COAL ASSESSMENT REPORT TITLE PAGE AND SUMMARY

TITLE OF REPORT:
Coal Assessment Report for the Burnt River coal property, British Columbia

TOTAL COST: $2500

AUTHOR(S): **C.G. Cathyl-Huhn, P.Geo. and L. Avery, B.Sc.**
SIGNATURE(S):

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S): **900215 201101 CX 9-5 August 25, 2011**
STATEMENT OF WORK EVENT NUMBER(S)/DATE(S):

YEAR OF WORK: **2013**

PROPERTY NAME: **Burnt River**

COAL LICENSE(S): **392554, 392555,4125719, 417474, 417475,417476**

MINERAL INVENTORY MINFILE NUMBER(S),IF KNOWN: **93P 007**

MINING DIVISION: **Liard**
NTS / BCGS: NTS **093P/05 / 93P.031**
LATITUDE: **55° 22' 25.4" North**
LONGITUDE: **121° 49' 56.2" West** (at centre of work)
UTM Zone: **10N** EASTING: **574000** NORTHING: **6137000** (at centre of work)

OWNER(S): **Walter Canadian Coal Partnership**

MAILING ADDRESS: **800-688 West Hastings Street, Vancouver, B.C. V6B 1P1**

OPERATOR(S): **0541237 B.C. on behalf of Walter Canadian Coal Partnership**

MAILING ADDRESS: **800-688 West Hastings Street, Vancouver, B.C. V6B 1P**1

REPORT KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude)
Bituminous coal, Early Cretaceous, Minnes Group, Bickford Formation, Bullhead Group, Cadomin Formation, Gething Formation, Gaylard Member, Chamberlain Member, Fort St. John Group, Gates Formation, Boulder Creek Formation, Walton Creek Member, Bullmoose Thrust, imbricate faults
REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS:
Coal Assessment Reports 486, 487, 488, 489 and 490

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	2,354 (hectares)	392554 392555 415719 417474 417475 417476	$312.23 $312.23 $313.29 $312.23 $313.29 $936.68
GEOPHYSICAL (line-kilometres)			
Ground			
(Specify types)			
Airborne			
(Specify types)			
Borehole			
Gamma, Resistivity,			
Resistivity			
Caliper			
Deviation			
Dip			
Others (specify)			
DRILLING (total metres, number of holes, size, storage location)			
Core			
Non-core			
SAMPLING AND ANALYSES	Number of samples		
Proximate			
Ultimate			
Petrographic			
Vitrinite reflectance			
Coking			
Wash tests			
PROSPECTING (scale/area)			
PREPARATORY / PHYSICAL Line/grid (km)			
Topo/Photogrammetric (scale, area)			
Road, local access (km)/trail			
Trench (number/metres)			
Underground development (metres)			
Bulk sample(s)			
Other (Personnel)			

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2 Objectives, situation, and details of work

This report presents results of a photogeological study of the Burnt River coal licences (tenures 392554, 392555, 415719, 417474, 417475 and 417476), conducted during the year 2013. The work here reported was undertaken as part of a regional reconsideration of stratigraphic and structural geology, in support of Walter Canadian Coal Partnership's (WCCP's) operations within the Rocky Mountain Foothills of British Columbia. No prior exploratory work is known to have been done within these coal licences during the period of ownership by WCCP, its associated firms, or its preceding firms.

2.1 Location, tenure, access and infrastructure

General location of the Burnt River coal property, within the Brazion coalfield of northeastern British Columbia, is depicted in **Map 2-1**, and access routes are shown in **Map 2-2**. The Brazion coalfield is here informally defined as the entire outcrop area of Jurassic and Early Cretaceous coal-measures, lying between the valleys of the Pine and Sukunka rivers. north of the Pine River through to the west bank of the Sukunka River. The coalfield name has no formal standing as a toponymic entity, and it is used within this report for purposes of convenience.

In detail, the Burnt River coal property comprises six coal tenures (392554, 392555, 415719, 417474, 417475 and 417476), covering a total area of 2354 hectares, more or less, as shown by **Map 2-2**. All of the tenures are contiguous, with the exception of Tenure 417474, which lies diagonally against Tenure 417476.

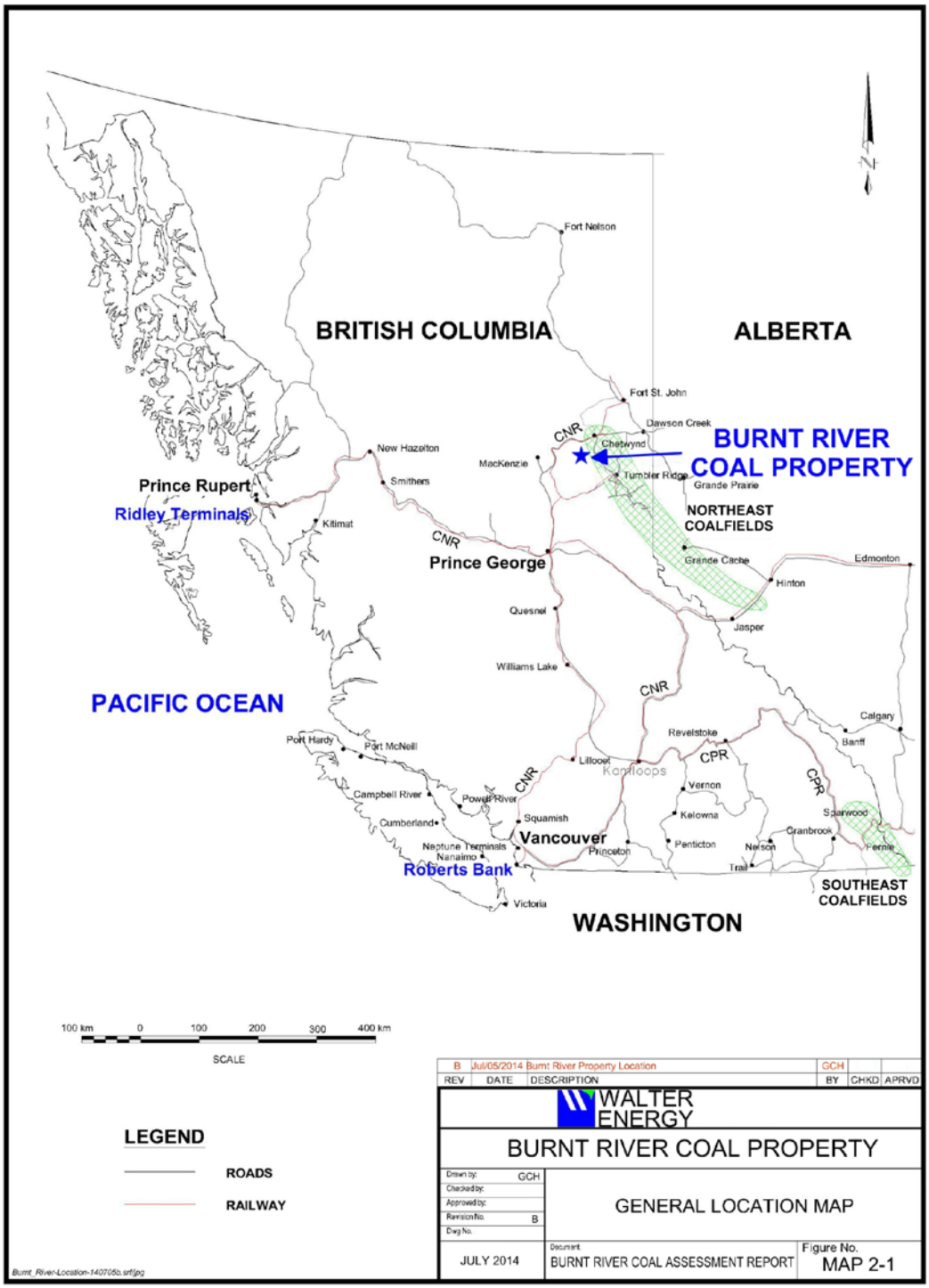
The Burnt River coal property is situated within the Dawson Creek TSA (Timber Supply Area). Cutting of timber for mining purposes is subject to the terms of a *Free Use Permit* issued by the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO). The property lies within Canfor's Tree Farm Licence (TFL) No.48, which mostly been harvesting; most of the readily-accessible parts of the Burnt River property are covered by juvenile second-growth forest.

Surface access for drilling and other exploratory works is regulated by the provincial government, subject to the *Coal Act Regulations* and the *Mines Act*.

Road access is available via two routes, of which the most convenient route is westward from the Sukunka River valley, and a somewhat more involved route is overland from the Pine River Valley, using Walter Energy's Falling Creek Connector Road.

To reach the property via road from the Sukunka River valley, access commences from the junction of highway BC-29 and the Sukunka Forest Service Road (FSR), which is maintained by the Sukunka Road Users Committee (a group of industrial users of the road). After travelling southward along the Sukunka FSR, following the eastern bank of Sukunka River, the junction with the Blind Creek Road is reached at kilometre 16.5 of the Sukunka FSR. Walter Energy holds tenure to the Blind Creek Road under a *Special Use Permit* (SUP) from MFLNRO.

The Blind Creek Road crosses Sukunka River on a recently-reconstructed wood-floored deck-girder bridge suitable for highway loads, and then winds steeply uphill atop the southern canyon wall of Blind Creek. A number of spur roads and trails branch southward from the Blind Creek Road.


BRITISH COLUMBIA
ALBERTA
PACIFIC OCEAN
WASHINGTON
BURNT RIVER COAL PROPERTY
Fort Nelson
Fort St. John
Dawson Creek
Chetwynd
Tumbler Ridge
Grande Prairie
MacKenzie
New Hazelton
Smithers
Prince Rupert
Ridley Terminals
Kitimat
Prince George
NORTHEAST COALFIELDS
Grande Cache
Edmonton
Hinton
Jasper
Quesnel
Williams Lake
Calgary
Banff
Revelstoke
Port Hardy
Port McNeill
Lillooet
Kamloops
Vernon
Campbell River
Powell River
Squamish
Kelowna
Cumberland
Vancouver
Neptune Terminals
Nanaimo
Roberts Bank
Penticton
Princeton
Nelson
Trail
Cranbrook
Sparwood
Fernie
Victoria
SOUTHEAST COALFIELDS
CNR
CPR
100 km 0 100 200 300 400 km
SCALE
LEGEND
ROADS
RAILWAY
B Jul/05/2014 Burnt River Property Location GCH
REV DATE DESCRIPTION BY CHKD APRVD
WALTER ENERGY
BURNT RIVER COAL PROPERTY
Drawn by: GCH
Checked by:
Approved by:
Revision No. B
Dwg No.
GENERAL LOCATION MAP
JULY 2014
Document BURNT RIVER COAL ASSESSMENT REPORT
Figure No. MAP 2-1
Burnt_River-Location-140705b.srf/jpg

The portion of Tenure 417476 lying north of Blind Creek is very poorly-served by roads, and is best accessed on foot via seismic lines which cross through the tenure. Conversely, the remainder of the Burnt River coal property, on the south side of Blind Creek, is well-served by a network of logging-roads and gas-well access-roads, most of which are constructed to reasonable industrial standards, but which are presently in various states of disrepair. The extreme south-western corners of Tenures 417474 and 417475, on the southwestern wall of Brazion Creek's canyon, are only practically accessible via helicopter-supported foot traverses. Road access to the main part of Tenures 417475 and 415719 requires passing through the security gate at Brule Mine, followed by travel westward along Camp Road. Access to the main body of Tenure 417474 requires a lengthy foot traverse from Brule Mine's camp.

