COAL ASSESSMENT REPORT TITLE PAGE AND SUMMARY

TITLE OF REPORT:
Coal Assessment Report for the West Brazion coal property, British Columbia

TOTAL COST: $191,801.06

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

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S):
PRG2001-0900227-0002, September 11, 2002

YEAR OF WORK: **2000, 2001, and 2014**

PROPERTY NAME: **West Brazion**

COAL LICENSE(S) AND/OR LEASES ON WHICH PHYSICAL WORK WAS DONE:
379582,379584, 379585 and 405144

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN: **093P 006**

MINING DIVISION: **Liard**
NTS / BCGS: **NTS 93P/5; BCGS/TRIM 093P.031**
LATITUDE: **55° 21' 25.27" N**
LONGITUDE: **121° 58' 29.04" W** (at centre of work)
UTM Zone: **10N** EASTING: **565000** NORTHING: **6135000**

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 1P1**

REPORT KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralisation, size and attitude. **Do not use abbreviations or codes**)
Bituminous coal, Early Cretaceous, Minnes Group, Bickford Formation, Bullhead Group, Cadomin Formation, Gething Formation, Gaylard Member, synclines, anticlines, thrust faults

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS:
Coal Assessment Reports 491, 531, 534, 687; Petroleum Resources Branch Assessment Reports 863, 1276

SUMMARY OF TYPES OF WORK IN THIS REPORT		EXTENT OF WORK (in metric units)	ON WHICH TENURES
GEOLOGICAL (scale, area)			
	Ground, mapping **– at 1:10,000 scale**	**2,388 (hectares)**	
	Photo interpretation **– at 1:10,000 scale**	**2,388 (hectares)**	
GEOPHYSICAL (line-kilometres)			
	Ground (Specify types)	**none**	
	Airborne (Specify types)	**none**	
	Borehole		
	Gamma, Resistivity,	**676.51 m**	**379582, 379584, 379585, 405144**
	Resistivity	**588.31 m**	**379582, 379584, 379585, 405144**
	Caliper	**588.31 m**	**379582, 379584, 379585, 405144**
	Deviation	**581.5**	**379582, 379584, 379585, 405144**
	Dipmeter	**none**	
	Others (specify) **neutron** **density**	**588.39** **588.31**	**379582, 379584, 379585, 405144** **379582, 379584, 379585, 405144**
	Core	**92.05 m**	**379584**
	Non-core	**582.55 m**	**379582, 379584, 379585, 405144**
SAMPLING AND ANALYSES			
Total # of Samples		**7 samples**	
	Proximate	**7 samples**	**379584**
	Ultimate	**none**	
	Petrographic	**none**	
	Vitrinite reflectance	**none**	
	Coking	**none**	
	Wash tests	**none**	
PROSPECTING (scale/area)		**none**	
PREPARATORY/PHYSICAL		**none**	
Line/grid (km)		**none**	
Trench (number, metres)		**none**	
Bulk sample(s)			

Page 18 (Table 4-3), a portion of Page 15 of this report, and analytical laboratory certificates remain confidential under the terms of the Coal Act Regulation, and have been removed from the public version.

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

1 Table of contents

Serial and section title (continued)

1.1 List of Tables

1.2 List of Maps

2 Objectives, situation, and details of work

This report concerns eight provincial mineral tenures (Coal Licenses 379579, 379580, 379581, 379582, 379584, 379585, 405144, and 405143) which comprise the West Brazion coal property. The objective of this report is to present results of a year-2001 exploration programme conducted by Walter Energy Inc.'s predecessor firm, Western Canadian Coal Corporation, and furthermore to provide an updated geological map of the property, based upon year-2014 ground-based geological mapping and satellite-imagery interpretation by L.R. Avery.

Current exploration, for purposes of this report, comprises work done between 2001 and 2014, by Western Canadian Corporation and Walter Energy Inc.'s subsidiary, Walter Canadian Coal Partnership. Historical exploration comprises work done prior to 2001, by Brameda Resources Limited on behalf of Teck Corporation (McClymont, 1979).

2.1 Location, tenure, access, and infrastructure

The West Brazion coal property is situated on the western side of Burnt River, southwest of the town of Chetwynd, in the Peace River district of northeastern British Columbia (as shown in **Map 2-1**). The property lies within the Brazion coalfield (an informal toponym, used for convenience), situated between the valleys of Pine and Sukunka rivers. The Brazion Coalfield is hosted by coal-measures of Late Jurassic to Early Cretaceous age, similar to most of the other coalfields of northeastern British Columbia.

The eight tenures which comprise the West Brazion property (as shown on **Map 2-2**) are contiguous, with a total area of 2,388 hectares.

West Brazion is accessible via all-weather roads. Driving directions from Chetwynd are:

- 29 kilometres south on paved Highway BC-29, then
- 16.5 kilometres south on the radio-controlled, Sukunka Forest Service Road, then
- 2.5 kilometres west, changing radio channels and crossing Sukunka River, on the Blind Road, then
- 23 kilometres southwest on the Lower Burnt Road, then turning onto East Brazion Road.

Coal Licence 405143 is reached at kilometre 3 on the East Brazion Road, and Coal Licence 379585 is reached at kilometre 15. The remaining tenures (Coal Licences 379597, 379580, 379581, 379582, 379584 and 405144) are only accessible by foot, or by helicopter to constructed landing-pads.

The West Brazion property lies within the Dawson Creek Timber Supply Area and within a Tree Farm License held by Canfor Corporation (Canfor). Removing trees for the purpose of mining is governed by the terms of a Free Use Permit. Surface access for means of exploration and drilling is subject to the terms of the *Mines Act* and the *Coal Act Regulations*.

