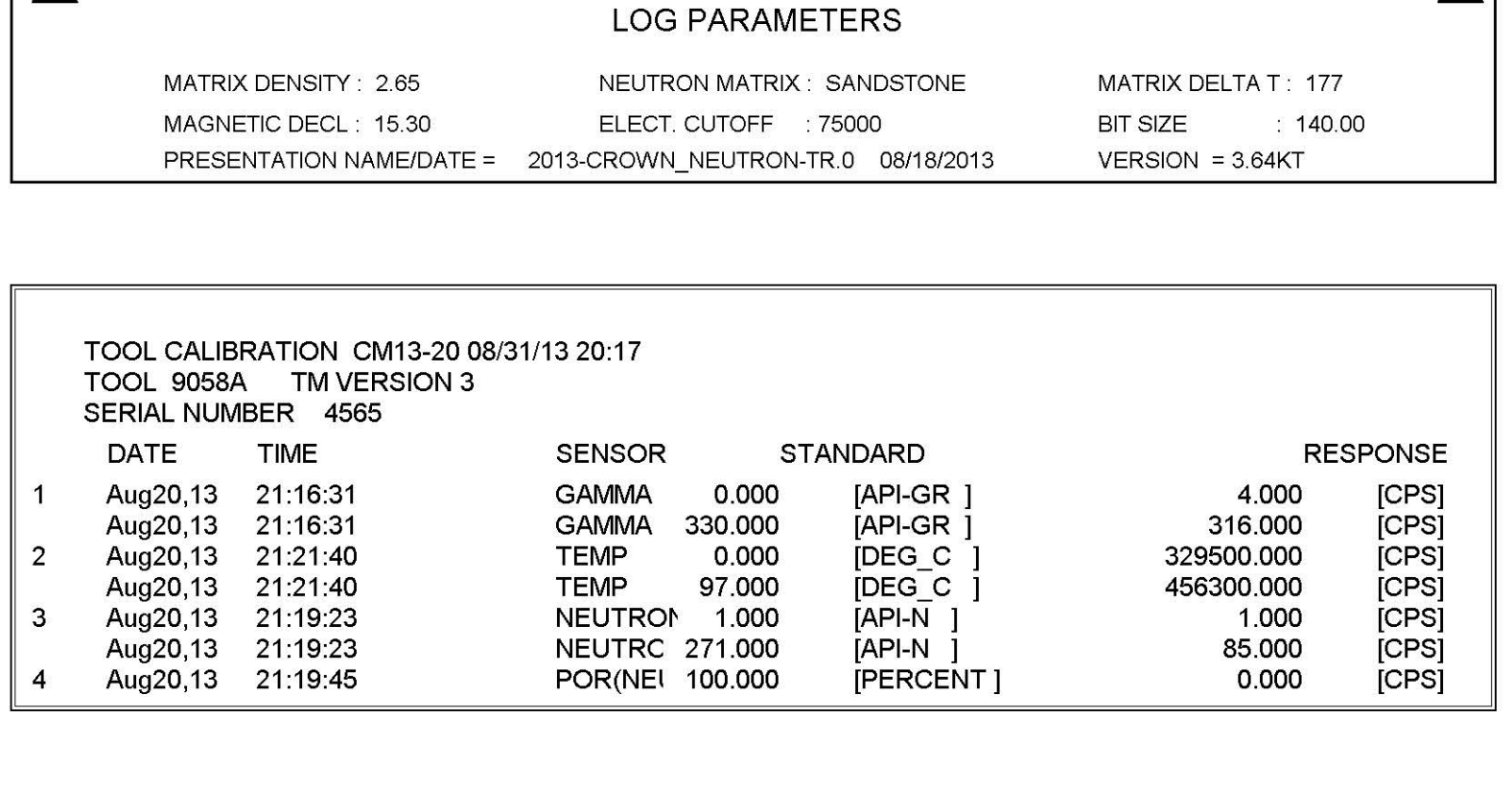
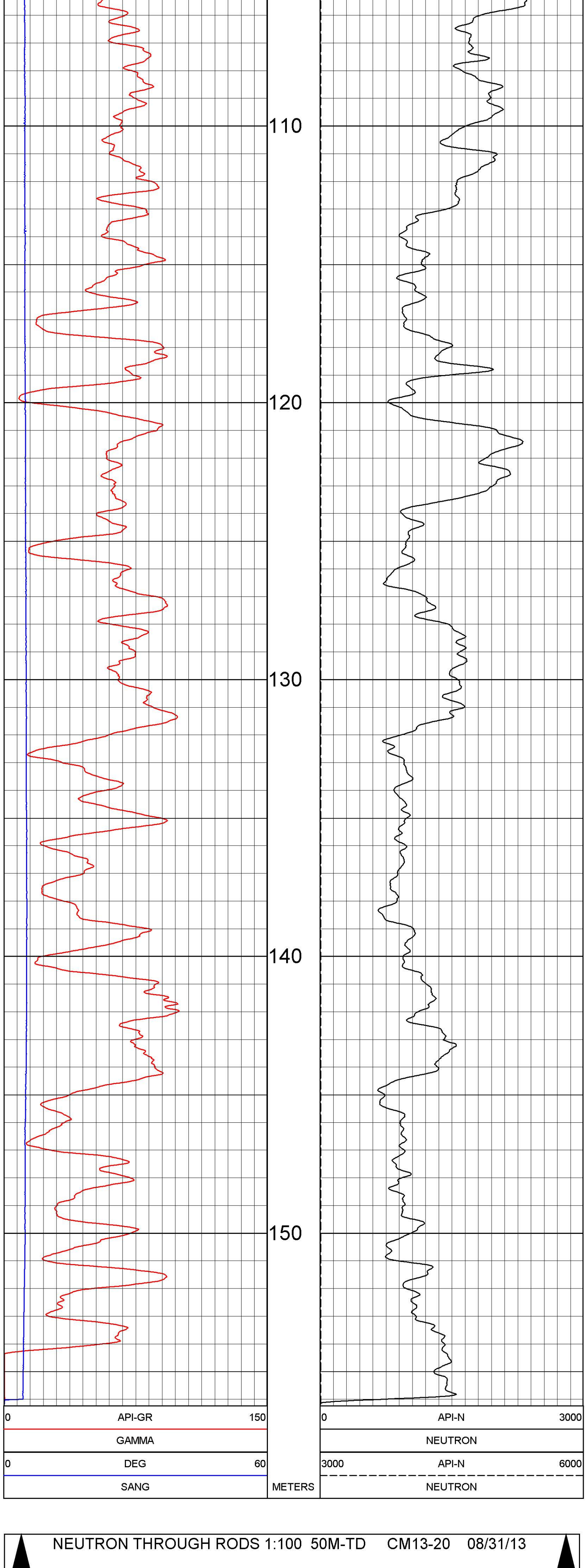
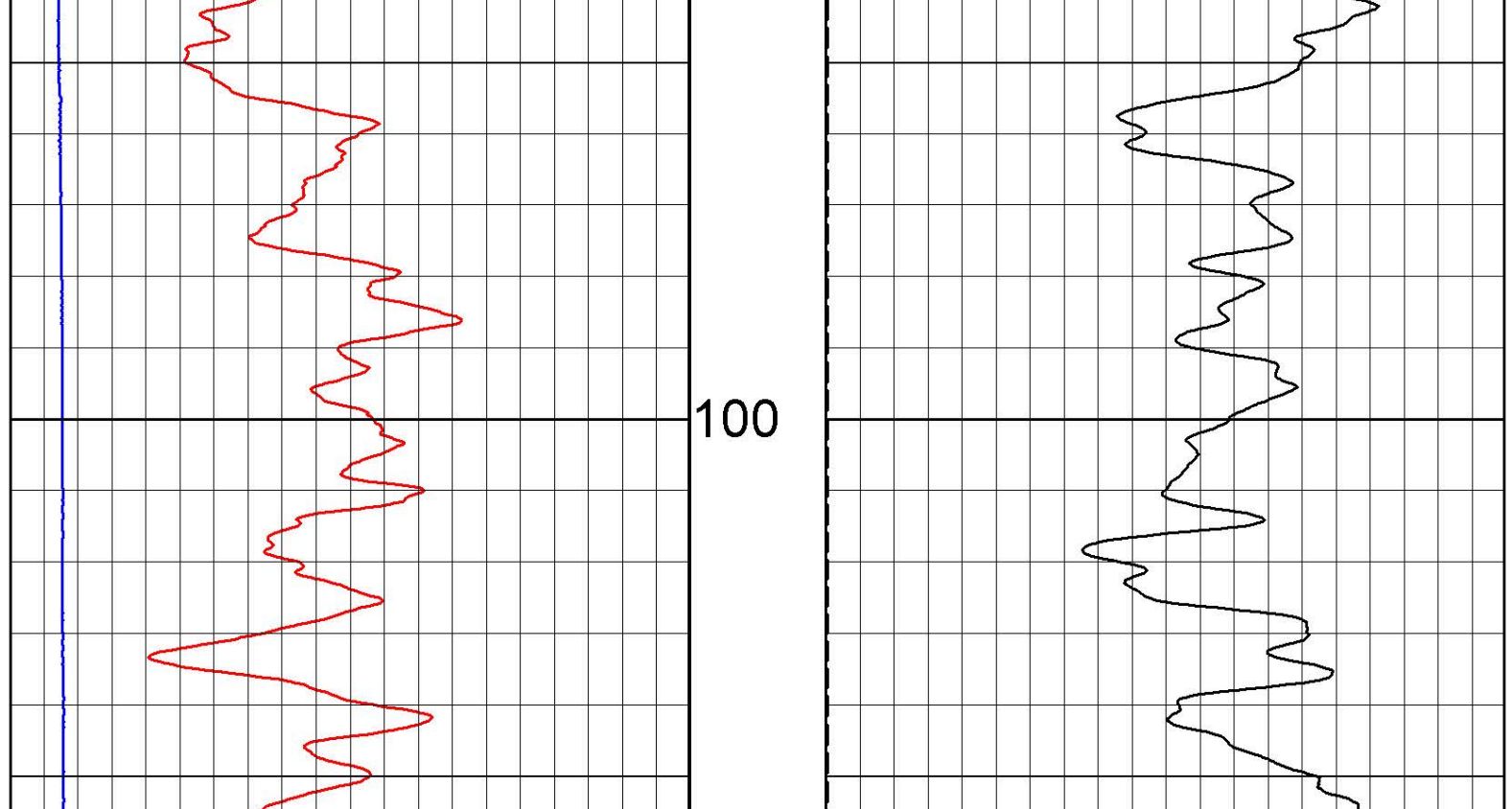
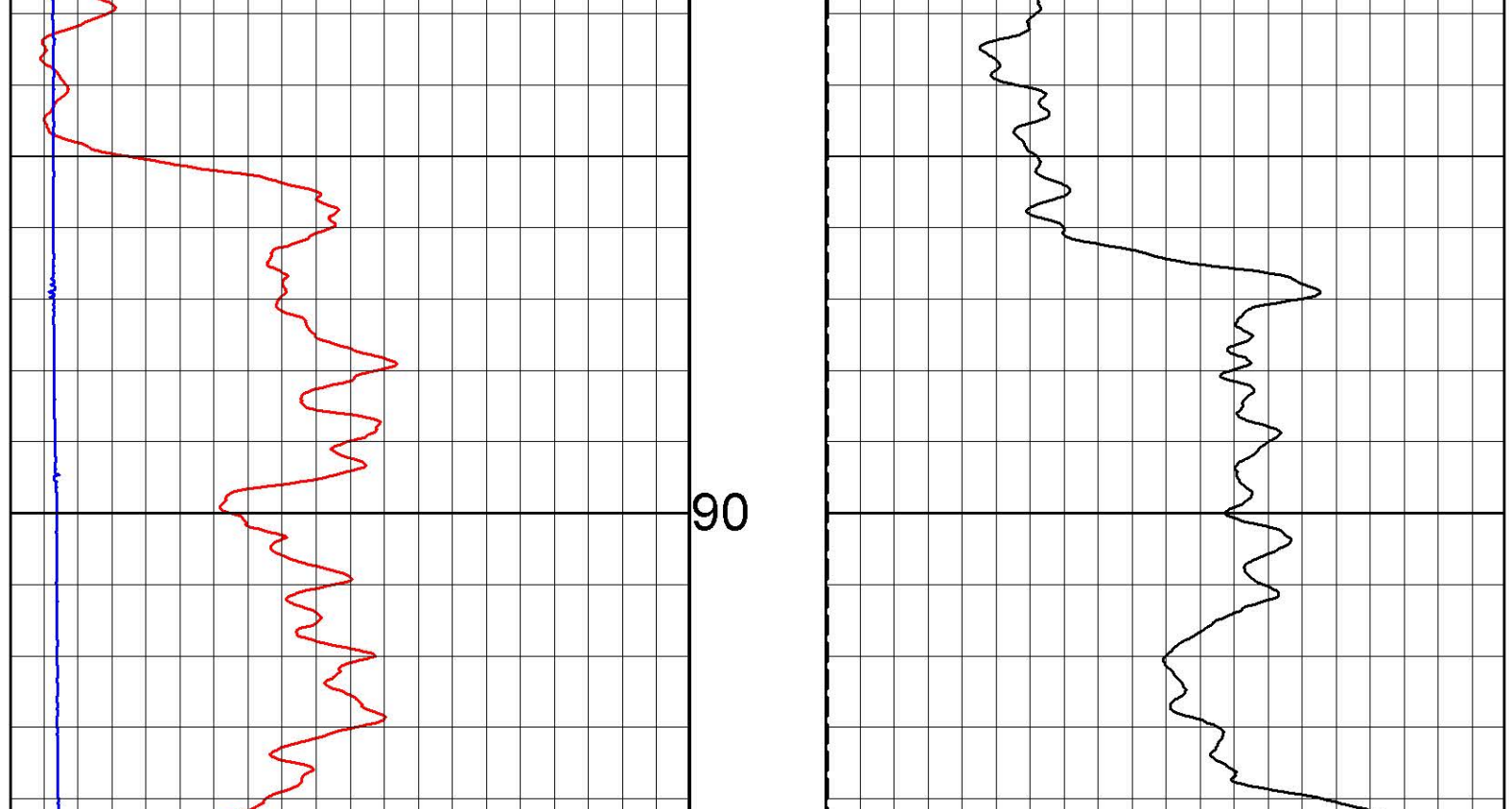
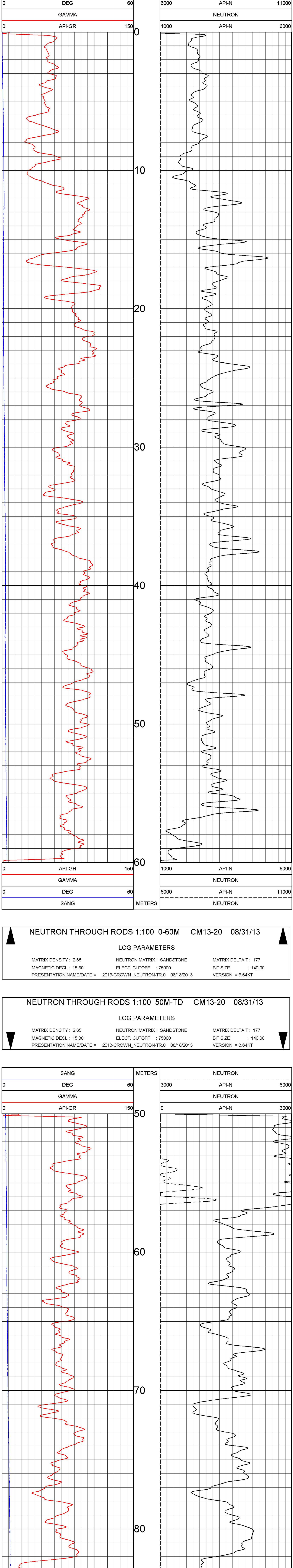
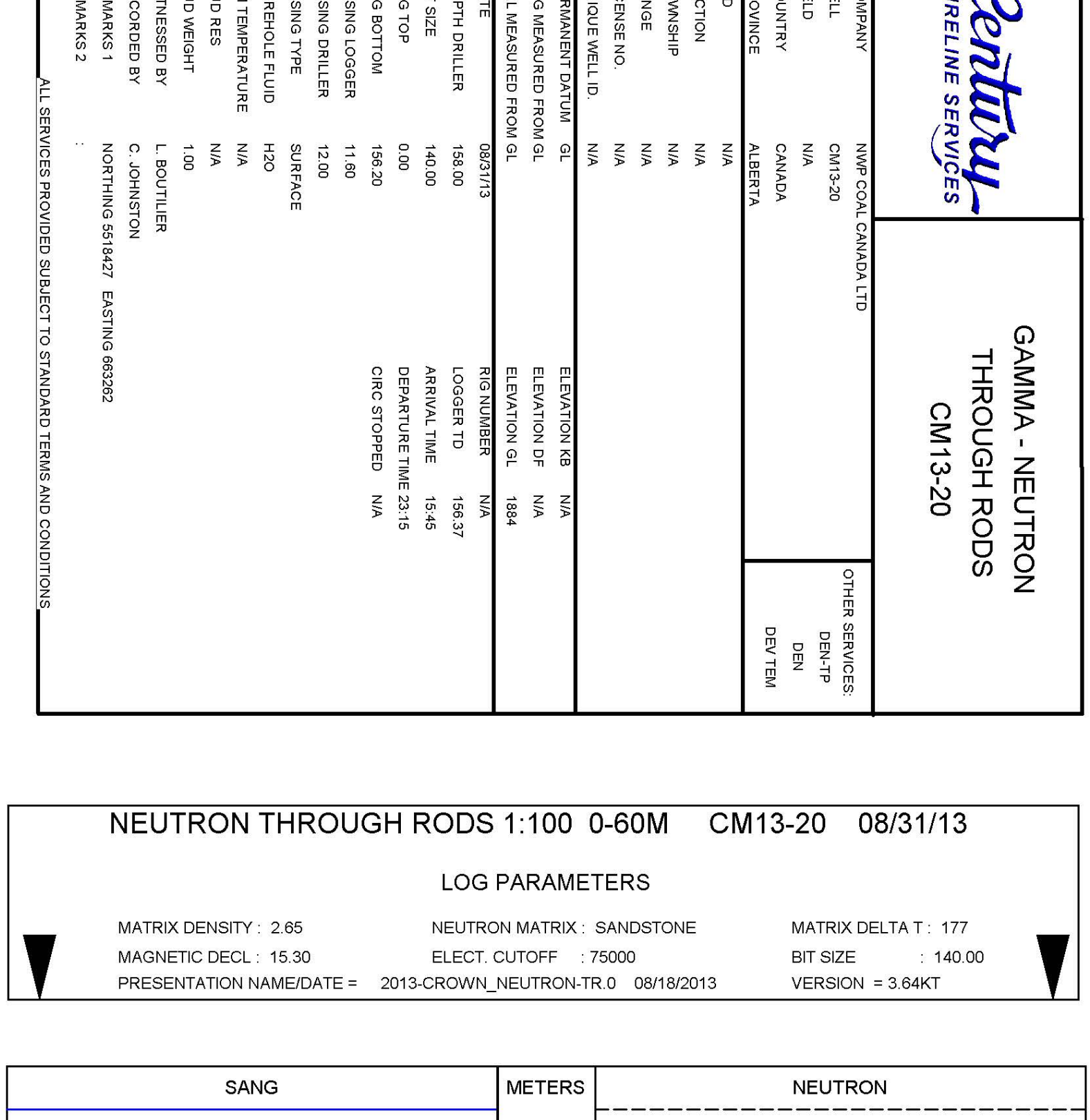
CABLE DEPTH	TRUE DEPTH	NORTH DEV.	EAST DEV.	DISTANCE	AZIMUTH	SANG	SANGB
13.02	13.02	-0.00	-0.00	0.0	249.3	0.9	249.3
14.00	14.00	-0.00	-0.02	0.0	255.2	1.1	255.1
15.00	15.00	-0.01	-0.03	0.0	254.7	0.9	253.6
16.00	16.00	-0.01	-0.05	0.0	252.9	0.8	238.3
17.00	17.00	-0.02	-0.06	0.1	250.1	0.7	238.8
18.00	18.00	-0.03	-0.07	0.1	248.6	0.8	250.2
19.00	19.00	-0.03	-0.08	0.1	247.5	0.3	274.2
20.00	20.00	-0.03	-0.08	0.1	248.5	0.3	264.4
21.00	21.00	-0.03	-0.09	0.1	249.6	0.1	288.7