The municipal airport at Chetwynd is the closest operating fixed-wing airfield to the Burnt River coal property. Helicopters may be chartered from the Chetwynd airport, or alternatively they may be hired from the Tumbler Ridge airport. With prior permission from the mine's management, helicopters may be landed at Brule Mine. During periods of low stream flow, landing is also possible on sandbars along Burnt River and Brazion Creek.

The closest railway service to Burnt River is at Walter Energy's Willow Creek coal-loading facility, situated on the southern bank of Pine River, west of Chetwynd. The most direct coal-haulage route to the railway is via the Falling Creek Connector Road.

Electrical power is available from B.C. Hydro at the Sukunka substation, which feeds a sub-transmission line to a transformer-station at Brule Mine. Power-distribution lines do not yet extend from the Brule transformer-station into the Burnt River coal property.

Telecommunications, including Internet access, are available via satellite and cellular telephone systems. Satellite access is excellent in upland areas, but unreliable in the heavily-wooded hillsides. Cellular coverage also likely to be inconsistent, owing to distance from transmitters, and to blocked line-of-sight in mountainous country.

Base-mapping for the Burnt River area is freely available from the provincial government's Base Map Online Store, which affords a facility for downloading representational shaded-relief topographic maps. Map-sheet 093P/5 (1:50,000) of the National Topographic System, and provincial base map sheets 093P.031 and 093P.032 (1:20,000) cover the property.

2.2 Physiography, climate and vegetation

Terrain is generally mountainous, with very steep hill slopes, capped by rounded, rolling, densely-forested plateaux whose sides have been deeply-dissected by steep gullies and ravines. Ground-surface elevations range from 695 metres along Blind Creek, at the eastern side of Tenure 417476, to 1265 metres at hilltops in Tenures 392554 and 417476.

The Burnt River area has a continental alpine climate, characterised by long, moderately cold, snowy winters and short, rainy summers. Snow and frost may occur in any month of the year. Winds are generally gusty and ongoing, with rare calm periods. Convective thunderstorms frequently occur during summer months, bringing intense rain-showers and occasional hail.

Immature second-growth coniferous forest covers most upland areas of the property, with more-abundant broadleaf trees along streams and creeks. South-facing slopes tend to be drier and

less sparsely-treed. Soil cover is patchy, consisting mainly, of till, colluvium and alluvium, with pockets of peat and silt within poorly-drained upland areas.

2.3 Property description

The Burnt River coal property consists of six coal licenses (**Map 2-2**), originally held by Teck Corporation (Teck), and sold by that firm to Western Canadian Coal Corp. (a predecessor company of Walter Energy) in 1999. **Table 2-1** presents tenure details for the Burnt River property, whose total area is 2,354 hectares and whose annual rental cost is $26,480.

Coal licences grant to their holder the exclusive right to explore for coal, subject to consultation with local First Nations, coordination of access with other tenure-holders (such as oil and gas firms, other mineral-tenure holders, and timber companies), and the successful submission of an exploratory work plan. Coal licences do not, in and of themselves, confer the ownership of coal upon their holder (as the coal remains the property of the Crown via the province of British Columbia), but they can under appropriate circumstances be converted into coal leases, upon which a scheme of mining may be established.

Table 2-1: Coal tenure at Burnt River

Tenure Numbers		Land description		Area in hectares (ha)	Dates		Annual rental at $10 or $15/ha
Current	Historic	Blocks	Units		Issued on	Renew by	
392554	CL 3067	Block F	23, 24, 33, 34	294	April 8, 2002	April 8, 2015	$4,410 (at $15)
392555	CL 3068	Block F	25, 26, 35, 36	294	April 8, 2002	April 8, 2015	$4,410 (at $15)
415719	CL 3069	Block F	27, 28, 37, 38	295	Nov. 18, 2004	Nov. 18, 2014	$4,425 (at $15)
415474	CL 3076	Block E	41, 42, 51, 52	294	May 31, 2006	May 31, 2015	$2,940 (at $10)
415475	CL 3070	Block F	29, 30, 39, 40	295	May 31, 2006	May 31, 2015	$2,950 (at $10)
417476	CL 3071, 3072 and 3078	Block F	41, 42, 43, 44, 51, 52, 53, 54, 63, 64, 73, 74	882	May 31, 2006	May 31, 2015	$8,820 (at $10)
Totals		6 coal licenses / 32 units		2,354 ha			$26,480

2.4 Coal resources and coal reserves

The Burnt River coal property has neither historic nor current coal resources, nor coal reserves, pertaining to it. At the property's current state of exploration, such determinations would be premature.

2.5 Summary of current work

A photogeological study, using *Google Earth* satellite imagery and archival aerial-photographs, was conducted in 2013 by Gwyneth Cathyl-Huhn P.Geo., as part of a broader regional study of the Brazion and Sukunka-Quintette coalfields. Substantial use was made of previous geological maps, including work by McClymont (1979), Hughes (1980), Hunter and Cunningham (1991a, b) and Legun (2003).

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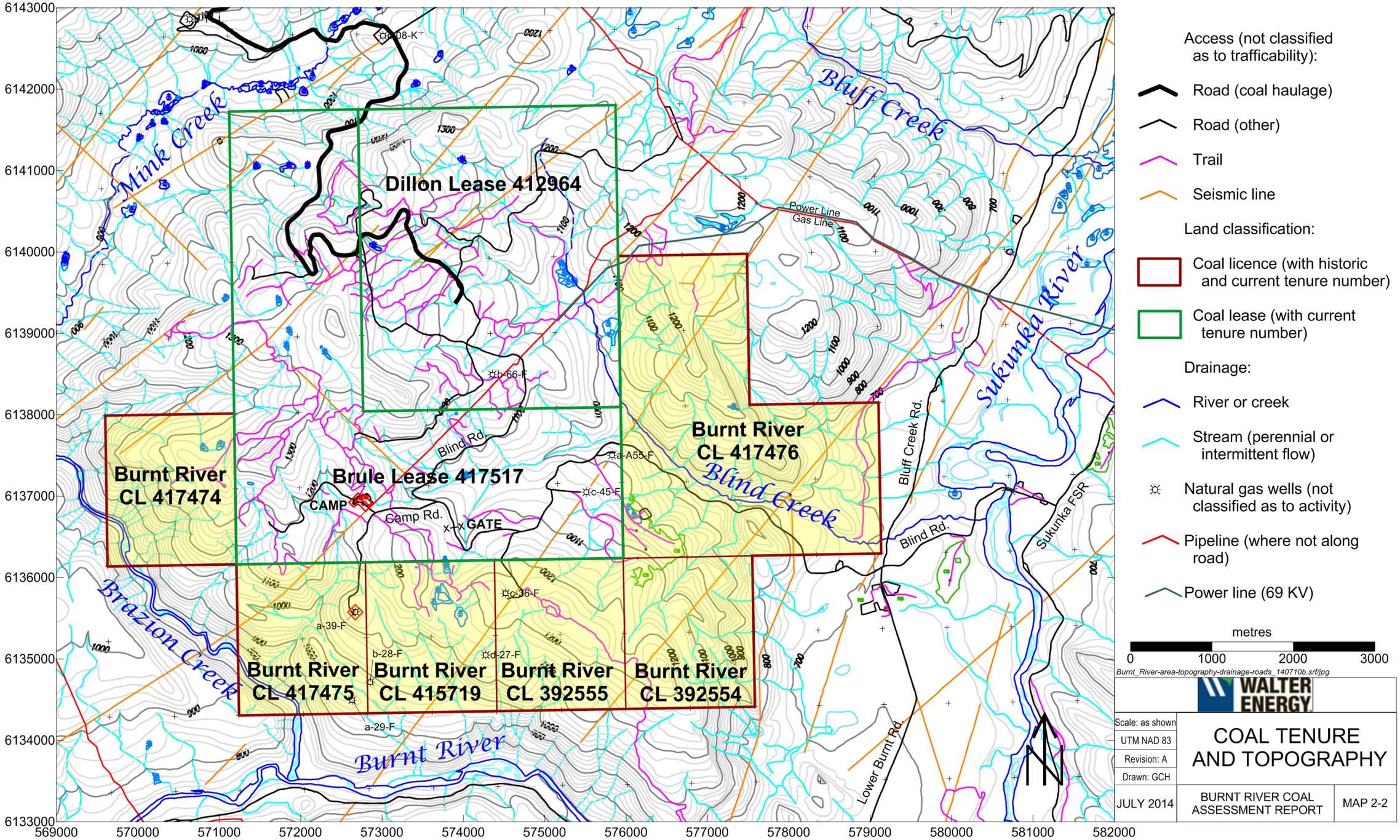
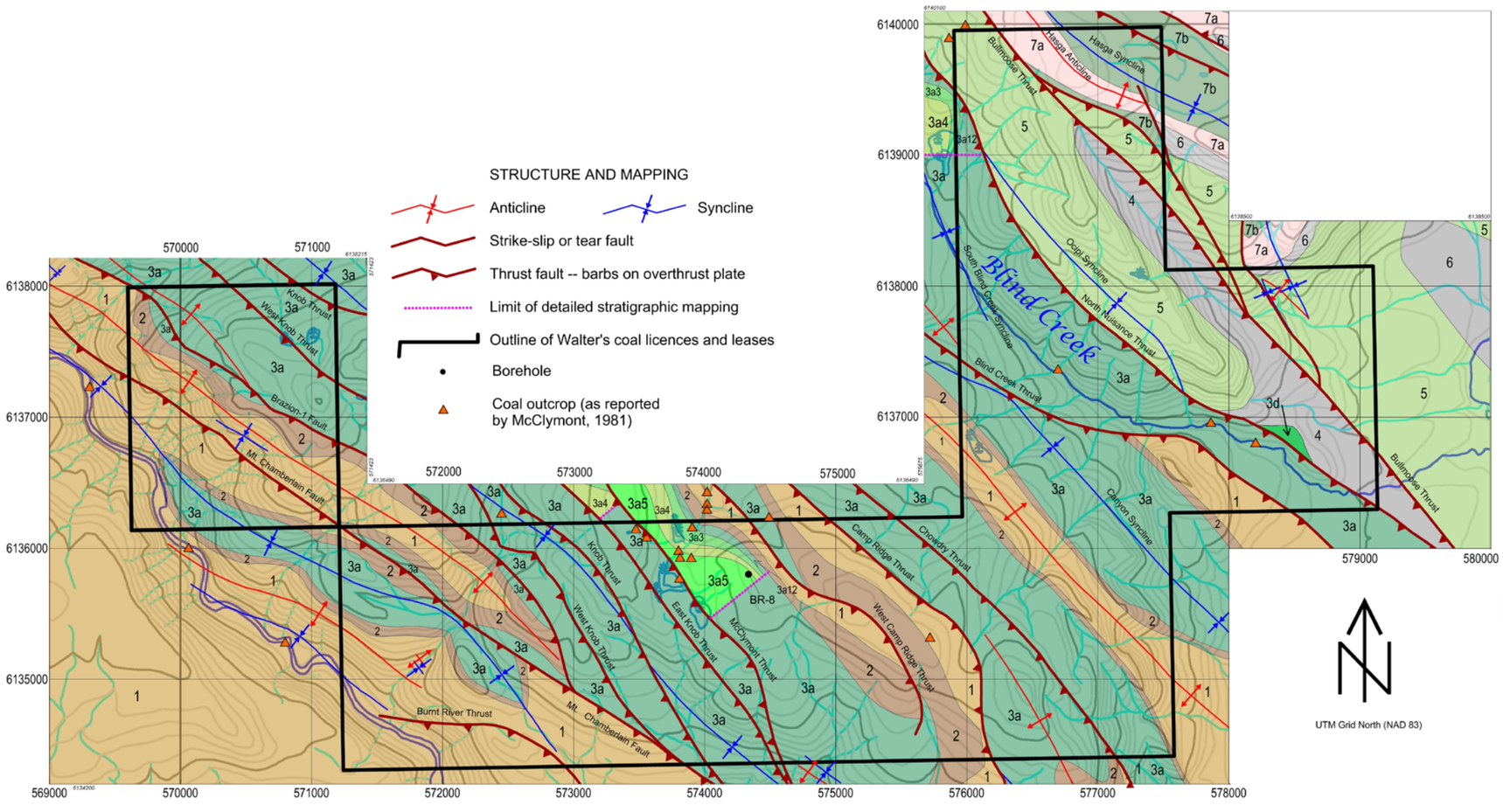