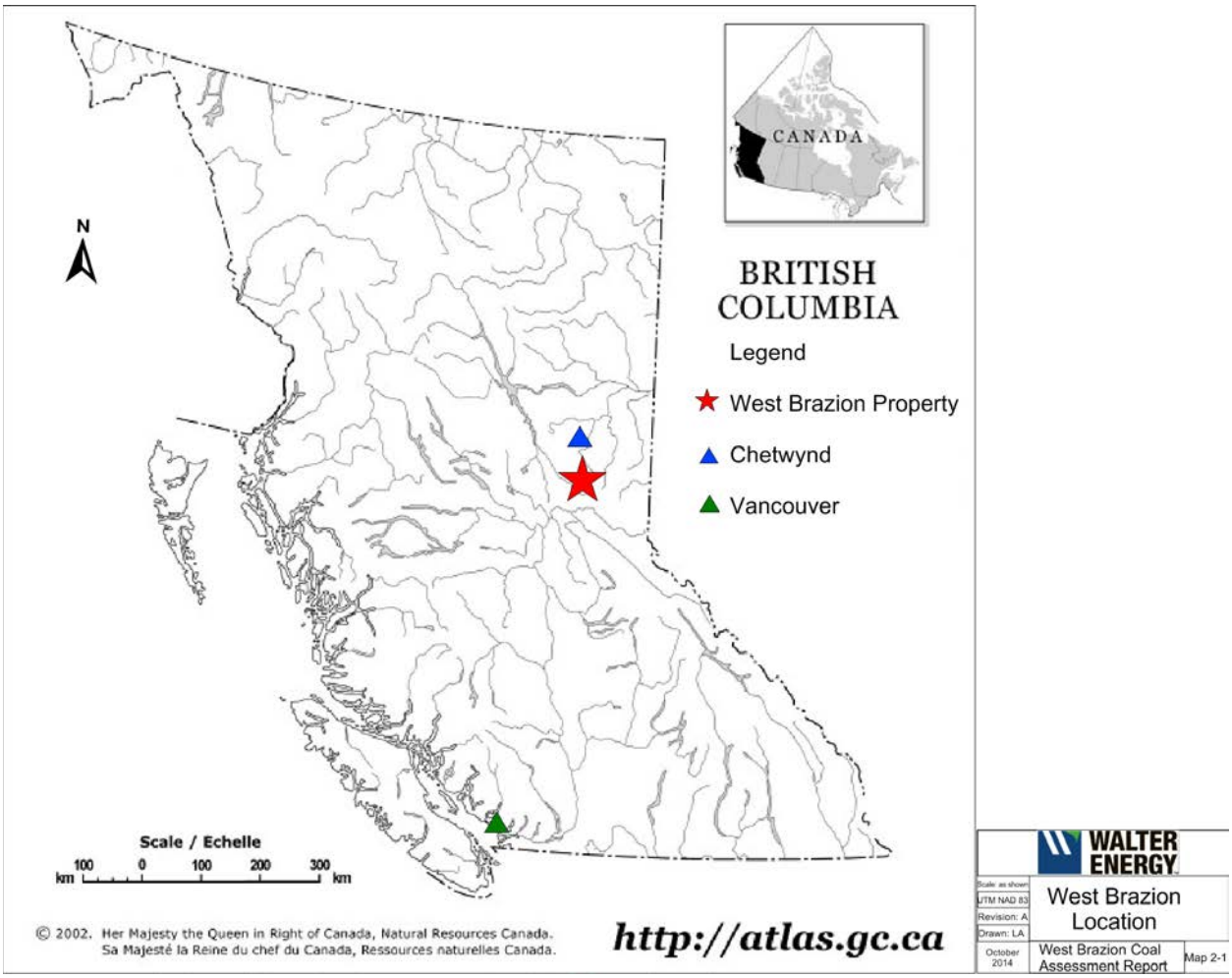
Roads leading to the West Brazion property are industrial roads, used and maintained mainly by logging companies such as Canfor, and oil and gas companies such as Sukunka Natural Resources. Portions of the West Brazion property, and areas lying immediately to the

west, have recently been logged, allowing for greater visibility of bedrock exposures as well as improved access via industrial roads and trails. Navigation is easier in the logged areas, owing to increased visibility at ground level.

The closest airport is at Chetwynd, where fixed-wing aircraft and helicopters can land. Helicopters can be hired out from Chetwynd, and landing may be safely done at a few locations along the Lower Burnt River and Brazion Creek, as well as on the roads that cross the southeastern edge of the property.

The closest railway service and coal-preparation plant are located at Walter Energy's Willow Creek Mine, situated an hour and half away via Highways 29 and 97, or alternatively accessible via an industrial road, the Falling Creek Connector Road, which links Walter Energy's Brule and Willow Creek mines.

Telecommunications are limited to satellite phones as there are no ground-based telephone lines; cellular telephone coverage is non-existent due to tree coverage, blocked line-of-sight, and distance to cellular service towers. The Internet is also not available due to location and vegetation coverage, other than via satellite links.



Base maps for the West Brazion area may be obtained from the British Columbia

government's Base Map Online Store. Map-sheets 93P/5 and 93O/8 of the federal government's National Topographic System covers the West Brazion property and nearby areas, at a scale of 1:50,000. An online web-service, *Google Earth* can also be used to gain an understanding of the property's physiography, although the service's coverage of the West Brazion area was last updated in 2005. More recent cutblocks, roads and wellsites are therefore not shown on *Google Earth*.

2.2 Physiography, climate, and vegetation

Terrain at West Brazion is generally mountainous, with steep, deeply-gullied hillsides capped by rounded, rolling, densely-forested uplands. Ground-surface elevations range from 1380 metres in the upland area within the northern portion of Coal Licence 379584, to 750 metres near the western bank of Burnt River, in Coal Licence 405143.

The West Brazion 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.

A patchwork of overmature, mature and juvenile 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 West Brazion coal property consists of eight coal licenses (**Maps 2-2** and **2-3**), originally held by Teck Corporation (Teck), and sold by that firm to Western Canadian Coal Corporation (a predecessor company of Walter Energy) in 1999. **Table 2-1** presents tenure details for the West Brazion property, whose total area is 2,354 hectares, and whose annual rental cost is $35,820.

