COAL ASSESSMENT REPORT TITLE PAGE AND SUMMARY

TITLE OF REPORT: Bingay Main Coal Property Report 2010 Technical Assessment Report

TOTAL COST: $3,969,084

AUTHOR(S): Edward J. Nunn, P.Eng. ; Richard Munroe, P. Geo
SIGNATURE(S):

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S): CX-12-4/Feb.11,2010
STATEMENT OF WORK EVENT NUMBER(S)/DATE(S): 3225459 to 3225460, Feb.11,2010

YEAR OF WORK: 2010

PROJECT NAME: Bingay Main Metallurgical Coal Project

COAL LICENSE(S) AND/OR LEASES ON WHICH PHYSICAL WORK WAS DONE:
374190, 414014, 415139, 417302
COAL LICENSE(S) IN PROJECT AREA ON WHICH NO PHYSICAL WORK WAS DONE OVER THE CURRENT REPORTING PERIOD: N/A

BC MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN: 082JSE011

MINING DIVISION: Kootenay Land District, Fort Steele Mining Division
NTS / BCGS: 82J/01W, 82J/02W, 82J/07W, 82J/016W
LATITUDE: 50° 11’ 53"
LONGITUDE: 114° 58’ 37" (at centre of work)
UTM Zone: ZONE 11 EASTING: 644385 NORTHING: 5562611

OWNER(S): Centermount Coal Ltd.

MAILING ADDRESS: 1055-1140 West Pender Street, Vancouver BC V6E4G1

OPERATOR(S) [who paid for the work]: Centermount Coal Ltd.

MAILING ADDRESS: 1055-1140 West Pender Street, Vancouver BC V6E4G1

REPORT KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude. **Do not use abbreviations or codes**):
Bingay Creek, Elk Valley Coalfield, Metallurgical Coal, Mist Mountain Formation, Elkford, syncline structure, Jura-Cretaceous, Moose Mountain Sandstone

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS:
Bingay Creek Coal Property Assessment Report, 5 June 2006, File No. 895

WORK PROPOSED OVER THE NEXT YEAR (SPECIFY WHICH TENURE BLOCKS WILL SEE PHYSICAL WORK, IF KNOWN): Continued exploration. 374190, 414014, 415139, 417302

RATIONALE FOR NEXT YEAR’S PROGRAM Continued exploration to complete the resource.

SUMMARY OF TYPES OF WORK IN THIS REPORT		EXTENT OF WORK (in metric units)	ON WHICH TENURES
GEOLOGICAL (scale, area)			
	Ground, mapping	None	
	Photo interpretation	1170 ha	374190, 414014, 415139, 417302
GEOPHYSICAL (line-kilometres)			
	Ground (Specify types)	None	
	Airborne (Specify types)	None	
	Borehole	56 holes, 14053.12m	374190, 414014, 415139, 417302
	Gamma, Resistivity,	54 holes, 13593.18m	374190, 414014, 415139, 417302
	Resistivity	48 holes, 11563.21m	374190, 414014, 415139, 417302
	Caliper	52 holes, 13075.94m	374190, 414014, 415139, 417302
	Deviation	54 holes, 13635.55m	374190, 414014, 415139, 417302
	Dip	54 holes, 13635.55m	374190, 414014, 415139, 417302
	Others (specify): sonic	8 holes, 2514.61m	374190, 414014, 415139, 417302
	Core	None	
	Non-core	None	
SAMPLING AND ANALYSES			
Total Number of Samples	299 samples	Coal quality	374190, 414014, 415139, 417302
	Proximate	299	
	Ultimate	299	
	Petrographic	38	
	Vitrinite reflectance	38	
	Coking	299	
	Wash tests	8	
PROSPECTING (scale/area)		none	
PREPARATORY/PHYSICAL			
Line/grid (km)		None	
Trench (number, metres)		8, 1.8km	374190, 414014, 415139, 417302
Bulk sample(s)		None	

Parts of Section 1, parts of Section 9, all of Appendix I, all of Appendix IV, all of Appendix VII, and parts of Appendix VIII remain confidential under the terms of the Coal Act Regulation, and have been removed from the public version.

http://www.bclaws.ca/civix/document/id/complete/statreg/251_2004

Exploration Work type	Comment	Days		
Personnel (Name)* / Position	**Field Days (list actual days)**	**Days**	**Rate**	**Subtotal**
Charlie Ruan/Professional				$4,000.00
Mimi Chien/Professional				$50,000.00
Bryan Edgren Professional				$36,000.00
Munroe Geological/Professional				$21,281.70
Ron A Swaren/Professional				$39,751.74
Amec/Professional				$3,462.00
Barry Ryan/professional				$31,025.40
Michael W.Hitch/Professional				$40,813.00
Dunsmuir Geoscience /Professional				$188,508.00
				$414,841.84
Office Studies	**List Personnel (note - Office only, do not include field days**			
Computer modelling	Gemcom -geological modelling			$24,000.00
Offier repair				$419.11
Other (specify)				$24,000.00
				$48,419.11
Airborne Exploration Surveys	**Line Kilometres / Enter total invoiced amount**			
Aeromagnetics				$0.00
				$0.00
Remote Sensing	**Area in Hectares / Enter total invoiced amount or list personnel**			
Aerial photography				$11,985.00
				$11,985.00
Ground Exploration Surveys	**Area in Hectares/List Personnel**			
Geological mapping				$1,344.00
GPS RTK Mapping	Taylor Munroe/Talon			$6,000.00
				$7,344.00
Ground geophysics	**Line Kilometres / Enter total amount invoiced list personnel**			
Radiometrics				
Well logging	56 holes, 14053.12 meter			
Geophysical interpretation				
Petrophysics				
Density		70.0	$2,250.00	$157,500.00
Standby		45.0	$500.00	$22,500.00
Log delivery		47.0	$100.00	$4,700.00
Mic				$11,890.00
				$196,590.00
Geochemical Surveying	**Number of Samples**	**No.**	**Rate**	**Subtotal**
Measurement	299 coal sample EVES			$29,253.48
Petrology	Vancouver Petrographics			$1,312.92
				$1,312.92
Drilling	**No. of Holes, Size of Core and Metres**	**No.**	**Rate**	**Subtotal**
Diamond	16 holes, 5782.97 in total			$0.00
Field Time				$242,150.00
Chargeable Materials				$256,496.99
Diamond Core Size HQ3	6 holes, 2844.23 meter		$130.00	$317,800.90
Diamond Core Size HQ3			$140.00	$104,395.20
Diamond Core Size HQ3			$150.00	$28,181.50
Diamond Core Size PW	10 hole, 193.58 meter			$12,852.00
Diamond Core Size PQ3				$146,968.50
Diamond Core Size PQ3	10 holes, 2938.74 meter			$212,059.75
Diamond Core Size HW	6 holes, 65.6 meter			$2,985.40

Mis				$17,011.48
Reverse circulation (RC)	48 holes, 9688.62 meter			$35,882.00
Reverse circulation (RC)				$996,501.99
General Supplies				$34,914.46
Gas Detector				$1,790.00
Excavator Sumps/Moving				$45,471.49
Dozer/Cat for site Prep				$694.26
Core Shed				$16,846.40
Core Logging				$2,376.00
Core Boxes				$39,799.03
Bryan'Expense				$22,591.52
Mimi Chien'Expense				$23,149.47
Stumpage				$3,575.00
Dip Meter Insruance				$2,775.00
Other stumpace				$4,800.00
Dilling Security				$7,645.00
Site radio				$4,978.35
Site Prepare				$8,910.00
Fuel				$190,425.10
Travel				$15,097.92
				$2,799,124.71
Other Operations	**Clarify**	**No.**	**Rate**	**Subtotal**
Trenching	1.8 km 8 trench			$40,810.00
Trenching sample Boxes				$8,330.00
				$49,140.00
Reclamation	**Clarify**	**No.**	**Rate**	**Subtotal**
After drilling	all driling pad site and terench have been recalimed			$6,000.00
Transportation		**No.**	**Rate**	**Subtotal**
truck Rentals				$68,726.27
truck transport				$10,935.67
fuel				$20,345.16
Fuel (litres/hour)				$2,416.00
Fuel Storage				$11,000.00
Venicle intransit Storage				$1,695.60
				$115,118.70
Accommodation & Food	**Rates per day**			
Hotel				$0.00
Camp				$119,058.86
Camp Electrical				$73.15
Camp Supplies				$7,378.76
Camp Security				$3,400.00
Camp Communication				$238.22
Camp Fuel				$1,668.30
Camp Cook				$41,857.33
Meals	day rate or actual costs-specify			$42,229.91
				$215,904.53
Miscellaneous				**Subtotal**
Telephone				$181.54
First Aid				$14,455.39
Safety First Aid				$11,475.00
First Aid Evacuation Link				$2,066.07
				$28,178.00
Equipment Rentals				**Subtotal**
Sample Prep				$60,145.00

Sink/Float				$4,482.00
labor				$16,498.74
				$81,125.74
Freight, rock samples				**Subtotal**
				$0.00
				$0.00
TOTAL Expenditures				**$3,969,084.55**

Bingay Main Coal Project

2010 Technical Assessment Report

Kootenay Land District, Fort Steele Mining Division
British Columbia

NTS: 82J/01W and 82J/02W and 82J/07W and 82J/016W

Latitude: 50° 11’ 53” N
Longitude: 114° 58’ 37” W

Tenure Numbers:

374190, 414014, 415139, 417302

Prepared for:
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1055- 1140 West Pender St.
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December 03, 2015

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Map

1.0 Summary

This report presents a technical assessment of the known geology and coal resource base of the Bingay Main area of southeast British Columbia, Canada, based on the exploration work conducted by Centermount Coal Ltd. during the summer and autumn of 2010. The Bingay Main exploration area, as presently considered, is bounded to the west by longitude 115°00' W and to the south by latitude 50°10' N. The exploration area is further bounded to the east by the west bank of the Elk River and to the north by latitude 50°15' N. The Bingay Main coal property was formerly known as the Bingay Creek Coal property until 2009. Applications were underway by Centerpoint Resources Inc. (owns 55% of Centermount Coal Ltd.) for coal licences from adjoining Bingay area properties. Three additional property areas are noted in this report (Bingay A, B and C). They are shown in Figures 3-2 below.

Historic explorations were done from 1903 until 2005 and current work was conducted by Centermount Coal Ltd. during the summer and autumn of 2010. The combination of the historical and current work has allowed for a much more substantial determination of coal resources of immediate interest for surface and underground coal mining within the Bingay Main coal property. An earlier *Geological Report* was written by C.G. (Gwyneth) Cathyl-Bickford P.Geo. Lic. Geo, in 2011. The thrust of the Geological Report by C.G. (Gwyneth) Cathyl-Bickford P.Geo. Lic. Geo, in 2011 was to act as a prerequisite to prefeasibility mine planning at Bingay Main.

The Bingay Main property lies within the Southern Rocky Mountains of south-eastern British Columbia, Canada. Bingay A coal licence application adjoins Bingay Main directly to the north. Bingay B and C coal licence application border Bingay Main directly to the south. Several other coal exploration properties and active coal mines (including the Greenhills and Fording River mines) are situated near to Bingay Main

These properties and mines constitute the known Elk Valley coalfield. The Bingay Main property consists of four contiguous parcels of Crown coal exploration licences totalling 1157 hectares, originally issued by the British Columbia Ministry of Energy, Mines and Petroleum Resources to other parties, and subsequently transferred to Centermount Coal Ltd. In comparison with most coal properties in British Columbia, exploration access to Bingay Main is convenient, by virtue of its location adjacent to the all-weather Elk River Forest Service Road. The branch roads and trails within the property allow for east and west movement across the license areas off the main forest road.

The closest railway is the Fording River branch of the Canadian Pacific Railway, located about 30 kilometres south-east from Bingay Main. The railway provides access to Canadian coal-shipping ports in westernmost British Columbia. Access to this rail system is possible with fairly easy trucking or the construction of a rail branch line.

No fee simple mineral lands are known to exist at Bingay Main. However, privately held mineral lands do exist to the east and south-east of the property. These are identified as the Greenhills Block of fee

simple coal lands covers coal beds which come to the ground surface along the western slopes of chain of high hills known as the Greenhills Range. These fee simple lands are not part of the Bingay Main coal property and are neither owned nor optioned by Centermount Coal Ltd.

In all, 74 boreholes are known to have been drilled within the Bingay Main coal licences, commencing in 1983 and continuing until 2010. Additional work was carried out subsequent to the 2010 program and will be reported upon in future. Of these known 74 boreholes, 57 encountered potentially-mineable coal. The other 17 boreholes include those which failed to reach the bedrock surface or which were abandoned at a shallow depth owing to drilling difficulties. It was later indicated that some of the holes had been drilled in previously unknown shear zones crossing the property suite. Some encountered older, non-coal-bearing rocks, lying outside the bounds of the Elk Valley coalfield.

The exploration program has identified that the property contains at least 32 coal beds, whose true thickness ranges from 0.3 to 16.2 metres. Of these coals, 24 typically are at least 1 metre thick, inclusive of contained bands of rock. Cumulative thickness of these coals is 62.6 metres, within an overall coal-bearing rock thickness of 460 metres; coal thus forms about 13.6% of the coal-bearing rocks at Bingay Main.

The Bingay Main coals are normal banded coals, consisting of alternating bright and dull bands, generally associated with thin and thick partings of rock. Most of the rock partings within the coal beds consist of variably-carbonaceous mudstone, with less-frequent partings of siltstone, ironstone and sandstone. Most of the rocks which lie between the coal beds at Bingay Main are siltstone, interspersed with sandstone and mudstone, with minor bands of limestone and ironstone. The coal-measures are folded into a tight synclinal downfold, along whose sides the coal beds approach the ground surface. New petrographic work was also commissioned to Vancouver Petrographics in an attempt to define marker beds and identify new horizons.

Coals lying within 12 metres of the ground surface are inferred to be oxidised, and are thus principally conceived to be of value as feedstock such as for the production of activated carbon, perhaps the bottom six meters being suitable for use in pulverised coal injection (PCI) into blast-furnaces, or as thermal coals. Coals at least 1 metre thick and lying between 10 and 600 metres below the ground surface are recognised to be of interest as coking coals (ASTM ranked medium to high volatile A bituminous). [redacted]

[redacted]

[redacted]

GSC Paper 88-21 is the "Standardized Coal Resource/Reserve Reporting System for Canada". In this document, coal deposit geology is classed into four categories — low, moderate, complex and severe. The author of the Bingay Main Coal Property Geological Report has classified the Bingay Main coal deposit as “Complex" which is defined by Paper 88-21 “Deposits that have been subject to relatively high levels of tectonic deformation. Tight folds, some with steeply inclined or overturned limbs, may be present, and offsets by faults are common.”

Based on all that is known on the property it must be described in the **COMPLEX** category of coal deposits. The Geological Survey of Canada Paper 88-21 is entitled, “A Standardized Coal Resource/ Reserve Reporting System for Canada”. In that report the classification guide for complex deposits is found on page 5. It notes that, in part, a complex deposit is as follows:

“Deposits in this category have been subjected to relatively high levels of tectonic deformation. Tight folds, some with steeply inclined or overturned limbs, may be present, and offsets by faults are common. Individual fault- bounded plates do, however, generally retain normal stratigraphic sequences, and seam thicknesses have only rarely been substantially modified from their pre-deformational thickness.”

This type of scenario is clearly evident at the Bingay location. Distinct boundaries are present and even with the deformation; small bedding details remain in many sequences. There were even distinct dinosaur foot prints located on some pit exposures. A severe category deposit has been subjected to extreme levels of tectonic deformation. The Bingay deposit has not reached that level of distress and remains in the complex category.

Further analytical work and further drilling, along with other supporting studies, were recommended in the Geological Report by C.G. (Gwyneth) Cathyl-Bickford P.Geo. Lic. Geo, in 2011 for the Bingay Main coal property, which is regarded as being a property of merit. Much of that work was followed up on and continues today. With respect the tonnage estimates suggested in the Geological Report by C.G. (Gwyneth) Cathyl-Bickford P.Geo. Lic. Geo, in 2011, this was not a signed off value in 2010. It was a work in progress as the senior author (Bickford) only made a bank cubic metre (BCM) calculation and it was then expressed as a tonnage value by initial calculation. A regression analysis was done on the ash content and using specific gravity relationships of the ash, the BCM was converted to tonnage. In later years, more follow up work was done on that aspect.

The model was also cut off in 2010 as winter set in. Additional drilling was done to the north in 2011 but planned in 2010. This allowed for new information on the model. The entire Bingay project is a work in progress and will be reported upon as new data becomes available.

The gas tests that were concluded in 2010 are similar to other Elk River area coal fields. Much of this data set was best presented in the appendix IV sections of this report.

2.0 Introduction and Terms of Reference

At the request of Edward J Nunn, P. Eng., Vice President of Centerpoint Resources Inc.,
This report was prepared to present new body of geological information to the BC government's Geological Services branches. The geology and coal resource base of the Bingay Main area is reported on in the proper Geological Report by C.G. (Gwyneth) Cathyl-Bickford P.Geo. Lic. Geo. submitted by Cathyl-Bickford in 2011.

The exploration work conducted during the summer and autumn of 2010 was extensive and led to larger discoveries on and around the property. The Bingay Main coal property was formerly known as the Bingay Creek Coal property prior to 2005. The name was changed in the Company reporting to better distinguish the property from adjoining properties.

2.1 Reliance on Other Experts

The 2010 exploration programme for Centermount Coal Ltd.'s Bingay Main project was led by President Edward (Ted) Nunn P.Eng. The director of exploration was C.G.(Gwyneth) Cathyl-Bickford P.Geo. Lic. Geol. Edward (Ted) Nunn P.Eng. was fully responsible for the resource estimates contained in this current assessment report. The writer (Munroe) makes no representations as to resource value or tonnage estimates. The other main participants in the 2010 work were, mining engineer Y.-S. (Mimi) Chien EIT, exploration advisor Dr. Michael Hitch P.Geo., coal bed gas geologist Dr. Barry Ryan P.Geo., structural geologist Richard Munroe P.Geo. FGAC, geologist Liao Shumin, surveyor Robert Simmerling P.Eng. and environmental advisors Sylvie Masse R.P.Bio. and Dr. Ico de Zwart R.P.Bio.

Assistance in locating archived geological data was graciously provided by Mr. Steve Gardner of Hillsborough Resources Limited. Particular thanks are due to Mr. William Shenfield of Iron Creek Exploration Ltd. In addition, Peter Jones, and Mr. David Grieve of the British Columbia Ministry of Energy, Mines and Petroleum Resources provided great support in the development of the geological information data base.

3.0 Property Description and Location

The Bingay Main property lies within the Southern Rocky Mountains of south-eastern British Columbia, Canada (as shown on **Figure 3-1: Project Location map).** The map shows the outline of the Bingay Main coal property, and depicts the areas of licensed lands. The Bingay Main property consists of four north-trending parcels of Crown coal exploration licences totalling 1157 hectares, originally issued by the British Columbia Ministry of Energy, Mines and Petroleum Resources, and subsequently transferred to Centermount Coal Ltd. The property is bounded to the east by coal mining leases held by Elk Valley Coal

Corporation, to the north and south by coal licence applications (designated as ‘Bingay A’, ‘Bingay B’ and ‘Bingay C’) held by Centerpoint Resources Inc., and to the west by vacant Crown mineral lands.

The Bingay Main exploration area, as presently considered, is bounded to the west by longitude 115°00' W, to the south by latitude 50°10' N, to the east by Elk River, and to the north by latitude 50°15' N. The area of present interest for coal exploration lies within a rectangle bounded by 43 to 45 easting, and 61 to 69 northing (grid references are to UTM NAD 83). NTS map sheet 82J/2 covers the Bingay Main area at 1:50,000 scale with topographic contours at 100-foot (ca. 30-metre) intervals. TRIM map sheets 082J.015, 082J.016, 082J.025 and 082J.026 cover the area at 1:20,000 scale. The nearest incorporated settlement to Bingay Main is the Town of Elkford, whose urban core lies 21 kilometres south by road from the Bingay Main property.

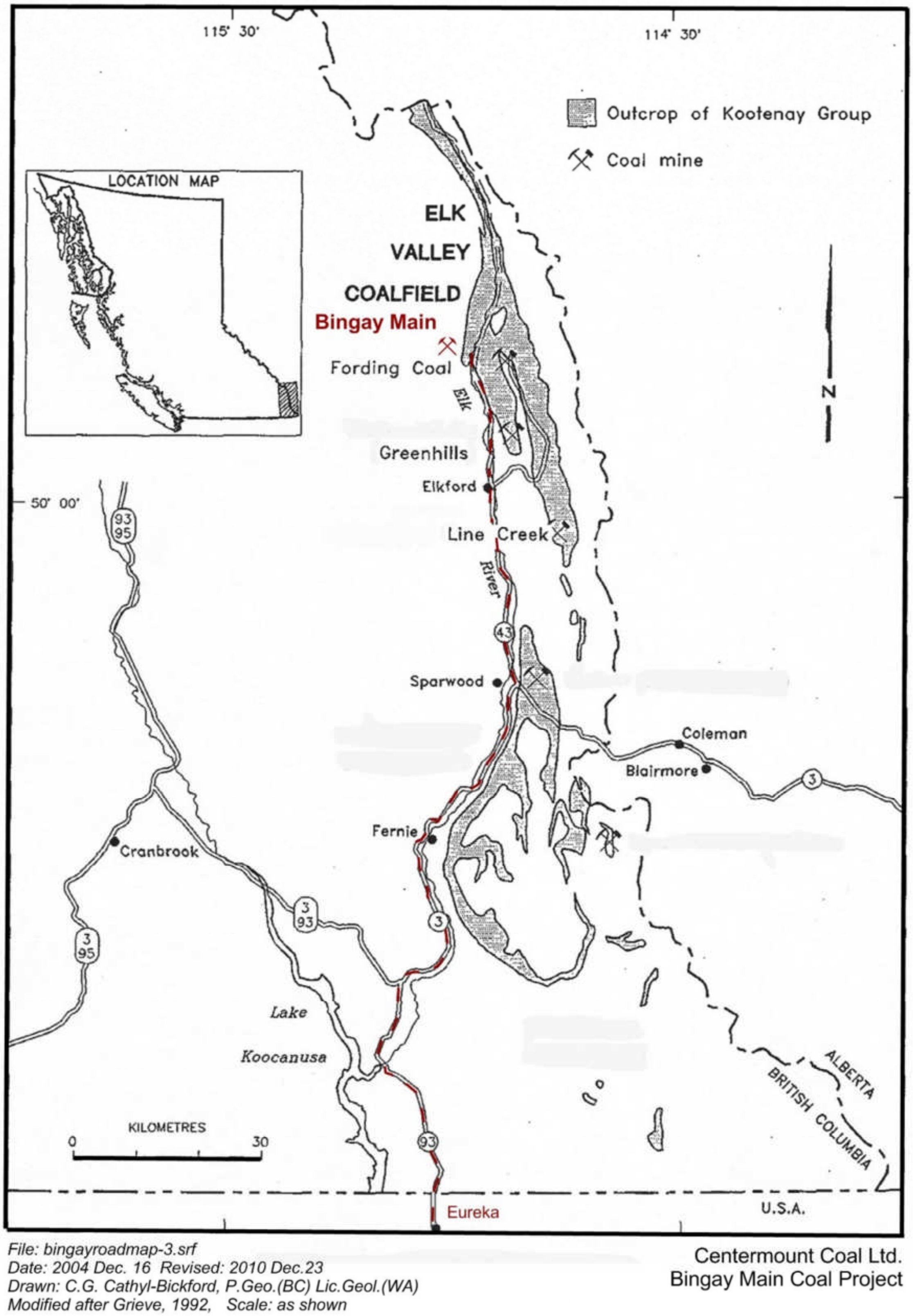

Figure 3-1: Project Location Map

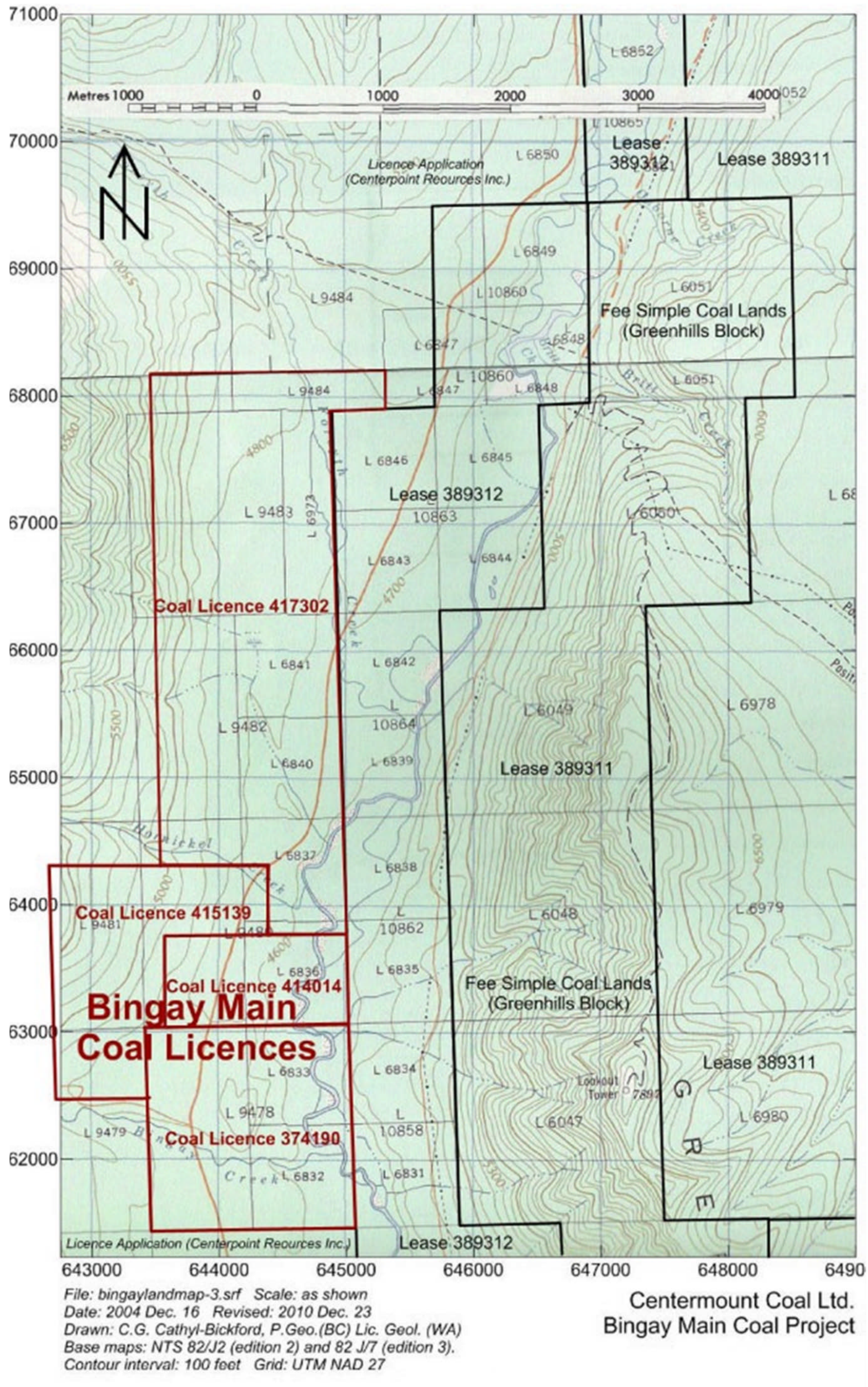

Figure 3-2: Coal License Map

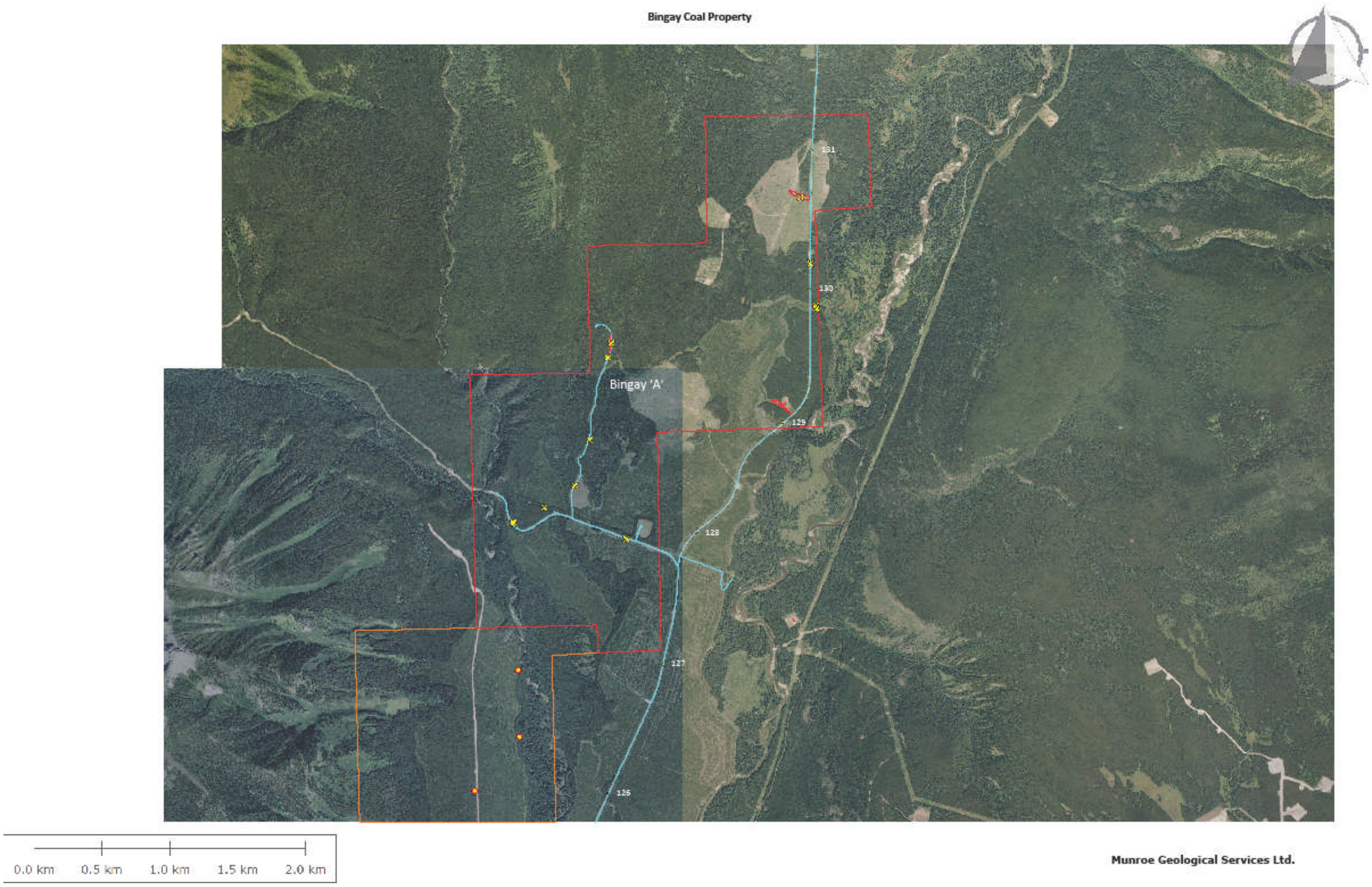

Figure 3-3: Bingay A area shown in red outline

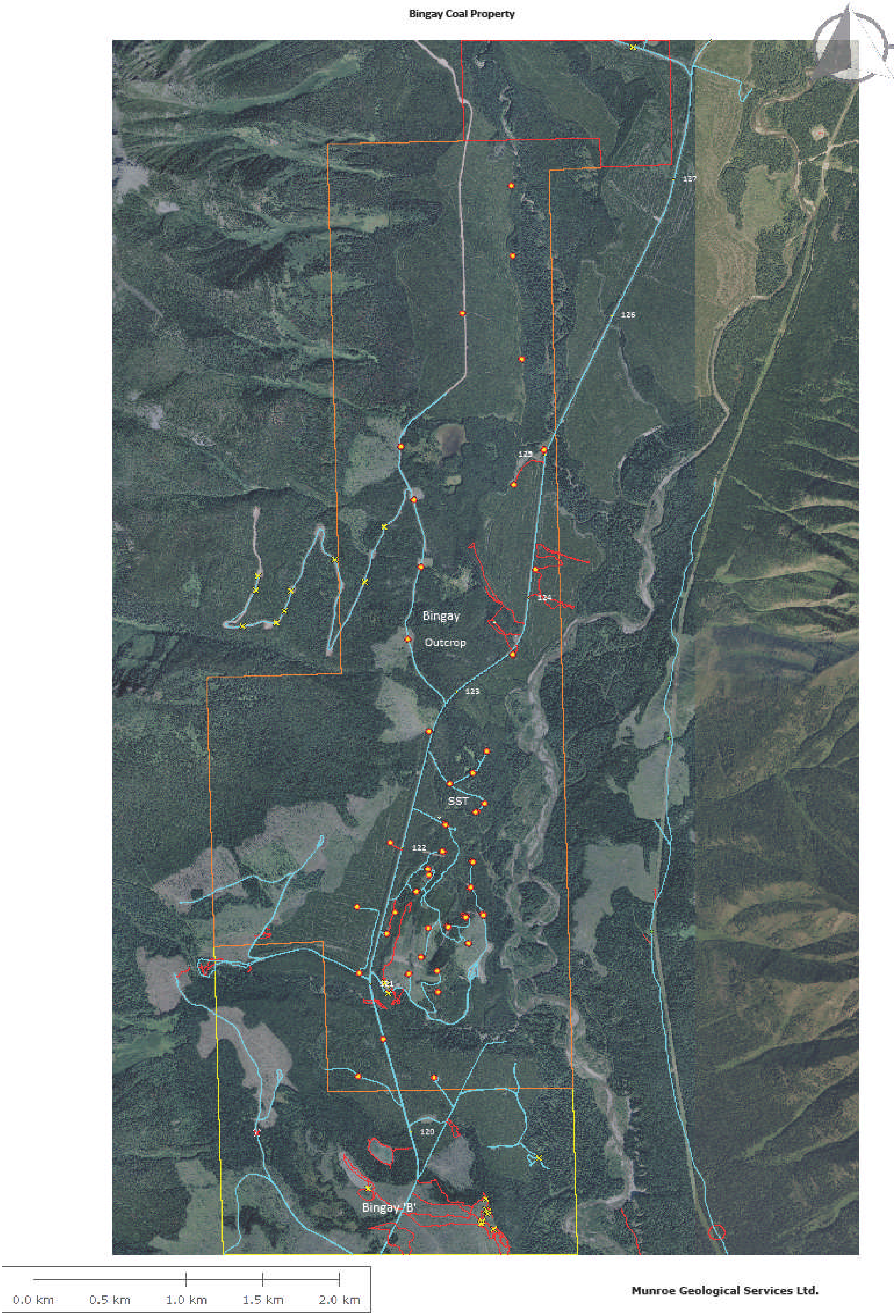

Figure 3-4: Bingay Main area – shown in orange outline

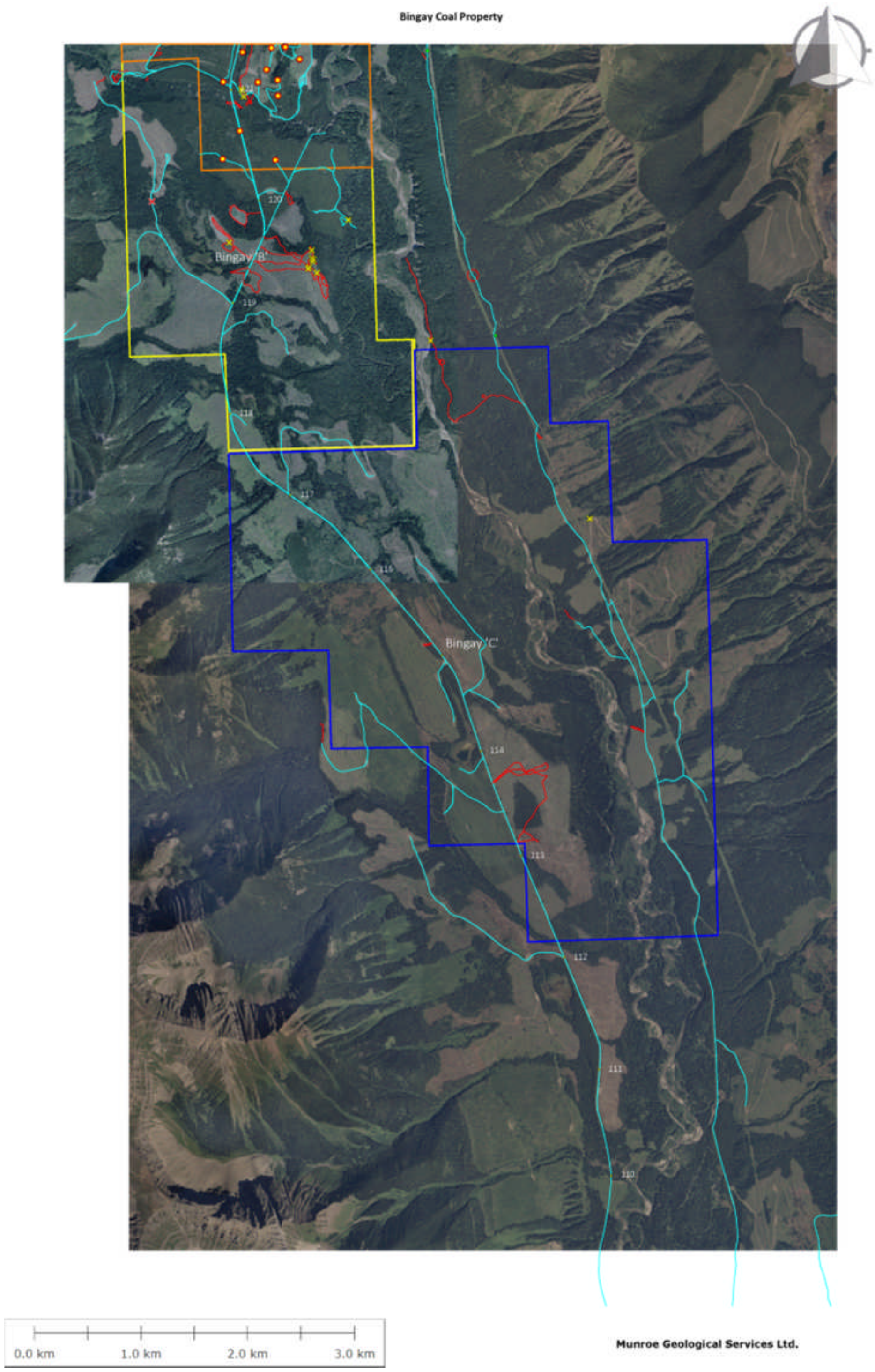

Figure 3-5: Bingay B (shown in yellow outline) & C area – shown in dark blue outline

The Bingay Main property comprises the coal licences listed in **Table 5-1** and shown in red on **Figure 3-2.** All of the coal licences are held in good standing as noted in the database maintained by the Province of British Columbia, at *http://www.empr.gov.bc.ca/Titles/MineralTitles/Coal/Pages/Search.aspx*) by Centermount Coal Ltd. The coal licences are contiguous, with no known in holdings of alienated coal rights.

The four coal licences listed in **Table 5-1** were originally staked by Hillsborough Resources Limited and subsequently transferred to Centermount Coal Ltd. No further coal licence applications have been made by Centermount within the Bingay Main area. The Company's existing coal licences are, however, bounded to the north and south by coal licence applications made by Centerpoint Resources Inc. (Bingay A, B and C). Coal licence boundaries at Bingay Main are defined according to the outlines of the various district lots, or according to unit boundaries of the provincial petroleum and natural gas grid, and as depicted on the official outline maps of the licences.

4.0 Accessibility and Infrastructure

Exploration access to Bingay Main is fairly convenient, by virtue of its location adjacent to the all-weather Elk River Forest Service Road, and the presence of branch roads and trails within the property.

Bingay Main is served by the Elk River forest service road, as shown on **Figures 3-1 to 3-5.** This road is administered by the provincial Ministry of Forests as a multiple-use public road, upon which industrial and recreational traffic may travel. Local hunters, hikers and fishermen/women occasionally use the road to access recreational areas farther up the Elk River Valley.

The Elk River road is maintained by Tembec Industries Inc., who only maintained the parts of the road which they wish to use for log-haulage. During the 2010 exploration program, this has meant that the entirety of the road between the Bingay Main coal property and Elkford is occasionally graded, but it does have local potholed sections owing to heavy truck traffic. Significant time and cost was expended by Centermount to maintain and upgrade the roads in this area. The road is easily travelled by pickup trucks and heavier load vehicles. Passenger car travel is not recommended. Should the Elk River road be used in the future for coal haulage, it would require major resurfacing. Adequate supplies of gravel are present within the Bingay Main property. The bridges on the road are of sufficient strength for logging trucks, but will require levelling or resurfacing to support more frequent high-speed use by coal trucks.

The Bingay Main coal property lies at kilometre post 121 on the Elk River road, roughly 22 kilometres north of the business core of Elkford. Two side roads branch off eastward from the main road: the southern road follows the south face of Bingay Hill and gives access to the recently-logged flatlands east of the hill. The northern road climbs over the west limb of the syncline and gives access to

Hillsborough's test pit on the Bingay No.10 coal bed. Total driving distance from the centre of the property to Elkford is 22 to 27 kilometres, depending on the starting point within the property and the route chosen to reach the Elk River road.