Dillon Lease 412964
Brule Lease 417517
Burnt River CL 417474
Burnt River CL 417476
Burnt River CL 417475
Burnt River CL 415719
Burnt River CL 392555
Burnt River CL 392554
Mink Creek
Bluff Creek
Blind Creek
Brazion Creek
Burnt River
Sukunka River
Power Line
Gas Line
Blind Rd.
Camp Rd.
CAMP
GATE
Bluff Creek Rd.
Sukunka FSR
Lower Burnt Rd.
b-66-K
a-A55-F
c-45-F
c-36-F
a-39-F
b-28-F
d-27-F
a-29-F
6143000
6142000
6141000
6140000
6139000
6138000
6137000
6136000
6135000
6134000
6133000
569000
570000
571000
572000
573000
574000
575000
576000
577000
578000
579000
580000
581000
582000
Access (not classified as to trafficability):
Road (coal haulage)
Road (other)
Trail
Seismic line
Land classification:
Coal licence (with historic and current tenure number)
Coal lease (with current tenure number)
Drainage:
River or creek
Stream (perennial or intermittent flow)
Natural gas wells (not classified as to activity)
Pipeline (where not along road)
Power line (69 KV)
metres
0
1000
2000
3000
Burnt_River-area-topography-drainage-roads_140710b.srf/jpg
WALTER ENERGY
Scale: as shown
UTM NAD 83
Revision: A
Drawn: GCH
COAL TENURE AND TOPOGRAPHY
JULY 2014
BURNT RIVER COAL ASSESSMENT REPORT
MAP 2-2

UTM NAD83

BURNT RIVER

NTS 93 P/05
CANADA



UTM Grid North (NAD 83)

map scale in metres

0 1000 2000 3000 4000

STRATIGRAPHY

FORT ST JOHN GROUP (Albian)
- 7 — Boulder Creek Formation -- sandstone, shale, conglomerate and coal
- 7b — Walton Creek Member -- siltstone, sandstone, conglomerate and coal
- 7a — Cadotte Member -- conglomerate and sandstone
- 6 — Hulcross Formation -- marine shale and siltstone, minor bentonite; basal grit
- 5 — Gates Formation -- sandstone, shale, conglomerate; minor coal
- 4 — Moosebar Formation -- marine siltstone and shale; bentonite; basal pebbly glauconitic sandstone (not Bluesky Member)

BULLHEAD GROUP (Barremian to Aptian)
Gething Formation -- siltstone, sandstone and conglomerate; minor bentonite and coal
- 3 — Chamberlain Member -- sandstone and siltstone; minor coal
- 3d — Bullmoose Member -- marine shale and siltstone; minor sandstone and bentonite
- 3c — Bluesky Member -- pebbly glauconitic sandstone (not mapped separately at this scale)
- 3b — Gaylard Member -- siltstone, sandstone and coal; lenses of conglomerate and pebbly sandstone; minor bentonite
- 3a — Division 5 -- sandstone and siltstone; minor coal
- 3a5 — Division 4 -- siltstone and sandstone; coal
- 3a4 — Division 3 -- siltstone and shale; coal
- 3a3 — Division 2 -- siltstone and sandstone; minor conglomerate and coal
- 3a2 — Division 1 -- sandstone, conglomerate and siltstone; minor coal
- 3a12

- 2 — Cadomin Formation -- cliff-forming conglomerate and sandstone; minor siltstone and coal

MINNES GROUP (Tithonian to Valanginian)
- 1 — Bickford, Monach, Beattie Peaks and Monteith Formations -- sandstone, siltstone, shale, conglomerate, quartzite, ironstone and coal (not mapped separately at this scale)

WALTER ENERGY

REV	DATE	DESCRIPTION
F	Jul 10/14	Chamberlain Member window

Drawn by: GCH
Scale: as shown
Dwg. No.: Burnt_River-licence-geology-140710f.srf/jpg

GEOLOGY OF BURNT RIVER COAL LICENCES

JULY 2014 | BURNT RIVER COAL ASSESSMENT REPORT | MAP 2-3

Author: C.G. Cathyl-Huhn P.Geo. Lic.Geol. RMSME Date: 2014 July 10
Grid system: UTM NAD83 Zone 10N in metres 100 km grid square: ES
Scale: as shown on bar-scale Topography: TRIM-derived rasters
Sources: compiled from work by B.McClymont (Teck Corporation, 1979, 1981), J.Hughes (Gulf Canada, 1980), and D.J.Hunter and J.M.Cunningham (BCGSB, 1991) and A.Legun (BCGCB, 2003)

Map 2-3 presents the resultant compilation, incorporating a reassessment of the nature of regional-scale thrust-faults and associated folds, and a reassignment of formation and member contacts within the coal-measures, based on more detailed studies within the nearby Brule mining lease (Cathyl-Huhn, 2013).

2.5.1 Acknowledgements and professional responsibility

Thanks are due to Preetpal Singh (at Walter Energy) for assistance with scanning and organisation of source materials, and for help with the assembly of this report into a coherent whole. Gwyneth Cathyl-Huhn P.Geo. accepts professional responsibility for the contents of this report.

2.6 Cross-reference to historic work

As with most other coal properties within northeastern British Columbia, the Burnt River coal property attracted considerable attention as a coking-coal exploration play during the late 1970s and early 1980s. As industrial expenditures declined in the middle 1980s, academic and governmental investigators carried on with regional geological studies, including structural mapping. In recent years, deep structures beneath the Burnt River area have attracted a modest amount of attention from the oil and gas industry, including widely-spaced seismic-reflection survey programmes and the drilling of a few deep exploratory wells in search of natural gas. **Table 2-2** presents a cross-reference to the most useful historic reports and maps.

2.6.1 Geological mapping

The most useful of the historic maps are Teck's geological compilations from their Burnt River coal property (McClymont, 1979; 1981), which at their time were the most complete collection of structural information available for the area, encompassing a much larger area than the current extent of the Burnt River coal licences. The 1981 map shows the locations of numerous coal outcrops discovered by Teck's workers during their traversing of the property; these outcrops are noted on **Map 2-3** of the present report.

Structural geology of the area to the south and west of the property, within the canyons of Burnt River and Brazion Creek, was mapped in the late 1970s and early 1980s by field parties working for Gulf Canada's Coal Division, as reported by Hughes (1980). Bedrock geology of the eastern and northeastern parts of the Burnt River property was reported by Hunter and Cunningham (1991b) and Legun (2003), working for the B.C. Geological Survey.

2.6.2 Coal-exploration drilling

Table 2-3 presents details of the only known coal-exploration borehole within the Burnt River coal property: Teck Corporation's borehole BR-8, as reported in Coal Assessment Report No.488 (McClymont, 1979).