Table 2-1: Coal tenure at West Brazion

Tenure Numbers		Land description		Area in hectares (ha)	Dates		Annual rental at $10 or $15/ha
Current	Historic	Blocks	Units		Issued on	Renew by	
379579		93P/5E	49, 50, 59 ,60	300	Aug. 11, 2000	Aug. 11, 2014	$4,500
379580		93P/5E	47, 48, 57, 58	300	Aug. 11, 2000	Aug. 11, 2014	$4,500
379581		93P/5E	45, 46, 55, 56	300	Aug. 11, 2000	Aug. 11, 2014	$4,500
379582		93P/5E	29, 30, 39, 40	300	Aug. 11, 2000	Aug. 11, 2014	$4,500
379584		93P/5E	27, 28, 37, 38	300	Aug. 11, 2000	Aug. 11, 2014	$4,500
379585		93P/5E	25, 26, 35, 36	300	Aug. 11, 2000	Aug. 11, 2014	$4,500
405144		93P/5E	7, 8, 17, 18	294	Sept. 19, 2003	Sept 19, 2014	$4,410
405143		93P/5E	5, 6, 15, 16	294	Sept. 19, 2003	Sept 19, 2014	$4,410
Totals		1 block/32 units		2,388 ha			$35,820

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.

2.4 Coal resources and coal reserves

The West Brazion 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 historic work

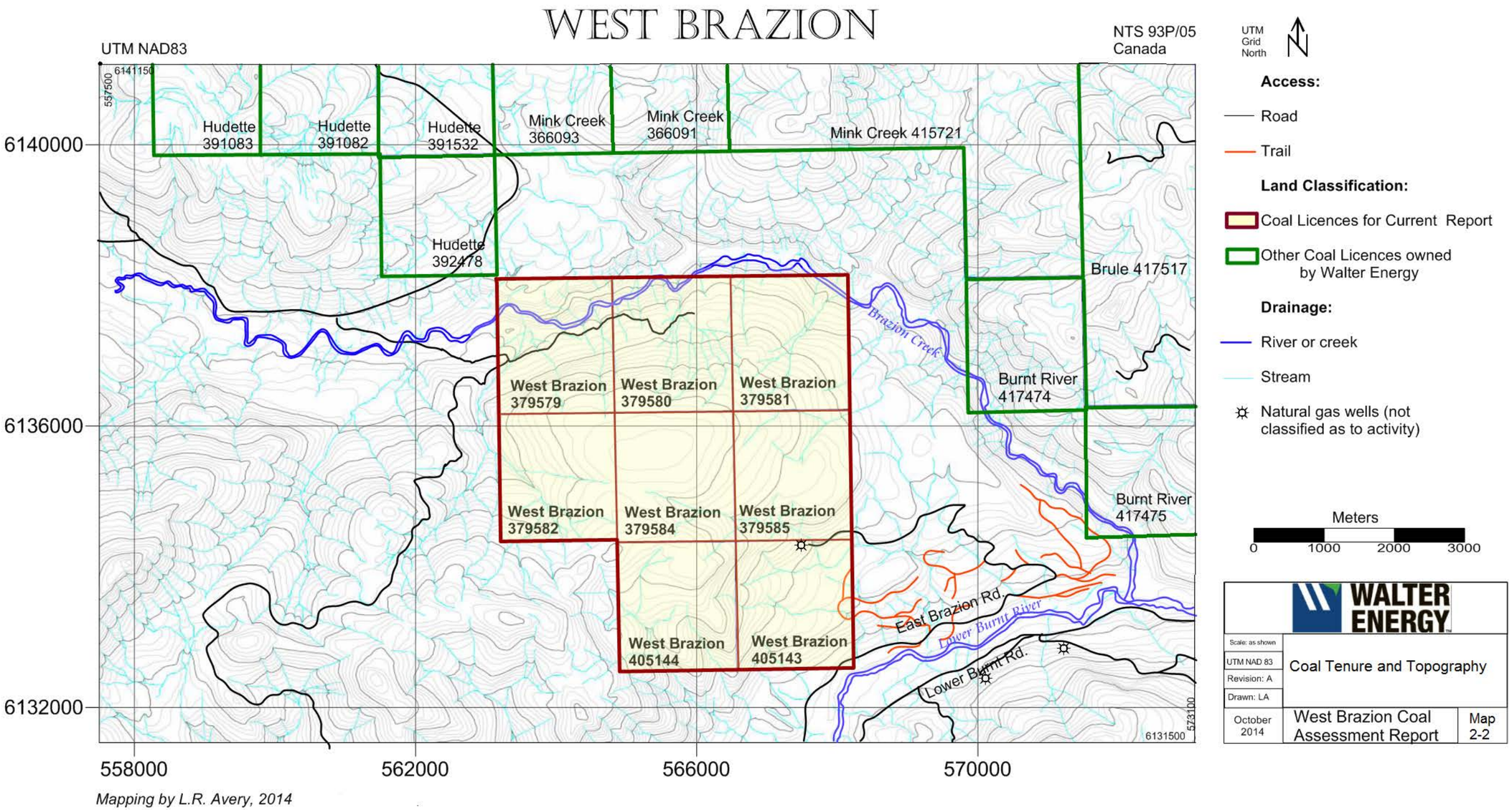
The West Brazion property is part of the larger Brazion coalfield, within the Northeast Coal Block of British Columbia. Northeastern British Columbia's coal has been explored on an off-and-on basis for many years (**Table 2-2**), although due to the lack of infrastructure and limitations on contemporary mining and exploration technologies, significant development did not take hold until the Asian steel-making boom of the 1960's, and the provincial government's lifting (late in the 1960s) of a moratorium on the staking of coal licences. In the early and middle 1970s, renewed interest in sea-borne export markets for coking coal spurred on exploration in this region (McClymont, 1979; 1981; Hughes, 1980; Childs, 1983).

