

## **Summary Report on the Coal Creek Property – 2011-2013 Exploration Program**



*Southeast British Columbia Centered at 5,480,150N and 650,000E (NAD 83)*

**Crowsnest Pass Coal Mining Ltd.**

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**Submission Date: 5-June-2014**

Appendices D and E of this report remain confidential under the terms of the Coal Act Regulation, and have been removed from the public version.

[http://www.bclaws.ca/EPLibraries/bclaws\\_new/document/ID/free/10\\_251\\_2004#section2](http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/free/10_251_2004#section2)



## **ASSESSMENT REPORT TITLE PAGE AND SUMMARY**

**TITLE OF REPORT:** Geological and Drilling Report on the Coal Creek Property

**TOTAL COST:** \$6,930,315

**AUTHOR(S):** Robert J. Morris, M.Sc., P.Geo. and Jaclyn L. Galbraith, B.Sc., E.I.T.  
**SIGNATURE(S):**

**NOTICE OF WORK PERMIT NUMBER(S)/DATE(S):** Mines Act Permit CX-12-500, Approval #11-1630534-0411, issued April 2011, Approval # 12-1630534-0831, issued August 2012.

**YEAR OF WORK:** 2011-2013

**PROPERTY NAME:** Coal Creek Project

**CLAIM NAME(S) (on which work was done):** 417638, 417637, 417653, and 417635

**COMMODITIES SOUGHT:** Coal

**MINING DIVISION:** FORT STEELE

**NTS / BCGS:** 82G/6, 7, 10

**LATITUDE:** 49° 27' 20"

**LONGITUDE:** 114° 55' 49" (at centre of work)

**UTM Zone:** 11      **EASTING:** 650,000m      **NORTHING:** 5,480,150m

**OWNER(S):** Crowsnest Pass Coal Mining Limited

**MAILING ADDRESS:** 1900 – 1040 West Georgia Street, Vancouver, BC V6E 4H3

**OPERATOR(S) [who paid for the work]:** Crowsnest Pass Coal Mining Limited

**MAILING ADDRESS:** 1900 – 1040 West Georgia Street, Vancouver, BC V6E 4H3

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

**REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS:**

## Statement of Costs

Activity	Provider	Costs in CAD per year			
		2011	2012	2013	Total 2011-2013
Project Management	Teviot	\$245,724	\$279,192	\$97,887	\$622,803
Technical Services	MMTS	\$362,537	\$340,532	\$103,940	\$807,009
Other Tech Services	Tetrattech, Devral	\$20,514	\$12,826	\$0	\$33,340
Site Management	Silenus	\$227,601	\$390,523	\$43,646	\$661,770
Roads and Site Services	TER, Newalta	\$53,231	\$218,044	\$0	\$271,275
Legal (inc. Licenses)	EKB, et al	\$169,344	\$177,567	\$158,860	\$505,771
Accounting (Local)	QAS	\$1,574	\$12,269	\$9,274	\$23,117
Insurance	Falkins	\$6,782	\$0	\$2,604	\$9,386
Drilling Contractor	Foraco, Ashburn	\$502,299	\$1,597,798	\$0	\$2,100,097
Geophysical Logging	Century Wireline Services	\$16,871	\$80,856	\$0	\$97,727
Cementation	Bearspaw, Foraco	\$0	\$139,824	\$0	\$139,824
Core and Storage Facilities	Teo	\$16,800	\$15,400	\$16,800	\$49,000
Road Rehab	Bed Venture, Johnson	\$0	\$0	\$6,689	\$6,689
Coal Analysis and Quality	EVES, Pearson	\$10,746	\$60,035	\$79,039	\$149,820
Environmental Baseline Work	Golder, Lotic, Maxxam, ALS, Matrix	\$598,926	\$564,950	\$118,296	\$1,282,172
Archaeological Studies	Anatum, et al	\$9,675	\$25,167	\$4,193	\$39,035
Donations	To City of Fernie	\$11,500	\$8,789	\$1,500	\$21,789
First Nations	C3	\$6,264	\$0	\$0	\$6,264
Other	Other	\$74,305	\$25,808	\$3,314	\$103,427
<b>Grand Total</b>		<b>\$2,334,693</b>	<b>\$3,949,580</b>	<b>\$646,042</b>	<b>\$6,930,315</b>

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## **1 SUMMARY**

The Coal Creek Project is a property located in southeast British Columbia, held by Crowsnest Pass Coal Mining Ltd. This report describes the exploration work conducted on the Coal Creek Property (the “Property”) from 2011 to 2013.

Underground mining took place on the Coal Creek property from 1898 to 1958, producing 18Mt of coal. Exploration in the area continued following the shutdown of the mines, from 1960 to the present. Exploration work over the years has consisted of geological mapping, trenching, drilling, bulk sampling and seismic analyses.

Crowsnest Pass Coal Mining Ltd. began exploration work on the Coal Creek property in 2011, drilling seven rotary/core holes in an attempt to gain samples for coal quality analysis. The program was designed to identify an initial mining area, targeting three of the upper seams, Seam B, Seam 10 and Seam 9. Drilling and recovery issues resulted in a limited number of representative samples being collected and results that were not of definitive value.

In 2012, a new approach to drilling was used, 23 reverse circulation drillholes were completed, and sufficient samples for coal quality analyses were collected. The 2012 program was designed to increase the level of coal quality assurance in the initial mining area, targeting only two of the upper seams; Upper 10 Seam Zone and Lower 9 Seam Zone. Coal quality analyses showed FSI values between seven and nine, and consistent rank across the project area.

Geological modelling was conducted in 2013 to update the model based on the drilling completed in 2011 and 2012.

## 2 INTRODUCTION & SCOPE

The Coal Creek Project is located east of the town of Fernie, in the Front Ranges of the Rocky Mountains physiographic region. The property is accessed via the Crowsnest Highway (Highway 3) and Coal Creek Road. Logging and exploration trails are used for drilling access. Exploration in the area dates back to the late nineteenth century. Underground coal mining on the property took place in the Coal Creek Mines, operated by the Crowsnest Pass Coal Company, from 1898 to 1958, with production of 18Mt of coal.

Exploration has continued in the Coal Creek area following the shut down of the underground mines. Various programs of geological mapping, trenching, drilling, and bulk sampling have taken place over the years from 1960 to the present. In the late twentieth and early twenty-first century, exploration for coalbed methane took place on the property in the form of drilling and seismic surveys.

The 2011 work was designed to identify an initial mining area within the property, to establish a small-scale initial operation that would allow for further exploration in other areas of the property in the future. Exploration and planning was based on underground room and pillar mining. Four rotary/core drillholes were completed in 2011, plus three secondary rotary/core drillholes (locations 2, 4 and 5 were drilled twice). Drilling targeted Seams B, 10, and 9, to confirm their down dip extension.

The 2012 program was designed to increase the level of coal quality assurance in the initial mining area. Twenty-three reverse circulation drillholes were completed in 2012, 21 of which were new locations and two of which were deepening holes from 2011. Drilling targeted the two upper seams, Upper 10 Seam Zone and Upper 9 Seam Zone. Coal quality sampling and analysis was successful, with results showing FSI values between seven and nine, and the coal rank being consistent across the project area.

Geological modelling was conducted in 2013 to update the model based on the drilling completed in 2011 and 2012.

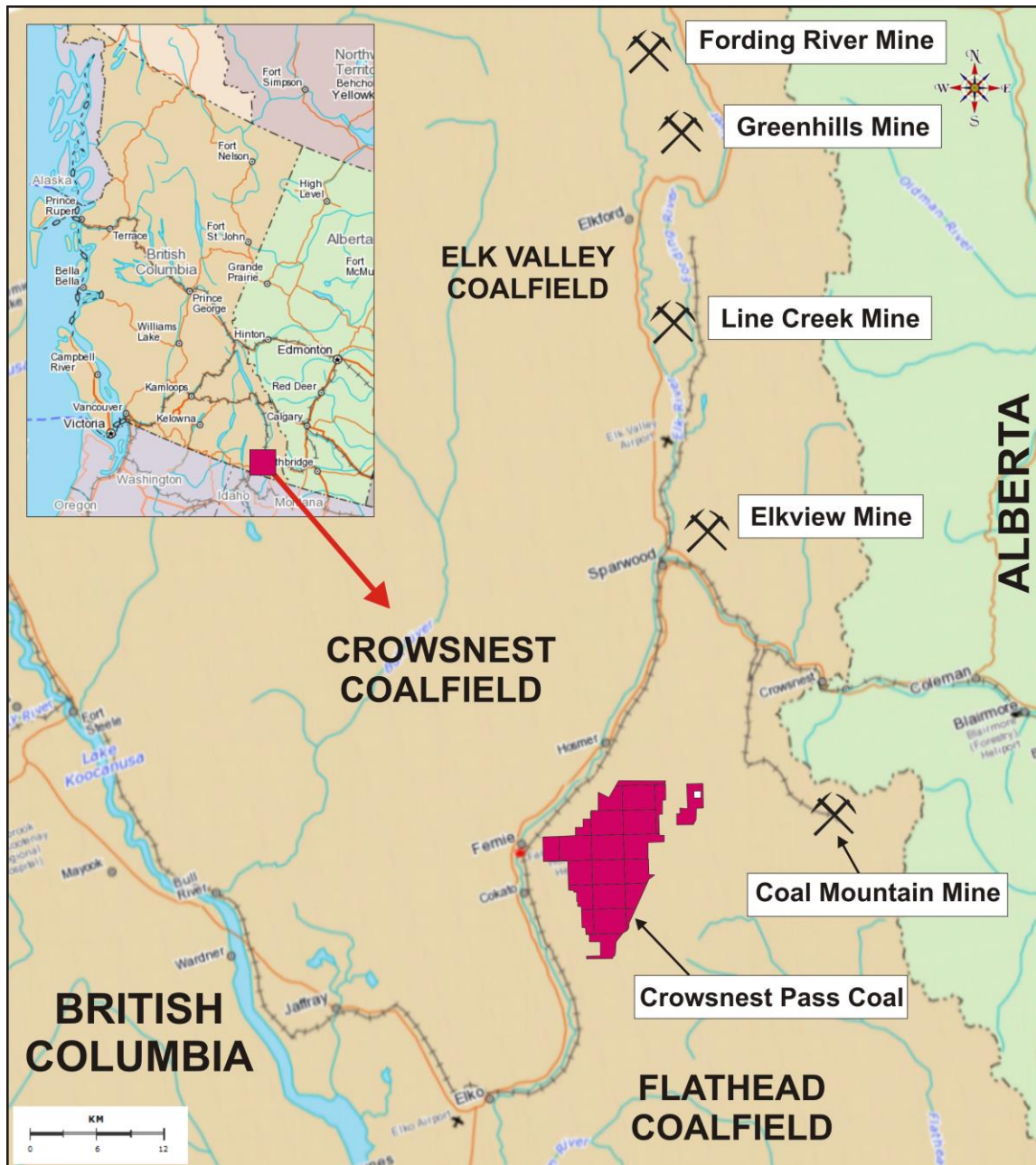
### 3 PROPERTY DESCRIPTION, ACCESSIBILITY, CLIMATE, INFRASTRUCTURE

The Coal Creek property is approximately 10km from Fernie and is approximately 204km<sup>2</sup>. The approximate centre of the Coal Creek property is 5,480,150N and 650,000E (UTM NAD 83). The Coal Creek property is comprised of twenty-three coal licences, which were acquired by CPCM in 2010 and four coal licence applications (Table 3-1). A location map and claim map show information on the licences and applications (Figure 3-1 and Figure 3-2). The red areas in Figure 3-2 represent coal licences and the green areas represent applications.