Table 2.2: Cross-references to previous work

Year	*Report author(s) and venue of publication*	*Organisation*	*Nature of work done*
1968	D.F. Stott, *GSC* Bulletin 152	Geological Survey of Canada	Regional geological report
1973	D.F. Stott, *GSC* Bulletin 219	Geological Survey of Canada	Regional geological report
1975	R.S. Versoza, Coal Assessment Report No.486	Brameda Resources Ltd.	Property studies
1977	R.S. Versoza, Coal Assessment Report No.477	Teck/Brameda	Property studies
1979	R.D. Gilchrist, *Geological Fieldwork* 1978	B.C. Geological Survey	Regional geological report
1979	B.I. McClymont, Coal Assessment Report No.488	Teck/Brameda	Property studies
1980	J.E. Hughes, Coal Assessment Report No.531	Gulf Canada Resources	Regional geological report
1981	J.E. Hughes and C.C. McFall, Coal Assessment Report No.680	Gulf Canada Resources	Regional geological report
1981	B.I. McClymont and J.H. Wright, Coal Assessment Report No.489	Teck/Brameda-Yukon	Property studies
1981	B.I. McClymont, Coal Assessment Report No. 490	Teck Corporation	Property studies
1982	D.W. Gibson, GSC Bulletin 431	Geological Survey of Canada	Stratigraphic studies
1982	D.W. Gibson, GSC Bulletin 440	Geological Survey of Canada	Stratigraphic studies
1984	M.E. McMechan, GSC Map 1858A	Geological Survey of Canada	Regional structural geology
1991	D.J. Hunter and J.M. Cunningham, Geological Fieldwork 1990	B.C. Geological Survey	Regional geological report
1991	D.J. Hunter and J.M. Cunningham, MEMPR Open-File Map 1991-4	B.C. Geological Survey	Structural mapping
2003	A.S. Legun, MEMPR Geoscience Map 2003-2	B.C. Geological Survey	Regional structural geology

Table 2-3: Historic coal-exploration drilling

Borehole	NAD83 Easting	NAD83 Northing	Collar (metres)	Depth metres)	Type	Geophysics	Year	Cross-reference to report
BR-8	574331.99	6135802.53	1235.40	148.17	NQ core	Yes	1978	CAR-488

3 Geology

Regional and local geology of the Burnt River coal property (**Map 2-3**) is known mainly from the extensive work of D.F. Stott (1960; 1963; 1968; 1973; 1974; 1981; 1998) and D. Gibson (1992a; 1992b), both from the Geological Survey of Canada, and B.McClymont (1979; 1981), from Teck.

As well, numerous other relevant coal-company reports are available as Coal Assessment Reports from the British Columbia Geological Survey Branch, as cited in **Section 7** of this report. The most useful of these reports (available as Coal Assessment Report No.490) was written by B.I. McClymont (1981) for a joint-venture of Teck and Brameda Resources Ltd.

3.1 Regional geology

The Burnt River coal property lies within the Brazion coalfield of northeastern British Columbia, part of the Foothills structural province of the Canadian Cordillera. All rocks exposed at the ground surface are of latest Jurassic to Early Cretaceous age, belonging to the Minnes (Tithonian to Valanginian stages), Bullhead (Barremian to Aptian stages) and Fort St. John (Albian stage) groups. Where not subsequently eroded, the total undeformed thickness of these rocks is 2200 to 2350 metres. Depth to Precambrian continental basement, including both Mesozoic and Palaeozoic rocks, is more substantial, in the range of 10 to 12 kilometres (McMechan, 1984), although some of this thickness is attributable to thrust-induced tectonic stacking of the strata, and to associated shortening across folds.

The majority of sedimentary rocks within the Brazion coalfield are clastic in origin, ranging in grain-size from claystones and mudstones through pebble-conglomerates. Lesser amounts of biologically- and chemically-derived sedimentary rocks are present, comprising coals, banded and nodular ironstones, glauconite-rich sandstones and gritstones, and impure dolomites.

Volcanic rocks constitute a very small component of the Jurassic and Early Cretaceous strata, comprising very fine- to fine-grained tuffs, interpreted to have originated as wind-borne distal ash-fall deposits from contemporaneous volcanoes situated within the Coast Plutonic Complex, far to the southwest of the property. The volcanic rocks characteristically occur as very thin (at most a few decimetres) yet regionally-extensive bands, which are of use as markers for structural and stratigraphic correlations. No intrusive rocks are known to occur at Burnt River.

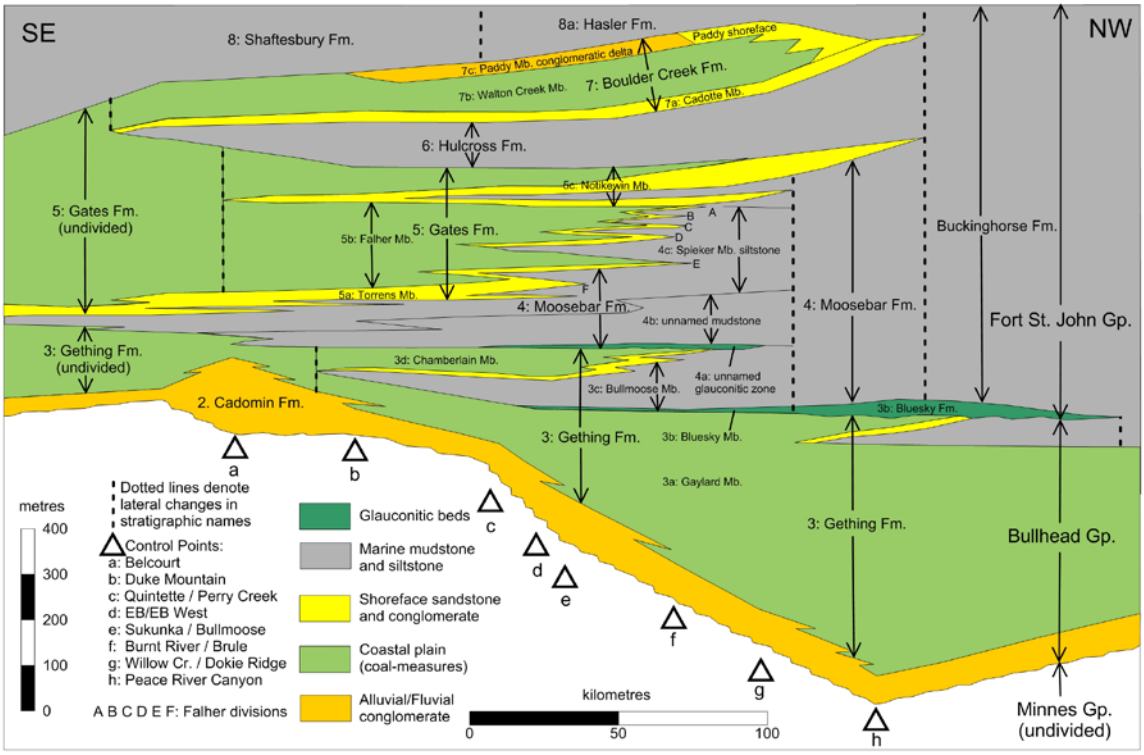
3.1.1 Regional sedimentology and stratigraphy

During much of the Early Cretaceous period, the Western Interior of North America was occupied by a shallow seaway, variably-designated by different authors as the Western Interior Sea, the Boreal Sea, or by various analogues of formation names, such as the Clearwater Sea, Hulcross Sea or Moosebar Sea. Depths of the seaway, magnitude of accommodation space for sediments, and overall shoreline trends, were largely controlled by vertical movements within a block-faulted crystalline basement terrane of Precambrian age, the Peace River Arch.

During the latest Jurassic and earliest Cretaceous periods, sediments of the Minnes Group and the basal part of the Bullhead Group were derived from actively-eroding upland areas within the North American craton, particularly from the Peace River Arch. The receiving basin

during this early time period lay to the west of the craton, within an actively-subsiding continental shelf which prograded westwards into the ancestral Pacific Ocean. Subsequently, slightly later within the Early Cretaceous period, sediments of the upper Bullhead Group and the Fort St. John Group were derived from actively-rising thrust-faulted tectonic forelands situated to the west and southwest of the seaway, synchronous with the docking of allochthonous tectonic terranes against the western margin of the North American craton.

Kalkreuth and Leckie (1989) recognised the close association between actively-subsiding shoreface sandstone deposits and the overlying presence of thick coal beds; this association is well-established within the upper part of the Gething Formation within the Brazion and Sukunka-Quintette coalfields, and less well-so within the lower part of the Gething Formation.



Drawing: NEBC-regional-stratigraphy_140710e.srf/jpg
Date: 5.July 2014 Scale: diagrammatic, as shown
Drawn by: C.G.Cathyl-Huhn P.Geo. Lic.Geol. RMSME,
modified from work by W.Kalkreuth and D.A. Leckie (1989)

Figure 3-1: Regional Stratigraphy of the Lower Cretaceous Bullhead Group and basal part of the Fort St. John Group

Figure 3-1, substantially adapted from Figure 3 of Kalkreuth and Leckie's paper, summarises regional stratigraphic relationships within the Bullhead Group and the lower part of the Fort St. John Group. Younger beds, which elsewhere form the top of the Fort St. John Group, have been completely removed by erosion within the Burnt River area, and so are omitted from the stratigraphic diagram. Details of the older Minnes Group (including the Monach Formation, which immediately underlies the Cadomin Formation) are not shown, as these rocks have been minimally-explored to date at Burnt River.

Within the diagram, the Early Cretaceous rocks of the Bullhead and basal Fort St. John groups are broadly classified by facies, with the most economically-significant facies being

the coastal-plain coal-measures of the various paleodeltas. All of the coastal-plain strata contain coal, although within the Brazion Coalfield all of the presently-known coal resources and coal reserves lie within the Gaylard member of the Gething Formation.

3.1.2 Regional tectonics

The Burnt River property's structural geology is moderately complex, perhaps less-so than that of the nearby Dillon coal mine, but on a similar order of complexity as seen at the nearby Brule Mine, and also as seen farther afield at Sukunka Colliery (Wallis and Jordan, 1974). The overall structural style of the Burnt River coal-measures is thin-skinned (Barss and Montandon, 1981), dominated by northeast-verging, southwest-dipping imbricate thrust-faults, with associated tight concentric folds. Thrusts characteristically overlap in *en echelon* manner, with displacement gradually transferring from one fault to another via trains of folds.

Thrusts range in scale from outcrop-scale mesocopic features with stratigraphic displacements of a few decimetres to a few metres, to regionally-throughgoing faults and fault zones (such as the Bullmoose Thrust, Mt. Chamberlain Fault and associated splays), whose stratigraphic offsets may locally exceed a kilometre.

Age relationships amongst the thrusts are inferred to be as are generally-observed within the Cordilleran fold-thrust belts of northwestern North America, with the oldest thrusts occupying stratigraphically-higher positions (generally to the southwest) of the stratigraphically-lower and younger thrusts.

3.2 Structural geology at property scale

In detail, the Burnt River property occupies a series of folded structural slices (informally referred to as structural 'plates', following general regional practice) bounded by, and stacked-up by southwestward-dipping, northeastward-verging thrust-faults. *En-echelon* folds are rarely observed, but this deficit may be more a function of limited outcrop exposure than of local tectonics.