Table 2.2: Cross-references to previous work

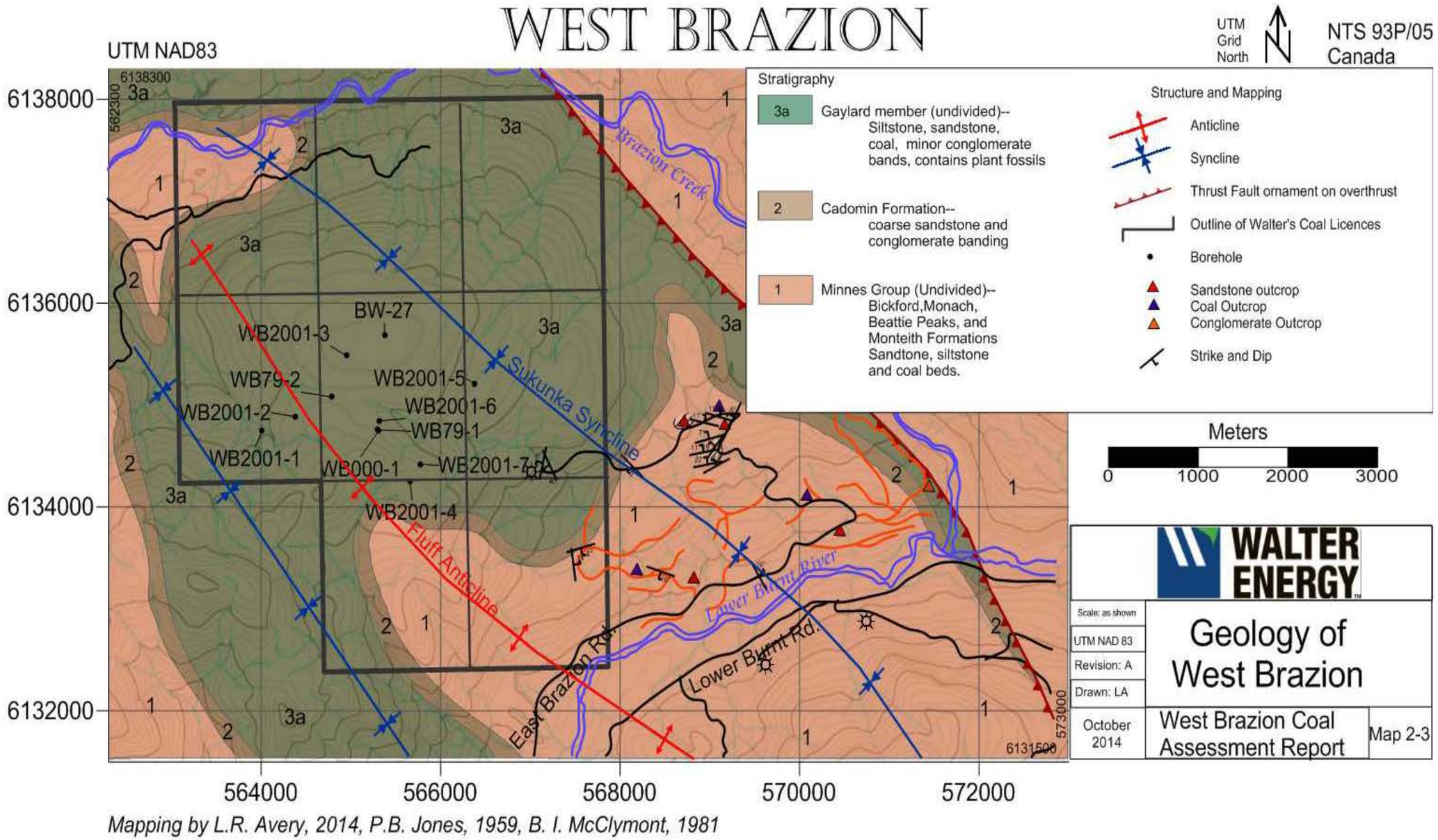
Year	*Report author(s) and venue of publication*	*Organisation*	*Nature of work done*
1960	P. B. Jones, Petroleum Resources Branch Assessment Report No. 863	Triad Oil	Geological mapping
1966:	J.N. Van Elsberg, Petroleum Resources Branch Assessment Report No.1276	Mobil Oil	Regional geological report
1968	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
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	B.I. McClymont, Coal Assessment Report No. 687	Teck Corporation	Property studies
1983	G.D. Childs, Coal Assessment Report No.534	Gulf Canada Resources Inc.	Regional geological report

2.5.1 Involvement of oil and gas industry

The oil and gas industry also took an interest in the Northeast, leading several geological and geophysical parties to examine the area. In 1959, structural geologist Dr. P. B. Jones mapped the West Brazion area, as part of a regional structural and stratigraphic study conducted on behalf of Triad Oil (Jones, 1960). Owing to a lack of access roads, most of Jones' work was along the banks of Burnt River and Brazion Creek. Triad Oil was subsequently acquired by British Petroleum, and



Mapping by L.R. Avery, 2014


WEST BRAZION
UTM NAD83
UTM Grid North
NTS 93P/05 Canada
6138000
6136000
6134000
6132000
562300
6138300
564000
566000
568000
570000
572000
573000
6131500
Brazion Creek
Sukunka Syncline
Fluff Anticline
East Brazion Rd.
Lower Burnt Rd.
Lower Burnt River
BW-27
WB2001-3
WB79-2
WB2001-5
WB2001-6
WB2001-2
WB79-1
WB2001-1
WB000-1
WB2001-7
WB2001-4
Stratigraphy
3a Gaylard member (undivided)-- Siltstone, sandstone, coal, minor conglomerate bands, contains plant fossils
2 Cadomin Formation-- coarse sandstone and conglomerate banding
1 Minnes Group (Undivided)-- Bickford,Monach, Beattie Peaks, and Monteith Formations Sandtone, siltstone and coal beds.
Structure and Mapping
Anticline
Syncline
Thrust Fault ornament on overthrust
Outline of Walter's Coal Licences
Borehole
Sandstone outcrop
Coal Outcrop
Conglomerate Outcrop
Strike and Dip
Meters
0 1000 2000 3000
WALTER ENERGY
Scale: as shown
UTM NAD 83
Revision: A
Drawn: LA
October 2014
Geology of West Brazion
West Brazion Coal Assessment Report
Map 2-3
Mapping by L.R. Avery, 2014, P.B. Jones, 1959, B. I. McClymont, 1981

provided with funding to drill several deep oil and gas wells near West Brazion. Mobil Oil also explored for potential oil and gas-bearing structures within the Brazion coalfield. Mobil's geologists (Van Elsberg, 1966) mapped outcrops and measured stratigraphic sections over large area in and around West Brazion.

During the 'energy crisis' of the late 1970s and early 1980s, several oil and gas companies, including British Petroleum and Gulf Oil, became interested in the possibilities of coal development within the Brazion and Sukunka-Quintette coalfields, targeting thermal coals and coking coals. British Petroleum's involvement was confined to areas east of Burnt River and Sukunka River, while Gulf Oil (through their subsidiary, Gulf Canada Resources) became interested in the area to the west and north, including the West Brazion property.