Elkford is served by paved provincial highways. Highway 43 runs northward from Sparwood, and Highway 3 connects westward to Fernie and Cranbrook, and eastward to Alberta. Driving time to Bingay from Vancouver is 14 hours from Vancouver (via the southern Trans-Provincial route along Highways 1, 3 and 43), 5 hours from Calgary (via the Black Diamond route along Highways 2, 22X, 22, 3 and 43), and 2.5 to 3 hours to Eureka, Montana.

The closest railhead to Bingay Main is about 30 kilometres away near Elkford, on the Fording River branch of the Canadian Pacific Railway. Coal shipments from Bingay Main could also access the Burlington Northern railhead at Eureka, Montana (as shown on **Figure 3-1.** This railhead is situated about 168 kilometres from Bingay Main, via Highways 43, 3 and 93. The closest all-weather airport is located in Cranbrook, with scheduled service available to Vancouver and Calgary, in western Canada.

The Bingay Main property lies within the dry cool subzone of the Montane Spruce continental bio-geoclimatic zone (Medinger and Pojar, 1991; Braumandl and Curran, 1992). Characteristic of this subzone is a temperate climate of continental type, with long, cold, relatively dry winters with light snowfall, and short, warm, dry summers. Minimum temperatures are –25 to –35 Celsius with reports from nearby Lower Kananaskis Lake being -52C during the winter of 1992 (Bickford)

Cold temperatures are generally confined to brief 'polar outbreak' periods in January and February. Maximum normal temperatures are 33 to 38 Celsius, typically found during extended periods of clear weather in mid- to late-summer.

Snowfalls or freezing rain may occur at any time between mid-September and mid-May, with the bulk of snow falling in mid-March and early April. Snowfalls up to 40 cm are possible in a single intense mid-winter storm when cold polar air is over-ridden by moist maritime air, but these snowfalls rapidly compact and ablate, and snow cover seldom accumulates to depths greater than 60 cm.

Continuous snow cover is usually gone by the end of April, with isolated drifts remaining in sheltered and shaded areas. In the extraordinarily warm winter of 2004-2005, snow cover was mostly gone in mid-March, and the Elk Valley had been barren of snow for much of the winter. Summers are warm and showery, with occasional afternoon thunderstorms. During dry summer weather, temperatures may exceed 30 Celsius.

Surface water supply is available from Bingay Creek and Elk River, and ample supplies of groundwater are available from the gravelled flats west of Elk River and north of Bingay Creek. Owing to fisheries concerns, industrial water supply will probably have to be abstracted from groundwater sources. Near-surface groundwater quality is unknown in detail, but anticipated to be acceptable for industrial use.

Substantial quantities of gravel, suitable for road-building, are present within the property. During the autumn 2004 and year-2010 drilling programmes, road gravel was taken from cuts along one of the access roads within the property. Roads and trails built in the spring of 2005 were mostly constructed from native gravelly soils. The size-consist and grading of these gravel sources were adequate for road-building.

Timber suitable for incidental use (such as stakes, fence posts, short utility poles and cribbing) is present within the Bingay Main property. The Elk River Valley contains an energy-transport corridor along its eastern side. This corridor is occupied by a high-voltage above-ground power line. All-weather roads extend along both sides of the river. On the west side of the river, the Elk River forest service road bisects the Bingay Main coal property.

Access to the Bingay Main coal property is regulated under the *Mines Act*, which allows for the reactivation and reconstruction of existing roads, as well as construction of new roads or exploration trails. Vehicular access to the area west of the Elk River road and north of Bingay Creek is restricted by the Ministry of Environment, in the interests of protecting wildlife species. Surface rights at Bingay Main are held by the Crown, with forest tenures held by Tembec Industries, Inc. Access to and within the coal property requires the negotiation of an annual road use agreement with Tembec.

Three-phase electrical power is available on the eastern side of Elk River, via the 138-KV KAN-ELK tie line connecting the British Columbia power grid to Trans-Alta Utilities' Kananaskis power plants. No power lines are presently in place on the west side of the river, and it is unlikely that any sub-transmission lines will be extended into the Bingay Main property within the near future. A portable generator set was used to service Centermount's exploration camp during the summer and autumn of 2010.

Reverse-circulation drilling rigs and PQ diamond-drills capable of drilling to depths of 600 to 800 metres are readily available in British Columbia and Alberta. Heavy industrial and construction equipment, including excavation and road-building equipment, is available from the Crowsnest Pass area as well as from towns in southern Alberta. Drilling supplies are available from distributors in Alberta and British Columbia.

Machine shops, industrial suppliers, and freight terminals are available in Elkford, Sparwood and Cranbrook. Owing to the well-established open-pit coal-mining industry in the Elk Valley, necessary equipment and supplies for mining, earth-moving and blasting can be obtained locally.

Bingay Main has no landline telephone or internet service. Cellular-telephone and wireless Internet services are provided by Telus and by Bell Canada, from terminal sites situated atop the Greenhills Range, east of Elk River. Cellular coverage is fair to good throughout the Bingay Main property, with the exception of topographically-isolated areas such as creek bottoms. During the summer and autumn of 2010, Centermount used satellite dishes to obtain television and Internet signals.

The Bingay Main property lies within the Elk River valley, which traverses along the southern Canadian Rocky Mountains. The Elk River valley is one of a series of contiguous valleys extending from Michel, British Columbia to Banff, Alberta. Both sides of the valley are bounded by mountain ranges. To the west are the rugged carbonate-rock peaks of the Western Front Ranges, and to the east are the more subdued sedimentary-rock ridges of the Greenhills Range.

The Elk River itself is a broad, braided, gravel-bedded river which is choked by numerous gravel bars and bounded by beaver-dammed side-channels. Some of these side-channels are partially filled with mossy wetlands. Bingay Creek is an incised, partially rock-bound meandering to braided stream which flows into Elk River from the west.

No bridges cross the Elk River between Elkford and Aldridge Creek (well north of Bingay Creek), but the river is shallow enough to be forded by people and animals with some difficulty due to its swift and very cold current. Bingay Creek itself is crossed by one bridge which carries the Elk River forest service road traffic. The creek itself can be forded easily in places by people and animals, except during the spring freshet. Steep cliff faces formed by near vertical shears are a great hindrance to travel in some locations.

Elevations within the Bingay Main property range from about 1380 to 1490 metres above mean sea level. The lowest elevations are found along the course of Elk River, and the highest elevations are found on Bingay Hill.

Soils of the Elk River valley have been mapped at a regional scale by the British Columbia Soil Survey (Lacelle, 1990) and at more detailed scale within the Bingay Hill area by Schori Consultants Inc. (Schori, 2005). Soil cover is generally quite thin at Bingay Hill and along the ridges which flank the northern slopes of the hill. Soil materials mostly consist of coarse-grained colluvium and regolith, mixed with large talus blocks below prominent sandstone ledges. Isolated swales near the hill are floored by wet, organic-rich silty muck; other than these areas, organic-rich topsoils appear to be patchy and generally very thin.

The lowland flats flanking Bingay Hill to the east and west are floored by extensive gravel deposits. To the west of the hill, the gravels appear to form part of an alluvial fan, into which is incised the channel of Bingay Creek. To the east of the hill, the gravels appear to form a succession of terraces, possibly of glaciofluvial and fluvial origin.

The Bingay Main property is covered by Crown forest lands, which have been logged at various times during the past 35 years. Most of the southern half of the property was logged in the past 10 years, and it now presents easy going for cross-country traversing. Some of the logging roads have been reclaimed by means of scarification followed by scattering of wood debris; this process effectively destroys the roadbed, and makes it more practical to build new roads rather than attempt to reconstruct roads which have been reclaimed. Mountain pine beetle has caused locally-severe damage to forests in the Elk River valley, including some of the mature trees at Bingay Main. Salvage logging to recover beetle-infested trees has been in progress since 1982, and has been conducted at an accelerated rate during the past three years.

Most of the remaining forest at Bingay Main consists of closely-spaced juvenile lodge pole pine with minor white spruce, subalpine fir and occasional western larch. Small patches of sub-mature to mature pine, fir and spruce are present in wetter lowland sites within the northern half of the property. Kinnikinnick and twinberry are present beneath older forest cover, and trailing strawberry plants, roses and daisies are present along the roadside

The Bingay Main property contains an abundance of wildlife, including moose, elk, black bear, grizzly bear, wolverine, porcupine, lynx, beaver, snowshoe hare, mule deer, marten, red squirrel and deer mouse. Birds include spruce grouse, woodpecker, common raven, Canada geese, American robin, and Steller's and gray jays. Other bird and animal species may also be present. Mosquitos and blackflies are present in the spring and summer months, although not to unbearable excess.

5.0 Mineral Tenure Information

Table 5-1: Coal Licence Details

TENURE	AREA IN HECTARES	DESCRIPTION	LICENSEE	ISSUE DATE	ANNIVERSARY DATE
374190	260	District Lot 9478 of Kootenay Land District	Centermount Coal Ltd.	18 January 2000	31 January
414014	64	NTS 082J 02 Block L Units 48, 49 save and except those portions within District Lot 9478 of Kootenay Land District and Coal Lease 389312	Centermount Coal Ltd.	15 September 2004	31 January
415139	241	NTS 082J 02 Block L Units 59, 60, 50, save and except that portion within lot 9478	Centermount Coal Ltd.	1 November 2004	31 January
417302	592	NTS 082J 02 Block L Units 58, 68, 69, 78, 79, 88, 89, 98, 99 save and except that portion covered by coal lease 389312	Centermount Coal Ltd.	7 March 2006	31 January

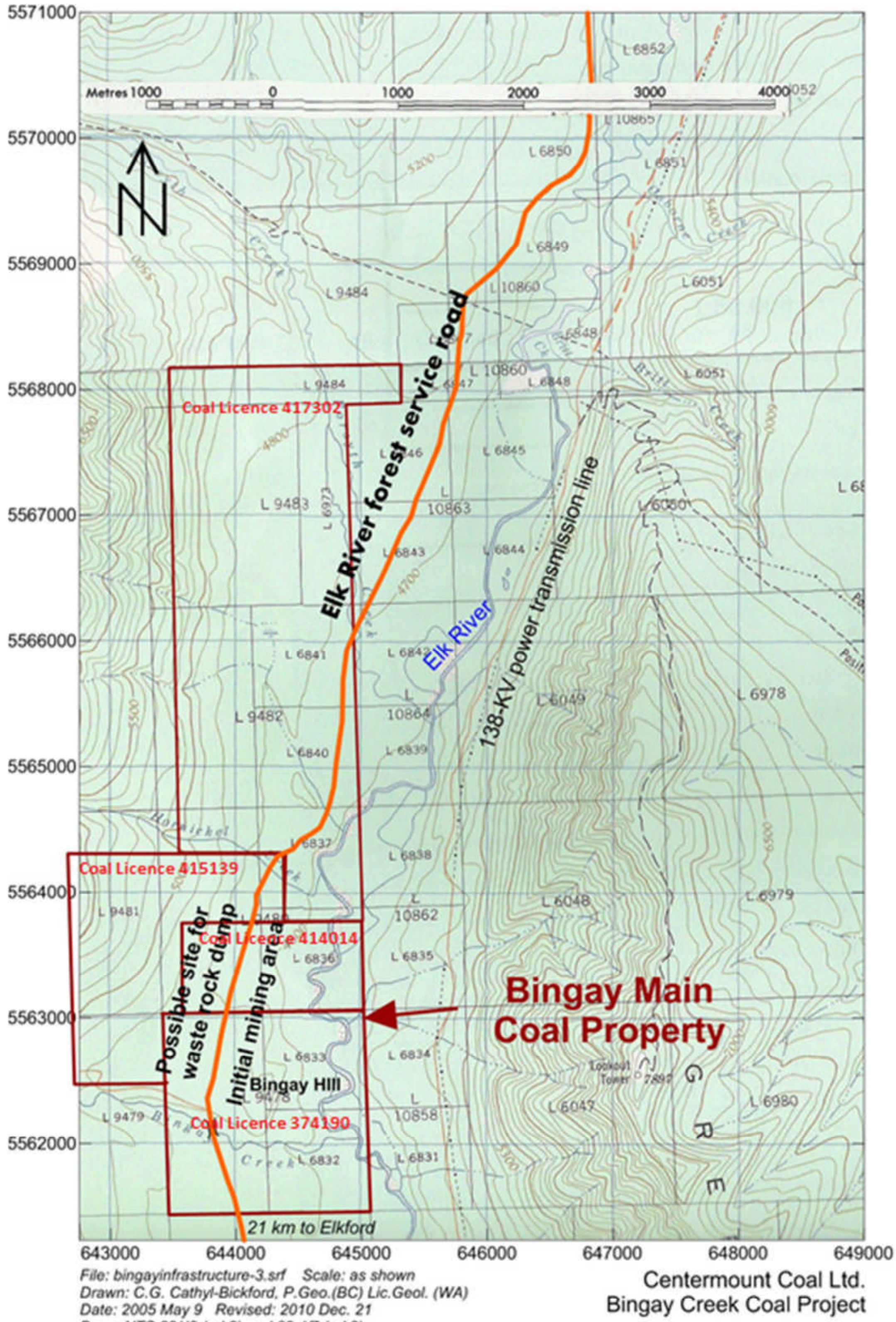

Figure 5-1: Infrastructure map

6.0 History

Coal licences were first filed at Bingay Main by the Elk Valley Coal and Coke Company in 1902-03, covering the lowlands of the Elk River valley along the western margin of the more extensive land-holdings of the Canadian Pacific Railway Syndicate. Employees of the railway company (who banded together as the Canadian Pacific Railway Syndicate) subsequently applied for grants of surface rights.

Those grants covered these coal lands, under the terms of the South African War Veterans' settlement programme, and the CPR filed for coal licences overtopping the Elk Valley lands in 1905. The CPR Papers (held at the Glenbow-Alberta Institute Archives in Calgary, Alberta) contain details of the legal wrangling between the two companies to secure and maintain control of the coal rights at Bingay Main.

The Elk Valley Coal and Coke Company appears to have been successful in retaining the coal rights until at least 1908, as an engineering report by Fraser (1908) details some of the company's work on its coal licences in the Elk River valley..

Coal licences at Bingay Main were held in the mid-1970s by Cominco, but subsequently dropped by that firm, as the land was again licensed to Specific Natural Resources in 1979, following the lifting of the provincial coal moratorium. Specific Natural Resources allowed their coal licences to lapse in the early 1980s, and the land was again re-staked in 1982, this time by Mr. William Shenfield of Fernie, British Columbia, in partnership with Mr. S.L. Gardner.

They sold the property to Utah Mines Ltd., who drilled the property in the late autumn of 1983. In 1986, Utah Mines abandoned their Canadian coal interests, and the Bingay Main coal licences reverted to Messrs. Shenfield and Gardner's control in May of 1987.

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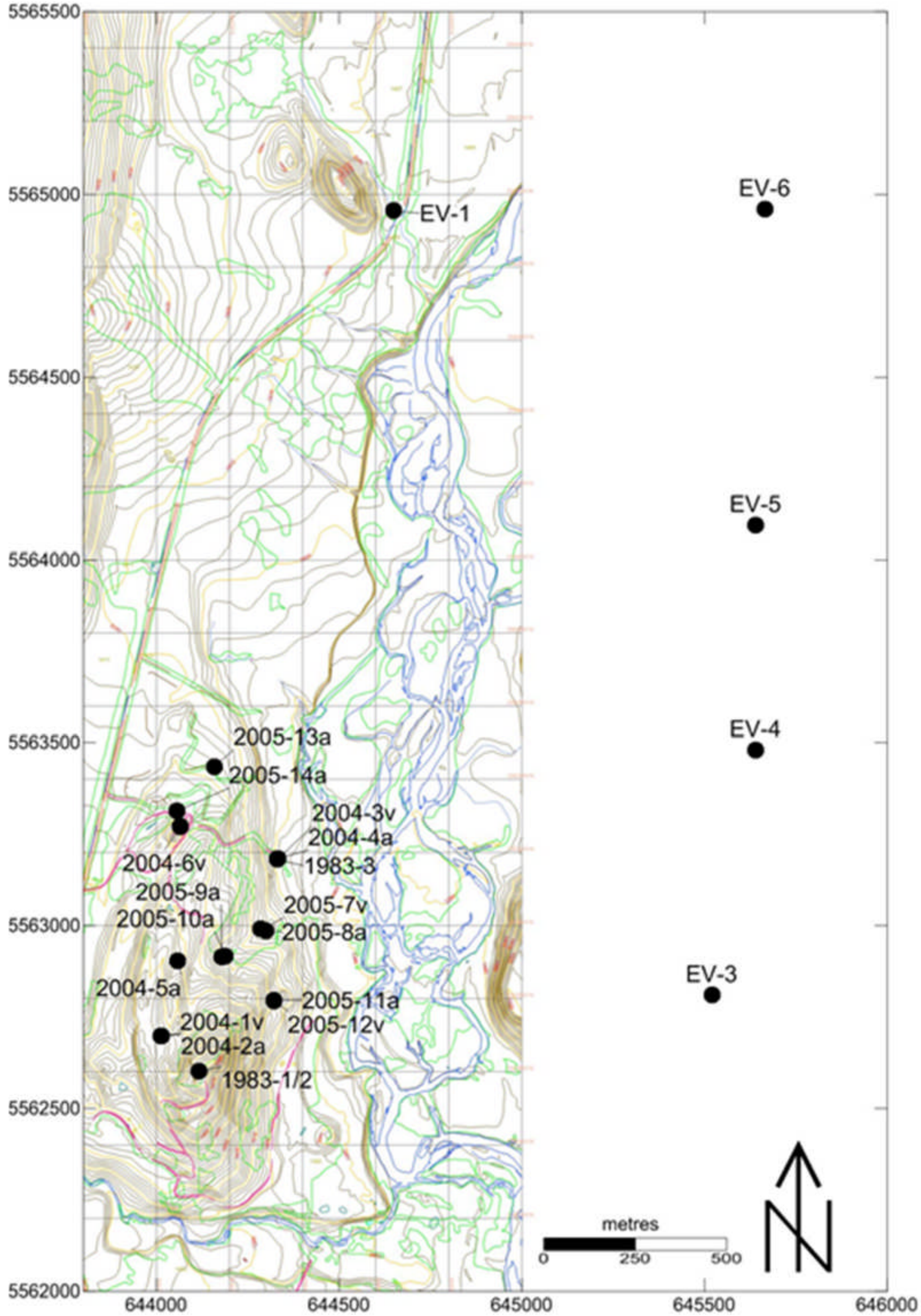
Considerable historic exploration work has been done at and nearby to Bingay Main, since the first discovery of coal along the upper Elk River valley in about 1902. Most of the work has involved diamond-drilling and rotary-drilling (totalling at least 74 boreholes within the property, and an additional 5 holes near but outside the property). In addition, trenching, test-pitting and adit work has been done within the property. The area has been geologically mapped in detail by the California Standard Company in 1955 and 1956, Utah Mines Ltd. in 1983 and by the senior author in the summer of 2004 and the spring of 2005. Regional geological mapping has also been done by the provincial and federal geological surveys.



File: bingayvalleyholes-2.srf
Date: 2005 May 8 Revised: 2010 Dec 25
Drawn: C.G. Cathyl-Bickford, P.Geo.Lic.Geol.
Base map: Year-2005 McElhanney topography
Scale: as shown Grid: UTM NAD 83

Centermount Coal Ltd.
Bingay Main Coal Project
Figure **6**-1: Historic boreholes at and near Bingay Main

Table 6-1: Summary of boreholes drilled at or near Bingay Main property:

Company:	*Dates:*	*Diamond-drill holes:*	*Rotary-drill holes:*
Elk Valley Coal and Coke Company	1910	unknown (neither logs nor locations are available)	
Cominco Limited	1974		6 holes (5 of which are outside the property)
Utah Mines Ltd.	1983	3 holes	
Hillsborough Resources Limited	2004		6 holes)
	2005		8 holes)
Subtotals		3 holes, totalling 886.7 m	20 holes totalling 3074.8 m
		at least 23 holes totalling 3961.5 metres: see **Figure 6-1**	
Centermount Coal Ltd.	2010	13 holes, totalling 5109.06 m	43 holes totalling 9645.94 m [and 6 re-entries of older holes, totalling 1567.67 m
Subtotal		56 holes totalling 14755 m: see **Figure 6-3**	
Total		At least 79 holes totalling 18716.5 m	

Nine firms have explored within and nearby the Bingay Main property, prior to Centermount's year-2010 exploration. In order of historic precedence, they are the Elk Valley Coal and Coke Company Limited, Canadian Pacific Railway Syndicate, California Standard Company, Imperial Oil Limited, Cominco Limited, Specific Natural Resources Ltd., Utah Mines Ltd., Iron Creek Exploration Ltd. and Hillsborough Resources Limited.

The Elk Valley Coal and Coke Company Limited dug prospect pits and trenches, and drove at least one, perhaps two or more, adits within the Bingay coal beds. Few details of this work have come to light, other than a brief report by Fraser (1908) and passing mention by Grieve (1992).

The Elk Valley Coal and Coke Company Limited may also have drilled at Bingay Main, since drill rods and pipes were found in the forest near the "400 ton adit" by William and Bob Shenfield in the 1970s (as reported by Jenks, 1979). Anderson (1984, page 6) quoted an article in the *Fernie Free Press*:

> *"In 1910, another company, the Elk Valley Coal and Coke Company, emerged and, on June 10 of that year, the Free Press reported that 20 men were on the scene and 'a diamond drill is being used for boring ... the first ... that has been taken up the Elk River." Evidence, in the form of hand trenches and coal spoil piles from this period were readily located.".*

The Canadian Pacific Railway Syndicate conducted geological mapping, dug trenches and pits, and drove several adits along the western slopes of the Greenhills Range, east of the Bingay Main coal property (Wilson, 1904; Wolfhard, 1967). According to Wolfhard, this work commenced during 1901-1903 and continued until 1910. An undated blueprint map of the 'Elk River Coal Land' (held by the Glenbow-Alberta Institute Archives in the CPR Papers, M2269, Box 199, File 1962) shows results of this work, including an observation of bedding dipping 51 degrees to the north-west near Bingay Hill.

According to the 1974 map, none of the trenches, pits or adits were driven within the present outlines of the Bingay Main coal property.

During the summers of 1955 and 1956, structural geologist Dr. G.G.L. Henderson of the California Standard Company led a programme of geological mapping within the firm's provincial petroleum and natural gas exploration permits, covering an area from the Alberta border southward along both sides of the Elk River valley to latitude 49°30'. Two progress reports accompanied by geological maps at scales of 1:31,680 and 1:63,360 were submitted to the British Columbia government (Henderson, 1956; Bannister, 1957).

California Standard's geologists recognised the existence of Kootenay strata at Bingay Hill, and they also found Kootenay outcrops on the western bank of Elk River in Lot 6833.

During the summer and autumn of 1959, Imperial Oil Limited conducted a programme of geological mapping and seismic surveys within the Elk River Valley (Labrecque, 1959). One of Imperial's seismic lines was shot along Britt and Forsyth creeks, north of Bingay Creek. Data quality on this line was poor, and the only reflector that could be mapped was considered to be the top of the Cambrian. Imperial's geological map shows the Bingay Main area to be underlain by Triassic strata, with no recognition of the Kootenay coal-measures.

In 1967, Cominco Limited mapped the geology of their Elk River coal lands, including the lower canyon of Bingay Creek and Bingay Hill itself (Wolfhard, 1967). On a 1974 geological map which accompanies the open-filed copy of Wolfhard's report, Bingay Hill and the nearby canyon of Bingay Creek are shown as being underlain by the Rocky Mountain Group (which is considerably older than the Kootenay coal--measures).

In 1974, Cominco Limited drilled six rotary-drill holes (numbered EV-1 through EV-6) along the Elk Valley, in an effort to ascertain the extent of Kootenay coal-measures beneath the valley floor within lands which at the time were held as coal licences by Cominco (Taplin, 1974). All six holes were drilled with a reverse-circulation drilling rig, using both air and mud as a drilling medium. These six holes are distinct from the similarly-named EV-series of exploratory drillholes located further north near Elk Pass (the Elk Valley Drill Project mentioned by Graham *et al*, 1977 and Gibson, 1985).

All but one of Cominco's boreholes lie outside the present Bingay Main coal licences, but one of the holes (EV-1) was drilled within the property, along the Elk River forest service road. Of the six holes, two were drilled on the west side of the river, and the remaining four were drilled on the east side of the river. Both of the western holes failed to reach bedrock, owing to caving and sloughing of wet surficial sand and gravel. One of the eastern holes (EV-4) struck coal in the basal Mist Mountain Member; the other three holes encountered shale and siltstone (probably Fernie Formation) at the bedrock surface.

On the strength of these borehole results, Cominco dropped their coal licences covering Bingay Main.

In the summer of 1979 Mr. John Jenks, accompanied by Messrs. William and Bob Shenfield, made a geological reconnaissance of the Bingay Main coal property (Jenks, 1979). Geological mapping and photo-geological interpretation were the only work done by Specific Natural Resources.

In 1983, Utah Mines purchased the Bingay Main coal property from Mr. William Shenfield. Subsequently, Utah mapped, trenched and drilled the Bingay Main coal property, producing a substantial assessment report on the coal resources (Anderson, 1984). Utah drilled three boreholes into the Mist Mountain coal measures. One of the holes (1983-1) probably reached the Moose Mountain sandstone, but the other two holes stopped short of this marker zone. All three boreholes were drilled with a diamond-drill rig, recovering HQ core. All three boreholes were geo-physically logged, with fair to good log quality. Cores from the boreholes are presently stored at Mr. Shenfield's residence in Fernie, where they were partially re-logged by the senior author during the summer of 2004.

Utah's coal assessment report is available as an open file report (Anderson, 1984) from the provincial Ministry of Energy, Mines and Petroleum Resources.

In 1988 and 1990, Iron Creek Exploration Ltd. (under the direction of Mr. William Shenfield) conducted an extensive programme of hand and mechanised trenching of the Bingay coal beds, with particular attention being given to the No.10 coal bed and the 11-12 coal zone.

In 1994, Iron Creek applied for a bulk sample permit from the provincial Ministry of Energy, Mines and Petroleum Resources (Shenfield and Gardner, 1996). A 2500-tonne sample was approved, and 200 tonnes were taken from the No.10 coal bed in Trench No.1 during 1996 (Gardner, 2004b). In 1997 and 2002, Iron Creek conducted additional trenching in the No.10 coal bed, as well as in the 11-12 coal zone at Trench No.2, and along a roadside exposure of the No.13 coal bed to the east of Trench No.2.

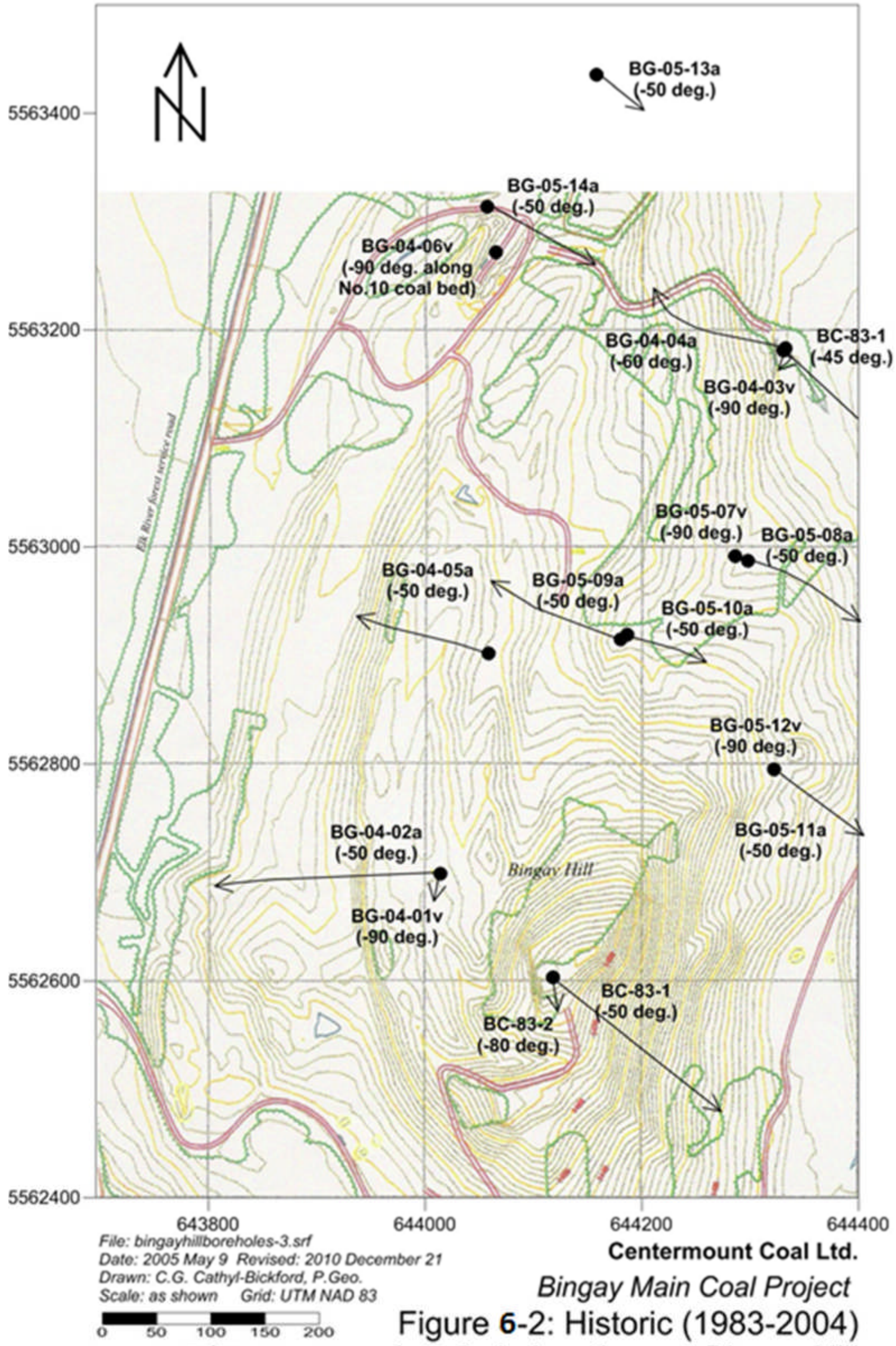


Figure 6-2: Historic (1983-2004) borehole locations at Bingay Hill

Hillsborough Resources Limited, a Vancouver-based coal mining and development company, explored the Bingay Main coal deposit in 2004 and 2005.In 2004, the company drilled six reverse-circulation boreholes at Bingay Main (Gardner, 2004b). All of these boreholes were collared within the Mist Mountain coal-measures, but drilling difficulties or planned shallow depth prevented reaching the Moose Mountain sandstones in any of the holes. Geophysical logs were run in five of the six holes. One of the holes was intentionally not logged, as it was drilled along the bedding of the No.10 coal bed in an effort to assess depth-of-oxidation of the coal.

The senior author's geological mapping of the Bingay Main coal property was commissioned by Hillsborough as part of their 2004 exploration programme. As well, Hillsborough commissioned baseline and scoping studies for their planned submission of a surface-mining development programme to the provincial Ministry of Energy, Mines and Petroleum Resources. These studies included a preliminary survey of acid rock drainage potential based on sampling of diamond-drill cores from Utah Mines' 1983 drilling programme (Morin and Hutt, 2004).

In 2005, Hillsborough drilled eight more reverse-circulation boreholes at Bingay Main. As with the previous year's work, all of the boreholes were collared within, and finished within, the Mist Mountain coal-measures. Geophysical logs were run in all of the boreholes, but in one of the holes only the near-surface strata could be logged, owing to caving of the borehole.

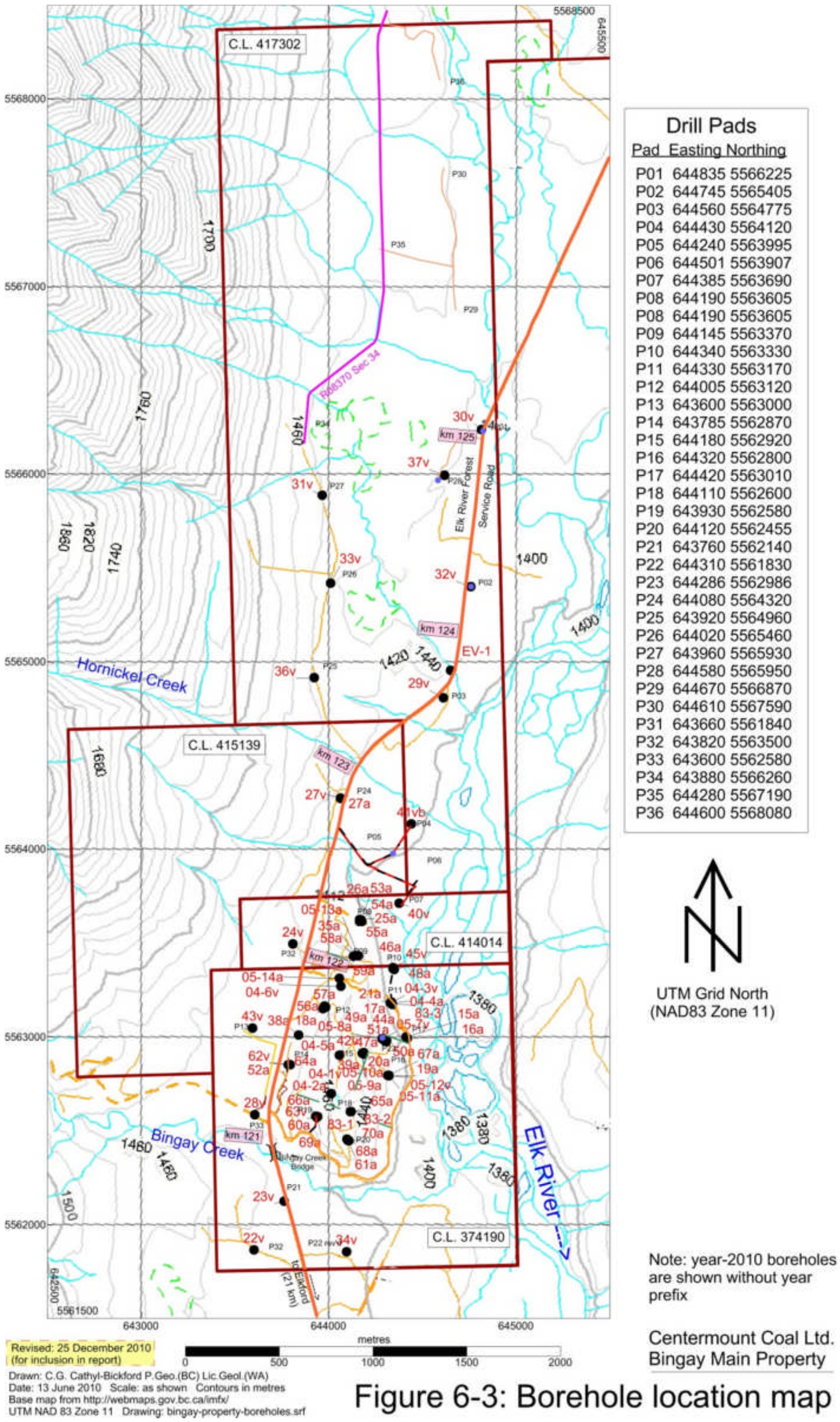


Figure 6-3: Borehole location map

From 1980 until 1991, the British Columbia Geological Survey Branch conducted an extensive programme of geological, petrographic and photogeological mapping in the Elk River coalfield, including the Bingay Main area. Two sets of preliminary geological maps (Grieve and Pearson, 1983, Grieve and Price, 1987), an open-file report with maps and cross-sections (Johnson and Smith, 1991) and a geological bulletin containing two maps (Grieve, 1992) document the results of this programme. Grieve and Pearson's 1983 mapping contains the most useful information concerning the geology of the Bingay Main area, insofar as it extends within parts of the property.

From 1915 until 1920, the Geological Survey of Canada conducted a regional mapping programme in the southern Rocky Mountains, covering the headwaters of the Elk and Highwood Rivers (Marshall, 1920; 1921). Mapping was done by J.S. Stewart, B. Rose and J.R. Marshall, and the overall geological compilation was done by J.R. Marshall. Marshall's map depicts "Kootenay Formation" at the confluence of Bingay Creek and Elk River, but his nearby cross-section shows all beds dipping to the east: it is likely that Marshall did not find the Kootenay outcrops at Bingay Creek.

In 1981 and 1982, R.A. Price, D.A. Grieve and C. Patenaude remapped the regional geology of this area, including the Bingay Main area (Price and others, 1992). On their map, they show Kootenay coal-measures and three bedding attitudes at Bingay Hill, and they show a north-plunging syncline running across the hill.

Four historical coal resource estimates have been reported for the Bingay Main coal property; two of these estimates were made by Utah Mines Ltd. (Davis, 1984), both before and after completion of their 1983 diamond-drill programme. The third and fourth estimates were made by the senior author (Cathyl-Bickford, 2004 and 2005), following completion of Hillsborough's year-2004 and year-2005 exploration programmes.

Davis' 1983 and 1984 estimates do not meet the present-day standards as mandated by Hughes et al (1989) in Geological Survey of Canada Paper 88-21, since he based his estimates on section lines with fewer control points than specified by Paper 88-21. Furthermore, the spacing between the section lines and the distance of projection beyond section lines are greater than those currently mandated.

As well, the use of the word 'reserves' in past practice does not meet the present-day standard as required under *National Instrument 43-101*, which calls for engineering input into such determinations. Therefore, the senior author considers Davis' historic estimates to have been of coal resources rather than coal reserves.

Prior to the 1983 drilling, J.D. Davis (1984, page 1) concluded:

> *"Recent information (J.Davis Oct 7/83) indicated a potential of 8 seams over approximately a square kilometer contained 'in situ' reserves of 17.445 x 10^6 tonnes of coal (@1.30 Sp.Gr.) with contained waste resulting in a strip ratio of 7.40:1 (m^3/tonne)."*

Following the 1983 drilling, J.D. Davis (1984, page 1) concluded:

"1. Diamond drill information indicates the presence of 22 coal seams of which 18 are of considerable extent and thickness (i.e.≥/1m. true - range 1.07 m - 11.08 m) to be used in a reserve calculation.

2. An updated 'in situ' deposit tonnage from 18 seams based on diamond drill results is 44.13 x 10^6 tonnes of coal (@1.30 Sp.Gr.) with contained waste (over burden and interburden) resulting in a strip ratio of 5.55:1 (m^3/tonne) Table 1.

3. Extension of the lowermost 8 seams to the northern extent could add a potential 8.2 x 10^6 tonnes and an associated amount of waste of 68.83 x $10^6 m^3$."

Following the 2004 drilling, (Cathyl-Bickford, 2004, page 9) concluded,

- *7.56 million tonnes of coal are <u>measured and indicated</u> resources of immediate interest for surface mining; and*

- *2.68 million tonnes of coal are <u>inferred</u> resources of immediate interest for surface mining.*

These resources occur within the Bingay 9-10, 11-12 and 20-21 coal zones, all of which lie within the Mist Mountain Formation of the Kootenay Group

Results from Hillsborough's year-2005 drilling programme demonstrated that more coal was available for incorporation in the resource base, owing to the recognition of thicker than expected coal zones in the middle part of the Mist Mountain Formation. In the subsequent report (Cathyl-Bickford, 2005), the following coal-resource estimate was made:

- *15.512 million tonnes of coal are <u>measured and indicated</u> resources of immediate interest for surface mining; and*

- *2.410 million tonnes of coal are <u>inferred</u> resources of immediate interest for surface mining.*

These quantities of coal represent a substantial increase over the 2004 resource estimate, which was based upon the drilling done to the end of 2004 (Cathyl-Bickford, 2004); this increase is mainly due to the many more coal intersections measured by the 2005 drilling, which allowed more coal zones to be brought into the resource base. A modest increase is also attributable to the northward extension of drilling along the west limb of the Bingay Syncline.

The year-2004 and year-2005 resource estimates were prepared in keeping with *National Instrument 43-101*, following guidelines laid down by Geological Society of Canada Paper 88-21. However, these estimates are now superseded by the estimate presented in **Section 19** of the present report.

No coal is known to have been produced from the Bingay Main property, other than about 400 tonnes of coal dumped on the ground at the portal of the old "400 ton adit", and 200 tonnes of coal taken from the No.10 coal bed by Iron Creek Exploration Ltd. for analytical purposes within the terms of a bulk sample permit granted by the provincial government.

The existence of significant areas of undocumented mine-workings at Bingay Main is regarded as unlikely. However, additional test pits and adits, not yet found by fieldwork, may be disclosed if additional areas of the property are cleared of trees.

7.0 Geology

The Bingay Main property covers the western margin of the Elk Valley coalfield. The coalfield is an infaulted remnant of a substantially larger body of coal-measures, correlative with the Crowsnest Basin to the south and the Highwood Pass/Mount Allen/Canmore coalfields to the north. Coal-measures at Bingay Main are hosted by the Mist Mountain Formation, part of the Jura-Cretaceous Kootenay Group (**Table 7-1)**. The Mist Mountain Formation is underlain by Jurassic rocks of the Morrissey and Fernie formations. At the crest of the Greenhills Range, east of the Bingay Main property, the Mist Mountain Formation is overlain by the younger coal-measures of the Elk Formation, also of Cretaceous age.

Geology of the Bingay Main area is known mainly from field mapping of bedrock outcrops at Bingay Hill, tied together by boreholes, road cuts and trenches along its flanks. The hill is bounded to the north-west and south-west by an extensive east-sloping apron of gravel, and to the north-east and south-east by terraced gravel deposits adjacent to the broad plain of the Elk River.

