



Ministry of Energy and Mines
BC Geological Survey

ASSESSMENT REPORT
TITLE PAGE AND SUMMARY

TITLE OF REPORT [type of survey(s)] SUKUNKA ASSESSMENT REPORT TOTAL COST \$16,794,466

AUTHOR(S) REBECCA GETTY P.GEO. SIGNATURE(S) [Signature]

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S) 1641111-201201 YEAR OF WORK 2012-2014

STATEMENT OF WORK - CASH PAYMENT EVENT NUMBER(S)/DATE(S) _____

PROPERTY NAME SUKUNKA

CLAIM NAME(S) (on which work was done) COAL LICENSES 327208, 327211, 327213, 327216, 327218, 327241-327245, 327255-327258, 327454-327456, 327468-327470

COMMODITIES SOUGHT COAL

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN _____

MINING DIVISION 09 LIARD NTS 92P04

LATITUDE 55 ° 13 ' _____ " LONGITUDE 121 ° 36 ' _____ " (at centre of work)

OWNER(S)

1) BORCAS COAL LTD. 2) _____

MAILING ADDRESS

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VANCOUVER BC V6E 4B1

OPERATOR(S) [who paid for the work]

1) GLENCORE 2) _____

MAILING ADDRESS

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PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude):
JURASSIC-EARLY CRETACEOUS MINNES GROUP, BULLHEAD GROUP AND FORT ST. JOHN GROUP. COAL BEARING SEQUENCE OF CONGLOMERATE, SANDSTONE, SILTSTONE AND CLAYSTONE TRANSECTED BY A SERIES OF NORTH WEST TRENING FAULTS.

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS _____

BRAMEDA RESOURCES LTD 1969-1970, TECK CORPORATION LTD 1970-1977, COALITION MINING LTD 1971-1975, BP EXPLORATION CANADA LTD 1977-1979 EXPLORATION REPORTS, TALISMAN ENERGY 2011. (OVER)

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)			
Ground, mapping _____			
Photo interpretation _____	850km ²	327208, 327211, 327213, 327216, 327218, 327241 to 327245, 327255 to 327258, 327454 to 327456, 327468 to 327470	\$39,390
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic _____			
Electromagnetic _____			
Induced Polarization _____			
Radiometric _____			
Seismic _____			
Other <u>DOWNHOLE GEOPHYSICS 105 HOLES</u>		327208, 327211, 327216, 327218, 327241-327245, 327255-327258, 327454-327456, 327468-327470, 327213	\$724,122
Airborne _____			
GEOCHEMICAL (number of samples analysed for ...)			
Soil _____			
Silt _____			
Rock <u>COAL QUALITY 412 SAMPLES</u>		AS ABOVE	\$552,493
Other <u>STATIC TESTS 598 SAMPLES</u>		AS ABOVE	
DRILLING (total metres; number of holes, size)			
Core <u>5333m & 491m 53 HQ HOLES & 17 6" HOLES</u>		AS ABOVE	\$2,220,942
Non-core <u>5491m 76 HOLES 140mm</u>		AS ABOVE	\$1,274,177
RELATED TECHNICAL			
Sampling/assaying <u>GEOLOGICAL SUPPORT</u>		AS ABOVE	\$1,630,728
Petrographic _____			
Mineralographic <u>ENVIRONMENTAL ASSESSMENT</u>		AS ABOVE	\$6,230,044
Metallurgic _____			
PROSPECTING (scale, area)			
PREPARATORY/PHYSICAL			
Line/grid (kilometres) _____			
Topographic/Photogrammetric (scale, area) _____			
Legal surveys (scale, area) _____			
Road, local access (kilometres)/trail <u>29.7 km</u>		AS ABOVE	\$2,498,315
Trench (metres) _____			
Underground dev. (metres) _____			
Other <u>EXPLORATION SUPPORT</u>		AS ABOVE	\$1,624,255
TOTAL COST			\$16,794,466

Section 3.7, Section 4.7, portions of Section 5.1 (pages 42-43), Appendix J, and Appendix S remain confidential under the terms of the Coal Act Regulation, and have been removed from the public version.

<http://www.bclaws.ca/civix/document/id/complete/statreg/25>

[1 2004](#)

SUKUNKA

COAL LICENSES

**327208, 327211, 327213, 327216, 327218,
327241-327245, 327255-327258, 327454-
327456 and 327468-327470**

**NTS SHEET 93P04
Lat. 55 ° 13', Long. 121 ° 36'
UTM ZONE 10 E 588425, N 6120947**

ASSESSMENT REPORT

FOR THE PERIOD

15th March 2012 – 30th August 2014

Prepared for: Mineral Titles British Columbia

***Prepared by: McElroy Bryan Geological Services
(Rebecca Getty, P. Geo.)***

On behalf of: Glencore

Date: 29th August 2014

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Consulting Geologists since 1970***

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1 INTRODUCTION

The Sukunka coal project is located approximately 60 km south of Chetwynd in the Peace River Coalfield of north-eastern British Columbia within the western foothills of the Canadian Rocky Mountains (**Figure 1**). The property is accessed at 32.5 km on the Sukunka Forest Service Road which runs parallel to the Sukunka River from Highway 29 (**Figure 2**). The exploration area lies to the east of the Chamberlain Creek and south of Skeeter Creek. The Sukunka Coal Project includes 36 British Columbia coal licences summarized in **Table 1**, however exploration drilling by Glencore only occurred in 20 licences.

Table 1. Sukunka Coal Licences

Coal Licence	Exploration Program (Y/N)	Coal Licence	Exploration Program (Y/N)
327206	N	327284	N
327207	N	327285	N
327208	Y	327288	N
327211	Y	327309	N
327213	Y	327380	N
327216	Y	327383	N
327218	Y	327390	N
327241	Y	327402	N
327242	Y	327407	N
327243	Y	327421	N
327244	Y	327453	N
327245	Y	327454	Y
327254	N	327455	Y
327255	Y	327456	Y
327256	Y	327464	N
327257	Y	327468	Y
327258	Y	327469	Y
327282	N	327470	Y

Glencore plc (Glencore), formerly Xstrata Coal Canada (XCC) considered the Sukunka project to be well placed to provide a high quality coking coal to the market but



required further assessment. Additional seams in the Upper Gething (Bird and Skeeter Seams) and the Lower Gething (B Seam) formations were identified as potential additional resources but seam correlations and coal quality data for the Lower Gething seams were limited due to drill hole paucity.

Historical data indicated the Chamberlain Seam of the Upper Gething Formation was a prime hard coking coal with low ash (4% - 6%), low sulphur (<0.6%), low volatiles (average air dried at 22%) and high free swelling index (7 - 9).

Exploration was planned by Glencore in two phases alongside environmental background studies. Phase 1 (2012 - 2013) focussed on open cut mining areas to complement and expand on historical data and refine structural interpretation for Pre-feasibility assessment. This phase comprised 14 fully cored holes (HQ, 64 mm core) for structural and coal quality assessment and two large diameter core holes (LD, 152 mm core) for coal washability analysis. In addition 14 open holes were drilled for a hydrogeological study and included installation of groundwater monitoring wells and sampling for water quality. All the exploration holes drilled were sampled for geochemical analysis.

Phase 2 (2013 - 2014) was planned to further develop the Phase 1 strategy in order to achieve the Feasibility stage. This included five HQ core holes for geochemical analysis, nine HQ core holes for geotechnical assessment, 17 HQ core and 47 open holes for structural and coal quality assessment and 15 LD core holes for coal washability and carbonisation tests. A test pit is also planned for the Skeeter and Chamberlain Seams. Hydrogeological assessment included 14 open holes for installation of groundwater monitoring wells and water quality analysis.



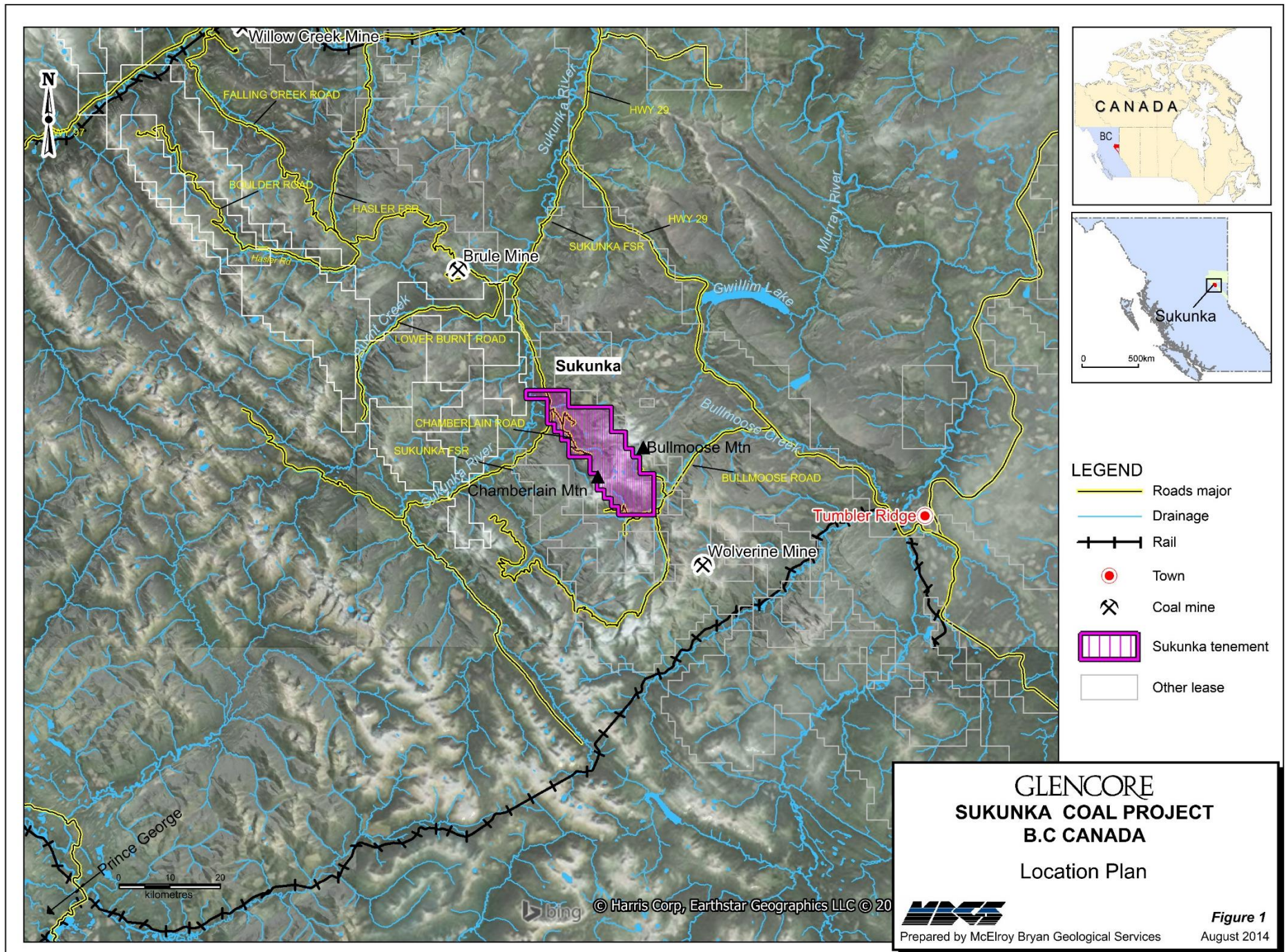
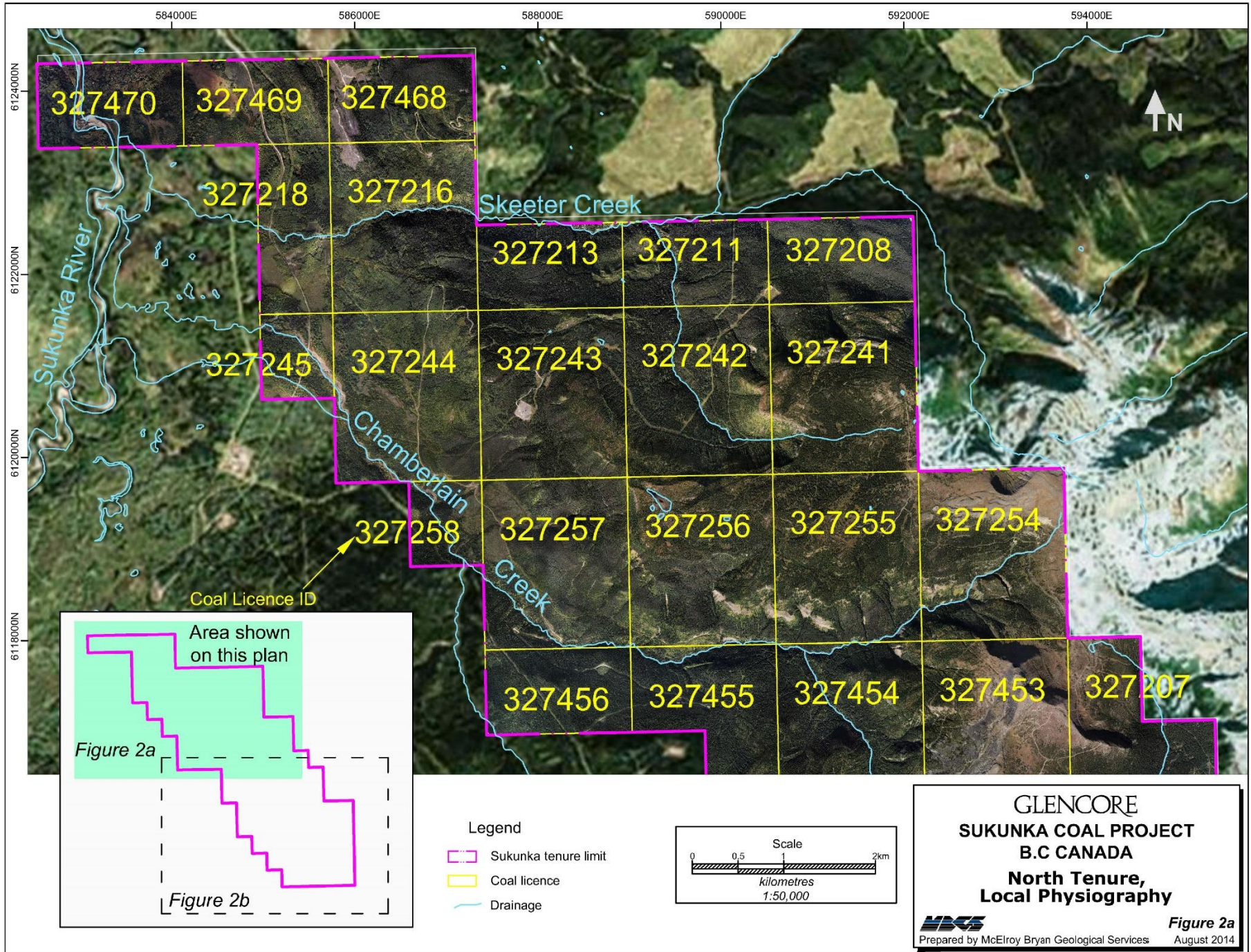
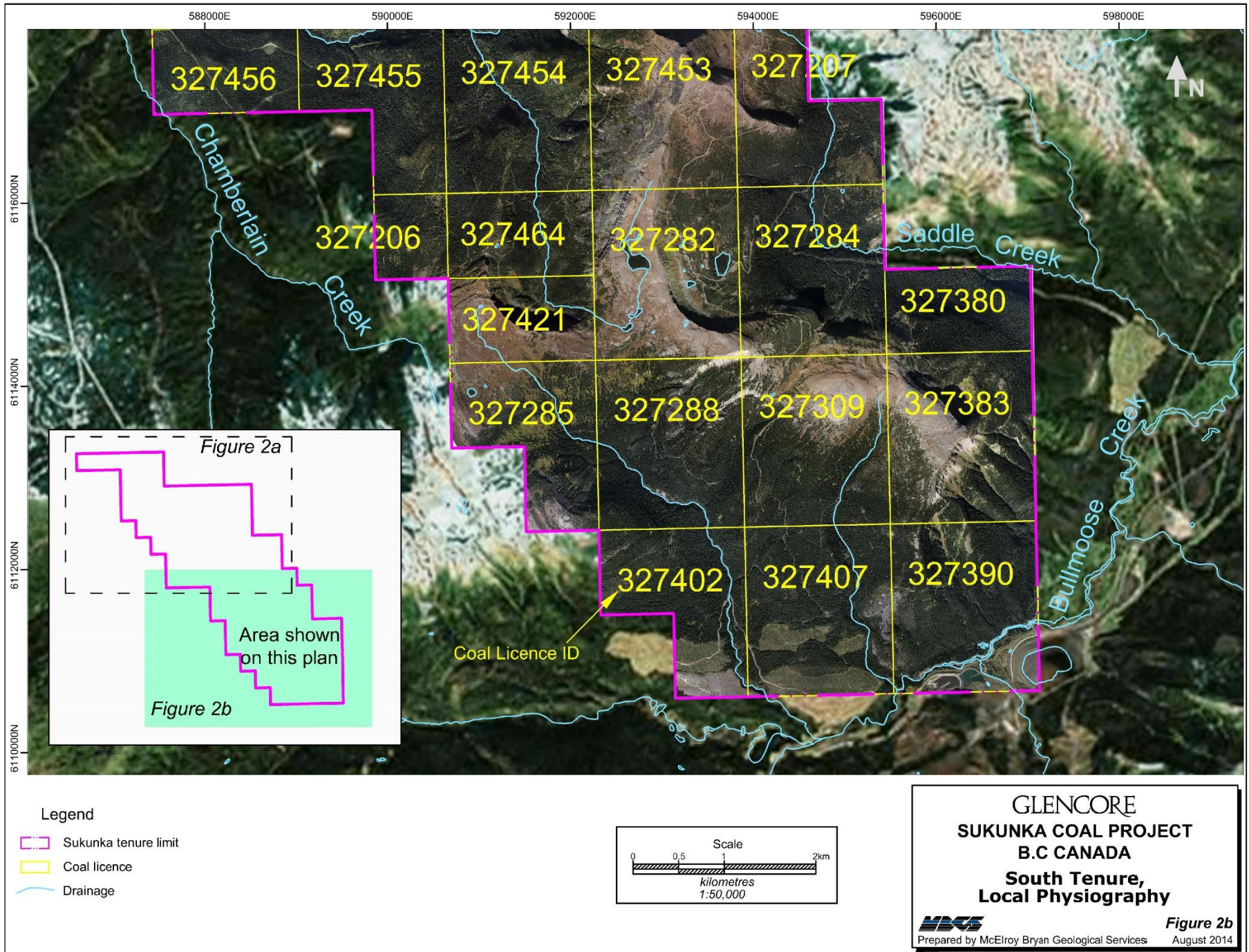


Figure 1
August 2014





GLENCORE
SUKUNKA COAL PROJECT
B.C CANADA
South Tenure,
Local Physiography

Figure 2b
 August 2014

MBCS
 Prepared by McElroy Bryan Geological Services

2 HISTORICAL EXPLORATION

Exploration commenced in 1969 following acquisition of the Sukunka and Bullmoose coal licences by Brameda Resources Ltd (Brameda) as a result of earlier independent reports of coal occurrences in the area.