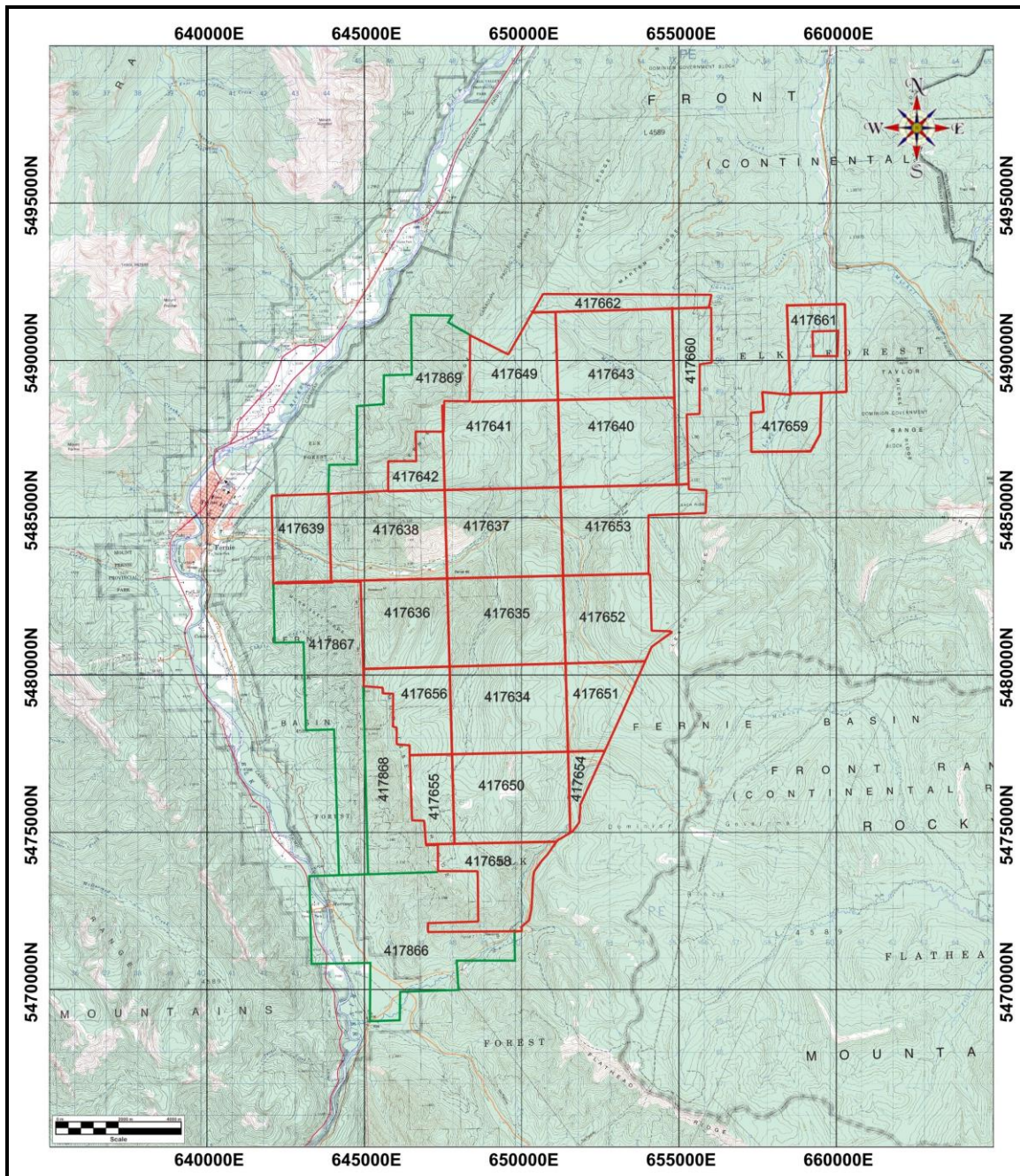
**Table 3-1 Coal Creek Project, Licences and Applications**

Tenure Number	Owner	Tenure Type	Tenure Sub Type	Good To Date	Status	Area (ha)
417634	147462 (100%)	Coal	License	2015/feb/15	GOOD	1008
417635	147462 (100%)	Coal	License	2015/feb/15	GOOD	1008
417636	147462 (100%)	Coal	License	2015/feb/15	GOOD	756
417637	147462 (100%)	Coal	License	2015/feb/15	GOOD	1007
417638	147462 (100%)	Coal	License	2015/feb/15	GOOD	1007
417639	147462 (100%)	Coal	License	2015/feb/15	GOOD	504
417640	147462 (100%)	Coal	License	2015/feb/15	GOOD	1007
417641	147462 (100%)	Coal	License	2015/feb/15	GOOD	1007
417642	147462 (100%)	Coal	License	2015/feb/15	GOOD	252
417643	147462 (100%)	Coal	License	2015/feb/15	GOOD	1006
417649	147462 (100%)	Coal	License	2014/may/08	GOOD	586
417650	147462 (100%)	Coal	License	2014/may/08	GOOD	1005
417651	147462 (100%)	Coal	License	2014/may/08	GOOD	501
417652	147462 (100%)	Coal	License	2014/may/08	GOOD	766
417653	147462 (100%)	Coal	License	2014/may/08	GOOD	913
417654	147462 (100%)	Coal	License	2014/may/08	GOOD	135
417655	147462 (100%)	Coal	License	2014/may/08	GOOD	340
417656	147462 (100%)	Coal	License	2014/may/08	GOOD	534
417658	147462 (100%)	Coal	License	2014/may/08	GOOD	657
417659	147462 (100%)	Coal	License	2014/may/08	GOOD	363
417660	147462 (100%)	Coal	License	2014/may/08	GOOD	427
417661	147462 (100%)	Coal	License	2014/may/08	GOOD	440
417662	147462 (100%)	Coal	License	2014/may/08	GOOD	267
417866	147462 (100%)	Coal	Application		GOOD	1725
417867	147462 (100%)	Coal	Application		GOOD	1125
417868	147462 (100%)	Coal	Application		GOOD	975
417869	147462 (100%)	Coal	Application		GOOD	1050
<b>Total Area</b>						<b>20,371</b>





**Figure 3-1 Regional Location Map**



**Figure 3-2 Claim Location**



The Coal Creek Project is located East of the town of Fernie, southeast British Columbia. Primary road access to the general area is via the Crowsnest Highway (Highway 3), which is an all-weather paved major highway, connecting Fernie with Sparwood in the north. The project area is accessed by driving south on Highway 3 to Fernie, turning southeast onto 4<sup>th</sup> Street, for 650m, turning southwest onto Pine Avenue for 400m, and turning southeast onto Coal Creek Road. From Coal Creek Road, the project area is approximately 10km further. There is a network of old logging and exploration trails on the property that were used for drilling access. Rail infrastructure of the Canadian Pacific Railway (CP) runs through the city of Fernie, connecting the area to the major export bulk commodity ports on the west coast of Canada.

The Property is situated in the northwest trending Front Ranges of the Rocky Mountains physiographic region, which is characterized by a series of steep mountains running to the northwest, incised by west flowing streams. Elevations range from 1,200m along Coal Creek to approximately 2,000m at the ridge tops.

There are historic underground mines located on the Coal Creek property in the Crowsnest Coalfield. There are also two open pit coalmines owned and operated by Teck Coal Ltd. in the same coalfield. Teck's Elkview operations produce metallurgical coal approximately 35km northeast of the Coal Creek Project, and their Coal Mountain operations produce both thermal and PCI coal approximately 30km east of the Coal Creek Project.

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

Surface rights are held by Tembec. There are no current oil and gas drilling activities on the Property.

Exploration in the area dates back to the late nineteenth century. The Crowsnest Pass Coal Company operated underground coalmines on the property from 1898 to 1958, producing 18Mt of coal.

Following the shutdown of the underground mines, exploration has been conducted on the property from 1960 to the present. In the early 1960's, CROPCO of the US Steel Corporation under agreement with the Crowsnest Pass Coal Company, conducted a program of drilling, trenching, geological mapping, and bulk sampling. From 1965-1968 Nittetsu of Japan conducted a bulk sampling and drilling program and feasibility study on

the Morrissey Creek area. In 1980, Shell purchased the Crowsnest Pass Coal Company and conducted 2D seismic analyses on the Property. In the 1990's, exploration for coalbed methane began on the Property. In 2003, Chevron conducted drilling and seismic analyses and from 2007-2009, BP conducted environmental studies and an aeromagnetic survey in the interest of finding coalbed methane resources. In 2008, exploration for coal resumed when Kennecott Canada Exploration (Rio Tinto Exploration) conducted a program of reverse circulation and core drilling for coal quality and geotechnical analyses, environmental studies and 2D seismic analyses. Recent geological mapping was carried out to prepare for the Crowsnest Pass Coal Mining Ltd. work, which began in 2011.