Most of the Burnt River coal property lies between two regionally-significant thrust faults: the Mt. Chamberlain Fault to the southwest of the property, and the Bullmoose Fault to the northeast of the property. The relative proportion of northeastward structural shortening due to faulting (as compared with shortening due to folding) appears to decrease slightly from the southwest to the northeast.

Map 2-3 depicts the map-scale pattern of thrusts and folds within the property. Some of the structures' names were first assigned by Teck Corporation's workers, others have been inherited from more detailed work by Walter Energy staff and consultants studying the Brule and Dillon mining areas, while yet others are newly-coined for the purposes of the regional geological study which underpins the present report.

Earlier workers (*vide* McClymont, 1979) considered that the Mt. Chamberlain Fault might be a strike-slip fault rather than a thrust fault, but its mapped relations to other thrusts and nearby folds do not support that supposition.

Thrust faults, as inferred from landforms and from limited ground-surface observations,

in general display sinuous map traces. Thrusts are furthermore suspected to curve vertically, in consequence of structural refraction between weak and strong beds, and perhaps as well due to passive folding above later-formed structural ramps along deeper, younger thrusts. Lack of subsurface structural information from drilling or from seismic-reflection surveys prevents the validation of this supposition.

Positional confidence of faults, folds and associated geological-unit contacts ranges from ‘speculative’ to ‘approximate’ within the Burnt River coal property, with the highest confidence being associated with areas along the north-central boundary of the property, closer to Brule Mine.

4 Stratigraphic review of the Burnt River coal property

A generalised stratigraphic profile of the Jurassic and Cretaceous coal-measures of the Burnt River area is presented as **Table 4-1**. The following discussion provides a systematic description of the major rock-units, drawing heavily upon the more-detailed results of drilling to the north of the property, within and adjacent to the Brule and Dillon leases.

For convenience, the discussion is broken into the headings of 'Younger rocks' (**Section 4.1**), 'Gething Formation coal-measures' (**Section 4.2**) and 'Older rocks' (**Section 4.3**).

4.1 Younger rocks

'Younger rocks' within the Burnt River coal property comprise Albian (Early Cretaceous) sedimentary rocks of the Boulder Creek, Hulcross, Gates and Moosebar formations, all of them being within the Fort St. John Group. The Boulder Creek Formation is the youngest of these rocks within the Burnt River property, underlying a very small portion of the property's northeastern corner. The following discussion proceeds downward in order of increasing geological age, from youngest to oldest.

4.1.1 Boulder Creek Formation (map-units 7b and 7a)

The Boulder Creek Formation, of late Middle Albian age (Gibson, 1992b) forms prominent cliffs in the upland area between Blind Creek and Sukunka River, immediately northeast of Tenure 417476. Boulder Creek rocks are inferred to extend into the extreme northeastern corner of the Burnt River coal property, within the Hasga fold complex, and beneath the Bullmoose Thrust.

Regionally, conglomerate and sandstone are the predominant lithologies of the Boulder Creek Formation, but the formation also contains fine-grained rocks including siltstone, root-penetrated, variably-carbonaceous mudstone, and coal. Conglomerate and sandstone are concentrated in the basal Cadotte Member (map-unit 7a) of the formation, while fine-grained rocks are concentrated in the overlying Walton Creek Member (map-unit 7b). The uppermost regional division of the Boulder Creek Formation, comprising the conglomerate of the Paddy Member, is not recognised at Burnt River.

The overall thickness of the Boulder Creek Formation is inferred to be 80 to 110 metres within the Burnt River property, of which the basal 30 metres comprises the Cadotte Member and the overlying 50 to 80 metres comprises the Walton Creek Member. The basal contact of the Boulder Creek Formation with the underlying Hulcross Formation is abrupt to erosional at local scale, and likely to be interfingering at regional scale.

4.1.2 Hulcross Formation (map-unit 6)

The Hulcross Formation, of middle Albian age within the Early Cretaceous (Stelck and Leckie, 1988) comprises thinly-interbedded, locally-concretionary grey siltstone, fine-grained sandstone and dark grey mudstone with occasional very thin but extremely-persistent interbeds of soft, light grey to white tuff (Kilby, 1985; Gibson, 1992b) and rare thin stringers of coal. Sideritic concretions are commonly found in isolated, laterally-persistent bands.

Table 4-1: Table of lithostratigraphic units

Group/Formation/ Member			Map-unit	Lithology and thickness		Coal bed details
Fort St. John Group	Boulder Creek Fm.	Walton Creek Mb.	7b	siltstone, sandstone, conglomerate and coal; 50 to 85 m thick.		not yet drilled within property
		Cadotte Mb.	7a	conglomerate and sandstone; 30 m thick.		
	Hulcross Fm.		6	marine shale, siltstone and sandstone; minor tuff and sideritic concretions; thin basal grit; 130 m thick.		
	Gates Fm.		5	sandstone, shale, conglomerate; minor coal; 70 to 100 m thick?		not yet drilled within property.
	Moosebar Fm.		4	marine siltstone and shale; minor tuff; basal pebbly glauconitic sandstone; 190 m thick?		
Bullhead Group	Gething Fm.	Chamberlain Mb.	3d	sandstone and siltstone; minor conglomerate and coal; 60 m thick?		not yet drilled within property.
		Bullmoose Mb.	3c	marine shale and siltstone; minor sandstone and tuff; 105 m thick.		
		Bluesky Mb.	3b	glauconitic pebbly sandstone, pebbly mudstone and conglomerate; 2 to 21 m thick.		
		Gaylard Mb. [note: informal divisions of the Gaylard Member are only recognised to a limited extent within the Burnt River property]	3a	3a5	Division 5 (beds above Seam 60): sandstone and siltstone, minor coal; 95 to 105 m thick.	minor coals?
				3a4	Division 4 (beds above Upper Seam): siltstone and sandstone; coal; 45 to 75 m thick.	major coal: Seam 60 (at top); minor coals: Markers D, C.
				3a3	Division 3: siltstone and shale; coal; 8 to 35 m thick.	major coals: Upper Seam (at top) and Lower Seam (at base).
				3a2	Division 2 (beds below Lower Seam): siltstone and sandstone; minor conglomerate and coal; 105 m thick?	minor coals: Markers B (near top), AA and A (near base).
				3a1	Division 1: sandstone, conglomerate and siltstone; minor coal near base; 35 to 70 m thick.	basal section potentially contains coal; not yet drilled within property.
	Cadomin Fm.		2	gritty sandstone and conglomerate; minor siltstone; 25 to 35 m thick?		
Minnes Group	Bickford Fm. (formerly known as the Brenot Fm.)		1	1d	sandstone, siltstone, mudstone and coal; 285 to 300 m thick.	not yet drilled within property.
	Monach Fm.			1c	sandstone and quartzite; minor siltstone and conglomerate; 50 m thick.	
	Beattie Peaks Fm.			1b	sandstone, siltstone and shale; minor ironstone and coal; 300 m thick.	not yet drilled within property.
	Monteith Fm.			1a	sandstone, shale and conglomerate; quartzite; 600 m thick?	

At Burnt River, the Hulcross Formation is inferred to only occur within an extremely limited area within the far northeastern extremity of the property, underlying a fault splay associated with the Bullmoose Thrust.

The thickness of the Hulcross Formation in the Burnt River area is estimated to be 130 metres. The formation's immediate base is characteristically marked by a thin (generally less than a metre thick) erosive-based bed of pebbly sandstone or gritstone, lying erosionally upon the underlying strata of the Gates Formation.

4.1.3 Gates Formation (map-unit 5)

The Gates Formation, of late Early Albian age within the Early Cretaceous (Stott, 1982), comprises thin to thick interbeds of sandstone, siltstone, conglomerate, and shale, locally accompanied by coal beds. The Gates Formation was formerly considered as a member within the Commotion Formation, and that usage prevailed in earlier governmental surveys and coal-industry exploration reports (Stott, 1968). Coals of the Gates Formation, and their enclosing sedimentary rocks, were deposited on the shoreline of the Clearwater Sea (part of the Western Interior Seaway) between 108.7 and 111.0 million years ago, as part of an extensive complex of coastal plains, deltas and estuaries collectively known as the Gates Delta.

Within the Burnt River property, the Gates coal-measures are present within the core of the Ocipi Syncline (beneath the North Nuisance Thrust) and within the Hasga fold/fault complex (beneath the Bullmoose Thrust), both of these areas being within the property's northeastern corner. No drilling has been done within the Gates Formation at Burnt River, and its coal content (if any) within the property is not yet known.

At Burnt River, the Gates Formation is inferred to be 70 to 100 metres thick. The nature of its contact with the underlying Moosebar Formation is unknown at local scale, but likely to be interfingering at the regional scale, as depicted schematically in **Figure 3-1**.

4.1.4 Moosebar Formation (map-unit 4)

The Moosebar Formation, of Early Albian age (Stott, 1968) comprises approximately 190 metres of marine siltstone and shale, with minor interbeds of sandstone and very thin but extremely-persistent bands of tuff (generically named as 'bentonites' by local geologists). Within the Burnt River property, the Moosebar Formation is inferred to form bedrock within a narrow structural slice lying between the North Nuisance Thrust and the Bullmoose Thrust. Insufficient lithological detail is available in this area, to support the usual subdivision of the formation into an upper siltstone/sandstone member, and a lower mudstone/tuff member.

The basal contact of the Moosebar Formation with the underlying Chamberlain Member of the Gething Formation is marked by a thin but laterally-persistent, formally-unnamed zone of erosive-based pebbly, glauconitic sandstone, siltstone and mudstone.

4.2 Gething Formation coal-measures (map-unit 3)

The Gething Formation, of early Aptian to early Albian age within the Early Cretaceous (Gibson, 1992a), comprises thin to thick interbeds of siltstone, sandstone, mudstone and coal, with lesser

amounts of gritstone, pebble-conglomerate, ironstone and tuff. The Gething Formation includes beds formerly designated as the Dresser Formation by Hughes (1964); its current stratigraphic extent was established by Stott (1968).

The Gething Formation originated as a complex of non-marine to shallow-marine sedimentary deposits, laid down by meandering and braided streams and rivers within a widely-extensive belt of coastal deltas, of which two (the Gaylard and Chamberlain paleodeltas) extended into the Burnt River area. Deltaic deposits were occasionally interrupted and at times extensively overrun by transgressive, shallow-marine deposits of the Western Interior Seaway. A thick central tongue of marine rocks (the Bullmoose Member) separates the non-marine and paralic deposits of the Gaylard and Chamberlain paleodeltas.