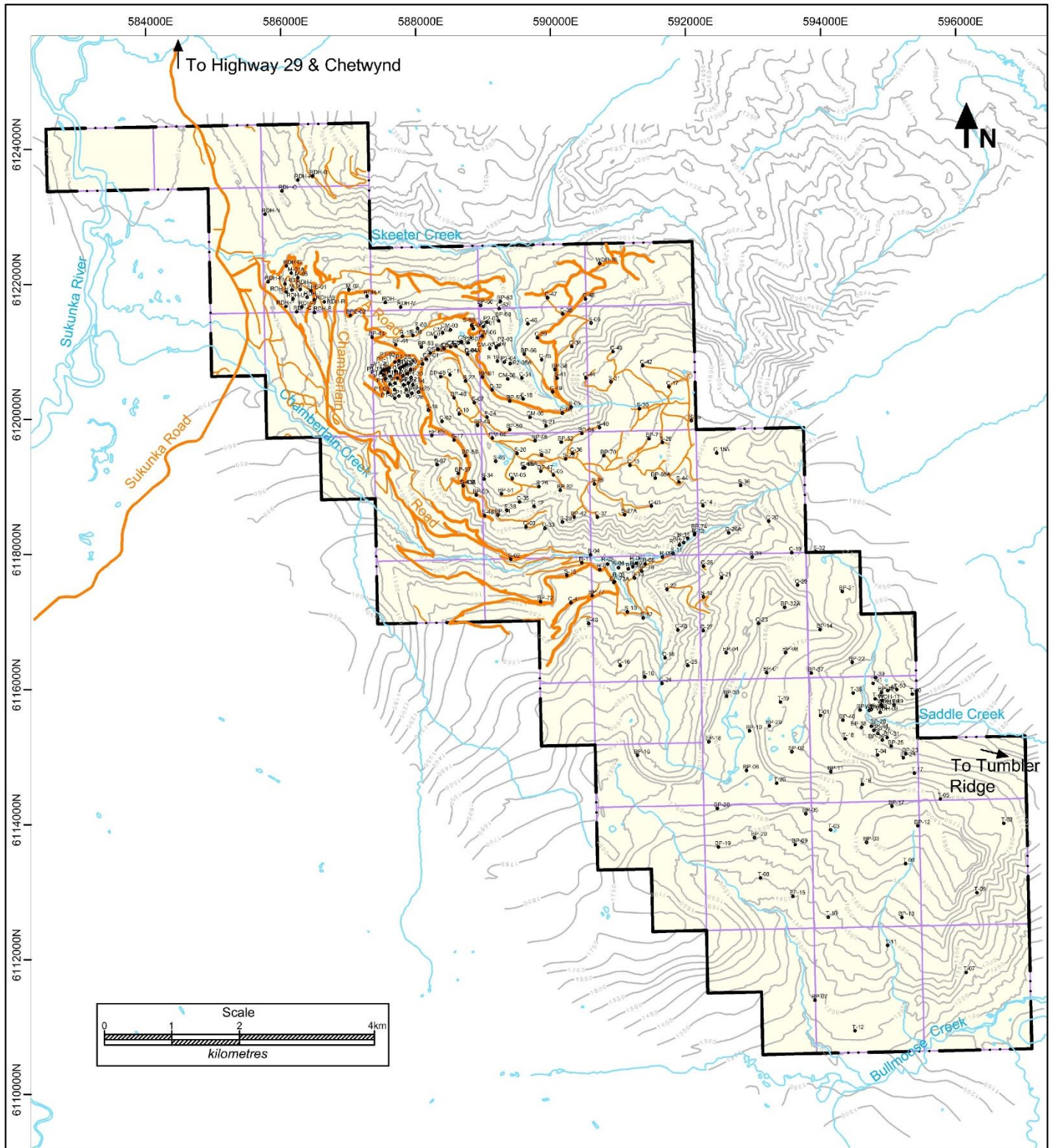
Historical exploration comprised four campaigns between 1969 and 1979. In total 253 core holes and 66 open holes were drilled to assess the Gates, Upper and Lower Gething Formations (**Figure 3**).

- Brameda (1969-1970)
- Teck Corporation Ltd (1970-1977)
- Coalition Mining Ltd (1971-1975)
- BP Exploration Canada Ltd (1977-1979)

The majority of holes were geophysically logged and are considered reliable. A large scale trial mine was excavated from 1972-1979 at two locations, the No 1 Mine and Main Mine in the Chamberlain and Skeeter Seams respectively and six adits were driven for channel and bulk samples for coal washability testing. Extensive field mapping was also carried out across the northern part of the deposit with intermittent mapping and excavation of 59 trenches. Additional assessments of experimental seismic and gas content were undertaken but the results of both were considered inconclusive.

In 1973 pilot scale coking and blast furnace tests were undertaken on clean Sukunka coal by the British Steel Corporation at Port Talbot, Wales. The test identified the Sukunka coal as an outstanding coking coal. In 1981, the British Columbia government granted provisional mine approval for detailed mine planning to BP Exploration Canada Ltd, but this did not commence.





Legend

- Historical drill hole
- Main road
- Minor road
- Drainage
- Topography (50m interval)
- Coal licence
- Sukunka tenure limit

GLENCORE
SUKUNKA COAL PROJECT
B.C CANADA
Historical Exploration

MBS
 Prepared by McElroy Bryan Geological Services

Figure 3
 August 2014



3 EXPLORATION PROGRAM 2012 - 2013

Phase 1 exploration commenced in March 2012 with a desktop assessment of the proposed exploration program to enable a Pre-feasibility assessment. This program included 14 HQ core holes (XKD5001 to XKD5014) and two LD core holes (XKL9001 and XKL9002) for structural and coal quality analysis (**Figure 4**). Three holes were redrilled and additional large diameter holes were not completed due to poor coal recovery.

The majority of holes were geophysically logged by Weatherford Slimline logging services (Weatherford) and coal plies were sent for coal quality analysis at ALS Laboratory Group (ALS), Vancouver. All exploration was supervised on site by McElroy Bryan Geological Service (MBGS).

Geochemical assessment is ongoing and supervised by Klohn Crippen Berger consultants. All exploration holes were sampled by field engineers from Lorax Environmental Services Ltd. (Lorax) for static and kinetic leech testing with static tests undertaken by SGS Canada Inc (SGS).

A baseline hydrogeological study comprised 14 open holes drilled up to 60 m at seven locations and was supervised by Knight Piésold Consulting Ltd (Knight Piésold).

All drill hole data is summarized in **Table 2**.

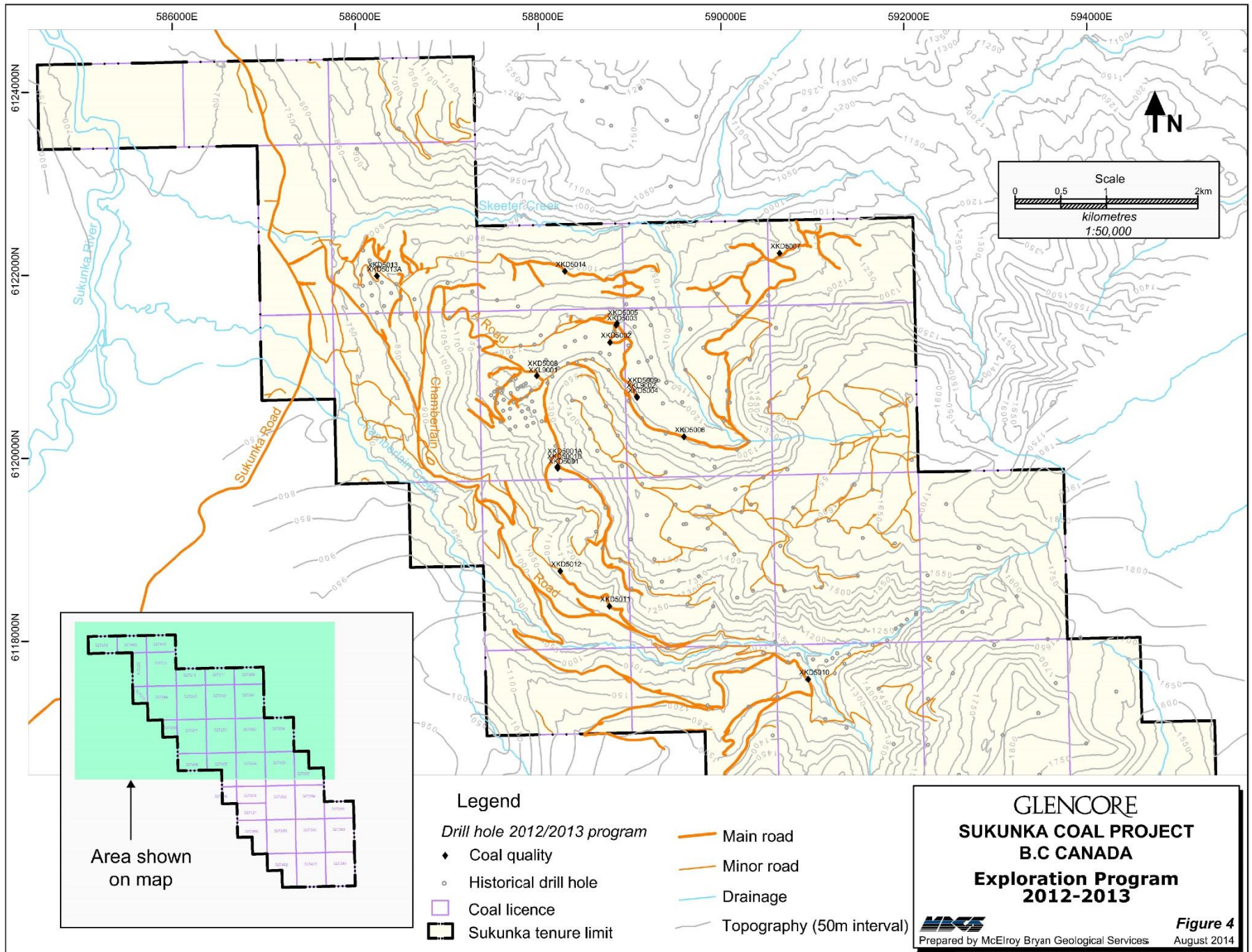
Table 2. Drill Hole Summary 2012-2013

Hole ID	Hole Type	Depth (m)	Available Data				Geophysics		Coal Quality		
			Field Logs	Core Photos	Geotechnical UCS	Geochemical Leech Test	LAS	Suite of Logs	Raw	Clean	Petrology
MW12-01D	Open	48.16	Yes	No	No	No	No	No	No	No	No
MW12-01S	Open	31.24	Yes	No	No	No	No	No	No	No	No
MW12-02D	Open	49.17	Yes	No	No	No	No	No	No	No	No
MW12-02S	Open	20.27	Yes	No	No	No	No	No	No	No	No
MW12-03D	Open	60.04	Yes	No	No	No	No	No	No	No	No
MW12-03S	Open	11.58	Yes	No	No	No	No	No	No	No	No
MW12-01D	Open	50.61	Yes	No	No	No	No	No	No	No	No
MW12-01D	Open	23.02	Yes	No	No	No	No	No	No	No	No
MW12-01D	Open	49.24	Yes	No	No	No	No	No	No	No	No
MW12-01D	Open	32.31	Yes	No	No	No	No	No	No	No	No
MW12-01D	Open	36.89	Yes	No	No	No	No	No	No	No	No
MW12-01D	Open	15.09	Yes	No	No	No	No	No	No	No	No
MW12-01D	Open	51.07	Yes	No	No	No	No	No	No	No	No
XKD5001	HQ Core	68.28	Yes	Yes	Yes	Yes	Yes	Full	Yes	Yes	Yes
XKD5001A	HQ Core	42.58	Yes	Yes	No	No	Yes	Full			Yes
XKD5001B	HQ Core	43.31	Yes	Yes	No	No	Yes	Partial			Yes
XKD5002	HQ Core	74.86	Yes	Yes	Yes	Pending	Yes	Full	Yes	Yes	Yes
XKD5003	HQ Core	41.50	Yes	Yes	Yes	Pending	Yes	Full	Yes	Yes	Yes
XKD5004	HQ Core	122.64	Yes	Yes	Yes	Pending	Yes	Full	Yes	Yes	Yes
XKD5005	HQ Core	23.10	Yes	Yes	Yes	Pending	Yes	Full	Yes	Yes	Yes
XKD5006	HQ Core	125.67	Yes	Yes	Yes	Pending	Yes	Full	Yes	Yes	Yes
XKD5007	HQ Core	98.48	Yes	Yes	Yes	Pending	Yes	Full	Yes	Yes	Yes
XKD5008	HQ Core	128.14	Yes	Yes	Yes	Pending	Yes	Full	Yes	Yes	Yes
XKD5009	HQ Core	98.02	Yes	Yes	Yes	Pending	Yes	Full	Yes	No	No
XKD5010	HQ Core	125.08	Yes	Yes	Yes	Pending	Yes	Full	Yes	Yes	Yes
XKD5011	HQ Core	133.50	Yes	Yes	Yes	Yes	Yes	Full	Yes	Yes	Yes



Hole ID	Hole Type	Depth (m)	Available Data				Geophysics		Coal Quality		
			Field Logs	Core Photos	Geotechnical UCS	Geochemical Leech Test	LAS	Suite of Logs	Raw	Clean	Petrology
XKD5012	HQ Core	104.01	Yes	Yes	Yes	Yes	Yes	Full	Yes	Yes	Yes
XKD5013	HQ Core	74.00	Yes	Yes	Yes	Yes	Yes	Full	Yes	Yes	Yes
XKD5013A	HQ Core	62.00	Yes	Yes	No	No	Yes	Partial	Yes	Yes	Yes
XKD5014	HQ Core	119.85	Yes	Yes	Yes	Yes	Yes	Full	Yes	Yes	Yes
XKL9001	HQ Core	110.43	Yes	Yes	No	No	Yes	Partial	No	Yes	Yes
XKL9002	HQ Core	93.84	Yes	Yes	No	No	No	No	Yes	Yes	Yes





3.1 Scope and Objectives

The objective of the 2012 – 2013 exploration program was to investigate the geological, geotechnical and geochemical constraints of the planned Sukunka open cut mining areas for Pre-feasibility assessment and it commenced with a desktop review of the proposed exploration program in March 2012.

Planned holes were located in areas with gaps from historical data to provide additional coal quality, structural data and further assess seam continuity, additionally some holes were planned in close proximity to some historical holes to validate this information.

Exploration drilling was designed along existing trails and roads as much as possible to minimise ground disturbance. Drilling was completed between March and May 2013 and was supervised on site at all times by MBGS.

Samples for coal washability were taken from all drilled seams and sent for analysis at ALS, Vancouver. A small LD program was planned to provide additional sizing and coal quality analysis however only two of these holes were drilled due to poor recovery.

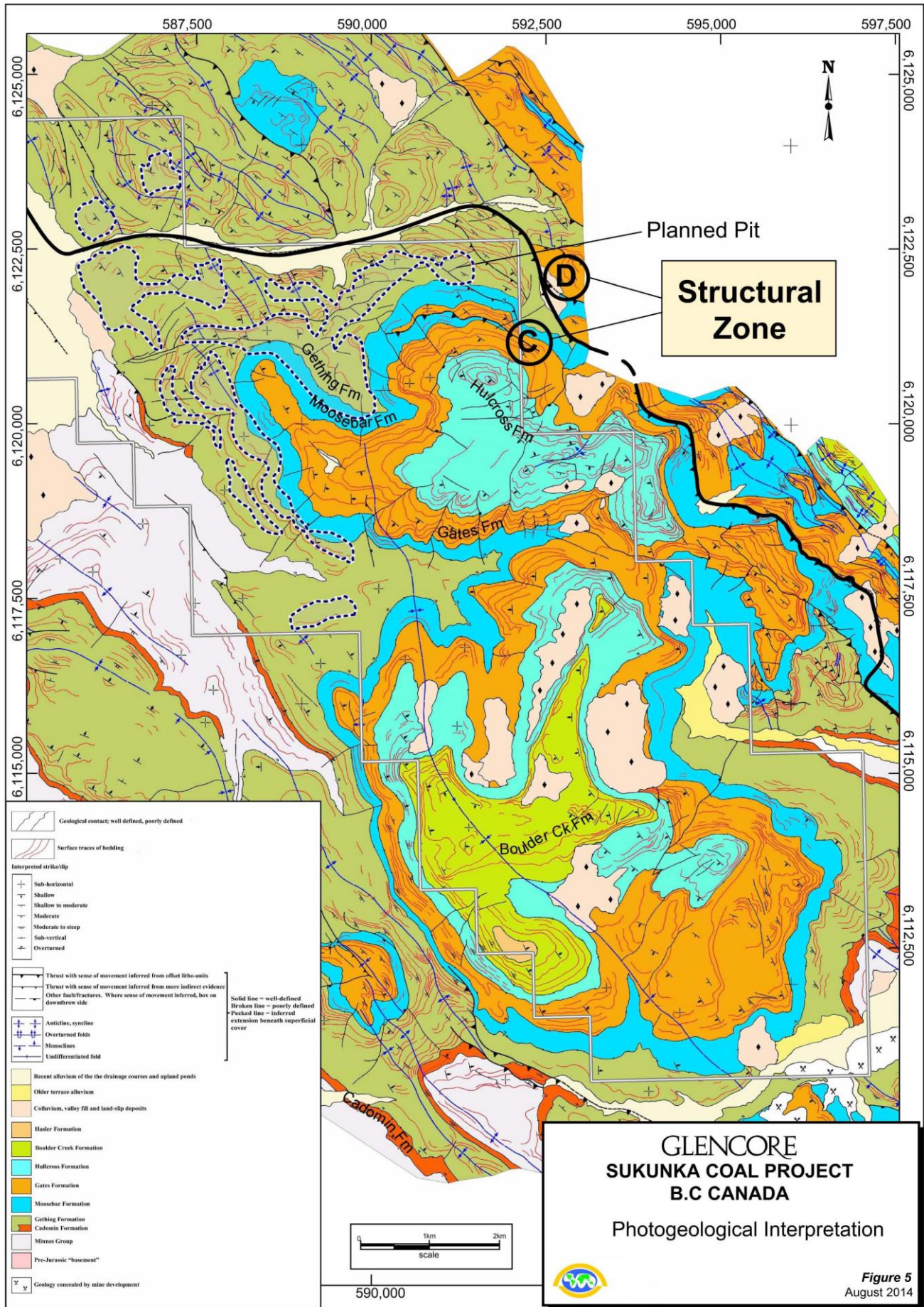
Samples were taken for geotechnical uniaxial compressive strength (UCS) testing above and below the Chamberlain Seam in all HQ core holes. As well, once drilling was completed all holes were sampled by Lorax for geochemical assessment of the acid generation properties of the bedrock under supervision by Klohn Crippen Berger consultants. Static tests have been undertaken by SGS and kinetic leech testing is ongoing.

A hydrogeological assessment to supplement baseline environmental studies was supervised by engineers from Knight Piésold from December 2012 to January 2013. Knight Piésold successfully installed 14 piezometers to monitor groundwater levels and collected groundwater samples.

In addition to the drilling program a regional aerial photo interpretation was completed in 2013 by Stephen Snodin of Consulting Services in Geological Image Interpretation and the results are shown in **Figure 5** and the complete report included in **Appendix A**. The interpretation was carried out using the British Columbia government colour stereoscopic photos flown in 2005 (1:30,000 scale). The resultant map correlates strongly with current structural and stratigraphic interpretation from the field data.

Exploration drilling during 2012 - 2013 confirmed the presence of Upper Gething seams and extended correlation of these seams to the north and northeast of the exploration area. Three holes investigated the Lower Gething coal seams in the north of the deposit and their presence was confirmed however the dip of the strata was identified to be higher (up to 30°) than in the Upper Gething sequence towards the south.





3.2 Drilling

Glencore contracted three drilling companies between 2012 and 2013, Westech Drilling Corporation (Westech), Cyr Drilling International Ltd (Cyr) and Carbon Mountain Drilling and Water Services Ltd (CMD). Details of drill holes are presented in **Appendix B**.

Westech was engaged to drill 14 open holes (MW - prefix) at seven sites for hydrogeological assessment under supervision by engineers from Knight Piésold. Holes were drilled with a B-54 air rotary rig between 10 m – 60 m with up to 23m of 140mm casing installed.

Cyr operated a skid-mounted diamond drill rig and was engaged to drill 14 fully cored HQ holes for coal quality, stratigraphic correlation, geochemical and geotechnical assessments (XKD5001 to XKD5014). Three redrills were required due to poor coal recovery (XKD5001 and XKD5013 suffix A and B). A total of 1485 m was cored to hole depths ranging between 40 m and 140 m with up to 50 m of steel casing cemented and left in the ground for blowout preventer operation (BOP). Holes shallower than 70 m or drilled on the same site as existing holes did not have BOP installed. Drill holes were terminated 20 m below the target Chamberlain Seam to allow enough core for geotechnical and geochemical sampling. All holes were sealed from bottom to surface upon completion.

CMD was contracted to drill three LD holes (6" core) with a Mack truck mounted rig of which only two were completed due to coal recovery issues (XKL9001 and XKL9002). Only coal seams and the immediate roof and floor were cored with depths determined from adjacent HQ holes. Holes were steel cased to 8 m and were not cemented at the time due to poor ground conditions (snow melt during freshete).



All holes were lithologically and geotechnically logged and photographed at the drill rig by field geologists (**Appendix C**). Field geologists were contracted from UTM Exploration Services Ltd (UTM) and were trained and supervised by MBGS.

Qualifications of geological staff are included in **Appendix D**. In addition to geological data, all drilling information was recorded including loss of returns, production of water and poor drilling conditions. Standing water levels were recorded by the geophysical loggers in all holes where possible.

The results of hydrogeological drilling and monitoring well development and testing were recorded by engineers from Knight Piésold and details are in **Appendix E**.

All core is stored at the Chetwynd core shed. Non-core holes were logged at the rig and samples were not retained.

All logging and sample data was entered into the Glencore acquire database in offline mode and Prolog software was used to produce lithological graphics to enable depth corrections to geophysical logs. Final data was saved in Prolog and also imported into the live acquire database at the Vancouver office.

3.3 Geophysical

All holes were geophysically logged by Weatherford. A standard suite of sondes was used where possible and included:

- density, gamma and caliper
- sonic
- neutron
- resistivity
- verticality
- acoustic scanner
- dipmeter

Down-hole problems such as low water levels and hole stability issues sometimes prevented logging with the full suite of tools as indicated in **Table 2**.

Hard copies of all recent geophysical logs are stored at the Chetwynd office with duplicates stored at the Vancouver office and all digital data is saved on the Glencore server in Vancouver. Geophysical data (LAS format) is included in **Appendix F**.

