TECHNICAL REPORT ON THE

Palisades Coal Property

ALBERTA, CANADA

Prepared for Altitude Resources Inc.

Report for NI 43-101

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List of Abbreviations

Abbreviation	Definition
µ	Micron
°C	degrees Celsius
°F	degree Fahrenheit
µg	Microgram
A	Ampere
A	Annum
Bbl	Barrels
Bcm	bank cubic metre
Bcy	bank cubic yard
Btu	British thermal units
C$	Canadian dollars
Cal	Calorie
Cfm	cubic feet per minute
Cm	Centimetre
cm^2	square centimetre
Cps	counts per second
D	day
ddpm	dial divisions per minute
dia.	diameter
Dlt	dry long ton
Dmt	dry metric tonne
Dst	dry short ton
Dwt	dead-weight ton
FSI	free swelling index
Ft	Foot
ft/s	foot per second
ft^2	square foot
ft^3	cubic foot
G	Gram
G	giga (billion)
Gal	Imperial gallon
g/L	gram per litre
g/t	gram per tonne
Gpm	Imperial gallons per minute
gr/ft^3	grain per cubic foot
gr/m^3	grain per cubic metre
Hr	Hour
Ha	Hectare
Hp	Horsepower
In	Inch
in^2	square inch
J	Joule
K	kilo (thousand)
Kcal	Kilocalorie
Kg	Kilogram
KJ/kg	kilojoules per kilogram
Km	Kilometre

Abbreviation	Definition
kph	kilometres per hour
km^2	square kilometre
kPa	kilopascal
kVA	kilovolt-amperes
kW	kilowatt
kWh	kilowatt-hour
L	Liter
L/s	litres per second
LOM	life of mine
m	metre
M	mega (million)
m^2	square metre
m^3	cubic metre
Ma	million years
MASL	metres above sea level
Mbcm	million bank cubic metres
min	minute
mm	millimetre
mph	miles per hour
MVA	megavolt-amperes
MW	megawatt
MWh	megawatt-hour
m^3/h	cubic metres per hour
opt, oz/st	ounce per short ton
oz	Troy ounce (31.1035g)
oz/dmt	ounce per dry metric tonne
pop.	population
ppb	part per billion
ppm	part per million
QA	quality assurance
QC	quality control
RL	relative elevation
R$_{Max}$	Maximum reflectance
ROM	run of mine
s	second
st	short ton
stpa	short ton per year
t	tonne
tpa	metric tonne per year
tpd	metric tonne per day
US$	United States dollar
USgpm	US gallon per minute
V	Volt
W	Watt
wmt	wet metric tonne
yd^3	cubic yard
yr	year

1 Summary

This Technical Report summarizes historic coal exploration, and drilling conducted in 2013 by Altitude Resources Inc. ("Altitude") on the Palisades Property, in the central Alberta foothills, and presents a resource estimate based upon current and historic drill information, and mapping.

1.1 Property Description

The centre of the Property is located at about 53°28'N, 118°0'W, approximately 35 km northwest of Hinton, AB, Canada (Figure 2-1). The Property can be accessed by road from Hinton via Highway 16, Highway 40 and either the Peppers Lake Road or Rock Lake Provincial Park Road. The Property is comprised of several coal leases in the Category 4 Land Use designation, and one coal lease application in the Category 2 Land Use Designation. A separate property owned by Altitude is located about 25 km northwest of the Palisades Property, spanning Moon Creek and Moberly Creek; this property is not included in the present report. Historical work in this area is reported as the "Hoff Property", first by Rio Tinto (1969) and then Denison Mines (1982-83). A previous NI 43-101 Technical Report was completed by Moose Mountain Technical Services in November 2011 on the Palisades Property.

1.2 Land Tenure

The Property is comprised of six contiguous Alberta Crown Coal leases and one coal lease application which are in Townships 51 and 52, Ranges 27 and 28, west of the 5th Meridian, and Range 01, west of the 6th Meridian. All of the coal leases and the coal lease application are held by Altitude Resources Inc. The total area of the combined leases and lease application is 11,668.4 hectares. The leases are located approximately 12 km west of the Canadian National Railway (CN) that runs to ports on the west coast.