Table 7-1: Table of formations for the Bingay Main area

Quaternary

Pleistocene to Holocene

Qd	*DRIFT: Gravel, alluvium, talus and till; minor localised mucky peats.*

Jurassic and Cretaceous

KOOTENAY GROUP (Jura-Cretaceous rocks only):

Tithonian to Hauterivian?

Ke	*ELK FORMATION: Sandstone, siltstone, mudstone, **coal** (including cannel coal and alginite-rich 'needle' coal); minor conglomerate*

JKmm	*MIST MOUNTAIN FORMATION: Siltstone, variably-carbonaceous mudstone; channel-filling, well-sorted quartzose sandstone; **coal**; minor marlstone, ironstone and tonstein.*

Jmo	*MORRISSEY FORMATION: Sandstone and minor siltstone.*

Jmo2	*MOOSE MOUNTAIN MEMBER: Quartzose sandstone containing minor amounts of rock fragments; minor siltstone and gritstone; very resistant to erosion.*

Jmo1	*WEARY RIDGE MEMBER: Silty sandstone composed of quartz and rock fragments, with interbeds of siltstone; softer than overlying beds.* *,*

Oxfordian to Tithonian?

JF	*FERNIE FORMATION: Interbedded siltstone and feldspar-rich silty sandstone; minor silty mudstone.*

Triassic and older

ROCKY MOUNTAIN SUPERGROUP AND SPRAY RIVER GROUP (UNDIVIDED)

Stephanian to Rhaetian?

Pre-JF	*Quartzitic and dolomitic sandstone, limestone and dolomite, mudstone and siltstone*

Within the Elk Valley coalfield, total preserved basin fill over the Precambrian cratonic rocks of North America is on the order of 10 kilometres, including sedimentary and volcanic rocks of Cambrian through Jurassic ages which together form economic basement beneath the Kootenay coal-measures. Detailed study of these older rocks is mostly irrelevant to coal exploration, except insofar as they are overthrust over the western margin of the coalfield.

The coal-measures of the Elk Valley coalfield were deposited in a rapidly-subsiding foreland basin, which lay along the north-eastern margin of the Columbian orogenic highlands. Rapid subsidence of the basin is evidenced by the abundance of detrital organic matter within the coal-measures, and the general scarcity of oxidised sediments

The Columbian highlands must have included active volcanic vents, since tonsteins (altered volcanic-ash bands) are present within the coal-measures. The Bingay Main area was either quite remote from these volcanoes, or at an unfavourable position *vis-à-vis* prevailing winds during late Jurassic and early Cretaceous time, because the tonsteins are relatively thin (generally less than 5 cm thick).

7.1 Local Geology

Interpreted bedrock geology of the Bingay Hill area is presented as **Figure 7-1** based on the senior author's fieldwork during the summer of 2004 and spring of 2005, supplemented by structural observations depicted on the California Standard Company's geological map (Henderson, 1956), and results of year-2010 drilling. **Table 7-2** documents the formation and member tops, interpreted by the senior author from logs and records of boreholes drilled at and near the Bingay Main area.

Table 7-2: 2010 Bingay Coal Drilling Pad & Borehole

Pad No.	Coordinate Pad		Borehole Name	Coordinate Borehole			Note
	Norhting	Easting		Norhting	Easting	Elevation (m)	
Pad 1	5566225	644835	2010-30v	5566237	644815	1414	P1-P3 in Bingay A, No coal.
Pad 2	5565406	644745	2010-32v	5565402	644758	1408	
Pad 3	5564775	644560	2010-29v	5564809	644612	1405	
Pad 4	5564120	644430					
Pad 5	5563995	644240	2010-41v	5563983	644349	1399	
Pad 6	5563907	644501					
Pad 7	5563690	644385	2010-40v	5563714	644377	1392	
			2010-25a	5563626	644166	1407	
			2010-26a	5563617	644178	1407	
Pad 8	5563605	644190	2010-53a	5563624	644169	1407	
			2010-54a	5563624	644174	1407	
			2010-55a	5563617	644164	1407	
			2005-13a	5563434	644158	1417	
Pad 9	5563370	644145	2010-35a	5563436	644148	1417	
			2010-58a	5563437	644145	1416	
			2010-59a	5563432	644133	1417	
			2010-45v	5563371	644343	1385	

Pad 10	5563330	644340	2010-46a	5563365	644344	1388	
			2010-48a	5563361	644350	1392	
Pad 11	5563170	644330	2010-17a	5563173	644340	1387	
			2010-21a	5563185	644336	1387	
Pad 12	5563120	644005	2010-18a	5563159	643984	1429	
			2010-56a	5563617	644164	1407	2010-38a between P12-P14
			2010-57a	5563151	643971	1429	
Pad 13	5563000	643600	2010-43v	5563048	643595	1424	
Pad 14	5562870	643785	2010-52a	5562853	643786	1421	
			2010-62v	5562853	643785	1421	
			2010-64a	5562851	643794	1421	
Pad 15	5562920	644180	2010-20a	5562915	644185	1416	
			2010-39a	5562915	644185	1416	
			2010-42v	5562914	644182	1416	
			2010-47a	5562909	644188	1417	
			2010-66a	5562576	643941	1442	
Pad 16	5562800	644320	2005-11a	5562796	644321	1418	
			2005-12v	5562793	644321	1418	
			2010-19a	5562793	644321	1417	
			2010-67a	5562795	644316	1417	
Pad 17	5563010	644420	2010-15a	5563000	644413	1389	
			2010-16a	5562993	644418	1389	
Pad 18	5562600	644110	2010-65a	5562602	644121	1489	
Pad 19	5562580	643930	2010-60a	5562577	643932	1442	
			2010-63v	5562571	643937	1442	
			2010-69a	5562576	643937	1442	
Pad 20	5562455	644120	2010-61a	5562455	644099	1463	
			2010-68a	5562449	644103	1462	
			2010-70a	5562448	644108	1462	
Pad 21	5562140	643760	2010-23v	5562127	643763	1409	
Pad 22	5561830	644310					2010-34v near P22
Pad 23	5562966	644286	2010-44a	5562979	644303	1402	
			2010-49a	5562982	644309	1402	
			2010-50a	5562977	644307	1402	
			2010-51a	5562977	644303	1402	
Pad 24	5564320	644080	2010-27v	5564274	644063	1412	
Pad 25	5564960	643920	2010-36v	5564915	643924	1429	P25-P30 in Bingay A, No coal.
Pad 26	5565460	644020	2010-33v	5565420	644011	1425	
Pad 27	5565930	643960	2010-31v	5565887	643966	1440	

Pad 28	5565950	644580	2010-37v	5565993	644618	1417	
Pad 29	5566870	644670					
Pad 30	5567590	644610					
Pad 31	5561840	643660	2010-22v	5561866	643602	1408	
Pad 32	5563500	643820	2010-24v	5563497	643810	1414	
Pad 33	5562580	643600	2010-28v	5562585	643607	1420	
Pad 34	5566260	643880					
Pad 35	5567190	644280					
Pad 36	5568080	644600					

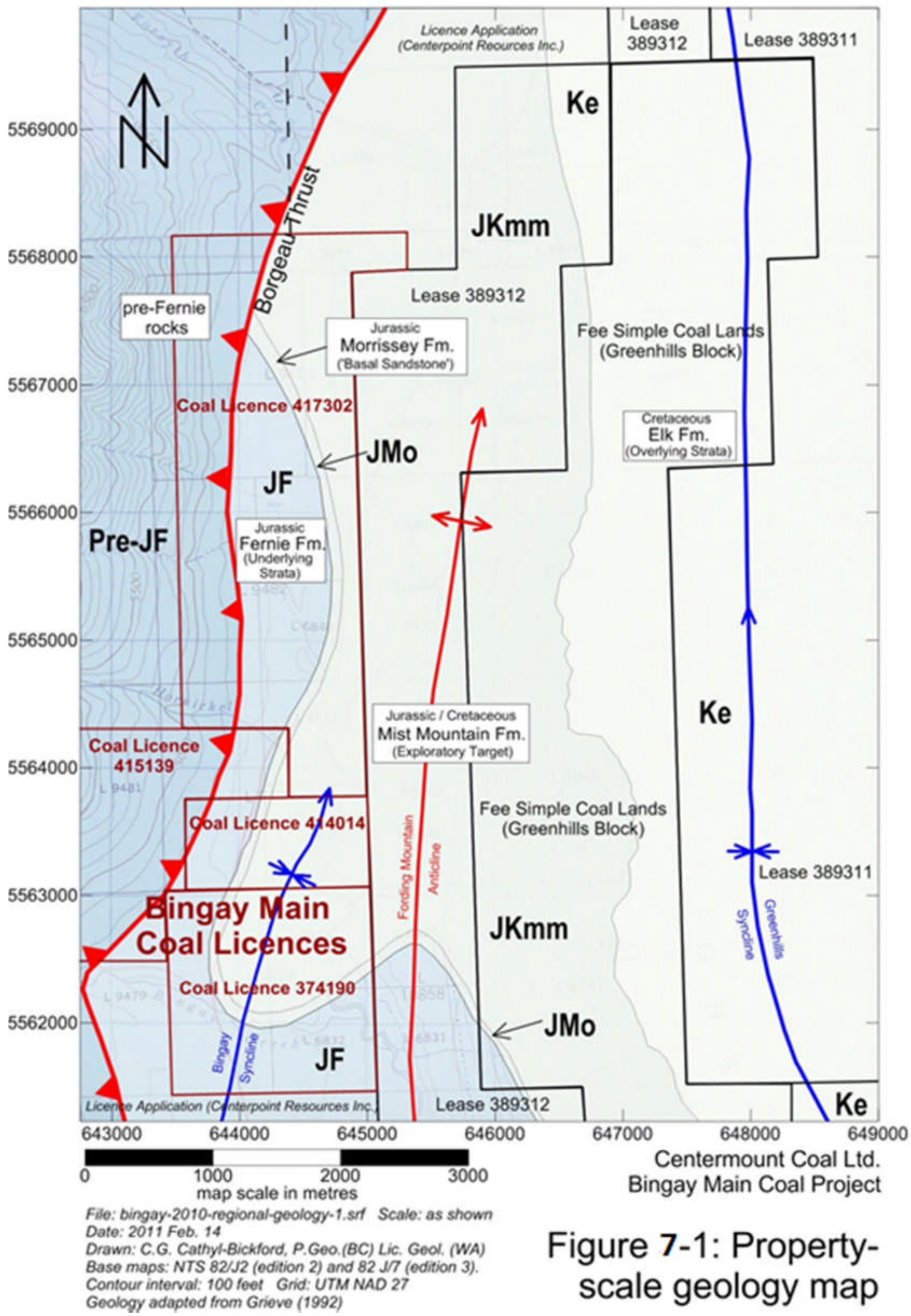
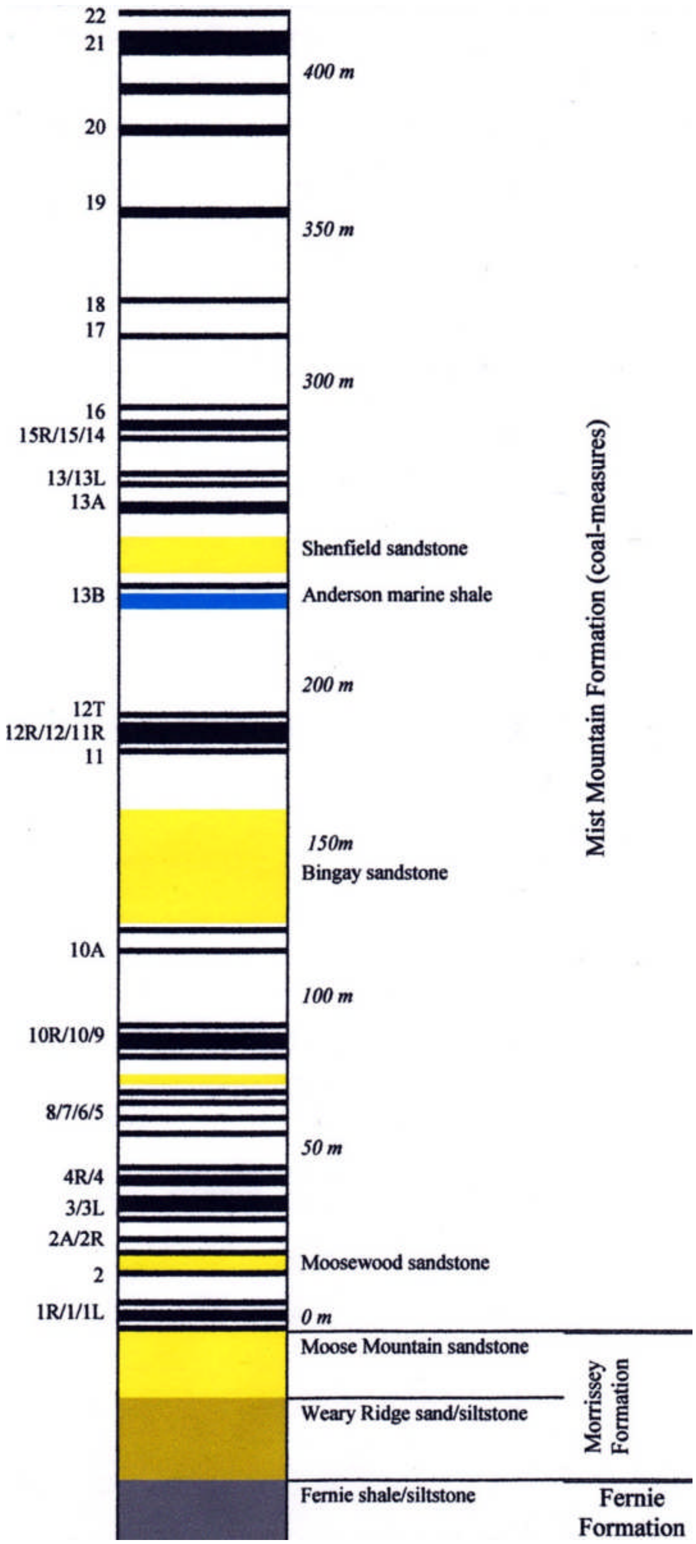


Figure 7-1: Property-scale geology map

Table 7-3 (below) presents, in graphic form, the nomenclature and stratigraphic position of major correlatable coal beds within the Mist Mountain coal-measures, along with the positions of major sandstones and an inferred marine band.

Three major stratigraphic assemblages are present at Bingay Main, and within the Elk Valley coalfield generally. From base upwards they are 'Basement', 'Coal-measures' and 'Drift cover,' of Jurassic and older, Jura-Cretaceous and Quaternary ages successively.

Economic basement beneath the Mist Mountain Formation (essentially, the older rocks beneath which no mineable coal could be expected to be found) is formed by sandstone of the Moose Mountain and Weary Ridge members of the Jurassic Morrissey Formation, and interbedded siltstone, sandstone and mudstone of the Jurassic Fernie Formation.



Drawn: C.G. Cathyl-Bickford P.Geo. Lic.Geol., 2010 December 20. Scale: approximate, as shown

Table 7-3: **Stratigraphic Column for Bingay Main**

The Moose Mountain Member forms prominent sandstone cliffs along the north bank of Bingay Creek, downstream from the Forest Service Road bridge. The Moose Mountain sandstones are also well-exposed along the access road which skirts the southern face of Bingay Hill, along the northern side of Bingay Creek. The two older rock-units are exposed beneath the Moose Mountain beds, within the canyon of Bingay Creek.

In the subsurface at Bingay Hill, the Moose Mountain Member has been reached in 21 boreholes, 20 of which were drilled during the year-2010 exploration programme. The contact of the Moose Mountain sandstone to the overlying Mist Mountain coal-measured has now been adequately established to be abrupt, marked by a variably-thick coal zone (the No.1 zone) directly overlying a rooted, quartzose, carbonaceous to coaly and sandy paleosol.

Outside the property, Cominco boreholes EV-3, EV-5, EV6 and exploratory gas well AECOG Mosquito d-16-D/82-J-7 all appear to have been collared in older shales or siltstones of the Fernie Formation. Cominco borehole EV-4 and exploratory gas well AECOG Mosquito d-96-L/82-J-2 both appear to have bottomed in Moose Mountain or Weary Ridge sandstone.

Coal-measures in the Bingay Main area are hosted by the Mist Mountain Formation of the Kootenay Group, of latest Jurassic to earliest Cretaceous age. Although younger coals are known from the overlying Elk Formation in the Greenhills Range (Grieve and Pearson, 1983), the Elk coals appear to have been stripped away by erosion within the Bingay Main property. During deposition of the Mist Mountain coal-measures, the Fernie Sea (the local name for the Interior Seaway) lay to the east and Northeast, and orogenically-elevated highlands lay to the Southwest.

The Mist Mountain Formation outcrops extensively on Bingay Hill, and along both limbs of the Bingay Syncline. Comparison of the drilled stratigraphic section at Bingay Main with the surface sections reported by Gibson (1985) from the Greenhills Range suggests that the upper third or quarter of the Mist Mountain has been lost to erosion at Bingay Main. The preserved true stratigraphic thickness of the Mist Mountain Formation at Bingay is about 460 metres.

Gibson (1985) proposed that the Moose Mountain sandstones might represent a coastal barrier or strandplain system, above and behind which extensive peatlands could form within the deltaic complex that comprises the Mist Mountain coal-measures. Although Gibson did not recognise any definitely marine interbeds within the Mist Mountain Formation, he did note the presence of extensively-burrowed rocks within the basal Mist Mountain. Such intensely-bioturbated strata were also noted by the senior author in the course of relogging some of Utah Mines' 1983 diamond-drill cores. The most continuous of these zones, with characteristic high gamma-log response, has been designated as the Anderson 'marine band', lying between the No.13 Lower and No.12 Rider coal beds.

The year-2004 and year-2005 geological mapping by the Bickford, and the more detailed year-2010 structural mapping by the writer (Munroe, 2010a, 2010b), was focussed on elucidating the overall structure and coalbed disposition within the Bingay Syncline, only passing attention was paid to palaeocurrent indicators. Some of the coal-measures rocks (most notably the thick sandstone beds) are rippled or cross-bedded, and such features afford the possibility that more detailed fieldwork might allow for the determination of palaeocurrent directions, and hence the outlining of small-scale palaeotopographic features within the coal-measures at Bingay Main.

In July 2010 the writer was commissioned by Centermount Coal Ltd. to conduct a series of trench surveys to examine the stratigraphic sequences and determine if any additional structural data could be developed for the property. After series of trips to the property during the summer the scope of work expanded to include a more regional structural examination of the rest of the Bingay property as well as three additional adjoining properties. These additional properties were identified as Bingay A, B and C and were reportedly under the control of Centerpoint Resources Inc.

The regional examination required trips up any passable old and new logging roads, old trails and openings in logged ground. No work permits were in place so only limited truck traffic, a lot of hiking and extensive digging with hand tools was required to look for outcrop locations. Some success was achieved in locating outcrops and tracing structural ridgelines in all four properties but the resulting information suite is sparse at best. A lot more field work with permitted heavy equipment support is needed to expose possible buried near-surface bedrock highs.

The field work was a critical element in attempting to understand the regional picture with respect to the potential for folding, faulting and shearing that is known and possible. After interviewing the government geologist it was clear that only limited “broad brush” field examination has been done on a classical basis for this region. Detailed studies of smaller sections have not been done by recent authors. The summer work also allowed access to old coal adit and shaft sites on the property and the discovery of possible collapsed old coal workings approximately 1.5 km south of Bingay Creek. It must be understood that coal exploration on these areas was done starting in the early 1900’s but nearly all of these records are lost in time.

However, what appear to be extensive workings dot the landscape in selected locations. This indicates that the potential for coal across the property is high and having a solid understanding of the structural basics for the region is critical. The valley floor and flanks are covered in thick till and fluvial sequences that mask the underlying folded, sheared and faulted bedrock strata. The use of seismic work in this region should also be strongly considered in defining possible bedrock features below the cover. The current drill program encountered several very deep unexpected intersections of glacial and fluvial cover that may be avoided in future work now that these deep features are both known and slightly understood. Another aspect to seismic and other geophysical examinations prior to drilling is the ability to potentially “see” buried fault and/or shear zones. Encountering such zones may result in drilling difficulties and added costs.

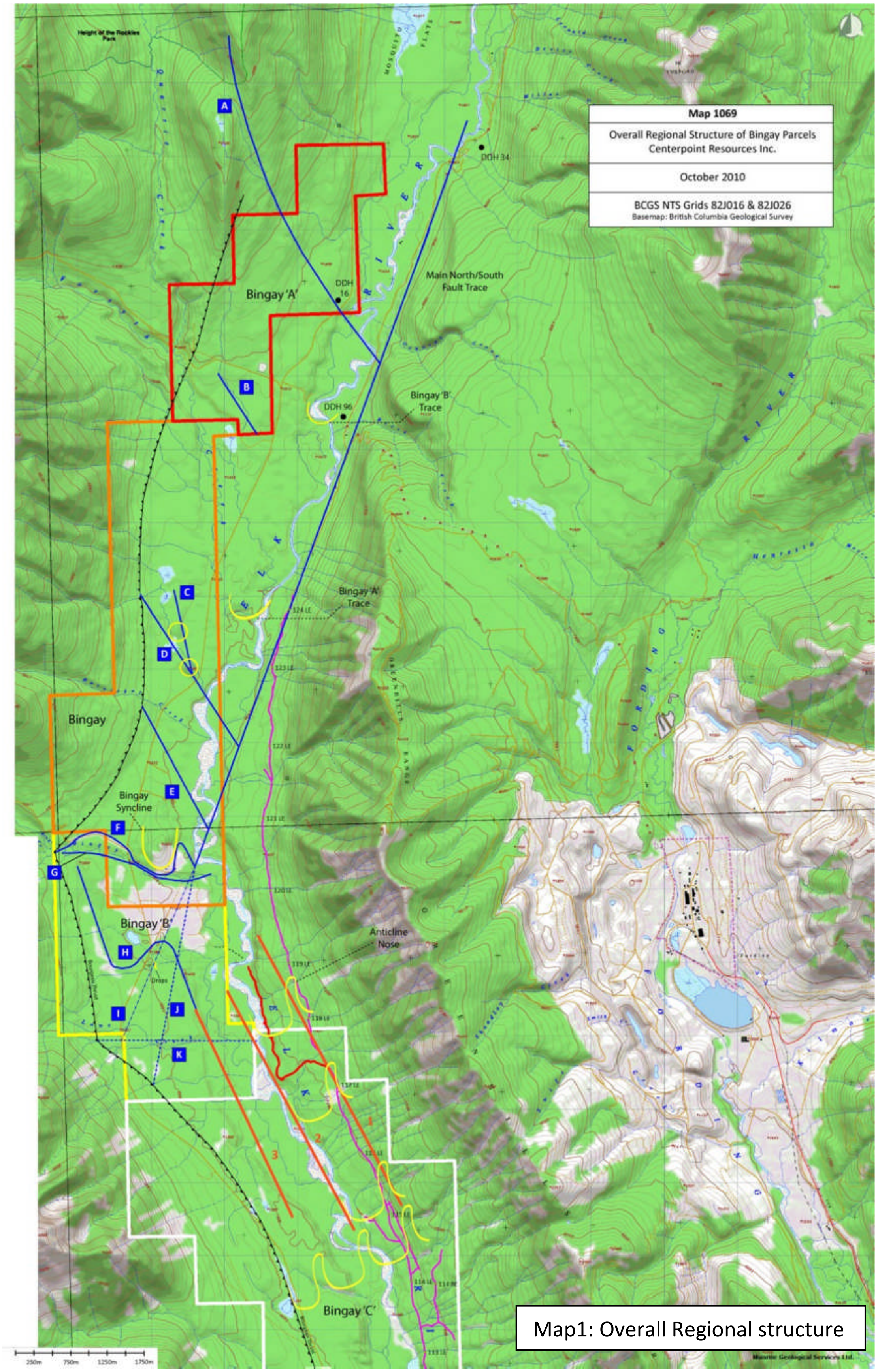
Part of the problem with primary exploration in the Elk Valley is the inability to “wildcat” test holes and trench works as prospective bedrock areas are discovered due to permit restrictions. As a result, this report will detail possible areas of bedrock highs in the valley floor along with associated flanking coal measures and a generalized structural plan indicating major zones of interest. Much more detailed field work is needed to better define these potential areas and new discoveries may alter this proposed plan in a significant manner. Changes in the ground knowledge base are expected in exploration and the operators must be able to adapt to these potential paradigm shifts accordingly.

Additional research is also need in archive data bases and government records to locate old airphotos, permit information and mining/exploration activity in the region. It was determined by a limited search that at least 9 old coal exploration licenses were issued on portions of the current property suite in the early 1900’s. This would indicate that a much larger body of forgotten knowledge may be hidden somewhere.

The field season work provided the opportunity to present a possible regional structural picture that will have to be correlated with the data set obtained from the current exploration drilling at Bingay Hill. This regional picture is centered on a possible but un-reported main north/ south fault system that traces a line from the NNE to the SSW along the frontal base of the Greenhill Range to the east of Elk River. Corresponding “drag” features from the movement along this line appear to run the width of the Elk River Valley but are lost under the over thrusting Bourgeau Thrust fault on the west flank. The N/S fault and the Bourgeau conspire to result in a constriction zone with its apex at the core of the steep, north dipping Bingay Hill syncline.

The following map depicts the overall collage of theoretical structural elements at play in the valley study area. Each fault trace represents a separate set of vectors that work in concert with the larger system. However, each also results in the potential for subduction, flat over thrusting and block rotation as the entire valley system is examined. In general terms the main forces in the valley appear to be the eastward compression from the Bourgeau Thrust along the entire western side of the valley. Indeed, the literature indicates that the entire range to the west is the direct result on this ramp thrust moving over the valley as it moves up the arm of the large anticline. The other main element referred to earlier as the proposed vertical Main North-South fault running parallel with the base of the Greenhills Range.

However, there are distinct ``pinch points`` along the thrust that appear to be evidence of shear elements perpendicular to the Bourgeau. The three main points of interest are the Hornickel, Bingay and Lowe Creek valleys. Either perpendicular or EW/SE movement is indicated at these junctures. This is however, in keeping with the expected change in direction of the force vectors as there is deflection point right at Bingay Creek where the North South fault appears to deviate to the SSW in the order of 10 to 15 degrees. (noted as I and J on the map) This deflection meets the intersection of the Bourgeau and perpendicular Lowe Creek fault. (noted as K on the map)



Map 1069
Overall Regional Structure of Bingay Parcels
Centerpoint Resources Inc.
October 2010
BCGS NTS Grids 82J016 & 82J026
Basemap: British Columbia Geological Survey
Main North/South
Fault Trace
Bingay 'A'
Bingay 'B'
Trace
Bingay 'A'
Trace
Bingay
Bingay
Syncline
Bingay 'B'
Anticline
Nose
Bingay 'C'
DDH 34
DDH 16
DDH 96
A
B
C
D
E
F
G
H
I
J
K
1
2
3
Map1: Overall Regional structure

South of Bingay Hill is the proposed surface trace of the E/W trending Bingay Creek Fault that controls the orientation of its thalweg and may be responsible for a thrust fault that elevated the northern section of the Bingay syncline. There may actually be at least 2 sub parallel fault traces north of the creek, with resistant layers of the folded strata that form the major elevated syncline core that is known as Bingay Hill. Sharp shear line traces, apparent drag folding and clockwise bed rotation is noted in the outcrops and trenches on the east flank of this hill. The rough orientations of the effects are sub parallel with the main N/S Trench some 250 m to the east.

North of the Hill the syncline appears to plunge deeply to the north. However at two locations along the Elk River muted course changes indicate that possibly obscured synform elements are trying to come to surface. These elements could be continuations of the Bingay syncline that have been cross faulted and block dropped. In addition to these muted features there are four NNW to SSE possible fault traces that have their western edges covered by the Bourgeau over thrust and the eastern ends truncate at the main N/S fault. One of these fault trace lines bifurcates right at the location of possibly 2 thrust up blocks that follow the trace of the bifurcation wedge. These blocks rise roughly 15 metres above the flat valley floor and can be seen as mounts from kilometers away.

South of Bingay Creek there are additional possible structural elements that are hidden under the till cover. The trace of the main N/S fault line deflects slightly to the south at the Bingay cross fault (s) and crosses the eastern apex of one of two opposing synoidal loops roughly one kilometer south of the Creek. The western arm of the twin loop structure truncates at the Bourgeau Thrust while the parallel eastern arm (NW/SE) descends to the south along the valley also parallel to the Elk River trace.

It should be noted that the averaged thalweg trace of the Elk River parallels the trace of the main N/S fault north of Bingay Creek. The river course then turns N/S at the intersection of the Bingay Creek fault and the main N/S fault. It remains on the N/S flow as it passes the constriction point east of Bingay Hill and runs roughly parallel with the observed N/S shear zone traces in strata on the east side of the Hill.

The river then turns to the SSE just below the Bingay Creek intersection and parallels the trace of the eastern arm of the synoidal loop for several kilometers down the valley. This also mirrors the changes in the Western flank of the Greenhills Range.

If a line is drawn SSE from the eastern end of the synoidal loop for roughly 3 kilometers it would generally parallel the western bank of the Elk River trace. Using this line as an axis trace (NW/SE - approximately 330 degrees AZ) other corresponding features can be seen. On the eastern flank of the Elk River roughly following the centerline of the hydro line, 2 kilometers south of Bingay Hill, a steep anticline fold nose overturned to the east was mapped in the early part of the century by explorers following the Greenhills coal measures on the east valley wall. The nose also displayed float coals in the till cover. Green beds were also located in outcrop roughly 150 m above the nose elevation which indicate coal measures should be found slightly higher in the stratigraphic column.

Following the trace of the anticline down to the east side of the river additional coal float was found in the till cover between the east road and the river. At the eastern bank of the river, Fernie Formation beds are noted to dip sharply (60-68 degrees) to the east while the Green beds found some 200 m above the river dip 70 to 80 degrees to the west. This configuration has to indicate that a sharply folded syncline exists in the 750 m between the river and the green bed outcrop. With a sharply overturned anticline axis above the green beds falling to the east an over thrusting stress is most likely coming from the west (Bourgeau Thrust) and sharply folding the strata into a series of roughly parallel synclinal troughs as the anticline arches would have been eroded off by glacial and fluvial action in the valley floor.

Using a simple replication of the fold energy needed to develop the east side syncline during the compression from the west, 3 synclinal, north south trending troughs with an axis of roughly 330 degrees AZ could have been formed. The western limb of the most westerly syncline would essentially end near the foot of the Bourgeau Thrust line. This configuration would account for the coal float found on the east side of Bingay C on the trail named Bill's Road (shown in red for the road builder and locator of the float decades ago, Bill Shenfield). Possible muted sub crops seen on imagery in the area also tend to match the configuration and positioning of possible near surface bedrock formations under the till.

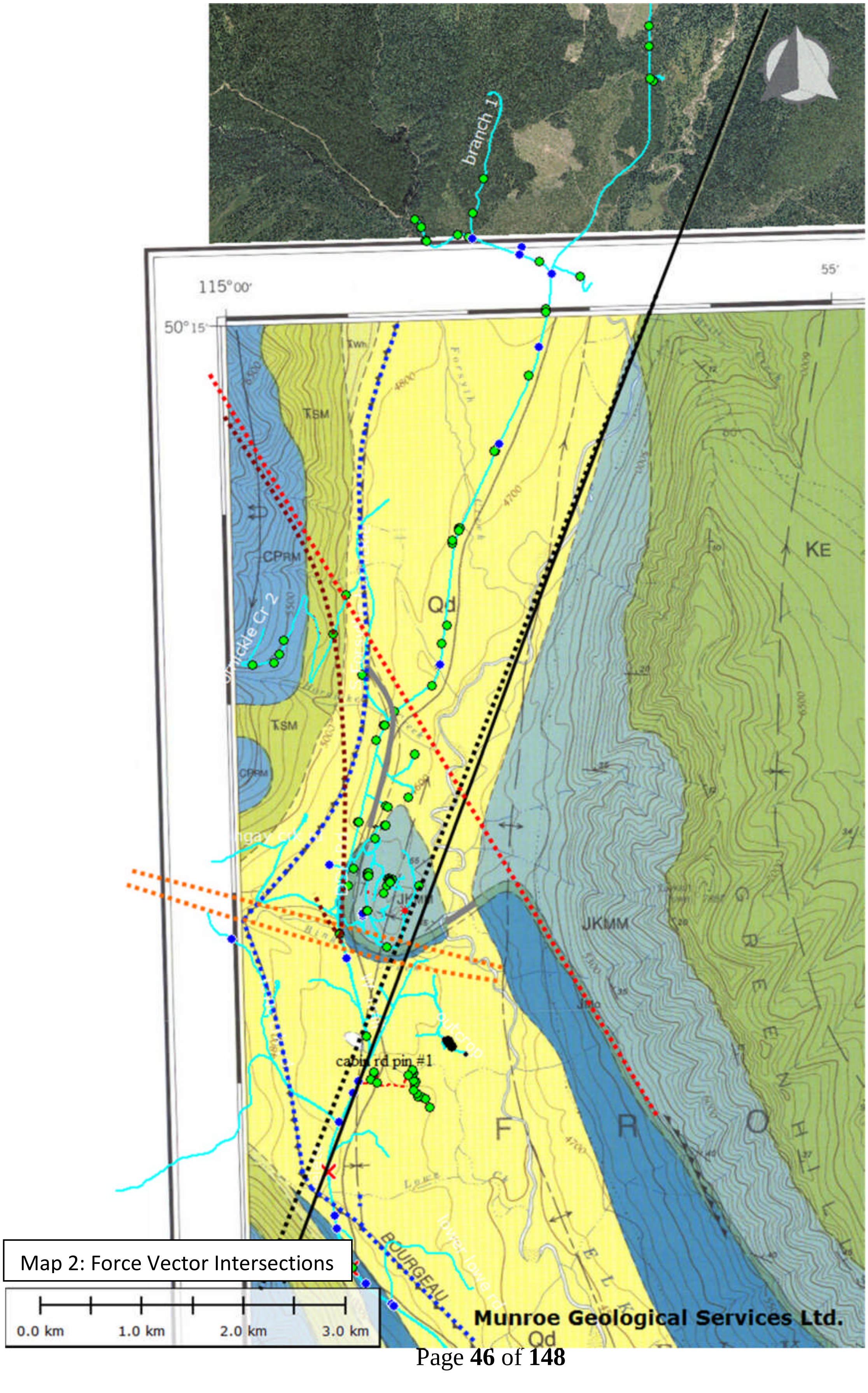
This compression model also fits the positioning of the possible sunken coal workings located 1.5 kilometers south of Bingay Creek. This area is noted as the ``drops`` on the preceding main map. However an excavator will have to be used to prove the location of coal measures in that location. Should they be found, additional near vertical coal measures should be replicated both east and west from that point along the axis to the south. We currently have no drill or excavation data on Bingay B or C to support any of this theory but several target areas can easily be reached in 2011 with proper permitting in place.

The presence of any uniform stratigraphic sections north of this point is problematic as the effects of possible over thrusting from the north parallel to the Bingay Creek fault system (s) mixed with the synoidal fold axis and a stress related re-orientation of the strike of the main N/S fault all meet between the slumped areas and Bingay Creek to the north. Drilling in this section will be difficult at best to properly orient any encountered strata. This was apparently the case with three rotary holes placed at the southern end of Bingay by Centermount Coal Ltd. in 2010.

Another important element to this model is found in the 1992 Geological Survey of Canada map # 1824A (Fording River) by D.A. Grieve. The writer interviewed Mr. Grieve this summer and determined that this general/ regional work was the most current understanding of that part of the valley. However, the sharp fold of the Morrissey Formation on the east side of the valley base, the stratigraphic folding of the bed shown wrapping around the base of Bingay Hill and continuing north to under the Bourgeau Thrust at Hornickel Creek is all accurately plotted. The configuration of this strata outline is almost a replica of the orientation of the twinned synoidal loop structural elements noted in the satellite and elevation imagery of Bingay B used by the writer to assist in the development of this model.

This currently understood regional geological map series provides a guide to assist developing the model of how the synclinal structures were formed. The following map series attempts to provide a conceptual plan for that development.

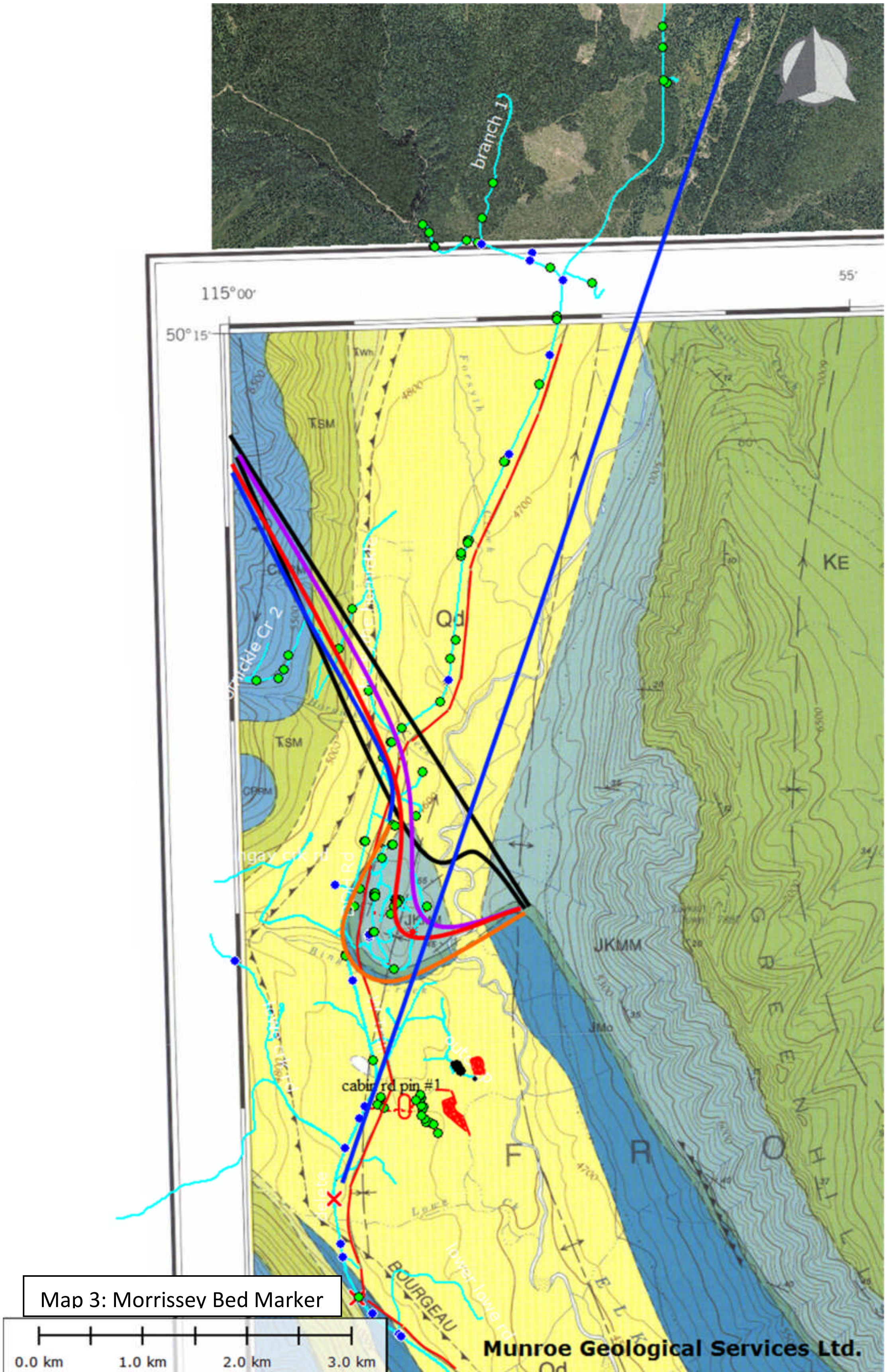
The three following images are the same base with changes in the structural framework as an overlay. The first shows the main intersections of the force vectors surrounding the Bingay Hill area. The NW to SE red dotted line follows what should have been the trace of the Morrissey Bed that runs along the base of Greenhills Range to the SE of Bingay Hill. The grey line on the map indicates the placement of the identified Morrissey beds in the field by Grieves etal. The black dotted and solid line shows the approximate trace of the proposed North-South fault. The twin orange lines show the EW orientation of the two Bingay Creek fault traces south of Bingay Hill. The Bourgeau Thrust is shown as the dotted blue line. The brown dotted line attempts to follow the track of movement that resulted in the meeting of these fault systems.