3.4 Geotechnical

Geotechnical samples for UCS, direct shear tests and Young's Modulus are summarized in **Table 3**. Samples were taken from all 14 HQ core holes (except in the redrilled holes) and all drill core was geotechnically logged by the geologist at the drill rig. Samples were selected above and below the Chamberlain Seam based on advice from Seedsman Geotechnics Pty Ltd. Samples were sealed in cling wrap, aluminium foil and packing tape to preserve moisture and subsequently sent to Golder Associates Ltd, the results are presented in **Appendix G**. Hole testing requirements were advised by Glencore.



Table 3. Geotechnical Data Summary 2012-2013

Hole ID	UCS	Direct	Young's Modulus
XKD5001	Yes	Yes	Yes
XKD5002	Yes	Yes	No
XKD5003	No	No	No
XKD5004	No	No	No
XKD5006	Yes	Yes	No
XKD5007	Yes	Yes	Yes
XKD5008	No	No	No
XKD5009	No	No	No
XKD50010	Yes	No	Yes
XKD50011	No	No	No
XKD50012	No	No	No
XKD50013A	No	No	No
XKD50014	No	No	No

All drill holes (14 HQ holes excluding redrilled holes) included dipmeter and acoustic scanner tools and the data was interpreted in conjunction with other available data to provide orientation of faults. ASIMS¹ interpreted the acoustic scanner images and provided dip and direction of all interpreted features (**Appendix G**).

A large number of faults and possible faults were identified by ASIMS. Some features corresponded to the current structural interpretation of a series of low angle thrust faults. The low angle thrust faults are difficult to identify in the acoustic image due to the similar orientation and dip angle to the strata bedding and the crushed zones along fault planes may masked the identification of these features.

The geological stratigraphy supports the current structural interpretation but without a clearer understanding of the actual fault geometry it is uncertain which features interpreted from the acoustic image are representative of the

¹ ASIMS is a joint initiative between MBGS and Seedsman Geotechnics

larger scale faulting and which are due to sympathetic stresses adjacent to the faults.

3.5 Geochemical

The geochemical assessment is supervised by Klohn Crippen Berger consultants. Twelve holes were sampled for geochemical analysis by Lorax (XKD5005 and XKD5009 excluded). The entire length of each drill core (excluding coal) was split along axis and one half sampled for both static and kinetic leech testing to assess the acid generation and metal leaching properties of the rock.

Static tests were undertaken by SGS on 458 core samples and six tailing samples. The static testing process and geochemical results are presented in **Appendix H**.

Kinetic testing to simulate in situ weathering is currently underway and represented by three field-bin tests and leachate samples. Subsamples from the field bins were analysed for static tests and humidity cell tests. The final report is in progress and unavailable at this time.

Preliminary static test results indicate that the majority of potentially acid generating units in the Sukunka stratigraphy are confined to tailings. The tailings and rock units near the coal seams show metal leaching potential.

The results of kinetic tests are still being analysed but preliminary results of humidity cells indicate potential acidity being generated over time with field bin tests showing more alkaline conditions and greater sulphate concentrations, however further data is required to analyse trending rates. Selenium is considered the most important mineral leachate parameter.

3.6 Survey

All holes drilled were surveyed by the Integrated ProAction Group (IPac) with the exception of XKD5005 which was located in the middle of an access road. During road use the stake was moved and the collar was not able to be located. Survey locations were identified and field verified by a Glencore employee. The IPac survey data is contained in **Appendix I**.

Survey was completed using a Trimble GNSS R8 RTK base Station and receiver following standard survey practices in accordance with Trimble guidelines. This equipment configuration provides an expected accuracy within 5 cm vertically and horizontally according to the manufacturers' specifications.

Control points were established in areas with a clear sky view and in good line of sight in all directions to avoid multipath interference. These points were all subsequently processed using Natural Resource Canada Geodetic Survey Division's Precise Point Positioning System to obtain a precise vertical and horizontal location and elevation.

Positions are ground coordinates and are valid in UTM Zone 10 N map projection (NAD83) with elevations above mean sea level, orthometric height CGVD28 (HTv2.0).

3.7 Coal Quality

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]



4 EXPLORATION PROGRAM 2013-2014

Exploration program undertaken during 2013 and 2014 comprised the planned phase 2. This exploration phase was planned to further develop the Phase 1 strategy in order to achieve the Feasibility stage.

The three key areas of investigation were:

1. Structural and coal quality assessment
2. Geotechnical assessment
3. Geochemical assessment

The program commenced in January 2014 and was completed in June 2014. Exploration focussed on the open cut mine areas with greater emphasis on locations within the first five years of mining and included (**Figure 6**):

- 5 HQ core holes for geochemical analysis
- 9 HQ core holes for geotechnical assessment
- 17 HQ core for coal quality analysis
- 15 LD core holes for washability and carbonisation tests
- 47 open holes for stratigraphic and structure definition.
- 15 open holes for hydrogeological assessment

Emphasis was placed on two locations, in the northeast area of possible mining infrastructure (MIA) and in the northwest area where the Lower Gething coal sequence is close to the surface.

The MIA area included 12 fully cored HQ holes and 18 open holes for structural and stratigraphic definition and three days of field mapping was undertaken to aid definition of the Chamberlain Seam outcrop.

The northwest area comprised five HQ core holes and 29 open holes to define the Lower Gething coal seams continuity, structure, to provide coal quality data and to



find a suitable location for a test pit to provide sufficient sample mass for carbonisation testing. Topography constraints limited the test pit location and the required sample mass was achieved instead by drilling 15 LD (6" core) holes.

A test pit has commenced for the Skeeter and Chamberlain Seams.

All exploration was supervised on site by MBGS and drill hole details are summarized in **Table 4**.

Geotechnical assessment included three shallow HQ core holes for UCS samples and a program designed and managed on site by Piteau Associates (Piteau) to provide geotechnical and hydrogeological data for waste dump and pit slope design criteria. In total nine HQ holes were fully cored from surface specifically for geotechnical assessment with these and a further nine holes geomechanically logged and sampled for point load and UCS tests. Nested vibrating wire piezometers were installed in ten holes and either packer or falling head tests were documented in 15 holes. Further assessment by soil engineers is planned for up to 48 trenches when conditions allow.

Geochemical assessment incorporated five holes specifically drilled for both static and kinetic leech tests to assess the acid generation properties of the rock. Static testing was undertaken by SGS and kinetic leech testing is ongoing. The geochemical assessment is supervised by Klohn Crippen Berger consultants.

Table 4. Drill Hole Summary 2013-2014

Hole ID	Hole Type	Purpose	Depth (m)	Available Data				Geophysics		Coal Quality		
				Field Logs	Core/Chip Photos	Geotechnical Log/UCS	Geochemical Leech Test	LAS	Suite of Logs	Raw	Clean	Petrology
MW13-08D	Open	Hydrogeology	61.57	Yes	No	No	No	Yes	Full	No	No	No
MW13-08S	Open	Hydrogeology	15.24	Yes	No	No	No	No	No	No	No	No
MW13-09D	Open	Hydrogeology	79.57	Yes	No	No	No	Yes	Partial	No	No	No
MW13-10D	Open	Hydrogeology	61.26	Yes	No	No	No	Yes	Full	No	No	No
MW13-11D	Open	Hydrogeology	89.63	Yes	No	No	No	Yes	Full	No	No	No
MW13-12D	Open	Hydrogeology	52.13	Yes	No	No	No	Yes	Full	No	No	No
MW13-12S	Open	Hydrogeology	31.17	Yes	No	No	No	No	No	No	No	No
MW14-13D	Open	Hydrogeology	99.71	Yes	No	No	No	Yes	Full	No	No	No
MW14-13S	Open	Hydrogeology	32.62	Yes	No	No	No	No	No	No	No	No
MW14-14D	Open	Hydrogeology	63.10	Yes	No	No	No	Yes	Full	No	No	No
MW14-14S	Open	Hydrogeology	33.84	Yes	No	No	No	No	No	No	No	No
MW14-15D	Open	Hydrogeology	47.10	Yes	No	No	No	No	No	No	No	No
MW14-15S	Open	Hydrogeology	32.01	Yes	No	No	No	No	No	No	No	No
MW14-16D	Open	Hydrogeology	50.60	Yes	No	No	No	Yes	Full	No	No	No
MW14-16S	Open	Hydrogeology	30.79	Yes	No	No	No	No	No	No	No	No
XKD5015	HQ Core	Coal Quality	30.10	Yes	Yes	No	No	Yes	Full	Yes	Pending	Yes
XKD5016	HQ Core	Geotechnical	53.03	Yes	Yes	No	No	Yes	Full	Yes	Pending	Yes
XKD5017	HQ Core	Geotechnical	50.00	Yes	Yes	No	No	Yes	Full	Yes	No	No
XKD5018	HQ Core	Geotechnical	50.05	Yes	Yes	No	No	Yes	Full	Yes	No	No
XKD5019	HQ Core	Coal Quality	68.13	Yes	Yes	Yes	No	Yes	Full	Yes	Pending	Yes
XKD5020	HQ Core	Coal Quality	80.05	Yes	Yes	No	No	Yes	Full	Yes	Pending	Yes
XKD5020A	HQ Core	Coal Quality	68.01	Yes	Yes	No	No	Yes	No	Yes	No	Yes
XKD5020B	HQ Core	Coal Quality	61.94	Yes	Yes	No	No	Yes	Full	Yes	No	No
XKD5021	HQ Core	Coal Quality	85.92	Yes	Yes	No	No	Yes	Full	Yes	Pending	Yes
XKD5021A	HQ Core	Coal Quality	71.04	Yes	Yes	No	No	Yes	Partial	Yes	No	No
XKD5022	HQ Core	Coal Quality	137.46	Yes	Yes	Yes	No	Yes	Full	Yes	No	No
XKD5023	HQ Core	Coal Quality	104.00	Yes	Yes	Yes	No	Yes	Full	Yes	Pending	Yes



Hole ID	Hole Type	Purpose	Depth (m)	Available Data				Geophysics		Coal Quality		
				Field Logs	Core/Chip Photos	Geotechnical Log/UCS	Geochemical Leech Test	LAS	Suite of Logs	Raw	Clean	Petrology
XKD5024	HQ Core	Coal Quality	176.25	Yes	Yes	Yes	No	Yes	Full	Yes	Pending	Yes
XKD5025	HQ Core	Coal Quality	33.25	Yes	Yes	No	No	Yes	Full	Yes	Pending	Yes
XKD5026	HQ Core	Coal Quality	31.65	Yes	Yes	No	No	Yes	Full	Yes	Pending	Pending
XKD5027	HQ Core	Coal Quality	87.22	Yes	Yes	No	No	Yes	Full	Yes	Pending	Pending
XKD5028	HQ Core	Coal Quality	65.81	Yes	Yes	No	No	Yes	Full	Yes	Pending	Pending
XKD5029	HQ Core	Coal Quality	24.50	Yes	Yes	No	No	Yes	Full	Yes	Pending	Pending
XKD5030	HQ Core	Geotechnical	13.69	Yes	Yes	No	No	No	No	N/A	N/A	N/A
XKD5031	HQ Core	Geotechnical	5.48	Yes	Yes	No	No	No	No	N/A	N/A	N/A
XKD5031A	HQ Core	Geotechnical	13.14	Yes	Yes	No	No	No	No	N/A	N/A	N/A
XKG7001	HQ Core	Geotechnical	104.12	Yes	Yes	Yes	No	Yes	Full	Yes	Pending	Yes
XKG7002	HQ Core	Geotechnical	200.67	Yes	Yes	Yes	No	Yes	Partial	Yes	Pending	Yes
XKG7003	HQ Core	Geotechnical	196.98	Yes	Yes	Yes	No	Yes	Partial	Yes	No	Yes
XKG7003A	HQ Core	Geotechnical	232.92	Yes	Yes	Yes	No	Yes	Full	Yes	No	Yes
XKG7004	HQ Core	Geotechnical	188.00	Yes	Yes	Yes	No	Yes	Full	Yes	Pending	Yes
XKG7005	HQ Core	Geotechnical	68.00	Yes	Yes	Yes	No	Yes	Full	Yes	Pending	Yes
XKG7006	HQ Core	Geotechnical	101.21	Yes	Yes	Yes	No	Yes	Full	Yes	Pending	Yes
XKG7008	HQ Core	Geotechnical	181.79	Yes	Yes	Yes	No	Yes	Full	Yes	No	Yes
XKG7009	HQ Core	Geotechnical	191.03	Yes	Yes	Yes	No	Yes	Full	Yes	Pending	Yes
XKH8001	HQ Core	Geochemical	156.00	Yes	Yes	Yes	Pending	Yes	Full	No	No	No
XKH8002	HQ Core	Geochemical	218.00	Yes	Yes	Yes	Pending	Yes	Partial	No	No	No
XKH8003	HQ Core	Geochemical	232.94	Yes	Yes	Yes	Pending	Yes	Full	No	No	No
XKH8004	HQ Core	Geochemical	133.91	Yes	Yes	Yes	Pending	Yes	Full	No	No	No
XKH8005	HQ Core	Geochemical	113.09	Yes	Yes	Yes	Pending	Yes	Full	No	No	No
XKR0001	Open	Exploration	80.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0002	Open	Exploration	80.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0003	Open	Exploration	79.55	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0004	Open	Exploration	79.55	Yes	Yes	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XKR0005	Open	Exploration	59.50	Yes	Yes	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XKR0006	Open	Exploration	44.50	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A

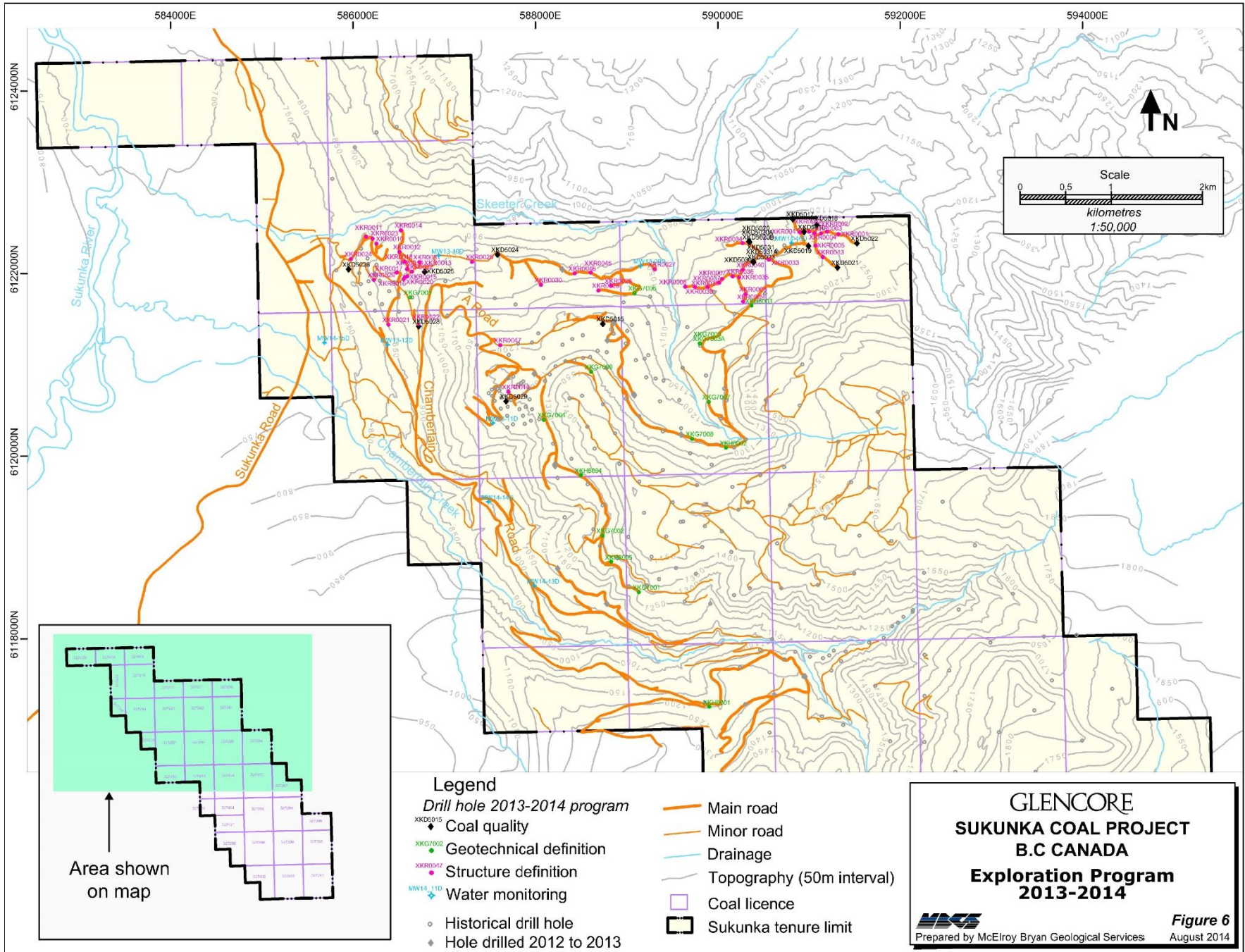


Hole ID	Hole Type	Purpose	Depth (m)	Available Data				Geophysics		Coal Quality		
				Field Logs	Core/Chip Photos	Geotechnical Log/UCS	Geochemical Leech Test	LAS	Suite of Logs	Raw	Washability	Petrology
XKR0007	Open	Exploration	100.00	Yes	Yes	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XKR0008	Open	Exploration	79.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0009	Open	Exploration	60.00	Yes	Yes	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XKR0010	Open	Exploration	30.00	Yes	Yes	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XKR0011	Open	Exploration	40.00	Yes	Yes	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XKR0012	Open	Exploration	65.00	Yes	Yes	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XKR0013	Open	Exploration	100.50	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0014	Open	Exploration	100.00	Yes	Yes	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XKR0015	Open	Exploration	100.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0016	Open	Exploration	100.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0017	Open	Exploration	100.00	Yes	Yes	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XKR0018	Open	Exploration	100.00	Yes	Yes	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XKR0019	Open	Exploration	100.00	Yes	Yes	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XKR0020	Open	Exploration	100.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0021	Open	Exploration	100.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0022	Open	Exploration	100.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0023	Open	Exploration	80.00	Yes	Yes	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XKR0024	Open	Exploration	80.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0025	Open	Exploration	140.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0026	Open	Exploration	70.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0027	Open	Exploration	100.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0028	Open	Exploration	100.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0029	Open	Exploration	224.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0030	Open	Exploration	214.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0031	Open	Exploration	70.00	Yes	Yes	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XKR0032	Open	Exploration	40.00	Yes	Yes	N/A	N/A	Yes	Partial	N/A	N/A	N/A
XKR0033	Open	Exploration	100.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0034	Open	Exploration	100.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0035	Open	Exploration	130.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A



Hole ID	Hole Type	Purpose	Depth (m)	Available Data				Geophysics		Coal Quality		
				Field Logs	Core/Chip Photos	Geotechnical Log/UCS	Geochemical Leech Test	LAS	Suite of Logs	Raw	Washability	Petrology
XKR0036	Open	Exploration	102.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0037	Open	Exploration	66.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0038	Open	Exploration	80.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0039	Open	Exploration	80.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0040	Open	Exploration	131.50	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0041	Open	Exploration	38.50	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0042	Open	Exploration	40.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0043	Open	Exploration	60.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0044	Open	Exploration	100.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0045	Open	Exploration	150.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0046	Open	Exploration	40.00	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKR0047	Open	Exploration	59.50	Yes	Yes	N/A	N/A	Yes	Full	N/A	N/A	N/A
XKL9003	LD	Exploration	26.50	Yes	Yes	N/A	N/A	No	No	Yes	Pending	Pending
XKL9004	LD	Exploration	25.00	Yes	Yes	N/A	N/A	No	No	Sent for carbonisation testing		
XKL9005	LD	Exploration	24.50	Yes	Yes	N/A	N/A	No	No			
XKL9006	LD	Exploration	23.50	Yes	Yes	N/A	N/A	No	No	Yes	Pending	Pending
XKL9007	LD	Exploration	22.00	Yes	Yes	N/A	N/A	No	No	Sent for carbonisation testing		
XKL9008	LD	Exploration	20.50	Yes	Yes	N/A	N/A	No	No			
XKL9009	LD	Exploration	26.60	Yes	Yes	N/A	N/A	No	No			
XKL9010	LD	Exploration	26.70	Yes	Yes	N/A	N/A	No	No			
XKL9011	LD	Exploration	26.30	Yes	Yes	N/A	N/A	No	No			
XKL9012	LD	Exploration	25.00	Yes	Yes	N/A	N/A	No	No			
XKL9013	LD	Exploration	23.50	Yes	Yes	N/A	N/A	No	No			
XKL9014	LD	Exploration	22.00	Yes	Yes	N/A	N/A	No	No	Sent for carbonisation testing		
XKL9015	LD	Exploration	29.50	Yes	Yes	N/A	N/A	No	No			
XKL9016	LD	Exploration	29.30	Yes	Yes	N/A	N/A	No	No	Yes	Pending	Pending
XKL9017	LD	Exploration	30.20	Yes	Yes	N/A	N/A	No	No	Sent for carbonisation testing		





4.1 Scope and Objectives

Exploration during this period was designed to provide sufficient data for Feasibility assessment across three key areas, structural and coal quality assessment, geotechnical assessment and geochemical assessment. All drilling occurred concurrently over six months from January to June 2014.