## **4 GEOLOGY**

### **4.1 Stratigraphy**

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

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

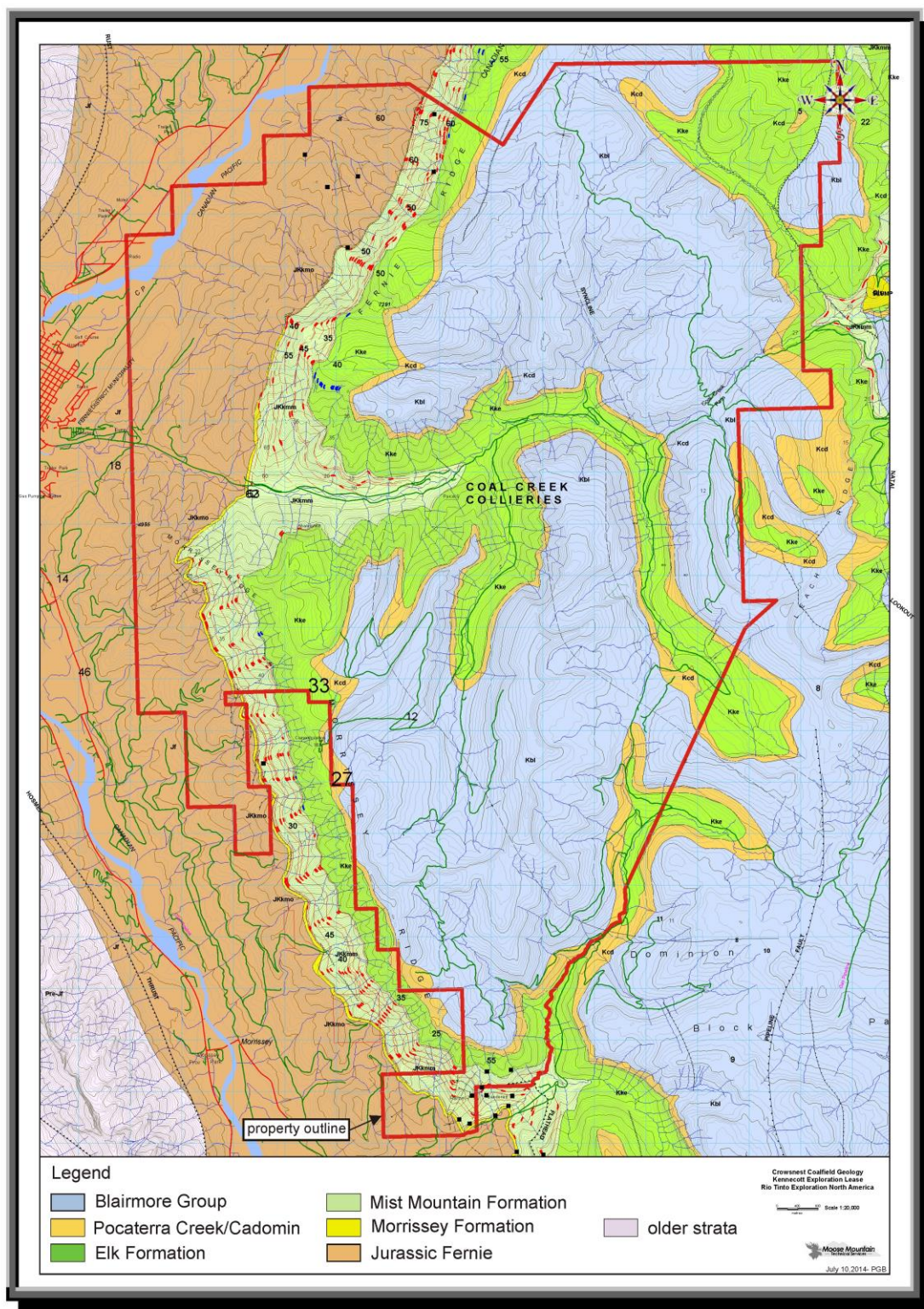
Three formations are recognized within the Kootenay Group, including the basal sandstone, Morrissey Formation, the coal-bearing Mist Mountain Formation, and the upper Elk Formation, Figure 4-1 and Figure 4-2.

The coal-bearing Mist Mountain Formation is 500-600m thick on average and consists of interbedded siltstone, sandstone, mudstone, shale, conglomerate and coal. The coal seams range in thickness from one metre in the upper Mist Mountain Formation to over 15m in the lower sections on the formation (Lawrence, 2006). In the project area CPCMC has identified 11 coal seams with thickness ranging from approximately two to 20m.

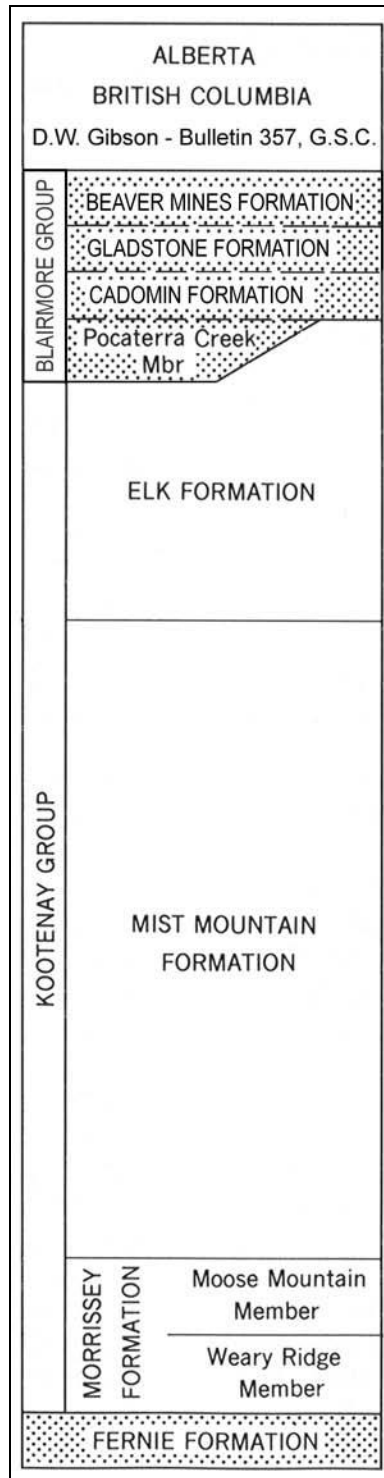
The total coal-bearing section as shown in Rio drillhole 08CN0001 is 561m, of which 72m is coal. The depositional regime shows alternating high-energy environments of conglomerate and sandstone interbedded with low energy siltstones, mudstones and coal horizons. There is considerable lateral variation in the thickness of these lithologic units, which complicates the correlation of individual coal horizons. Some coal zones will locally disappear, and all seams show variation in thickness laterally.

The coal horizons are more properly classified as multi-seam zones containing several individual seams separated by thin mudstone partings that can range in thickness from 1.5m to 20m. Occasionally a particular horizon will be split by a major sandstone resulting in a distinct Upper and Lower Zone.

The coal zones of interest in the Initial Mining Area occur at the top of the stratigraphic sequence and are identified as the 10 Upper Seam and 10 Lower Seam mining horizons, and the 9 Upper Seam and 9 Seam horizons which occur typically 50 meters below the 10 Seams. Figure 4-3 has been compiled from the drilling and interpretation of the geology to date on the Coal Creek property. The section shows 10 coal seams within a section approximately 320m thick.

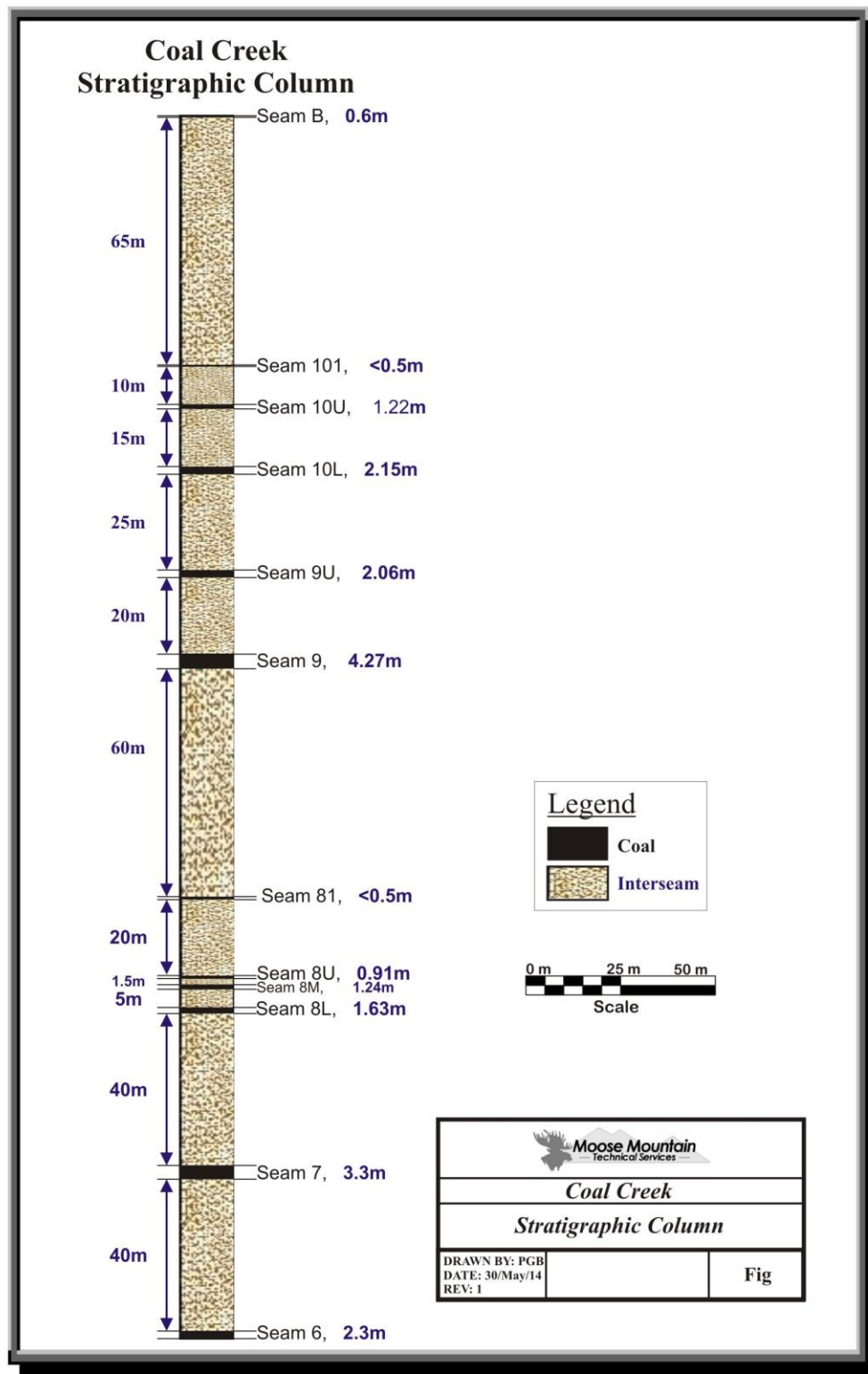


**Figure 4-1 Coal Creek Geology Map (From Lawrence, 2006)**



**Figure 4-2 Stratigraphic Section**





**Figure 4-3 Stratigraphic Column; Coal Creek Property**



## **4.2 Structure**

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

The Crowsnest coalfield is a complex synclinorium in the Lewis thrust sheet. The major compressional features of the basin are the synclines linked en echelon by low-amplitude anticlines. A series of west dipping thrust faults dominate the structure of the north half of the basin.

## **4.3 Resource Model Sections**

Correlation charts for Seams B, 10, 9, and 8 have been compiled in east-west and north south directions, between drillholes across the Property. The correlation charts are available from the Ministry of Energy and Mines of British Columbia Assessment Reports division.

## 5 EXPLORATION PROGRAM 2011-2013

### 5.1 Exploration Program 2011

The 2011 work was designed to identify an initial mining area within the Property, to establish a small-scale initial operation that would allow for further exploration in other areas of the property in the future. Exploration and planning was based on underground room and pillar mining. The target was a seam that is easily accessible, mineable height, at least two metres thick and good quality coking coal. Drilling targeted Seams B, 10, and 9, to confirm their down dip extension from the historic mines. A notice of work was approved for eleven drillholes and two adits.