22.00	22.00	-0.03	-0.09	0.1	251.1	0.2	314.3
23.00	23.00	-0.03	-0.09	0.1	252.4	0.1	319.1
24.00	24.00	-0.03	-0.09	0.1	254.0	0.4	303.9
25.00	25.00	-0.02	-0.10	0.1	257.3	0.4	315.7
26.00	26.00	-0.02	-0.10	0.1	260.4	0.3	345.8
27.00	27.00	-0.01	-0.10	0.1	263.6	0.3	336.6
28.00	28.00	-0.00	-0.11	0.1	268.5	0.6	331.6
29.00	29.00	0.01	-0.12	0.1	275.1	1.1	322.2
30.00	30.00	0.02	-0.12	0.1	281.0	0.7	338.3
31.00	31.00	0.04	-0.13	0.1	287.4	1.1	339.7
32.00	32.00	0.06	-0.14	0.1	293.2	1.3	342.2
33.00	33.00	0.08	-0.14	0.2	298.6	1.2	344.3
34.00	34.00	0.10	-0.15	0.2	303.4	1.1	344.5
35.00	35.00	0.12	-0.15	0.2	307.8	1.2	340.8
36.00	36.00	0.14	-0.16	0.2	311.7	1.4	346.6
37.00	37.00	0.16	-0.16	0.2	315.1	1.6	353.1