Map 2: Force Vector Intersections

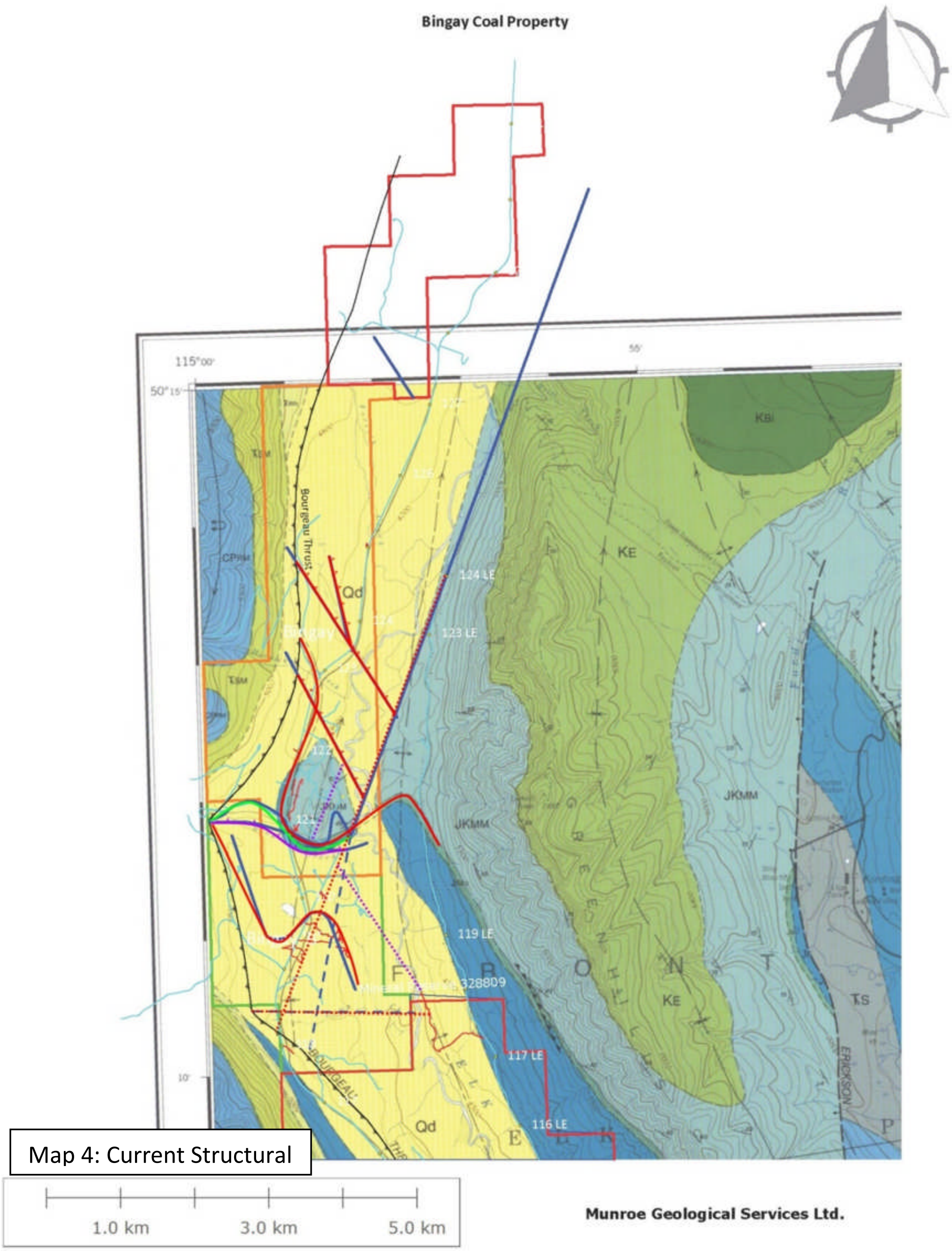
The following map shows the theoretical movement of the Morrissey bed marker as the strata became folded into the syncline and the ground west of the main North-South fault was forced south. The Bourgeau would have continued to exert eastward forces into the strata north of the Hill but then vectors would have changed between Bingay and Lowe Creek. The Bourgeau would have then changed its push slightly to the NE past the southern end of the North-South fault.

The black lines indicate the first and second positions of the fold. As the compression continued the movement would have been to the purple line, then to the red and finally to the orange line position where it is seen today.



Map 3: Morrissey Bed Marker

The following map shows the proposed current state of the structural elements around the Bingay Hill area with the geological map base as a reference. It is followed by a second map showing the refined structures on the topographic map base. Again it must be stressed that a considerable amount of drilling and trenching will be required to verify any of these elements.



Map 4: Current Structural

The ground surface within the Elk River valley is mostly covered by a variably-thick drift mantle (generally a few metres to a few tens of metres thick, but locally well over 200 metres thick) of glacial, glaciofluvial, alluvial and fluvial sediments, which together occupy the 'known covered areas' mapped by Henderson (1956). Bedrock exposures are therefore confined to isolated areas where sandstone-rich portions of the Kootenay coal-measures have resisted erosion, and to the incised canyon of Bingay Creek.

The best exposures of drift are in road-cuts along the Elk River forest service road, and in the cutbanks of the Elk River. Rounded boulders of Palaeozoic quartzite form isolated large glacial erratics at the ground surface within the Bingay Main property, most notably on the southern slopes of Bingay Hill.

West and north of Bingay Hill, stratigraphy of the drift cover appears to be fairly consistent, with a near-surface gravelly alluvial-fan or fluvial-terrace deposit underlain by a sticky silty clay, which in turn is underlain by yet another extensive sheet of water-bearing gravel with sandy interbeds. The basal gravel forms a confined aquifer, which locally yields substantial flows of artesian groundwater when entered by a drill.

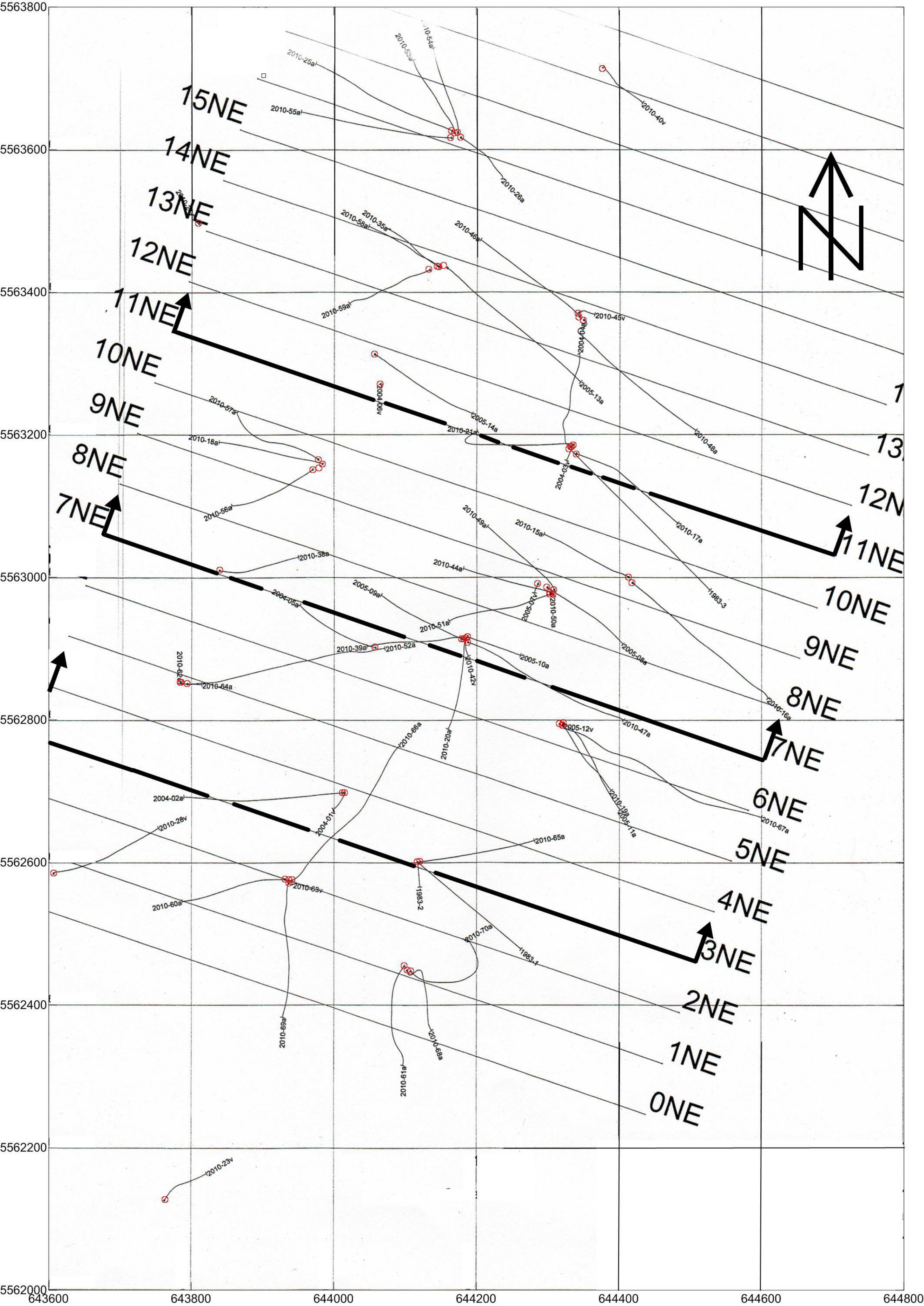
Figure 7-1 (ABOVE) shows bedrock geology of the Bingay Main property as presently understood by the senior author. This map incorporates findings from geological mapping by various workers in the area: Grieve and Pearson (1983), Grieve and Price (1987), Cathyl-Bickford (2005) and Munroe (2010b; 2010c).

Within the Bingay Main property *per se*, the Fernie, Morrissey and Mist Mountain formations form bedrock; bounding the property to the east and west are younger and older rocks respectively.

Geological structure of the Bingay Main property is known mainly from mapping of bedrock outcrops (most extensively done by Richard Munroe during the year-2010 exploration programme, and reported by him in three stand-alone reports (*ibid*., 2010a, 2010b and 2010c) as cited under this report's references; with earlier work documented in Cathyl-Bickford's 2005 report), supplemented by dipmeter records from most of the 2004, 2005 and 2010 boreholes**. Figure 7-2** shows cross-section locations and the horizontal projection of all boreholes drilled at Bingay Hill, where the presently-recognised coal resources (see APPENDIX **VIII:** Geological Report **ITEM 19**) are located.

Computer-based structural modelling, based on subsurface data from most of the boreholes, and working in context of known and inferred bedrock geology, was undertaken during November and December by Gemcom Software International Inc. (Brandão, Barnett and Bui, 2010). Gemcom's structural maps and several of their cross-sections are incorporated, with annotations by the senior author, within the present report as discussed below.

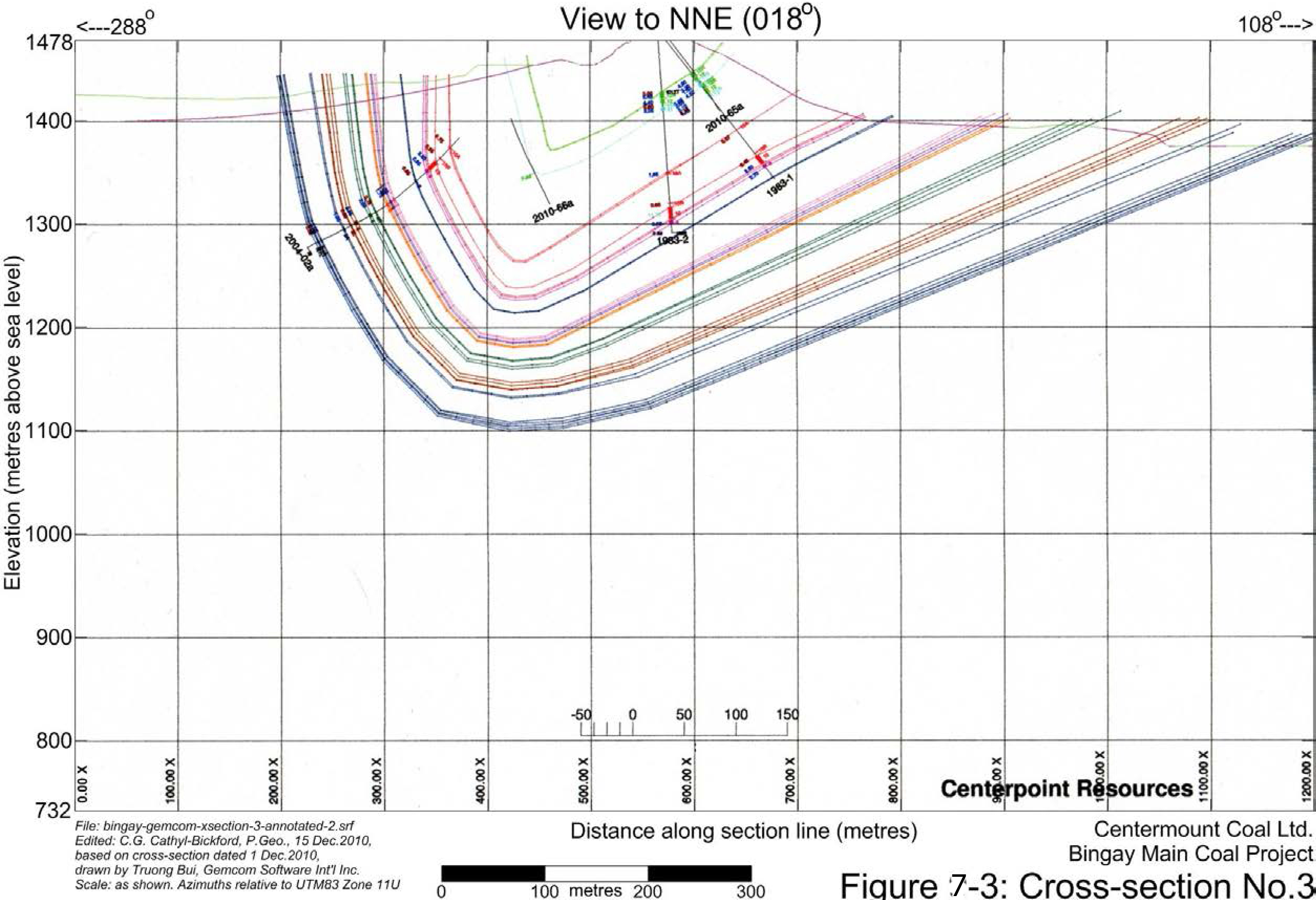
Figures 7-3 through **7-5** present selected structural cross-sections derived from Gemcom's modelling of the intensely-drilled Bingay Hill area. Cross-sections Nos.3, 7 and 11 correspond approximately to cross-sections B-B', D-D' and F-F' from previous work (Cathyl-Bickford, 2005). **Figure 7-6** also based on a Gemcom map, shows the locations of coal intersections along boreholes which were used to generate the model. Shown in blue on this map are the mapped and inferred traces of the No.10 through No.21 coal beds, based on year-2004 and year-2005 fieldwork.



File: bingay-boreholes+sections-2.srf
Edited: C.G. Cathyl-Bickford, P.Geo., 15 Dec.2010,
based on map dated 27 Nov.2010,
drawn by staff of Gemcom Software Int'l Inc.
Scale: as shown. Grid: UTM NAD83 Zone 11U

Centermount Coal Ltd.
Bingay Main Coal Project

Figure 7-2: Borehole trajectories and cross-section locations at Bingay Hill



File: bingay-gemcom-xsection-3-annotated-2.srf
Edited: C.G. Cathyl-Bickford, P.Geo., 15 Dec.2010,
based on cross-section dated 1 Dec.2010,
drawn by Truong Bui, Gemcom Software Int'l Inc.
Scale: as shown. Azimuths relative to UTM83 Zone 11U

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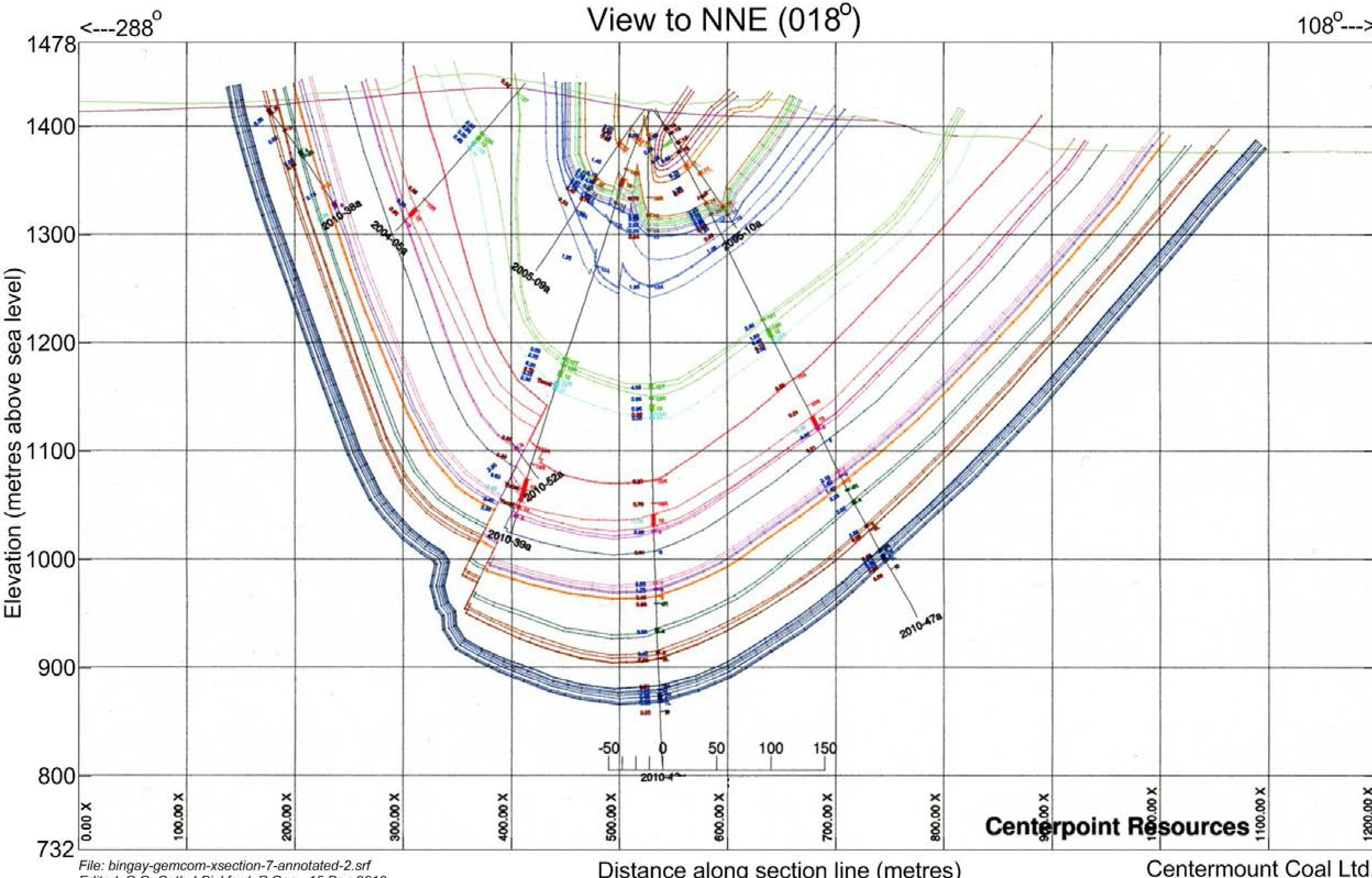
Figure 7-3: Cross-section No.3



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drawn by Truong Bui, Gemcom Software Int'l Inc.
Scale: as shown. Azimuths relative to UTM83 Zone 11U

0 100 metres 200 300

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Figure 7-4: Cross-section No.7

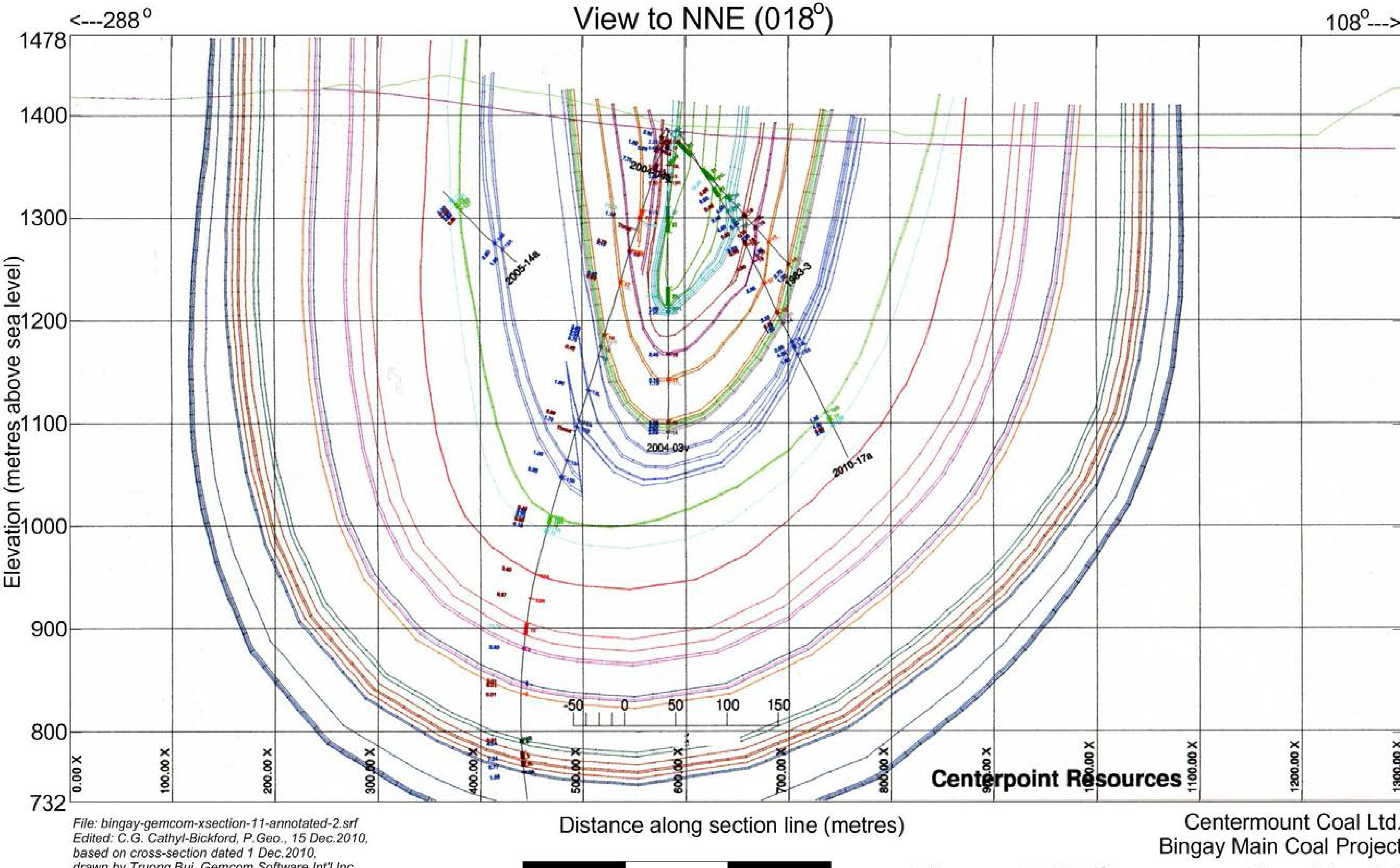
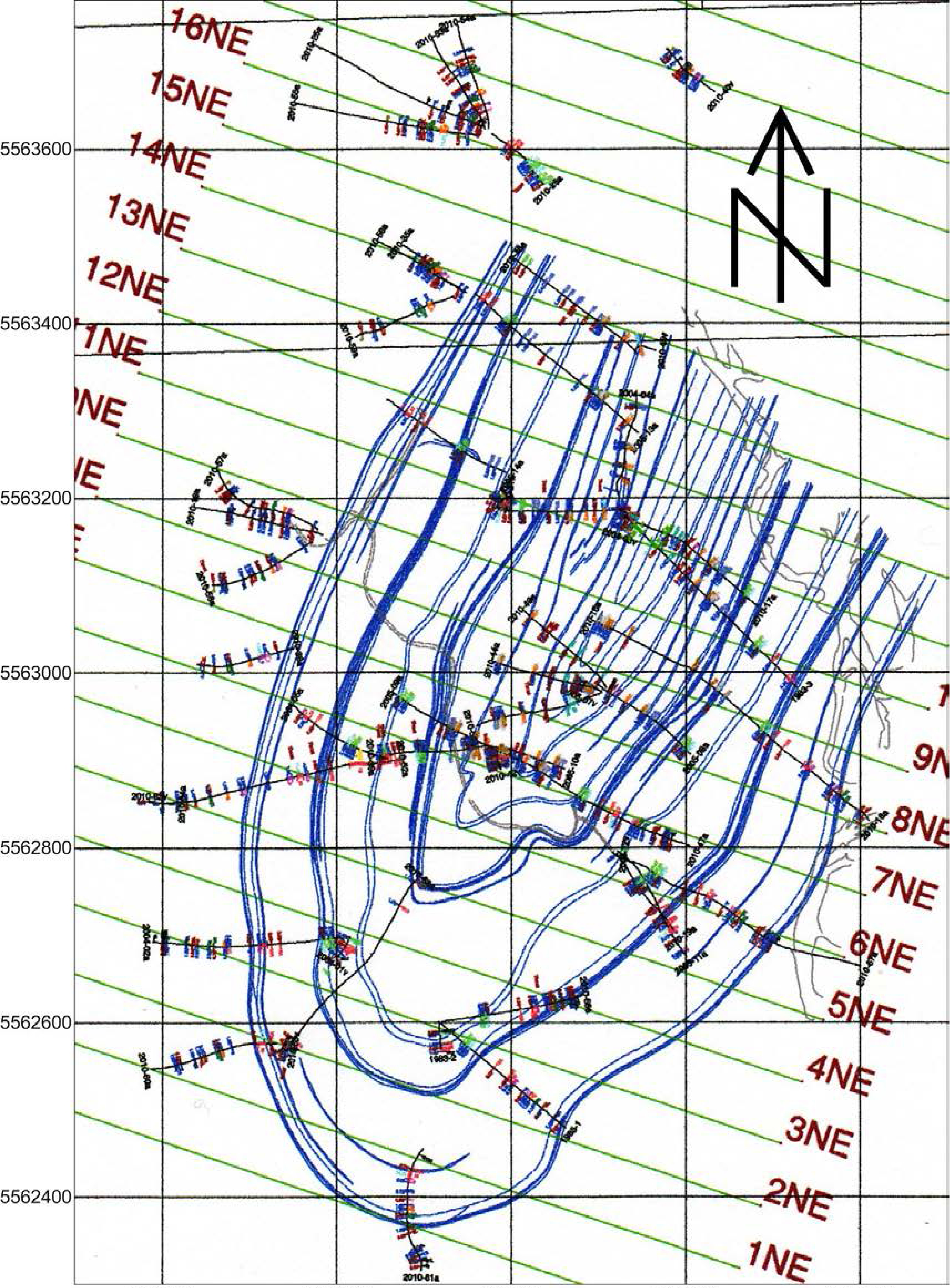


Figure 7-5: Cross-section No.11



File: bingay-borehole-trajectories-modelled-2.srf
Edited: C.G. Cathyl-Bickford, P.Geo., 25 Dec.2010,
based on map dated 27 Nov.2010,
drawn by staff of Gemcom Software Int'l Inc.
Scale: as shown. Grid: UTM NAD83 Zone 11U

0 metres 200

Centermount Coal Ltd.
Bingay Main Coal Project

Figure 7-6: Boreholes with modelled coal intersections

Cross-section No.3 (**Figure 7-3)** shows the interpreted structure through the top of Bingay Hill. Coal zones from No.1 (depicted in dark blue) through the No.9/10 (depicted in pink) and the No.11/12 (depicted in light green) are shown dipping steeply to the east along the western limb of the Bingay Syncline, and dipping moderately to the west along the syncline's eastern limb. The major coal zones show consistent multiple-bed stratigraphy, with no interpreted internal structural repeats.

Cross-section No.7 (**Figure 7-4)** shows the interpreted structure through the north-eastern flank of Bingay Hill, along a section line 300 metres to the Northeast of cross-section No.3. Structure in this area is interpreted to be more complex, with such complexity being mainly supported by the interpreted intersection of the No.19 coal bed in overturned western limb of the Bingay Syncline by boreholes 2005-10a and 2010-47a. The eastern limb of the syncline is here interpreted to dip more steeply to the west, than was seen in cross-section No.3. Borehole 2010-38a is interpreted to gradually work its way up-section as it progresses downward, although it still appears unlikely to reach the No.9/10 coal zone if it were continued on its present course.

Cross-section No.11 (**Figure 7-5)** shows the interpreted structure another 300 metres further to the Northeast. The Bingay Syncline is now seen to be almost isoclinal in its core, with the No.21 coal bed (shown in green) and the No.20 coal bed (shown in light blue) being intersected across the axial zone by boreholes 1983-3, 2004-3v and 2010-17a. The No.13A and No.13B coal beds (shown in dark blue) are interpreted to be displaced by a westward-verging out-of-the-syncline thrust fault situated near the base of the western limb of the Bingay Syncline.

Nine informally-named stratigraphic markers (included in **Table 7-3**, above are present in outcrop or suboutcrop within the explored part of the Bingay Main coal property. These markers are best recognised at the southern end of the property, in the area of frequent rock outcrops at Bingay Hill, and may be traced northwards, albeit with increasing difficulty, to near the northern boundary of Coal Licence 374190.

From top down, the markers are:

- **Shenfield Rock** - a prominent ledge-forming multi-storey unit of quartzarenite (mapped by Utah's geologists as 'Channel Deposit 2'), which forms bold cliffs on the western side of Bingay Hill, and which caps the hill itself. The Shenfield Rock also forms a prominent northeast-trending ledge along the south-eastern limb of the Bingay Syncline. The sandstone ranges from 15 to 35 metres thick; part of the thickness variation may be due to lateral pinch-out of some of its constituent channel-fills.

- **Anderson 'marine band'** - a recessive-weathering unit of interbedded mudstone, siltstone, limestone, and ironstone with occasional thin lenses of coal, which has a distinctively elevated geophysical response on gamma-ray logs (typically over 130 API units of log response). This unit is characteristically bioturbated, and on the strength of its gamma-log response, the Anderson ‘marine band’ is interpreted as a discrete band of marine strata, perhaps deposited during a period of elevated sea level.

- **No.11-12 coal zone** - a recessive-weathering unit of thickly-interbedded coal (Bingay Nos.11, 11R, 12, 12 R and 12T coal beds) and variably-carbonaceous mudstone, with minor thin interbeds of siltstone and tonstein. The 11-12 coal zone subcrops within a deep north-west-trending gully on the southern face of Bingay Hill.

- **Bingay Rock** - a prominent ledge-forming multi-story unit of quartzarenite (mapped by Utah's geologists as 'Channel Deposit 1'), which forms a persistent ridge of vertically-dipping rocks along the western limb of the Bingay Syncline. The Bingay Rock ranges from 25 to 50 metres thick, locally scouring up to 15 metres into the underlying beds.

No.10 coal bed - a recessive-weathering unit of coal (Bingay Nos.10 and locally the closely-overlying 10R coal beds), with minor thin interbeds of ironstone and tonstein. The No.10 coal bed is exposed in road cuts and trenches along the western limb of the Bingay Syncline, and it is also exposed in numerous old test pits along the western and southern flanks of Bingay Hill.

- **No.4 coal bed** – a recessive-weathering unit of coal (Bingay Nos.4 and locally the closely-overlying 4R coal beds) with minor thin interbeds of mudstone and siltstone. The No.4 coal is not known to outcrop within the Bingay Hill area, being generally covered by a layer of gravel or silty till. However, it may closely approach the ground surface to the east of borehole 2010-38a and to the west of borehole 2010-18a.

- **Moosewood sandstone** – a lenticular unit of very hard, erosive-based, locally cross-bedded quartzarenite, comprising the basal thick sand of the Mist Mountain Formation. The Moosewood sandstone forms a resistant, slow-drilling zone beneath the No.2A coal bed and above the No.2 coal bed.

- **No.1 coal zone** – a recessive-weathering unit of coal (Bingay Nos.1L, 1 and 1R coal beds) with minor thin interbeds of siltstone and mudstone, and locally thicker interbeds of interlaminated sandstone and siltstone. The No.1 coal zone possibly corresponds to the Balmer coal zone as seen further south in the Crowsnest coalfield.

- **Moose Mountain sandstone** - a prominent ledge-forming unit of very hard and resistant quartzlitharenite, comprising the upper part of the Morrissey Formation. The Moose Mountain sandstone is well-exposed along the south-western face of Bingay Hill, on the eastern side of Elk River Road, just above the fringing gravel flats. The Moose Mountain sandstone also forms a prominent vertically-dipping wall along the northern bank of Bingay Creek, downstream from the road bridge. The sandstone ranges from 12 to 25 metres thick.

The Bingay Rock and the Shenfield Rock are useful in walking-out the structure of the Bingay Hill area, and can be fairly readily recognised on the gamma-ray logs of the various boreholes drilled within the property. Both of these sandstone units are outlined in yellow on **Figure 9-7**. These two sandstones may together correspond with the sandstone-rich Cliff Marker, which has been mapped by Cominco's geologists within the middle of the Kootenay coal-measures along the western slopes of the Greenhills Range (Wolfhard, 1967). The Moose Mountain sandstone, although only sparsely exposed at outcrop, forms a distinctively slow-drilling zone and is therefore useful in subsurface exploration

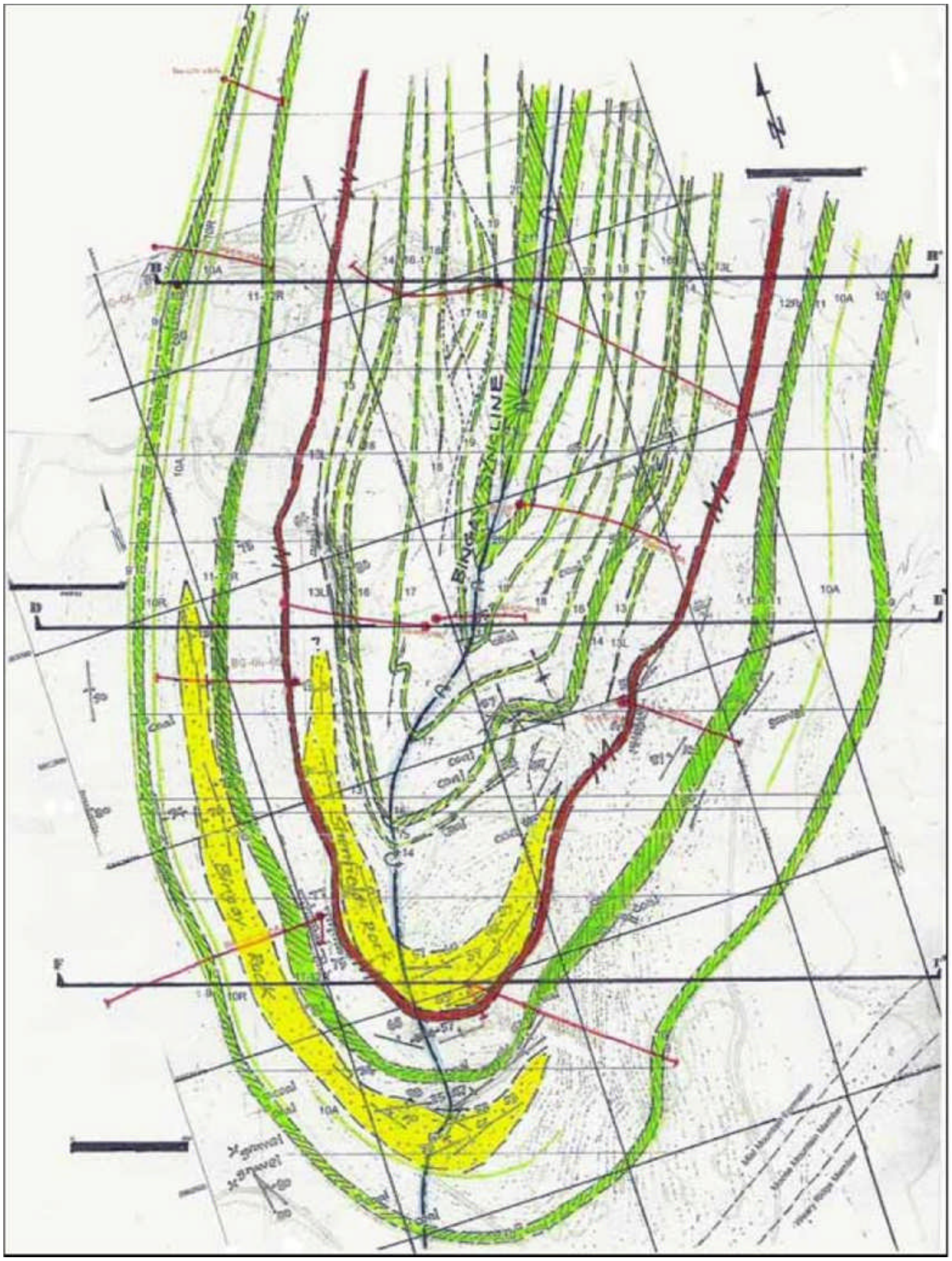


Figure 7-7: Geological map of the Bingay Hill area

The Bingay Main coal property contains at least thirty-two readily correlatable (**Tables 7-4** through **7-7**) coal beds, which range in true stratigraphic thickness from 0.3 to 16.2 metres. Cumulative thickness of these coals in a composite section of the coal-measures is 62.6 metres, over a stratigraphic interval of 460 metres (Cathyl-Bickford, 2005). Coal thus forms about 13.6% of the stratigraphic section at Bingay

Main. Of these coals, 24 typically have gross thickness of at least 1 metre inclusive of contained bands of rock.

- Eight coal beds (the Nos. 9 and 10 coal beds within the No.9-10 coal zone, the Nos. 11, 1R, 12 and 12R coal beds within the No.11-12 coal zone, and the Nos. 20 and 21 coal beds within the No.21 coal zone) were recognised as being closely-associated, and amenable to resource estimation on the strength of Hillsborough's year-2004 drilling programme (Cathyl-Bickford, 2004).

- A further eight coal beds (the Nos. 13, 17, 18 and 19 coal beds, and the Nos. 14, 15, 15R and 16 coal beds within the No.14-16 coal zone) were sufficiently explored during Hillsborough's year-2005 drilling programme to allow for coal-resource calculations. Thus, a total of 16 major coal beds were incorporated in the year-2005 resource base (Cathyl-Bickford, 2005).

- During the year-2010 drilling programme, emphasis was placed on establishing the thickness and stratigraphic relationships of coals lying beneath the No.9 coal zone. On the basis of this drilling, a further twelve coal beds (the Nos.1L, 1 and 1R coal beds within the No.1 coal zone, and the Nos. 2, 2A, 3L, 3, 4 (including 4R), 5, 6, 7 and 8 coal beds) have now been recognised as sufficiently explored to permit volumetric calculations (Brandão, Barnett and Bui, 2010). As well, the Nos. 12T, 13B, 13A and 13L coals were recognised as being at least locally present.

The Bingay Main coals are normal banded humic coals (as are most coals within the world's coalfields, consisting of alternating bright and dull bands, generally associated with thin and thick partings of rock. Most of the rock partings consist of variably-carbonaceous mudstone, with less-frequent partings of siltstone, ironstone, tonstein and sandstone.

Most of the internal partings within the coals contain plant debris and rootlet traces, indicative of the formation of palaeosols. The floors of the coal beds are often, but not always, rooted as well, suggesting that the coals formed from peats which were derived from in-situ vegetation. However, some of the coal beds' floors, most notably some delicately-laminated, soft, non-silty and very carbonaceous mudstones, lack rootlets altogether. This lack of rootlets suggests that, in such cases, the overlying coals may have originated as floating 'peat islands' above the waters of lakes, ponds or lagoons.

Where seen by the senior author in cores or in trenched sections, the Bingay Main coals have often been observed to be sheared. Shearing ranges from slight to intense. Nevertheless, most of the coals have retained coherent bedding and banding, and the true stratigraphic relationships within and amongst the coals are not difficult to discern. Coals are sometimes intensely weathered at outcrop, reducing them to essentially a smutty, coaly soil; for effective description of such coals, they must be trenched downward until less-weathered material is reached. The requisite depth of trenching at Bingay Main ranges from a few decimetres to a few metres.

Drilled depths to the tops of the Bingay coal beds, their net and gross drilled thicknesses, and their interpreted true stratigraphic thicknesses, are summarised below in **Table 7-4** (for year-1983 boreholes), **Table 7-5** (for year-2004 boreholes), **Table 7-6** (for year-2005 boreholes) and **Table 7-7** (for year-2010 boreholes, presented in five parts owing to the number of holes drilled in 2010). Also shown are depth to top and gross thickness of the Anderson marine band, and depths to tops of the Moose Mountain and Weary Ridge sandstones and the Fernie siltstone. Boreholes not listed in these tables were either drilled wholly within older, non-coal-bearing strata, were so shallow as to not reach any coal even though they entered coal-measures, or failed to reach bedrock.