1.3 Geology and Mineralization

The Property lies within the North-Central Alberta Foothills near the eastern edge of the Front Ranges of the Canadian Rocky Mountains. It is bounded by the north-trending, west-dipping, Collie Creek thrust sheet in the east, and the Folding Mountain thrust sheet in the west. The rocks underlying the Property are within the predominantly continental Lower Cretaceous Luscar Group (Langenberg and McMechan, 1985), which is equivalent to the Blairmore Group in Southern Alberta and Fort St. John Group in northeastern BC (Figure 7-1). The Luscar Group is overlain by dark gray marine shales of the Shaftesbury Formation. Strata of the Luscar Group are divided into four formations identified in ascending order as the Cadomin, Gladstone, Moosebar and the coal-bearing Gates Formation.

The Gates Formation consists primarily of sandstones, siltstones and coal cyclothems. The base of this Formation is characterized by a massive, medium-grained, 20 to 40 m thick sandstone unit known as the Torrens Member, which conformably overlies the marine shales of the Moosebar Formation. Overlying the Torrens Member is the coal bearing unit, referred to as the Grande Cache Member. The Grande Cache Member consists of fine-grained sandstones, siltstones and mudstones, and continuous coal seams. On the Property, this Member is 85 to 95 m thick and has three distinct identified coal zones. Overlying the Grande Cache Member is the Mountain Park Member, which consists predominantly of thick-bedded, fine- to medium-grained sandstone sequences with distinct siderite grains. This member ranges from 85 to 200 m in thickness and forms prominent ridges on the Property.

Stratigraphy in the Palisades area has been subjected to first and second order thrust faulting, as well as asymmetrical folding. The major faults, the Collie Creek Thrust in the northeast, and Folding Mountain Thrust in the southwest, trend northwest and dip to the southwest. Secondary local thrusts within each thrust sheet also trend northwest, resulting in local structure units or packages affecting the coal seam thickness and occurrence. Major folds include the Moosehorn and Coal Hill Synclines, and the Solomon Creek Anticline, which trend northwest and dip steeply to vertically to the southwest (Denison, 1984).

Three main coal seams, from top to bottom, Moosehorn, Hoff, and Solomon, have been correlated in the Palisades area. Coal is low–volatile bituminous with variable but generally moderate ash content, good washability, and good coking properties, similar to that mined at Grande Cache.

1.4 EXPLORATION

This Technical Report presents the results of a program of drilling, trenching and mapping on the Property, conducted between July and September of 2013. Twenty-seven reverse circulation drillholes and three sonic core holes were completed in the South Palisades, Central Palisades (Icewater Creek) and Coal Hill areas. Where possible, existing access was rehabilitated, and new construction was minimized. All constructed access was reclaimed at the end of the program.

Significant historical exploration programs on the Property, including drilling, trenching and mapping, were conducted by Rio Tinto Canadian Exploration Ltd., in 1969 (five rotary drillholes), and by Denison Mines Limited in 1982 to 1983 (twenty three core holes).

1.5 COAL QUALITY

The limited core samples collected in 2013 confirm the coal rank as Low Volatile Bituminous Coking Coal (Ro 1.45 to 1.53). The clean coal core samples show an average FSI (Free Swelling Index) of 8, Fluidity values of 4 to 40 ddpm, and positive Dilatation. Petrographic analysis shows a Reactive/Inert ratio of 70/30 and a predicted ASTM Stability of 63. Ash analysis shows low total alkaline content (10% average) which should contribute to a high CSR value. The phosphorous in coal is 0.014% which is extremely low and highly desirable. The coal is ranked as a low-volatile hard coking coal.

1.6 MINERAL RESOURCE ESTIMATES

The in-place, surface-mineable resources for the Coal Hill area and regional Palisades Property area are summarized in Table 1-1. These areas are outlined in Figure 14-1. Assumptions and methodology are provided in Section 14.

Table 1-1. Palisades In-Place Surface-Mineable Coal Resources Summary.