38.00	38.00	0.19	-0.17	0.3	318.2	1.8	342.7
39.00	39.00	0.22	-0.18	0.3	321.2	1.9	356.8
40.00	40.00	0.25	-0.18	0.3	324.0	1.6	355.5
41.00	41.00	0.28	-0.19	0.3	326.1	1.6	345.6
42.00	42.00	0.31	-0.20	0.4	327.8	1.7	348.6
43.00	42.99	0.34	-0.20	0.4	329.2	1.7	339.2
44.00	43.99	0.37	-0.21	0.4	330.4	1.8	342.9
45.00	44.99	0.40	-0.22	0.5	331.5	1.7	342.6
46.00	45.99	0.43	-0.22	0.5	332.6	1.9	346.2
47.00	46.99	0.46	-0.23	0.5	333.5	1.7	351.8
48.00	47.99	0.49	-0.24	0.5	334.2	1.9	348.1
49.00	48.99	0.53	-0.24	0.6	335.0	2.6	356.1
50.00	49.99	0.55	-0.25	0.6	335.7	1.5	346.7
51.00	50.99	0.58	-0.25	0.6	336.3	1.6	345.3
52.00	51.99	0.60	-0.26	0.7	336.8	1.1	343.1
53.00	52.99	0.63	-0.26	0.7	337.4	1.2	352.8
53.68	53.67	0.64	-0.27	0.7	337.5	1.1	278.6