2.5.2 Historic geological mapping

Mapping by Jones (1960), McClymont (1979; 1981) and Childs (1983) has been useful in our current geological interpretation. Jones and Childs reported on the structural geology over a wide area, including West Brazion, whereas McClymont reported more-detailed interpretations of the West Brazion structure.

2.5.3 Historic coal-exploration drilling

Table 2-3 presents details of the three historic coal-exploration boreholes within the West Brazion property. These boreholes were drilled by Brameda Resources on behalf of Teck Corporation in 1978 and 1979, encountering coal. Nevertheless, Teck elected to drop the property in 1999. Geophysical logs and other supporting data are presented for these boreholes, as **Appendix A**.

2.6 Current work

Current work, for the purposes of this report, comprises year-2000 and year-2001 drilling, and year-2014 photogeological studies using *Google Earth* satellite imagery, followed by ground-based geological mapping.

2.6.1 Current photogeological and geological mapping

During the summer and autumn of 2014, L.R. Avery undertook a reconnaissance-scale ground-based geological mapping programme within the West Brazion property along with immediately-adjoining areas. Advantage was taken of new bedrock outcrops, exposed by logging companies and oil and gas companies. New roads have cut into the rock, allowing for new data to be collected. A photogeological study was concurrently conducted, to improve the accuracy of geological maps previously compiled by B.I. McClymont (1979) and by P.B. Jones (1960).

Re-interpretation the results of historic and current exploratory drilling was undertaken, as a means to further update Walter Energy's understanding of West Brazion's geology. **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, as well as outcrop locations from the recent geological field study.

Table 2-3: Historic coal-exploration drilling

Hole ID	Year	Easting	Northing	Elevation	Borehole Geophysical Logs						Strati-graphic Log	Core	Lab Data	TD
					Gamma	Density	Caliper	Resistivity	Neutron	Deviation				
BW-27	1978	565405.2	6136606	1295	no	no	No	no	no	no	yes	yes	yes	35
WB79-1	1979	565321.7	6135680	1371	no	no	No	no	no	no	yes	yes	no	51.2
WB79-2	1979	565253	6136406	1329	no	no	No	no	no	no	yes	yes	no	45.97

Note: all depths, elevations and coordinate positions in metres; coordinates are UTM NAD83 in Zone 10N. TD = total depth.

Table 2-4: Current coal-exploration drilling

Hole ID	Year	Easting	Northing	Elevation	Borehole Geophysical Logs						Strati-graphic Log	Core	Lab Data	TD
					Gamma	Density	Caliper	Resistivity	Neutron	Deviation				
WB00-1	2000	565336.6	6135668	1371.3	88.2m	no	no	no	no	no	no	yes	yes	92.05
WB2001-1	2001	564042.9	6135671	1289.46	105.05m	105.05m	105.05m	105.05m	105.11m	105.02m	no	no	no	105.05
WB2001-2	2001	564410	6135809	1336.61	159.57m	159.57m	159.57m	159.57m	159.59m	153.46m	no	no	no	153.57
WB2001-3	2001	564980.6	6136406	1304.46	74.01m	74.01m	74.01m	74.01m	73.99m	73.98m	no	no	no	74.01
WB2001-4	2001	565684.6	6135177	1351.4	70.90m	70.90m	70.90m	70.90m	70.88m	70.87m	no	no	no	70.9
WB2001-5	2001	566405.7	6136135	1299.47	71.12m	71.12m	71.12m	71.12m	71.10m	71.08m	no	no	no	71.12
WB2001-6	2001	565345.7	6135768	1362.9	75.76m	75.76m	75.76m	75.76m	75.82m	75.82m	no	no	no	76
WB2001-7	2001	565803.6	6135343	1354.77	31.9m	31.9m	31.9m	31.9m	31.9m	31.27m	no	no	no	31.9

Note: all depths, elevations and coordinate positions in metres; coordinates are UTM NAD83 in Zone 10N. TD = total depth.

2.6.2 Current drilling

Table 2-4 presents details of the eight current coal-exploration boreholes within the West Brazion property. These boreholes were drilled by Western Canadian Coal Corporation in 2000 and 2001. Geophysical logs and other supporting data for these boreholes are presented in **Appendix A** of the present report.

2.7 Acknowledgements and professional responsibility

Thanks due to Blake Snodsmith, in Walter Energy's Alabama office, for locating and providing TRIM base-map data, from which the topographic base of **Map 2-2** was assembled. Sara McPhail P.Geo. and David Richardson P.Geo., at the B.C. Ministry of Natural Gas Operations, provided copies of oil and gas companies' well records and geological reports.

Laura Avery conducted geological fieldwork, capably assisted by Ryan LeMay. She also laid out the bulk of this report, and prepared its figures. Preetpal Singh scanned and organised geophysical logs and other source materials, and helped to assemble this report into a coherent whole. Gwyneth Cathyl-Huhn P.Geo. conducted a scientific review and technical edit of this report, and accepts professional responsibility, under the *Coal Act Regulations,* for the contents of this report.

3 Geology

Regional and local geology of the West Brazion 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), both from the Geological Survey of Canada.

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.687) was written by B.I. McClymont (1979) for a joint-venture of Teck and Brameda Resources Ltd.

3.1 Regional geology

The West Brazion property is part of the Brazion coalfield, within the Inner Foothills of the Canadian Rocky Mountains. All rocks observed at the surface near West Brazion are of Late Jurassic to Early Cretaceous age, belonging to the Minnes and Bullhead groups of sedimentary rocks.

Most rocks are clastic in texture, ranging from very fine grained, variably-carbonaceous claystones and mudstones, through siltstones and sandstones, to gritstones and conglomerates stones to sandstones, to conglomerates. Smaller amounts of biologically and chemically-derived sedimentary rocks are present, in the form of coal, ironstones, glauconite-rich sandstones and gritstones, and impure dolomites.

Volcanic activity originating from the Coast Plutonic Complex; lying far to the southwest of West Brazion, was the source for the volcanic ash bands found within the Jurassic and Early Cretaceous strata. These ash bands are thin, generally only reaching a few centimetres thick, but they are widely-distributed areally and stratigraphically, and they therefore make excellent stratigraphic markers.