Structural and coal quality assessment was planned to infill previous data and investigate areas of limited information for further understanding of seam continuity, structural setting and coal quality characteristics. Drill holes were located mainly in the northeast and the northwest areas. Crop lines and structure in the northeast were considered important for detailed mine planning to locate the MIA and the initial HQ core program was augmented by a series of open holes and field mapping to allow more detailed fault delineation and outcrop assessment. This resulted in refinement of seam outcrops and the identification of an additional thrust fault in the northeast.

The northwest drilling aim to gain a good understanding of the Lower Gething coal seams and to locate a suitable test pit site. The result of intensive drilling failed to find a suitable test pit site but allowed a more confident stratigraphic correlation and identified additional coal seams with mining potential. Strata in this area dips steeply (up to $\sim 30^\circ$) and intersected up to four thrust faults. Six HQ core holes were drilled for coal quality assessment of this sequence.

Carbonisation tests were planned for both Lower Gething (B and E Seams) and Upper Gething coal seams (Skeeter and Chamberlain Seams). The sample for the Lower Gething coal seams was obtained from a series of LD (6" core) holes, 12 holes for the B Seam and three holes for the E Seam. The Upper Gething test pit has commenced.

Hydrogeological assessment to supplement baseline environmental studies was supervised by engineers from Knight Piésold from December 2013 to



January 2014. Knight Piésold successfully installed 14 monitoring wells with PVC piezometers and collected groundwater quality samples.

Geotechnical assessment of the pit slopes and waste dump areas for detailed mine planning was designed and managed on site by Piteau. The program incorporated geotechnical assessment of 18 fully cored HQ holes and hydrogeological assessment of 15 holes which occurred concurrently with exploration drilling. This was followed by structural outcrop mapping in July 2014. A series of up to 48 trenches will be investigated by soil engineers as soon as access is possible and the results will be incorporated into a final report.

Geochemical assessment is supervised by Klohn Crippen Berger consultants and is to assess the acid generation properties of the rock. This included five HQ core holes drilled specifically for samples for static and kinetic leach testing. Sampling was carried out by Stantec.

4.2 Drilling

Three drill companies were contracted by Glencore in 2013 - 2014, Cyr Drilling International Ltd (Cyr), Westech Drilling Corp (Westech) and Good Earth Drilling Services Ltd (Good Earth). Details of drill holes are tabulated in **Appendix K**.

Cyr operated a skid-mounted diamond drill rig and was engaged to drill 28 fully cored HQ holes totalling 1311m for coal quality and stratigraphic correlation, geotechnical and geochemical assessment (XKD50015 to XKD5024, XKG7001 to XKG7009, XKH8001 to XKH8005 respectively). Three redrills were required due to poor coal recovery (XKD5020 and XKD5021 suffix A and B) and one hole was redrilled due to loss of a drill string in poor ground conditions (XKG7003A).



Drill holes were cored from surface to depths ranging between 30 m – 230 m with up to 30 m of steel casing cemented and left in the ground for blowout preventer operation (BOP) in holes drilled to more than 100 m.

Holes shallower than 100 m or drilled on the same site as existing holes did not have BOP installed. Holes were terminated 20 m below the target seam for geotechnical and geochemical sampling. All holes were sealed from bottom to surface on completion.

Westech was initially contracted to drill 15 open holes at nine sites for installation of groundwater monitoring wells under supervision by engineers from Knight Piésold. An air rotary rig (B-54) rig was used and final depth of holes ranged between 15 m – 100 m with up to 47 m of 140 mm casing installed. Subsequently, Westech drill 47 open holes totalling 4193 m to investigate crop lines in the northeast and to define the Lower Gething coal seams in the northwest. Westech also drilled six HQ core holes to obtain additional coal quality data for the Lower Gething seams and two shallow holes (with one redrill due to a lost drill string) to provide UCS samples for Piteau. All holes were sealed from bottom to surface on completion.

Good Earth was contracted to drill 15 LD holes (6" core) to provide sufficient sample mass for carbonization testing. Twelve holes were drilled at one site to target the B Seam and three at another site for the E Seam. Only coal and the immediate roof and floor were cored with depths determined from a pilot HQ hole on each site. Holes were drilled up to 30 m depth, steel cased up to 15 m and were cemented from bottom to surface upon completion.

All holes were lithologically and geotechnically logged and photographed on site by field geologists (**Appendix L**) and geotechnical engineers (report in progress).

Field geologists were contracted from UTM Exploration Services Ltd (UTM) and were trained and supervised by MBGS, who provided on site geological supervision and additional field geologists and all lithological and geotechnical



logging procedures. Qualifications of geological staff are included in **Appendix M**.

Geomechanical logging was carried out by Piteau's geotechnical engineers and selected intervals were checked by the Project Manager.

Drilling information was recorded including loss of returns, production of water and poor drilling conditions. Dip tests were not utilised as standing water levels were recorded by the geophysical loggers in all holes where possible.

The results of hydrogeological drilling and monitoring well development and testing were recorded by engineers from Knight Piésold and details are in **Appendix N**.

All core and chip samples are stored at the Chetwynd core shed.

All logging and sample data was entered into Prolog software to produce lithological graphics to enable depth corrections to geophysical logs. Final data was saved in Prolog, exported to csv files and stored on the server at the Vancouver office.

4.3 Geophysical

All holes were geophysically logged by Weatherford. A standard suite of sondes was used where possible and included:

- density, gamma and caliper
- sonic
- neutron
- resistivity
- verticality
- acoustic scanner
- dipmeter



Downhole problems such as low water levels and hole stability issues sometimes prevented logging with the full suite of tools as indicated in **Table 4**. In holes XKG7002 and XKG7003 only the density and neutron logs were able to be run through the rods due to poor hole conditions. Standing water levels were recorded in all drill holes where possible. Hard copies of all recent geophysical logs are stored at the Chetwynd office with duplicates stored at the Vancouver office and digital data is saved on the Glencore server at Vancouver. Geophysical data (LAS format) is included in **Appendix O**.

4.4 Geotechnical

A geotechnical program to investigate geomechanical and hydrogeological parameters for waste dump and pit slope design was planned and managed on site by Piteau concurrent with the drill program (**Table 5**).

The program included nine fully cored holes drilled specifically for geotechnical purposes (XKG7001 - XKG7009). These holes were triple tubed and eight holes were core oriented (60° - 70° dip) using an ACT II or ACT III tool where possible compared with the results of hole deviation logs to allow accurate corrections if required. The holes were oriented to help eliminate potential blind spots developed when core is oriented close to vertical or sub-vertical joint sets and to obtain a statistically viable number of joint measurements.

In addition to the nine dedicated geotechnical holes, nine exploration holes were geomechanically logged by Piteau's engineers according to the "Rock Mass Classification in Rock Engineering" system developed by Z.T. Bieniawski in 1976 to enable assessment of rock mass strengths and logging was validated by Piteau's Project Manager. A total of 86 samples were taken for UCS tests and sent to AMEC Environment & Infrastructure (AMEC) in Hamilton, Ontario and the results are presented in **Appendix P**.



Samples of tuffaceous rock were sent to Golder Associates in Burnaby, BC and the results are pending. Point load tests were carried out on core in the field to provide additional rock hardness with estimated strengths.

Hydrogeological assessment was undertaken to help determine rock mass permeability. Nested vibrating wire piezometers were installed in 10 holes and either falling head or down-hole packer testing was conducted on all 15 holes.

During July 2014 surface outcrop mapping was undertaken by geotechnical engineers to provide additional structural data and for correlation against drilling results. Additional assessment of surface structures in up to 48 trenches will be investigated by soil engineers once conditions allow.

Table 5. Geotechnical Drill Hole Summary 2013-2014

Hole ID	Hole Purpose	Depth (m)	Orientated Structure	Geomechanically Logged	Hydrogeological Testing	Piezometer Installation
XKG7001	Geotechnical	104.12	Yes	Yes	Falling Head	Yes
XKG7002	Geotechnical	200.67	Yes	Yes	Falling Head	Yes
XKG7003	Geotechnical	196.98	No	Yes	No	No
XKG7003A	Geotechnical	232.92	No	Yes	Packer Test	No
XKG7004	Geotechnical	188.00	Yes	Yes	Packer Test	Yes
XKG7005	Geotechnical	68.00	Yes	Yes	Packer Test	No
XKG7006	Geotechnical	101.21	Yes	Yes	Packer Test	Yes
XKG7007	Geotechnical	218.27	Yes	Yes	Packer Test	Yes
XKG7008	Geotechnical	181.79	Yes	Yes	Packer Test	Yes
XKG7009	Geotechnical	191.03	Yes	Yes	Packer Test	Yes
XKH8001	Geochemical	156.00	Yes	Yes	Falling Head	No
XKH8002	Geochemical	218.00	Yes	Yes	Falling Head	No
XKH8003	Geochemical	232.94	Yes	Yes	Falling Head	Yes
XKH8004	Geochemical	133.91	Yes	Yes	Falling Head	No
XKH8005	Geochemical	113.09	Yes	Yes	Falling Head	No
XKD5019	Coal Quality	68.13	Yes	Yes	No	No
XKD5022	Coal Quality	137.46	Yes	Yes	No	No
XKD5023	Coal Quality	104.00	Yes	Yes	No	Yes
XKD5024	Coal Quality	176.25	Yes	Yes	Packer Test	Yes

In addition to Piteau's geotechnical assessment, all the exploration holes were geotechnically logged on site by field geologists.



4.5 Geochemical

Five HQ core holes were drilled specifically for geochemical analysis (XKH8001 to XKH8005). The entire length of each drill core (including coal) was sampled by Stantec and split along axis with one half sampled for both static and kinetic leech testing to assess the acid generation properties of the rock. Static testing was undertaken by SGS with kinetic tests taking up to 52 weeks to complete.

The resulting geochemical report is in progress. The geochemical assessment is supervised by Klohn Crippen Berger consultants. Sample intervals and results are presented in **Appendix Q**.

4.6 Survey

All holes drilled were surveyed by the Integrated ProAction Group (IPac) Survey locations were identified and field verified by a Glencore employee. The IPac survey data is in **Appendix R**.

The survey was completed using a Trimble GNSS R8 RTK base Station and receiver following standard survey practices in accordance with Trimble guidelines. This survey equipment configuration provides accuracy in the order of 5 cm in the vertical and the horizontal according to the manufacturers' specifications.

Control points were established in areas with a clear sky view and in good line of sight in all directions to avoid multipath interference. These points were all subsequently processed using Natural Resource Canada Geodetic Survey Division's Precise Point Positioning System to obtain a precise vertical and horizontal location and elevation. Positions are



ground coordinates and are valid in UTM Zone 10 N map projection (NAD83) with elevations above mean sea level, orthometric height CGVD28 (HTv2.0).

4.7 Coal Quality

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]

[Redacted text block]



5 GEOLOGY

5.1 Regional Geology

Sukunka lies within the western foothills of the Rocky Mountains in a northwest trending belt of coal bearing strata known as the Inner Foothill Belt. This belt extends approximately 300 km in British Columbia and lies within a Mesozoic sequence deposited to the east of a strongly folded Palaeozoic belt which crops out throughout the Rocky Mountains. The Peace River Coalfield is the northern part of this belt which contains coal seams of Lower Cretaceous age within the Gates and the Gething formations (**Figure 8**).

The stratigraphic sequence at Sukunka comprises formations within the Bullhead Group and the Fort St John Group (**Figure 9**).

- The Bullhead Group is a non-marine sequence and comprises the Gething and Cadomin Formations. The basal Cadomin Formation is a distinctive marker unit of coarse sandstone and conglomerate which is conformably overlain by the mudstone, siltstone, interbedded sandstone and coal seams of the Gething Formation.
 - The **Gething Formation** is locally subdivided into Upper, Middle and Lower Members. The Lower Gething Member comprises interbedded sandstone and coal seams and is overlain by the Middle Gething, a dominantly sandstone unit with siltstone and mudstone interbeds. The Upper Gething is a sequence of sandstone, siltstone and claystone units and contains the main coal seams of economic interest.
- The Fort St. John Group conformably overlies the Bullhead Group and marks a sedimentary change in the basin from terrestrial to marine environment. This change is well represented by a glauconitic sandstone of coastal marine



environment known as the Bluesky Member which is at the base of the Moosebar Formation. The Moosebar Formation is up to 215 m of uniform, well bedded marine mudstone and siltstone with up to five laterally extensive tuffaceous bands.

- The Sukunka Formation is a fining-upward sequence of fine grained siltstone and sandstone conformably overlies the Moosebar Formation.
- Gates Formation overlies the Sukunka Formation and is up to 200 m of sandstone, siltstone and mudstone and contains up to 11 coal seams of economic significance south of Sukunka.
- The marine Hulcross Formation and overlying sandstone, conglomerate, mudstone and thin coal seams of the Boulder Creek Formation only occur in the topographically highest areas of the Sukunka lease.

The geological structure and stratigraphy at Sukunka is consistent with the regional trend of en-echelon parallel thrust faults dipping gently to the south-west with minor folding that has been modified by glacial processes. The stratigraphy marks a series of marine incursions with transitions between coarse clastic sandstones and marine mudstones.

5.1 Deposit Geology

The main seams of economic interest in the area lie within the Upper and Lower Gething Formation (**Figure 10**).

The Lower Gething interval outcrops in the west and north of the deposit and comprises interbedded sandstone and mudstone and is now known to contain nine correlatable coal horizons (A – I). The B and E Seams are the main seams of interest but the C and D seams may have localised potential.



The Middle Gething sequence does not contain coal and the Chamberlain Seam at the base of the Upper Gething marks the boundary between these two sequences while the Bird Seam sits at the top of the Upper Gething Interval. Interbed lithologies consist of sandstones and subordinate interbedded siltstones and claystones.

- The Bird Seam is the stratigraphically highest unit of the Upper Gething sequence. The Bird Seam splits into an upper (BIRD2) and a lower (BIRD1) ply. The seam reaches up to 4 m thickness in the south and progressively thins towards the north to less than 1 m with an average of 0.7 m thickness per ply (~1.5 m together). [REDACTED]

[REDACTED]

Interburden lithologies between the Bird and Skeeter Seams are predominantly sandstone with interbedded siltstone and claystone coarsening to the north.

- The Skeeter Seam occurs about 10 m above the Chamberlain Seam and consists of a thicker upper ply (SK2) and a thinner banded lower ply (SK1).

[REDACTED]

[REDACTED]

[REDACTED] The SK1 deteriorates to a carbonaceous claystone across most of the deposit and on average is only 0.4 m thick. This seam deteriorates in thickness and quality towards the south of the deposit. Interburden lithologies between the Skeeter and Chamberlain Seams are consistently siltstones and claystones.

- The Chamberlain Seam is the main seam in the Sukunka area. This seam varies in thickness from approximately 2 m up to 6 m where the Chamberlain coalesces with the Skeeter Seam towards the south of the deposit. [REDACTED]

[REDACTED]

[REDACTED]

Sometimes overlying the Skeeter and/or Chamberlain Seams is a carbonaceous or stony coal band locally known as 'bone' [REDACTED]
[REDACTED] These bands are known to vary in both thickness and continuity across the deposit.

The floor of the Chamberlain Seam is a consistent fine-grained competent sandstone. The exception is a belt across the center of the lease where a mudstone band up to 1 m exists and may require further investigation if mining progresses towards that area.

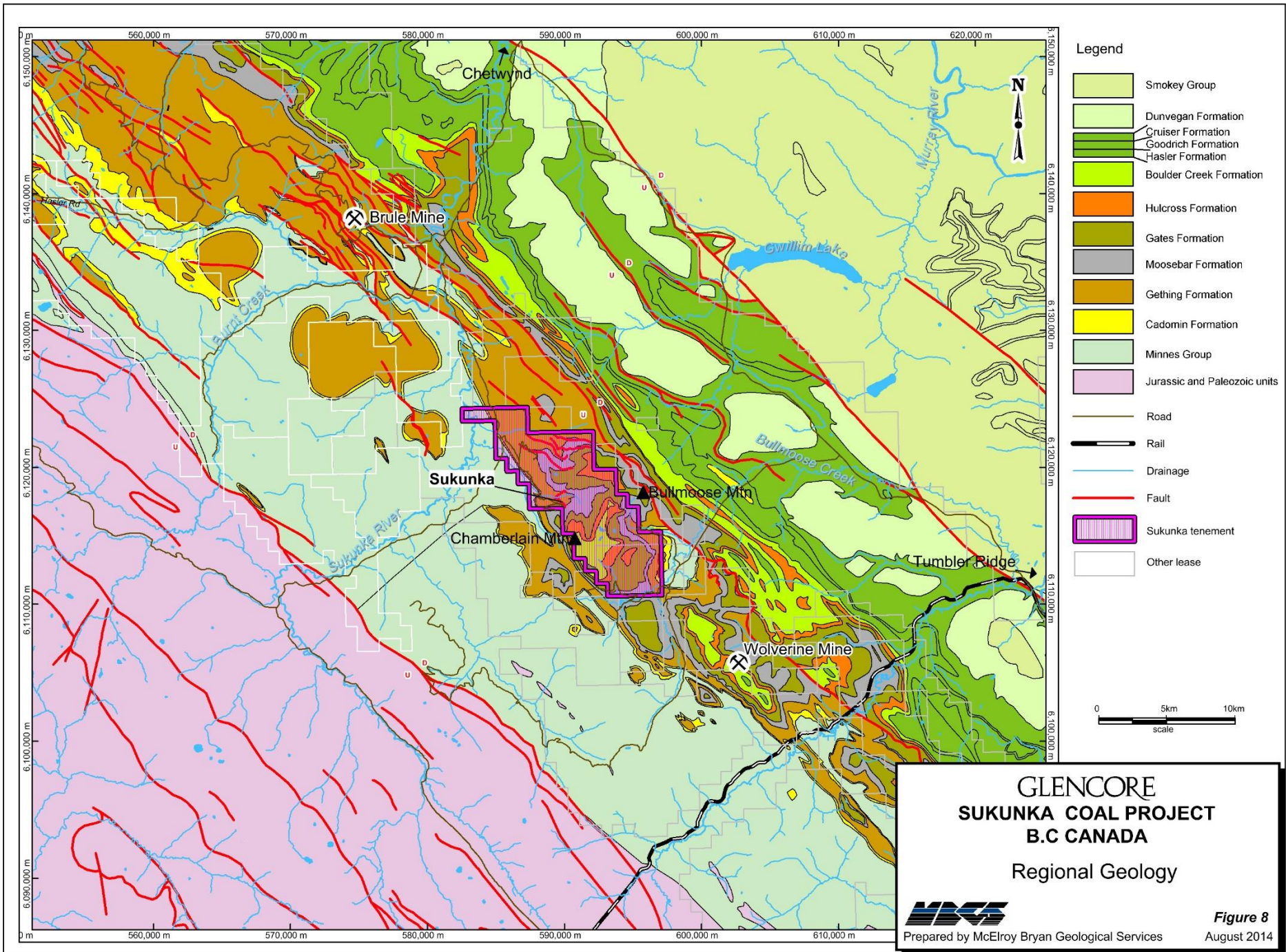
Understanding of the Lower Gething stratigraphy was greatly improved during the 2013-2014 exploration program. Additional data indicated the presence of three additional seams of interest in the northwest. Strata in this area dip up to 30° and is displaced by several thrust faults (**Figure 11**).