COMPANY	INMP COAL CANADA LTD	OTHER SERVICES	
WELL	CM13-20	DEW-HP	
FIELD	N/A	DEN	
COUNTRY	CANADA	DEV/TEM	
PROVINCE	ALBERTA		
SECTION	N/A		
TOWNSHIP	N/A		
RANGE	N/A		
LICENSE NO.	N/A		
UNIQUE WELL ID	N/A		

PERMANENT DATUM	GL	ELEVATION RB	N/A
LOG MEASURED FROM GL		ELEVATION OF	N/A
DRILL MEASURED FROM GL		ELEVATION OF	1884

DATE	08/31/13	RIS NUMBER	N/A
DEPTH DRILLER	158.00	LOGSER TD	158.37
BIT SIZE	140.00	ARRIVAL TIME	15:45
LOG TOP	0.00	DEPARTURE TIME	23:15
LOG BOTTOM	156.20	CIRC STOPPED	N/A
CASING LOGSER	11.80		
CASING DRILLER	12.00		
CASING TYPE	SURFACE		
ROSBOLE FLUID	H2O		
RIM TEMPERATURE	N/A		
MUD RES	N/A		
MUD WEIGHT	11.00		
WITNESSED BY	L. BOULTNER		
RECORDED BY	C. JOHNSTON		
REMARKS 1	NORTHING 451947 EASTING 86292		
REMARKS 2			

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS



DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Aug20,13 21:16:31	GAMMA	0.000	4.000 [CPS]
1	Aug20,13 21:16:31	GAMMA	330.000	315.000 [CPS]
2	Aug20,13 21:21:40	TEMP	0.000	329500.000 [CPS]
2	Aug20,13 21:21:40	TEMP	97.000	456300.000 [CPS]
3	Aug20,13 21:19:23	NEUTRON	1.000	1.000 [CPS]
3	Aug20,13 21:19:23	NEUTRON	271.000	85.000 [CPS]
4	Aug20,13 21:19:45	POR/NEI	100.000	0.000 [CPS]

COMPANY	: NWFP COAL CANADA LTD	OTHER SERVICES:	
WELL	: CM13-20	DEN-TP	
FIELD	: N/A	DEV-TP	
COUNTRY	: CANADA	NEU-TP	
PROVINCE	: ALBERTA		

LSD	: N/A
SECTION	: N/A
TOWNSHIP	: N/A
RANGE	: N/A
LICENSE NO.	: N/A
UNIQUE WELL ID.	: N/A

PERMANENT DATUM	: GL	ELEVATION KB	: N/A
LOG MEASURED FROM	: GL	ELEVATION DF	: N/A
DRL MEASURED FROM	: GL	ELEVATION GL	: 1884