Area	In-Place Coal Resources (TONNES) Stripping Ratio Cutoff 20:1			
	ASTM Group	**Measured**	**Indicated**	**Inferred**
Coal Hill	Low-Volatile Bituminous	4,164,026	794,575	158,380
Central-South Palisades	Low-Volatile Bituminous	1,850,685	2,679,647	4,418,511
Total Property*		**6,014,711**	**3,474,222**	**4,576,891**
Total In-Place[θ]		*6,353,122*	*3,700,238*	*4,871,431*

(* partings removed, average 8 m oxidised zone removed)
([θ] as reported in news release 2014-02-19)

The Property hosts a large exploration target of low-volatile bituminous coal that requires additional drilling to define a resource. Exploration targets which are in part down-dip projections of the coal resources and in part projections along strike are listed in Table 1-2. These targets are in part conceptual and based on current geological understanding; hence only rounded tonnages are presented. Coal is present in the Grande Cache Member on the limbs of other folds on the Property, but is not included in the exploration target presented below due to lack of information on seam thickness and continuity. The target areas are outlined in Figure 14-1.

Table 1-2. Palisades In-Place Exploration Targets (metric tonnes).

Area	Exploration Target* (TONNES) *rounded-down*
Coal Hill	1,000,000
Central-South Palisades	31,000,000
Total Property	**32,000,000**

*conceptual in-place coal with no stripping ratio cutoff

1.7 Conclusions and Recommendations

The results of the 2013 exploration program show that previous geological interpretation by Rio (Benkis, 1970) and Denison (1984) in the southern and eastern part of the property are not accurate. Areas mapped as Grande Cache and Mountain Park Members of the Gates Formation in the Central and South Palisades are actually the Shaftsbury Formation. The overturned anticline in the Central Palisades appears to translate laterally into a thrust fault, truncating Grande Cache sediments against the younger Shaftsbury Formation. The Coal Hill Syncline and Coal Hill Anticline are dissected by several splays from the Collie Creek Thrust which increase the thickness of Grande Cache Member rocks and cause numerous seam repeats. These observations suggest that the coal-bearing Grande Cache member is shifted further to the west than previously mapped.

The conclusions drawn from the 2013 exploration program are that coal seams in the eastern part of the property, while thickened in places by folding, and repeated by thrust faulting, especially in the area of Coal Hill, are generally thinner and contain more partings than was previously thought.

A two-phase program is recommended. Phase One would entail a detailed field assessment in the western part of the property to confirm the existence and structural configuration of the coal-bearing section prior to initiating any further drilling on the property. This program would include field mapping and possibly trenching to the west of the drill access in the south of the Property, and over the Solomon Creek anticline in the central part of the Property, at an estimated cost of $370,000. Phase Two would be contingent upon Phase One and would be a campaign of up to 3,000 m of reverse circulation drilling and 500 m of coring assuming that target areas can be identified by the initial Phase One program. Additional exploration of the Palisades North extension on the north side of the Wildhay River would also be recommended. The estimated cost of Phase Two would be $ 2,830,000.

2 INTRODUCTION

Dahrouge Geological Consulting Ltd. ("Dahrouge") has been retained by Altitude Resources Inc. ("Altitude") to prepare an independent Technical Report on the Palisades Coal Property ("the Property"), located in Alberta, Canada (Figure 2-1). The report was commissioned by Altitude to comply with regulatory disclosure and reporting requirements outlined in Canadian National Instrument 43-101, Standards for Disclosure of Mineral Projects ("NI 43-101"), companion policy NI 43-101CP, and Form 43-101F ("Technical Reports").

Robert Engler, P. Geol, John Gorham, P. Geol, and William Miller, P.Geo, are the Qualified Persons responsible for preparing this Technical Report on the Property. Mr. Engler is responsible for Section 13 and jointly responsible for Sections 1, 12, 25 and 26. Mr. Gorham is responsible for all sections of this report except section 13. Mr. Miller is jointly responsible for Sections 1, 14, 25 and 26.

The purpose of this report is to review coal exploration on the Property carried out in 2012 and 2013 and present a resource estimate based upon drilling completed in 2013. Information, conclusions, and recommendations contained in this report are based on field observations as well as published and unpublished data (see Section 27: References).

Mr. Engler visited the Property on August 18-20, September 19-21 and September 28-29, 2013. Mr. Gorham visited the Property August 11-21, 28-31 and September 1-6 and 12-30, 2013. Mr. Miller did not visit the Property.