Coals of the Gething Formation at Burnt River, and their enclosing sedimentary rocks, were deposited between 111 and 123 million years ago (Gibson, *ibid.*), on the basis of regional plant-fossil and foraminiferal zonations.

Following upon suggestions made by coal-company geologists (Wallis and Jordan, 1974) and subsequent correlation studies by the British Columbia Geological Survey (Duff and Gilchrist, 1981), Gibson formally divided the Gething Formation into three members: the upper, non-marine to transitional Chamberlain Member, the middle marine Bullmoose Member, and the basal, non-marine to transitional Gaylard Member. A fourth member of the Gething Formation, the Bluesky Member, is also inferred to be present between the base of the Bullmoose Member and the top of the Gaylard Member.

4.2.1 Chamberlain Member (map-unit 3d)

The Chamberlain Member of the Gething Formation is inferred to be exposed only in a small area within Tenure 417476, between the North Nuisance Thrust and the Bullmoose Thrust, although it is possibly also present at depth, in the sub-thrust rocks lying beneath the Bullmoose Thrust. The Chamberlain Member comprises interbedded sandstone and siltstone, with minor conglomerate, grading northward and northeastward to sandy siltstone (Gibson, 1992a). Regionally, the Chamberlain Member is well-known to contain several coal beds within the Sukunka-Quintette coalfield (Wallis and Jordan, 1974), but it has not yet been tested by coal-exploration boreholes within the Burnt River coal property. Owing to its limited near-surface extent (due to being cut off by the North Nuisance Thrust), the Chamberlain Member is unlikely to afford a worthwhile exploration target at Burnt River.

The Chamberlain Member is inferred to be approximately 60 metres thick within the subthrust area, with an abrupt to interfingering basal contact above the underlying Bullmoose Member.

4.2.2 Bullmoose Member (map-unit 3c)

Within the Burnt River coal property, the Bullmoose Member of the Gething Formation is inferred to only be present at great depth, beneath and to the northeast of the Bullmoose Thrust. Regionally, the Bullmoose Member comprises thinly-interbedded marine shale and siltstone, with an overall turbiditic aspect, accompanied by minor sandstone and tuff; similar lithologies would be expected to exist within the subthrust rocks at Burnt River. Where a complete section of the Bullmoose Member has been drilled (within the Rocky Creek coal property, south of Burnt River), its thickness is 83 metres, and its basal contact with the

underlying Bluesky Member is gradational to abrupt. A similar contact relationship is expected at Burnt River, although the Bullmoose Member is inferred to be slightly thicker, at 105 metres.

4.2.3 Bluesky Member (map-unit 3b)

As with the Bullmoose Member, the Bluesky Member of the Gething Formation is inferred to only be present at depth, within a limited part of Tenure 417476, beneath and to the northeast of the Bullmoose Thrust. The Bluesky Member comprises pebbly sandstone, pebbly mudstone and cherty pebble-conglomerate, often containing sparse to abundant glauconite, correlated on the basis of its stratigraphic position and distinctive glauconitic content with the Bluesky Formation of the Dawson Creek area (Kilby, 1984; Legun, 1990; Gibson, 1992a). Regionally, the Bluesky ranges in thickness from 2 to 21 metres, with at least part of its thickness variation being occasioned by its erosion basal contact with the underlying Gaylard Member of the Gething Formation. Similar thickness and contact relationships are likely for the Bluesky Member at Burnt River.

4.2.4 Gaylard Member (map-unit 3a)

The Gaylard Member of the Gething Formation is inferred to be represented at Burnt River by approximately 330 metres of siltstone, sandstone, mudstone and minor ironstone, tuff, gritstone and conglomerate, likely associated with several coal beds, although few details of its coal content are yet known at property-scale owing to lack of drilling.

Within and adjacent to the active mining area at Brule Mine (north of the Burnt River property), the Gaylard coal-measures have been subdivided into five informal ‘divisions’, based mainly upon gross lithology and the presence of major coal beds, but such a subdivision is not yet generally practicable within the Burnt River area, except adjacent to closely-drilled parts of the Brule lease.

Siltstone is by far the most predominant rock-type within the Gaylard Member, characterised by variable levels of bioturbation from patchy to intense, occasionally associated with bands of nodular or massive (rarely mosaic-textured) ironstone, and ranging in texture from muddy to very sandy.

Sandstones within the Gaylard Member range in texture from fine- to coarse-grained, rarely very coarse-grained to gritty or pebbly, and they are frequently cross-bedded.

Mudstones within the Gaylard Member are generally silty, at times very much so, and variably-carbonaceous. Nodular ironstone is occasionally present within mudstone units, but the nodules appear to be randomly-disposed rather than concentrated into specific horizons. Glauconite is rarely, but notably, present within the finer mudstones, suggesting that such mudstones may host higher-order maximum flooding surfaces.

Tuff bands (colloquially termed as ‘ash bands’) are occasionally present within the well-exposed sections of the Gaylard Member at Brule Mine, and are also assumed to be present at Burnt River. These bands of pyroclastic volcanic rock appear as distinctively white to very light grey, clay-rich, soft layers, ranging from a few millimetres to a decimetre thick, within their otherwise-unremarkable bounding strata.

Coals and associated coaly mudstones comprise 5% to 10% of the Gaylard section at

Brule Mine, and are anticipated to be equally-prevalent at Burnt River. Where observed in active working-faces at Brule Mine, the Gaylard Member coals range in texture from blocky and well-cleated to intensely-sheared and pulverised, locally forming finely-imbricate masses of 'cornflakes'.

The basal contact of the Gaylard Member with the underlying Cadomin Formation is abrupt to possibly-erosional at the local scale (Cant, 1996), and interfingering at regional scale (Stott, 1968; Gibson, 1992a), being drawn at the top of a coarse-grained, locally-pebbly, often-gritty bed of sandstone.

4.3 Older rocks

Along anticlinal crests, and also within the overthrust strata above and to the southwest of the Mt. Chamberlain Fault, rocks older than the Gething Formation are locally exposed within the Burnt River coal property. These rocks remain virtually-unexplored at the local scale, other than by the few natural-gas wells which have penetrated these formations at Burnt River. Most of what is known of these formations' coal content comes from drilling within the Rocky Creek coal property, south of Burnt River (Chowdry, 1980; Bowler, 1981).

In order from top down, these older formations comprise the Cadomin Formation (the basal unit within the Bullhead Group), and the Bickford, Monach, Beattie Peaks and Monteith Formations (within the Minnes Group), ranging in age from Late Jurassic to Early Cretaceous.

At regional and property scale, all four of constituent formations within the Minnes Group are mapped together as a single unit (map-unit 1); within the present detailed discussion and within **Table 4-1**, however, these formations are treated individually (as map-units 1d, 1c, 1b and 1a).

4.3.1 Cadomin Formation (map-unit 2)

The Cadomin Formation immediately underlies the Gething Formation, forming the basal part of the Bullhead Group (Stott, 1968). As such, the Cadomin Formation includes strata previously assigned to the Dresser Formation of the Crassier Group by Hughes (1964).

The Cadomin Formation comprises one or more thick beds of coarse-grained, gritty to pebbly sandstone and pebble-conglomerate (McLean, 1981) with occasional lenses of siltstone and pebbly gritstone, and rare thin lenses of dirty coal. The Cadomin Formation thus resembles the basal sandstone unit (Division 1) of the Gaylard Member, and its distinction from the overlying Gaylard sandstones rests mainly upon the Cadomin Formation's greater lateral continuity.

At Burnt River, the Cadomin Formation is estimated to be 25 to 35 metres thick. Its basal contact with the underlying Bickford Formation is erosional, with considerable local scour into the older sediments. Regionally, the base of the Cadomin marks a northeastward-deepening angular unconformity, cutting down into successively-older rocks of the Minnes Group (Stott, 1973).

4.3.2 Bickford Formation (map-unit 1d)

The Bickford Formation is the stratigraphically-highest and therefore youngest of the four formations which comprise the Minnes Group (Stott, 1981; 1998). The formation was previously designated by Hughes (1964) as the Brenot Formation, being the basal part of his now-superseded Crassier Group. The name 'Brenot' remained in local use by coal-industry workers until the earliest 1980s (Hughes, 1980; Stott, 1981).

The Bickford Formation consists of non-marine sandstone, siltstone, mudstone and coal, with a total thickness of 285 to 300 metres (Chowdry, 1980). Within the Burnt River property, channel-filling conglomerates, up to 11 metres thick, occur near the top of the formation (Stott, 1998).The uppermost few metres of the formation, immediately beneath the base of the Cadomin Formation, is typically bleached and altered to a distinctively-soft, very light grey to white layer of clay-rich sediment.

Coals of potentially-mineable thickness were reported from the Bickford Formation within the Rocky Creek coal property (south of Burnt River), on the basis of extensive drilling during the early 1980s, but the formation has yet to be drilled at Burnt River, and its local coal potential is therefore unknown.

The basal contact of the Bickford Formation with the underlying Monach Formation is generally abrupt at local scale, but interfingering on a regional scale, being drawn at the top of the distinctive quartzitic sandstone beds of the Monach.

4.3.3 Monach Formation (map-unit 1c)

The Monach Formation comprises cliff-forming sandstone and quartzite, with lesser amounts of interbedded siltstone and conglomerate, and occasional thin coals, part of the Minnes Group (Chowdry, 1980; Stott, 1998); Hughes (1964) previously considered the Monach Formation to be the uppermost unit within his Beaudette Group, along with the underlying Beattie Peaks and Monteith formations. The coal content of the Monach Formation appears to be minimal, on a regional basis, and the formation's principal economic significance is as a marker bed in drilling and geological mapping.

The thickness of the Monach Formation at Rocky Creek is approximately 50 metres (Bowler, 1981); a similar thickness appears plausible for the Burnt River area. The basal contact of the Monach Formation with the underlying Beattie Peaks Formation is gradational at local scale, and likely to be interfingering on a regional scale (Stott, 1998).

4.3.4 Beattie Peaks Formation (map-unit 1b)

The Beattie Peaks Formation comprises sandstone, siltstone and shale, locally accompanied by minor ironstone and coal, originating as a regionally-extensive shallow-marine to deep-marine turbidite system (Stott, 1998). Chowdry (1980) recognised the existence of thin coals and one thick coal (up to 2.5 metres) within the Beattie Peaks Formation at Rocky Creek, but these coals have not yet been traced into the Burnt River area, where the formation remains unexplored.