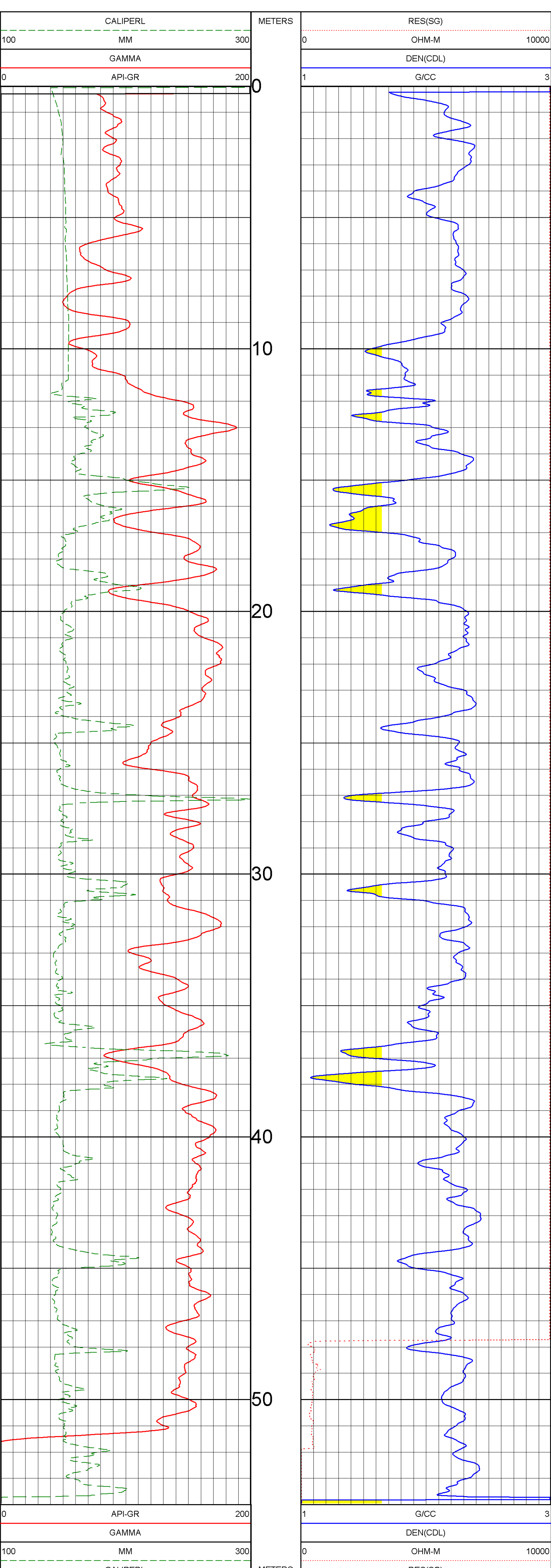
DATE	: 08/31/13	RIG NUMBER	: N/A
DEPTH DRILLER	: 158.00	LOGGER TD	: 156.37
BIT SIZE	: 140.00	ARRIVAL TIME	: 15:45
LOG TOP	: 0.00	DEPARTURE TIME	: 23:15
LOG BOTTOM	: 53.95	CIRC STOPPED	: N/A

CASING LOGGER	: 11.80
CASING DRILLER	: 12.00
CASING TYPE	: SURFACE
BOREHOLE FLUID	: H2O
RM TEMPERATURE	: N/A
MUD RES	: N/A
MUD WEIGHT	: 1.00
WITNESSED BY	: L. BOUTILLER
RECORDED BY	: C. JOHNSTON
REMARKS 1	: NORTHING 55184427 EASTING 663362
REMARKS 2	: HOLE BRIDGED AT 54.24M

DENSITY 1:100 CM13-20 08/31/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES.0 08/18/2013		VERSION = 3.64KT



DENSITY 1:100 CM13-20 08/31/13

LOG PARAMETERS

MATRIX DENSITY : 2.65	NEUTRON MATRIX : SANDSTONE	MATRIX DELTA T : 177
MAGNETIC DECL : 15.30	ELECT. CUTOFF : 75000	BIT SIZE : 140.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-RES.0 08/18/2013		VERSION = 3.64KT

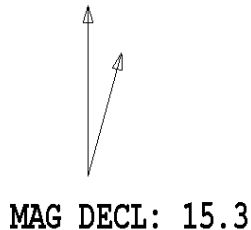
DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Jun25,13 15:33:14	GAMMA	0.000 [API-GR]	0.100 [CPS]
2	Jun25,13 15:33:14	GAMMA	545.000 [API-GR]	558.000 [CPS]
3	Aug19,13 13:06:53	VOLTAGE	26.200 [MV]	4350.000 [CPS]
3	Aug19,13 13:06:53	VOLTAGE	227.600 [MV]	31550.000 [CPS]
3	Mar06,13 15:12:26	CALIPER	76.400 [CM]	117554.000 [CPS]
4	Aug19,13 13:07:09	CALIPER	177.800 [CM]	347820.000 [CPS]
4	Aug19,13 13:07:09	DEN(LS)	1.620 [G/CC]	17088.000 [CPS]
4	Aug19,13 13:07:09	DEN(LS)	2.612 [G/CC]	2263.000 [CPS]
5	Aug27,13 18:24:35	DEN(SS)	1.590 [G/CC]	68540.000 [CPS]
5	Aug27,13 18:24:35	DEN(SS)	2.580 [G/CC]	26130.000 [CPS]
6	Aug19,13 13:07:41	CALIPERL	100.000 [CM]	112529.000 [CPS]
6	Aug19,13 13:07:41	CALIPERL	200.000 [CM]	217210.000 [CPS]
7	Aug19,13 13:08:07	CURRENT	26.200 [UA]	8769.000 [CPS]
7	Aug19,13 13:08:07	CURRENT	227.600 [UA]	26334.000 [CPS]
8	Feb14,10 11:28:44	F	Default [CPS]	
9	Feb14,10 11:28:44	X	Default [CPS]	