Table 7-4: Drilled and true thickness of coal beds in year-1983 boreholes

hole/	**1983-1a**		**1983-2a**		**1983-3a**	
UTM coordinates	644117	5562601	644117	5562601	644330	5563180
Elevation	1489		1489		1388.2	
Geometry	Azimuth 130	Dip 50	Azimuth 175	Dip 80	Azimuth 135	Dip 45
Drift	3.05		0.61		5.95	
Casing shoe	3.05		3.05		6.1	
notes	no faults		no faults		fold axis @52.5 m 52.5	
coal beds	intersected	dip/true	Intersected	dip/true	intersected	dip/true
No.22						
22-net						
22-gross						
No.21R						
21R-net						
21R-gross						
No.21					19.15	39 degrees
21-net					18.05	14.03
21-gross					20.8	16.16
No.21 repeat					57	30 degrees
21-net					14.15	12.25
21-gross					16	13.86
No.21L					74.1	30 degrees
21L-net					0.68	0.59
21L-gross					0.68	0.59
No.20R					not present?	--
20R-net					0	0
20R-gross					0	0
No.20R repeat					not present	--
20R-net					0	0
20R-gross					0	0
No.20					14.95	40 degrees

20-net			0.78	0.6
20-gross			1.1	0.84
No.20 repeat			97.05	11 degrees
20-net			4.2	4.12
20-gross			4.55	4.47
No.20L			9.5	40 degrees
20L-net			0.5	0.38
20L-gross			0.5	0.38
No.19R			not present	--
19R-net			0	0
19R-gross			0	0

Table 7-4: Drilled and true thickness of coal beds in year-1983 boreholes (continued)

No.19R repeat			not present	--
19R-net			0	0
19R-gross			0	0
No.19			118.55	15 degrees
19-net			4.4	4.25
19-gross			5.5	5.31
No.19 repeat			not present	--
19-net			0	0
19.gross			0	0
No.19L			132.2	15 degrees
19L-net			0.18	0.17
19L-gross			0.18	0.17
No.18R			not present	--
18R-net			0	0
18R-gross			0	0
No.18			137.05	17 degrees
18-net			1.61	1.54
18-gross			2.65	2.53
No.18 repeat			not present	--
18-net			0	0
18-gross			0	0
No.17			157.11	20 degrees
17-net			1.63	1.53
17-gross			1.89	1.77
No.17 repeat			not present	--
17-net			0	0
17-gross			0	0
No.17L			160.45	23 degrees
17L-net			0.25	0.23
17L-gross			0.25	0.23
No.17L repeat			not present	--
17L-net			0	0
17L-gross			0	0
No.16R			not present	--
16R-net			0	0
16R-gross			0	0
No.16R repeat			not present	---

16R-net					0	0
16R-gross					0	0
No.16					187.2	26 degrees
16-net					2	1.8
16-gross					2.7	2.43
No.16 repeat					not present	--
16-net					0	0
16-gross					0	0
No.15R					193.8	26 degrees
15R-net					1.05	0.94
15R-gross					1.2	1.08
No.15					195.85	26 degrees
15-net					1.3	1.17
15-gross					1.55	1.39
No.14					198.35	26 degrees
14-net					1.5	1.35
14-gross					1.6	1.44
No.13					215.56	20 degrees
13-net					2.34	2.2
13-gross					2.74	2.57

Table 7-4: Drilled and true thickness of coal beds in year-1983 boreholes (continued)

No.13L					218.85	20 degrees
13L-net					1.15	1.08
13L-gross					1.15	1.08
No.13L repeat					not present	--
13L-net					0	0
13L-gross					0	0
No.13A					232.05	20 degrees
13A-net					0.9	0.85
13A-gross					1.2	1.13
No.13A repeat					not present	--
13A-net					0	0
13A-gross					0	0
No.13B					not present	--
13B-net					0	0
13B-gross					0	0
No.13B repeat					not present	--
13B-net					0	0
13B-gross					0	0
Anderson	17.75		19.9	41 degrees	237.95	15 degrees
And’s’n-gross	9.6		11.45	8.64	8.05	7.78
Anderson repeat	not present	--	not present	--	not present	--
And’s’n-gross	0	0	0	0	0	0
No.12T	not present	--	not present	--	not present	--
12T-net	0	0	0	0	0	0
12T-gross	0	0	0	0	0	0
No.12R	55	14 degrees	61.55	41 degrees	293.75	15 degrees
12R-net	4.9	4.75	4.1	3.09	1.7	1.64
12R-gross	4.9	4.75	5.45	4.11	2.8	2.7

No.12R repeat	not present	--	not present	--	not present	--
12R-net	0	0	0	0	0	0
12R-gross	0	0	0	0	0	0
No.12	61	11.5 degrees	68	41.5 degrees	297	16.5 degrees
12-net	3.2	3.14	3.45	2.58	3.6	3.45
12-gross	3.2	3.14	4.4	3.3	5.25	5.03
No.12 repeat	not present	--	not present	--	not present	--
12-net	0	0	0	0	0	0
12-gross	0	0	0	0	0	0
No.11R	64.5	11 degrees	73.95	42 degrees	303.84	15 degrees
11R-net	1.5	1.47	0.5	0.37	0.49	0.47
11R-gross	1.5	1.47	0.8	0.59	0.51	0.49
No.11R repeat	not present	--	not present	--	not present	--
11R-net	0	0	0	0	0	0
11R-gross	0	0	0	0	0	0
No.11	67.9	19 degrees	76.75	42 degrees	305.55	14 degrees
11-net	2.28	2.16	2.4	1.78	1.3	1.26
11-gross	4.52	4.27	3.05	2.27	2.05	1.99
No.11 repeat	not present	--	not present	--	not present	--
11-net	0	0	0	0	0	0
11-gross	0	0	0	0	0	0
No.10A	127.53	10 degrees	140.2	30 degrees	333.5	13 degrees
10A-net	0.07	0.07	1.1	0.95	1.24	1.21
10A-gross	0.07	0.07	1.85	1.6	2.65	2.58
No.10A repeat	not present	--	not present	--	not present	--
10A-net	0	0	0	0	0	0
10A-gross	0	0	0	0	0	0

Table 7-4: Drilled and true thickness of coal beds in year-1983 boreholes (continued)

No.10R	157	10 degrees	170.55	23 degrees	not present	--
10R-net	0.45	0.44	0.65	0.6	0	0
10R-gross	0.45	0.44	0.65	0.6	0	0
No.10	160.15	16.5 degrees	174.75	21 degrees	370.25	13 degrees
10-net	9.6	9.2	9.9	9.24	8.35	8.14
10-gross	10.25	9.83	11.7	11.92	9.35	9.11
No.10 repeat	not present	--	not present	--	not present	--
10-net	0	0	0	0	0	0
10-gross	0	0	0	0	0	0
No.10 repeat 2	not present	--	not present	--	not present	--
10-net	0	0	0	0	0	0
10.gross	0	0	0	0	0	0
No.9	171.7	10.5 degrees	187.7	22 degrees	381.05	14.5 degrees
9-net	2.3	2.26	3.15	2.92	1.87	1.81
9-gross	2.7	2.65	3.8	3.52	2.41	2.33
No.9 repeat	not present	--	not present	--	not present	--
9-net	0	0	0	0	0	0
9-gross	0	0	0	0	0	0
No.9 repeat 2	not present	--	not present	--	not present	--
9-net	0	0	0	0	0	0
9-gross	0	0	0	0	0	0

No.8	194.5	11 degrees	not reached	not reached	not reached	not reached
8-net	0.85	0.83				
8-gross	0.85	0.83				
No.7	201.2	10 degrees				
7-net	1.1	1.08				
7-gross	1.3	1.28				
No.6	207	11 degrees				
6-net	1.2	1.18				
6-gross	1.2	1.18				
No.5	212.85	10 degrees				
5-net	1.05	1.03				
5-gross	1.05	1.03				
No.5 repeat	not present	--				
5-net	0	0				
5-gross	0	0				
No.4R	not present	--				
4R-net	0	0				
4R-gross	0	0				
No.4R repeat	not present	--				
4R-net	0	0				
4R-gross	0	0				
No.4	222.85	11 degrees				
4-net	2.75	2.7				
4-gross	3.05	2.99				
No.4 repeat	not present	--				
4-net	0	0				
4-gross	0	0				
No.3	238.8	11 degrees				
3-net	1.4	1.37				
3-gross	1.4	1.37				
No.3L	240.5	13 degrees				
3L-net	0	0				
3L-gross	0.3	0.29				
No.2A	265.85	15 degrees				
2A-net	0.85	0.82				
2A-gross	1.15	1.11				

Table 7-4: Drilled and true thickness of coal beds in year-1983 boreholes (concluded)

No.2	267.35	16 degrees				
2-net	1.1	1.05				
2-gross	1.1	1.05				
No.1R	279.3	12 degrees				
1R-net	0.37	0.36				
1R-gross	0.37	0.36				
No.1	285.4	12 degrees				
1-net	1	0.98				
1-gross	1.02	1				
No.1L	not present	--				
1L-net	0	0				
1L-gross	0	0				

Moose Mountain	286.42		
No.0	not reached		
0-net			
0-gross			
Weary Ridge			
Fernie			
Total depth / Hole	295.35 1983-1a	199.95 1983-2a	394.41 1983-3a

Table 7-5: Drilled and true thickness of coal beds in year-2004 boreholes

hole	2004-1v relog		2004-2a relog		2004-3v		2004-4a		2004-5a		2004-6v	
UTM coords	644015	5562698	644012	5562698	644333.29	5563183.069	644332	5563183	644058	5562902	644065	5563271
Elevation	1452.3		1452.2		1387.214		1387.2		1440.1		1421.9	
Geometry	vertical	Dip 90	265	Dip 50	Vertical	Dip 90	280	Dip 60	284	Dip 50	vertical	Dip 90
Drift	2.4	2.4	2.3	1.76	0	0	1.8	1.56	0	0	0	0
Casing shoe	2.5	2.5	2.3	1.76	3	3	3	2.6	3	2.3	0	0
notes >注	no faults		no faults		fold axis @ 127.2		thrust @60.8		no faults		all drilled in No.10 coal bed	
coal beds	intersected	dip/true	intersected	dip/true	Intersected	dip/true	intersected	dip/true	intersected	dip/true	intersected	dip/true
No.22												
22-net												
22-gross												
No.21R												
21R-net												
21R-gross												
No.21					85.4	66 degrees						
21-net					15.8	6.43						
21-gross					15.8	6.43						
No.21 repeat					154.35	37 degrees						
21-net					17.25	13.78						
21-gross					17.8	14.22						
No.21L					not present	--						
21L-net					0	0						
21L-gross					0	0						
No.20R					174.3	38 degrees						
20R-net					1	0.79						
20R-gross					1	0.79						
No.20R repeat					not present	--						
20R-net					0	0						
20R-gross					0	0						
No.20					76.25	66 degrees						
20-net					9.15	3.72						
20-gross					9.15	3.72						
No.20 repeat					177.15	38 degrees						
20-net					1.4	1.1						
20-gross					2.95	2.32						
No.20L					not present	--						
20L-net					0	0						
20L-gross					0	0						
No.19R					10.75	43 degrees						
19R-net					2.25	1.65						
19R-gross					2.25	1.65						

No.19R repeat			52.5 67 degrees			
19R-net			0.2 0.08			
19R-gross			0.2 0.08			
No.19			14.75 53 degrees	8.85 54 degrees		
19-net			6.45 3.88	2.85 1.68		
19-gross			6.45 3.88	2.85 1.68		
No.19 repeat			44.2 67 degrees	not present --		
19-net			2.9 1.13	0 0		
19.gross			3.3 1.29	0 0		
No.19L			35.35 67 degrees	not present --		
19L-net			0.85 0.33	0 0		
19L-gross			0.85 0.33	0 0		

Table 7-5: Drilled and true thickness of coal beds in year-2004 boreholes (continued) ）

No.18R			not present --	96.8 62 degrees		
18R-net			0 0	1.1 0.52		
18R-gross			0 0	1.1 0.52		
No.18			218.5 31 degrees	21.55 58 degrees		
18-net			1.95 1.67	5.5 2.91		
18-gross			2.45 2.1	5.5 2.91		
No.18 repeat			not present --	98.9 62 degrees		
18-net			0 0	1.7 0.8		
18-gross			0 0	1.7 0.8		
No.17			243.5 28.5 degrees	125.85 58 degrees		
17-net			3.1 2.72	2.6 1.38		
17-gross			3.1 2.72	2.6 1.38		
No.17 repeat			not present --	not present --		
17-net			0 0	0 0		
17-gross			0 0	0 0		
No.17L			247.7 28.5 degrees	129.45 58 degrees		
17L-net			0 0	0 0		
17L-gross			1.1 0.97	0.55 0.29		
No.17L repeat			not present --	not present --		
17L-net			0 0	0 0		
17L-gross			0 0	0 0		
No.16R			not present --	not present --		
16R-net			0 0	0 0		
16R-gross			0 0	0 0		
No.16R repeat			not present ---	not present ---		
16R-net			0 0	0 0		
16R-gross			0 0	0 0		

No.16			286.2	16 degrees	163.15	62 degrees		
16-net			3.65	3.51	2.7	1.27		
16-gross			3.95	3.8	2.7	1.27		
No.16 repeat			not present	--	not present	--		
16-net			0	0	0	0		
16-gross			0	0	0	0		
No.15R			290.65	22 degrees	165.85	62 degrees		
15R-net			2	1.85	1.55	0.73		
15R-gross			2	1.85	1.55	0.73		
No.15			293.15	14.5 degrees	168.1	59 degrees		
15-net			2.45	2.37	1.55	0.8		
15-gross			2.45	2.37	1.55	0.8		
No.14			297.15	11 degrees	171.65	57 degrees		
14-net			2.5	2.45	2.3	1.25		
14-gross			2.5	2.45	2.3	1.25		
No.13			not reached	not reached	232.55	45 degrees		
13-net					0.85	0.6		
13-gross					0.85	0.6		
No.13L					235.8	45 degrees		
13L-net					1.55	1.1		
13L-gross					1.55	1.1		
No.13L repeat					not present	--		
13L-net					0	0		
13L-gross					0	0		
No.13A					not reached	not reached		
13A-net								
13A-gross								
No.13B								
13B-net								
13B-gross								

Table 7-5: Drilled and true thickness of coal beds in year-2004 boreholes (continued)

Anderson MB									3.3	36 degrees		
And's'n-gross									2.25	1.82		
Anderson MB rpt									not present	--		
Anderson gross									0	0		
No.12T	92.8	31 degrees	23.4	30 degrees					10.5	36 degrees		
12T-net	2	1.71	1.3	1.13					0	0		
12T-gross	2	1.71	1.3	1.13					0.55	0.44		
No.12R	95.9	56 degrees	24.7	28.5 degrees					60.35	29		
12R-net	15.3	8.56	5.7	5.01					2.65	2.32		
12R-gross	15.3	8.56	5.7	5.01					2.65	2.32		
No.12R repeat	not present	--	not present	--					not present	--		
12R-net	0	0	0	0					0	0		
12R-gross	0	0	0	0					0	0		
No.12	115.05	54 degrees	32	30.5 degrees					65.25	30 degrees		
12-net	10.5	6.17	6.1	5.26					3.5	3.03		
12-gross	12.25	7.2	6.2	5.34					3.95	3.42		
No.12 repeat	not present	--	not present	--					not present	--		
12-net	0	0	0	0					0	0		
12-gross	0	0	0	0					0	0		
No.11R	131.3	53.5 degrees	39.65	32.5 degrees					70.8	31		
11R-net	2.55	1.52	0.95	0.8					5	4.29		
11R-gross	2.55	1.52	0.95	0.8					5	4.29		
No.11R repeat	not present	--	not present	--					not present	--		
11R-net	0	0	0	0					0	0		
11R-gross	0	0	0	0					0	0		
No.11	142.05	40 degrees	41.95	35 degrees					78.25	32 degrees		
11-net	2.65	2.03	2.45	2.01					2.4	2.04		
11-gross	2.95	2.26	2.85	2.33					2.4	2.04		
No.11 repeat	not present	--	not present	--					not present	--		
11-net	0	0	0	0					0	0		
11-gross	0	0	0	0					0	0		
No.10A	209	19 degrees	109.1	25.5 degrees					not present?	--		
10A-net	0.7	0.66	0.75	0.68					0	0		
10A-gross	0.7	0.66	0.75	0.68					0	0		
No.10A repeat	not present	--	not present	--					not present	--		
10A-net	0	0	0	0					0	0		
10A-gross	0	0	0	0					0	0		
No.10R	233.6	54 degrees	123.5	22.5 degrees					143.55	35 degrees		
10R-net	0.9	0.53	0.95	0.88					0.65	0.53		
10R-gross	0.9	0.53	0.95	0.88					0.65	0.53		
No.10	241.5	37 degrees	129.5	24.5 degrees					155.6	34.5 degrees		

10-net	11.55	9.22	9.85	8.96			9.55	7.87	
10-gross	12.6	10.06	9.85	8.96			9.55	7.87	
No.10 repeat	not present	--	not present	--			not present	--	
10-net	0	0	0	0			0	0	
10-gross	0	0	0	0			0	0	
No.10 repeat 2	not present	--	not present	--			not present	0	
10-net	0	0	0	0			0	0	
10.gross	0	0	0	0			0	0	
No.9	256.35	44 degrees	141.2	17.5 degrees			170.75	34 degrees	
9-net	5.45	3.92	2.55	2.43			0.9	0.74	
9-gross	6.45	4.64	2.65	2.53			0.9	0.74	
No.9 repeat	not present	--	not present	--			not present	--	
9-net	0	0	0	0			0	0	
9-gross	0	0	0	0			0	0	

Table 7-5: Drilled and true thickness of coal beds in year-2004 boreholes (concluded) ）

No.9 repeat 2	not present	--	not present	--					not present	--		
9-net	0	0	0	0					0	0		
9-gross	0	0	0	0					0	0		
No.8	279.95	45 degrees	157.15	27.5 degrees					not reached	not reached		
8-net	1.7	1.2	0.85	0.75								
8-gross	2.55	1.8	0.85	0.75								
No.7	308.8	38.5 degrees	185.75	29 degrees								
7-net	2.65	2.07	1.6	1.4								
7-gross	2.65	2.07	1.6	1.4								
No.6	not reached	not reached	189.75	28 degrees								
6-net			1.55	1.37								
6-gross			1.55	1.37								
No.5			193.5	29 degrees								
5-net			1.75	1.53								
5-gross			1.75	1.53								
No.5 repeat			not present	--								
5-net			0	0								
5-gross			0	0								
No.4R			208.4	22.5 degrees								
4R-net			0.75	0.69								
4R-gross			0.75	0.69								
No.4R repeat			not present	--								
4R-net			0	0								
4R-gross			0	0								
No.4			213.9	26 degrees								
4-net			2.3	2.07								
4-gross			2.5	2.25								
No.4 repeat			not present	--								
4-net			0	0								
4-gross			0	0								
No.3			229.7	25.5 degrees								
3-net			2.55	2.3								
3-gross			2.95	2.66								
No.3L			236.55	25 degrees								
3L-net			0.8	0.73								
3L-gross			0.8	0.73								
No.2A			244	22 degrees								
2A-net			1.15	1.07								
2A-gross			1.35	1.25								
No.2			269.05	22 degrees								
2-net			1.05	0.97								
2-gross			1.05	0.97								

No.1R		not present	--				
1R-net		0	0				
1R-gross		0	0				
No.1		272.5	22 degrees				
1-net		1.05	0.97				
1-gross		1.05	0.97				
No.1L		not present	--				
1L-net		0	0				
1L-gross		0	0				
Moose Mountain		273.55					
No.0		not reached	not reached				
Total depth	316.38	286.5		306.7	245.5	186	32

Table 7-6: Drilled and true thickness of coal beds in year-2005 boreholes

Hole/	2005-7v		2005-8a		2005-9a		2005-10a		2005-11a relog		2005-12v relog		2005-13a relog		2005-14a relog	
UTM coords	644286	5562991	644299	5562986	644179.438	5562913.758	644187.496	5562916.689	644322	5562796	644321	5562793	644158	5563434	644057	5563313
Elevation	1402.5		1402.1		1416.095		1416.095		1417.5		1417.5		1416.7		1423.7	
Geometry	vertical	Dip 90	127	Dip 50	292	Dip 50	112	Dip 50	127	Dip 50	vertical	Dip 90	132	Dip 50	122	Dip 50
Drift	5.85	5.85	5.7	4.37	6.2	4.75	4.7	3.6	3.8	2.91	2.5	2.5	1	0.77	0.4	0.31
Casing shoe	5.9	5.9	5.9	2.9	9.4	7.2	5.8	4.44	5.8	4.44	2.4	2.4	2.9	2.22	2.25	1.72
Notes >	thrust @102.8		no faults		no faults		fold axis at 33.3		no faults		no faults		thrust @199.25		no faults	
Notes >							fault? @ 91.4									
Coal beds	intersected	dip/true	intersected	dip/true	Intersected	dip/true	intersected	dip/true	intersected	dip/true	intersected	dip/true	intersected	dip/true	intersected	dip/true
No.22																
22-net																
22-gross 总																
No.21R																
21R-net																
21R-gross																
No.21																
21-net																
21-gross																
No.21L																
21L-net																
21L-gross																
No.20R																
20R-net																
20R-gross																
No.20	7.38	44 degrees														
20-net	10.99	7.91														
20-gross	10.99	7.91														
No.20 repeat	not present	--														
20-net	0	0														
20-gross	0	0														
No.20L	not present	--														
20L-net	0	0														
20L-gross	0	0														
No.19R	not present	--					not present	--								
19R-net	0	0					0	0								
19R-gross	0	0					0	0								
No.19R repeat	not present	--					not present	--								
19R-net	0	0					0	0								
19R-gross	0	0					0	0								
No.19	61.93	50 degrees	22.35	19 degrees			27.15	21 degrees								
19-net	3.74	2.4	4.63	4.38			2.22	2.07								
19-gross	3.74	2.4	4.63	4.38			2.22	2.07								

No.19 repeat	not present	--	not present	--			37.45	32 degrees								
19-net	0	0	0	0			3.05	2.59								
19.gross	0	0	0	0			3.05	2.59								
No.19L	66.38	51 degrees	27.61	17 degrees			not present	--								
19L-net	0.52	0.33	0.37	0.35			0	0								
19L-gross	0.52	0.33	0.37	0.35			0	0								
No.18R	not present	--	not present	--			not present	--								
18R-net	0	0	0	0			0	0								
18R-gross	0	0	0	0			0	0								
No.18	87.98	53 degrees	40.66	14 degrees			not present	--								
18-net	1.71	1.03	1.14	1.11			0	0								
18-gross	2.34	1.41	1.71	1.66			0	0								
No.18 repeat	not present	--	not present	--			not present	--					not reached	not reached		
18-net	0	0	0	0			0	0								
18-gross	0	0	0	0			0	0								

Table 7-6: Drilled and true thickness of coal beds in year-2005 boreholes (continued)

No.17	116.67	43 degrees	61.5	18 degrees	38.05	17.5 degrees	72.5	26.5 degrees					330	31 degrees		
17-net	2.43	1.78	2.2	2.09	3.18	3.03	3	2.68					3.75	3.21		
17-gross	2.43	1.78	2.2	2.09	3.18	3.03	3	2.68					3.75	3.21		
No.17 repeat	not present	--	not present	--	not present	--	not present	--					not present	---		
17-net	0	0	0	0	0	0	0	0					0	0		
17-gross	0	0	0	0	0	0	0	0					0	0		
No.17L	120.35	43 degrees	64.28	18 degrees	41.78	17.5 degrees	76.42	34 degrees					327.8	46.5 degrees		
17L-net	0	0	0	0.32	0.8	0.76	0.43	0.36					0	0		
17L-gross	0.2	0.15	0.34	0.32	0.8	0.76	0.43	0.36					0.75	0.52		
No.17L repeat	not present	--	not present	--	not present	--	not present	--					not present	---		
17L-net	0	0	0	0	0	0	0	0					0	0		
17L-gross	0	0	0	0	0	0	0	0					0	0		
No.16R	157.82	52 degrees	not present	--	not present	--	not present	--					not present	--		
16R-net	0.38	0.23	0	0	0	0	0	0					0	0		
16R-gross	0.38	0.23	0	0	0	0	0	0					0	0		
No.16R repeat	not present	---	not present	---	not present	---	not present	---					not present	---		
16R-net	0	0	0	0	0	0	0	0					0	0		
16R-gross	0	0	0	0	0	0	0	0					0	0		
No.16	163.03	54 degrees	101.07	10 degrees	77.62	19.5 degrees	110.2	15 degrees					282.4	47.5 degrees		
16-net	2.79	1.64	2.63	2.59	4.71	4.44	2.85	2.75					3.6	2.43		
16-gross	2.92	1.72	3.2	3.15	4.71	4.44	2.85	2.75					3.6	2.43		
No.16 repeat	not present	--	not present	--	not present	--	not present	--					not present	--		
16-net	0	0	0	0	0	0	0	0					0	0		
16-gross	0	0	0	0	0	0	0	0					0	0		
No.15R	165.95	54 degrees	104.96	10 degrees	82.33	19.5 degrees	113.05	15 degrees					280.6	47.5 degrees		
15R-net	2.19	1.29	1.84	1.81	1.13	1.07	1.57	1.52					1.8	1.22		
15R-gross	2.19	1.29	2.04	2.01	1.13	1.07	1.57	1.52					1.8	1.22		
No.15	168.4	46 degrees	107.77	13.5 degrees	83.91	19.5 degrees	115.45	20 degrees					277.05	44.5 degrees		
15-net	1.85	1.29	1.4	1.36	1.79	1.69	1.45	1.36					2.05	1.46		
15-gross	2.12	1.47	1.4	1.36	1.79	1.69	1.45	1.36					2.05	1.46		
No.14	171.8	40 degrees	110.92	13 degrees	89.85	22 degrees	119.35	27 degrees					272.45	53 degrees		
14-net	0.42	0.32	1.75	1.71	2.27	2.1	1.8	1.6					2.3	1.38		
14-gross	0.42	0.32	1.75	1.71	2.27	2.1	1.8	1.6					2.3	1.38		
No.13	182.95	38.5 degrees	123.72	16 degrees	94.65	40 degrees	127.4	30 degrees					264.65	30 degrees		
13-net	0.2	0.16	1.05	1.01	1.05	0.8	0	0					0.65	0.56		
13-gross	0.2	0.16	2.07	1.99	1.05	0.8	0.45	0.39					0.65	0.56		
No.13L	not reached	not reached	129.67	17 degrees	99.13	40 degrees	not reached	not reached					238.25	55 degrees		
13L-net			1.34	1.28	0.45	0.34							1.2	0.69		
13L-gross			1.34	1.28	0.45	0.34							1.2	0.69		
No.13L repeat			not present	--	not present	--							166.8	44 degrees	not reached	not reached
13L-net			0	0	0	0							0	0		
13L-gross			0	0	0	0							0.5	0.36		

No.13A		not present	--	112.6	36 degrees							130.4	45 degrees	212.55	50.5 degrees
13A-net		0	0	0	0							1.6	1.13	1.85	1.18
13A-gross		0	0	0.33	0.27							1.6	1.13	1.85	1.18
No.13A repeat		not present	--	not present	--							not present	--	not present	---
13A-net		0	0	0	0							0	0	0	0
13A-gross		0	0	0	0							0	0	0	0
No.13B		not present	--	not present	--							116.55	45 degrees	202.1	55 degrees
13B-net		0	0	0	0							2.8	1.98	2.8	1.61
13B-gross		0	0	0	0							2.8	1.98	2.8	1.61
No.13B repeat		not present	--	not present	--							not present	--	not present	---
13B-net		0	0	0	0							0	0	0	0
13B-gross		0	0	0	0							0	0	0	0
Anderson MB		151	9 degrees	157	31 degrees			12.5	18 degrees	19.45	53.5 degrees	110.35	50 degrees	193.8	38.5 degrees
And’s’n-gross		7.5	7.41	9	7.71			9	8.56	12	7.14	4.6	2.96	5.55	4.34
Anderson rpt		not present	--	not present	--			not present	--	not present	---	not present	--	not present	--
And’s’n-gross		0	0	0	0			0	0	0	0	0	0	0	0

Table 7-6: Drilled and true thickness of coal beds in year-2005 boreholes (continued)

No.12T		203.7	12 degrees	195.37	29 degrees		60.6	13.5 degrees	93.6	47.5 degrees.	87	44 degrees	156.9	35 degrees
12T-net		0	0	2.04	1.78		0	0	2.5	1.69	0	0	0	0
12T-gross		0	0	3.16	2.76		1	0.97	2.5	1.69	0.5	0.36	0.8	0.66
No.12R		208.37	12 degrees	200.85	26 degrees		71	9 degrees	109.3	47.5 degrees?	79.05	45 degrees	151.5	35 degrees
12R-net		1.83	1.79	1.92	1.73		2.05	2.02	4.2	2.84	4.25	3.01	2.6	2.13
12R-gross		2.06	2.01	1.92	1.73		2.05	2.02	4.2	2.84	4.25	3.01	2.6	2.13
No.12R repeat		not present	--	not present	--		not present	---	not present	---	not present	---	not present	---
12R-net		0	0	0	0		0	0	0	0	0	0	0	0
12R-gross		0	0	0	0		0	0	0	0	0	0	0	0
No.12		211.77	10 degrees	206.8	26.5 degrees		73.95	9 degrees	115	47.5 degrees?	75.4	48.5 degrees	148.7	35 degrees
12-net		4.6	4.53	5.37	4.81		6	5.93	8.9	6.01	3.65	2.42	2.8	2.29
12-gross		4.73	4.66	5.82	5.21		6	5.93	8.9	6.01	3.65	2.42	2.8	2.29
No.12 repeat		not present	--	not present	--		not present	---	not present	---	not present	---	not present	---
12-net		0	0	0	0		0	0	0	0	0	0	0	0
12-gross		0	0	0	0		0	0	0	0	0	0	0	0
No.11R		218.2	11 degrees	213.67	28.5 degrees		81.65	15.5 degrees	126.3	47.5 degrees?	71.85	43.5 degrees	146.55	49 degrees
11R-net		0.56	0.55	0.7	0.62		0.65	0.63	2	1.35	1.65	1.2	0.95	0.62
11R-gross		0.68	0.67	0.7	0.62		0.65	0.63	2	1.35	1.65	1.2	0.95	0.62
No.11R repeat		not present	--	not present	--		not present	---	not present	---	not present	---	not present	---
11R-net		0	0	0	0		0	0	0	0	0	0	0	0
11R-gross		0	0	0	0		0	0	0	0	0	0	0	0
No.11		220.33	12 degrees	215.69	28.5 degrees		84.1	10 degrees	130	47.5 degrees?	68.85	42 degrees	141.95	44 degrees
11-net		1.91	1.87	2.46	2.16		2	1.97	not to base	not to base	1.4	1.04	3.3	2.37
11-gross		2.1	2.05	2.46	2.16		2	1.97	not to base	not to base	1.4	1.04	3.3	2.37
No.11 repeat		not present	--	not present	--		not present	--	not reached	not reached	not present	---	not present	---
11-net		0	0	0	0		0	0			0	0	0	0
11-gross		0	0	0	0		0	0			0	0	0	0
No.10A		not reached	not reached	not reached	not reached		126.3	6 degrees			30.7	46 degrees	77.7	50 degrees
10A-net							0.55	0.55			3.6	2.5	1.3	0.84
10A-gross							0.55	0.55			5.35	3.72	3.4	2.19
No.10A repeat							not present	--			not present	--	not present	--
10A-net							0	0			0	0	0	0
10A-gross							0	0			0	0	0	0
No.10R							152	20 degrees			18.65	23 degrees	66.45	51 degrees
10R-net							0	0			1	0.92	0.65	0.41
10R-gross							0	0			1	0.92	0.65	0.41
No.10							163.6	6 degrees			10.75	38 degrees	40.6	49 degrees
10-net							9.84	9.79			7.1	5.59	8.55	5.61
10-gross							10.1	10.04			7.1	5.59	8.8	5.77
No.10 repeat							not present	--			not present	---	not present	---
10-net							0	0			0	0	0	0
10-gross							0	0			0	0	0	0

No.10 repeat 2					not present --		not present ---	not present ---
10-net					0 0		0 0	0 0
10.gross					0 0		0 0	0 0
No.9					174.6 6 degrees?			28 49 degrees
9-net					2 1.99			1.9 1.25
9-gross					2 1.99			1.9 1.25
No.9 repeat					not present --			
9-net					0 0			
9-gross					0 0			
No.9 repeat 2					not present --			
9-net					0 0			
9-gross					0 0			
No.8					187.5 6 degrees?			
8-net					0 0			
8-gross					0 0			

Table 7-6: Drilled and true thickness of coal beds in year-2005 boreholes (concluded)

No.7					211.95	6 degrees?			
7-net					2.05	2.04			
7-gross					2.05	2.04			
No.6					217.1	6 degrees?			
6-net					1.3	1.29			
6-gross					1.3	1.29			
No.5					not reached	not reached			
5-net									
5-gross									
No.5 repeat									
5-net									
5-gross									
No.4R									
4R-net									
4R-gross									
No.4R repeat									
4R-net									
4R-gross									
No.4									
4-net									
4-gross									
No.4 repeat									
4-net									
4-gross									
No.3									
3-net									
3-gross									
No.3L									
3L-net									
3L-gross									
No.2A									
2A-net									
2A-gross									
No.2									
2-net									
2-gross									
No.1R									
1R-net									
1R-gross									
No.1									
1-net									
1-gross									

No.1L								
1L-net								
1L-gross								
Moose Mountain								
No.0								
0-net								
0-gross								
Weary Ridge								
Fernie								
Total depth	184.96	230.49	225.18	135	231.65	140.21	354.48	231.65

Table 7-7 (part 1 of 5): Drilled and true thickness of coal beds in year-2010 boreholes

hole/	2010-15a		2010-16a		2010-17a		2010-18A		2010-19a		2010-20a		2010-21a		2010-25a	
UTM coords	644413.132	5563000.113	644418.437	5562992.526	644340	5563173	643984.12	5563158.9	644320.815	5562792.501	644184.986	5562914.74	644335.965	5563185.487	644165.282	5563626.456
elevation	1388.952		1388.636		1387.2		1429.239		1417.365		1415.895		1386.789		1407.43	
geometry	303.04972	Dip 61.8969	130.08889	Dip 47.6792	110	60	282.8808	Dip 56.9033	139.95861	Dip 62.9922	203.244722	Dip 62.5819	287.71722	Dip 69.5189	297.975	Dip 50.1475
Drift	4.57	4.03	6.5	4.81	5.18	4.49	4	3.35	2.4	2.14	3.1	2.75	1.5	1.41	13.7	10.52
Casing shoe	20.12	17.75	9	6.65	10.06	8.71	8.2	6.87	7.4	6.59	8.2	7.28	14.8	13.91	27.95	21.46
notes >	thrust@ 250.75		fault@ 37.80		no faults		no faults		no faults		no faults		thrust @103.7		no faults	
notes >													thrust @310.5			
notes >													(logs to 445)			
coal beds	intersected	dip/true	intersected	dip/true	intersected	dip/true	intersected	dip/true	intersected	dip/true	intersected	dip/true	intersected	dip/true	intersected	dip/true
No.21					67.4	39.5 degrees										
21-net					9	6.94										
21-gross					9.95	7.68										
No.21L					80.95	18.5 degrees										
21L-net					0.45	0.43										
21L-gross					0.45	0.43										
No.20R					93.2	16 degrees										
20R-net					2.4	2.31										
20R-gross					2.4	2.31										
No.20					103.3	32.5 degrees										
20-net					4.6	3.88										
20-gross					4.6	3.88										
No.20L					113.7	40.5 degrees										
20L-net					0	0										
20L-gross					0.3	0.23										
No.19R					not present	--										
19R-net					0	0										
19R-gross					0	0										
No.19					127.8	6 degrees							21.5	55 degrees		
19-net					3.6	3.58							1.8	1.03		
19-gross					3.6	3.58							1.8	1.03		
No.19L					132.7	6 degrees							not present	---		
19L-net					0.6	0.6							0	0		
19L-gross					0.6	0.6							0	0		
No.18R					not present	---							123.7	45 degrees		
18R-net					0	0							0.7	0.49		
18R-gross					0	0							0.7	0.49		
No.18					149.6	6 degrees							35.85	49 degrees		
18-net					0.9	0.9							7.75	5.08		
18-gross					0.9	0.9							7.75	5.08		
No.18 repeat					not present	---							125.05	45 degrees		
18-net					0	0							2.04	1.44		

18-gross			0	0					2.15	1.52	
No.17			172.4	6 degrees			20.4	2 degrees	83.4	45 degrees	
17-net			2.35	2.34			2	2	10.2	7.21	
17-gross			2.35	2.34			2	2	10.7	7.57	
No.17 repeat			not present	---			not present	---	155.1	47.5 degrees	
17-net			0	0			0	0	3.4	2.3	
17-gross			0	0			0	0	3.4	2.3	
No.17L			not present	---			not present	---	95	45 degrees	
17L-net			0	0			0	0	0.95	0.67	
17L-gross			0	0			0	0	1.1	0.78	
No.17L repeat			not present	---			not present	---	159.95	45 degrees	
17L-net			0	0			0	0	0.8	0.57	
17L-gross			0	0			0	0	0.8	0.57	

Table 7-7 (part 1 of 5): Drilled and true thickness of coal beds in year-2010 boreholes (continued)

No.16R	10.6	42 degrees			not present	---					65.45	5 degrees	not present	---		
16R-net	6.85	5.09			0	0					2.1	2.09	0	0		
16R-gross	6.85	5.09			0	0					2.1	2.09	0	0		
No.16R repeat	201	0 degrees			not present	---					not present	---	not present	---		
16R-net	0	0			0	0					0	0	0	0		
16R-gross	0.4	0.4			0	0					0	0	0	0		
No.16	243.95	42 degrees	17.4	17 degrees	203.8	6 degrees					73.85	4 degrees	209.75	50 degrees		
16-net	6.2	4.61	3.05	2.92	2.4	2.39					3.25	3.24	3.85	2.47		
16-gross	6.2	4.61	3.55	3.39	3.5	3.48					3.25	3.24	3.85	2.47		
No.16 repeat	251.05	45 degrees	not present	--	not present	"--"					not present	--	not present	--		
16-net	5.5	3.89	0	0	0	0					0	0	0	0		
16-gross	5.5	3.89	0	0	0	0					0	0	0	0		
No.15R	257	53 degrees	28.25	15 degrees	212	6 degrees					77.1	8 degrees	213.6	50 degrees		
15R-net	4.75	2.86	3.15	3.04	0.75	0.75					1.55	1.53	2.5	1.61		
15R-gross	4.75	2.86	3.15	3.04	0.75	0.75					1.55	1.53	2.5	1.61		
No.15	264.6	37 degrees	32.75	18 degrees	213.35	6 degrees					79.5	8 degrees	217.7	50 degrees		
15-net	4.35	3.47	1.85	1.76	1.7	1.69					0.9	0.89	2.35	1.51		
15-gross	4.35	3.47	1.85	1.76	1.7	1.69					0.9	0.89	2.35	1.51		
No.14	272.8	20 degrees	46.45	13.5 degrees	216.75	6 degrees					82.45	7.5 degrees	222.45	46 degrees		
14-net	6.2	5.83	3.35	3.26	1.9	1.89					1.5	1.49	2.75	1.91		
14-gross	6.65	6.25	4.5	4.38	1.9	1.89					1.5	1.49	2.75	1.91		
No.13	not reached?	not reached?	faulted	missing	236.9	6 degrees					91.3	17 degrees	232.55	60 degrees		
13-net			faulted	missing	2.05	2.04					0	0	0	0		
13-gross			faulted	missing	2.95	2.93					1.15	1.1	0.45	0.23		
No.13L			faulted	missing	241.45	6 degrees					96.4	13 degrees	267.55	55 degrees		
13L-net			faulted	missing	4.8	4.77					0	0	1.2	0.69		
13L-gross			faulted	missing	4.8	4.77					0.3	0.29	1.6	0.92		
No.13A			faulted	missing	250.9	6 degrees					113.6	20 degrees	298.6	50 degrees		
13A-net			faulted	missing	1.6	1.59					0.85	0.8	0.8	0.51		
13A-gross			faulted	missing	1.6	1.59					0.85	0.8	0.8	0.51		
No.13A repeat			faulted	missing	not present	--					not present	---	339.65	45 degrees		
13A-net			faulted	missing	0	0					0	0	1.35	0.95		
13A-gross			faulted	missing	0	0					0	0	1.35	0.95		
No.13B			faulted	missing	not present	--					not present	---	304.7	45 degrees		
13B-net			faulted	missing	0	0					0	0	1.6	1.13		
13B-gross			faulted	missing	0	0					0	0	1.7	1.2		
No.13B repeat			faulted	missing	not present	--					not present	---	355.55	53.5 degrees		
13B-net			faulted	missing	0	0					0	0	3.25	1.93		
13B-gross			faulted	missing	0	0					0	0	3.25	1.93		
Anderson MB			75.8	20 degrees	264.5	6 degrees			13.5	56 degrees	153.05	17 degrees	307.25	45 degrees		
And’s’n-gross			6.8	6.39	4.8	4.77			5.3	2.96	7.05	6.74	2.25	1.59		
Anderson rpt			not present	---	not present	--			not present	---	not present	--	360.2	45 degrees		

And’s’n-gross		0	0	0	0		0	0	0	0	3.5	2.47	
No.12T		not present	---	not present	--		66.55	12.5 degrees	211.6	5.5 degrees	396.05	45 degrees.	
12T-net		0	0	0	0		0.95	0.93	2.35	2.34	0	0	
12T-gross		0	0	0	0		0.95	0.93	3.1	3.09	0.4	0.28	
No.12R		122	4.5 degrees	315.25	6 degrees		73.75	12.5 degrees	215.65	5.5 degrees	397.35	50 degrees	
12R-net		2.55	2.54	1.35	1.34		2.15	2.1	2.75	2.74	3.85	2.47	
12R-gross		2.55	2.54	1.35	1.34		2.55	2.49	2.75	2.74	3.85	2.47	
No.12		125.3	5 degrees	320.4	6 degrees		77.5	16 degrees	220.8	11 degrees	401.55	62.5 degrees	
12-net		4.4	4.38	4.1	4.08		4.9	4.71	>6.4	>6.28	3.7	1.71	
12-gross		4.8	4.78	4.9	4.87		4.9	4.71	>6.4	>6.28	3.7	1.71	
No.11R		131.45	12 degrees	326.9	6 degrees		83.9	16 degrees	not reached	not reached	407.2	60 degrees	
11R-net		0.9	0.88	0.8	0.8		0.9	0.87			0.95	0.48	
11R-gross		0.9	0.88	0.8	0.8		0.9	0.87			0.95	0.48	
No.11		133.8	24 degrees	329.05	6 degrees		86.3	13.5 degrees			409.9	47.5 degrees	
11-net		2	1.83	1.65	1.64		2	1.94			4.15	2.8	
11-gross		2	1.83	2.4	2.39		2	1.94			4.15	2.8	