The thickness of the Beattie Peaks Formation at Rocky Creek is approximately 300 metres, comprised mainly of sandstone, siltstone and shale, with minor ironstone and coal. A similar thickness of strata is inferred to be present within the Burnt River

properties. The basal contact of the Beattie Peaks Formation upon the underlying Monteith Formation is abrupt (Hughes, 1964), and possibly interfingering on a regional scale.

4.3.5 Monteith Formation (map-unit 1a)

The Monteith Formation forms the basal unit of the Minnes Group (Stott, 1968) and as such it also formerly constituted the basal formation within Hughes' (1964) Beaudette Group. As with the other formations the Monteith Formation remains unexplored at Burnt River Mine. Within the Rocky Creek coal property, however, Chowdry (1980) recognised interbedded sandstone, shale and conglomerate, with lesser amounts of quartzite and occasional thin coals.

The thickness of the Monteith Formation at Rocky Creek was estimated to be very approximately 600 metres (Chowdry, *ibid.*); a similar thickness appears reasonable for Burnt River.

5 Reclamation

As no disturbant exploration work is currently known to have been done within the Burnt River coal property by Walter Energy, Walter Canadian Coal Partnership, or any other associated firm, no associated reclamation obligation is known to have been required within the property. The one historic borehole, Teck's BR-8, has not yet been relocated and examined for its site's and access trail's state of reclamation.

6 Statement of costs

Prior to year-2013, exploratory costs ascribable to the Burnt River coal property are unknown, although they are expected to have been very low, owing to the lack of drilling or other disturbant exploratory work during the period subsequent to Teck's sale of the property to Western Canadian Coal.

During year-2013, no detailed accounting was made of the division of geological labour involved in the regional photogeological compilation study, but a reasonable estimate of work time on the senior geologist's part (Gwyneth Cathyl-Huhn) is five days at nine hours/day. Given direct labour cost of $55.58/hour, the 45 working hours would amount to $2501.10, which may be rounded to $2500 in keeping with the estimated nature of this cost. **Table 6-1** presents standardised cost breakdown by activity. The photogeological compilation is here allocated as 'report preparation.'

Table 6-1: Cost breakdown by activity

Item	Quantity [Q]	Unit cost [C]	Cost of work [Q x C]
Field personnel	0 person-days	not applicable	$nil
Consultants	0 person-days	not applicable	$nil
Food/accommodation	0 person-days	not applicable	$nil
Mobe/demob within BC	nil	$nil	$nil
Aircraft support	nil	$nil	$nil
Vehicle rentals	nil	$nil	$nil
Equipment/supplies	nil	$nil	$nil
Instrument rentals	nil	$nil	$nil
Laboratory analysis	nil	$nil	$nil
Contract jobs//unit costs	nil	$nil	$nil
Report preparation	45 hours	$55.58/hour	$2500 (rounded)
Management	0 person-days	not applicable	$nil
		TOTAL (rounded)	$2500

Table 6-2 presents the apportioned costs of the year-2013 work, ascribable to each coal licence on the basis of equal cost per hectare. Hectare cost basis for this work was derived by dividing the $2500 estimated total cost by the 2354 hectares' area of the property, yielding a cost per hectare of $1.062 per hectare.

Table 6-2: Apportioned costs of year-2013 work

Tenure	Area (hectares) [A]	Unit cost/hectare [C]	Cost of work [A x C]
392554	294	$1.062	$312.23
392555	294	$1.062	$312.23
415719	295	$1.062	$313.29
417474	294	$1.062	$312.23
417475	295	$1.062	$313.29
417476	882	$1.062	$936.68
		Sum of costs: $2499.95 (rounded, $2500.00)	

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8 Conclusions

The Burnt River coal property contains coal-measures of latest Jurassic to Early Cretaceous age, within the Minnes, Bullhead and Fort St. John groups of sedimentary rocks. These rocks are deformed by numerous northeast-verging, southwest-dipping imbricate thrust faults and associated tight concentric folds, consistent with the overall thin-skinned structural style of the Rocky Mountain Foothills of northeastern British Columbia. The structural geology of the Burnt River property is of a similar level of complexity as is seen at the nearby Brule coal mine.

The most recent historic exploration work at Burnt River had been done by Teck Corporation, as has previously been reported in Coal Assessment Reports Nos. 486, 487, 488, 489 and 490. No subsequent disturbant exploration work is known to have been done within the property, during its period of ownership by Walter Energy, Walter Canadian Coal Partnership, associated firms, or preceding firms.

Year-2013 work on the Burnt River coal property comprises photogeological compilation studies, conducted by Walter Canadian Coal Partnership as part of a broader examination of coal properties within the Brazion and Sukunka-Quintette coalfields of northeastern British Columbia, Canada. This work has met its immediate objectives of providing a better understanding of the property's structural and stratigraphic geology.

No new discoveries of coal outcrops have been made within the property, as a consequence of the current study, but the near-surface extent and structural configuration of the regionally-significant coal-measures of the Gething Formation (within the Bullhead Group) has been better-defined by this work.

Neither coal resources nor coal reserves are attributable to the Burnt River coal property at its present state of exploration. The Burnt River property merits further work, as recommended within **Section 9** of this report.

9 Recommendations

1. The Burnt River coal property should continue to be held in good standing, as an exploration property.

2. Coal-quality trends at Burnt River coal property are not at all well-known. In particular, the potential for coking coal is still unknown; therefore:

Hand-trenching of coal outcrops, followed by petrographic analysis and oxidation tests, is therefore recommended. Outcrops should be dug out sufficiently-deeply to reach fresh material, and due allowance should be made for oxidation.

Proximate analysis is only likely to be useful in the case of coals whose oxidation test results are acceptable.

As a starting point for this work, the coal outcrops discovered by Teck (as shown on **Map 2-3**) are worthy of examination.

Coal-quality studies should include the coals of the Minnes Group, if possible.

2. Contingent upon favourable results from the coal-quality studies, ground-based structural mapping should be undertaken, with the goal of identifying those areas where lower stripping ratios might be expected on the basis of favourable bedrock structure.

Potential for overthrusting and repetition of coal beds, or fold-associated ‘pod zones’ of coal, should be considered in this phase of work.

Acquisition and reprocessing of commercially-available existing oilfield seismic-reflection data may be a cost-effective means of clarifying the structural geology of these areas.

3. If results of work items 1) and 2) are favourable, drill targets may then be identified and tested, with the aim of establishing whether commercially-significant quantities of saleable coal are present within practicable mining geometries.

10 Statements of qualifications

I, Laura Rose Avery B.Sc. B.Ed., do hereby certify that:

a) I am currently employed on a full-time basis by Walter Canadian Coal Partnership, a subsidiary of Walter Energy, in their Northeast British Columbia office in Chetwynd, British Columbia.

b) This certificate applies to the current report, titled *Coal Assessment Report for the Burnt River coal property, British Columbia, Canada*, dated July 17, 2014.

c) I am in the processes of applying for my Professional Engineers and Geoscientists of British Columbia status.

d) I received my Bachelor of Science from Saint Mary's University in Halifax in 2006.

e) I have worked in the coal industry for 2 years and 10 months.

f) I have been pit geologist for the Brazion group since March 2012.

g) I have been co-chair of the Joint Occupational Health, Safety and Environment Committee for both Brule and Willow for 2 years.

I, C.G. Cathyl-Huhn P.Geo.(BC) Lic.Geol.(WA) RMSME, do hereby certify that:

a) I am currently employed on a full-time basis by Walter Canadian Coal Partnership, a subsidiary of Walter Energy, in their Northeast British Columbia office in Tumbler Ridge, British Columbia.

b) This certificate applies to the current report, titled *Coal Assessment Report for the Burnt River coal property, British Columbia, Canada*, dated July 17, 2014.

c) I am a member (Professional Geoscientist, Licence No.20550) of the Association of Professional Engineers and Geoscientists of British Columbia, licenced as a geologist (Licence No.2089) in Washington State, and a founding Registered Member of the Society for Mining, Metallurgy and Exploration (SME, Member No.518350). I have worked as a colliery geologist in several countries for over 36 years since my graduation from university.

d) I certify that by reason of my education, affiliation with professional associations, and past relevant work experience, having written numerous published and private geological reports and technical papers concerning coalfield geology, coal-mining geology and coal-resource estimation, that I am qualified as a Qualified Person as defined by Canadian *National Instrument 43-101* and a Competent Person as defined by the Australian *JORC Code*.

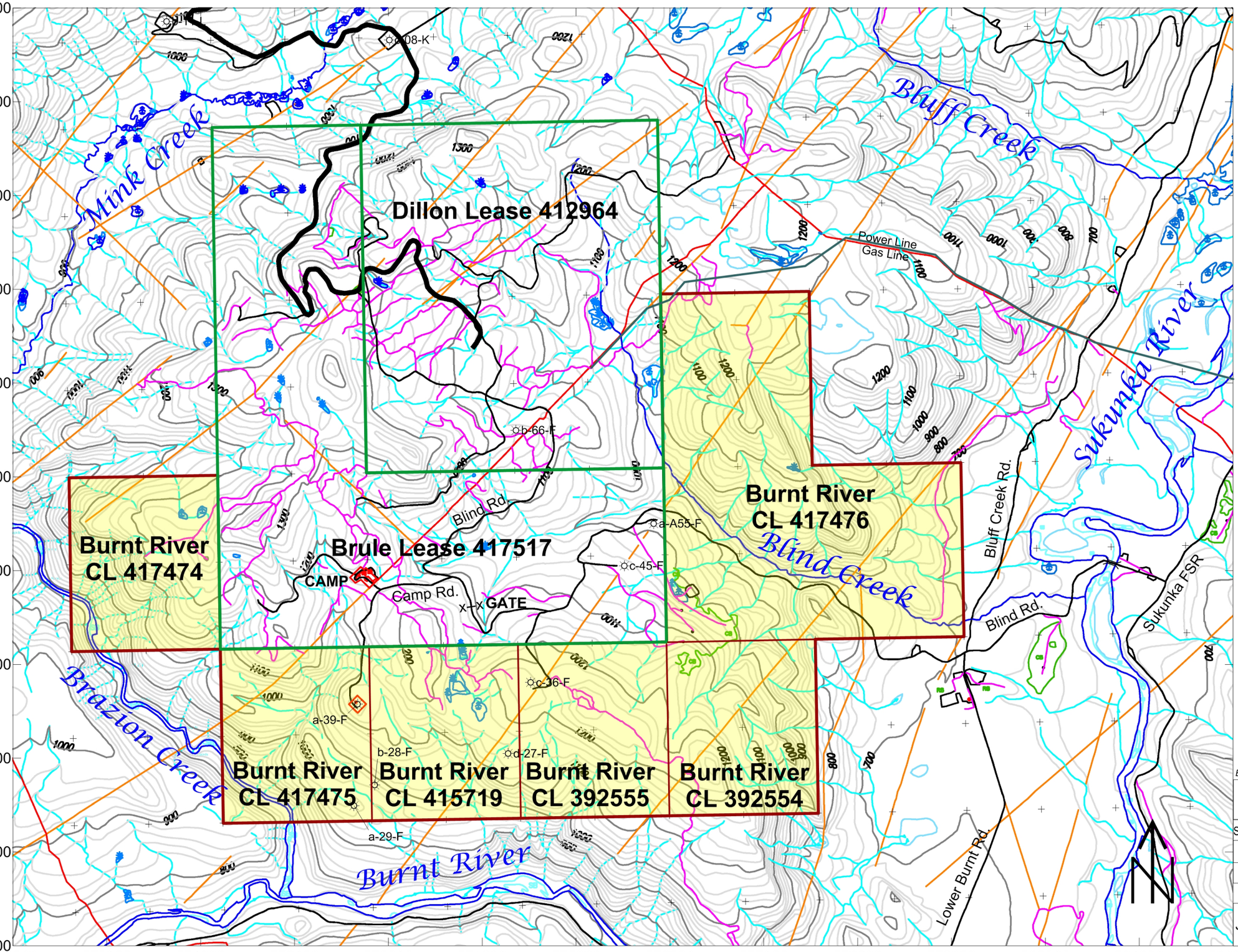
e) My most recent visit to the Burnt River coal property was in the spring of 2014.