TOOL CALIBRATION CM13-20 08/31/13 22:47
 TOOL 9239C1 TM VERSION 2025
 SERIAL NUMBER 4428

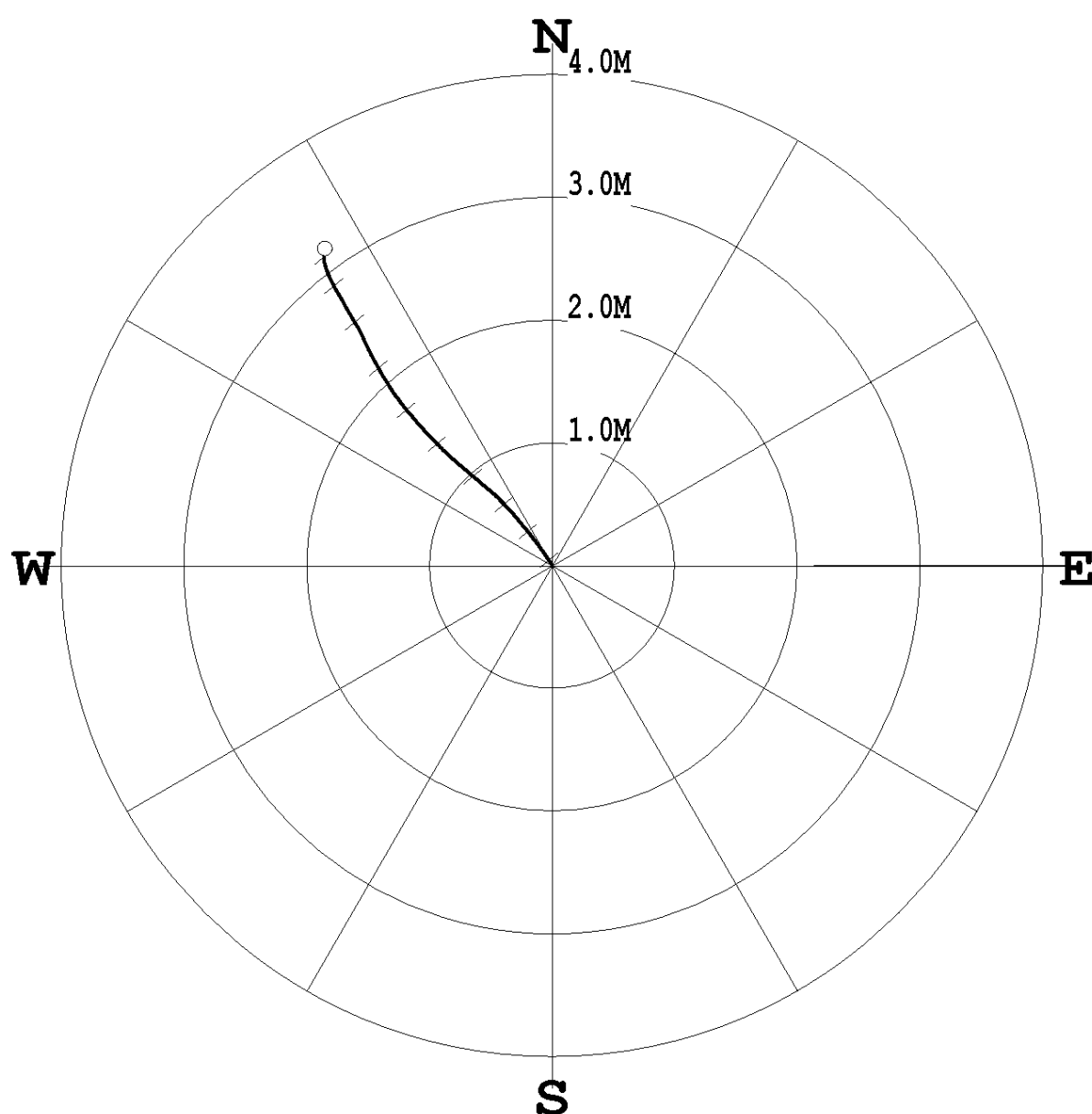
ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

PLAN VIEW COMPU-LOG DEVIATION

CLIENT: NWP COAL CANADA LTD
 LOCATION: N/A
 HOLE ID: CM13-25
 DATE OF LOG: 09/02/13
 PROBE: 9057A 4430



SCALE: 1 M/CM
 TRUE DEPTH: 113.66 M
 AZIMUTH: 324.4
 DISTANCE: 3.2 M
 + = 10 M INCR
 ○ = BOTTOM OF HOLE



* * * * * COMPU-LOG - VERTICAL DEVIATION * * * * *

CLIENT : NWP COAL CANADA LTD HOLE ID. : CM13-25
 FIELD OFFICE : CENTURY DATE OF LOG : 09/02/13
 DATA FROM : N/A PROBE : 9057A , 4430
 MAG. DECL. : 15.300 DEPTH UNITS : METERS
 LOG: CM13-25_09-02-13_15-34_9057A_.02_17.00_113.91_DEVI.log