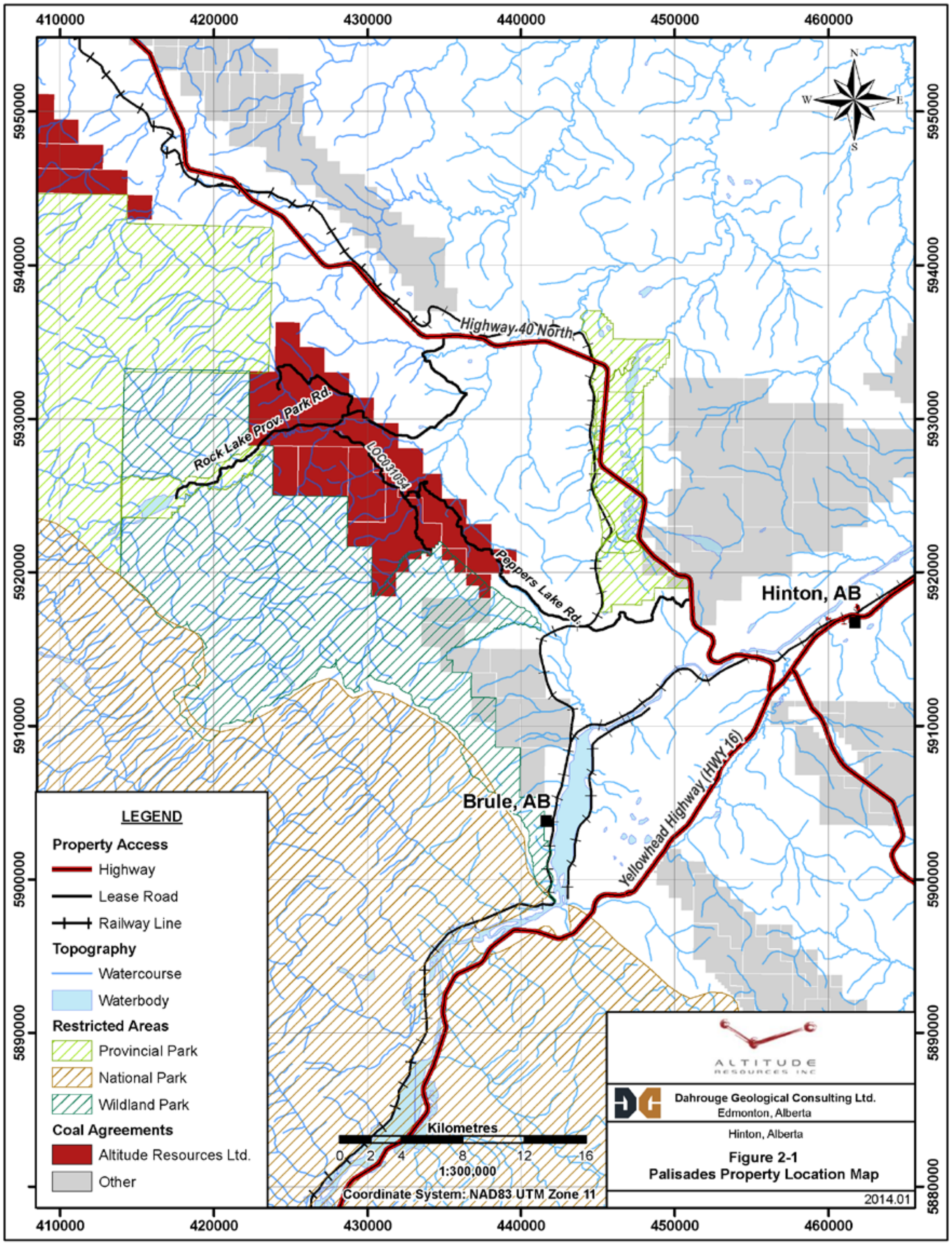

Figure 2-1. Location of the Palisades Coal Property

3 Reliance on Other Experts

This report has been prepared by, Robert Engler, P. Geol, of Moose Mountain Technical Services, and John Gorham, P. Geol. and William Miller, P. Geo. of Dahrouge Geological Consulting Ltd. for Altitude Resources Inc. ("Altitude"). The information, conclusions, opinions, and estimates contained herein are based on:

- Information available to the authors at the time of preparation of this report,
- Assumptions, conditions, and qualifications as set forth in this report, and
- Data, reports, and other information supplied by Altitude Resources Inc. or available in the public domain

The authors have relied upon the professional quality of the historical work reported in various studies. The authors have no reason to believe that the information used in the preparation of this report is false or purposefully misleading, and have relied on the accuracy and integrity of the data referenced in Section 27 of this report.