f) I am principal author of this report, titled *Coal Assessment Report for the Burnt River coal property, British Columbia, Canada*, dated July 17, 2014, concerning the Brule coal property.

g) As of the date of the writing of this report, I am not independent of Walter Canadian Coal Partnership and Walter Energy, pursuant to the tests in Section 1.4 of *National Instrument 43-101*.

"original signed and sealed by"

Dated this 17th day of July, 2014. C.G. Cathyl-Huhn P.Geo. Lic.Geol. RMSME



Access (not classified as to trafficability):

- Road (coal haulage)
- Road (other)
- Trail
- Seismic line

Land classification:

- Coal licence (with historic and current tenure number)
- Coal lease (with current tenure number)

Drainage:

- River or creek
- Stream (perennial or intermittent flow)

- Natural gas wells (not classified as to activity)
- Pipeline (where not along road)
- Power line (69 KV)

metres

0 1000 2000 3000

Burnt_River-area-topography-drainage-roads_140710b.srf/jpg

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Scale: as shown	COAL TENURE AND TOPOGRAPHY	
UTM NAD 83		
Revision: A		
Drawn: GCH		
JULY 2014	BURNT RIVER COAL ASSESSMENT REPORT	MAP 2-2

UTM NAD83

BURNT RIVER

NTS 93 P/05
CANADA

STRUCTURE AND MAPPING

- Anticline
- Syncline
- Strike-slip or tear fault
- Thrust fault -- barbs on overthrust plate
- Limit of detailed stratigraphic mapping
- Outline of Walter's coal licences and leases
- Borehole
- Coal outcrop (as reported by McClymont, 1981)

STRATIGRAPHY

FORT ST JOHN GROUP (Albian)
Boulder Creek Formation -- sandstone, shale, conglomerate and coal

- 7 — Walton Creek Member -- siltstone, sandstone, conglomerate and coal
- 7b — Cadotte Member -- conglomerate and sandstone
- 7a — Hulcross Formation -- marine shale and siltstone, minor bentonite; basal grit
- 6 — Gates Formation -- sandstone, shale, conglomerate; minor coal
- 5 — Moosebar Formation -- marine siltstone and shale; bentonite; basal pebbly glauconitic sandstone (not Bluesky Member)
- 4

BULLHEAD GROUP (Barremian to Aptian)
Gething Formation -- siltstone, sandstone and conglomerate; minor bentonite and coal

- 3 — Chamberlain Member -- sandstone and siltstone; minor coal
- 3d — Bullmoose Member -- marine shale and siltstone; minor sandstone and bentonite
- 3c — Bluesky Member -- pebbly glauconitic sandstone (not mapped separately at this scale)
- 3b — Gaylard Member -- siltstone, sandstone and coal; lenses of conglomerate and pebbly sandstone; minor bentonite
- 3a — Division 5 -- sandstone and siltstone; minor coal
- 3a5 — Division 4 -- siltstone and sandstone; coal
- 3a4 — Division 3 -- siltstone and shale; coal
- 3a3 — Division 2 -- siltstone and sandstone; minor conglomerate and coal
- 3a2 — Division 1 -- sandstone, conglomerate and siltstone; minor coal
- 3a12 — Cadomin Formation -- cliff-forming conglomerate and sandstone; minor siltstone and coal
- 2 — MINNES GROUP (Tithonian to Valanginian)
Bickford, Monach, Beattie Peaks and Monteith Formations -- sandstone, siltstone, shale, conglomerate, quartzite, ironstone and coal (not mapped separately at this scale)
- 1

UTM Grid North (NAD 83)

WALTER ENERGY

map scale in metres

0 1000 2000 3000 4000

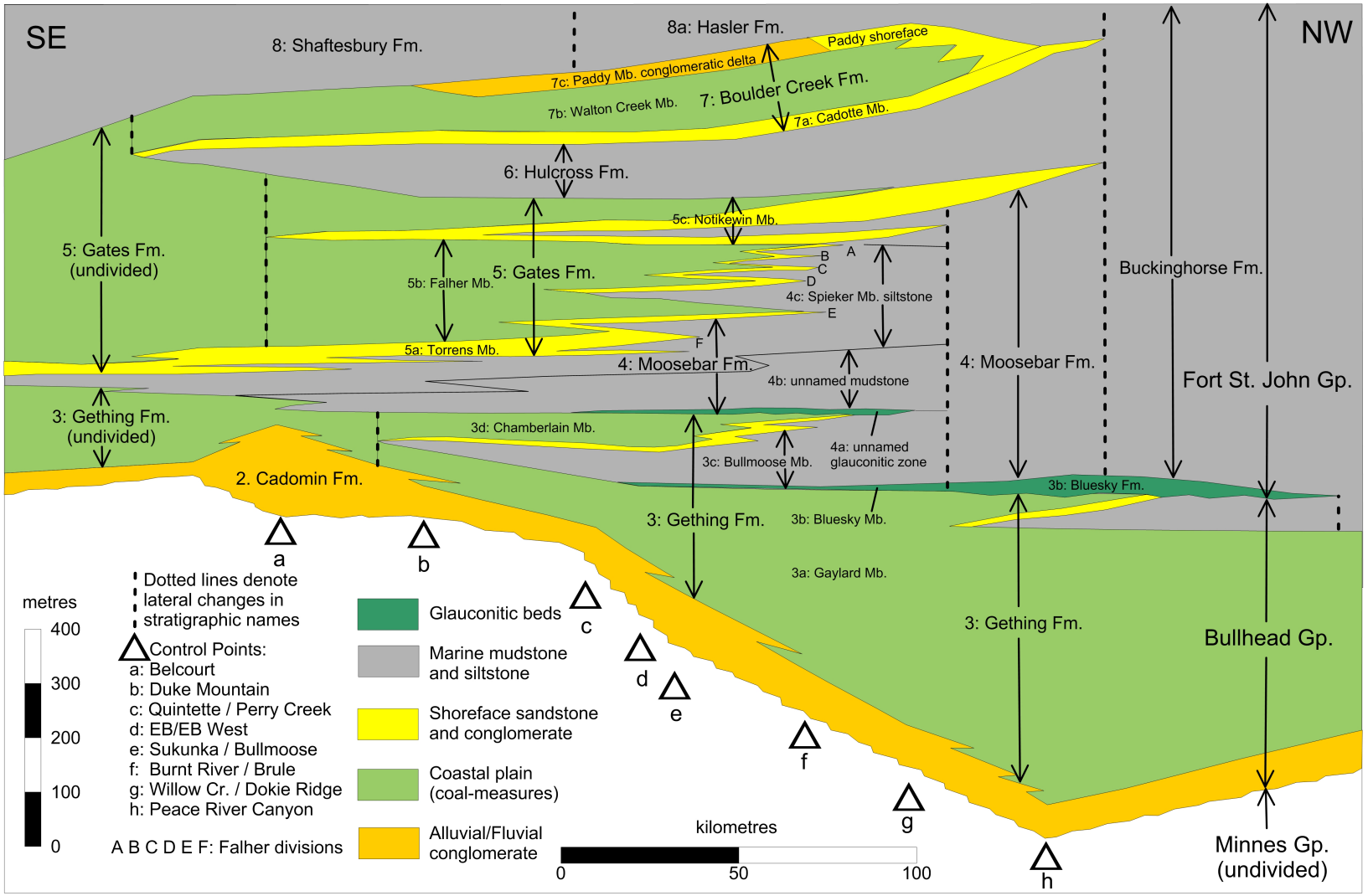
Author: C.G. Cathyl-Huhn P.Geo. Lic.Geol. RMSME Date: 2014 July 10
Grid system: UTM NAD83 Zone 10N in metres 100 km grid square: ES
Scale: as shown on bar-scale Topography: TRIM-derived rasters
Sources: compiled from work by B.McClymont (Teck Corporation, 1979, 1981), J.Hughes (Gulf Canada, 1980), and D.J.Hunter and J.M.Cunningham (BCGSB, 1991) and A.Legun (BCGCB, 2003)

REV	DATE	DESCRIPTION
F	Jul 10/14	Chamberlain Member window

Drawn by: GCH
Scale: as shown
Dwg. No.: Burnt_River-licence-geology-140710f.srf/jpg

GEOLOGY OF BURNT RIVER COAL LICENCES

JULY 2014 | BURNT RIVER COAL ASSESSMENT REPORT | MAP 2-3



Drawing: NEBC-regional-stratigraphy_140710e.srf/jpg
Date: 5.July 2014 Scale: diagrammatic, as shown
Drawn by: C.G.Cathyl-Huhn P.Geo. Lic.Geol. RMSME, modified from work by W.Kalkreuth and D.A. Leckie (1989)

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Figure 3-1: Regional Stratigraphy of the Lower Cretaceous Bullhead Group and basal part of the Fort St. John Group