Table 7-7 (part 1 of 5): Drilled and true thickness of coal beds in year-2010 boreholes (concluded)

No.10A			145.4	3 degrees	not reached	not reached			128.45	16 degrees			455.85	51.5 degrees		
10A-net			0	0					0	0			0.4	0.25		
10A-gross			0.6	0.6					0.65	0.62			0.4	0.25		
No.10R			167.3	15 degrees					149.6	13 degrees			480.22	45 degrees		
10R-net			0	0					0	0			0.97	0.69		
10R-gross			0.5	0.48					0	0			0.97	0.69		
No.10			204.2	1.5 degrees					162.85	3 degrees			505.25	54 degrees		
10-net			9.8	9.8					>6.35	>6.34			12.43	7.31		
10-gross			9.8	9.8					>6.35	>6.34			12.7	7.46		
No.9			215.9	0 degrees					not reached	not reached			530.05	53 degrees		
9-net			2	2									2.87	1.73		
9-gross			2	2									2.93	1.76		
No.8			250.6	0.5 degrees			19.8	38.5 degrees					565.27	53 degrees		
8-net			2.35	2.35			0.95	0.74					0	0		
8-gross			2.7	2.7			0.95	0.74					0	0		
No.7			254.2	2 degrees			58.2	44.5 degrees					568.61	53 degrees		
7-net			1.3	1.3			1.6	1.14					0	0		
7-gross			1.3	1.3			1.8	1.28					0	0		
No.6			258.4	0 degrees			62.55	37 degrees					not present	--		
6-net			0.95	0.95			1.5	1.2					0	0		
6-gross			0.95	0.95			1.5	1.2					0	0		
No.5			265.5	1 degrees			69.7	36 degrees					577.29	63 degrees		
5-net			1.05	1.05			0.65	0.53					0	0		
5-gross			1.05	1.05			0.65	0.53					0	0		
No.4R			272.45	0 degrees			not present	--					622.39	70 degrees	16.4	42 degrees
4R-net			1.15	1.15			0	0					0	0	2.6	1.93
4R-gross			1.15	1.15			0	0					0	0	2.6	1.93
No.4			278.95	0.75 degrees			86.5	41.5 degrees					623.41	51 degrees	19.95	42 degrees
4-net			2.6	2.6			2.9	2.17					4.54	2.86	2.6	1.93
4-gross			3.45	3.45			2.9	2.17					4.54	2.86	4.25	3.16
No.3			303.6	0 degrees			98.65	40 degrees					636.65	60 degrees	35.3	53 degrees
3-net			1.4	1.4			1.8	1.38					7.11	3.56	0	0
3-gross			1.7	1.7			2.1	1.38					7.31	3.66	0	0
No.3L			310.65	0 degrees			105	36 degrees					645.8	65 degrees	39	53 degrees
3L-net			0.7	0.7			2.75	2.22					3.98	1.68	0	0
3L-gross			0.7	0.7			2.75	2.22					5.77	2.44	0	0
No.2A			not reached	not reached			120.65	41.5 degrees					656.8	57.5 degrees	43	53 degrees
2A-net							0.95	0.71					1.8	0.97	1.8	1.08
2A-gross							0.95	0.71					1.89	1.02	2.15	1.29
No.2							153.75	55 degrees					694.37	64 degrees	69	58 degrees
2-net							1.15	0.66					0	0	0	0
2-gross							1.3	0.75					0.05	0.02	0	0

No.1R				158.1	42.5 degrees			716	50 degrees	not present	--
1R-net				0.65	0.48			1.71	1.1	0	0
1R-gross				0.65	0.48			1.71	1.1	0	0
No.1				160.5	38 degrees			717.74	50 degrees	74.5	56 degrees
1-net				1.3	1.02			1.77	1.14	1.7	0.95
1-gross				1.3	1.02			1.77	1.14	1.7	0.95
No.1L				not present	--			not reached	not reached	92	53 degrees
1L-net				0	0					0	0
1L-gross				0	0					0	0
Moose Mountain				164.8						92.7	
No.0				not present	--					not present	--
0-net				0	0					0	0
0-gross				0	0					0	0
Weary Ridge				185.4						109.5	
Fernie				not reached	not reached					127.2	
Total depth	284.99	323.09	365.76	214.58		188.98	230.73	722.68		322.17	

Table 7-7 (part 2 of 5): Drilled and true thickness of coal beds in year-2010 boreholes

hole	2010-26a		2010-27v		2010-35a		2010-38a		2010-39a		2010-40v		2010-42v		2010-44a	
UTM coords	644177.76	5563617.387	644062.865	5564273.545	644147.753	5563435.666	643839.894	5563010.012	644185.1	5562914.862	644376.837	5563714.01	644182.293	5562913.528	644303.158	5562978.704
Elevation	1407.012		1411.583		1416.575		1420.157		1416.025		1392.259		1415.567		1401.874	
Geometry	121.295	Dip 48.3311	vertical	Dip 90	298.00719	Dip 50	100	Dip 50	280	Dip 65	vertical	Dip 90	vertical	Dip 90	293.18989	Dip 50
Drift	13.1	10.04	>141.73	>141.73	1.3	1	1.4	1.07	7.5	6.8	73.76	73.76	7.62	7.62	9.2	7.05
Casing shoe	15.5	11.87	141.73	141.73	3.2	2.45	13.11	10.04	8.5	7.7	77.42	77.42	8.6	8.6	12.19	9.34
notes >	thrust @97.8		not to rock		extensional fault @109.9		no faults		thrust @373.65		no faults		no faults		no faults	
notes >									thrust @389.75							
notes >									thrust @272.15							
coal beds	intersected	dip/true	intersected	dip/true	Intersected	dip/true	intersected	dip/true	intersected	dip/true	intersected	dip/true	intersected	dip/true	intersected	dip/true
No.21L																
21L-net																
21L-gross													.			
No.20R															47.6	21.5 degrees
20R-net															0	0
20R-gross															0.5	0.47
No.20															58.2	31 degrees
20-net															2.4	2.06
20-gross															3.3	2.83
No.20L															62.3	40 degrees
20L-net															0.65	0.5
20L-gross															0.65	0.5
No.19R															82.1	25.5 degrees
19R-net															0.35	0.32
19R-gross															0.35	0.32
No.19															82.8	29.5 degrees
19-net															1.85	1.61
19-gross															1.85	1.61
No.19L															not present	--
19L-net															0	0
19L-gross															0	0
No.18R															not present	--
18R-net															0	0
18R-gross															0	0
No.18															not present	--
18-net															0	0
18-gross															0	0
No.17									28.4	45 degrees			21.6	30 degrees	104.4	4.5 degrees
17-net									3.2	2.26			2.55	2.21	2.35	2.34
17-gross									3.2	2.26			2.55	2.21	2.35	2.34
No.17L									32.45	45 degrees			not present	---	107.2	28 degrees
17L-net									0.8	0.59			0	0	0.25	0.22

17L-gross					0.8	0.59		0	0	0.25	0.22
No.16R					59.6	35 degrees		80.75	43 degrees	not present	--
16R-net					0	0		0	0	0	0
16R-gross					1.45	1.19		0.75	0.75	0	0
No.16					69.4	35 degrees		96	40 degrees	150.2	36 degrees
16-net					8.15	6.68		2.9	2.22	1.7	1.38
16-gross					8.15	6.68		2.9	2.22	1.7	1.38
No.16 repeat					not present	--		not present	--	not present	--
16-net					0	0		0	0	0	0
16-gross					0	0		0	0	0	0
No.15R					77.55	35 degrees		98.6	45 degrees	151.9	36 degrees
15R-net					4.9	4.01		3.2	2.26	1.9	1.54
15R-gross					4.9	4.01		3.2	2.26	1.9	1.54
No.15					83.85	37 degrees		104.45	40 degrees	154.7	36 degrees
15-net					3.25	2.6		2.51	1.92	1.5	1.21
15-gross					3.25	2.6		2.55	1.95	1.5	1.21

Table 7-7 (part 2 of 5): Drilled and true thickness of coal beds in year-2010 boreholes (continued)

No.14									92.5	25 degrees			110	45 degrees	not reached	not reached
14-net									1.9	1.72			2.16	1.53		
14-gross									1.9	1.72			2.2	1.56		
No.13									97.35	25 degrees			116.26	45 degrees		
13-net									0.75	1.68			0.68	0.48		
13-gross									0.75	1.68			0.94	0.66		
No.13L									111	38 degrees			not present	--		
13L-net									1	0.79			0	0		
13L-gross									1	0.79			0	0		
No.13A									154.4	40 degrees			162.3	47 degrees		
13A-net									1.25	0.96			1.33	0.91		
13A-gross									1.25	0.96			1.35	0.92		
No.13B									not present	--			not present	---		
13B-net									0	0			0	0		
13B-gross									0	0			0	0		
Anderson MB									192.25	26 degrees			205.35	38 degrees		
And's'n-gross									9.1	8.18			8.35	6.58		
No.12T	126	32 degrees							245	20 degrees			253.7	23.5 degrees		
12T-net	>0.40	>0.34							2.2	2.07			4.27	3.92		
12T-gross	>0.40	>0.34							3	2.82			4.6	4.22		
No.12R	88.9	25 degrees							251.35	20 degrees			265.4	19.5 degrees		
12R-net	4.7	4.26							2.25	2.11			2.95	2.78		
12R-gross	4.7	4.26							2.25	2.11			2.95	2.78		
No.12R repeat	115.5	32 degrees							not present	---			not present	---		
12R-net	3.8	3.22							0	0			0	0		
12R-gross	3.8	3.22							0	0			0	0		
No.12	84.2	25 degrees							257.7	20 degrees			273.05	26.25 degrees		
12-net	4.7	4.26							6.3	5.92			5.66	5.08		
12-gross	4.7	4.26							6.3	5.92			5.95	5.34		
No.12 repeat	109.6	28 degrees							not present	---			not present	---		
12-net	4.5	3.97							0	0			0	0		
12-gross	5.9	5.21							0	0			0	0		
No.11R	77.4	47.5 degrees							266	20 degrees			280.85	39 degrees		
11R-net	5.6	3.78							0.7	0.66			0.9	0.7		
11R-gross	5.6	3.78							0.7	0.66			0.9	0.7		
No.11R repeat	100.25	50.5 degrees							not present	---			not present	---		
11R-net	5.45	3.47							0	0			0	0		
11R-gross	5.45	3.47							0	0			0	0		
No.11	72.2	26 degrees							268.15	20 degrees			283.2	43 degrees		
11-net	2.7	2.43							2.85	2.68			3.03	2.22		
11-gross	4.05	3.64							3.35	3.15			3.05	2.23		
No.11 repeat	97.8	27 degrees							272.15	20 degrees			not present	---		

11-net	0.70 partial	0.62 partial							5.3	4.98			0	0		
11-gross	0.70 partial	0.62 partial							5.3	4.98			0	0		
No.10A	47	32 degrees							332.45	45 degrees			342.6	40 degrees		
10A-net	0	0							0.8	0.57			0.8	0.61		
10A-gross	0.6	0.51							0.8	0.57			0.8	0.61		
No.10R	41.2	38 degrees							349.4	45 degrees			363.65	25 degrees		
10R-net	0.7	0.55							0.4	0.28			0.7	0.63		
10R-gross	0.7	0.55							0.4	0.28			0.7	0.63		
No.10	29.2	44 degrees							364.05	30 degrees			374.05	34 degrees		
10-net	7.35	5.29							9.09	7.87			9.72	8.06		
10-gross	7.35	5.29							9.6	8.31			11.05	9.16		
No.10 repeat	not present	---							373.65	30 degrees			not present	---		
10-net	0	0							11.14	9.52			0	0		
10-gross	0	0							12.4	10.6			0	0		

Table 7-7 (part 2 of 5): Drilled and true thickness of coal beds in year-2010 boreholes (concluded) ）

No.10 repeat 2	not present	---							389.75	48 degrees			not present	---		
10-net	0	0							3.45	2.31			0	0		
10.gross	0	0							3.45	2.31			0	0		
No.9	not reached	not reached					not reached	not reached	398.05	45 degrees	not reached	not reached	388.6	41 degrees		
9-net									3.22	2.28			2.25	1.7		
9-gross									3.35	2.37			2.25	1.7		
No.8					4.95	50 degrees	152.05	70 degrees	not reached	not reached	279.4	42 degrees	408.6	45 degrees		
8-net					2.25	1.45	0.9	0.31			3.1	2.3	0	0		
8-gross					2.25	1.45	0.9	0.31			3.5	2.6	0	0		
No.7					45.5	35 degrees	127.95	72.5 degrees			268.35	42 degrees	436.6	40 degrees		
7-net					1.1	0.91	7.52	2.26			7.9	5.87	2.65	2.03		
7-gross					1.6	1.31	8.35	2.51			9.45	7.02	2.65	2.03		
No.6					57.6	41 degrees	115.45	67.5 degrees			259.05	53.5 degrees	443.05	32 degrees		
6-net					0	0	2.65	1.01			5.4	3.21	1.75	1.48		
6-gross					0	0	2.65	1.01			6.15	3.66	1.75	1.48		
No.5					68.7	20 degrees	96.5	80 degrees			234.7	56 degrees	450.3	36 degrees		
5-net					6.2	5.83	2.15	0.37			2.7	1.51	0.45	0.36		
5-gross					6.8	6.39	2.15	0.37			3.9	2.18	0.45	0.36		
No.4R					85.05	23.5 degrees	61.65	46.5 degrees			224	52.5 degrees	456.45	40 degrees		
4R-net					0.75	0.69	0.9	0.62			1.45	0.88	0.9	0.69		
4R-gross					0.75	0.69	0.9	0.62			1.45	0.88	0.9	0.69		
No.4					85.8	44 degrees	54.6	41.5 degrees			220.2	44.5 degrees	480.25	40 degrees		
4-net					7.45	5.36	5.85	4.38			3.25	2.32	3.25	2.49		
4-gross					7.45	5.36	5.85	4.38			3.25	2.32	3.85	2.95		
No.3					103.4	23.5 degrees	29.9	70 degrees			214	55 degrees	500.6	45 degrees		
3-net					3.2	2.93	2	0.68			0	0	2.88	2.04		
3-gross					3.2	2.93	2	0.68			0.5	0.29	3.45	2.44		
No.3L					faulted out?	faulted out?	5.35	21.5 degrees			209.8	54.5 degrees	507.9	53 degrees		
3L-net					faulted out?	Faultedout?	5.85	5.44			0	0	0.8	0.48		
3L-gross					faulted out?	faulted out?	6.35	5.91			0.5	0.29	0.8	0.48		
No.2A					faulted out?	faulted out?					200	54 degrees	533	45 degrees		
2A-net					faulted out?	faulted out?					0	0	0	0		
2A-gross					faulted out?	faulted out?					0.8	0.47	0.55	0.39		
No.2					faulted out?	faulted out?					168.95	46.5 degrees	536.6	25 degrees		

2-net				faulted out?	faulted out?			1.7	1.17	1.05	0.95	
2-gross				faulted out?	faulted out?			2.2	1.51	1.3	1.18	
No.1R				not present?	--			143	44 degrees	539.95	35 degrees	
1R-net				0	0			2.6	1.87	2.85	2.33	
1R-gross				0	0			2.6	1.87	2.85	2.33	
No.1				116.95	43.5 degrees			137.8	38.5 degrees	543	40 degrees	
1-net				3.1	2.25			0.6	0.47	3.7	2.83	
1-gross				3.1	2.25			0.6	0.47	3.7	2.83	
No.1L				not present?	--			136.65	49 degrees	548.05	42.5 degrees	
1L-net				0	0			0.55	0.36	1.05	0.77	
1L-gross				0	0			0.55	0.36	1.05	0.77	
Moose Mountain				122.8				133.3	overturned	549.3	40 degrees	
No.0				not present?	--			116	46.5 degrees	not present	--	
0-net				0	0			2.15	1.48	0	0	
0-gross				0	0			2.4	1.65	0	0	
Weary Ridge				137.5				99.6	overturned	579.25		
Fernie		not reached	not reached	153.4				81.6	overturned	not reached	not reached	
Total depth	128.02	142.65		201.17		184.1	415.75	347.47		610.51		157.89

Table 7-7 (part 3 of 5): Drilled and true thickness of coal beds in year-2010 boreholes

hole/	2010-45v		2010-46a		2010-47a		2010-48a		2010-49a		2010-51a		2010-52a		2010-53a	
UTM coords	644342.891	5563370.624	644344.02	5563365.163	644187.97	5562909.141	644350.174	5563360.897	644308.698	5562982.465	644303.204	5562976.725	643785.8253	5562852.592	644169.2428	5563623.668
Elevation	1385.402		1388.103		1416.991		1391.545		1401.586		1401.814		1420.9977		1406.9339	
Geometry	vertical	Dip 90	320.111	Dip 50	111.775	Dip 65	129.6387	Dip 50	333.71204	Dip 50	251.47219	Dip 50	100.02916	Dip 50	345.60225	Dip 48
Drift	18.4	18.4	18.5	14.17	8.84	8.01	33.53	25.69	9.14	7	9.14	7	19.51	14.95	12.8	9.51
Casing shoe	23.1	23.1	21.7	16.62	9.75	8.84	36	27.58	10.67	8.17	9.14	7	17.37	13.31	15.85	11.78
notes >	no faults		fault @142.00		no faults		fault @273.96		no faults		fault @35.00		thrust @266.00		extensional @120.75	
notes >							log to 195.1				thrust @116.0		thrust @303.80			
coal beds	Intersected	dip/true	intersected	dip/true	intersected	Dip/true	intersected	dip/true	Intersected	dip/true	Intersected	dip/true	Intersected	dip/true	Intersected	dip/true
No.22							58.3	61 degrees								
22-net							1	0.48								
22-gross							1	0.48								
No.22 repeat							69.85	52.5 degrees								
22-net							0.95	0.58								
22-gross							0.95	0.58								
No.21R							49.9	61 degrees								
21R-net							1.5	0.73								
21R-gross							1.5	0.73								
No.21R repeat							80.55	54 degrees								
21R-net							0	0								
21R-gross							0.7	0.41								
No.21							42.2	60 degrees								
21-net							8.65	4.33								
21-gross							9.2	4.6								
No.21 repeat							83.45	54 degrees								
21-net							13.35	7.85								
21-gross							14.2	8.35								
No.21L							not present	--								
21L-net							0	0								
21L-gross							0	0								
No.20R							162.25	15 degrees	21.6	42 degrees						
20R-net							1.65	1.59	0	0						
20R-gross							1.65	1.59	0.75	0.56						
No.20R repeat							not present	--	78.8	44.5 degrees						
20R-net							0	0	0	0						
20R-gross							0	0	0.5	0.36						
No.20							164.7	22 degrees	100.75	51 degrees	48.8	28 degrees				
20-net							7.05	6.54	0.95	0.6	12.75	11.26				
20-gross							8	7.42	0.95	0.6	13.6	12.01				

No.20L					not present	--	102.5	38 degrees	65	20.5 degrees		
20L-net					0	0	1.45	1.14	1.8	1.69		
20L-gross					0	0	1.45	1.14	1.8	1.69		
No.19R					not present	--	147.6	48 degrees	98	14.5 degrees		
19R-net					0	0	0.55	0.37	0.8	0.77		
19R-gross					0	0	0.55	0.37	0.8	0.77		
No.19			19.95	28 degrees	192.87	25 degrees	149	37 degrees	99.55	12 degrees		
19-net			2.85	2.52	3.38	3.06	8.2	6.55	1.65	1.61		
19-gross			2.85	2.52	3.38	3.06	8.2	6.55	1.65	1.61		
No.19 repeat			44.65	40 degrees	not present	--	not present	--	not present	--		
19-net			1.72	1.32	0	0	0	0	0	0		
19.gross			2.3	1.76	0	0	0	0	0	0		
No.19L			not present	--	201.79	34 degrees	157.7	26 degrees	not present	--		
19L-net			0	0	5.6	4.64	0.55	0.49	0	0		
19L-gross			0	0	5.6	4.64	0.55	0.49	0	0		
No.18R			not present	--	not present	--	not present	--	not present	--		
18R-net			0	0	0	0	0	0	0	0		
18R-gross			0	0	0	0	0	0	0	0		

Table 7-7 (part 3 of 5): Drilled and true thickness of coal beds in year-2010 boreholes (continued)

No.18					not present	--	217.2	40 degrees	not present	--	not present	--				
18-net					0	0	5.93	4.54	0	0	0	0				
18-gross					0	0	6.13	4.7	0	0	0	0				
No.17	115.9	57.5 degrees	32	17.5 degrees	58.75	41 degrees	300.29	28 degrees	193.45	23.5 degrees	130.6	3.5 degrees				
17-net	13.6	7.31	2.95	2.81	4.7	3.55	3.27	2.89	3.35	3.07	2.55	2.55				
17-gross	13.6	7.31	2.95	2.81	4.7	3.55	3.39	2.89	3.35	3.07	2.55	2.55				
No.17L	134.5	55 degrees	36.35	12 degrees	63.61	40 degrees	306.88	31 degrees	198.2	45.5 degrees	133.75	5 degrees				
17L-net	2.6	1.49	0.7	0.68	1.29	0.99	3.21	2.75	0.55	0.39	0.55	0.55				
17L-gross	2.6	1.49	0.7	0.68	1.29	0.99	3.28	2.81	0.55	0.39	0.55	0.55				
No.16R	not reached	not reached	not present	--	not present	--	not present	--	not reached	not reached	not present	--				
16R-net			0	0	0	0	0	0			0	0				
16R-gross			0	0	0	0	0	0			0	0				
No.16			76.5	14.5 degrees	98.65	48 degrees	331.48	45 degrees			158.95	2.5 degrees				
16-net			2.55	2.47	2.55	1.71	2.98	2.11			3.35	3.35				
16-gross			2.55	2.47	2.55	1.71	2.98	2.11			3.35	3.35				
No.15R			79.05	14.5 degrees	101.2	37 degrees	334.68	42.5 degrees			162.3	2 degrees				
15R-net			2.4	2.32	3.05	2.44	1.22	0.9			2.5	2.5				
15R-gross			2.4	2.32	3.05	2.44	1.22	0.9			2.5	2.5				
No.15			82.3	7 degrees	105.1	36 degrees	337.11	40 degrees			165.6	8.5 degrees				
15-net			1.7	1.69	2	1.62	0	0.8			1.3	1.29				
15-gross			1.7	1.69	2	1.62	1.04	0.8			1.3	1.29				
No.14			85.55	10 degrees	109.45	36 degrees	343.69	37.5 degrees			169.4	10.5 degrees				
14-net			2.3	2.27	2.25	1.82	0.41	0.33			1.9	1.87				
14-gross			2.3	2.27	2.25	1.82	0.41	0.33			1.9	1.87				
No.13			93.05	24 degrees	118.35	42.5 degrees	355.4	25 degrees			174.2	19 degrees				
13-net			0.75	0.69	0.45	0.33	0	0			0.75	0.71				
13-gross			0.75	0.69	0.45	0.33	0	0			0.75	0.71				
No.13L			111.1	34 degrees	not present	--	402.12	15 degrees			not reached	not reached				
13L-net			0.75	0.62	0	0	>0.8	>0.77								
13L-gross			0.75	0.62	0	0	>0.8	>0.77								
No.13L repeat			142	19.5 degrees	not present	--	not reached	not reached								
13L-net			0.65	0.61	0	0										
13L-gross			0.65	0.61	0	0										
No.13A			138.1	13 degrees	140	38 degrees										
13A-net			0.6	0.58	1.05	0.83										
13A-gross			0.6	0.58	1.05	0.83										
No.13A repeat			159	20 degrees	not present	--										
13A-net			0.8	0.75	0	0										
13A-gross			0.8	0.75	0	0										

No.13B		168.8	12 degrees	not present	--						
13B-net		1.6	1.57	0	0						
13B-gross		1.6	1.57	0	0						
No.13B repeat		199.8	16.75 degrees	not present	--						
13B-net		4.65	4.45	0	0						
13B-gross		5.4	5.17	0	0						
Anderson MB		170.4	19 degrees	166.45	31 degrees						
And’s’n-gross		3.9	3.69	9.6	8.23						
Anderson rpt		207.7	21.5 degrees	not present	--						
And’s’n-gross		2.7	2.51	0	0						
No.12T		242.5	23.5 degrees	219	30 degrees						
12T-net		0.8	0.73	0	0						
12T-gross		0.8	0.73	2.45	2.12						
No.12R		251.7	52 degrees.?	229.75	25.5 degrees						
12R-net		>0.9	>0.55?	1.6	1.44						
12R-gross		>0.9	>0.55?	1.6	1.44						
No.12		not reached	not reached	232.1	30 degrees						
12-net				6.7	5.8						
12-gross				6.9	5.98						

Table 7-7 (part 3 of 5): Drilled and true thickness of coal beds in year-2010 boreholes (continued)

No.11R					240.55	30 degrees										
11R-net					0.75	0.65										
11R-gross					0.75	0.65										
No.11					242.65	41 degrees										
11-net					2	1.51										
11-gross					2	1.51										
No.10A					282.3	22 degrees							304.2	49 degrees		
10A-net					0.55	0.51							0.9	0.59		
10A-gross					0.55	0.51							0.9	0.59		
No.10R					310.3	--							329	40 degrees		
10R-net					0	0							0.9	0.69		
10R-gross					0	0							0.9	0.69		
No.10					320.95	35.5 degrees							266	67.5 degrees		
10-net					9.7	7.9							10.5	4.02		
10-gross					10.35	8.43							11.9	4.55		
No.10 repeat					not present	--							363.68	70 degrees		
10-net					0	0							38.6	13.2		
10-gross					0	0							40.12	13.72		
No.9					331.8	35 degrees							248.9	67.5 degrees		
9-net					2.9	2.38							5.8	2.22		
9-gross					3.35	2.74							7.75	2.97		
No.9 repeat					not present	--							283.35	58 degrees		
9-net					0	0							4.7	2.49		
9-gross					0	0							4.9	2.6		
No.9 repeat 2					not present	--							414.05	65 degrees		
9-net					0	0							3.55	1.5		
9-gross					0	0							3.55	1.5		
No.8					347.3	27 degrees							213	57.5 degrees		
8-net					0	0							1.2	0.64		
8-gross					0	0							1.2	0.64		
No.7					376.45	31 degrees							169.05	60 degrees	17	36 degrees
7-net					2.15	1.84							2.7	1.35	0	0
7-gross					2.15	1.84							2.7	1.35	0.55	0.44
No.6					381.55	29 degrees							162.95	55 degrees	33.3	41 degrees
6-net					1.4	1.22							1.45	0.83	1.8	1.36
6-gross					1.4	1.22							1.45	0.83	1.8	1.36
No.5					387.9	25 degrees							138.2	70 degrees	39.6	33.5 degrees
5-net					1.4	1.27							1.1	0.38	1.6	1.33
5-gross					1.4	1.27							1.1	0.38	1.6	1.33
No.4R					395.1	30 degrees							109.2	60 degrees	49.3	56 degrees
4R-net					1.65	1.43							0.55	0.28	0.3	0.17
4R-gross					2.2	1.91							0.55	0.28	0.3	0.17

No.4			407.4	35 degrees				106.95	60 degrees	51.6	33 degrees
4-net			3.2	2.62				1.65	0.83	2	1.68
4-gross			3.85	3.15				1.65	0.83	2	1.68
No.3			433	35 degrees				80.4	62.5 degrees	67.65	30 degrees
3-net			1.95	1.6				2.4	1.11	1.35	1.17
3-gross			2.5	2.05				2.4	1.11	1.35	1.17
No.3L			439.1	31 degrees				65.25	65 degrees	71.2	13 degrees
3L-net			0.5	0.43				1.45	0.61	0.65	0.63
3L-gross			0.5	0.43				2.05	0.87	0.65	0.63
No.2A			458.7	25 degrees				48.45	60 degrees	73.4	22 degrees
2A-net			0.32	0.29				2.35	1.18	0.6	0.56
2A-gross			0.46	0.42				2.35	1.18	0.6	0.56
No.2			459.9	35 degrees						not present	--
2-net			1.45	1.19						0	0
2-gross			1.9	1.56						0	0

Table 7-7 (part 3 of 5): Drilled and true thickness of coal beds in year-2010 boreholes (concluded)

No.1R					464.25	36.5 degrees									not present	--
1R-net					2.3	1.85									0	0
1R-gross					2.3	1.85									0	0
No.1					466.75	36.5 degrees									89.6	30.5 degrees
1-net					3.07	2.47									0.55	0.47
1-gross					3.1	2.49									0.55	0.47
No.1L					470.92	35 degrees									97.8	31.5 degrees
1L-net					0.98	0.8									0	0
1L-gross					0.98	0.8									0	0
Moose Mountain					471.9	35 degrees									98.65	32.5 degrees
No.0					not present	--									109.2	32.5 degrees
0-net					0	0									0	0
0-gross					0	0									0	0
Weary Ridge					503										120.75	
Fernie					not reached	not reached									not reached	not reached
Total depth	243.84		262.13		531.27		376.73		213.36		201.17		453.24		140.21	

Table 7-7 (part 4 of 5): Drilled and true thickness of coal beds in year-2010 boreholes）

hole/	2010-54a		2010-55a		2010-56a		2010-57a		2010-58a		2010-59a		2010-60a		2010-61a	
UTM coords	644173.978	5563624.18	644164.201	5563616.99	643970.543	5563151.14	643978.207	5563164.79	644144.92	5563436.50	644133.322	5563431.78	643931.501	5562576.81	644098.717	5562455.12
Elevation	1406.8777		1407.1641		1428.7837		1429.1906		1416.3361		1416.7003		1441.9328		1462.588	
Geometry	359.20772	Dip 48	270.9302	Dip 48	233.63238	Dip 48	307.8509	Dip 48	313.2060	Dip 49	243.4207	Dip 48	270	Dip 50	220.3848	Dip 48
Drift	13.41	9.97	12.5	9.29	1.52	1.13	2.13	1.58	1.52	1.15	8.84	6.57	4.57	3.5	18.58	14.23
Casing shoe	15.85	11.78	15.85	11.78	5.79	4.3	9.75	7.25	5.79	4.37	9.75	7.25	6.1	4.67	21.95	16.81
notes >	no faults		no faults		fault at 192.0		no faults		extensional fault @100.60		extensional fault @129.8		extensional fault @92.8 92.8 处延伸断层		no faults 无断层	
coal beds	Intersected	dip/true	Intersected	dip/true	Intersected	dip/true	Intersected	dip/true	Intersected	dip/true	Intersected	dip/true	Intersected 夹层	dip/true	Intersected 夹层	dip/true
No.10A																
10A-net																
10A-gross																
No.10R													10.2	17 degrees	39.6	6 degrees
10R-net													0.55	0.53	0.7	0.7
10R-gross													0.55	0.53	0.7	0.7
No.10													16.8	50 degrees	43.45	24 degrees
10-net													13.75	8.84	13.8	12.61
10-gross													13.75	8.84	14.3	13.06
No.9													35	50 degrees	59.15	21 degrees
9-net													0.85	0.55	5.25	4.9
9-gross													0.85	0.55	5.25	4.9

No.8					13.8	36.5 degrees	9.7	25 degrees	10.55	50 degrees			75.25	50 degrees	78.3	42 degrees
8-net					2	1.61	0.9	0.82	0.5	0.32			1.35	0.87	2.7	2.01
8-gross					2.3	1.85	0.9	0.82	0.5	0.32			1.35	0.87	3.25	2.42
No.7	30.8	41 degrees	19.75	15 degrees	64.6	35.5 degrees	49.95	29.5 degrees	47.2	12 degrees			faulted out	faulted out	95	4 degrees
7-net	0	0	4.95	4.78	2.1	1.71	1.65	1.44	0	0			faulted out	faulted out	0.3	0.3
7-gross	0.5	0.38	4.95	4.78	2.1	1.71	1.65	1.44	0.3	0.29			faulted out	faulted out	0.3	0.3
No.6	41.8	40 degrees	35.3	48 degrees	69.75	33.5 degrees	53.8	23 degrees	53	49 degrees			faulted out	faulted out	104.1	2 degrees
6-net	0	0	0.7	0.47	1.8	1.5	1.05	0.97	0	0			faulted out	faulted out	1.55	1.55
6-gross	0.5	0.38	0.7	0.47	1.8	1.5	1.05	0.97	0	0			faulted out	faulted out	1.55	1.55
No.5	59.4	43.5 degrees	51.6	32 degrees	77.9	40.5 degrees	61	29 degrees	64.5	61 degrees	34.9	44 degrees	93	32 degrees	110.8	0.5 degrees
5-net	7.6	5.51	10	8.48	0.85	0.65	0.5	0.44	4.55	2.21	8.8	6.33	1.45	1.23	1.25	1.25
5-gross	7.6	5.51	10.2	8.65	0.85	0.65	0.5	0.44	5.05	2.45	9.6	6.91	1.45	1.23	1.25	1.25
No.4R	99	66.5 degrees	73.4	11.5 degrees	98.6	35.5 degrees	76.25	16.5 degrees	77.25	54 degrees	52.9	43 degrees	98	35 degrees	119.75	3 degrees
4R-net	3	1.2	2.45	2.4	0.6	0.49	0.35	0.34	1.55	0.91	4	2.93	0.95	0.78	0.9	0.9
4R-gross	3	1.2	2.45	2.4	0.6	0.49	0.35	0.34	1.55	0.91	5.1	3.73	0.95	0.78	0.9	0.9
No.4	104.8	46 degrees	76.45	45 degrees	99.2	30.5 degrees	76.6	25.5 degrees	79.35	40 degrees	58.85	33 degrees	99.8	35 degrees	121.65	2 degrees
4-net	4.55	3.16	5.15	3.64	2.4	2.07	2.25	2.03	3.85	2.95	7.8	6.54	4.8	3.93	3.1	3.1
4-gross	5.15	3.58	5.15	3.64	2.4	2.07	2.25	2.03	3.85	2.95	8.25	6.92	4.8	3.93	3.4	3.4

Table 7-7 (part 4 of 5): Drilled and true thickness of coal beds in year-2010 boreholes (concluded)

No.3	115	47 degrees	85.95	30.5 degrees	113	26.5 degrees	86.95	26.5 degrees	93.2	35 degrees	124.7	53 degrees	124.4	40 degrees	141.2	7 degrees
3-net	0	0	0.75	0.65	3	2.68	3.35	3	2.55	2.09	3.95	2.38	2.8	2.14	1.8	1.79
3-gross	0.25	0.17	0.75	0.65	3	2.68	3.35	3	2.55	2.09	4.1	2.47	3.7	2.83	1.8	1.79
No.3L	122.75	43.5 degrees	89.85	53.5 degrees	121.1	39.5 degrees	94.25	15 degrees	99.4	31 degrees	faulted out	faulted out	133.3	45 degrees	149.4	1 degrees
3L-net	0	0	0	0	1.5	1.16	1.65	1.59	1.2	1.03	faulted out	faulted out	1.15	0.81	0	0
3L-gross	0.25	0.18	0	0	2	1.54	1.65	1.59	1.2	1.03	faulted out	faulted out	1.15	0.81	0.6	0.6
No.2A	134.8	42 degrees	93.95	25.5 degrees	136.25	33 degrees	111.35	5 degrees	faulted out	faulted out	faulted out	faulted out	144.6	42.5 degrees	174.25	4 degrees
2A-net	1.6	1.19	1.05	0.95	1.5	1.26	0.65	0.65	faulted out	faulted out	faulted out	faulted out	1.5	1.11	3.55	3.54
2A-gross	1.6	1.19	1.05	0.95	1.5	1.26	0.65	0.65	faulted out	faulted out	faulted out	faulted out	1.5	1.11	3.55	3.54
No.2	not reached	not reached	not present	--	168.85	51.5 degrees	137	7 degrees	faulted out	faulted out	faulted out	faulted out	171.25	45 degrees	179.85	0.5 degrees
2-net			0	0	0	0	0	0	faulted out	faulted out	faulted out	faulted out	0	0	1.3	1.3
2-gross			0	0	0.4	0.25	0.6	0.6	faulted out	faulted out	faulted out	faulted out	0.15	0.11	1.3	1.3
No.1R			112.7	25.5 degrees	170.5	45 degrees	138.75	5.5 degrees	112.25	21 degrees	138.45	46 degrees	175.8	45 degrees	185.75	1.5 degrees
1R-net			1.4	1.26	1.2	0.85	0.85	0.85	1.05	0.98	0.75	0.52	1.75	1.24	0.9	0.9
1R-gross			1.4	1.26	1.2	0.85	0.85	0.85	1.05	0.98	0.75	0.52	1.75	1.24	0.9	0.9
No.1			114.7	25.5 degrees	175.3	30 degrees	141.75	13 degrees	113.55	21 degrees	141.6	36 degrees	180.4	45 degrees	192.2	7.5 degrees
1-net			0.95	0.86	1.1	0.95	0.85	0.83	0.75	0.7	0.75	0.61	1.95	1.38	1	0.99
1-gross			0.95	0.86	1.1	0.95	0.85	0.83	0.75	0.7	0.75	0.61	1.95	1.38	1	0.99
No.1L			122.75	25.5 degrees	177.6	14 degrees	143.8	39 degrees	not present	--	not present	--	not present	--	not present	--
1L-net			0	0	0.7	0.68	0.85	0.66	0	0	0	0	0	0	0	0
1L-gross			0	0	0.7	0.68	0.85	0.66	0	0	0	0	0	0	0	0
Moose Mountain			125.2	25.5 degrees	179.6	52 degrees	146.05	11 degrees	114.3	21 degrees	148.9	31.5 degrees	182.35	45 degrees	193.2	12 degrees
No.0			139.6	25.5 degrees	191	30 degrees	152.25	17 degrees	not present	--	158.6	24.5 degrees	not present	--	not present	--
0-net			0.7	0.63	faulted?	faulted?	0	0	0	0	0	0	0	0	0	0
0-gross			0.7	0.63	faulted?	faulted?	0.45	0.43	0	0	0.2	0.18	0	0	0	0
Weary Ridge			147.8		not reached	not reached	165.7		132.3		167.5		195.85	42.5 degrees	202.75	
Fernie			174.3				Not reached	not reached	152.8		not reached	not reached	217.8	45 degrees	not reached	not reached
Total depth	170.69		268.22		193.55		170.69		188.98		170.69		302.36		211.23	

Table 7-7 (part 5 of 5): Drilled and true thickness of coal beds in year-2010 boreholes

hole/	2010-62v		2010-63v		2010-64a		2010-65a		2010-66a		2010-67a		2010-68a		2010-69a		2010-70a	
UTM coords	643784.65	5562852.7	643936.99	5562571.3	643794.32	5562851.0	644120.62	5562601.7	643941.44	5562575.6	644316.46	5562794.5	644102.68	5562448.8	643936.84	5562575.8	644107.61	5562448.1
Elevation	1420.9071		1441.6413		1420.6983		1489.0119		1442.0804		1417.3722		1462.4481		1442.191		1462.2742	
Geometry	vertical	Dip 90	vertical	Dip 90	95	Dip 85	82.7210	Dip 47	56.9298	Dip 50	136.1076	Dip 48	176.3162	Dip 49	200.1042	Dip 50	143.5422	Dip 50
Drift	18.2	18.2	1.9	1.9	15.85	15.79	0.9	0.69	6.5	4.98	5.5	4.09	39.45	30.22	3	2.3	39.6	30.34
Casing shoe	17.9	17.9	6.2	6.2	15.24	15.18	4.57	3.5	6.5	4.98	5.9	4.38	39.3	30.1	5	3.83	46.05	35.28
notes >	no faults		fault?@362.74		no faults		thrust? @206		fold axis @133.0		no faults		no faults		fold axis @141.5		no faults	
notes >							(may be major one)								thrust @168.8			
coal beds	Intersected	dip/true	Intersected	dip/true	Intersected	dip/true	Intersected	dip/true	Intersected	dip/true	Intersected	dip/true	Intersected	dip/true	Intersected	dip/true	Intersected	dip/true
No.13B																		
13B-net																		
13B-gross																		
Anderson MB							22.3	2 degrees			15.6	5 degrees						
And’s’n-gross							9.3	9.29			4.4	4.38						
No.12T							69.6	2 degrees			66.4	5 degrees						
12T-net							2.4	2.4			1.5	1.49						
12T-gross							2.4	2.4			1.5	1.49						
No.12R							72	6.5 degrees			73.05	10 degrees						
12R-net							2.65	2.63			2.47	2.43						
12R-gross							2.65	2.63			2.65	2.61						
No.12							75.95	0.5 degrees			76.85	10 degrees						
12-net							5.1	5.1			4.84	4.76						
12-gross							5.1	5.1			4.95	4.87						
No.11R							82.65	7 degrees			83.2	10 degrees						
11R-net							0.75	0.74			0.64	0.63						
11R-gross							0.75	0.74			0.69	0.68						

Table 7-7 (part 5 of 5): Drilled and true thickness of coal beds in year-2010 boreholes (continued)