For the purpose of this report, the authors have relied on ownership information provided by Altitude and verified through the Alberta Government interactive coal tenure map system at:

https://gis.energy.gov.ab.ca/Geoview/Viewer.aspx?Viewer=StandaloneCoalSLExt

While title documents were reviewed for this study, it does not constitute, nor is it intended to represent, a legal, or any other opinion as to title.

Some relevant information on the Property presented in this report is based on data derived from reports written by geologists and/or engineers whose professional status may or may not be known in relation to the NI 43-101 definition of a Qualified Person. The authors have made every attempt to accurately convey the content of those files, but cannot guarantee the accuracy or validity of the work contained within those files. However, the authors believe that these reports were written with the objective of presenting the results without any misleading intent. In this sense, the information presented should be considered reliable, unless otherwise stated, and may be used without any prejudice by Altitude Resources Inc. Except for the purposes legislated under provincial securities laws, and any use of this report by a third party is at that party's sole risk.

4 PROPERTY DESCRIPTION AND LOCATION

4.1 LOCATION

The centre of the Property is located at about 53°28'N, 118°0'W, approximately 35 km northwest of Hinton, AB, Canada (Figure 2-1) in the foothills of the Rocky Mountains. The Property extends from the Wildhay River in the northwest to Solomon Creek in the southeast over a distance of 12 km. Access to the Property is via the Yellowhead Highway (Highway 16), Highway 40 North and either Peppers Lake Road or Rock Lake Provincial Park Rd. The Property is comprised of six coal leases and one coal lease application totalling 11,682 ha (Figure 4-1; Table 4-1). Altitude has four other contiguous coal lease applications (the Moberly Property) located about 28 km northwest of the Palisades Property, which are not the subject of this Technical Report.