Four rotary/core drillholes were completed in 2011 (DH11-02, -04, -05, and -09), plus three secondary rotary/core drillholes (locations 2, 4 and 5 were drilled twice). Casing was set at two locations (DH11-08 and DH11-10), but these holes were not otherwise drilled in 2011. Ashburn Drilling Ltd. conducted both rotary and core drilling with an Ingersoll Rand TH 60 drill, and a diamond HQ core bit, air hammer and diamond PDC bits. A total of 1,457.4m was drilled in 2011. The core is stored in a garage facility in Fernie, BC.

All drillholes were geophysically logged through the rods using the gamma-neutron method. If the hole remained open after the rods were pulled, open hole gamma-density/compensated density and deviation logs were attempted. Only partial logs of DH11-04B were acquired due to caving at 173m. Century Wireline Services conducted the geophysical logging.

Plans were to use the core for coal quality and for geotechnical analyses; however, core recovery issues resulted in only partial samples and coal quality testing that could only provide indicative results. Coring recovered: one partial sample of B Seam, three reasonable samples of 10 Seam, and one poor sample of 9 Seam. The friable nature of the coal contributed to poor recovery. Proximate analysis of the 10 Seam confirmed a mid volatile bituminous coking coal rank with 8 to 9 FSI values. Coal samples were catalogued and sent to Elk Valley Environmental Services Lab in Sparwood.

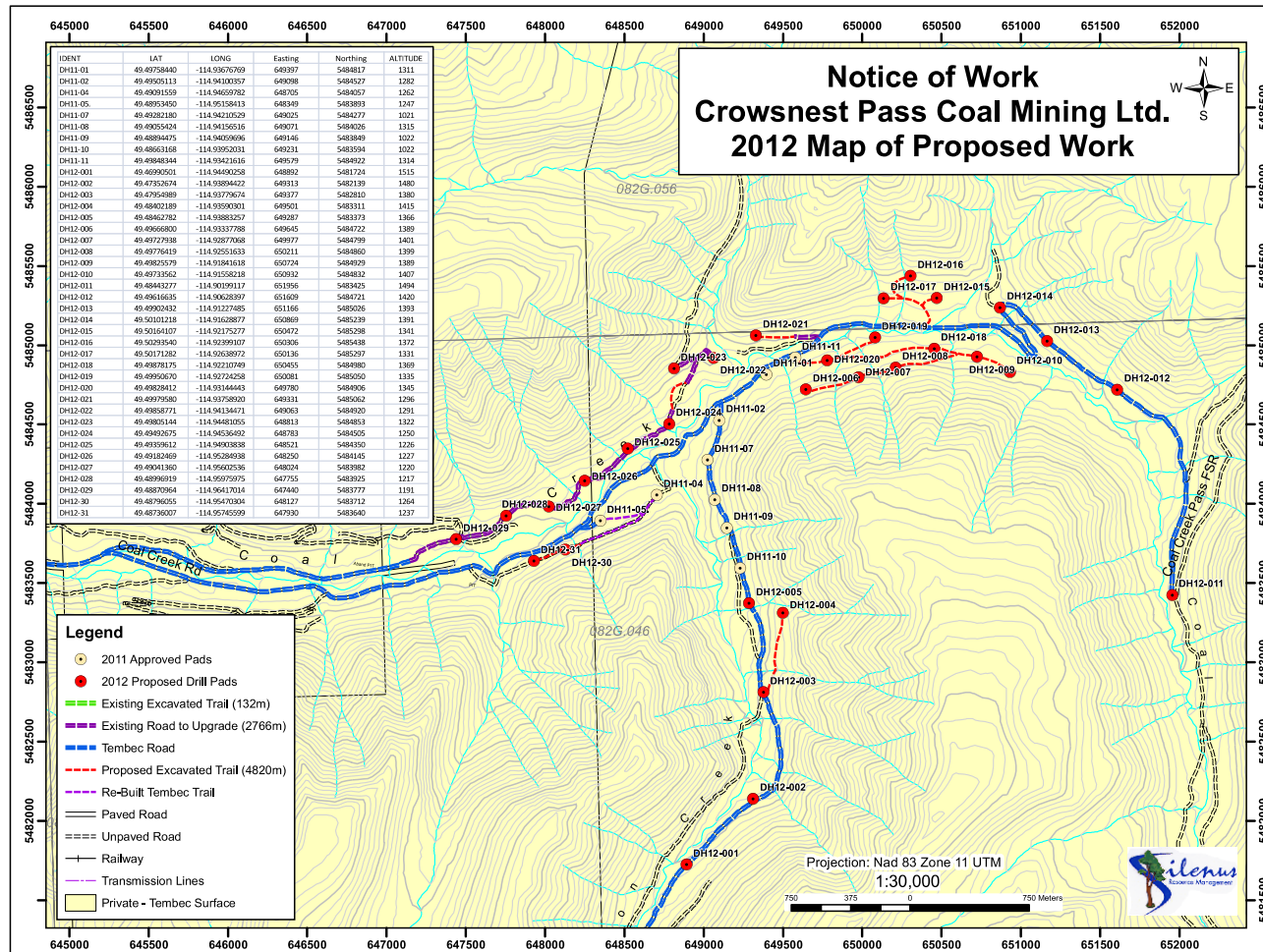
Coring in rock had good recovery and sufficient samples from DH11-09 and DH11-05 were obtained to characterize the 9 and 10 Seams in terms of rock strength.

Access roads and drill sites were built by TER Contracting Co. Ltd.

The map in Figure 5-1 shows the location of the drillholes. Detailed collar locations and coal seam data are included in the Drillhole Data found in Appendix A. A summary of the coring data is provided in Appendix C.

Extremely hard conglomerate layers between coal seams and an abundance of water, with insufficient air volume to manage it, contributed to drilling issues. The planned adits were postponed.

The results of the 2011 drilling program showed that ground conditions and rock types were cause for many drilling and recovery issues. Variations in seam thickness over short distances also proved to be problematic in predicting core points. Infill drilling will be required to define areas of consistent seam thickness, and pilot holes are recommended before coring.



**Figure 5-1 Drillhole Location Map**

## **5.2 Exploration Program 2012**

The 2012 program was designed to increase the level of coal quality assurance and geological control within the initial mining area (approximately six square kilometres) of the Coal Creek Property. The drilling focused on the two upper seams, Upper 10 Seam Zone, which was historically mined on the north side of Coal Creek, and the Lower 9 Seam Zone, which was extensively developed on the southwest side of the coal creek valley. In 2012, 36 drillholes were permitted along existing and new access roads within the Coal Creek and Matheson Creek valleys. Drillholes were spaced 250m to a maximum of 600m apart.

The 2012, Coal Creek exploration program included 23 reverse circulation rotary drillholes, for a total of 7,265m. Twenty-one drillholes were at new locations, and two drillholes were 2011 holes deepened in 2012 (DH11-04B and DH11-05). Foraco of Calgary completed the drilling, with TH100 and TH60 drills.

All drillholes were geophysically logged through the pipes using the gamma-neutron or gamma-density method. Some drillholes were logged through the pipes with both gamma-neutron and gamma-density. Holes DH12-11 and DH12-12 were not logged through the pipes. Once the pipes were pulled, the holes were logged for hole deviation and gamma-density/compensated density in the open hole. Holes DH11-05, DH12-13, DH12-16, DH12-28 and DH12-29 were logged only partially in open hole due to caving at 242m, 380m, 340m, 158m, and 89m respectively. Holes DH11-01 and DH12-30 were additionally logged with Full Wave Sonic. Century Wireline Services conducted the geophysical logging.

Access roads and drill sites were constructed by TER Contracting Co. Ltd., six kilometres of previous forestry roads were upgraded/built, and 28 drill sites were constructed in 2012. After drillholes were completed, Foraco cemented each hole to surface.

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

Environmental baseline work continued in 2012 with Golder Associates conducting air, water, fish, and wildlife studies. Extensive archaeological work was also conducted, and infrastructure studies were continued throughout 2012. An introductory geochemical program was run in 2012 to test the characteristics of overburden and near-seam material.

Representative coal samples were collected on 0.5m increments from each drillhole on all coal seams greater than one metre. While this method, reverse circulation drilling, significantly increases sample recovery, the crushed and pulverized nature of the coal samples makes them useless for washability studies. As a result a single 1.55SG float wash was performed on all raw composites to create a "proxy" clean product rank, rheology and chemistry evaluation.

Half metre coal samples were composited into full seam composite samples representing the 10 Seam, 9 Upper and 9 Lower Seams and 8 Seam (where encountered at shallow depth). Composites were created from careful correlation between geophysical logs and incremental sample depth records. The samples were sent to Elk Valley Environmental Services lab in Sparwood. Birtley Coal and Minerals Testing in Calgary did mineral analysis of ash, and Pearson Coal Petrography in Victoria did the petrographic analysis.

Initial lab testing determined Proximate Analysis, Sulphur, and FSI on both the raw and 1.555 clean float samples. The Clean samples were tested for Fluidity, Dilatation, 10 Element Ash Chemistry, and complete Petrographic Analysis. Quality data was used to characterize the consistency or variability of these quality parameters across the Initial Mining Area.

A single 21kg clean sample of 9 Seam (Hole 12-30) was sent to CANMET Labs in Ottawa for CRI and CSR testing. This sample is from the likely mine start up area.

Two seam groups, Seam 8 and 7 were intersected below the 9 Seam, along the western margin of the initial mining area. These two seams deteriorate towards the east of the initial mining area. Seam 8 was intersected and sampled in five drillholes, showing typically three main coal plies, the upper, middle and lower. Seam 8 is typically 80m below the 9 Seam. Seam 7 was intersected in one drillhole on the extreme west boundary of the initial mining area. It is approximately 40m below the 8 Seam. Seam 7 appears relatively dirty with multiple partings. Limited seam intersections for Seam 8 and 7 resulted in a very preliminary set of analysis being undertaken to get a sense of the individual seam qualities.

Reports on the 2012 Coal Quality Evaluation are included in Appendices D and E.

Drilling in 2012 was successful; the more powerful equipment of Foraco provided much better productivity than in the 2011 program. The results of the 2012 program show that all four coal zones show strong FSI values, ranging from seven to nine. In general, the rank, rheological properties, chemistry and composition of the coal zones are consistent and predictable in the study area. Initial CSR and CRI testing of the 9 Seam indicate that it is an outstanding coking coal. Both Seam 8 and 7 are mid-volatile bituminous coking coals as evidenced by volatile matter content and high FSI values. Seam 8 is potentially mineable, and Seam 7 appears uneconomic and likely too deep to be considered in the initial mining area.

RC samples cannot be used for washability testing due to the nature of the samples; therefore it is recommended that the next phase of evaluation focus on washability testing, which requires representative large diameter (15cm) coring samples from the initial mining area. It is also recommended to attempt to gain enough large diameter core

material (350kg clean coal) to run pilot scale carbonization tests on the main development coal seams to confirm actual stability, CSR and CRI numbers.