No.11							84.95	6.5 degrees			85.6	10 degrees						
11-net							1.25	1.24			2.15	2.12						
11-gross							1.25	1.24			2.15	2.12						
No.10A							153.25	6 degrees	16.1	45 degrees	127.7	8 degrees						
10A-net							0.6	0.6	0	0	0	0						
10A-gross							0.6	0.6	0.65	0.57	0.3	0.3						
No.10A repeat							not present	--	276.2	50 degrees	not present	--						
10A-net							0	0	1.05	0.67	0	0						
10A-gross							0	0	1.05	0.67	0	0						
No.10R			43.85	75 degrees			181	4 degrees	315.3	50 degrees	151.2	9 degrees			23.3	19.5 degrees		
10R-net			0	0			0	0	1.15	0.74	0	0			1.05	0.95		
10R-gross			0	0			0.85	0.85	1.15	0.74	0	0			1.05	0.95		
No.10			51.75	60 degrees			183.4	1 degrees	not reached		164.55	8 degrees	39.45	12 degrees	32.25	24 degrees	39.6	35 degrees
10-net			10.45	5.23			8.85	8.85			8.16	8.08	1.3	1.27	8.95	8.18	0.8	0.66
10-gross			10.65	5.23			8.85	8.85			8.55	8.47	1.3	1.27	8.95	8.18	0.8	0.66
No.9			64.55	45 degrees			193	3 degrees			174	6 degrees	41.8	4 degrees	42	11.5 degrees	41.3	41.5 degrees
9-net			1.1	0.78			3.2	3.2			1.97	1.97	4.6	4.59	4.2	4.12	3.15	2.36
9-gross			1.1	0.78			3.2	3.2			1.97	1.97	4.95	4.94	4.2	4.12	3.15	2.36
No.8			86.2	60 degrees			216.85	6 degrees			199.3	14.5 degrees	60.45	13.5 degrees	60.45	28 degrees	57.95	3.5 degrees
8-net			1.7	0.85			2.8	2.78			0	0	2.3	2.24	1.05	0.93	2.1	2.1
8-gross			2.6	1.3			2.8	2.78			0	0	2.3	2.24	1.05	0.93	2.1	2.1
No.7			200.6	65 degrees			222.9	3 degrees			211	6.5 degrees	72.8	13 degrees	89.8	38 degrees	65.25	5.5 degrees
7-net			2.8	1.18			1.1	1.1			1.6	1.59	0	0	1.8	1.42	0	0
7-gross			2.8	1.18			1.45	1.45			1.6	1.59	0.6	0.58	1.8	1.42	0.25	0.25
No.6			213.85	66 degrees			229	2 degrees			216	8.25 degrees	79.35	6 degrees	99	62 degrees	74.9	6 degrees
6-net			2.75	1.12			1.4	1.4			1.35	1.34	1.65	1.64	1.2	0.74	1.55	1.54
6-gross			2.75	1.12			1.4	1.4			1.4	1.39	1.65	1.64	1.2	0.74	1.55	1.54
No.5			229.1	45 degrees			235.8	3.5 degrees			224.35	5 degrees	86.4	4 degrees	115.25	36.5 degrees	82.65	5 degrees
5-net			1.3	0.92			0.8	0.8			1.2	1.19	1.25	1.25	1.6	1.29	1.25	1.25
5-gross			1.3	0.92			0.8	0.8			1.2	1.19	1.25	1.25	1.6	1.29	1.25	1.25
No.5 repeat			not present	--			not present	--			not present	--	not present	--	167.2	30.5 degrees	not present	--
5-net			0	0			0	0			0	0	0	0	1.8	1.55	0	0
5-gross			0	0			0	0			0	0	0	0	1.8	1.55	0	0
No.4R			257.8	55 degrees			243.6	6 degrees			230.9	8 degrees	94.65	7.5 degrees	125.25	27.5 degrees	90.55	8.5 degrees
4R-net			0.7	0.4			0.55	0.55			0.75	0.74	1.55	1.54	1	0.89	1.45	1.43

4R-gross			0.7	0.4			0.55	0.55			0.75	0.74	1.55	1.54	1	0.89	1.45	1.43
No.4R repeat			not present	--			not present	--			not present	--	not present	--	160.65	18.5 degrees	not present	--
4R-net			0	0			0	0			0	0	0	0	0.35	0.33	0	0
4R-gross			0	0			0	0			0	0	0	0	0.35	0.33	0	0
No.4			258.5	55 degrees			244.45	7 degrees			237.6	10 degrees	99.2	3.5 degrees	127	31 degrees	94.1	9.5 degrees
4-net			4.55	2.29			1.95	1.94			3.1	3.05	3.15	3.14	2.2	1.89	3.2	3.16
4-gross			4.55	2.29			1.95	1.94			3.65	3.59	3.15	3.14	2.2	1.89	3.95	4.94
No.4 repeat			not present	--			not present	--			not present	--	not present	--	154.85	32 degrees	not present	--
4-net			0	0			0	0			0	0	0	0	1.95	1.65	0	0
4-gross			0	0			0	0			0	0	0	0	1.95	1.65	0	0
No.3			281.4	53.5 degrees			264.4	3 degrees			266.6	15 degrees	118.35	4.5 degrees	200.95	37.5 degrees	114.65	3 degrees
3-net			4	2.38			1.35	1.35			1.48	1.43	1.05	1.05	4.1	3.25	1.25	1.25
3-gross			4	2.38			1.75	1.75			2.05	1.98	1.05	1.05	4.4	3.49	1.25	1.25
No.3L			289.35	45 degrees			268.25	5 degrees			271.6	15 degrees	122.2	6 degrees	212.8	29 degrees	121.3	4.5 degrees
3L-net			0	0			0	0			0.7	0.68	0	0	0.35	0.31	0	0
3L-gross			0.5	0.35			0.35	0.35			0.7	0.68	0.3	0.3	0.35	0.31	0.3	0.3
No.2A			323.35	49 degrees			290.95	2 degrees			282.4	12 degrees	148.5	4.5 degrees	234	43 degrees	144	31 degrees
2A-net			3.25	2.13			2.45	2.45			0.17	0.17	1.55	1.55	2.55	1.86	1.8	1.54
2A-gross			3.25	2.13			2.45	2.45			0.17	0.17	1.55	1.55	2.55	1.86	1.8	1.54
No.2	30.7	45 degrees	329.7	49 degrees	49.95	75 degrees	297.1	2 degrees			284.1	16 degrees	153.65	8.5 degrees	252.6	8.5 degrees	149.55	5.5 degrees
2-net	0.2	0.14	0.6	0.39	0	0	0	0			1.36	1.31	1.1	1.09	0	0	0.55	0.55
2-gross	0.2	0.14	0.6	0.39	0	0	0	0			2	1.92	1.1	1.09	0.6	0.59	0.55	0.55

Table 7-7 (part 5 of 5): Drilled and true thickness of coal beds in year-2010 boreholes (concluded)

No.1R	33.6	45 degrees	342.8	41 degrees	57.35	70 degrees	301.75	2 degrees			289.45	0 degrees	161.8	1 degrees	258	4.5 degrees	157.95	18 degrees
1R-net	2.36	1.67	0.95	0.72	2.9	0.99	0.7	0.7			3	3	0.85	0.85	1.15	1.15	0.65	0.65
1R-gross	2.45	1.73	0.95	0.72	2.9	0.99	0.7	0.7			3	3	0.85	0.85	1.15	1.15	0.65	0.65
No.1	38.65	45 degrees	352.95	47 degrees	65.75	73 degrees	306.75	2 degrees			292.65	6 degrees	169	no data	266.15	7 degrees	165.95	20.5 degrees
1-net	1.71	1.21	1.75	1.19	5.45	1.59	0.9	0.9			1.95	1.94	no data	no data	1.1	1.09	0.75	0.7
1-gross	1.71	1.21	1.75	1.19	5.45	1.59	0.9	0.9			1.95	1.94	no data	no data	1.1	1.09	0.75	0.7
No.1L	not present	--	not reached		not present	--	not present	--			295.4	5 degrees			not present	--	not present	--
1L-net	0	0			0	0	0	0			0.95	0.95			0	0	0	0
1L-gross	0	0			0	0	0	0			0.95	0.95			0	0	0	0
Moose Mountain	40.36	45 degrees			71.2	74 degrees	307.65				296.35	5 degrees			267.8	18 degrees	166.7	22 degrees
No.0	55.2	60 degrees			not present	--	not present	--			not present	--			279.4	19.5 degrees	not present	--
0-net	0	0			0	0	0	0			0	0			0	0	0	0
0-gross	0	0			0	0	0	0			0	0			0.2	0.19	0	0
Weary Ridge	60.45	58 degrees			105.9		327.8				310				not reached		178	21.5 degrees
Fernie	not reached 未打到				151.9		not reached				356.7						not reached	
Total depth	118.87		282.85		250.85		339.24		324.92		440.74		173.74		288.65		187.45	

8.0 Exploration

8.1 Rock Sampling

A limited amount of rock or coal sampling was done on surface since the coal, mudstones and shales were heavily weathered. Several hard sandstone outcrops were sampled and sent to Vancouver Petrographics Ltd. for analysis. The following report details the nature of some of the confining structures found in the drilling program. This petrographic analysis will allow researchers to establish a basis for future nomenclature applications.

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Report 100895

November 22, 2010

Samples:

Six rock samples, as detailed below, were submitted by Richard Munroe, with a request for petrographic study.

N.	ID1	ID2	Lithology
1	Pimple Crest		Fine sandstone
2	Tree Root		Polymictic pebble conglomerate
3	Horn 3	3	Medium to coarse sandstone
4	Horn 5	5	Quartz-chlorite-barite-calcite crackle breccia
5	Horn	8a	Medium to coarse siltstone
6	Horn	8b	Very-fine sandstone

Summary:

Sample **1** (Pimple Crest) is a fine sandstone. The sample is homogeneously composed of well-sorted clasts of quartz, K-feldspar and minor amounts of opaque minerals, immersed in carbonate cement (including sparry calcite).

Sample **2** (Tree Root) is a polymictic conglomerate composed of lithic fragments, composed mainly of siltstone, mudstone and minor biomicrite, heterogeneously dispersed in the sample along with fine-grained quartz clasts. None of the lithic fragments and clasts display any preferred orientation or other sedimentary structure. Calcite is concentrated in the matrix of the rock.

Sample **3** consists of two different lithological domains divided by a sub-planar boundary. Both lithological domains are classified as medium-grained to coarse-grained sandstone. Their clasts are mostly composed of quartz with a similar grain-size and clast shape displayed in both domains. The primary differences between the two domains are the matrix material and existence of compositional layering – with a matrix composed of quartz and no observed layering in one case and a cryptocrystalline matrix possibly composed of carbonate and clay and a macroscopically visible compositional layering in the other case.

Sample **4** is intensely altered by quartz. The sample is crosscut by chlorite-barite-calcite quartz- opaque minerals that are in turn crosscut by thin quartz-rich veinlets, which infill tension gashes produced by a brittle deformation event.

Samples **5** and **6** are medium to coarse siltstone with well-defined layering and intermittent grain size increases. The presence of abundant limonitic stain gives the sample an intense red-brown colour while the quartz of feldspathic-rich portions of the samples have a paler colour and a coarser grain size.

Sample 6 shows a well-developed sub-planar lamination, also observed in the marginal portion of sample 5.

In the following descriptions the clasts are described using the attached roundness and sphericity chart (see Figure 6)

Individual descriptions and a set of photomicrographs are attached.

References

Walker J.D., Cohen H.A., 2007, The Geoscience Handbook – AGI Data Sheets, 4th Edition. American Geological Institute, 302 pp.

Sample: Pimple Crest o/c

Fine sandstone

Macroscopically the sample is pink, homogeneously coloured with a grain size of up to 0.25 mm. No bedding, lamination or other sedimentary structures are observed on the offcut block.

Feldspar staining highlighted K-feldspar grains that was otherwise not detectable with a hand lens. Irregular cavities are angular to sub-angular, prismoidal to discoidal, occupy 2-3% of the total area of the offcut and range from 0.2 to 2 mm in size.

At the microscopic scale the sample is homogeneously composed of well-sorted clasts of quartz, K-feldspar, and minor amounts of opaque minerals immersed in carbonate cement (including sparry calcite). The sample does not display any preferential orientation of grains or compositional layering. All the terrigenous clasts belong to the sand fraction and the sample represents a fine-grained sandstone.

mineral	**modal %**	**main size range (mm)**
Calcite and dolomite	40 - 50	up to 0.25
quartz	40 - 45	up to 0.20
feldspar	10 15	up to 0.15
chlorite	3 5	up to 0.06
opaque mineral	1 - 3	up to 0.06
rutile?	tr	

The **matrix** is composed of carbonates, including calcite, that cement the terrigenous minerals and generally match the shapes of the clasts. Porosity is limited to the cavities described above and is possibly formed by the dissolution of carbonates.

Carbonates (including calcite) are angular to sub-angular, spherical to discoidal and have a grain size ranging from 0.01 to 0.025 mm.

Quartz is uniformly distributed as well-sorted clasts, angular to sub-angular (1.5-2.5 roundness) and prismoidal to spherical (4.5-2.5 sphericity), ranging in grain size from 0.03 to 0.15 mm. The grain-size is unimodal and the shape is xenomorphic. Quartz is indented with carbonate and, where in contact with other quartz or feldspar grains, the interstices are filled by carbonates. Quartz generally shows straight extinction.

K-Feldspar is uniformly distributed within the sample as sub-angular to sub-rounded (2.5-3.5 roundness) and sub-prismoidal to spherical (3.5-2.5 sphericity), up to 0.10-0.12 mm. The distribution of the grain-size is unimodal and the shape is xenomorphic and with straight extinction and is generally fresh, showing little to no alteration.

Opaque minerals include hematite are generally rounded to well rounded (4.5-5.5 roundness) and sub-discoidal to discoidal (1.5-0.5 sphericity).

Rare grains of an unidentified mineral with low birefringence, straight extinction and refraction index higher than quartz have sub-angular (2.5 roundness) and prismoidal shape (4.5 sphericity).

Sample: Tree Root

Polymictic pebble conglomerate

Macroscopically the sample shows heterogeneously dispersed polymictic lithic fragments , their grain-size is bimodal with coarser fragments exceeding 5 mm and finer grains generally below 1 mm in size.

None of the lithic fragments display any preferred orientation, or other sedimentary structure. Calcite is concentrated in the matrix of the rock and is heterogeneously distributed.

At the microscopic scale the sample is composed of terrigenous polymictic lithic fragments (up to 7 mm), in most cases these fragments are fractured. Finer-grained (up to 1 mm) lithic fragments are rimmed by opaque minerals. The terrigenous fragments consist of abundant quartz fragments (up to 0.6 mm) and lesser amounts of opaque minerals including hematite (up to 0.25 mm). Most of the lithic fragments and terrigenous minerals are in contact with each other (clast supported) and are well-cemented by sparry calcite.

mineral-lithic fragment	**modal %**	**main size range (mm)**
mudstone	35 - 40	up to 8
siltstone	22 - 25	up to 6
quartz	20 - 25	0.3-0.4
biomicrite	5 - 7	1.5
very fine sandstone	2 - 4	2
opaque minerals	1 - 2	0.2
matrix: calcite	10 - 15	

Mudstone with less than 10% of coarse angular fragments of quartz (up to 0.03 mm), minor opaque minerals (hematite) up to 0.1 mm, and lithic fragments up to 8 mm in size occur as rounded to well-rounded (4.5-5.5 roundness) sub-discoidal to discoidal (1.5-0.5 sphericity) clasts. Most of the fragments are fractured and the fractures are infilled by calcite. Opaque minerals, hematite and limonitic material infill the fractures and form a coat that partially rims the fragments. Mudstone fragments may occur with a brownish colour and contain more than 95% clay. On rare occasions fine-grained dolomitic crystals are observed within the mudstone fragments.

It is not always possible to distinguish between mudstone and siltstone clasts due to the continuum in the grain size between the two terms. Siltstone contains less than 10% of coarser subrounded fragments of quartz (up to 0.05 mm) and displays the same microstructural features described for the mudstone with maximum grain size up to 6 mm, showing a generally darker colour and a better defined foliation. Some of the siltstone fragments were recrystallized and display a very fine-grained homogeneous groundmass mostly consisting of microgranular quartz.

Both siltstone and mudstone assume angular to sub-angular (1.5-2.5 roundness) and prismoidal to spherical (4.5-2.5 sphericity) shapes when approaching their smallest grain size (0.05-1 mm).

Quartz fragments show an unimodal grain shape distribution from 0.3 to 0.4 mm, are angular to well-rounded (1.5-5.5 roundness) sub-prismoidal to sub-discoidal (3.5-1.5 sphericity).

Quartz is occasionally fractured and the fractures are infilled by calcite.

Biomicrite occurs as angular to sub-angular (1.5-2.5 roundness) spherical to sub-discoidal (2.5-1.5 sphericity) clasts up to 1.5 mm in size and contain fossil forms such as calcite spherulites and other prismoidal to sub-prismoidal shapes averaging 0.04 mm. They are responsible for the samples most intense reactions to HCl.

Rare angular fragments up to 2 mm of very fine sandstones are composed of 90% angular to sub-angular (1.5-2.5 roundness) and prismoidal to spherical (4.5-2.5 sphericity) quartz fragments up to 0.6-0.7 mm, minor fossiliferous relicts and opaque minerals.

The **matrix** is composed of sparry calcite that welds the clasts together and infills the fractures of the lithic fragments and quartz clasts.

Sample: Horn 3

Medium to coarse sandstone

Macroscopically the sample consists of two different lithological domains divided by a subplanar boundary. Domain A (in the upper part of the thin section) is made up of light grey to white clasts up to 1 mm in size and minor yellowish (after staining) subangular fragments that are immersed in a grey matrix which is mostly composed of quartz. The distribution of the clasts is heterogeneous and some of the clasts have been dissolved leaving the rock with a porosity estimated to be less than 1 %. No other sedimentary structures or preferential orientation of the grains are observed.

Domain B, in the lower part of the section, displays a layering parallel to the contact with domain A. The differential colour after the staining, of the two domains and corresponding to subtle grain-size heterogeneity of the quartz clasts are the primary means used to differentiate the two domains.

mineral-lithic fragment	**modal %**	**main size range (mm)**
Domain A		
quartz	80 - 84	0.15-0.55
clay altered clasts	7 - 10	0.1-0.8
Matrix: quartz	10 - 15	
Domain B		
quartz	75 - 85	0.1-1.1
clay altered clasts	10 - 12	0.1-0.8
chlorite altered lithological fragments	2 - 4	0.4-0.5
Matrix: quartz and clay in alternated subdomains	10 - 15	

At the microscope domain **A** can be observed to be mostly composed (see modal percentage in the table above) of sub-angular to rounded (2.5-4.5 roundness) sub-prismoidal to subdiscoidal (3.5-1.5

sphericity) quartz clasts with grain-size from 0.15 to 0.55 mm and subrounded to rounded (3.5-4.5 roundness) sub-prismoidal to sub-discoidal (3.5-1.5 sphericity) clasts completely altered by clay. In a few instances these clay altered clasts display prismoidal relicts possibly after fossils in the form of concentric layered textures. Thin veinlet of recrystallized quartz crosscut the altered clast. The grain size of the altered clasts varies from 0.1 to 0.8 mm. The clasts, in most cases are in reciprocal contact (clast supported) and are cemented by recrystallized quartz. In most cases the old shape of the quartz clast is still visible as an alignment of fluid and solid inclusions. Fractures are predominantly continuous across the quartz clasts and through the quartz matrix.

The domain **A** is classified as a medium to coarse sandstone.

At the contact between domain A and B the cement type changes from quartz (in domain A) to a cryptocrystalline aggregate, possibly consisting of clay.

In domain **B** quartz still constitutes most of the domain as sub-angular to rounded (2.5-4.5 roundness) sub-prismoidal to sub-discoidal (3.5-1.5 sphericity) clasts with a grain-size varying from 0.1 to 1.1 mm interbedded with 2-3 mm layers containing quartz as matrix of the clasts.

In these subdomains the quartz clasts can be interlobated with other quartz clasts. The clayaltered clasts are more abundant with respect to domain A, are angular to rounded (1.5 to 4.5 roundness) sub-prismoidal to sub-discoidal (3.5-1.5 sphericity) and their grain size varies from 0.05 to 1.1 mm. The clasts are heterogeneously distributed within the domain and show a higher variety of composition than in domain A. In a few instances chlorite-rich lithological fragments are recognized. As already described in domain A, fractures, mostly parallel to the contact and the layering, are a common feature, which generally continue through both the clasts and the matrix and are mostly closed.

This domain is classified as a medium to coarse sandstone.

Sample: Horn 5

Quartz-chlorite-barite-calcite crackle breccia

Macroscopically the sample displays a grey colour with no visible clasts or sedimentary structures. It is intersected by an irregular network of veining, which is mostly white in colour and contains calcite and a white mineral that is non-reactive to HCl, is softer than quartz and hosts some cavities. Veinlets of quartz can be detected with the aid of a hand lens.

At the microscope the rock is observed to be intensely altered by quartz, which is pervasively and homogeneously distributed as a very fine-grained (~0.02 mm) aggregate of angular to sub-angular (1.5-2.5 roundness) prismoidal to spherical (4.5-2.5 sphericity) coarser-grained (~0.1 mm) quartz grains that are possibly relicts of the sedimentary rock or the products of the quartz alteration.

mineral-lithic fragment	modal %	main size range (mm)
quartz	88 - 92	0.02-0.2
chlorite	3 - 5	up to 0.2
barite	2 - 5	up to 4
calcite	1 - 3	up to 1.2
opaque minerals	1	up to 0.1

The silicified rock is crosscut by a network of abundant, thin (up to 0.01 mm) quartz-rich veinlets that infill tension gashes produced by a brittle deformation event. Some of the quartz within the veining was subjected to deformation after its emplacement as indicated by the undulose extinction of the amoeboid to polygonal quartz grains (up to 0.2 mm) contained in the veinlets (up to 0.2 mm in thickness).

The sample contains chlorite-rich veins, in which chlorite forms fan-like microstructures with the flakes projecting towards the centre of the vein. The chlorite veins in a few cases, particularly where the vein appears wider (up to 2.5 mm), contains an assemblage including barite+calcite+quartz+opaque minerals. The composition of the thicker veins is not consistent and probably reflects multiple stages of infill and a progressive change of the orientation of the strain as indicated by the curved shape of the barite-rich vein and some of the thinner quartz-rich veinlets. Opaque minerals are interpreted to have been introduced during the alteration-infill stage as they are more abundant in proximity to the vein and within the veins and veinlets.

Quartz veinlets crosscut both the chlorite veins and the barite+ epidote+ calcite+ quartz+ opaque mineral veins.

Sample: Horn 8

Medium to coarse siltstone

Macroscopically the sample displays a reddish brown colour fading with the gradual increase of the grain-size to a light reddish brown. Well-defined layering and intermittent grain-size increases are observed in the darker portion of the sample. The layers with coarser grain size are lighter due to the higher percentage of quartz and abundant white mica among the components. The maximum grain-size observed macroscopically is up to 0.1 mm within the lighter layers.

At the microscopic scale the rock is seen to be intensely stained by limonitic materials that give the reddish-brown colour to the sample and hamper the identification of most of the minerals. The terrigenous components of the sample and the grain-size characterize the sample as a medium to coarse siltstone.

mineral-lithic fragment	modal %	main size range (mm)
quartz-feldspar	40 - 50	0.02-0.06
Clay-carbonate cryptocrystalline material	25 30	<0.002
hematite	10 - 15	up to 0.5
calcite	10 - 15	up to 0.3
white mica	5 - 10	0.05
chlorite	3 - 5	0.05

The thin, coarser and more lightly tinted layers are up to 0.3 mm thick and contain a higher percentage (up to 40-50%) of quartzofeldspathic grains. The grains are sub-angular to subrounded (1.5-3.5 roundness) prismoidal to sub-discoidal (4.5-1.5 sphericity). These layers effervesce with HCl, however calcite is not easily identified and it may be part of the finergrained fraction of the layer. The transition between the coarser layers and the finer portion of the sample is gradational, with the percentage of coarser quartz grains decreasing from 40% to 5-10% within 0.5 mm. The darker portion has a grain-size of 0.02-0.04 mm with angular to sub-angular (1.5-2.5 roundness) and prismoidal to sub-discoidal (4.5-1.5 sphericity) grains.

Most of the grains appear transparent and are interpreted to be of terrigenous origin, however the intense stain by limonitic material render their identification impossible. Within the lighter portion of the rock terrigenous minerals are identified, namely feldspar (albite?), hematite, chlorite, pyrite (cubic and replaced by hematite).

Quartz is the coarsest mineral with a grain-size of up to 0.06 mm, undulose extinction and angular to sub-rounded (1.5-3.5 roundness) and prismoidal to sub-discoidal (4.5-1.5 sphericity) grains with a generally bimodal distribution of the grain-size and percentage of grains. Quartz is coarser (0.02-0.06 mm) and more abundant (40% and higher) in the lighter part of the sample and is finer-grained (less than 0.02 mm), and less abundant (~5-10%) in the more intensely stained part of the sample. Quartz is immersed in finer-grained minerals and a matrix possibly composed of clay and carbonate. Opaque minerals are the only minerals that reach the same grain-size of quartz and all of the opaques are replaced by hematite. Much of the rounded limonitic material shows microstructure with a darker core. In few instances the limonite appears as framboidal aggregates.

Sample **Horn 8 b** shows a better developed sub-planar lamination of the same lithology described in Sample Horn 8a.

In this portion of the sample the “darker”, finer-grained limonitic layers are rhythmically interbedded with coarser-grained (up to 0.08 mm) layers up to 0.5 mm thick containing calcite (40-50% and up to 0.8 mm in size) quartz (up to 0.04 mm), possibly feldspar, white mica (up to 0.1 mm) and a lesser amount of limonitic and stained irresolvable minerals. These coarser grained layers are classified as very fine sandstone.

Very thin (up to 0.02 mm) beds of sparry calcite and rare dolomite are sub-parallel to the very fine sandstone layers and are rhythmically interbedded with the red siltstone.

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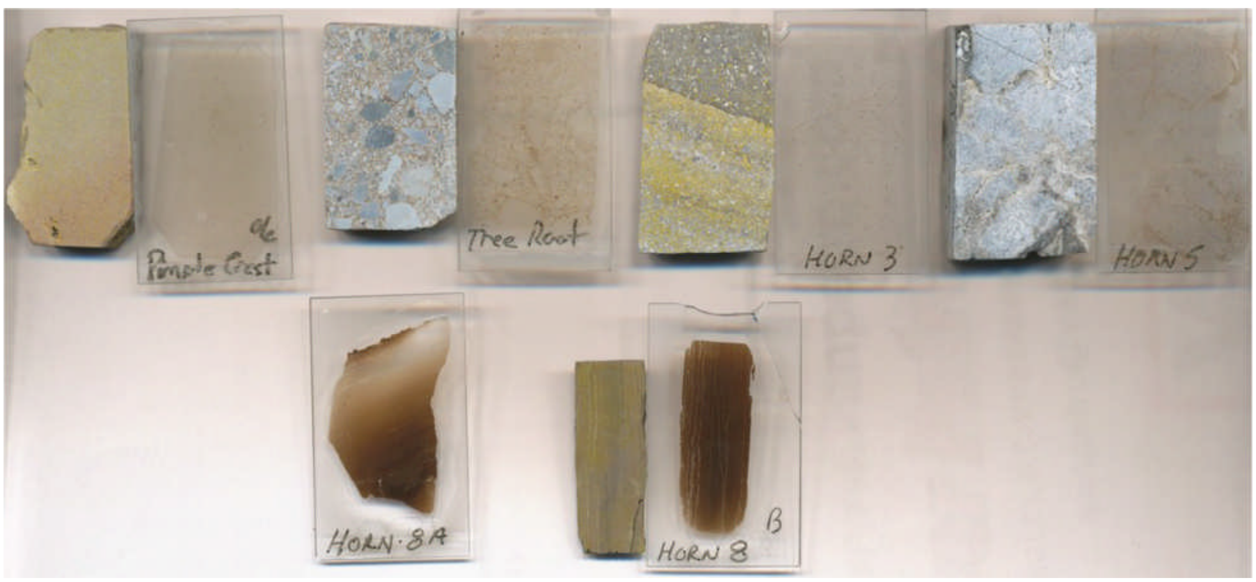
Figure	ID1	ID2	Lithology
Figure 0			Thin section and offcuts
Figure 1	Pimple Crest		Fine sandstone
Figure 2	Tree Root		Polymictic pebble conglomerate
Figure 2a	Tree Root		Polymictic pebble conglomerate
Figure 3	Horn 3	3	Medium to coarse sandstone
Figure 4	Horn 5	5	Quartz-chlorite-barite-calcite crackle breccia
Figure 5	Horn 8a	8a	Medium to coarse siltstone
Figure 5a	Horn 8a	8a	Medium to coarse siltstone
Figure 5b	Horn 8b	8b	Medium to coarse siltstone
Figure 6			Roundness and Sphericity Chart (AGI Data Sheet 4.8)



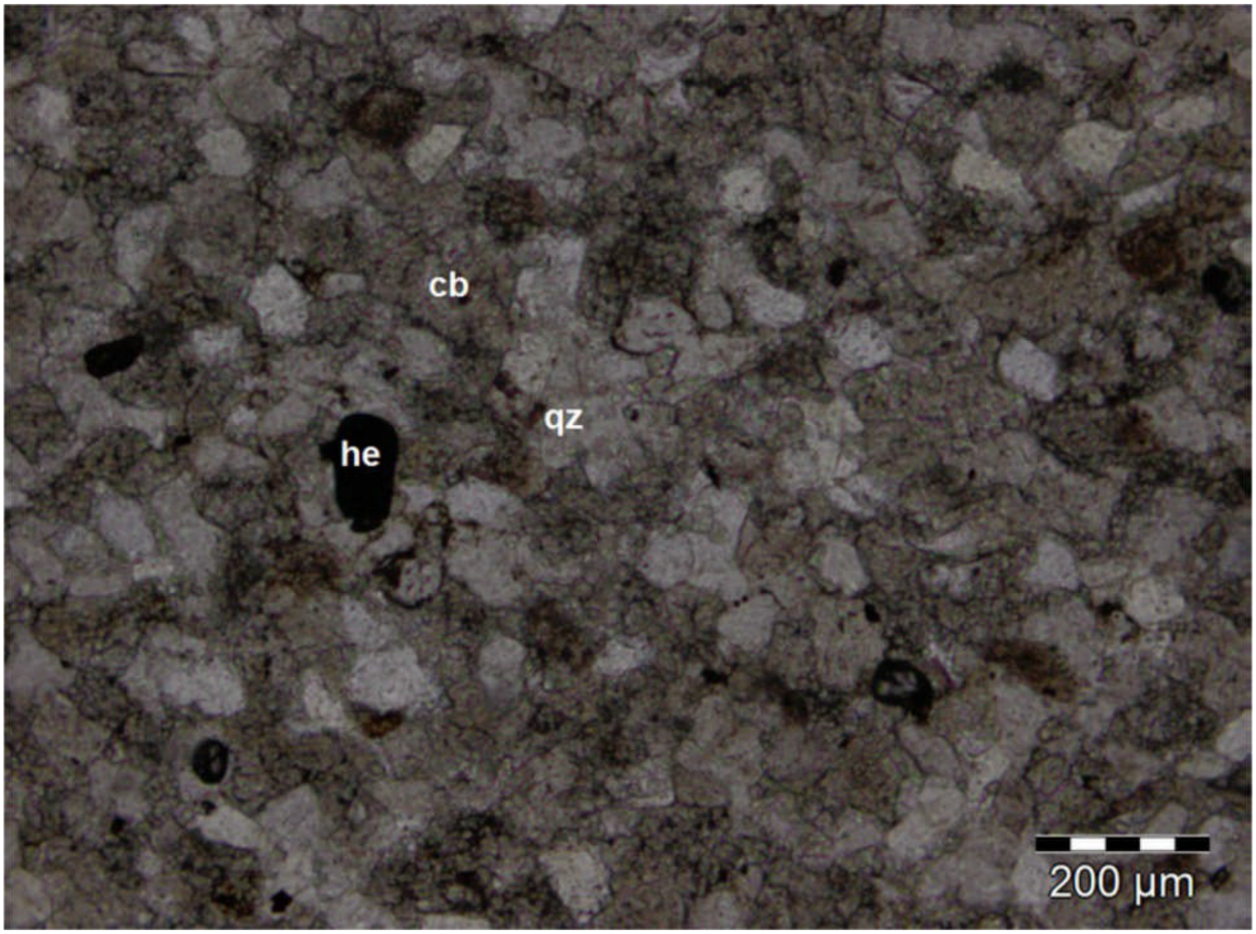


Figure 1: Fine sandstone - Photomicrograph showing well-sorted clasts of quartz (qz), K-feldspar, and minor amounts of hematite (he) immersed in carbonate cement including sparry calcite (cb). Plane polarized transmitted light.

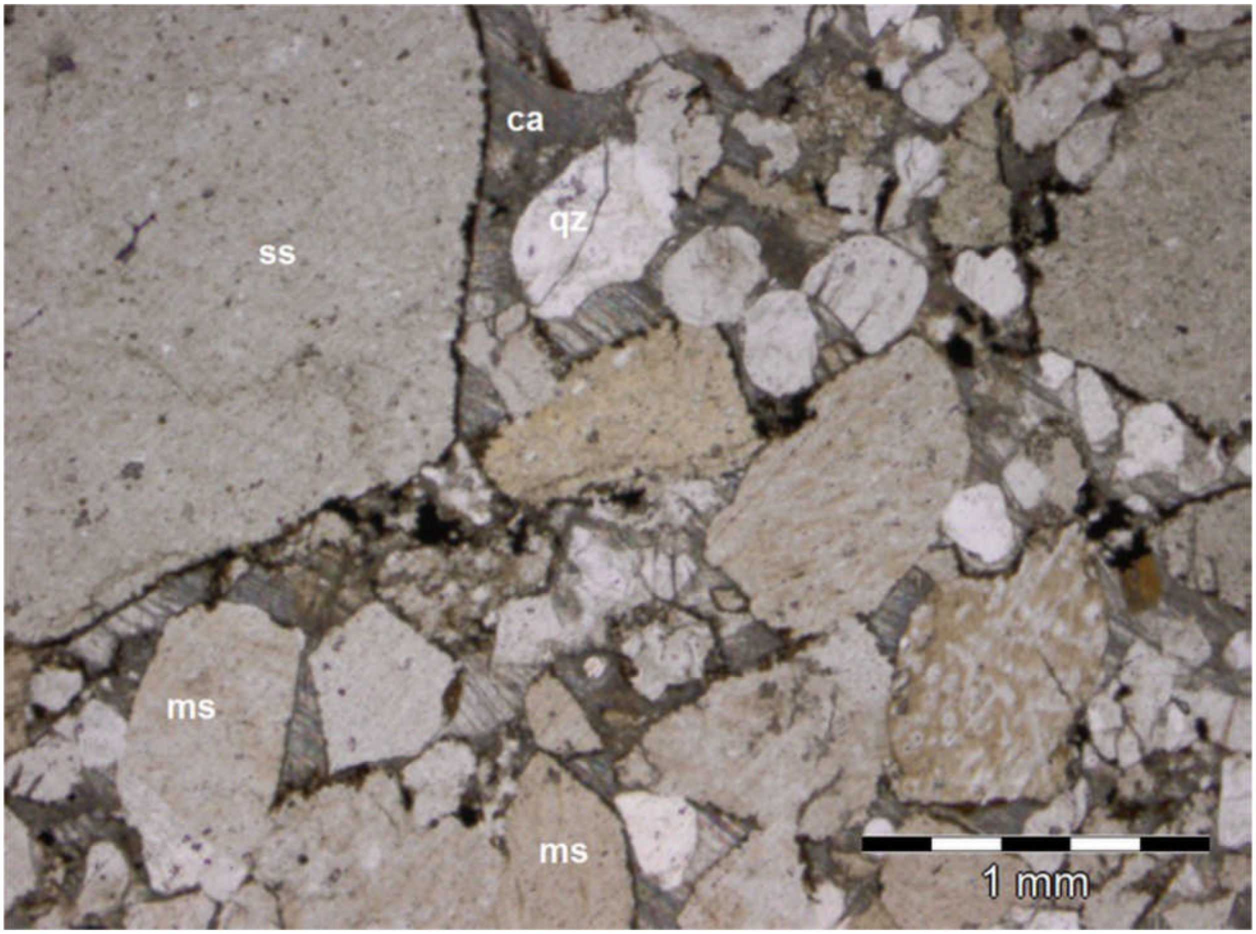


Figure 2: Polymictic pebble conglomerate - Photomicrograph showing lithic fragments of siltstone (ss), mudstone (ms) and quartz (qz) cemented by sparry calcite (ca). Plane polarized transmitted light.

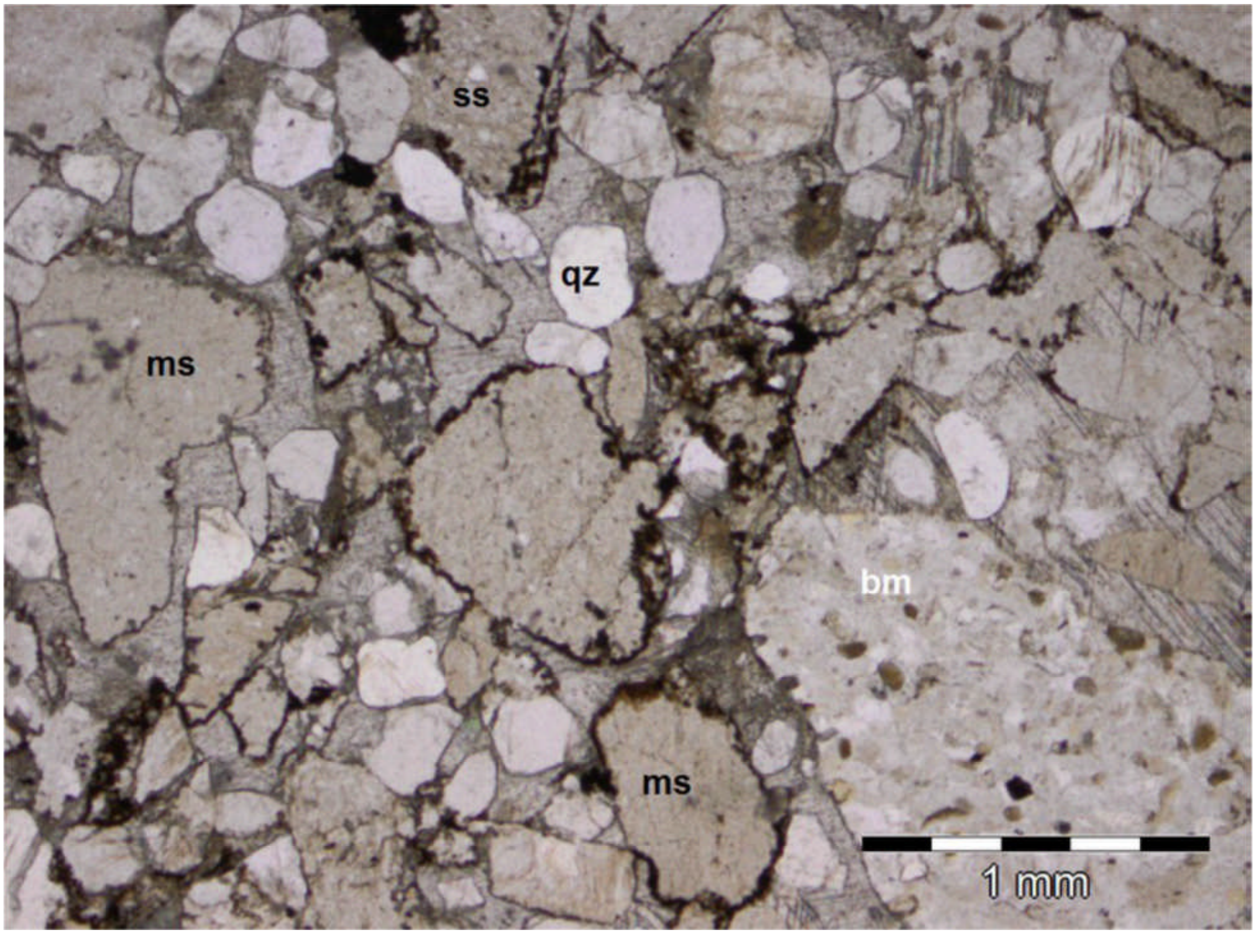


Figure 2a: Polymictic pebble conglomerate - Photomicrograph showing lithic fragments of siltstone (ss), mudstone (ms), biomicrite (bm) and quartz (qz) cemented by sparry calcite. Opaque minerals are rimming some lithic fragments and clasts. Plane polarized transmitted light.