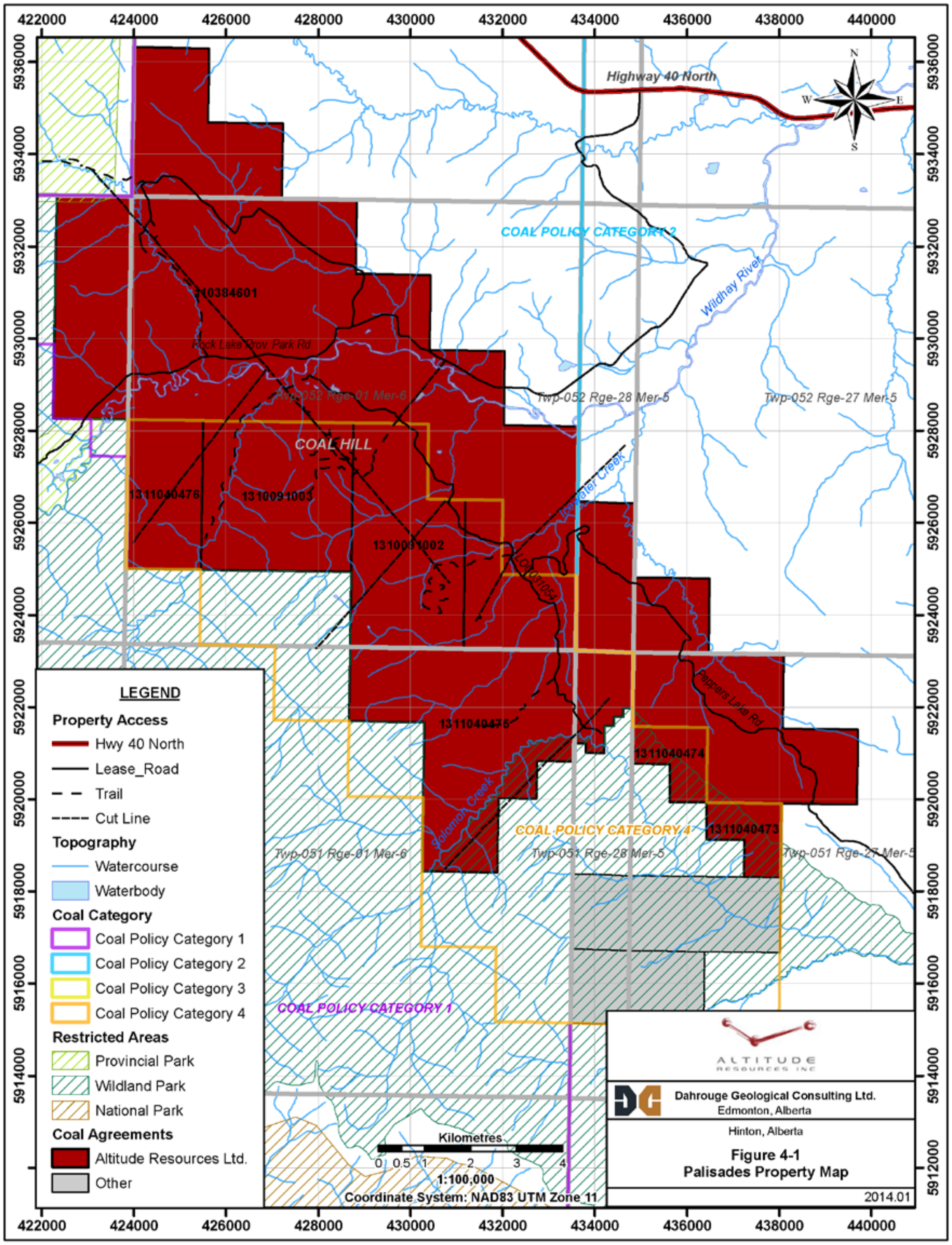

Figure 4-1. Palisades Coal Property Map.

4.2 MINERAL TENURE

The Property consists of six contiguous coal leases which were acquired through open Public Tender of undisposed Coal Rights in September, 2010, and one coal lease application which was acquired October 17, 2011, encompassing an aggregate area of approximately 11,682 ha. The land that comprises the Property is Crown Land. The six leases and the A13 coal lease application are held by Altitude Resources Inc. and are summarized in Table 4-1. They can be viewed on the Alberta Government Energy Website using the interactive coal map:

https://gis.energy.gov.ab.ca/Geoview/Viewer.aspx?Viewer=StandaloneCoalSLExt

Table 4-1. Details of the Palisades Coal Property Claims.

Lease Type	Lease Number	Area (hectares)	Date Recorded	Renewal Date
A13(application)	110384601	7034.0	17-Oct-2011	-
013	1310091002	1024.0	02-Sept-2010	03-Sept-2025
013	1310091003	1024.0	02-Sept-2010	03-Sept-2025
013	1311040473	50.8	07-Apr-2011	08-Apr-2026
013	1311040474	82.9	07-Apr-2011	08-Apr-2026
013	1311040475	1954.7	07-Apr-2011	08-Apr-2026
013	1311040476	512.0	07-Apr-2011	08-Apr-2026
Total		11, 682.4		

Alberta Crown Coal Leases are granted for a term of 15 years and are renewable for additional terms on application. There are no other obligations on the property other than annual lease rental requirements ($3.50 per hectare) to the Alberta Government and subsequent Coal Royalty payments after production.

Applications for coal lease agreements (A13) in Alberta must be accompanied by the $625.00 application fee, the first year's rent ($3.50 per hectare with a minimum of $50.00), plus GST as applicable. For a coal lease on a road allowance, the first year's rent is $50.00. Once received, an application is checked to confirm the requested mineral rights are available. The application is then reviewed with respect to development restrictions or policies, and the appropriate method of disposition. A successful coal lease application may, depending upon the circumstances, lead to an agreement being issued directly to the applicant, or may result in competitive bidding.

Altitude must pay an annual rent of $3.50/ha to the Alberta government to retain the Property, as well as royalties according to the Coal Royalty Regulation if any production occurs. The current royalty rate for Crown-owned bituminous (Mountain/Foothills) coal is 1% of mine-mouth revenue before mine payout, and 1% of mine mouth revenue plus 13% of net revenue after mine payout.

A coal lease grants the right to explore the land within the boundaries of the lease. A coal lease does not grant surface rights; a surface lease or grant is required. Altitude has not applied for a surface lease on the Property.

The Property falls within the Rocky Mountain Forest Reserve, which is managed by the Alberta Government, and within the West Fraser Mills Forest Management Area. A road use agreement with West Fraser Mills is required for access to the Property.