### **5.3 Geological Modelling 2013**

In 2013, the geological model for the Coal Creek Project was updated based on the recent drilling data obtained. There are eight coal seams modelled in the project area and there are seven coal seams modelled in the initial mine area.

## **6 SUMMARY AND CONCLUSIONS**

The 2011 exploration program was not as successful as hoped. Insufficient drill capacity, excessive volumes of water, lack of pilot drillholes, and the friable nature of the coal seams caused numerous drilling and recovery issues. In 2012, the program worked well. Reverse circulation samples were collected for coal quality analysis. The results of the 2012 program show that all four coal zones have strong FSI values, ranging from seven to nine.

In general, the rank, rheological properties, chemistry and composition of the coal zones are consistent and predictable in the study area. Initial CSR and CRI testing of the 9 Seam indicate that it is an outstanding coking coal. The geological model was updated in 2013 based on the 2011 and 2012 drilling results.

Future exploration recommended on the initial mining area includes large diameter (15cm) coring to obtain sufficient samples for washability testing and to run pilot scale carbonization tests on the main development coal seams to confirm actual stability, CSR, and CRI numbers.



## **7 REFERENCES**

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## **8 CERTIFICATE AND SIGNATURE PAGES**

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

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

1. This certificate applies to the assessment report titled *Summary Report on the Coal Creek Property – 2011-2013 Exploration Program*.
2. I am independent of the Crowsnest Pass Coal Mining Ltd. and work as a consultant geologist.
3. That I graduated as a geologist from the University of British Columbia, Vancouver, with a degree of Bachelor of Science in 1973.
4. That I graduated as a geologist from Queen's University, Kingston, Ontario, with a degree of Master of Science in 1978.
5. That I am a member in good standing of the Association of Professional Engineers and Geoscientists of the Province of British Columbia (registration #18,301).
6. That I have been involved in the mining and exploration projects since my graduation in 1973.
7. That I am familiar with the subject area from fieldwork since 1983 and that I personally supervised the preparation of this report.

**Dated this 5<sup>th</sup> day of June 2014; in Fernie, British Columbia**

*“Signed and Sealed”*

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

**CERTIFICATE OF QUALIFICATIONS: JACLYN L. GALBRAITH**

**I Jaclyn L. Galbraith, Engineer-in-Training (Geological), Moose Mountain Technical Services hereby certify that:**

1. This certificate applies to the assessment report titled *Summary Report on the Coal Creek Property – 2011-2013 Exploration Program*.
2. I am independent of the Crowsnest Pass Coal Mining Ltd. and work as a consultant geologist.
3. That I graduated as a geological engineer from Queen's University, Kingston, Ontario, with a degree of Bachelor of Science Geological Engineering in 2010.
4. That I am a member in good standing of the Association of Professional Engineers and Geoscientists of the Province of British Columbia (Registration #159069).
5. That I have been involved in the mining exploration projects since my summer co-op work in 2007.
6. That I am familiar with the subject area from fieldwork since 2008 and that I personally wrote and supervised the preparation of this report.

**Dated this 5<sup>th</sup> day of June 2014; in Fernie, British Columbia**

*“Signed and Sealed”*

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**J.L. Galbraith, B.Sc., E.I.T.**

## Appendix A Drillhole Data

DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH11-01	649394.87	5484829.54	1308.03	352.0	2012	0.00	32.95	32.95	
DH11-01						32.95	34.41	1.46	C
DH11-01						34.41	58.18	23.77	
DH11-01						58.18	58.45	0.27	C
DH11-01						58.45	71.77	13.32	
DH11-01						71.77	72.79	1.02	C
DH11-01						72.79	115.93	43.14	
DH11-01						115.93	116.21	0.28	C
DH11-01						116.21	179.61	63.40	
DH11-01						179.61	180.79	1.18	B
DH11-01						180.79	218.32	37.53	
DH11-01						218.32	218.59	0.27	C
DH11-01						218.59	248.31	29.72	
DH11-01						248.31	248.69	0.38	C
DH11-01						248.69	249.93	1.24	
DH11-01						249.93	250.17	0.24	C
DH11-01						250.17	270.80	20.63	
DH11-01						270.80	271.47	0.67	10U
DH11-01						271.47	275.51	4.04	
DH11-01						275.51	276.31	0.80	c
DH11-01						276.31	277.07	0.76	
DH11-01						277.07	278.10	1.03	10L
DH11-01						278.10	278.50	0.40	
DH11-01						278.50	279.66	1.16	10L
DH11-01						279.66	298.10	18.44	
DH11-01						298.10	298.40	0.30	C
DH11-01						298.40	306.18	7.78	
DH11-01						306.18	306.61	0.43	C
DH11-01						306.61	307.06	0.45	
DH11-01						307.06	307.79	0.73	C
DH11-01						307.79	310.57	2.78	
DH11-01						310.57	313.12	2.55	9U
DH11-01						313.12	313.36	0.24	
DH11-01						313.36	314.86	1.50	9U
DH11-01						314.86	334.38	19.52	

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DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH11-01						334.38	335.75	1.37	9
DH11-01						335.75	336.01	0.26	
DH11-01						336.01	338.04	2.03	9
DH11-01						338.04	352.00	13.96	
DH11-02	649101.42	5484520.27	1286.96	285.0	2011	0.0	51.3	51.3	
DH11-02						51.3	51.6	0.3	C
DH11-02						51.6	94.7	43.1	
DH11-02						94.7	95.7	1.0	B
DH11-02						95.7	103.3	7.6	
DH11-02						103.3	103.6	0.3	C
DH11-02						103.6	181.0	77.4	
DH11-02						181.0	181.4	0.4	C
DH11-02						181.4	213.1	31.7	
DH11-02						213.1	213.9	0.8	10U
DH11-02						213.9	216.0	2.1	
DH11-02						216.0	216.3	0.3	10L
DH11-02						216.3	216.5	0.2	
DH11-02						216.5	217.5	1.0	10L
DH11-02						217.5	218.2	0.7	
DH11-02						218.2	218.7	0.5	C
DH11-02						218.7	257.0	38.3	
DH11-02						257.0	257.4	0.4	C
DH11-02						257.4	258.7	1.4	
DH11-02						258.7	259.0	0.3	9U
DH11-02						259.0	259.3	0.3	
DH11-02						259.3	261.7	2.5	9U
DH11-02						261.7	275.1	13.4	
DH11-02						275.1	277.8	2.7	9
DH11-02						277.8	285.0	7.2	
DH11-02B	649102.04	5484526.15	1286.74	195.0	2011				
DH11-04	648711.21	5484059.97	1249.89	99.7	2011				
DH11-04B	648709.10	5484058.13	1250.34	340.0	2011/2012	0.00	58.52	58.52	
DH11-04B						58.52	58.66	0.14	C
DH11-04B						58.66	90.96	32.30	
DH11-04B						90.96	91.24	0.28	B
DH11-04B						91.24	127.02	35.78	
DH11-04B						127.02	127.58	0.56	C
DH11-04B						127.58	129.12	1.54	
DH11-04B						129.12	129.36	0.24	10U

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DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH11-04B						129.36	129.51	0.15	
DH11-04B						129.51	131.43	1.92	10U
DH11-04B						131.43	132.15	0.72	
DH11-04B						132.15	134.85	2.70	10U
DH11-04B						134.85	137.00	2.15	
DH11-04B						137.00	137.17	0.17	C
DH11-04B						137.17	138.07	0.90	
DH11-04B						138.07	141.51	3.44	10L
DH11-04B						141.51	142.69	1.18	
DH11-04B						142.69	144.87	2.18	10L
DH11-04B						144.87	145.71	0.84	
DH11-04B						145.71	146.22	0.51	C
DH11-04B						146.22	148.37	2.15	
DH11-04B						148.37	148.81	0.44	C
DH11-04B						148.81	155.09	6.28	
DH11-04B						155.09	156.48	1.39	C
DH11-04B						156.48	157.44	0.96	
DH11-04B						157.44	158.01	0.57	C
DH11-04B						158.01	159.48	1.47	
DH11-04B						159.48	159.73	0.25	C
DH11-04B						159.73	204.78	45.05	
DH11-04B						204.78	207.09	2.31	9U
DH11-04B						207.09	217.50	10.41	
DH11-04B						217.50	222.15	4.65	9
DH11-04B						222.15	318.42	96.27	
DH11-04B						318.42	319.24	0.82	8U
DH11-04B						319.24	323.97	4.73	
DH11-04B						323.97	324.56	0.59	8M
DH11-04B						324.56	324.70	0.14	
DH11-04B						324.70	325.70	1.00	8M
DH11-04B						325.70	340.00	14.30	
DH11-05	648322.01	5483866.80	1237.39	285.5	2011/2012	0.00	52.68	52.68	
DH11-05						52.68	53.08	0.40	B
DH11-05						53.08	89.39	36.31	
DH11-05						89.39	89.80	0.41	C
DH11-05						89.80	92.82	3.02	
DH11-05						92.82	94.80	1.98	10U
DH11-05						94.80	96.45	1.65	
DH11-05						96.45	98.18	1.73	10L

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DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH11-05						98.18	98.71	0.53	
DH11-05						98.71	99.54	0.83	10L
DH11-05						99.54	99.72	0.18	
DH11-05						99.72	100.15	0.43	10L
DH11-05						100.15	100.84	0.69	
DH11-05						100.84	101.04	0.20	C
DH11-05						101.04	144.96	43.92	
DH11-05						144.96	145.98	1.02	9U
DH11-05						145.98	161.20	15.22	
DH11-05						161.20	166.58	5.38	9
DH11-05						166.58	241.70	75.12	
DH11-05						241.70	242.10	0.40	C
DH11-05						242.10	259.30	17.20	
DH11-05						259.30	259.90	0.60	8U
DH11-05						259.90	266.90	7.00	
DH11-05						266.90	267.30	0.40	C
DH11-05						267.30	269.70	2.40	
DH11-05						269.70	271.50	1.80	8L
DH11-05						271.50	285.50	14.00	
<b>DH11-05B</b>	648324.49	5483869.66	1237.25	167.5	2011				
DH11-07	649030.73	5484270.42	1300.89	311.0	2012	0.00	85.41	85.41	
DH11-07						85.41	86.59	1.18	C
DH11-07						86.59	143.83	57.24	
DH11-07						143.83	144.06	0.23	C
DH11-07						144.06	170.37	26.31	
DH11-07						170.37	170.65	0.28	B
DH11-07						170.65	201.43	30.78	
DH11-07						201.43	201.89	0.46	C
DH11-07						201.89	204.34	2.45	
DH11-07						204.34	207.15	2.81	10U
DH11-07						207.15	208.00	0.85	
DH11-07						208.00	208.35	0.35	10L
DH11-07						208.35	208.66	0.31	
DH11-07						208.66	210.31	1.65	10L
DH11-07						210.31	212.09	1.78	
DH11-07						212.09	212.55	0.46	C
DH11-07						212.55	247.60	35.05	
DH11-07						247.60	247.94	0.34	C
DH11-07						247.94	250.86	2.92	