3.1.1 Regional sedimentology and stratigraphy

During Early Cretaceous time, a shallow sea occupied the western interior of North America. This sea has been given many names over the years depending on the time period, or the author referring to it. In this report, the sea shall be referred to as the Western Interior Sea. The erosion of the North American craton, during the latest Jurassic and earliest Cretaceous, sourced the sediments of the Minnes Group. During this time, the North American continent was moving westward into the ancient Pacific Ocean, overriding dense oceanic crust, and therefore becoming uplifted to form the ancestral western mountains of the Omineca Geanticline.

Northeastward-directed thrust faults, derived from the rising mountain ranges, became the tectonically-involved sources of the Bullhead Group sediments. Sedimentation kept a variable balance with compaction of older sediments, and the episodic vertical movements of the cratonic crust beneath the Western Interior Sea. Coastal plains and wave-dominated deltas formed, fostering the accumulation of strandplain coals (Kalkreuth and Leckie, 1988). As the deltas prograded and the shorelines thus regressed there was space for plants to flourish. The

high water table and influx of sediments allowed for vegetation to thrive.

Kalkreuth and Leckie (1988) concluded that peat-forming vegetation grew on the landward sides of the strandplains, as the coals are low in sulphur and show minimal influence of sea-water intrusion. As the sea subsequently transgressed over the strandplains, the peat would have been buried and the process would have started again with a new influx of sediment coming from the western mountain-front.

3.2 Structural geology at property scale

The principal structural features (**Map 2-3**) at West Brazion are a northeast-verging thrust fault, and an anticline-syncline pair (Jones, 1960; Childs, 1983). Jones' Sukunka Syncline is termed the Table Syncline by Childs; this syncline preserves the lower part of the Gething Formation within its core. To the southwest of the property, Jones and Childs both mapped a box anticline, the Goodrich Anticline, whose northeastern limb brings the deeper formations of the Minnes Group to the surface. Jones (*ibid.*) maps an additional anticline, the Fluff Anticline, crossing the southwestern side of the West Brazion property.

Jones also recognised an unnamed northeast-verging thrust fault, which follows the southwestern slopes of the Brazion Creek valley, and which thus cuts across the northeastern corner of the West Brazion property. As with other faults within the Brazion coalfield (Cathyl-Huhn and Avery, 2014a; 2014b), this thrust fault is 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 West Brazion coal property.

4 Stratigraphic review of the West Brazion coal property

Table 4-1 shows the lithostratigraphic sequence for the West Brazion Property. Within the West Brazion only two groups of Mesozoic rocks are exposed: the Lower Cretaceous Bullhead Group, and the underlying Jurassic to Cretaceous Minnes Group . Overlying rocks, of the Lower Cretaceous Fort St. John Group, are present in surrounding areas (Cathyl-Huhn and Avery, 2014a; 2014b), but they appear to have been stripped away by erosion within the West Brazion tenure.

The Bullhead Group is represented by two formations, and the Minnes Group is represented by four formations, recognised on the basis of distinctive lithology, supported to a minimal extent by palaeobotanical and palaeontological evidence. None of the formations, other than the Gething Formation of the Bullhead Group, can be divided into formal members. Only the basal Gaylard Member of the Gething Formation is present at West Brazion.

Table 4-1: Table of lithostratigraphic units and major coal beds

Geologic Age	Group	Formation	Member	Map unit	Lithology and thickness	Coal Bed Details
Late Jurassic to Early Cretaceous	Bullhead	Gething	Gaylard	3a	sandstone, conglomerate and siltstone; coal; over 250m thick	coal beds D, C, B, A and Discovery Seam
		Cadomin	(undivided)	2	gritty sandstone and conglomerate; minor siltstone; thickness unknown	
	Minnes	Bickford	(undivided)	1	sandstone, siltstone, mudstone and coal; 285 to 300 m thick	minor coal and coaly shale
		Monach	(undivided)		sandstone and quartzite; minor siltstone and conglomerate; thickness unknown	
		Beattie Peaks	(undivided)		sandstone, siltstone and shale; minor ironstone and coal; thickness unknown	coals possible but not drilled on this property
		Monteith	(undivided)		sandstone, shale and conglomerate; quartzite ; thickness unknown	

4.1 Gething Formation

The Gething formation comprises fining-upward cyclothems of non-marine sandstone and siltstone (Childs, 1983), containing plant fossils and numerous coal beds. The Gething Formation has been subdivided, on lithostratigraphic grounds, into four members (Duff and Gilchrist, 1981; Legun, 1990; Gibson, 1992; Cathyl-Huhn and Avery, 2014). Of these four members, only the basal Gaylard Member has been encountered at West Brazion.

4.1.1 Gaylard Member

The Gaylard Member predominantly consists of fine-grained sandstone, frequently fining-

upward into shales and mudstones. Carbonaceous shales and fossilised plant debris are found throughout the Gaylard Member.

The basal contact of the Gaylard Member with the underlying Cadomin Formation is gradational by interbedding (Hughes, 1964; Childs, 1983).

4.1.1.1 Gaylard coals

At West Brazion, five major coal beds have been found within the Gaylard Member. These coals are typically bright and blocky (McClymont, 1979). Two of Teck Corporation's three boreholes (BW-27 and WB79-2) encountered the thickest of these coal beds, the Discovery Seam. The third of Teck's boreholes (WB79-1) encountered four thinner, shallower coal beds, designated from top down as the D, C, B and A coals.

Western Canadian Coal Corporation's borehole WB00-1, drilled in 2000, intersected all five of the West Brazion coal beds, and thus confirmed their stratigraphic order. The overall thickness of the five coal beds is 8 metres.

Correlations between the five main coal beds at West Brazion, and the major coal beds at Walter Energy's Brule Mine (Cathyl-Huhn and Avery, 2014a), are not yet possible, owing to scarcity of drilling within the intervening Burnt River coal property (Cathyl-Huhn and Avery, 2014b).

Table 4-2 presents the coal bed intersections for all eleven holes. [redacted]

In summary, the relatively simple geological structure of the West Brazion property suggests that West Brazion has the potential to host a small mining operation, however more exploration and sampling would need to be done to confirm the extent of the deposit. Work to date is insufficient to support the determination of coal resources.