The Palisades Property consists of six coal leases which are wholly within the Coal Development Policy Category 4 land zone, as designated by the 1976 Alberta Coal Policy. This land category allows for coal surface mine development by the lease holder. The application for a coal lease agreement (A13) is wholly within the Coal Development Policy Category 2 land zone. This category allows for limited exploration under strict controls. Approved development is generally restricted to in-situ or underground, as the area is considered to have moderate environmental sensitivity and minimal existing infrastructure.

There are two surface disposition types which may require consultation or restrict certain activities upon public lands. The activity types include Consultative Notation – Provincial Government (CNT) and Protective Notation (PNT). CNT does not impose any land use restriction but indicates that an agency wishes to be consulted prior to any commitment or disposition of the land. A CNT must not prevent the taking of applications or the cancellation of an application. All applications must be referred to the holding agency. The holding agency may request special conditions with respect to proposed disposition. If the holding agency wishes to restrict the proposed land use, the holding agency must apply for a Protective Notation (PNT) that will permit the appropriate level of restriction with respect to the surface disposition. Generally speaking, the purpose of these restrictions is either managing natural hazards (erosion, flood risk, slope stability) or land management (wildlife, grazing, irrigation, watercourse protection). Currently, PNT8890245 (Grazing Lands) has been cancelled, so no notations appear on the Property.

4.3 ENVIRONMENTAL LIABILITIES

The authors are not aware of any environmental liabilities associated with the Property.

4.4 REQUIRED PERMITS

Exploration requires a Coal Exploration Permit from the Alberta Government. As of the effective date of this report, Altitude has applied for and been granted a Coal Exploration Permit (CEP 130001) for exploration drilling activity issued by the Alberta Government. This CEP is active until May 6, 2014. The current or future operations of Altitude, including development and commencement of production activities on this property require other permits governed by laws and regulations pertaining to development, mining, production, taxes, labour standards, occupational health, waste disposal, toxic substances, land use, environmental protection, mine safety and other matters, may be required as the Project progresses.

4.5 OTHER SIGNIFICANT FACTORS AND RISKS

The Rock Lake –Solomon Creek Wildland Provincial Park (WPP-0015-02) established December 20, 2000, overlaps parts of coal leases 013-1311040473, 013-1311040474 and 013-1311040475 as well as the two quarter sections (SW29 and SW 31 TWP 51-R27W5 of lease application A13-110384601. This area is currently restricted for any off-highway vehicle access.

5 Accessibility, Climate, Local Resources, Infrastructure, and Physiography

5.1 Topography, Elevation, and Vegetation

The Property is situated within the sub-alpine-montane sub-region of the larger Rocky Mountain Natural Region in Alberta. In general, the terrain is steep and mountainous with highly variable elevations characterized by a series of steep rounded hills running northwest-southeast, parallel to the front range of the Rocky Mountains, and is incised by east flowing streams. The topographic elevation on the Property ranges from 1,350 to 2,000 m. The Wildhay River forms the northern boundary of the Property, flowing east from Rock Lake towards the Athabasca River drainage system. The southern boundary is formed by Solomon Creek. Vegetation on the Property is dominated by Engelmann spruce and subalpine fir at higher elevations, and lodgepole pine, balsam fir, alder, willow, black spruce and mixed grasslands at lower elevations.

5.2 Infrastructure and Local Resources

The Property is located approximately 20 km northwest of the town of Hinton, 76 km west of Edson and 300 km west of the city of Edmonton. The Property can be accessed by driving westwards from Hinton for 3.5 km on the Yellowhead Highway (Highway 16), then north on Highway 40 for about 11 km to the junction with Peppers Lake Road. The eastern boundary of the property is 28 km westward on the Peppers Lake Rd, which is a graveled all-weather, gated, forestry road owned by West Fraser Mills. Transport to and from the Property is by 4x4 truck, and on trails and cutlines, it is by ATV or on foot. Alternative road access to the north part of the Property is via the Rock Lake Provincial Park Road which leaves Highway 40 about 41 km from the junction with Highway 60 and runs west along the Wildhay River valley about 18 km to the eastern boundary of the Property.

The Canadian National Railway (CN) rail line runs 12 km parallel to the eastern boundary of the property. The railway provides direct access for coal delivery to the Port of Vancouver and to the Ridley Island Terminal at Prince Rupert. Paved landing strips are available in both Hinton and Edson for light aircraft.