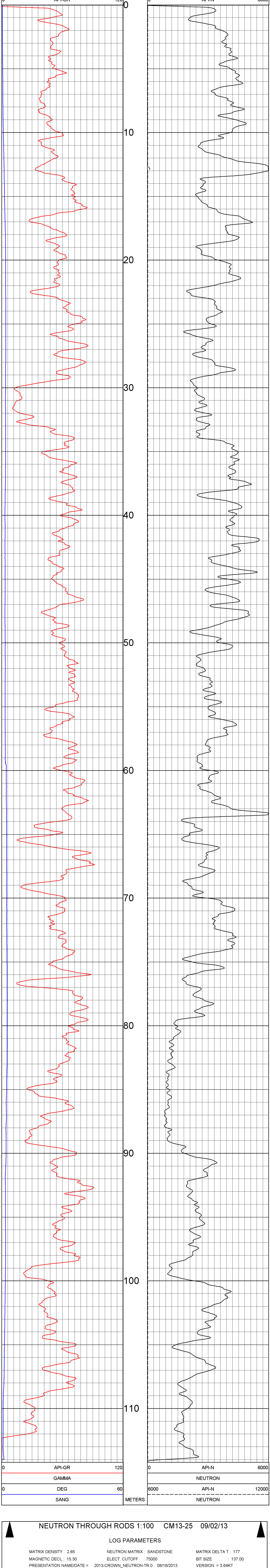
CABLE DEPTH	TRUE DEPTH	NORTH DEV.	EAST DEV.	DISTANCE	AZIMUTH	SANG	SANGB
17.02	17.02	0.00	-0.00	0.0	334.5	0.7	334.5
18.00	18.00	0.01	-0.01	0.0	328.8	0.9	329.7
19.00	19.00	0.03	-0.02	0.0	329.6	0.7	334.0
20.00	20.00	0.05	-0.03	0.1	328.4	1.2	330.3
21.00	21.00	0.06	-0.04	0.1	327.8	1.2	323.7
22.00	22.00	0.09	-0.05	0.1	327.6	1.8	325.0
23.00	23.00	0.11	-0.07	0.1	326.9	1.7	320.7
24.00	24.00	0.13	-0.09	0.2	326.3	1.3	320.0
25.00	25.00	0.16	-0.11	0.2	325.9	2.0	326.9
26.00	26.00	0.18	-0.13	0.2	325.7	2.0	320.2
27.00	27.00	0.21	-0.14	0.3	325.4	1.5	334.2
28.00	28.00	0.23	-0.16	0.3	325.0	1.7	324.6
29.00	29.00	0.26	-0.18	0.3	324.7	1.9	323.5
30.00	30.00	0.28	-0.20	0.3	324.4	1.8	323.8
31.00	30.99	0.30	-0.22	0.4	324.1	1.7	316.5
32.00	31.99	0.33	-0.24	0.4	323.8	1.5	323.3
33.00	32.99	0.35	-0.26	0.4	323.6	1.7	317.9
34.00	33.99	0.37	-0.28	0.5	323.4	1.9	323.4
35.00	34.99	0.40	-0.30	0.5	323.2	1.7	318.7
36.00	35.99	0.42	-0.32	0.5	323.0	1.6	321.3
37.00	36.99	0.44	-0.33	0.6	322.8	1.6	320.4
38.00	37.99	0.46	-0.35	0.6	322.5	1.6	309.3
39.00	38.99	0.48	-0.37	0.6	322.3	1.8	316.9
40.00	39.99	0.50	-0.39	0.6	322.0	1.6	314.8
41.00	40.99	0.52	-0.41	0.7	321.7	1.7	315.9
42.00	41.99	0.55	-0.44	0.7	321.4	2.0	313.8
43.00	42.99	0.57	-0.46	0.7	321.1	2.0	309.7
44.00	43.99	0.59	-0.48	0.8	320.8	2.0	305.4
45.00	44.99	0.61	-0.51	0.8	320.3	2.0	299.3
46.00	45.99	0.63	-0.53	0.8	319.9	2.2	303.2
47.00	46.99	0.66	-0.56	0.9	319.5	2.1	310.3
48.00	47.99	0.68	-0.59	0.9	319.1	2.0	314.1
49.00	48.99	0.71	-0.62	0.9	318.8	2.1	310.7
50.00	49.98	0.73	-0.65	1.0	318.5	2.2	318.8
51.00	50.98	0.75	-0.68	1.0	318.1	2.3	312.3
52.00	51.98	0.78	-0.71	1.1	317.9	2.3	310.5
53.00	52.98	0.80	-0.73	1.1	317.6	2.2	313.4
54.00	53.98	0.83	-0.76	1.1	317.4	2.2	308.3
55.00	54.98	0.86	-0.79	1.2	317.1	2.5	309.4
56.00	55.98	0.88	-0.83	1.2	316.9	2.5	306.6
57.00	56.98	0.91	-0.86	1.3	316.8	2.2	313.9
58.00	57.98	0.94	-0.88	1.3	316.7	2.0	313.6
59.00	58.98	0.96	-0.91	1.3	316.6	2.5	312.6
60.00	59.98	0.99	-0.94	1.4	316.6	2.2	317.5
61.00	60.98	1.02	-0.96	1.4	316.6	1.9	315.4
62.00	61.98	1.05	-0.99	1.4	316.6	1.9	312.5
63.00	62.98	1.07	-1.01	1.5	316.5	1.9	314.4
64.00	63.97	1.10	-1.04	1.5	316.6	2.0	311.1
65.00	64.97	1.13	-1.06	1.5	316.6	2.2	317.3
66.00	65.97	1.15	-1.09	1.6	316.6	2.3	323.6
67.00	66.97	1.18	-1.11	1.6	316.7	2.1	325.0
68.00	67.97	1.21	-1.14	1.7	316.8	2.2	319.4
69.00	68.97	1.24	-1.16	1.7	316.9	2.1	319.4
70.00	69.97	1.27	-1.19	1.7	316.9	2.2	324.1
71.00	70.97	1.30	-1.21	1.8	317.0	2.2	320.5
72.00	71.97	1.33	-1.24	1.8	317.1	2.3	319.8
73.00	72.97	1.37	-1.26	1.9	317.3	2.5	319.7
74.00	73.97	1.40	-1.29	1.9	317.4	2.3	323.4
75.00	74.97	1.44	-1.31	1.9	317.6	2.3	326.7
76.00	75.96	1.47	-1.33	2.0	317.8	2.4	331.8
77.00	76.96	1.50	-1.35	2.0	318.0	2.6	334.1
78.00	77.96	1.54	-1.38	2.1	318.2	2.2	325.8
79.00	78.96	1.57	-1.40	2.1	318.4	2.2	329.3
80.00	79.96	1.61	-1.42	2.1	318.7	2.7	335.6
81.00	80.96	1.65	-1.44	2.2	318.9	2.6	328.1
82.00	81.96	1.69	-1.46	2.2	319.2	2.6	331.4
83.00	82.96	1.73	-1.48	2.3	319.4	2.6	334.9
84.00	83.96	1.77	-1.50	2.3	319.7	2.4	333.6
85.00	84.96	1.80	-1.52	2.4	319.9	2.3	332.7
86.00	85.96	1.84	-1.53	2.4	320.2	2.3	335.9
87.00	86.96	1.88	-1.55	2.4	320.5	2.3	336.4
88.00	87.95	1.91	-1.57	2.5	320.7	2.3	330.3
89.00	88.95	1.95	-1.59	2.5	320.8	2.3	328.7
90.00	89.95	1.98	-1.61	2.6	320.9	2.1	329.1
91.00	90.95	2.01	-1.63	2.6	321.0	2.1	330.5
92.00	91.95	2.04	-1.65	2.6	321.2	2.0	329.6
93.00	92.95	2.07	-1.66	2.7	321.3	2.0	329.2
94.00	93.95	2.10	-1.68	2.7	321.4	1.9	330.2
95.00	94.95	2.13	-1.70	2.7	321.5	2.0	332.6
96.00	95.95	2.16	-1.71	2.8	321.6	2.0	329.1
97.00	96.95	2.19	-1.73	2.8	321.7	1.9	328.8
98.00	97.95	2.22	-1.75	2.8	321.8	1.8	329.4
99.00	98.95	2.25	-1.76	2.9	321.9	1.8	330.2
100.00	99.95	2.28	-1.78	2.9	322.0	1.9	334.7
101.00	100.95	2.31	-1.79	2.9	322.1	1.8	331.1
102.00	101.95	2.33	-1.81	2.9	322.2	1.6	334.7
103.00	102.95	2.36	-1.82	3.0	322.4	1.6	333.9
104.00	103.95	2.38	-1.83	3.0	322.5	1.6	340.4
105.00	104.94	2.41	-1.84	3.0	322.7	1.4	336.7
106.00	105.94	2.43	-1.85	3.1	322.8	1.3	340.9
107.00	106.94	2.45	-1.85	3.1	323.0	1.4	341.7
108.00	107.94	2.48	-1.86	3.1	323.1	1.2	347.1
109.00	108.94	2.50	-1.86	3.1	323.3	1.0	357.7
110.00	109.94	2.51	-1.86	3.1	323.5	1.1	356.4
111.00	110.94	2.53	-1.86	3.1	323.7	1.2	8.3
112.00	111.94	2.55	-1.86	3.2	324.0	1.1	7.9
113.00	112.94	2.57	-1.85	3.2	324.2	1.0	10.9
113.72	113.66	2.58	-1.85	3.2	324.4	0.8	10.0