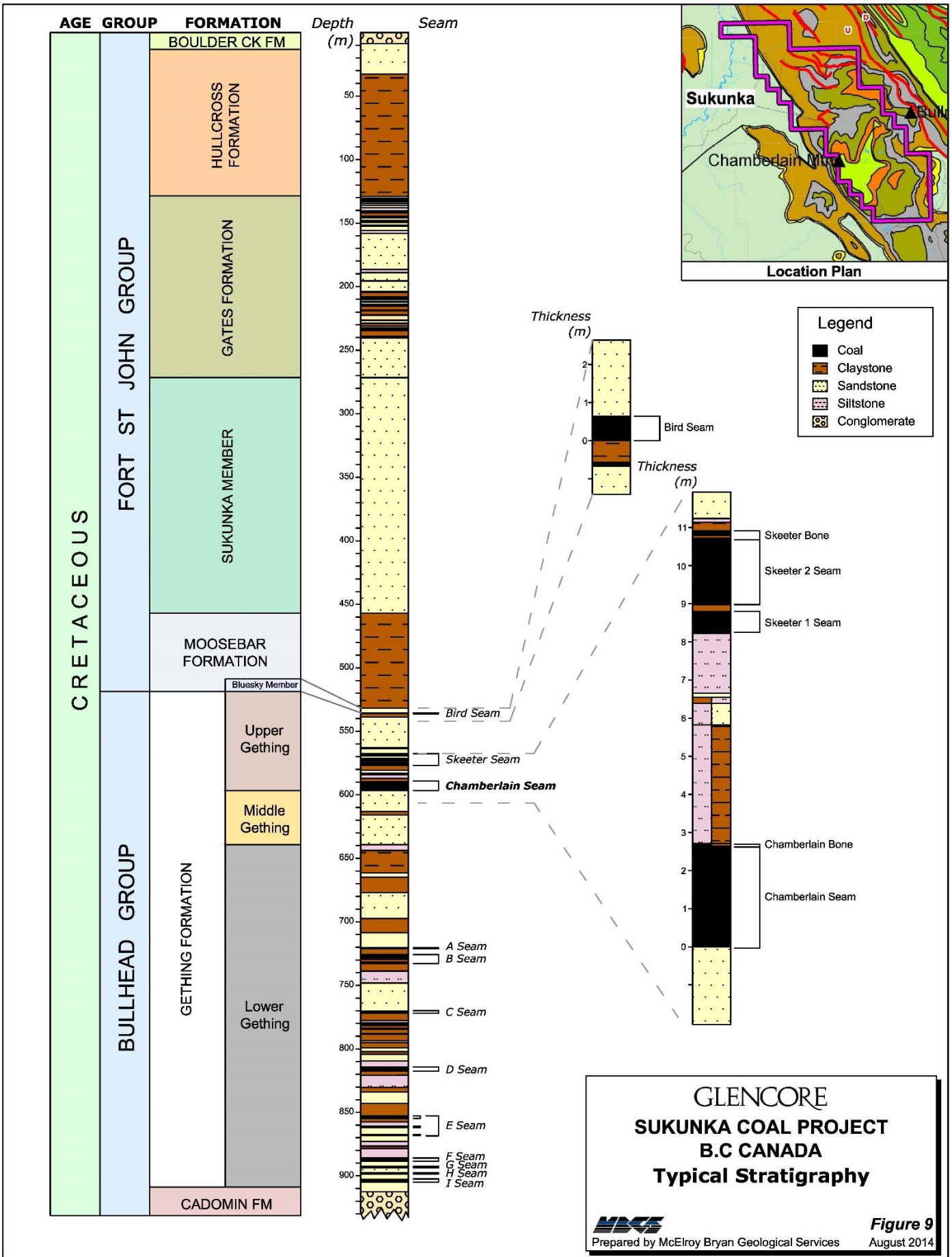
- The B Seam is the main seam of economic interest in the Lower Gething sequence. This seam comprised four plies: B23, B22, B21 and B1 [REDACTED]
[REDACTED]
The base of the B Seam degrades below the B1 ply to stony coal tending to carbonaceous claystone.
- The E Seam is approximately 3.5 m thick split into 4 plies. [REDACTED]
[REDACTED]
[REDACTED]
- The interburden between the B and the E Seam is approximately 80 m but may be tectonically thickened and comprises claystone and siltstone with thin coal bands.
- The C and D Seams are thin (~1-2 m) bands which occur within the B and E Seam interburden. Coal quality data for these seams is restricted to one hole and so is not considered representative at the moment.

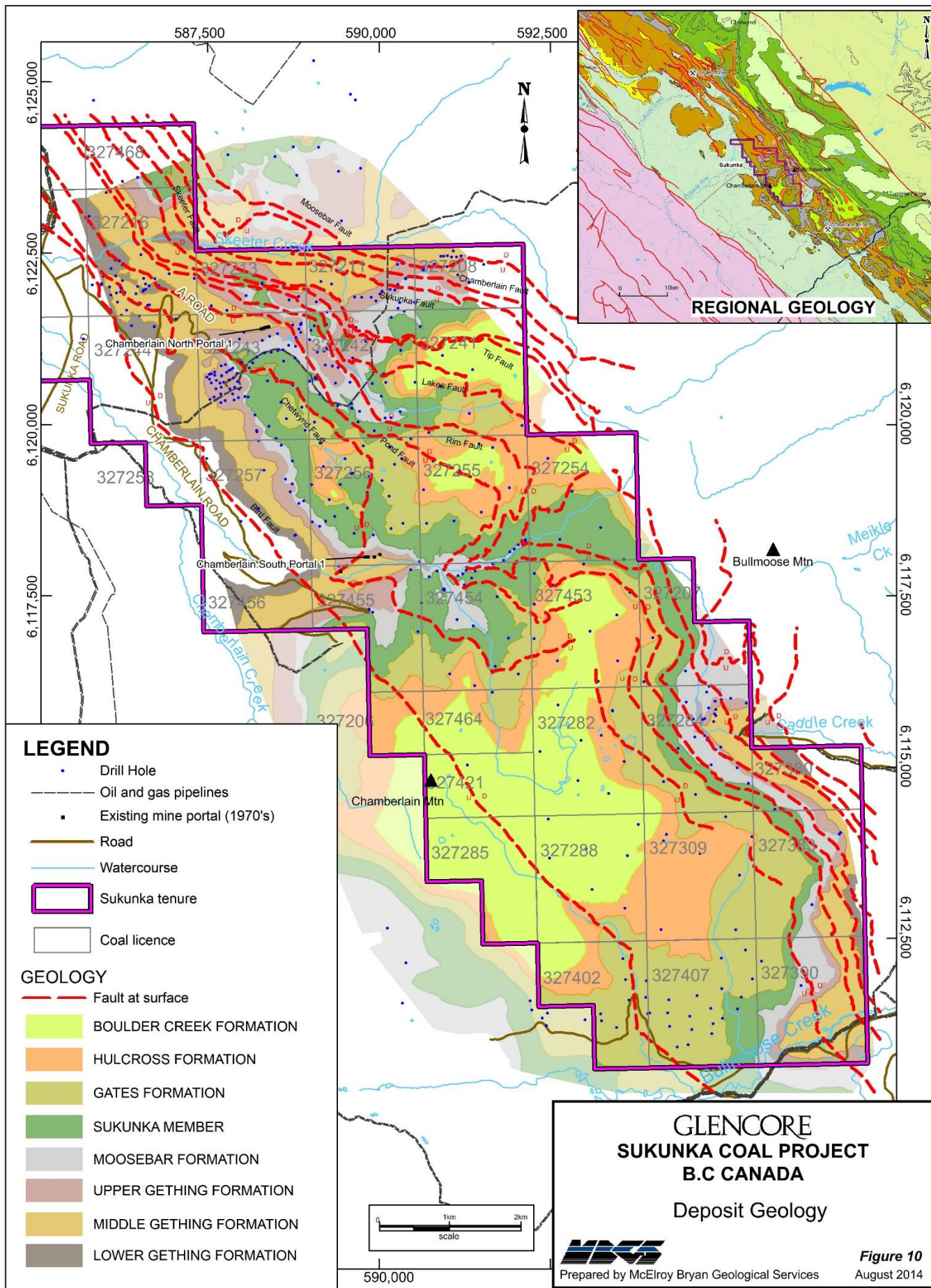
At least ten north-westerly trending parallel reverse faults that dip at about 15° - 20° to the southwest occur across the Sukunka area. Displacement varies from a few centimetres to tens of metres and zones of disturbance adjacent to the faults are variable. Small scale faults and shear structures also occur with movement along bedding planes or at very low angles to bedding planes.

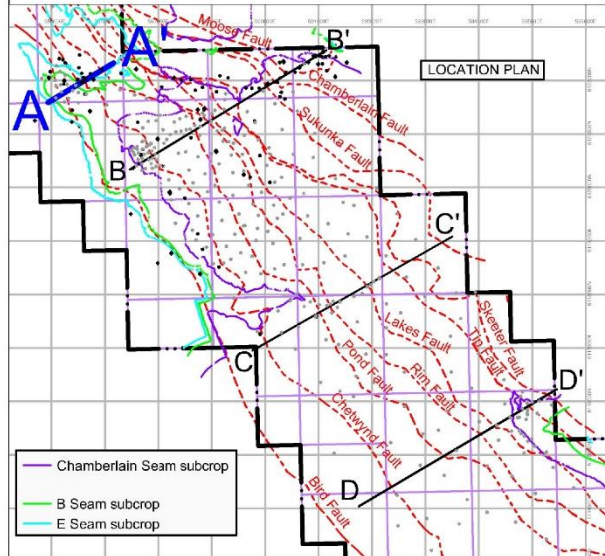
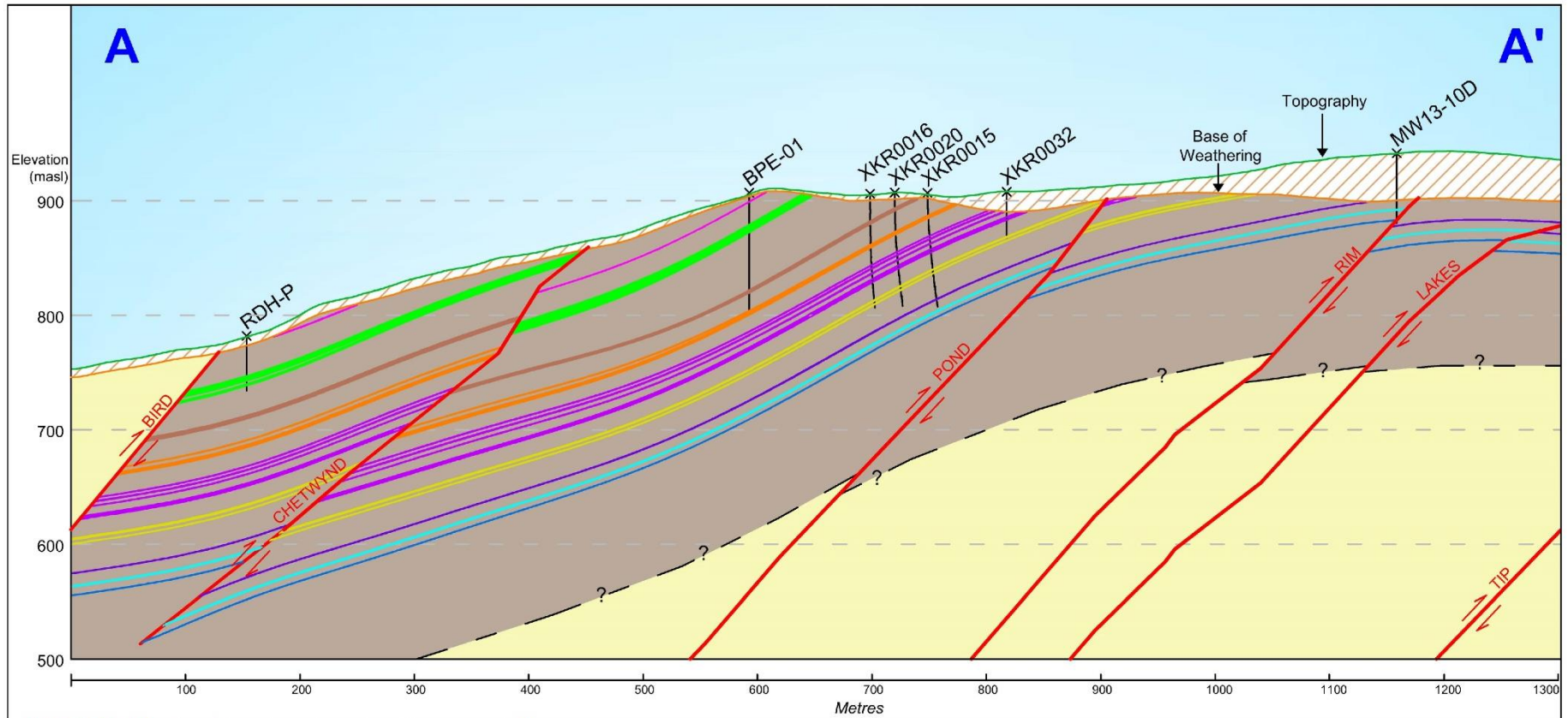
Coal seams are continuous or with minor disturbance within blocks bounded by the main thrust faults. These blocks have been interpreted as structural plates are thrust over each other. **Figures 11 - 14** show geological cross sections.









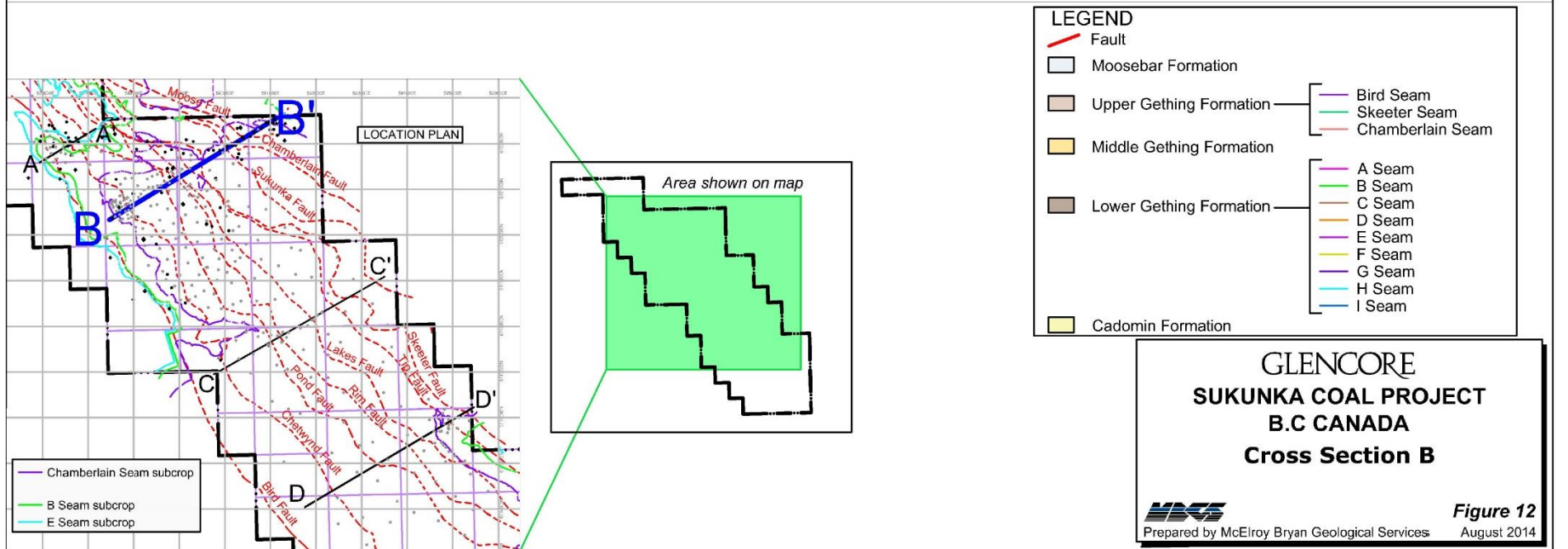
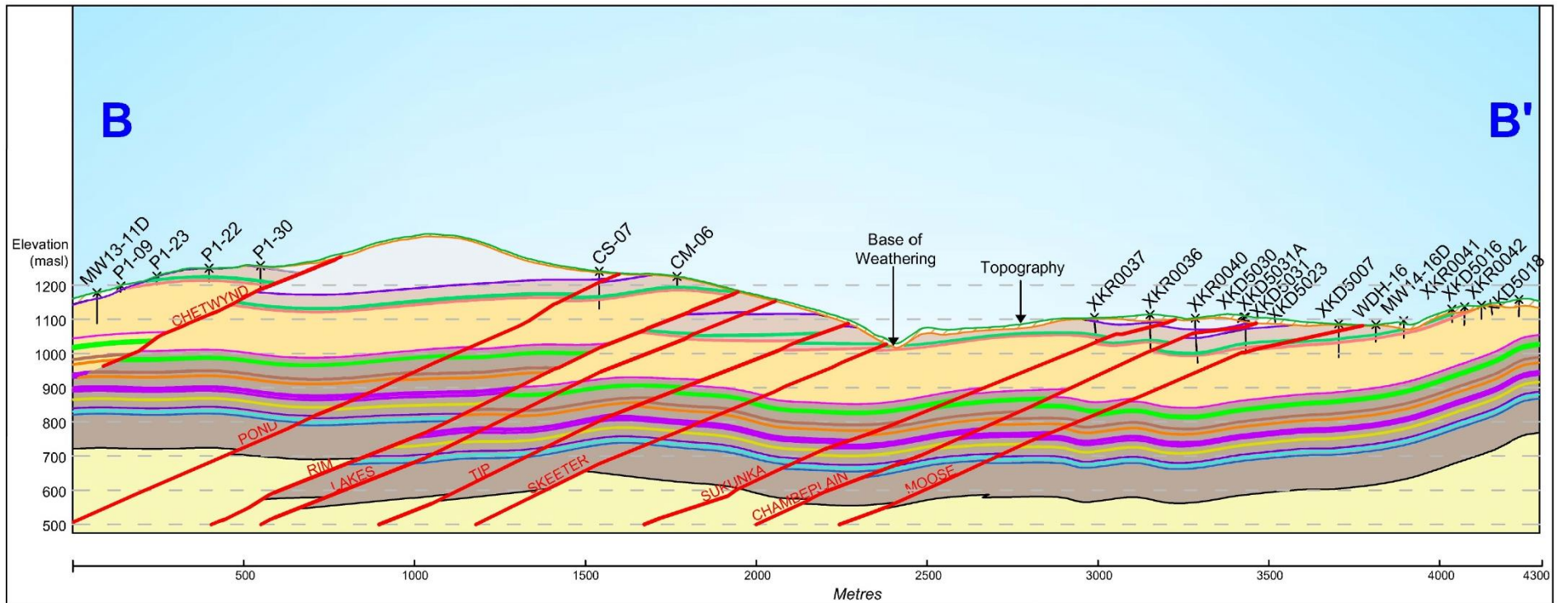


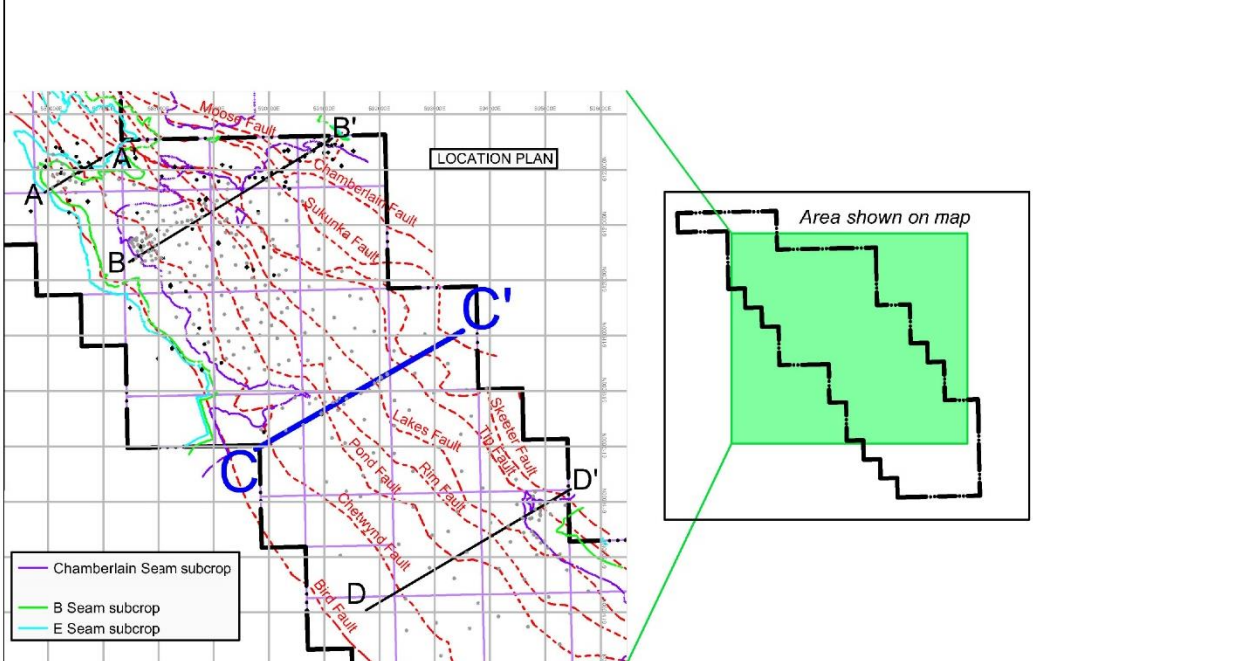
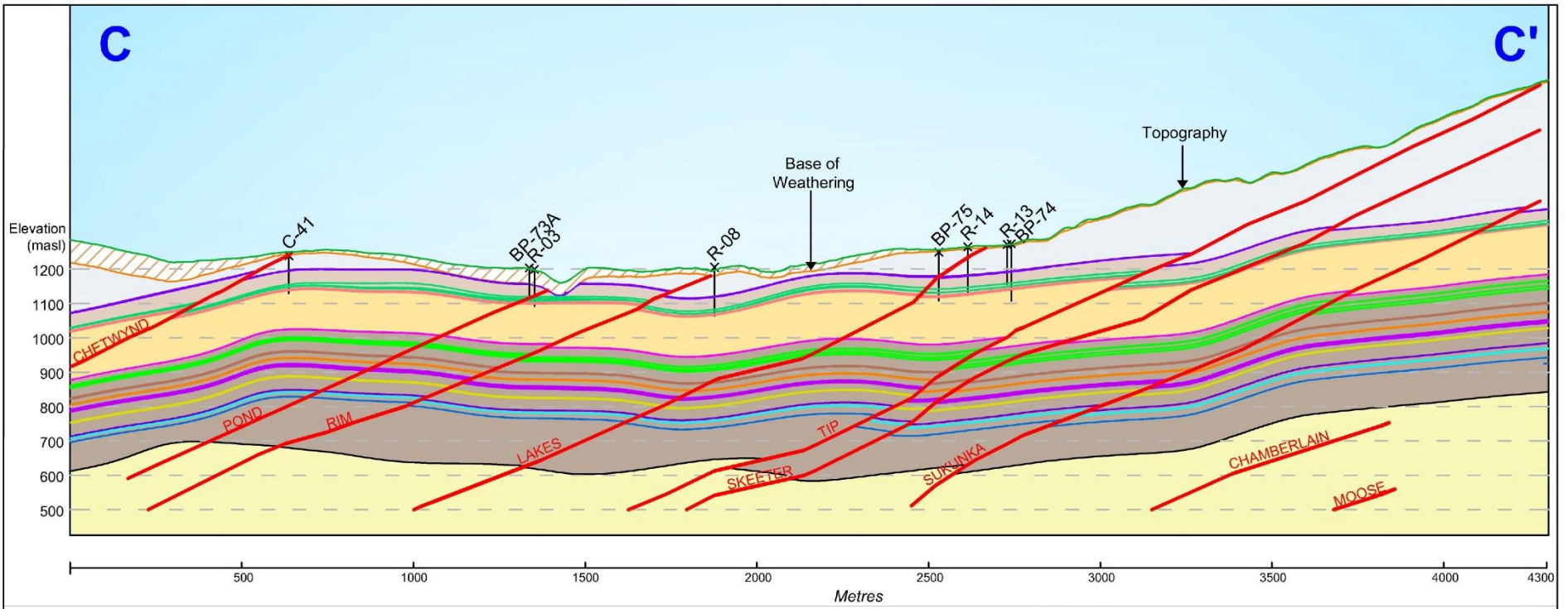
LEGEND