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DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH11-07						250.86	253.49	2.63	9U
DH11-07						253.49	254.41	0.92	
DH11-07						254.41	254.66	0.25	C
DH11-07						254.66	255.43	0.77	
DH11-07						255.43	256.17	0.74	C
DH11-07						256.17	258.58	2.41	
DH11-07						258.58	259.77	1.19	9
DH11-07						259.77	260.11	0.34	
DH11-07						260.11	264.16	4.05	9
DH11-07						264.16	311.00	46.84	
<b>DH11-07-R1</b>	649033.50	5484254.35	1303.52	0.0	2012				
DH11-08	649081.06	5484018.52	1321.30	329.0	2012	0.00	81.83	81.83	
DH11-08						81.83	82.37	0.54	B
DH11-08						82.37	165.28	82.91	
DH11-08						165.28	165.55	0.27	C
DH11-08						165.55	185.06	19.51	
DH11-08						185.06	185.87	0.81	101
DH11-08						185.87	187.86	1.99	
DH11-08						187.86	190.42	2.56	10U
DH11-08						190.42	191.74	1.32	
DH11-08						191.74	193.39	1.65	10L
DH11-08						193.39	195.17	1.78	
DH11-08						195.17	195.46	0.29	C
DH11-08						195.46	235.00	39.54	
DH11-08						235.00	235.37	0.37	C
DH11-08						235.37	238.21	2.84	
DH11-08						238.21	241.27	3.06	9U
DH11-08						241.27	243.04	1.77	
DH11-08						243.04	247.66	4.62	9
DH11-08						247.66	302.01	54.35	
DH11-08						302.01	302.52	0.51	C
DH11-08						302.52	315.07	12.55	
DH11-08						315.07	315.94	0.87	C
DH11-08						315.94	329.00	13.06	
<b>DH11-08-R1</b>	649090.46	5484010.30	1323.95	0.0	2012				
DH11-09	649148.16	5483873.23	1336.40	316.2	2011	0.0	171.4	171.40	
DH11-09						171.4	171.6	0.20	C
DH11-09						171.6	186.3	14.70	



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DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH11-09						186.3	187.4	1.10	10U
DH11-09						187.4	189.4	2.00	
DH11-09						189.4	191.0	1.60	10L
DH11-09						191.0	197.0	6.00	
DH11-09						197.0	197.3	0.30	C
DH11-09						197.3	235.7	38.40	
DH11-09						235.7	236.3	0.60	C
DH11-09						236.3	239.3	3.00	
DH11-09						239.3	242.2	2.85	9U
DH11-09						242.2	242.3	0.18	
DH11-09						242.3	242.8	0.47	9U
DH11-09						242.8	243.8	0.95	
DH11-09						243.8	248.2	4.45	9
DH11-09						248.2	299.7	51.50	
DH11-09						299.7	300.8	1.10	8U
DH11-09						300.8	303.0	2.20	
DH11-09						303.0	303.5	0.50	8M
DH11-09						303.5	306.0	2.50	
DH11-09						306.0	307.4	1.40	8L
DH11-09						307.4	311.7	4.30	
DH11-09						311.7	312.5	0.80	C
DH11-09						312.5	316.2	3.73	
DH11-10	649235.33	5483596.13	1350.14	358.0	2012	0.00	84.98	84.98	
DH11-10						84.98	85.22	0.24	C
DH11-10						85.22	170.42	85.20	
DH11-10						170.42	170.65	0.23	C
DH11-10						170.65	183.62	12.97	
DH11-10						183.62	185.18	1.56	10U
DH11-10						185.18	187.47	2.29	
DH11-10						187.47	189.48	2.01	10L
DH11-10						189.48	197.59	8.11	
DH11-10						197.59	197.84	0.25	C
DH11-10						197.84	240.39	42.55	
DH11-10						240.39	243.71	3.32	9
DH11-10						243.71	244.51	0.80	
DH11-10						244.51	248.99	4.48	9
DH11-10						248.99	289.64	40.65	
DH11-10						289.64	289.92	0.28	C
DH11-10						289.92	304.92	15.00	

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DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH11-10						304.92	305.80	0.88	8U
DH11-10						305.80	316.85	11.05	
DH11-10						316.85	317.76	0.91	8L
DH11-10						317.76	358.00	40.24	
DH11-11	649586.41	5484908.48	1307.82	396.0	2012	0.0	9.4	9.4	
DH11-11						9.4	10.1	0.7	C
DH11-11						0.0	50.7	50.7	
DH11-11						50.7	51.2	0.5	C
DH11-11						51.2	86.4	35.2	
DH11-11						86.4	86.8	0.4	C
DH11-11						86.8	95.4	8.6	
DH11-11						95.4	96.0	0.6	C
DH11-11						96.0	139.5	43.5	
DH11-11						139.5	139.7	0.2	C
DH11-11						139.7	206.8	67.1	
DH11-11						206.8	208.0	1.2	B
DH11-11						208.0	212.1	4.1	
DH11-11						212.1	212.3	0.2	C
DH11-11						212.3	246.8	34.5	
DH11-11						246.8	247.3	0.5	C
DH11-11						247.3	280.0	32.7	
DH11-11						280.0	280.4	0.4	C
DH11-11						280.4	281.4	1.0	
DH11-11						281.4	282.0	0.6	C
DH11-11						282.0	297.5	15.5	
DH11-11						297.5	298.3	0.8	10U
DH11-11						298.3	303.3	5.0	
DH11-11						303.3	303.7	0.4	C
DH11-11						303.7	305.0	1.3	
DH11-11						305.0	306.0	1.0	10L
DH11-11						306.0	306.5	0.5	
DH11-11						306.5	309.8	3.3	10L
DH11-11						309.8	328.2	18.4	
DH11-11						328.2	329.3	1.1	C
DH11-11						329.3	333.0	3.7	
DH11-11						333.0	334.4	1.4	9U
DH11-11						334.4	335.8	1.4	
DH11-11						335.8	337.7	1.9	9U
DH11-11						337.7	348.6	10.9	

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DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH11-11						348.6	351.8	3.2	9
DH11-11						351.8	379.8	28.0	
DH11-11						379.8	380.1	0.3	C
DH11-11						380.1	382.3	2.2	
DH11-11						382.3	382.6	0.3	C
DH11-11						382.6	396.0	13.4	
DH12-03	649385.71	5482828.27	1408.99	414.0	2012	0.00	157.64	157.64	
DH12-03						157.64	158.03	0.39	C
DH12-03						158.03	164.31	6.28	
DH12-03						164.31	165.70	1.39	10U
DH12-03						165.70	170.16	4.46	
DH12-03						170.16	171.92	1.76	10L
DH12-03						171.92	234.35	62.43	
DH12-03						234.35	237.46	3.11	9
DH12-03						237.46	238.41	0.95	
DH12-03						238.41	241.77	3.36	9
DH12-03						241.77	242.52	0.75	
DH12-03						242.52	242.88	0.36	C
DH12-03						242.88	276.69	33.81	
DH12-03						276.69	277.12	0.43	C
DH12-03						277.12	281.91	4.79	
DH12-03						281.91	282.58	0.67	C
DH12-03						282.58	303.68	21.10	
DH12-03						303.68	304.27	0.59	C
DH12-03						304.27	343.03	38.76	
DH12-03						343.03	343.43	0.40	C
DH12-03						343.43	345.01	1.58	
DH12-03						345.01	345.84	0.83	8U
DH12-03						345.84	367.81	21.97	
DH12-03						367.81	368.23	0.42	8L
DH12-03						368.23	414.00	45.77	
DH12-05	649284.76	5483365.05	1363.78	310.0	2012	0.00	86.52	86.52	
DH12-05						86.52	86.72	0.20	C
DH12-05						86.72	88.85	2.13	
DH12-05						88.85	89.14	0.29	B
DH12-05						89.14	176.39	87.25	
DH12-05						176.39	176.82	0.43	C
DH12-05						176.82	187.87	11.05	
DH12-05						187.87	188.81	0.94	10U

**Crowsnest Pass Coal Mining Ltd.**  
**Coal Creek Project**

DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH12-05						188.81	191.19	2.38	
DH12-05						191.19	193.18	1.99	10L
DH12-05						193.18	201.83	8.65	
DH12-05						201.83	202.08	0.25	C
DH12-05						202.08	203.55	1.47	
DH12-05						203.55	203.73	0.18	C
DH12-05						203.73	224.64	20.91	
DH12-05						224.64	224.84	0.20	C
DH12-05						224.84	239.87	15.03	
DH12-05						239.87	240.13	0.26	C
DH12-05						240.13	244.80	4.67	
DH12-05						244.80	248.31	3.51	9
DH12-05						248.31	248.75	0.44	
DH12-05						248.75	252.48	3.73	9
DH12-05						252.48	252.79	0.31	
DH12-05						252.79	253.35	0.56	9
DH12-05						253.35	293.39	40.04	
DH12-05						293.39	293.55	0.16	8U
DH12-05						293.55	302.73	9.18	
DH12-05						302.73	303.55	0.82	8L
DH12-05						303.55	310.00	6.45	
DH12-11	651965.81	5483448.13	1489.96	365.0	2012	0.00	49.91	49.91	
DH12-11						49.91	50.04	0.13	C
DH12-11						50.04	68.08	18.04	
DH12-11						68.08	68.77	0.69	C
DH12-11						68.77	98.39	29.62	
DH12-11						98.39	99.04	0.65	C
DH12-11						99.04	99.15	0.11	
DH12-11						99.15	99.50	0.35	C
DH12-11						99.50	103.59	4.09	
DH12-11						103.59	103.76	0.17	C
DH12-11						103.76	109.81	6.05	
DH12-11						109.81	110.11	0.30	C
DH12-11						110.11	206.40	96.29	
DH12-11						206.40	206.98	0.58	C
DH12-11						206.98	248.01	41.03	
DH12-11						248.01	248.54	0.53	C
DH12-11						248.54	330.14	81.60	
DH12-11						330.14	330.24	0.10	C