4.2 Cadomin Formation

The Cadomin Formation underlies the Gething Formation. The Cadomin Formation has, in past usage, been also known as the Dresser Formation (Childs, 1983; Gibson, 1992), although the latter stratigraphic name is now deprecated.

The Cadomin consists mainly of pebble-conglomerate and coarse-grained sandstone, formed in medial to distal positions within a complex of a complex of alluvial fans and braidplains. As noted by McClymont (1979), the Cadomin Formation is resistant to erosion, rendering it easier to map.

The Cadomin Formation is inferred to form bedrock within the southeastern corner of the West Brazion coal property, along both limbs of the Fluff Anticline (**Map 2-3**). The Cadomin is inferred to follow the leading edge of overthrust strata, close to the unnamed thrust fault which

crosses the junction of Brazion Creek and Burnt River.

4.3 Minnes Group

The Minnes Group, of Late Jurassic to Early Cretaceous age (Stott, 1998), consists predominantly of quartzose to argillaceous sandstone. Overall thickness of the Minnes Group, and of its constituent formations, is not known at West Brazion, owing to lack of drilling other than by a deep oil and gas well which encountered thrust-faulted rocks.

The Minnes Group may on the basis of lithology be readily divided into four formations, of which only the uppermost (the Bickford Formation *sensu* Stott, 1981) may be recognised at outcrop within the West Brazion property.

4.3.1 Bickford Formation

The Bickford Formation, as recognised by Stott (1981) comprises interbedded, cross-bedded and cross-laminated sandstone and siltstone, with virtually no fossils, although the formation does contain carbonaceous shales and coal beds. Childs (1983) considered the Bickford Formation to be more aptly referred to the Brenot Formation, part of Hughes' (1964) Crassier Group. The thickness of the Bickford Formation at West Brazion is unknown.

Table 4-2: Gaylard Member coal intersections within historic and current boreholes

Borehole	BW-27	WB79-1	WB79-2	WB00-1	WB2001-1	WB2001-2	WB2001-3	WB2001-4	WB2001-5	WB2001-6	WB2001-7
Elevation	1295	1371	1329	1371.3	1289.46	1336.61	1304.46	1351.4	1299.47	1362.9	1354.77
Drift		0.9	4.86	7.1	2.85	2.6	2.98	2.85	3.0	2.95	2.85
D Seam roof				19.05					14.1	17.8	
D Seam floor				19.63					14.6	18.65	
C Seam roof		22.7		23.05					17.5	21.06	
C Seam floor		23.98		24.04					19.2	22.85	
B Seam roof		28.54		28.05					22.2	26.25	
B Seam floor		30.18		30.1					22.7	28.45	
A Seam roof		44.8		44.7					45.8	45.1	7.15
A Seam floor		45.57		45.2					46.7	45.5	7.65
Discovery Seam roof	21.18	DNR	32.75	66.0		21.72	18.85		DNR	68.55	DNR
Discovery Seam floor	23.77	DNR	35.25	71.22		24.5	24.4		DNR	72.1	DNR
Total depth	34.44	51.2	45.97	92.05	105.05	153.57	74.01	70.9	71.12	75.76	31.09
Comments				Discovery Seam is split			Discovery Seam is split		C-Seam is split	C-Seam and Discovery Seam are split	

Notes: elevations and depths given in metres. Drift is thickness of unconsolidated material; hence depth to bedrock. DNR = did not reach

5 Reclamation

Sites and access roads, of the three historic Teck Corporation boreholes and the eight Western Canadian Coal Corporation boreholes, were not relocated during the year-2014 fieldwork, and their current state of reclamation is not known. It may, however, be reasonably presumed that sites, and roads no longer to be used, would have been reseeded with then-current formulations of reclamation mix, and any fallen timber bucked to short lengths and either buried within the road prisms, or scattered along the roads.

6 Statement of costs

Table 6-1 outlines the approximate cost of the 2000, 2001 drilling program conducted in the years 2000 and 2001. Walter Energy does not have cost reports for these years so an average based off the provincial exploration report given for years 2009, 2010 and 2011. These reports breakdown the various activities associated with drilling as outlined in the table. The cost of each activity was broken down into an average per-meter unit cost, which can then be multiplied by the number of meters drilled.

Costs for the year-2014 geological fieldwork at West Brazion are based upon an hourly payroll rate as no boreholes were drilled. An hourly rate of $40 was used as an approximation. Fieldwork time, followed by office time for data-analysis, totalled 50 hours, thus resulting in a total cost of $2000.

Table 6-1: West Brazion exploratory cost breakdown by activity

Year	*British Columbia average unit cost (per meter)*	2000	2001	2014	Total
Number of rotary drill holes		0	7	0	7
Number of core drill holes		1	0	0	1
Total metres (rotary)		0	582.55 m	0	582.55 m
Total metres (core)		92.05 m	0	0	92.05 m
Rotary drilling cost	*$201.34*	$18,550.84	nil	nil	$18,550.84
Core drilling cost	*$210.34*	$0.00	$122,533.57	nil	$122,533.57
Geophysical logging	*$17.56*	$1,616.40	$10,229.58	nil	$11,845.98
Coal analysis	*$79.63*	$7,329.94	nil	nil	$7,329.94
Road work	*$23.30*	$2,144.77	$13,573.42	nil	$15,718.18
Photogeological and geological mapping		0	0	$2000.00	$2000.00
Personnel	*$20.49*	$1,886.10	$11,936.45		$13,822.55
Total programme costs	*$293.08*	**$31,528.05**	**$158,273.01**	**$2000.00**	**$191,801.06**
Total number of boreholes		1	7		8
Total metres drilling		92.05m	582.55m		674.60

Note: Drilling costs are based upon total depth drilled. Exceptions are the lab analysis as this would only be done on core, so it was derived from core total depth (thus excluding rotary-drilling). Data source for unit costs: Bouchard (2011) report on behalf of Natural Resources Canada.

7 References

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8 Conclusions

The West Brazion coal property contains coal-measures of the Gaylard Member of the Gething Formation. Within the Gaylard Member, three historic (pre-2000) boreholes and eight current (year-2000 and year-2001) boreholes have encountered five coal beds, which have a combined average thickness of 8 metres.