- Fault
- Lower Gething Formation
- Cadomin Formation
- A Seam
- B Seam
- C Seam
- D Seam
- E Seam
- F Seam
- G Seam
- H Seam
- I Seam

GLENCORE
SUKUNKA COAL PROJECT
B.C CANADA
Cross Section A

Figure 11
 Prepared by McElroy Bryan Geological Services August 2014





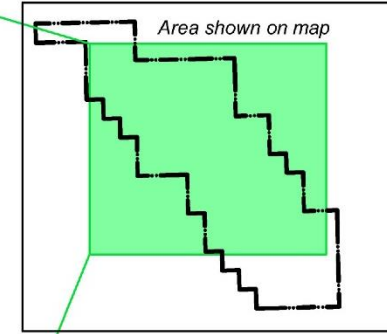
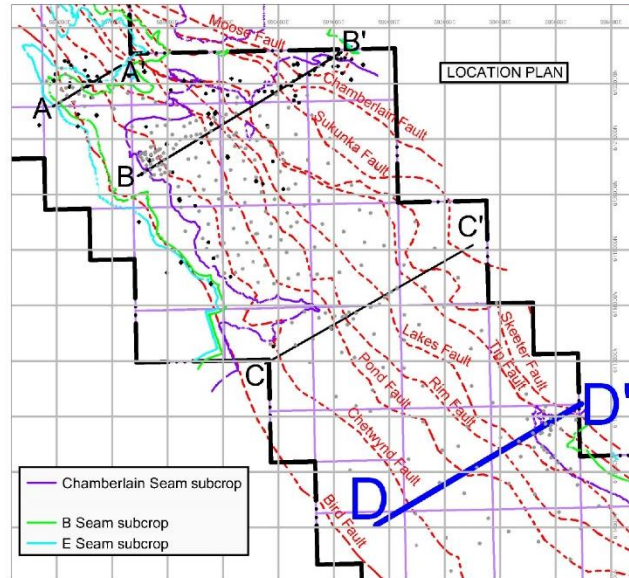
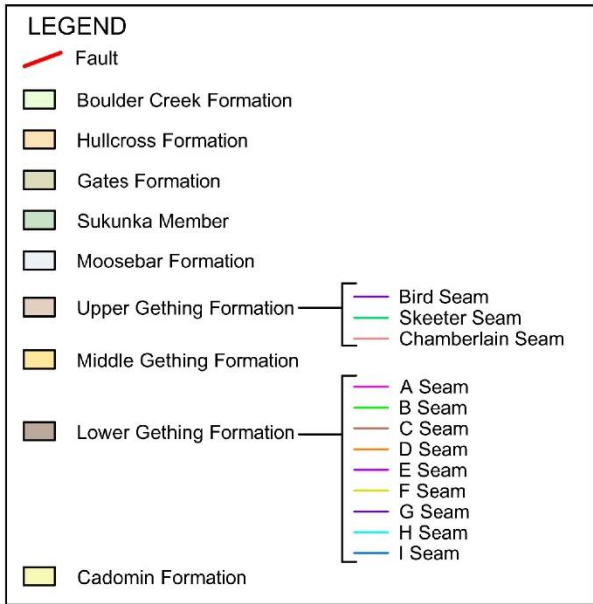
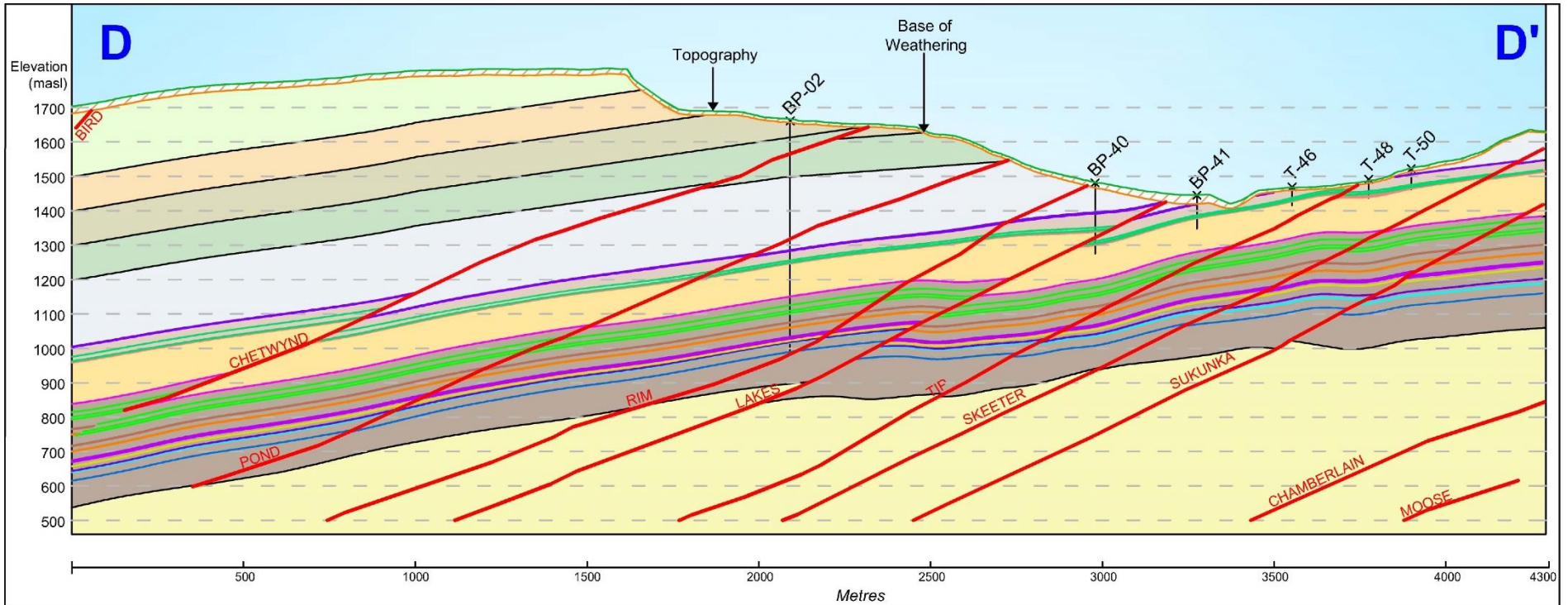
LEGEND

- Fault
- Moosebar Formation
- Upper Gething Formation
- Middle Gething Formation
- Lower Gething Formation
- Cadomin Formation

- Bird Seam
- Skeeter Seam
- Chamberlain Seam
- A Seam
- B Seam
- C Seam
- D Seam
- E Seam
- F Seam
- G Seam
- H Seam
- I Seam

GLENCORE
SUKUNKA COAL PROJECT
B.C CANADA
Cross Section C

Figure 13
 Prepared by McElroy Bryan Geological Services August 2014



**GLENCORE
SUKUNKA COAL PROJECT
B.C CANADA
Cross Section D**

Figure 14
Prepared by McElroy Bryan Geological Services August 2014

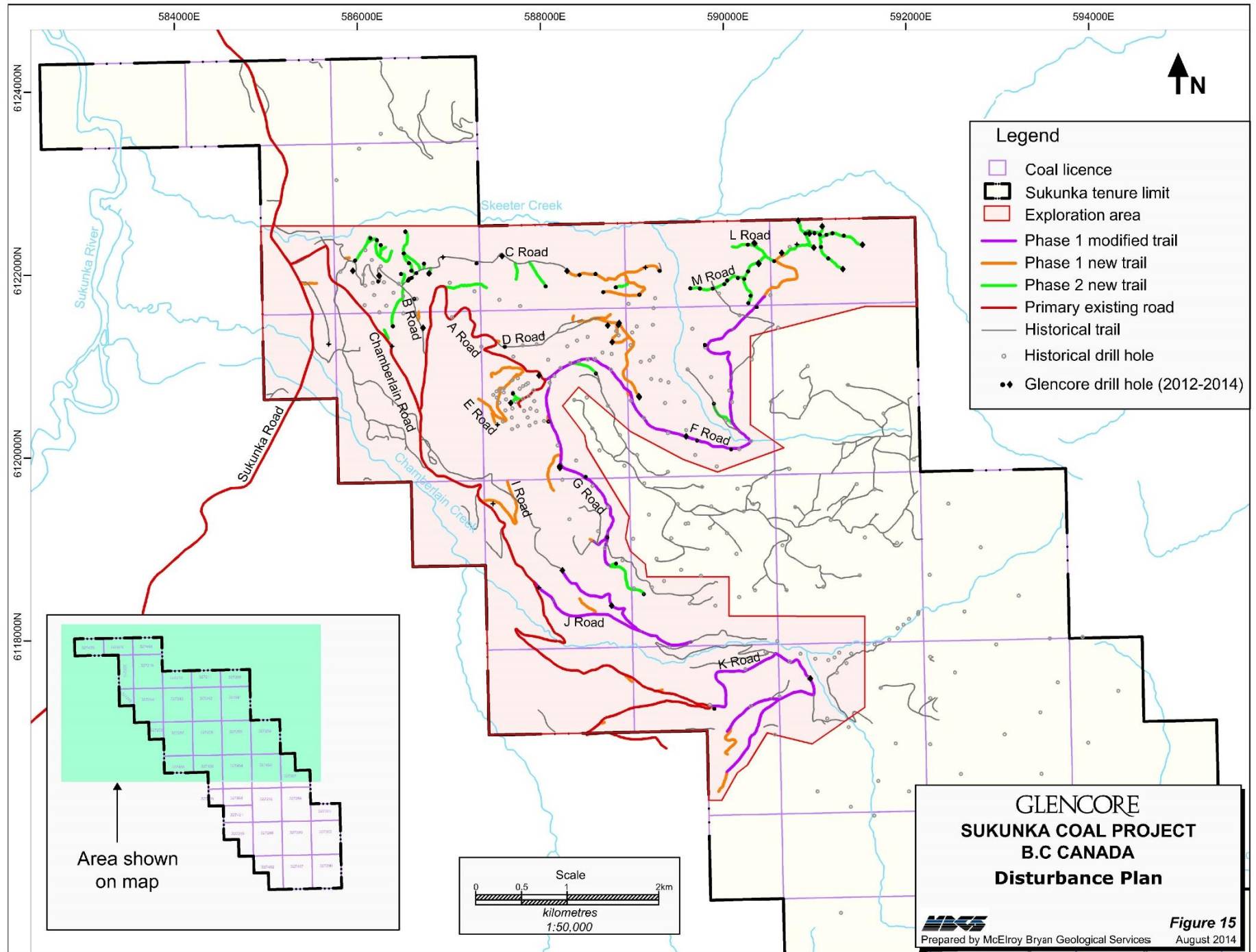
6 PHYSICAL WORK

Physical work throughout the exploration program has included construction of tracks and drill pads to allow access for drilling and support equipment and including several stream crossings and four temporary bridge.

All construction work was undertaken by Bump Construction Ltd in accordance with the Notice of Work, Occupant License to Cut, Mines Act (1996) and Section 9 of the Water Act (1996) for stream crossings.

Disturbance has remained within prescribed limits. **Figure 15** shows drill pad locations and roads that have been constructed for exploration purposes.





7 STATEMENT OF COSTS

Expenditure from March 2012 to June 2014 included exploration drilling and support costs, geological and geotechnical modeling and reporting and baseline environmental studies. A summary of annual expenditure is provided in **Tables 6 and 7** with a detailed spreadsheet in **Appendix T**.

Table 6. Summary of Costs 2013

Work Type	Total Cost
Drilling - Non-core	\$291,827
Drilling - Diamond	\$855,851
Drilling - Large Diameter	\$146,619
Drilling - Total	\$1,294,297
Geological Support	\$841,753
Exploration Support	\$957,237
Laboratory Costs	\$257,972
Environmental Assessment	\$3,479,722
Construction	\$1,262,886
Transportation	\$202,108
TOTAL Expenditures	\$8,295,975



Table 7. Summary of Costs 2014

Work Type	Total Cost
Drilling - Non-core	\$982,350
Drilling - Diamond	\$1,078,124
Drilling - Large Diameter	\$140,348
Drilling - Total	\$2,200,822
Geological Support	\$788,975
Exploration Support	\$1,114,809
Laboratory Costs	\$294,521
Environmental Assessment	\$2,750,322
Construction	\$1,235,429
Rentals	\$7,392
Transportation	\$106,221
TOTAL Expenditures	\$8,498,491



8 CONCLUSION

Exploration drilling from 2012 to 2014 focused on three key areas, structure, coal quality, geotechnical and geochemical assessment.

1. Structure and coal quality

- Exploration confirmed the presence and continuity of coal seams of the Upper Gething and provided additional data to improve stratigraphic correlations. The Chamberlain Seam outcrop has been refined and an additional fault has been confirmed in the northeast.
- Recent data in the Lower Gething sequence indicated additional potential mining targets and clean coal washability data will be available for these seams once analysis is completed.
- Carbonization tests are currently underway for seams of both the Upper and Lower Gething seams.

2. Geotechnical data has been collected and the resulting report is in progress.

3. Geochemical data has been collected and the resulting report is in progress.



9 REFERENCES

Austen & Butta Ltd, 1970. The Sukunka River Coal Project, British Columbia. Progress Report No. 1

Coalition Mining Ltd, 1973. Sukunka Coal Project, Geological Summary

BP Exploration Canada Ltd, 1977. Prospectus for Sukunka/Bullmoose Property

Teck Corporation, 1979. The 1979 Exploration Report on the Bullmoose Coal Property, Sukunka River area

Talisman Energy, 2011. Technical Report, Sukunka-Bullmoose Coal Property



10 APPENDICES



Appendix A – Photogeological Interpretation



Appendix B – Table of Drill Data 2012 - 2013

DRILL HOLE NUMBER	SURVEY DATA *denotes GPS coordinates			TOTAL DEPTH (m)	CASING DEPTH (m)	DATE DRILLED	HOLE TYPE	HOLE SIZE (mm)	DIP (°)	AZIMUTH (°)	GEOLOGICAL LOGS	LAS	PHOTOS	RAW COAL DATA	CLEAN COAL DATA
	EASTING	NORTHING	COLLAR RL (masl)												
MW12-01D	585917.69	6122192.85	777.08	48.16	4.30	12-Dec-12	Non-Core	111	90	0	No	No	No	N/A	N/A
MW12-01S	585918.03	6122184.61	777.14	31.24	4.60	14-Dec-12	Non-Core	111	90	0	No	No	No	N/A	N/A
MW12-02D	588396.47	6119833.64	1293.17	49.17	5.80	15-Dec-12	Non-Core	111	90	0	No	No	No	N/A	N/A
MW12-02S	588403.39	6119829.53	1293.27	20.27	4.60	16-Dec-12	Non-Core	111	90	0	No	No	No	N/A	N/A
MW12-03D	588863.07	6118901.63	1299.58	60.04	6.10	18-Dec-12	Non-Core	111	90	0	No	No	No	N/A	N/A
MW12-03S	588872.57	6118902.28	1299.93	11.58	6.10	19-Dec-12	Non-Core	111	90	0	No	No	No	N/A	N/A
MW13-04D	588291.39	6122050.81	1012.99	50.61	18.30	9-Jan-13	Non-Core	111	90	0	No	No	No	N/A	N/A
MW13-04S	588297.66	6122063.35	1012.88	23.02	23.00	10-Jan-13	Non-Core	111	90	0	No	No	No	N/A	N/A
MW13-05D	588708.42	6117711.52	1075.50	49.24	4.60	12-Jan-13	Non-Core	111	90	0	No	No	No	N/A	N/A
MW13-05S	588698.91	6117704.80	1075.55	32.31	3.70	13-Jan-13	Non-Core	111	90	0	No	No	No	N/A	N/A
MW13-06D	588207.88	6118027.73	927.40	36.89	16.20	14-Jan-13	Non-Core	111	90	0	No	No	No	N/A	N/A
MW13-06S	588216.32	6118021.99	927.58	15.09	15.10	15-Jan-13	Non-Core	111	90	0	No	No	No	N/A	N/A
MW13-07D	586735.45	6119895.84	886.93	51.07	1.80	16-Jan-13	Non-Core	111	90	0	No	No	No	N/A	N/A
MW13-07S	586724.97	6119896.18	886.72	38.81	1.80	17-Jan-13	Non-Core	111	90	0	No	No	No	N/A	N/A
MW13-08D	585565.13	6122563.96	742.27	61.57	45.40	7-Dec-13	Non-Core	111	90	0	No	Yes	No	N/A	N/A
MW13-08S	585575.50	6122563.01	741.38	15.24	15.40	9-Dec-13	Non-Core	111	90	0	No	No	No	N/A	N/A
MW13-09D	589151.15	6122084.95	1050.41	79.57	3.40	11-Dec-13	Non-Core	111	90	0	No	Yes	No	N/A	N/A
MW13-10D	586938.16	6122197.77	941.48	61.26	5.00	14-Dec-13	Non-Core	111	90	0	No	Yes	No	N/A	N/A
MW13-11D	587533.57	6120364.18	1177.73	89.63	3.10	17-Dec-13	Non-Core	111	90	0	No	Yes	No	N/A	N/A

DRILL HOLE NUMBER	SURVEY DATA *denotes GPS coordinates			TOTAL DEPTH (m)	CASING DEPTH (m)	DATE DRILLED	HOLE TYPE	HOLE SIZE (mm)	DIP (°)	AZIMUTH (°)	GEOLOGICAL LOGS	LAS	PHOTOS	RAW COAL DATA	CLEAN COAL DATA
	EASTING	NORTHING	COLLAR RL (masl)												
MW13-12D	586380.55	6121222.74	811.58	52.13	3.40	19-Dec-13	Non-Core	111	90	0	No	Yes	No	N/A	N/A
MW13-12S	586374.67	6121221.76	811.85	31.17	3.10	8-Jan-14	Non-Core	111	90	0	No	No	No	N/A	N/A
XKD5001	588217.20	6119892.30	1283.90	68.28	26.00	21-Mar-13	Core	96	90	0	Yes	Yes	Yes	N/A	N/A
XKD5001A	588200.00*	6119880.00*	1284.57*	42.58	3.00	22-Mar-13	Core	96	90	0	Yes	Yes	Yes	Yes	Yes
XKD5001B	588200.00*	6119880.00*	1284.19*	43.31	3.00	1-Apr-13	Core	96	90	0	Yes	Yes	Yes	Yes	Yes
XKD5002	588789.00	6121268.90	1236.40	74.86	26.00	25-Mar-13	Core	96	90	0	Yes	Yes	Yes	Yes	Yes
XKD5003	588856.00	6121456.90	1219.00	41.50	0.00	26-Mar-13	Core	96	90	0	Yes	Yes	Yes	Yes	Yes
XKD5004	589084.60	6120666.70	1239.90	122.64	27.00	29-Mar-13	Core	96	90	0	Yes	Yes	Yes	Yes	Yes
XKD5005	588865.00*	6121477.00*	1210.00*	23.10	3.00	30-Mar-13	Core	96	90	0	Yes	Yes	Yes	Yes	Yes
XKD5006	589597.17	6120237.67	1245.63	125.67	33.00	3-Apr-13	Core	96	90	0	Yes	Yes	Yes	Yes	Yes
XKD5007	590642.30	6122244.70	1087.00	98.48	32.00	7-Apr-13	Core	96	90	0	Yes	Yes	Yes	Yes	Yes
XKD5008	587987.20	6120904.10	1244.00	128.14	27.00	11-Apr-13	Core	96	90	0	Yes	Yes	Yes	Yes	Yes
XKD5009	589080.30	6120677.80	1239.50	98.02	12.00	13-Apr-13	Core	96	90	0	Yes	Yes	Yes	No	No
XKD5010	590955.70	6117588.40	1202.60	125.08	48.00	17-Apr-13	Core	96	90	0	Yes	Yes	Yes	Yes	Yes
XKD5011	588782.40	6118387.00	1096.10	133.50	24.00	21-Apr-13	Core	96	90	0	Yes	Yes	Yes	Yes	Yes
XKD5012	588243.90	6118771.30	1109.70	104.01	21.00	24-Apr-13	Core	96	90	0	Yes	Yes	Yes	Yes	Yes
XKD5013	586238.70	6121996.10	863.40	74.00	10.00	26-Apr-13	Core	96	90	0	Yes	Yes	Yes	No	No
XKD5013A	586241.80	6121993.10	863.40	62.00	3.00	27-Apr-13	Core	96	90	0	Yes	Yes	Yes	Yes	Yes
XKD5014	588295.20	6122047.00	1011.80	119.85	26.00	1-May-13	Core	96	90	0	Yes	Yes	Yes	No	Yes
XKL9001	587998.10	6120891.00	1244.50	110.43	3.00	25-Apr-13	Core	203	90	0	Yes	Yes	Yes	Yes	No
XKL9002	589070.50	6120670.40	1240.10	93.84	8.00	3-May-13	Core	203	90	0	Yes	Yes	Yes	Yes	No

Appendix C – Geological Data 2012 - 2013



Appendix D – Statement of Geological Qualifications 2012 – 2013

Statement of Qualifications – Sukunka 2013 -2014

McElroy Bryan Geological Services (MBGS),
680 Willoughby Road, Willoughby,
NSW, Australia, 6163.