COMPANY : NWP COAL CANADA LTD	OTHER SERVICES:
WELL : CM13-25	DEV/TEM
FIELD : N/A	DEN/TP
COUNTRY : CANADA	DEN
PROVINCE : ALBERTA	
LSD : N/A	
SECTION : N/A	
TOWNSHIP : N/A	
RANGE : N/A	
LICENSE NO. : N/A	
UNIQUE WELL ID. : N/A	
PERMANENT DATUM : GL	ELEVATION RG : N/A
LOG MEASURED FROM : GL	ELEVATION DF : N/A
DIRL MEASURED FROM : GL	ELEVATION GI : 1828.00
DATE : 09/02/13	RIG NUMBER : N/A
DEPTH DRILLER : 115.20	LOGGER TD : 114.62
BIT SIZE : 137.00	ARRIVAL TIME : 12:45
LOG TOP : 0.00	DEPARTURE TIME : 16:30
LOG BOTTOM : 114.17	CIRC STOPPED : N/A
CASING LOGGER : 117.0	
CASING DRILLER : 12.00	
CASING TYPE : SURFACE	
BOREHOLE FLUID : H2O	
RM TEMPERATURE : N/A	
MUD RES : N/A	
MUD WEIGHT : 1.00	
WITNESSED BY : L. BOUTILIER	
RECORDED BY : C. JOHNSTON	
REMARKS 1 : NORTHING 5517930 EASTING 663785	
REMARKS 2 :	

NEUTRON THROUGH RODS 1:100 CM13-25 09/02/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
 MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 137.00
 PRESENTATION NAME/DATE = 2013-CROWN_NEUTRON-TR.0 08/18/2013 VERSION = 3.64KT



NEUTRON THROUGH RODS 1:100 CM13-25 09/02/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
 MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 137.00
 PRESENTATION NAME/DATE = 2013-CROWN_NEUTRON-TR.0 08/18/2013 VERSION = 3.64KT

DATE	TIME	SENSOR	STANDARD	RESPONSE
1	Jul31,13 11:08:47	GAMMA	0.000 [API-GR]	0.100 [CPS]
1	Jul31,13 11:08:47	GAMMA	545.000 [API-GR]	608.000 [CPS]
2	Jul31,13 11:25:36	NEUTRON	0.000 [API-N]	1.000 [CPS]
2	Jul31,13 11:25:36	NEUTRON	271.000 [API-N]	38.000 [CPS]
3	Apr30,08 14:54:38	SP	0.000 [MV]	325650.000 [CPS]
3	Apr30,08 14:54:38	SP	97.000 [MV]	277560.000 [CPS]
4	Jul02,07 08:07:18	RES(16N)	0.000 [OHM-M]	3892.000 [CPS]
4	Jul02,07 08:07:18	RES(16N)	1996.000 [OHM-M]	421781.000 [CPS]
5	Jul02,07 08:07:23	RES(64N)	0.000 [OHM-M]	3324.000 [CPS]
5	Jul02,07 08:07:23	RES(64N)	1990.000 [OHM-M]	426303.000 [CPS]
6	Jul31,13 13:32:13	TEMP	10.000 [DEG_F]	343298.000 [CPS]
6	Jul31,13 13:32:13	TEMP	71.000 [DEG_F]	423631.000 [CPS]
7	Jul02,07 08:07:32	RES	0.000 [OHM]	4438.000 [CPS]
7	Jul02,07 08:07:32	RES	989.000 [OHM]	162986.000 [CPS]
8	Jun26,07 14:31:00	POR(NEU)	Default [CPS]	Default [CPS]

TOOL CALIBRATION CM13-25 09/02/13 13:50
 TOOL 9057A TM VERSION 4
 SERIAL NUMBER 4430

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

**GAMMA-DENSITY (CPS)
THROUGH RODS
CM13-25**

COMPANY : NMP COAL CANADA LTD
WELL : CM13-25
FIELD : N/A
COUNTRY : CANADA
PROVINCE : ALBERTA

OTHER SERVICES:
DEV TEM
NEU-TP
DEN

LSD : N/A
SECTION : N/A
TOWNSHIP : N/A
RANGE : N/A
LICENSE NO. : N/A
UNIQUE WELL ID. : N/A

PERMANENT DATUM : N/A
LOG MEASURED FROM : N/A
DRL MEASURED FROM : N/A

DATE : 09/02/13
DEPTH DRILLER : 115.20
BIT SIZE : 137.00
LOG TOP : 0.00
LOG BOTTOM : -114.27
CASING LOGGER : 11.70
CASING DRILLER : 12.00

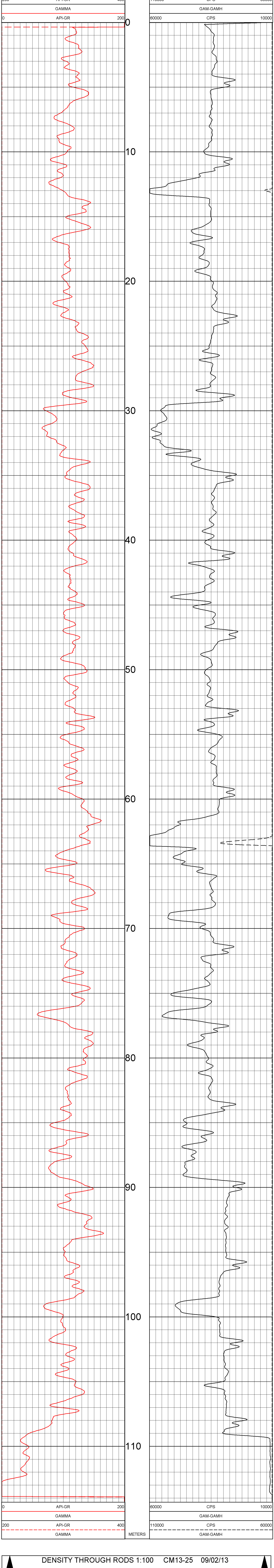
CASING TYPE : SURFACE
BOREHOLE FLUID : H2O
RT TEMPERATURE : N/A
MUD RES : N/A
MUD WEIGHT : 1.00
WITNESSED BY : L. BOUTLIER
RECORDED BY : C. JOHNSTON
REMARKS 1 : NORTHING 5517990 EASTING 663766
REMARKS 2 :

ALL SERVICES PROVIDED SUBJECT TO STANDARD TERMS AND CONDITIONS

DENSITY THROUGH RODS 1:100 CM13-25 09/02/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 137.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-TR.0 08/18/2013 VERSION = 3.64KT



DENSITY THROUGH RODS 1:100 CM13-25 09/02/13

LOG PARAMETERS

MATRIX DENSITY : 2.65 NEUTRON MATRIX : SANDSTONE MATRIX DELTA T : 177
MAGNETIC DECL : 15.30 ELECT. CUTOFF : 75000 BIT SIZE : 137.00
PRESENTATION NAME/DATE = 2013-CROWN_DENSITY-TR.0 08/18/2013 VERSION = 3.64KT

DATE	TIME	SENSOR	STANDARD	RESPONSE
1 Jul31.13	13:50:15	GAMMA	0.000 [API-GR]	0.100 [CPS]
Jul31.13	13:50:15	GAMMA	545.000 [API-GR]	190.000 [CPS]

APPENDIX 4
ANAYTICAL RESULTS CERTIFICATES