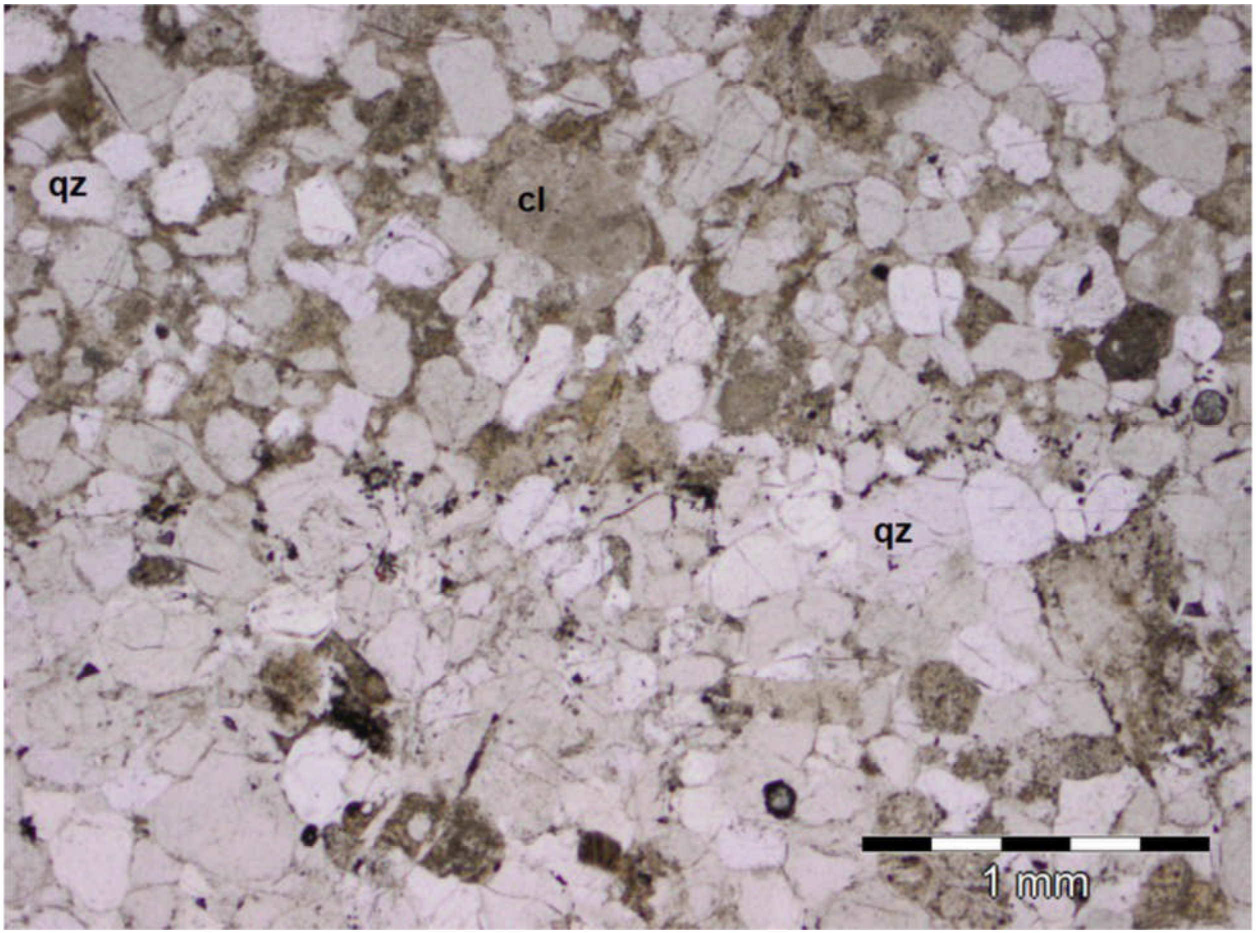


Figure 3: Medium to coarse sandstone - Photomicrograph showing quartz clasts (qz) and minor clay altered feldspar, cemented by quartz in the lower part of the photomicrograph; in the upper part quartz and clay altered feldspar (cl) are cemented by clay and carbonate. Plane polarized transmitted light.

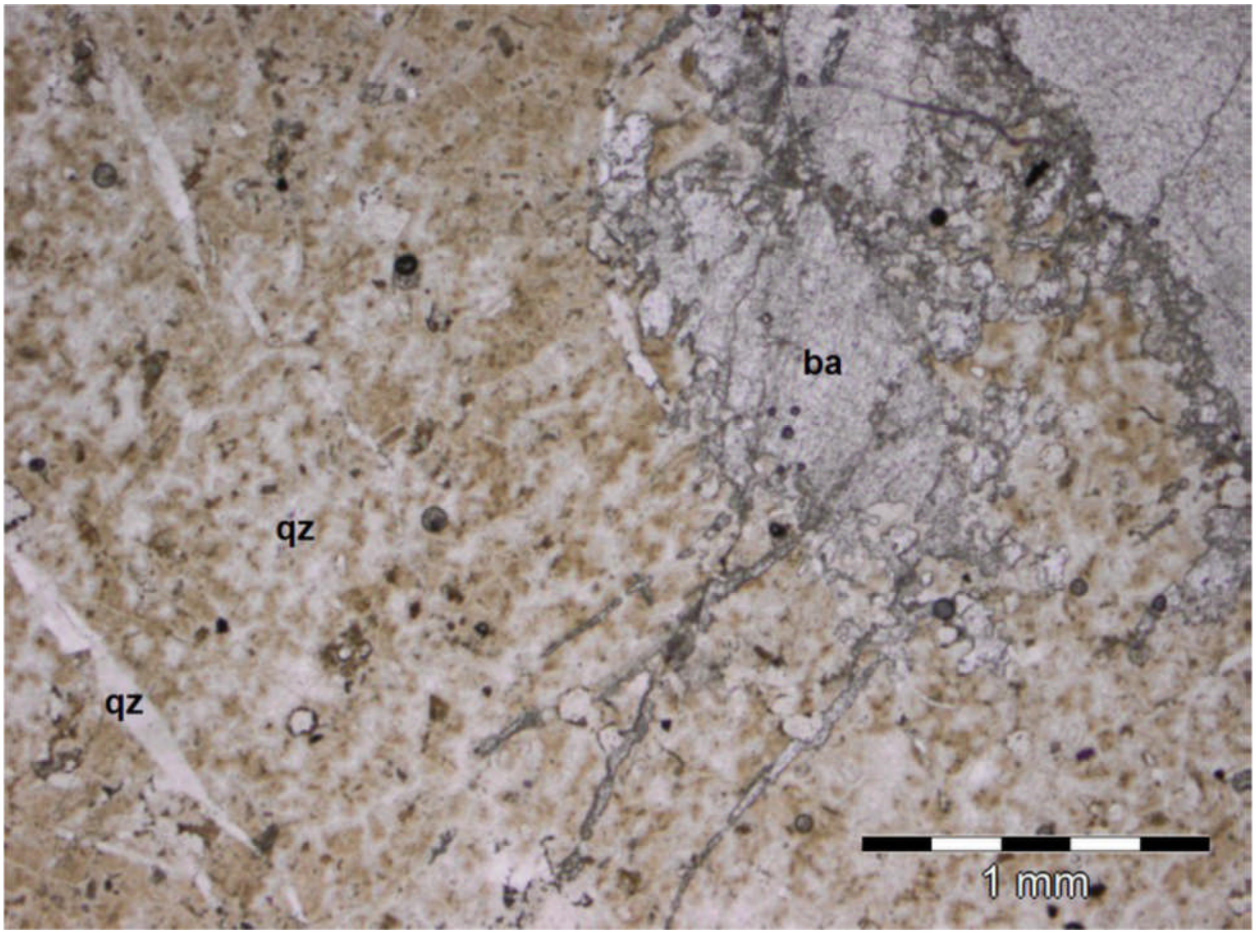


Figure 4: Quartz-chlorite-barite-calcite crackle breccia - Photomicrograph displaying a matrix intensely altered by quartz (qz) crosscut by barite veins (ba) and quartz veinlets (qz). Plane polarized transmitted light.

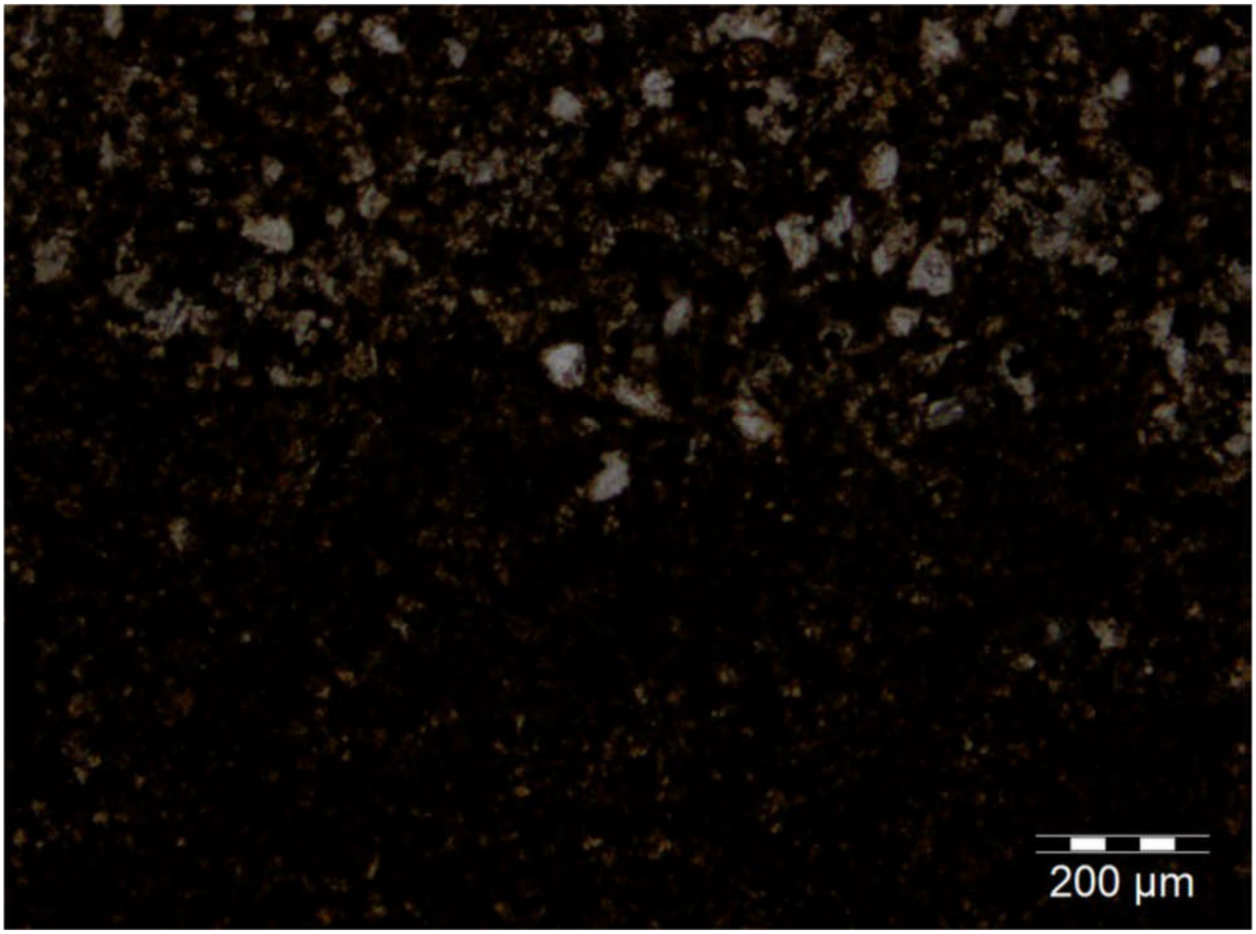


Figure 5: Medium to coarse siltstone - Photomicrograph showing a medium grained siltstone intensely stained by limonite and hematite with a coarser layer with more abundant quartz and feldspar (transparent clasts). Plane polarized transmitted light.

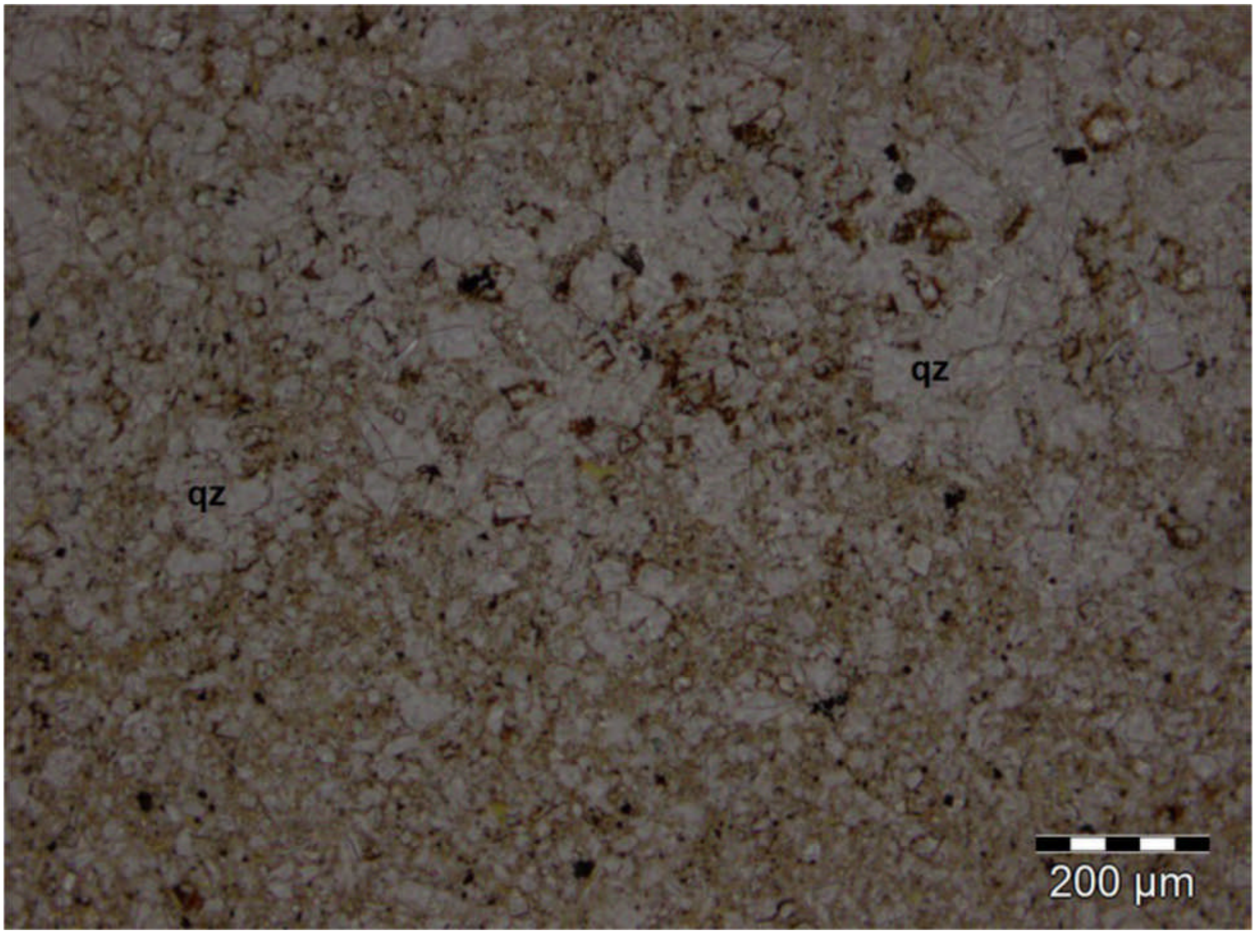


Figure 5a: Medium to coarse siltstone - Photomicrograph showing the lighter and coarser domain of the sample with more abundant and coarser clasts of quartz (qz) immersed in a matrix composed of cryptocrystalline material and limonite. Plane polarized transmitted light.

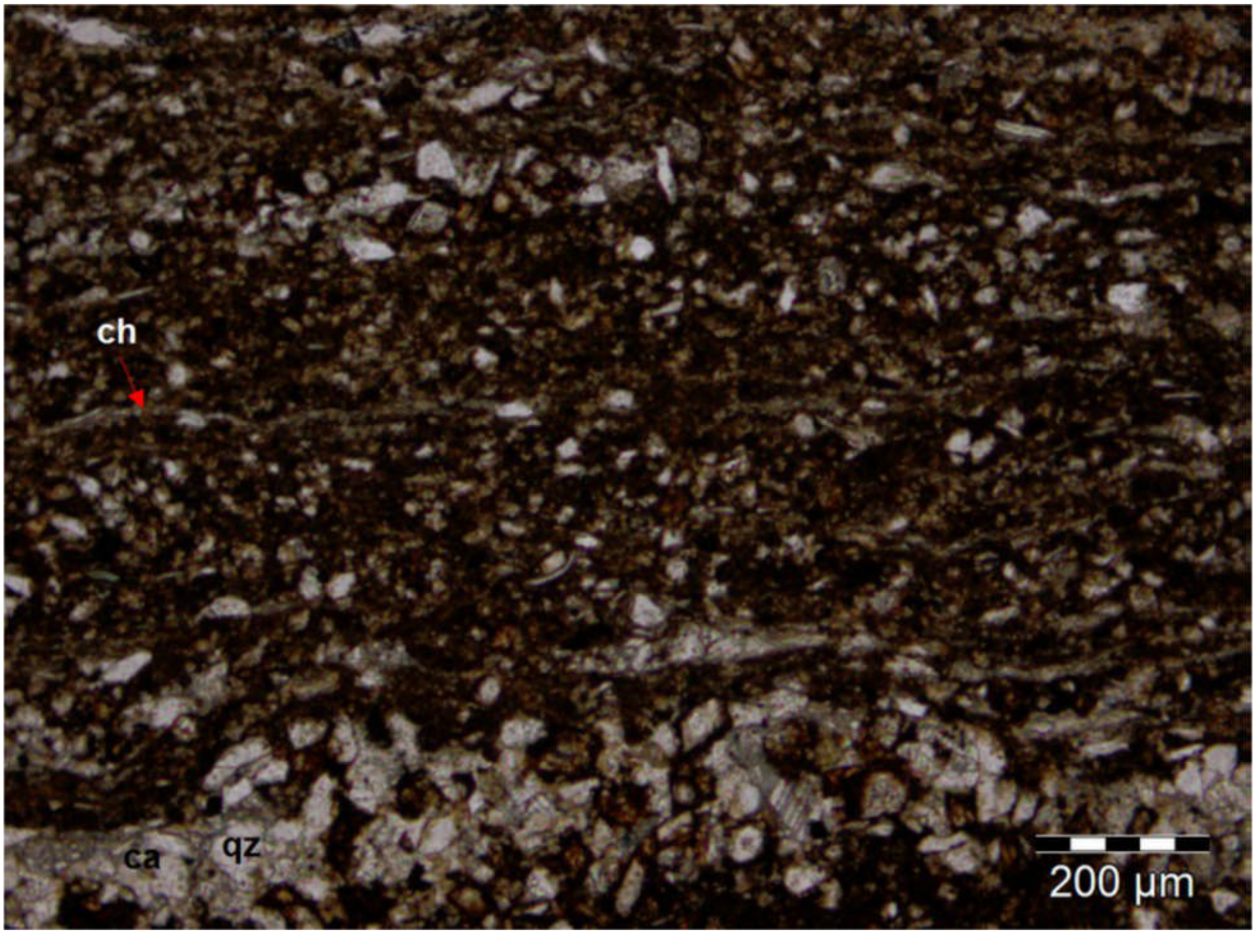


Figure 5b: Medium to coarse siltstone - Photomicrograph showing a thin layer of very fine-grained sandstone with calcite (ca) quartz (qz), feldspar, white mica and minor limonite in a medium grained siltstone intensely stained by limonite and interbedded very thin layers of chlorite (ch). Plane polarized transmitted light.

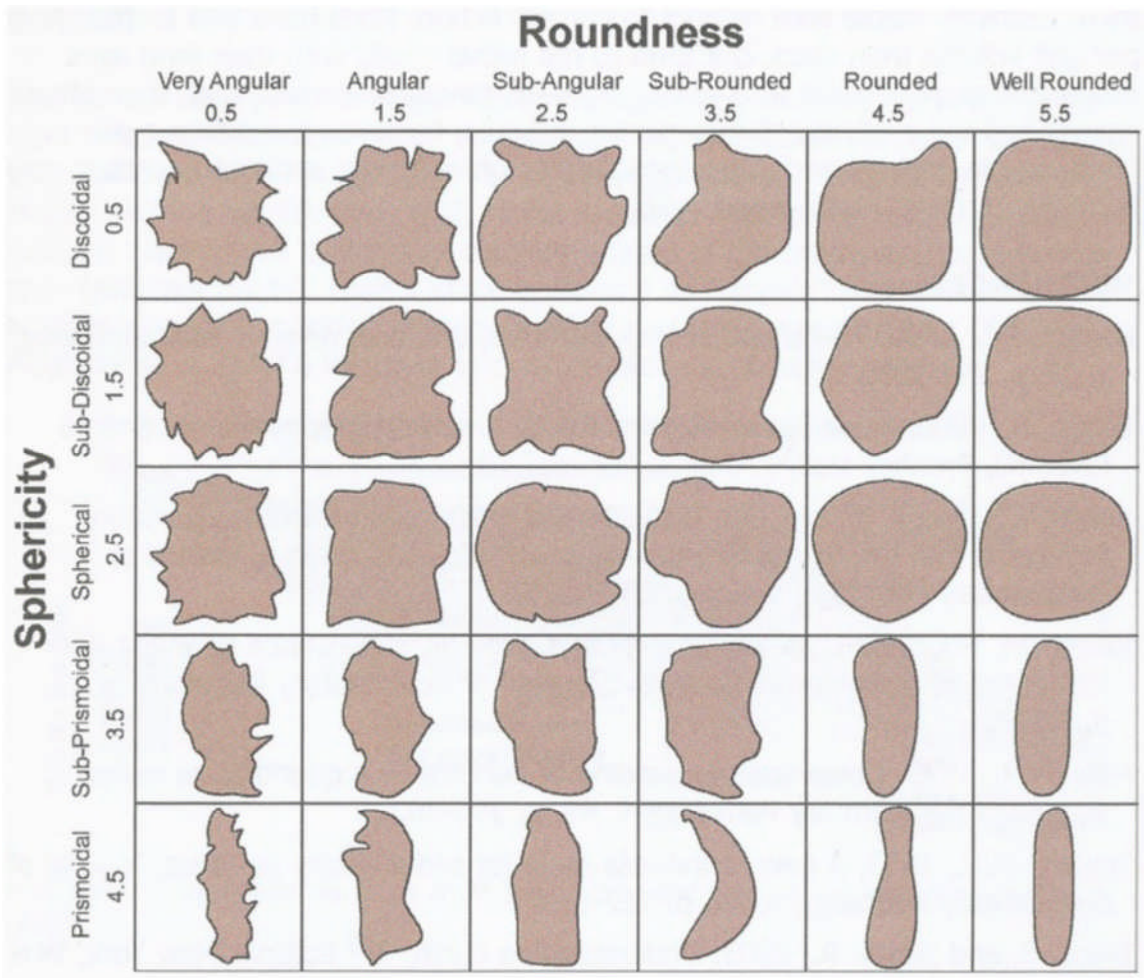


Figure 6: Roundness and Sphericity Chart (AGI Data Sheet 4.8)

This report consists of 20 pages and is signed by:

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8.2 Grid Layout

Bingay Main's grid layout is not cutout on the forested surface but is based on a Geometrics flyover referencing ground known point survey markers which was used to create a digital terrain model at 0.5 metre contour intervals.

The drill holes and trenches were survey controlled using the terrain model. The grid maps clearly assisted in defining the topographic elements of the Bingay Hill Property suite. The sharp geological boundaries are well defined in places by the differential erosion of the sand and mud stone belts. The complex nature of the boundary movements also required a very sophisticated suite of instrumental techniques to maximize the value of each drill hole. Geophysical and geotechnical down hole and physical test methods were used on all the holes to ensure any and all data sets were possible to obtain.

The wide varieties of data sets from each analysis are noted in the assorted appendices of this report. They also serve to provide a solid foundation of bed lithological nature. Understanding this nature is important for future drilling and exploration efforts on the property as a good foundation of knowledge across a broad spectrum of parameters is now available.

The geophysical testing included dip meter and gamma recording. Calipers and down hole nuclear tools were used to obtain density and resistivity logs as well. In short, if there was a standard testing process available for the hole, it was generally done. With respect to the drill core analysis, RQD and Q Index values were obtained and all drill core was digitally photographed to allow for direct visual “calibration” to the assorted core/down hole reporting methods.

Similar intensity was directed to the various surface trench examinations. Detailed logging and measurements were coupled with fine element sample collection (plus coal seam analysis submissions, where encountered) and prolific photography of all stages of the analysis.

8.3 Data Verification

Data used in the preparation of this report were either:

1) derived from the senior author's interpretation of downhole geophysical logs, or

2) directly collected by the senior author in the course of her diamond-drill core examinations and geological fieldwork at Bingay Main, or

3) (in the case of analytical results), prepared by laboratory staff from reputable firms.

Data were collected following customary Canadian coal-industry exploration practices, under the overall supervision of one or more licenced geologists or engineers who had substantial experience with coal exploration. There appears to be no reason to suspect that the exploration data have been tampered with, censored, or altered in any way. However, the senior author for the Geological Report by C.G. (Gwyneth) Cathyl-Bickford P.Geo. Lic. Geo, in 2011 (Bickford) was not present on the property during the 1983 or 2004 drilling programmes, and did not participate in the borehole-sampling exercise; furthermore, she has accepted the available geophysical data for those programmes on an 'as-found' basis.

Exploratory data were cross-checked between years: for example, the year-2010 geophysical records were compared with those obtained in 1983, 2004 and 2005, to ensure that coals were consistently correlated within each year's collection of geophysical data as well as between year-sets. The year-to-year comparison was important inasmuch as several geophysical contractors have worked at Bingay Main over the years.

(from Item 16, Geological Report by C.G. (Gwyneth) Cathyl-Bickford P.Geo. Lic. Geo, in 2011)

9.0 Conclusions and Recommendations

9.1 Interpretation & conclusions

Verification of regional geology, local presence of potentially-mineable coal, and lateral continuity of the major coal beds at Bingay Main, has been accomplished to the senior author's satisfaction, by means of geological mapping, review of historic drilling, execution of current drilling and downhole geophysical programmes, and interpretation of borehole geophysical logs.

In addition, coal-quality studies are currently underway at a reputable Canadian laboratory. Coal-quality data presented within this report are as have become available to Centermount Coal Ltd. up until 31 January 2011. [redacted]

The Bingay Main coal deposit comprises at least 32 coal beds, whose individual true stratigraphic thickness ranges from 0.3 to 16.2 metres. Of these coals, 24 typically are at least 1 metre thick, inclusive of contained bands of rock. Cumulative stratigraphic thickness of these coals is interpreted to be 62.6 metres, within an overall coal-bearing rock thickness of 460 metres. Coal thus forms about 13.6% of the coal-bearing rocks at Bingay Main.

[redacted]

[redacted]

Oxidised coal is principally conceived to be of value as feedstock for the production of activated carbon, perhaps suitable for used in pulverised coal injection (PCI) into blast-furnaces, or as thermal coals.

Further analytical work and further drilling, along with other supporting studies, are recommended for the Bingay Main coal property, which is regarded as being a property of merit.

(from Item 21, Geological Report by C.G. (Gwyneth) Cathyl-Bickford P.Geo. Lic. Geo, in 2011)

9.2 Recommendations

Further work at Bingay Main should focus on two points:

First, detailed exploration should be aimed at improving understanding of the geometry and quality of coal resources within the eastern, southern and western flanks of Bingay Hill, in support of mine-planning for this area.

- Core drilling should be done, as it affords the only means other than adit driveage, by which solid samples of the coals can be obtained from depths beneath the zone of near-surface oxidation. Drilling of 16 totalling 4800 metres is recommended (**see Figure 22-1**). Most of these boreholes would be situated at existing, presently-permitted, drill pads. Two of the recommended drill pads at Bingay Hill (pads P37 and P38, on the eastern side of the hill and near the year-2010 campsite) would be new pads, for which a permitting-amendment request must be submitted to the District Inspector of Mines.
- Trenching should be done along the subcrops of the major coal beds, to collect additional information as to the thickness and internal structure of the coal beds, and further to collect samples of oxidised coal from known, surveyed locations in support of activated-carbon testwork. As direct seam-tracing by means of continuous trenches is unlikely to be approved under the present regulatory regime, consideration should be given to excavating a series of closely-spaced cross-trenches along the subcrop traces.
- A substantial sample of oxidised coal (on the order of a few tonnes) should be taken from the existing trench in the No.10 coal bed, in support of activated-carbon testwork.
- Detailed geotechnical mapping within the southern Bingay Hill area should also be done, with the objective of collecting information concerning the orientation, irregularities and frequencies of joints and fractures within potential highwall and endwall strata.
- Borehole and trench positions should be surveyed on an as-needed and ongoing basis.
- Sampling and coal-quality analysis should be done as close to concurrently with retrieval of borehole cores and collection of trench samples as possible.

Second, exploratory drilling should be continued within the northernmost part of the Bingay Main property (within the northeastern quadrant of Coal Licence 417302, as shown **in Figure 22-1**). This drilling would support rapid assessment of whether coal-measures are present at accessible depths within areas which were not successfully addressed by the year-2010 drilling programme.

- Drilling of 9 holes totalling 5400 metres is recommended. All holes would be from existing permitted locations. Core drilling is recommended, for the structural information thus made available.
- Inasmuch as soft ground conditions made it quite difficult to move drilling rigs and supporting equipment along exploration trails during the rainy summer of 2010, serious consideration should be given to winter drilling within the outlying areas. Snow roads may afford better trafficability during the cold winter months, than would earthen trails (particularly within muskeg areas) during the wet summer months.

(from Item 22, Geological Report by C.G. (Gwyneth) Cathyl-Bickford P.Geo. Lic. Geo, in 2011)

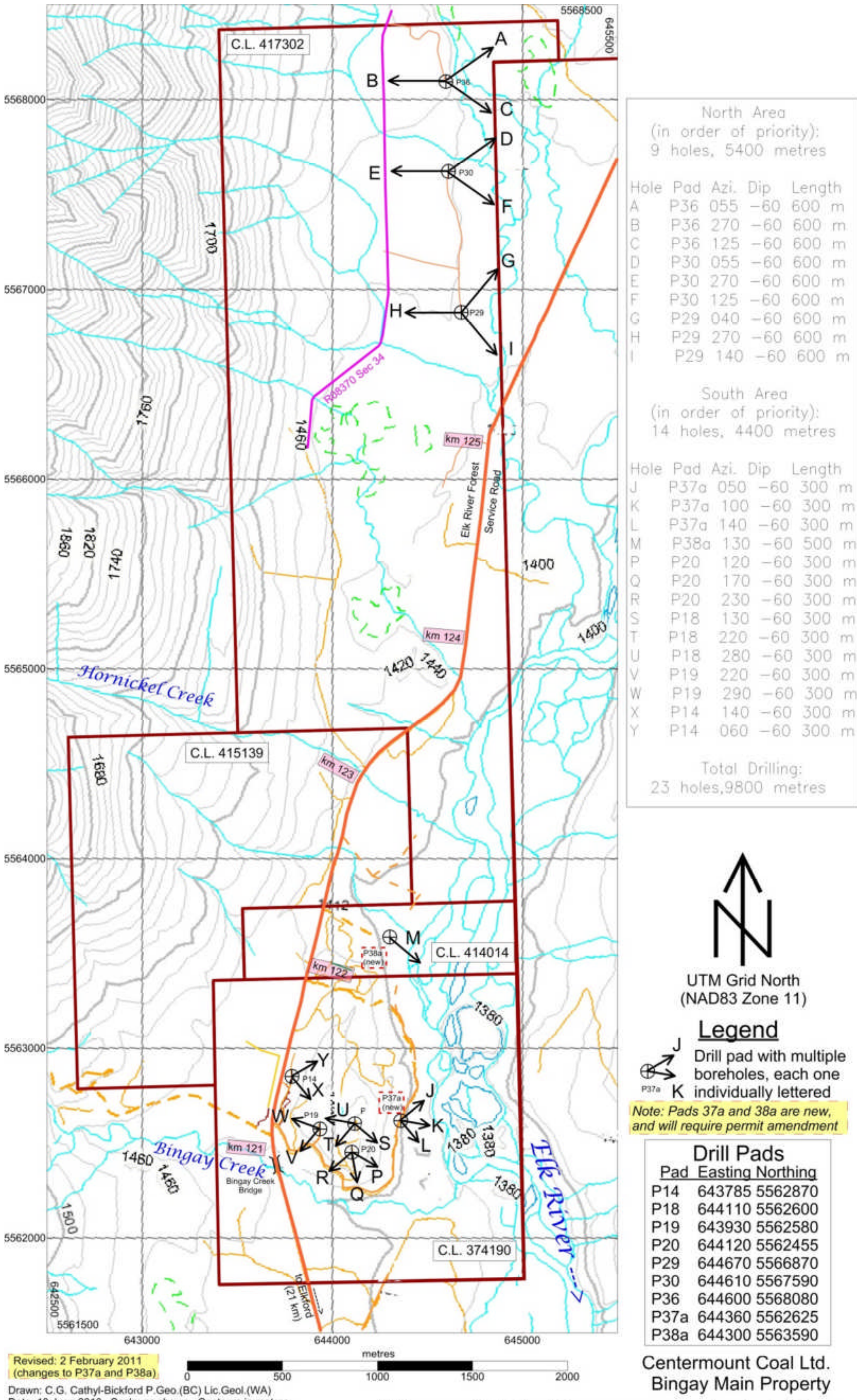

Figure 22-1: Recommended drilling

10.0 Statement of Costs

Exploration Work type	Comment	Days		
Personnel (Name)* / Position	**Field Days (list actual days)**	**Days**	**Rate**	**Subtotal**
Charlie Ruan/Professional				$4,000.00
Mimi Chien/Professional				$50,000.00
Bryan Edgren Professional				$36,000.00
Munroe Geological/Professional				$21,281.70
Ron A Swaren/Professional				$39,751.74
Amec/Professional				$3,462.00
Barry Ryan/professional				$31,025.40
Michael W.Hitch/Professional				$40,813.00
Dunsmuir Geoscience /Professional				$188,508.00
				$414,841.84
Office Studies	**List Personnel (note - Office only, do not include field days**			
Computer modelling	Gemcom -geological modelling			$24,000.00
Offier repair				$419.11
Other (specify)				$24,000.00
				$48,419.11
Airborne Exploration Surveys	**Line Kilometres / Enter total invoiced amount**			
Aeromagnetics				$0.00
				$0.00
Remote Sensing	**Area in Hectares / Enter total invoiced amount or list personnel**			
Aerial photography				$11,985.00
				$11,985.00
Ground Exploration Surveys	**Area in Hectares/List Personnel**			
Geological mapping				$1,344.00
GPS RTK Mapping	Taylor Munroe/Talon			$6,000.00
				$7,344.00
Ground geophysics	**Line Kilometres / Enter total amount invoiced list personnel**			
Radiometrics				
Well logging	56 holes, 14053.12 meter			
Geophysical interpretation				
Petrophysics				
Density		70.0	$2,250.00	$157,500.00
Standby		45.0	$500.00	$22,500.00
Log delivery		47.0	$100.00	$4,700.00
Mic				$11,890.00
				$196,590.00
Geochemical Surveying	**Number of Samples**	**No.**	**Rate**	**Subtotal**
Measurement	299 coal sample EVES			$29,253.48
Petrology	Vancouver Petrographics			$1,312.92

				$1,312.92
Drilling	**No. of Holes, Size of Core and Metres**	**No.**	**Rate**	**Subtotal**
Diamond	16 holes, 5782.97 in total			$0.00
Field Time				$242,150.00
Chargeable Materials				$256,496.99
Diamond Core Size HQ3	6 holes, 2844.23 meter		$130.00	$317,800.90
Diamond Core Size HQ3			$140.00	$104,395.20
Diamond Core Size HQ3			$150.00	$28,181.50
Diamond Core Size PW	10 hole, 193.58 meter			$12,852.00
Diamond Core Size PQ3				$146,968.50
Diamond Core Size PQ3	10 holes, 2938.74 meter			$212,059.75
Diamond Core Size HW	6 holes, 65.6 meter			$2,985.40
Mis				$17,011.48
Reverse circulation (RC)	48 holes, 9688.62 meter			$35,882.00
Reverse circulation (RC)				$996,501.99
General Supplies				$34,914.46
Gas Detector				$1,790.00
Excavator Sumps/Moving				$45,471.49
Dozer/Cat for site Prep				$694.26
Core Shed				$16,846.40
Core Logging				$2,376.00
Core Boxes				$39,799.03
Bryan'Expense				$22,591.52
Mimi Chien'Expense				$23,149.47
Stumpage				$3,575.00
Dip Meter Insruance				$2,775.00
Other stumpace				$4,800.00
Dilling Security				$7,645.00
Site radio				$4,978.35
Site Prepare				$8,910.00
Fuel				$190,425.10
Travel				$15,097.92
				$2,799,124.71
Other Operations	**Clarify**	**No.**	**Rate**	**Subtotal**
Trenching	1.8 km 8 trench			$40,810.00
Trenching sample Boxes				$8,330.00
				$49,140.00
Reclamation	**Clarify**	**No.**	**Rate**	**Subtotal**
After drilling	all driling pad site and terench have been recalimed			$6,000.00
Transportation		**No.**	**Rate**	**Subtotal**
truck Rentals				$68,726.27
truck transport				$10,935.67
fuel				$20,345.16
Fuel (litres/hour)				$2,416.00
Fuel Storage				$11,000.00

Venicle intransit Storage				$1,695.60
				$115,118.70
Accommodation & Food	**Rates per day**			
Hotel				$0.00
Camp				$119,058.86
Camp Electrical				$73.15
Camp Supplies				$7,378.76
Camp Security				$3,400.00
Camp Communication				$238.22
Camp Fuel				$1,668.30
Camp Cook				$41,857.33
Meals	day rate or actual costs-specify			$42,229.91
				$215,904.53
Miscellaneous				**Subtotal**
Telephone				$181.54
First Aid				$14,455.39
Safety First Aid				$11,475.00
First Aid Evacuation Link				$2,066.07
				$28,178.00
Equipment Rentals				**Subtotal**
Sample Prep				$60,145.00
Sink/Float				$4,482.00
labor				$16,498.74
				$81,125.74
Freight, rock samples				**Subtotal**
				$0.00
				$0.00
TOTAL Expenditures				**$3,969,084.55**

11.0 References

The principal reference sources for this document were the year-2005 geological report on the Bingay Main (formerly known as 'Bingay Creek') property (Cathyl-Bickford, 2005) and the regional geological reports by Gibson (1985) and Grieve (1992); both of the latter works are available in major university libraries across Canada. Other technical and scientific reports, as listed below, were found to contain relevant information.

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(from Item 23, Geological Report by C.G. (Gwyneth) Cathyl-Bickford P.Geo. Lic. Geo, in 2011)

Certificate of Qualification

I, Edward J. Nunn, residing at 4226 Granger Road, Nelson, British Columbia, declare:

1. That I have been associated with the mining industry for 49 years primarily working in project engineering and management for mine operating companies. Twenty nine of these years were experienced in the coal and industrial mineral industries for: Kaiser Resources Ltd., An Tai Bao Surface Coal Mine, Greymouth Coal, Crystal Graphite Corporation and Centermount Coal Ltd. My metal mining experience included Cominco Ltd. (four operations), Lornex Mining Corporation, Echo Bay Mines, Reeves MacDonald Mines, and Granduc Operating Company.

2. My experience includes exploration including assessment reports, geological engineering, civil/structural engineering, mine engineering, contract management, safety programs, financial analyzes, governmental affairs and project/operations supervision and management in both surface and underground mining environments.

3. I obtain a degree in Mining Engineering from Queens's University and Mineral Resource Geology from Northern Alberta Institute of Technology.

4. I am registered as a Professional Engineer in the Province of British Columbia.

5. I have been employed as Vice President – Technical of Centermount Coal Ltd since 2009.

6. Since the beginning of Centermount's Bingay project, I have managed all exploration related programs, and have been the Qualified Person for Geological Resource Modelling.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
E. J. NUNN

Edward J. Nunn, P. Eng.

30 November 2015

Certificate of Qualification

I, Richard G.R. Munroe, residing at 1408 Madrona Place, Coquitlam, British Columbia, declare that:

1. I am a geologist and have been employed in mineral exploration, industrial mineral development and earth science studies with industry and government since 1977. I was involved as either a consultant or employee of Lafarge Canada and its associated names from 1977 to 2002. I held the position of President of Sutherland Minerals Ltd., which is a private mining development corporation in Manitoba. I am a past director of Teslin Resources Ltd., which is a publicly traded corporation in British Columbia. In addition, I am the President of Munroe Geological Services Ltd., a private company registered in BC. I am also the Chief Executive Officer of Augustus Mining Corp. and Tiberius Gold Corp, which are private companies registered in BC. There is no current linkage in any manner between the affairs of Centermount Coal Ltd., Sutherland Minerals Ltd., Teslin Resources Ltd., Augustus Mining Corp. or Tiberius Gold Corp.
2. I obtained a Bachelors degree in Earth Science from the University of Manitoba in 1977. I was installed as a Fellow of the Geological Association of Canada in 1984.
3. I am actively registered as a Professional Geoscientist with both the Association of Professional Engineers and Geosciences of British Columbia, Alberta and Manitoba. (2000).
4. I visited the Bingay Creek area between July 9, 2010 and November 26, 2010 on many occasions since that time.
5. I am not an employee or insider of the issuer.
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. As a Qualified Person, I have read the Instrument and the Assessment Report has been prepared in line with that instrument's format. I have had no involvement in any manner with any resource valuations contained in the previously issued 43-101 report.
7. I am responsible for the preparation of the technical report titled "Bingay Coal Property Structural Analysis" of November 10, 2010". I did not have prior involvement (pre-July 2010) with the properties that are the subject matter of that Technical Report.
8. I am not aware of any material fact or material change with respect to the subject matter of the Technical Report that is not reflected in this Assessment Report, the omission to disclose which makes the Assessment Report misleading.
9. I am independent of the issuer applying all of the tests in section 1.5 of National Instrument 43-101.
10. I consented to the filing of the "Bingay Coal Property Structural Analysis of November 10 2010" , with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication and the public company files on their websites accessible by the public, of that Technical Report. That consent stands.

PROFESSIONAL PROVINCE OF R. G. R. MUNROE #27370 BRITISH COLUMBIA GEOSCIENTIST

PROVINCE OF MANITOBA R.G.R. MUNROE REGISTERED PROFESSIONAL GEOSCIENTIST

Dec 2 2015

Dated: December 2, 2015

Richard Munroe, B.Sc., F.G.A.C., P.Geo. (APEGBC, AGEGM, APEGA)