**Crowsnest Pass Coal Mining Ltd.**  
**Coal Creek Project**

DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH12-11						330.24	365.00	34.76	
DH12-12	651614.42	5484717.32	1419.19	468.5	2012	0.00	44.64	44.64	
DH12-12						44.64	45.00	0.36	C
DH12-12						45.00	140.53	95.53	
DH12-12						140.53	141.22	0.69	C
DH12-12						141.22	187.46	46.24	
DH12-12						187.46	187.85	0.39	C
DH12-12						187.85	216.59	28.74	
DH12-12						216.59	216.95	0.36	C
DH12-12						216.95	252.84	35.89	
DH12-12						252.84	253.56	0.72	B
DH12-12						253.56	259.97	6.41	
DH12-12						259.97	260.61	0.64	C
DH12-12						260.61	362.22	101.61	
DH12-12						362.22	362.50	0.28	C
DH12-12						362.50	403.30	40.80	
DH12-12						403.30	403.60	0.30	101
DH12-12						403.60	403.97	0.37	
DH12-12						403.97	404.38	0.41	101
DH12-12						404.38	446.20	41.82	
DH12-12						446.20	446.65	0.45	10U
DH12-12						446.65	458.99	12.34	
DH12-12						458.99	459.41	0.42	10L
DH12-12						459.41	459.93	0.52	
DH12-12						459.93	460.15	0.22	C
DH12-12						460.15	468.50	8.35	
DH12-13	651188.24	5485017.80	1400.24	576.0	2012	0.00	68.55	68.55	
DH12-13						68.55	68.97	0.42	C
DH12-13						68.97	157.78	88.81	
DH12-13						157.78	158.10	0.32	C
DH12-13						158.10	160.19	2.09	
DH12-13						160.19	160.61	0.42	C
DH12-13						160.61	161.50	0.89	
DH12-13						161.50	161.79	0.29	C
DH12-13						161.79	198.24	36.45	
DH12-13						198.24	198.51	0.27	C
DH12-13						198.51	211.72	13.21	
DH12-13						211.72	212.04	0.32	C
DH12-13						212.04	218.34	6.30	

**Crowsnest Pass Coal Mining Ltd.**  
**Coal Creek Project**

DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH12-13						218.34	219.03	0.69	C
DH12-13						219.03	249.93	30.90	
DH12-13						249.93	250.21	0.28	C
DH12-13						250.21	259.26	9.05	
DH12-13						259.26	259.63	0.37	C
DH12-13						259.63	328.65	69.02	
DH12-13						328.65	328.88	0.23	C
DH12-13						328.88	345.65	16.77	
DH12-13						345.65	345.99	0.34	B
DH12-13						345.99	346.25	0.26	
DH12-13						346.25	346.73	0.48	B
DH12-13						346.73	411.80	65.07	
DH12-13						411.80	412.20	0.40	c
DH12-13						412.20	412.60	0.40	
DH12-13						412.60	412.90	0.30	c
DH12-13						412.90	418.00	5.10	
DH12-13						418.00	418.30	0.30	10U
DH12-13						418.30	425.00	6.70	
DH12-13						425.00	425.20	0.20	c
DH12-13						425.20	445.80	20.60	
DH12-13						445.80	446.30	0.50	c
DH12-13						446.30	448.80	2.50	
DH12-13						448.80	449.70	0.90	10L
DH12-13						449.70	469.90	20.20	
DH12-13						469.90	470.20	0.30	C
DH12-13						470.20	503.30	33.10	
DH12-13						503.30	504.70	1.40	9U
DH12-13						504.70	505.00	0.30	
DH12-13						505.00	510.20	5.20	9U
DH12-13						510.20	545.50	35.30	
DH12-13						545.50	548.50	3.00	9
DH12-13						548.50	549.60	1.10	
DH12-13						549.60	551.20	1.60	9
DH12-13						551.20	576.00	24.80	
DH12-14	650861.34	5485238.90	1370.34	493.0	2012	0.00	149.09	149.09	
DH12-14						149.09	149.38	0.29	
DH12-14						149.38	150.73	1.35	
DH12-14						150.73	151.13	0.40	
DH12-14						151.13	152.45	1.32	

**Crowsnest Pass Coal Mining Ltd.**  
**Coal Creek Project**

DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH12-14						152.45	153.19	0.74	
DH12-14						153.19	209.65	56.46	
DH12-14						209.65	210.55	0.90	
DH12-14						210.55	245.60	35.05	
DH12-14						245.60	246.26	0.66	
DH12-14						246.26	341.43	95.17	
DH12-14						341.43	342.61	1.18	B
DH12-14						342.61	402.85	60.24	
DH12-14						402.85	403.01	0.16	10I
DH12-14						403.01	413.66	10.65	
DH12-14						413.66	414.09	0.43	10U
DH12-14						414.09	418.70	4.61	
DH12-14						418.70	418.80	0.10	c
DH12-14						418.80	432.46	13.66	
DH12-14						432.46	433.54	1.08	10L
DH12-14						433.54	456.77	23.23	
DH12-14						456.77	457.17	0.40	C
DH12-14						457.17	458.06	0.89	
DH12-14						458.06	459.11	1.05	c
DH12-14						459.11	460.56	1.45	
DH12-14						460.56	462.25	1.69	9U
DH12-14						462.25	474.30	12.05	
DH12-14						474.30	476.03	1.73	9
DH12-14						476.03	476.34	0.31	
DH12-14						476.34	478.02	1.68	9
DH12-14						478.02	493.00	14.98	
DH12-16	650308.87	5485388.22	1371.90	493.0	2012	0.00	99.59	99.59	
DH12-16						99.59	99.93	0.34	C
DH12-16						99.93	130.93	31.00	
DH12-16						130.93	131.09	0.16	C
DH12-16						131.09	133.90	2.81	
DH12-16						133.90	134.49	0.59	C
DH12-16						134.49	199.01	64.52	
DH12-16						199.01	199.46	0.45	C
DH12-16						199.46	242.36	42.90	
DH12-16						242.36	242.63	0.27	C
DH12-16						242.63	253.86	11.23	
DH12-16						253.86	254.12	0.26	C
DH12-16						254.12	335.56	81.44	

**Crowsnest Pass Coal Mining Ltd.**  
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DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH12-16						335.56	336.72	1.16	B
DH12-16						336.72	339.40	2.68	
DH12-16						339.40	339.88	0.48	C
DH12-16						339.88	402.60	62.72	
DH12-16						402.60	403.20	0.60	101
DH12-16						403.20	412.30	9.10	
DH12-16						412.30	412.90	0.60	10U
DH12-16						412.90	424.50	11.60	
DH12-16						424.50	424.60	0.10	C
DH12-16						424.60	426.60	2.00	
DH12-16						426.60	427.70	1.10	10L
DH12-16						427.70	451.30	23.60	
DH12-16						451.30	452.30	1.00	9U
DH12-16						452.30	453.30	1.00	
DH12-16						453.30	455.50	2.20	9U
DH12-16						455.50	473.80	18.30	
DH12-16						473.80	474.80	1.00	9
DH12-16						474.80	475.30	0.50	
DH12-16						475.30	477.00	1.70	9
DH12-16						477.00	493.00	16.00	
DH12-20	649911.56	5484949.72	1334.13	419.8	2012	0.0	256.3	256.3	
DH12-20						256.3	257.2	0.9	B
DH12-20						257.2	290.2	33.0	
DH12-20						290.2	290.4	0.2	C
DH12-20						290.4	328.7	38.3	
DH12-20						328.7	329.2	0.5	C
DH12-20						329.2	329.8	0.6	
DH12-20						329.8	330.3	0.5	C
DH12-20						330.3	339.8	9.5	
DH12-20						339.8	340.8	1.0	10U
DH12-20						340.8	352.7	11.9	
DH12-20						352.7	353.6	0.9	10L
DH12-20						353.6	354.4	0.8	
DH12-20						354.4	357.0	2.6	10L
DH12-20						357.0	379.2	22.2	
DH12-20						379.2	379.6	0.4	C
DH12-20						379.6	381.7	2.1	
DH12-20						381.7	383.7	2.0	9U
DH12-20						383.7	384.2	0.5	



**Crowsnest Pass Coal Mining Ltd.**  
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DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH12-20						384.2	387.0	2.8	9U
DH12-20						387.0	402.4	15.4	
DH12-20						402.4	404.3	1.9	9
DH12-20						404.3	404.5	0.2	
DH12-20						404.5	406.5	2.0	9
DH12-20						406.5	419.8	13.3	
DH12-23	648797.74	5484839.28	1316.81	340.0	2012	0.00	35.54	35.54	
DH12-23						35.54	36.18	0.64	C
DH12-23						36.18	36.67	0.49	
DH12-23						36.67	37.14	0.47	C
DH12-23						37.14	48.39	11.25	
DH12-23						48.39	48.76	0.37	C
DH12-23						48.76	49.08	0.32	
DH12-23						49.08	50.35	1.27	C
DH12-23						50.35	53.95	3.60	
DH12-23						53.95	54.29	0.34	C
DH12-23						54.29	98.38	44.09	
DH12-23						98.38	98.65	0.27	C
DH12-23						98.65	116.81	18.16	
DH12-23						116.81	117.03	0.22	C
DH12-23						117.03	160.59	43.56	
DH12-23						160.59	161.65	1.06	B
DH12-23						161.65	162.81	1.16	
DH12-23						162.81	163.47	0.66	C
DH12-23						163.47	165.80	2.33	
DH12-23						165.80	166.01	0.21	C
DH12-23						166.01	210.36	44.35	
DH12-23						210.36	210.59	0.23	C
DH12-23						210.59	236.17	25.58	
DH12-23						236.17	236.58	0.41	C
DH12-23						236.58	258.45	21.87	
DH12-23						258.45	258.67	0.22	101
DH12-23						258.67	270.25	11.58	
DH12-23						270.25	270.58	0.33	C
DH12-23						270.58	271.29	0.71	
DH12-23						271.29	272.28	0.99	10U
DH12-23						272.28	279.29	7.01	
DH12-23						279.29	280.01	0.72	10L
DH12-23						280.01	280.31	0.30	

**Crowsnest Pass Coal Mining Ltd.**  
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DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH12-23						280.31	280.49	0.18	10L
DH12-23						280.49	281.49	1.00	
DH12-23						281.49	281.74	0.25	C
DH12-23						281.74	311.74	30.00	
DH12-23						311.74	312.16	0.42	C
DH12-23						312.16	314.05	1.89	
DH12-23						314.05	314.70	0.65	9U
DH12-23						314.70	314.90	0.20	
DH12-23						314.90	316.71	1.81	9U
DH12-23						316.71	340.00	23.29	
DH12-25	648528.53	5484343.13	1228.53	191.0	2012	0.00	66.10	66.10	
DH12-25						66.10	66.20	0.10	C
DH12-25						66.20	106.21	40.01	
DH12-25						106.21	106.77	0.56	101
DH12-25						106.77	107.45	0.68	
DH12-25						107.45	107.77	0.32	C
DH12-25						107.77	110.13	2.36	
DH12-25						110.13	111.71	1.58	10U
DH12-25						111.71	113.59	1.88	
DH12-25						113.59	115.95	2.36	10L
DH12-25						115.95	116.96	1.01	
DH12-25						116.96	117.28	0.32	C
DH12-25						117.28	117.73	0.45	
DH12-25						117.73	117.94	0.21	C
DH12-25						117.94	155.09	37.15	
DH12-25						155.09	156.09	1.00	9U
DH12-25						156.09	173.08	16.99	
DH12-25						173.08	177.98	4.90	9
DH12-25						177.98	191.00	13.02	
DH12-26	648290.05	5484150.19	1219.38	153.0	2012	0.00	22.83	22.83	
DH12-26						22.83	23.25	0.42	C
DH12-26						23.25	59.37	36.12	
DH12-26						59.37	59.84	0.47	101
DH12-26						59.84	63.73	3.89	
DH12-26						63.73	64.67	0.94	10U
DH12-26						64.67	65.56	0.89	
DH12-26						65.56	65.84	0.28	C
DH12-26						65.84	67.37	1.53	
DH12-26						67.37	70.39	3.02	10L