The West Brazion property has the potential to host a small mining operation, however more exploration and sampling would need to be done to confirm the extent of the deposit. Work to date is insufficient to support the determination of coal resources.

The location of the property, being relatively close to the Falling Creek Connector Road (via Brule Mine), would allow for coal shipments to the Willow Creek coal preparation plant and railway loadout.

9 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 West Brazion coal property, British Columbia, Canada*, dated October 28, 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 3 years.

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.

h) My most recent visit to the West Brazion property was September 2014

I, Preetpal Singh M.A.Sc., 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 West Brazion coal property, British Columbia, Canada*, dated October 28, 2014.

c) I am a member of the IEEE Computer Society since 2006.

d) I am in the process of applying for registration with the Association of Professional Engineers and Geoscientists of British Columbia.

e) I received my Bachelor of Science in Computer Science from Laurentian University in 2008, and my Master's of Applied Science in Mineral Resource Engineering, also from Laurentian University, in 2012.

f) I have worked as a data analyst for Walter Canadian Coal Partnership since July of 2013.

g) I am a contributing author of this report, titled *Coal Assessment Report for the West Brazion coal property, British Columbia, Canada*, dated October 28, 2014, concerning the EB Trend coal property.

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 West Brazion coal property, British Columbia, Canada*, dated October 28, 2014.

c) I am a member (Professional Geoscientist, Licence No.20550) of the Association of Professional Engineers and Geoscientists of British Columbia, licensed 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 West Brazion coal property was in August 2014.

f) For purposes of the *Coal Act Regulations* and the *Mines Act*, I accept professional responsibility for this report, titled *Coal Assessment Report for the West Brazion coal property, British Columbia, Canada*, dated October 31, 2014, concerning the West Brazion 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*.

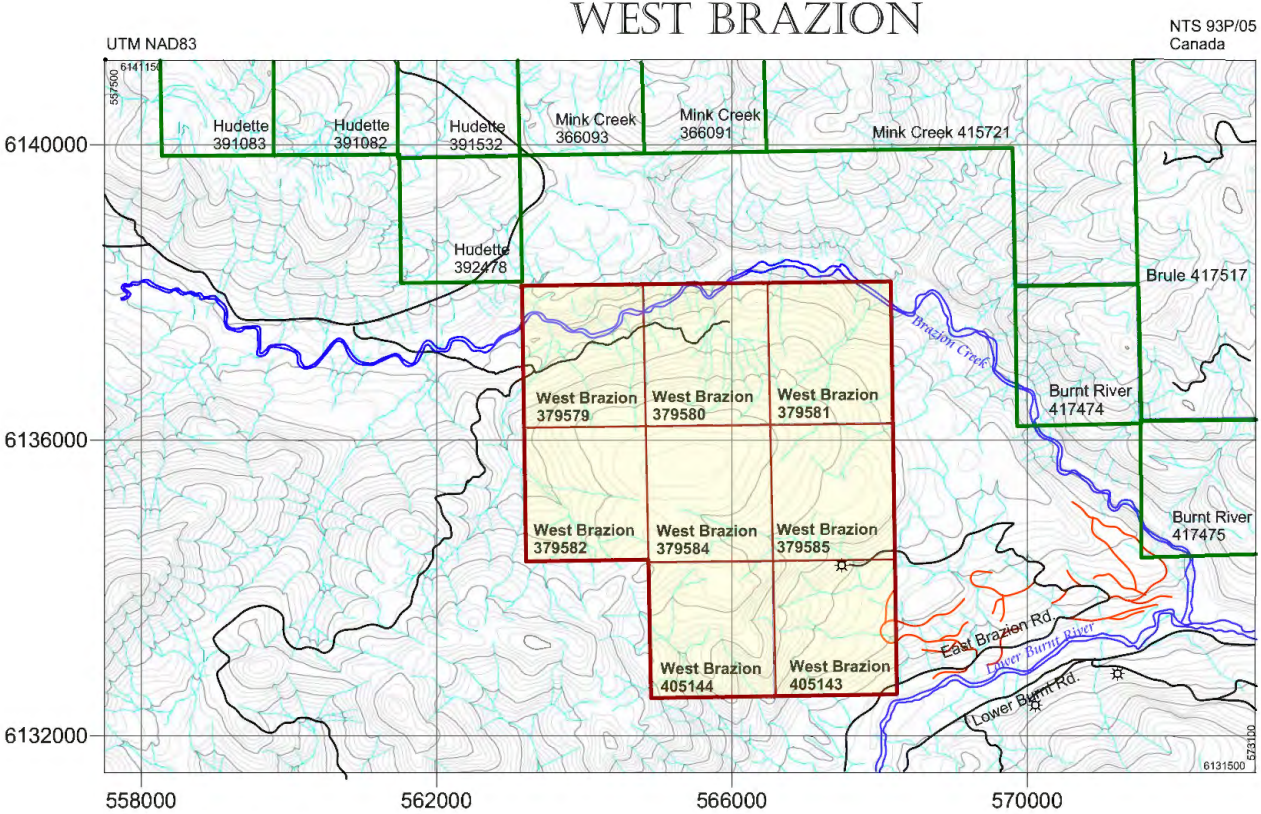
"original signed and sealed by"
Dated October 28, 2014. C.G. Cathyl-Huhn P.Geo. Lic.Geol. RMSME

Appendix A:
Geophysical, analytical, and supporting data for current boreholes

This appendix contains scanned copies of geophysical logs, analytical reports, and other supporting data for the eight ‘current’ boreholes drilled by Western Canadian Coal Corporation in the years 2000 and 2001.

Table 2-4, given above in **Section 2** of this report, provides a checklist of geophysical logs run within the current boreholes.

WEST BRAZION



Access:

- Road
- Trail

Land Classification:

- Coal Licences for Current Report
- Other Coal Licences owned by Walter Energy

Drainage:

- River or creek
- Stream
- Natural gas wells (not classified as to activity)

WALTER ENERGY

Scale: as shown	Coal Tenure and Topography
UTM NAD 83	
Revision: A	
Drawn: LA	
October 2014	West Brazion Coal Assessment Report — Map 2-2

Mapping by L.R. Avery, 2014

WEST BRAZION

Mapping by L.R. Avery, 2014, P.B. Jones, 1959, B. I. McClymont, 1981