Beccy.Getty@mbgs.com.au

I am currently employed as a Project Geologist at MBGS where I have worked since 2008. I graduated with a Bachelor of Science with Honours degree in geology from the University of Brighton, UK in 2008. I am a member of the Association of Professional Engineers and Geoscientists BC (APEGBC member number 179835), Australian Institute of Mining and Metallurgy (AusIMM member number 504526) and Australian Institute of Geoscientists (AIG member number 5686). My work experience has included supervision of exploration at the Suska and Sukunka deposits for Glencore from November 2012 to May 2013 and coal exploration across seven Australian projects, from greenfield projects to exploration adjacent to active mines and for both underground and open cut requirements. My role has encompassed drill supervision; geological and geotechnical logging and sampling; field mapping; training and mentoring junior and contract geologists; data management and analysis and statutory and internal reporting.

I supervised exploration on site at Sukunka from January 2014 to June 2014. All details of the work performed are accurately described in this report and I am not aware of any relevant omissions.

Dated 15th August 2014.



Rebecca Getty P. Geo.

Statement of Geological Qualifications – Sukunka 2012 - 2013

UTM Exploration Services provided field geologists to staff drill rigs on a 24 hour basis. A summary of each geologists experience is outlined below.

Kay McKenzie, M.I.T, has been employed as a contract geologist since graduating with a Bachelor of Science Honours degree (Geology) from St Marys University, Halifax, Nova Scotia in 2009. Her experience included core logging; lithological and geotechnical sampling; mapping; reporting; data management and analysis and project management across eight hard rock projects throughout Canada. Kay had been contracted by Glencore as a field geologist on the Suska project from June 2012 to January 2013.

Barry MacCallum, M.I.T., has been employed as a contract geologist since graduating with a Bachelor of Science with Honours degree (Geology) from St Marys University in Halifax, Nova Scotia in 2009. His experience included core logging; field mapping and sampling; structural interpretation; data analysis and project management across 10 hard rock exploration projects throughout Canada. Barry had been contracted by Glencore as a field geologist on the Suska project from June 2012 to January 2013.

Darren LeFort has been employed as a contract geologist since graduating with a Master of Science degree (Applied Science) from St Marys University, Halifax, Nova Scotia in 2012. His experience included sampling, petrographic analysis and technical writing for projects with Vale Ltd. (Sudbury), Codelco (Chuquicamata) and USGS (Bokan Mt). Darren had been contracted by Glencore as a field geologist on the Suska project from June 2012 to January 2013.

Celeste Rambaran has been employed as a contract geologist since graduating with a Bachelor of Science degree (Earth and Ocean Science) from the University of British Columbia in 2009. Her experience included core logging, mapping and trenching as an assistant and sample management across four hard rock exploration projects in the Yukon and Nunavut. Celeste had been contracted by Glencore as a field geologist on the Suska project from June 2012 to January 2013.



Jessica Stewart has been employed as a contract geologist since graduating with a Bachelor of Science degree (Geology) in 2012. Her experience included core logging, mapping and sampling and data management as a summer student in Nunavut. Jessica had been contracted by Glencore as a field geologist on the Suska project from June 2012 to January 2013.

Danielle Hussey has been employed as a contract geologist since graduating with a Bachelor of Science Honours degree (Earth Science) from the Memorial University of Newfoundland in 2011. Her experience included core logging and report writing for two hard rock projects in Newfoundland and Labrador. Danielle had been contracted by Glencore as a field geologist on the Suska project from June 2012 to January 2013.



Appendix E – Hydrogeological Report 2012 – 2013



Appendix F - Geophysical Data 2012 – 2013

Statement of Qualifications

Weatherford Slimline logging services is an international company with more than 30 years' experience in geophysical logging for coal exploration. All the field engineers undergo the suite of training requirements listed below. Field engineers undergo six weeks training at head office and are required to pass a seven hour Break Out exam supervised by senior management.

- BC First Aid and standard First Aid
- H2S
- Radiation Training
- Transport of Dangerous Goods
- Fit Test for SCBA
- Hearing Test
- Fatigue Management
- WHIMS
- Trip Inspection Light Vehicle
- PST
- Weatherford Health and Safety Induction
- EEP Competency Assessment
- Mechanics in Motion
- RADAR reporting cards
- OSSA
- Vehicle Cargo Securement
- Journey Management
- Defensive Driving

The relative field experience of the Weatherford engineers is listed below.

Randie Gainer - 9 years

Luke Oliver - 7 years

Cameron Shape - 3 years

Sean O'Donnell - 3 years

Sharjeel Husainy - 3 years

Andrew Reek - 1 year in Canada, 3 years in Australia



Appendix G – Geotechnical Data



Appendix H – Geochemical Data 2012 – 2013



Appendix I – Survey Data 2012 – 2013



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TECHNICAL MEMORANDUM

DATE: July 9, 2014

TO: John Anderson
Glencore Canada

FROM: Aaron Blom
Integrated ProAction Corp.

RE: Survey Procedures and Specifications for As Built Surveys conducted for Glencore Canada

Integrated ProAction Corporation (IPaC) has conducted As Built Surveys for Glencore Canada since August 2012 using Trimble GNSS R8 RTK survey instruments. Control points (base stations) were established in areas with clear sky views and good line of sight in all directions to avoid multipath interference. These points were all subsequently post processed using Natural Resource Canada Geodetic Survey Division's Precise Point Positioning service to obtain a precise horizontal and vertical location and elevation. Standard survey practices were followed using all Trimble guidelines for the R8 GNSS receiver. This equipment configuration can be expected to be accurate within 5cm vertically and horizontally according to the manufacturer's (Trimble) specifications. Horizontal positions are ground coordinates valid in UTM Zone 10 N map projection (NAD83). Elevations are orthometric height above mean sea level (geoid model HTv2.0). Integrated ProAction Corp. has been surveying following these standards on numerous types of small and large projects throughout BC since 2006 using this type of equipment.

Please contact me at any time if you have any questions or require any additional information.

Respectfully Submitted,
Integrated ProAction Corp.

per Aaron Blom
Project Manager



Integrated ProAction Corp. Engineering, Forestry, Environmental, Log Marketing, Wood Fibre Management, Business Consulting



Appendix J – Coal Quality Data 2012 – 2013



Appendix K –Drill Hole Data 2013 – 2014

DRILL HOLE NUMBER	SURVEY DATA *denotes GPS coordinates			TOTAL DEPTH (m)	CASING DEPTH (m)	DATE DRILLED	HOLE TYPE	HOLE SIZE (mm)	DIP (°)	AZIMUTH (°)	GEOLOGICAL LOGS	LAS	PHOTOS	RAW COAL DATA	CLEAN COAL DATA
	EASTING	NORTHING	COLLAR RL (masl)												
MW14-13D	587986.09	6118584.58	1002.20	99.71	7.20	11-Jan-14	Non-Core	111	90	0	No	Yes	No	N/A	N/A
MW14-13S	587981.34	6118591.95	1001.65	32.62	11.00	11-Jan-14	Non-Core	111	90	0	No	No	No	N/A	N/A
MW14-14D	587483.93	6119502.36	948.71	63.10	11.00	13-Jan-14	Non-Core	111	90	0	No	Yes	No	N/A	N/A
MW14-14S	587476.49	6119504.24	948.44	33.84	12.50	14-Jan-14	Non-Core	111	90	0	No	No	No	N/A	N/A
MW14-15D	585687.93	6121245.64	729.66	47.10	47.10	15-Jan-14	Non-Core	111	90	0	No	No	No	N/A	N/A
MW14-15S	585696.41	6121250.39	728.61	32.01	32.00	17-Jan-14	Non-Core	111	90	0	No	No	No	N/A	N/A
MW14-16D	590808.01	6122337.63	1096.26	50.60	4.90	19-Jan-14	Non-Core	111	90	0	No	Yes	No	N/A	N/A
MW14-16S	590818.41	6122339.84	1096.66	30.79	3.35	20-Jan-14	Non-Core	111	90	0	No	No	No	N/A	N/A
XKD5015	588738.53	6121451.20	1224.91	30.10	3.00	12-Feb-14	Core	96	90	0	Yes	Yes	Yes	Yes	No
XKD5016	590944.52	6122456.35	1136.22	53.03	3.00	21-Feb-14	Core	96	90	0	Yes	Yes	Yes	Yes	No
XKD5017	590822.19	6122594.53	1115.46	50.00	3.00	23-Feb-14	Core	96	90	0	Yes	Yes	Yes	N/A	N/A
XKD5018	591084.30	6122532.28	1158.36	50.05	6.00	25-Feb-14	Core	96	90	0	Yes	Yes	Yes	N/A	N/A
XKD5019	590993.52	6122303.39	1124.15	68.13	3.00	26-Feb-14	Core	96	90	0	Yes	Yes	Yes	Yes	No
XKD5020	590339.20	6122354.06	1078.34	80.05	5.00	28-Feb-14	Core	96	90	0	Yes	Yes	Yes	Yes	No
XKD5020A	590339.43	6122353.69	1078.26	68.01	6.00	3-Mar-14	Core	96	90	0	Yes	Yes	Yes	No	No
XKD5020B	590347.39	6122347.83	1078.27	61.94	3.00	5-Mar-14	Core	96	90	0	Yes	Yes	Yes	No	No
XKD5021	591310.83	6122068.49	1179.62	85.92	26.00	8-Mar-14	Core	96	90	0	Yes	Yes	Yes	Yes	No
XKD5021A	591305.00*	6122071.00*	1179.62*	71.04	21.00	10-Mar-14	Core	96	90	0	Yes	Yes	Yes	Yes	No
XKD5022	591525.25	6122333.65	1232.18	137.46	21.00	14-Mar-14	Core	96	90	0	Yes	Yes	Yes	N/A	N/A
XKD5023	590392.61	6122129.66	1105.82	104.00	21.00	17-Mar-14	Core	96	90	0	Yes	Yes	Yes	Yes	No
XKD5024	587584.08	6122210.16	996.25	176.25	30.00	5-Apr-14	Core	96	90	0	Yes	Yes	Yes	Yes	No
XKD5025	586786.70	6122020.40	907.86	33.25	9.20	9-May-14	Core	96	90	0	Yes	Yes	Yes	Yes	No
XKD5026	585951.51	6122048.41	781.29	31.65	4.20	26-May-14	Core	96	90	0	Yes	Yes	Yes	No	No
XKD5027	589305.64	6122048.55	1039.43	87.22	3.00	28-May-14	Core	96	90	0	Yes	Yes	Yes	No	No

DRILL HOLE NUMBER	SURVEY DATA *denotes GPS coordinates			TOTAL DEPTH (m)	CASING DEPTH (m)	DATE DRILLED	HOLE TYPE	HOLE SIZE (mm)	DIP (°)	AZIMUTH (°)	GEOLOGICAL LOGS	LAS	PHOTOS	RAW COAL DATA	CLEAN COAL DATA
	EASTING	NORTHING	COLLAR RL (masl)												
XKD5028	586719.73	6121423.89	935.00	65.81	6.10	29-May-14	Core	96	90	0	Yes	Yes	Yes	No	No
XKD5029	587679.04	6120602.16	1244.65	24.50	1.57	29-May-14	Core	96	90	0	Yes	Yes	Yes	No	No
XKD5030	590390.07	6122125.67	1106.04	13.69	6.85	30-May-14	Core	96	90	0	Yes	Yes	Yes	N/A	N/A
XKD5031	590388.76	6122132.50	1106.01	5.48	5.48	30-May-14	Core	96	90	0	Yes	Yes	Yes	N/A	N/A
XKD5031A	590387.30	6122132.28	1106.10	13.14	6.60	30-May-14	Core	96	90	0	Yes	Yes	Yes	N/A	N/A
XKH8001	589906.13	6117257.82	1198.42	156.00	30.00	9-Feb-17	Core	96	60	007	Yes	Yes	Yes	N/A	N/A
XKH8002	590088.79	6120093.84	1262.29	218.00	30.00	18-Feb-14	Core	96	90	0	Yes	Yes	Yes	N/A	N/A
XKH8003	590368.46	6121651.53	1151.99	232.94	30.00	26-Feb-14	Core	96	60	318	Yes	Yes	Yes	N/A	N/A
XKH8004	588497.69	6119794.60	1293.00	133.91	30.00	6-Mar-14	Core	96	60	037	Yes	Yes	Yes	N/A	N/A
XKH8005	588830.34	6118846.96	1273.05	113.09	24.00	10-Mar-14	Core	96	90	0	Yes	Yes	Yes	N/A	N/A
XKG7001	589134.13	6118511.89	1255.81	104.12	27.00	14-Mar-14	Core	96	60	078	Yes	Yes	Yes	No	No
XKG7002	588735.35	6119132.93	1289.61	200.67	15.00	19-Mar-14	Core	96	60	273	Yes	Yes	Yes	No	No
XKG7003	589801.12	6121237.12	1183.91	196.98	21.00	22-Mar-14	Core	96	90	0	Yes	Yes	Yes	No	No
XKG7003A	589804.83	6121234.66	1184.10	232.92	30.00	28-Mar-14	Core	96	90	0	Yes	Yes	Yes	No	No
XKG7004	588091.72	6120398.43	1269.08	188.00	30.00	24-Mar-14	Core	96	60	233	Yes	Yes	Yes	No	No
XKG7005	586624.39	6121741.22	919.74	68.00	7.30	28-Mar-14	Core	96	60	315	Yes	Yes	Yes	No	No
XKG7006	589086.92	6121786.89	1093.25	101.21	30.00	31-Mar-14	Core	96	60	182	Yes	Yes	Yes	No	No
XKG7007	589900.38	6120595.16	1207.55	218.27	30.00	4-Apr-14	Core	96	60	270	Yes	Yes	Yes	No	No
XKG7008	589715.97	6120190.44	1243.29	181.79	30.00	9-Apr-14	Core	96	60	059	Yes	Yes	Yes	No	No
XKG7009	588610.33	6120925.03	1314.01	191.03	30.00	11-Apr-14	Core	96	60	007	Yes	Yes	Yes	No	No
XKR0001	591320.84	6122434.02	1197.76	80.00	6.00	16-Mar-14	Non-Core	92	90	0	Yes	Yes	Yes	N/A	N/A
XKR0002	591197.20	6122458.93	1178.62	80.00	5.00	17-Mar-14	Non-Core	92	90	0	Yes	Yes	Yes	N/A	N/A
XKR0003	591131.18	6122443.14	1167.35	79.55	2.00	18-Mar-14	Non-Core	92	90	0	Yes	Yes	Yes	N/A	N/A
XKR0004	591059.70	6122443.93	1152.17	79.55	2.00	19-Mar-14	Non-Core	92	90	0	Yes	Yes	Yes	N/A	N/A
XKR0005	591071.02	6122309.69	1155.16	59.50	15.00	23-Mar-14	Non-Core	92	90	0	Yes	Yes	Yes	N/A	N/A
XKR0006	589642.18	6121857.66	1086.40	44.50	1.50	25-Mar-14	Non-Core	92	90	0	Yes	Yes	Yes	N/A	N/A

DRILL HOLE NUMBER	SURVEY DATA *denotes GPS coordinates			TOTAL DEPTH (m)	CASING DEPTH (m)	DATE DRILLED	HOLE TYPE	HOLE SIZE (mm)	DIP (°)	AZIMUTH (°)	GEOLOGICAL LOGS	LAS	PHOTOS	RAW COAL DATA	CLEAN COAL DATA
	EASTING	NORTHING	COLLAR RL (masl)												
XKR0007	590045.06	6121943.27	1105.82	100.00	1.50	29-Mar-14	Non-Core	92	90	0	Yes	Yes	Yes	N/A	N/A
XKR0008	590301.19	6121776.05	1129.50	79.00	6.00	27-Mar-14	Non-Core	92	90	0	Yes	Yes	Yes	N/A	N/A
XKR0009	590277.65	6121694.92	1136.24	60.00	3.50	27-Mar-14	Non-Core	114	90	0	Yes	Yes	Yes	N/A	N/A
XKR0010	586256.35	6122329.37	844.40	30.00	30.00	30-Mar-14	Non-Core	140	90	0	Yes	Yes	Yes	N/A	N/A
XKR0011	586144.32	6122404.97	811.66	40.00	40.00	31-Mar-14	Non-Core	140	90	0	Yes	Yes	Yes	N/A	N/A
XKR0012	586509.16	6122238.83	893.14	65.00	19.50	1-Apr-14	Non-Core	114	90	0	Yes	Yes	Yes	N/A	N/A
XKR0013	586778.27	6122018.13	917.61	100.50	12.00	3-Apr-14	Non-Core	114	90	0	Yes	Yes	Yes	N/A	N/A
XKR0014	586526.24	6122475.23	887.86	100.00	1.50	4-Apr-14	Non-Core	89	90	0	Yes	Yes	Yes	N/A	N/A
XKR0015	586595.70	6121971.79	906.65	100.00	2.00	5-Apr-14	Non-Core	89	90	0	Yes	Yes	Yes	N/A	N/A
XKR0016	586555.39	6121941.59	906.10	100.00	2.00	6-Apr-14	Non-Core	114	90	0	Yes	Yes	Yes	N/A	N/A
XKR0017	586479.06	6122013.89	901.09	100.00	1.20	7-Apr-14	Non-Core	114	90	0	Yes	Yes	Yes	N/A	N/A
XKR0018	586565.13	6122131.88	898.60	100.00	17.00	8-Apr-14	Non-Core	114	90	0	Yes	Yes	Yes	N/A	N/A
XKR0019	586593.36	6122050.13	899.14	100.00	27.50	9-Apr-14	Non-Core	114	90	0	Yes	Yes	Yes	N/A	N/A
XKR0020	586568.88	6121960.93	907.12	100.00	2.10	15-Apr-14	Non-Core	114	90	0	Yes	Yes	Yes	N/A	N/A
XKR0021	586389.80	6121442.07	851.39	100.00	1.80	16-Apr-14	Non-Core	114	90	0	Yes	Yes	Yes	N/A	N/A
XKR0022	586719.25	6121427.02	935.14	100.00	6.00	17-Apr-14	Non-Core	114	90	0	Yes	Yes	Yes	N/A	N/A
XKR0023	586214.06	6122384.11	827.34	80.00	34.00	18-Apr-14	Non-Core	114	90	0	Yes	Yes	Yes	N/A	N/A
XKR0024	585976.55	6122161.30	785.04	80.00	2.10	19-Apr-14	Non-Core	114	90	0	Yes	Yes	Yes	N/A	N/A
XKR0025	587304.94	6122130.28	971.30	140.00	30.00	23-Apr-14	Non-Core	127	90	0	Yes	Yes	Yes	N/A	N/A
XKR0026	588827.34	6121867.87	1066.16	70.00	2.00	25-Apr-14	Non-Core	114	90	0	Yes	Yes	Yes	N/A	N/A