**Crowsnest Pass Coal Mining Ltd.**  
**Coal Creek Project**

DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH12-26						70.39	71.55	1.16	
DH12-26						71.55	71.94	0.39	C
DH12-26						71.94	72.39	0.45	
DH12-26						72.39	72.63	0.24	C
DH12-26						72.63	135.60	62.97	
DH12-26						135.60	137.80	2.20	9
DH12-26						137.80	138.32	0.52	
DH12-26						138.32	139.75	1.43	9
DH12-26						139.75	139.93	0.18	
DH12-26						139.93	140.24	0.31	9
DH12-26						140.24	153.00	12.76	
DH12-27	648025.38	5483990.72	1215.57	226.2	2012	0.00	22.88	22.88	
DH12-27						22.88	23.77	0.89	10I
DH12-27						23.77	28.58	4.81	
DH12-27						28.58	28.95	0.37	C
DH12-27						28.95	30.92	1.97	
DH12-27						30.92	31.92	1.00	10U
DH12-27						31.92	32.10	0.18	
DH12-27						32.10	32.41	0.31	10U
DH12-27						32.41	33.82	1.41	
DH12-27						33.82	37.13	3.31	10L
DH12-27						37.13	74.94	37.81	
DH12-27						74.94	75.24	0.30	C
DH12-27						75.24	75.97	0.73	
DH12-27						75.97	77.78	1.81	9U
DH12-27						77.78	80.61	2.83	
DH12-27						80.61	81.19	0.58	C
DH12-27						81.19	95.15	13.96	
DH12-27						95.15	96.92	1.77	9
DH12-27						96.92	97.56	0.64	
DH12-27						97.56	98.61	1.05	9
DH12-27						98.61	124.51	25.90	
DH12-27						124.51	125.11	0.60	C
DH12-27						125.11	185.03	59.92	
DH12-27						185.03	185.53	0.50	C
DH12-27						185.53	204.21	18.68	
DH12-27						204.21	205.12	0.91	8U
DH12-27						205.12	207.18	2.06	
DH12-27						207.18	209.24	2.06	8M

**Crowsnest Pass Coal Mining Ltd.**  
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DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH12-27						209.24	212.70	3.46	
DH12-27						212.70	213.46	0.76	8L
DH12-27						213.46	214.05	0.59	
DH12-27						214.05	215.40	1.35	8L
DH12-27						215.40	215.87	0.47	
DH12-27						215.87	217.61	1.74	8L
DH12-27						217.61	226.20	8.59	
DH12-28	647760.22	5483937.18	1218.75	175.0	2012	0.00	40.92	40.92	
DH12-28						40.92	41.86	0.94	9U
DH12-28						41.86	57.73	15.87	
DH12-28						57.73	61.58	3.85	9
DH12-28						61.58	62.71	1.13	
DH12-28						62.71	63.63	0.92	C
DH12-28						63.63	96.53	32.90	
DH12-28						96.53	96.92	0.39	C
DH12-28						96.92	113.46	16.54	
DH12-28						113.46	114.11	0.65	C
DH12-28						114.11	125.29	11.18	
DH12-28						125.29	126.28	0.99	81
DH12-28						126.28	126.87	0.59	
DH12-28						126.87	127.36	0.49	C
DH12-28						127.36	147.50	20.14	
DH12-28						147.50	148.52	1.02	8U
DH12-28						148.52	150.28	1.76	
DH12-28						150.28	153.29	3.01	8M
DH12-28						153.29	153.44	0.15	
DH12-28						153.44	154.08	0.64	8M
DH12-28						154.08	157.90	3.82	
DH12-28						157.90	158.30	0.40	8L
DH12-28						158.30	159.50	1.20	
DH12-28						159.50	159.80	0.30	C
DH12-28						159.80	160.90	1.10	
DH12-28						160.90	161.20	0.30	C
DH12-28						161.20	163.40	2.20	
DH12-28						163.40	163.50	0.10	C
DH12-28						163.50	175.00	11.50	
DH12-29	647426.28	5483774.46	1187.93	208.0	2012	0.00	45.04	45.04	
DH12-29						45.04	46.14	1.10	81
DH12-29						46.14	49.50	3.36	

**Crowsnest Pass Coal Mining Ltd.**  
**Coal Creek Project**

DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH12-29						49.50	50.20	0.70	C
DH12-29						50.20	74.19	23.99	
DH12-29						74.19	75.72	1.53	8U
DH12-29						75.72	77.13	1.41	
DH12-29						77.13	79.53	2.40	8M
DH12-29						79.53	84.13	4.60	
DH12-29						84.13	86.11	1.98	C
DH12-29						86.11	90.30	4.19	
DH12-29						90.30	93.90	3.60	8L
DH12-29						93.90	131.10	37.20	
DH12-29						131.10	131.40	0.30	C
DH12-29						131.40	134.20	2.80	
DH12-29						134.20	135.20	1.00	c
DH12-29						135.20	136.70	1.50	
DH12-29						136.70	136.90	0.20	c
DH12-29						136.90	137.90	1.00	
DH12-29						137.90	140.30	2.40	7
DH12-29						140.30	176.90	36.60	
DH12-29						176.90	177.80	0.90	c
DH12-29						177.80	180.80	3.00	
DH12-29						180.80	181.10	0.30	6
DH12-29						181.10	208.00	26.90	
DH12-30	648132.06	5483717.08	1255.22	200.0	2012	0.00	111.16	111.16	
DH12-30						111.16	111.67	0.51	101
DH12-30						111.67	115.95	4.28	
DH12-30						115.95	117.49	1.54	10U
DH12-30						117.49	120.31	2.82	
DH12-30						120.31	121.75	1.44	10L
DH12-30						121.75	122.35	0.60	
DH12-30						122.35	122.78	0.43	10L
DH12-30						122.78	123.41	0.63	
DH12-30						123.41	124.53	1.12	10L
DH12-30						124.53	182.42	57.89	
DH12-30						182.42	185.48	3.06	9
DH12-30						185.48	185.85	0.37	
DH12-30						185.85	187.22	1.37	9
DH12-30						186.22	200.00	13.78	
DH12-31	647927.16	5483635.68	1237.07	255.0	2012	0.00	36.88	36.88	
DH12-31						36.88	37.37	0.49	101

**Crowsnest Pass Coal Mining Ltd.**  
**Coal Creek Project**

DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH12-31						37.37	49.29	11.92	
DH12-31						49.29	49.47	0.18	C
DH12-31						49.47	50.87	1.40	
DH12-31						50.87	51.37	0.50	10U
DH12-31						51.37	53.35	1.98	
DH12-31						53.35	55.49	2.14	10L
DH12-31						55.49	56.11	0.62	
DH12-31						56.11	56.98	0.87	10L
DH12-31						56.98	58.09	1.11	
DH12-31						58.09	58.37	0.28	C
DH12-31						58.37	103.25	44.88	
DH12-31						103.25	103.75	0.50	9U
DH12-31						103.75	104.13	0.38	
DH12-31						104.13	104.95	0.82	9U
DH12-31						104.95	122.15	17.20	
DH12-31						122.15	122.29	0.14	C
DH12-31						122.29	123.51	1.22	
DH12-31						123.51	127.20	3.69	9
DH12-31						127.20	127.69	0.49	
DH12-31						127.69	128.19	0.50	9
DH12-31						128.19	128.37	0.20	
DH12-31						128.37	129.45	1.08	9
DH12-31						129.45	177.29	47.84	
DH12-31						177.29	178.43	1.14	C
DH12-31						178.43	197.26	18.83	
DH12-31						197.26	198.73	1.47	81
DH12-31						198.73	199.51	0.78	
DH12-31						199.51	201.12	1.61	81
DH12-31						201.12	201.42	0.30	
DH12-31						201.42	201.87	0.45	C
DH12-31						201.87	217.99	16.12	
DH12-31						217.99	219.03	1.04	8U
DH12-31						219.03	221.03	2.00	
DH12-31						221.03	223.32	2.29	8M
DH12-31						223.32	224.54	1.22	
DH12-31						224.54	224.93	0.39	C
DH12-31						224.93	229.76	4.83	
DH12-31						229.76	230.21	0.45	C
DH12-31						230.21	231.07	0.86	

***Crowsnest Pass Coal Mining Ltd.  
Coal Creek Project***

DH ID	Easting	Northing	Elevation	TD	Year Drilled	From (m)	To (m)	Thickness (m)	Seam
DH12-31						231.07	233.13	2.06	8L
DH12-31						233.13	234.44	1.31	
DH12-31						234.44	234.71	0.27	C
DH12-31						234.71	235.19	0.48	
DH12-31						235.19	236.37	1.18	c
DH12-31						236.37	255.00	18.63	

## **Appendix B      Geophysical Logs & Correlation Charts**

Geophysical Logs and Correlation charts are available upon request from the Ministry of Energy and Mines of British Columbia Assessment Reports Division.

Geophysical logs named DH11-02B correspond to DH11-02 in the DH database.



## Appendix C 2011 Coring Summary

Hole	Coal Zone	From (m)	To (m)	Interval (m)	Recovered (m)	Rec %	Rock type	Sample No.
DH 11-09	B Seam	186.3	188	1.7	0	0	Coal	
		188.5	189.4	0.9	0.38	42	Shale/coal	1-09
		189.4	191	1.6	1.05	65.6	Coal	2-09
		191	191.45	0.45	0.29	64	Carb shale	3-09
		191.45	191.8	0.35	0.33	85	Shale/coal	4-09
	10 Seam	235.7	236.3	0.6	0.52	86.6	Coal	5-09
		236.3	237	0.7	0.58	83	Shale/coal	6-09
		239.3	240	0.7	0.46	66	Coal	7-09
		240	242.15	2.15	1.86	86.5	Coal	8-09
		242.15	242.33	0.18	0.18	100	Siltstone	9-09
		242.33	242.8	0.47	0	0	Shale/coal	
		242.8	243.75		0	0	Shale	
		243.75	248.2	4.45	3.71	83.3	Coal	10-09
		248.2	249	0.8	0.71	100	Shale/coal	11-09
DH 11-05	10 Seam	92.85	93.45	0.6	.45	75	Coal	1-05
		94.0	94.6	0.6	.51	85	Coal	2-05
		96.3	98	1.7	1.38	81.2	Coal	3-05 to 5-05
DH11-05B	10 Seam	92.46	93.71	1.25	1.25	100	Coal	1-05B
		94	94.6	0.6	0.52	86.6	Coal	2-05B
		96.3	98	1.7	1.25	71.4	Coal	3-05B
		98.45	99.2	.75	.83	1.10	Coal	4-05B
	9 Seam	160.63	166.27	5.64	0.23	18.2	Carb shale	5-05B
					0.80		Coal	6-05B

## **Appendix D      July 28 2013 Coal Creek 2012 – Coal Quality Evaluation Program Report**