DRILL HOLE NUMBER	SURVEY DATA *denotes GPS coordinates			TOTAL DEPTH (m)	CASING DEPTH (m)	DATE DRILLED	HOLE TYPE	HOLE SIZE (mm)	DIP (°)	AZIMUTH (°)	GEOLOGICAL LOGS	LAS	PHOTOS	RAW COAL DATA	CLEAN COAL DATA
	EASTING	NORTHING	COLLAR RL (masl)												
XKR0027	589305.64	6122048.55	1039.43	100.00	45.00	26-Apr-14	Non-Core	114	90	0	Yes	Yes	Yes	N/A	N/A
XKR0028	588689.95	6121815.84	1075.13	100.00	0.50	28-Apr-14	Non-Core	114	90	0	Yes	Yes	Yes	N/A	N/A
XKR0029	586229.43	6121932.72	854.52	224.00	28.00	5-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A
XKR0030	588060.84	6121878.47	1052.80	214.00	4.50	7-May-14	Non-Core	114	90	0	Yes	Yes	Yes	N/A	N/A
XKR0031	586729.77	6122126.88	914.37	70.00	5.00	7-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A
XKR0032	590559.97	6122154.10	1105.74	40.00	21.50	9-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A
XKR0033	590271.29	6122334.98	1076.28	100.00	18.50	11-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A
XKR0034	590231.85	6121959.90	1110.05	100.00	3.00	11-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A
XKR0035A	590231.85	6121959.90	1110.05	130.00	17.00	16-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A
XKR0036	590162.29	6121970.54	1113.56	102.00	2.50	13-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A
XKR0037	590013.99	6121902.18	1105.14	66.00	0.50	13-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A
XKR0038	589887.53	6121853.84	1100.78	80.00	1.50	14-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A
XKR0039	589747.51	6121855.00	1091.65	80.00	1.50	14-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A
XKR0040	590273.48	6122042.73	1103.35	131.50	30.40	16-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A
XKR0041	590901.59	6122454.36	1130.01	38.50	1.50	16-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A
XKR0042	590999.90	6122459.99	1141.62	40.00	1.50	17-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A
XKR0043	591150.79	6122183.33	1151.45	60.00	10.60	17-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A
XKR0044	587703.08	6120705.42	1253.95	100.00	1.70	18-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A
XKR0045	588605.43	6122013.56	1035.23	150.00	6.10	19-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A
XKR0046	588430.55	6122003.95	1025.41	40.00	5.00	19-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A

DRILL HOLE NUMBER	SURVEY DATA *denotes GPS coordinates			TOTAL DEPTH (m)	CASING DEPTH (m)	DATE DRILLED	HOLE TYPE	HOLE SIZE (mm)	DIP (°)	AZIMUTH (°)	GEOLOGICAL LOGS	LAS	PHOTOS	RAW COAL DATA	CLEAN COAL DATA
	EASTING	NORTHING	COLLAR RL (masl)												
XKR0047	587613.31	6121217.31	1185.09	59.50	7.50	20-May-14	Non-Core	90	90	0	Yes	Yes	Yes	N/A	N/A
XKL9003	585952.75	6122046.70	781.08	26.50	6.00	2-Jun-14	Core	152	90	0	Yes	No	Yes	No	No
XKL9004	585952.41	6122043.02	781.18	25.00	6.00	3-Jun-14	Core	152	90	0	Yes	No	Yes	No	No
XKL9005	585952.33	6122039.09	781.20	24.50	6.00	3-Jun-14	Core	152	90	0	Yes	No	Yes	No	No
XKL9006	585953.03	6122049.75	781.01	23.50	6.00	4-Jun-14	Core	152	90	0	Yes	No	Yes	No	No
XKL9007	585953.39	6122053.06	780.96	22.00	6.00	5-Jun-14	Core	152	90	0	Yes	No	Yes	No	No
XKL9008	585953.74	6122056.81	781.05	20.50	6.00	5-Jun-14	Core	152	90	0	Yes	No	Yes	No	No
XKL9009	585948.93	6122040.05	781.04	26.60	6.00	6-Jun-14	Core	152	90	0	Yes	No	Yes	No	No
XKL9010	585949.35	6122043.25	781.04	26.70	6.00	7-Jun-14	Core	152	90	0	Yes	No	Yes	No	No
XKL9011	585949.62	6122046.86	780.96	26.30	6.00	8-Jun-14	Core	152	90	0	Yes	No	Yes	No	No
XKL9012	585949.89	6122050.33	780.91	25.00	6.00	8-Jun-14	Core	152	90	0	Yes	No	Yes	No	No
XKL9013	585950.10	6122053.58	781.08	23.50	6.00	9-Jun-14	Core	152	90	0	Yes	No	Yes	No	No
XKL9014	585950.47	6122056.90	780.84	22.00	6.00	9-Jun-14	Core	152	90	0	Yes	No	Yes	No	No
XKL9015	586785.86	6122010.86	917.92	29.50	9.00	11-Jun-14	Core	152	90	0	Yes	No	Yes	No	No
XKL9016	586784.93	6122014.19	917.65	29.30	9.00	11-Jun-14	Core	152	90	0	Yes	No	Yes	No	No
XKL9017	586784.11	6122016.83	917.61	30.20	9.00	12-Jun-14	Core	152	90	0	Yes	No	Yes	No	No

Appendix L – Geological Data 2013 - 2014



Appendix M – Statement of Geological Qualifications 2013 – 2014

Statement of Qualifications – Sukunka 2012 -2013

McElroy Bryan Geological Services (MBGS),
680 Willoughby Road, Willoughby,
NSW, Australia, 6163.
Beccy.Getty@mbgs.com.au

I am currently employed as a Project Geologist at MBGS where I have worked since 2008. I graduated with a Bachelor of Science with Honours degree in geology from the University of Brighton, UK in 2008. I am a member of the Association of Professional Engineers and Geoscientists BC (APEGBC member number 179835), Australian Institute of Mining and Metallurgy (AusIMM member number 504526) and Australian Institute of Geoscientists (AIG member number 5686). My work experience has included supervision of exploration at the Suska deposit for Glencore from November 2012 to February 2013 and coal exploration across seven Australian projects, from greenfield projects to exploration adjacent to active mines and for both underground and open cut requirements. My role has encompassed drill supervision; geological and geotechnical logging and sampling; field mapping; training and mentoring junior and contract geologists; data management and analysis and statutory and internal reporting. I supervised exploration on site at Sukunka from February 2013 to May 2013. All details of the work performed are accurately described in this report and I am not aware of any relevant omissions.

Dated 15th August 2014.



Rebecca Getty. P. Geo.

Statement of Geological Qualifications – Sukunka 2013 - 2014

UTM Exploration Services provided field geologists to staff drill rigs on a 24 hour basis. A summary of each geologists experience is outlined below.

Kay McKenzie, M.I.T, has been employed as a contract geologist since graduating with a Bachelor of Science Honours degree (Geology) from St Marys University, Halifax, Nova Scotia in 2009. Her experience included core logging; lithological and geotechnical sampling; mapping; reporting; data management and analysis and project management across eight hard rock projects throughout Canada. Kay had been contracted by Glencore as a field geologist for both the Suska and Sukunka exploration projects from June 2012 to May 2013.

Jessica Stewart has been employed as a contract geologist since graduating with a Bachelor of Science degree (Geology) in 2012. Her experience included core logging, mapping and sampling and data management as a summer student in Nunavut. Jessica had been contracted by Glencore as a field geologist for both the Suska and Sukunka exploration projects from June 2012 to May 2013.

Emily Hallé, PMP, has been employed as a geologist since graduating with a Bachelor in Science Honours degree (Geology) in 2005 and as well as undertaking contact work is a director of Hallé Geological Services. Her experience included geological and geotechnical logging of core and chips; mapping and sampling; data management and analysis; project management and generation; statutory reporting and employee training and supervision for hard rock projects across Canada, the US and South Africa.



Appendix N – Hydrogeological Report 2013 – 2014



Appendix O - Geophysical Data 2013 – 2014



Appendix P –Geotechnical Data 2013 – 2014

Table of Geotechnical Results (AMEC)

Drill hole-Sample#	Rock Type	Depth from (m)	Depth to (m)	Hardness	Length (mm)	Diameter (mm)	L/D Ratio	Mass dry (gm)	Density (kg/m ³)	Load (kN)	UCS (MPa)
XKH-8003-01	Siltstone	56.06	56.18	2.0	124.53	60.95	2.04	937.5	2580	58.3	20.0
XKH-8003-02	Siltstone	65.03	65.15	3.0	125.24	60.81	2.06	957.0	2631	55.1	19.0
XKH-8003-06	Sandstone	111.12	111.24	5.0	123.75	60.80	2.04	966.9	2691	623.3	214.7
XKH-8003-08	Claystone	137.02	137.14	2.5	124.67	60.45	2.06	949.8	2655	88.6	30.9
XKH-8003-09	Sandstone	148.33	148.45	5.0	125.20	60.73	2.06	965.7	2663	477.7	164.9
XKH-8003-12	Sandstone	182.24	182.36	4.5	123.62	60.21	2.05	934.5	2655	84.2	29.6
XKH-8003-13	Sandstone/ Siltstone	201.30	201.42	3.0	124.80	60.29	2.07	968.0	2717	230.7	80.8
XKH-8002-02	Claystone	24.23	24.35	4.0	127.72	63.12	2.02	1056.6	2644	163.6	52.3
XKH-8002-08	Sandstone	89.01	89.13	5.0	124.35	60.98	2.04	976.9	2690	483.9	165.7
XKH-8002-10	Claystone/ Siltstone	111.98	112.10	4.0	125.26	61.28	2.04	993.9	2690	395.2	134.0
XKH-8002-12	Claystone	149.42	149.54	5.0	125.18	60.97	2.05	972.7	2661	716.3	245.3
XKH-8002-14	Claystone	184.70	184.82	2.5	124.07	61.11	2.03	1000.6	2750	284.5	97.0
XKH-8001-04	Sandstone/ Sandstone	72.41	72.53	4.5	125.44	60.95	2.06	977.6	2671	493.7	169.2
XKH-8001-07	Sandstone	106.09	106.21	5.0	124.77	60.90	2.05	981.5	2701	543.5	186.6
XKH-8001-08	Sandstone / Siltstone	115.68	115.80	4.0	124.05	60.95	2.04	974.6	2693	330.5	113.3
XKH-8001-09	Claystone	120.24	120.36	4.0	125.14	60.98	2.05	989.6	2708	270.0	92.4
XKH-8001-10	Claystone	133.64	133.76	3.0	124.96	60.89	2.05	929.8	2555	71.5	24.6
XKH-8005-01	Claystone	34.56	34.68	2.0	124.98	60.78	2.06	948.0	2614	117.4	40.5
XKH-8005-06	Siltstone	88.36	88.48	3.0	132.57	60.76	2.18	1032.0	2685	149.6	51.6
XKH-8005-08	Siltstone/ Sandstone	108.84	108.96	4.0	125.33	60.69	2.07	961.8	2653	150.2	51.9
XKH-8004-01	Claystone	17.09	17.21	2.0	-	-	-	-	-	-	-
XKH-8004-02	Claystone	28.38	28.50	2.5	124.42	60.68	2.05	939.6	2611	160.9	55.6
XKH-8004-03	Claystone	40.22	40.34	2.0	125.65	60.75	2.07	961.5	2640	122.9	42.4
XKH-8004-06	Sandstone/ Siltstone	79.38	79.50	4.0	124.72	60.92	2.05	972.4	2675	396.8	136.1
XKH-8004-09	Sandstone	106.87	106.99	4.5	125.42	60.81	2.06	999.0	2743	281.4	96.9
XKG-7006-03	Sandstone/ Siltstone	42.28	42.40	2.5	124.52	60.90	2.04	976.5	2692	258.9	88.9
XKG-7006-04	Sandstone	57.04	57.16	4.5	124.43	60.90	2.04	959.8	2648	562.9	193.2
XKG-7006-05	Sandstone	81.71	81.83	4.0	124.58	60.83	2.05	952.4	2631	574.4	197.6
XKG-7008-02	Claystone	30.15	30.27	3.0	125.86	60.74	2.07	965.2	2647	151.3	52.2
XKG-7008-04	Sandstone	53.18	53.30	4.5	124.59	60.82	2.05	982.0	2713	677.5	233.2
XKG-7008-06	Claystone/ Siltstone	80.93	81.05	3.0	124.79	60.75	2.05	987.5	2730	185.8	64.1
XKG-7008-07	Siltstone	126.93	127.05	3.0	128.77	60.81	2.12	1025.8	2743	247.5	85.2
XKG-7008-10	Sandstone	171.42	171.54	5.0	123.77	60.87	2.03	981.1	2724	710.8	244.3



Drill hole-Sample#	Rock Type	Depth from (m)	Depth to (m)	Hardness	Length (mm)	Diameter (mm)	L/D Ratio	Mass dry (gm)	Density (kg/m ³)	Load (kN)	UCS (MPa)
XKG-7008-11	Sandstone/Claystone	179.96	180.08	3.5	123.84	60.73	2.04	961.9	2681	337.6	116.5
XKG-7009-01	Claystone	29.05	29.17	2.5	127.66	63.13	2.02	1050.9	2630	135.6	43.3
XKG-7009-06	Claystone	102.65	102.77	2.5	124.36	60.06	2.07	917.0	2603	127.7	45.1
XKG-7009-07	Sandstone	116.04	116.16	5.0	124.35	60.30	2.06	936.7	2638	540.3	189.2
XKG-7009-10	Sandstone	153.65	153.77	4.5	124.44	60.39	2.06	934.6	2622	474.8	165.8
XKG-7009-11	Sandstone	170.16	170.28	4.5	123.64	60.40	2.05	936.2	2643	729.7	254.7
XKG-7004-03	Sandstone/Siltstone	51.74	51.86	3.0	125.73	60.64	2.07	970.9	2674	314.7	109.0
XKG-7004-05	Siltstone	90.27	90.39	3.0	124.37	60.56	2.05	968.2	2703	508.2	176.4
XKG-7004-06	Sandstone	103.75	103.87	5.0	124.76	60.66	2.06	965.9	2679	477.7	165.3
XKG-7002-03	Sandstone	72.11	72.23	4.0	123.78	60.74	2.04	951.5	2653	543.2	187.5
XKG-7002-06	Claystone	115.71	115.83	3.0	124.69	60.75	2.05	993.8	2750	228.0	78.7
XKG-7002-09	Sandstone	154.68	154.80	5.0	124.73	60.94	2.05	970.2	2667	599.1	205.4
XKG-7002-10	Siltstone	175.38	175.50	2.0	124.15	60.90	2.04	986.0	2727	123.9	42.5
XKG-7002-12	Sandstone	192.22	192.34	5.0	124.58	60.90	2.05	978.5	2696	596.2	204.7
XKG-7001-02	Sandstone	35.90	36.02	4.5	124.80	60.40	2.07	989.1	2766	650.2	226.9
XKG-7001-03	Sandstone	47.94	48.06	4.5	124.74	60.76	2.05	972.6	2689	441.3	152.2
XKG-7001-06	Sandstone	88.16	88.28	4.5	124.67	60.88	2.05	982.2	2706	544.2	186.9
XKG-7001-05A	Sandstone	72.72	72.84	3.0	125.01	60.83	2.06	1005.0	2766	300.2	103.3
XKG-7003-01	Sandstone	25.31	25.43	5.0	124.74	60.51	2.06	972.3	2711	595.4	207.0
XKG-7003-02	Claystone/Siltstone	37.62	37.74	3.5	124.39	60.82	2.05	963.9	2667	199.4	68.6
XKG-7003-04	Claystone/Siltstone	68.22	68.34	3.0	123.66	60.68	2.04	960.3	2685	342.1	118.3
XKG-7003-05	Sandstone	80.49	80.61	4.0	124.17	60.77	2.04	953.7	2648	139.1	48.0
XKG-7003-10	Claystone/Siltstone	182.02	182.14	3.5	124.38	60.59	2.05	964.6	2690	302.3	104.8
XKG-7003-07A	Claystone	124.13	124.25	3.0	123.87	60.82	2.04	950.2	2640	100.3	34.5
XKG-7003A-02	Sandstone/Claystone	37.46	37.58	3.5	124.46	60.82	2.05	968.3	2678	108.1	37.2
XKG-7003A-05	Sandstone	79.60	79.72	5.0	124.28	60.85	2.04	946.5	2619	355.4	122.2
XKG-7003A-09	Sandstone	160.68	160.80	5.0	125.24	60.72	2.06	968.5	2671	709.4	245.0
XKG-7003A-10	Sandstone	169.51	169.63	4.5	124.47	60.82	2.05	975.4	2697	601.2	206.9
XKG-7003A-12	Siltstone/Sandstone	204.09	204.21	3.5	124.65	60.54	2.06	974.8	2717	426.9	148.3
XKG-7003A-13	Sandstone	220.87	220.99	4.0	124.74	60.83	2.05	960.6	2650	457.3	157.4
XKG-7007-02	Claystone	72.92	73.04	3.0	-	-	-	-	-	-	-
XKG-7007-03	Sandstone	91.18	91.30	4.0	124.43	60.80	2.05	965.6	2673	603.1	207.7
XKG-7007-05	Claystone/Siltstone	122.90	123.02	3.0	123.86	60.72	2.04	977.8	2726	253.0	87.4
XKG-7007-06	Sandstone	132.96	133.08	4.0	124.10	60.90	2.04	961.7	2660	519.7	178.4
XKG-7007-08	Claystone	166.37	166.49	3.0	124.18	60.83	2.04	967.0	2679	388.0	133.5
XKG-7007-09	Sandstone	177.07	177.19	5.0	124.71	60.90	2.05	978.5	2694	612.6	210.3
XKG-7007-11	Sandstone/Siltstone	200.46	200.58	4.0	125.41	60.57	2.07	977.4	2705	436.0	151.3



Drill hole-Sample#	Rock Type	Depth from (m)	Depth to (m)	Hardness	Length (mm)	Diameter (mm)	L/D Ratio	Mass dry (gm)	Density (kg/m ³)	Load (kN)	UCS (MPa)
XKG-7007-12	Siltstone/Claystone	209.88	210.00	3.0	124.47	60.83	2.05	967.3	2674	329.7	113.4
XKD-5019-02	Claystone/Siltstone	23.28	23.40	2.5	123.72	63.06	1.96	1026.8	2657	288.0	92.2
XKD-5019-03	Siltstone/Sandstone	38.12	38.24	2.5	120.43	63.13	1.91	1017.7	2700	254.2	81.2
XKD-5022-04	Siltstone	37.58	37.70	3.5	124.31	59.71	2.08	932.3	2678	247.2	88.3
XKD-5022-09	Claystone	114.28	114.40	3.0	124.13	60.62	2.05	968.9	2704	385.8	133.7
XKD-5023-01	Claystone	25.32	25.44	3.0	125.10	60.75	2.06	955.6	2635	58.4	20.1
XKD-5023-03	Claystone	51.87	51.99	3.5	125.06	60.69	2.06	974.3	2693	219.8	76.0
XKD-5023-05	Claystone	72.32	72.44	3.0	124.12	60.82	2.04	958.2	2657	114.4	39.4
XKD-5024-04	Claystone	51.70	51.82	3.0	123.90	60.66	2.04	966.6	2699	378.8	131.1
XKD-5024-05	Claystone	62.11	62.23	3.0	123.55	60.80	2.03	947.8	2642	124.2	42.8
XKD-5024-06	Claystone	75.40	75.52	4.5	125.08	60.67	2.06	976.9	2702	270.8	93.7
XKD-5024-07	Claystone	86.17	86.29	4.0	124.83	60.85	2.05	977.7	2693	385.6	132.6
XKD-5024-08	Claystone/Siltstone	99.63	99.75	4.0	124.27	60.75	2.05	969.8	2692	173.9	60.0
XKD-5024-10	Claystone/Siltstone	129.14	129.26	3.5	124.37	60.78	2.05	945.8	2621	211.3	72.8
XKD-5024-11	Claystone	145.22	145.34	4.0	123.28	60.87	2.03	956.8	2667	55.7	19.1
XKD-5024-12	Sandstone	161.42	161.54	4.0	125.94	60.76	2.07	969.4	2655	383.5	132.3



Appendix Q – Geochemical Data 2013 – 2014



Appendix R – Survey Data 2013 – 2014



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TECHNICAL MEMORANDUM

DATE: July 9, 2014

TO: John Anderson
Glencore Canada

FROM: Aaron Blom
Integrated ProAction Corp.

**RE: Survey Procedures and Specifications for As Built Surveys conducted for
Glencore Canada**

Integrated ProAction Corporation (IPaC) has conducted As Built Surveys for Glencore Canada since August 2012 using Trimble GNSS R8 RTK survey instruments. Control points (base stations) were established in areas with clear sky views and good line of sight in all directions to avoid multipath interference. These points were all subsequently post processed using Natural Resource Canada Geodetic Survey Division's Precise Point Positioning service to obtain a precise horizontal and vertical location and elevation. Standard survey practices were followed using all Trimble guidelines for the R8 GNSS receiver. This equipment configuration can be expected to be accurate within 5cm vertically and horizontally according to the manufacturer's (Trimble) specifications. Horizontal positions are ground coordinates valid in UTM Zone 10 N map projection (NAD83). Elevations are orthometric height above mean sea level (geoid model HTv2.0). Integrated ProAction Corp. has been surveying following these standards on numerous types of small and large projects throughout BC since 2006 using this type of equipment.

Please contact me at any time if you have any questions or require any additional information.

Respectfully Submitted,
Integrated ProAction Corp.

per Aaron Blom
Project Manager



Appendix S – Coal Quality Data 2013 - 2014



Appendix T – Statement of Costs