Hinton, the closest community, with a population of 9,640 (2011 census) is located about 20 km southeast of the property. It hosts a full range of accommodations, food, fuel and other necessary services. Major employers are Teck Coal, Hinton pulp, and Hinton Wood Products (West Fraser Mills Ltd.), as well as oil and gas operations. Other communities near to the Property include Grande Cache (pop. 4,319), about 80 km to the northwest along Hwy 40, and Jasper (pop. 4,051), about 70 km to the southwest.

Several coal mines are operating in the Hinton area. Teck Resources Limited operates the Cheviot and Luscar mines about 40 km south of Hinton. This operation produces metallurgical coal from the Lower Cretaceous Gates Formation, as does the Grande Cache Coal mine at Grande Cache, about 140 km northwest of Hinton. Currently Coalspur Mines Ltd is developing its Vista project for thermal coal immediately southeast of Hinton in the Tertiary Coalspur Formation.

There is currently no existing mine infrastructure on the Property.

5.3 CLIMATE

The climate of the region is classified as boreal sub-alpine, characterized by long cold winters and short cool summers. Daily temperatures range from a mean maximum of 9°C to a mean minimum of minus 2.5°C, with a mean daily temperature of 3°C. Extreme temperatures range from a maximum of 30°C in August to a minimum of minus 42°C in January. The average annual number of days with frost is 280.

The mean total precipitation in the region is approximately 500 mm, which includes the rainfall equivalent of a mean snowfall of 119 cm. The average annual number of days with measurable precipitation is 133.

6 HISTORY

The first geological investigations of the region were undertaken by the Geological Survey of Canada. The coal deposits of the Foothills region surrounding the Athabasca River were first examined in 1910 and 1911 by D.B. Dowling (Dowling, 1914). In 1914, the Blue Diamond Coal Company commenced commercial underground production on deposits immediately north of Brule Lake, in what is now the Grande Cache member of the Gates Formation. A total of 1,677,500, tonnes were reportedly produced from 2 seams. The underground mines at Brule closed permanently in 1928, the closure attributed to complex structural conditions and faulting which affected production costs. The company also drove exploration tunnels on seams near Rock Lake along the Wildhay River in 1928/29. The Solomon Creek Coal Company produced about 700 tonnes from Sec 31-50-27W5 between 1919 and 1924 (ERCB ST-25, 2010). Several other mines were developed in the area, including Mt. Cavell Collieries Ltd. at Pocahontas, and those at the town of Coalspur which operated until the 1950's.

In 1916, the region northwest of Brule, including the Palisades area, was studied by J.M. MacVicar (MacVicar, 1919). In 1927, B.R. McKay made a detailed study of the Brule mining operations and coal deposits extending north to Solomon Creek (McKay, 1928). The purpose was to record in detail the stratigraphy and structure of coal seams at the active mine and assist in extending these deposits northwest towards the area of the Palisades Coal Property. Much of the detailed structural mapping undertaken by MacKay is still relevant to conditions that apply to the Palisades Coal lease area.

Between 1943 and 1945, A.H. Lang mapped the Brule and Entrance areas for the Geological Survey of Canada. Considerable work has been done over the years on the stratigraphy of the Lower Cretaceous in the Alberta Foothills. The work concentrated on establishing nomenclature for the central and northern Foothills, and correlating this stratigraphy with that of the southern Foothills. The original stratigraphic work was done by MacKay (1929a and b; 1930), who established the original formational names for the Lower Cretaceous in the Athabasca Region. Later work was done by Lang (1947), Irish (1965), Thorsteinsson (1952) and J.R. McLean (1982). The stratigraphic nomenclature used in this report is that established by Langenberg and McMechan (1985) of the Alberta Geologic Survey and is based on detailed geological mapping of the region.

The increasing demand for coking coal in the 1960's led to renewed exploration in the Alberta foothills with focus on the Lower Cretaceous Luscar Group. This led to the opening of the Smoky River Mines at Grande Cache, the Cardinal River Mine southeast of Hinton in the early 1970's, and the Gregg River Mine adjacent to Cardinal River in 1983.

Prior to the acquisition of the Palisades coal leases by Altitude Resources, the only significant exploration in the immediate area was undertaken by Rio Tinto Canadian Exploration Ltd. ("Rio") who acquired the property in 1969 and Denison Mines Ltd. ("Denison") who subsequently acquired the property in 1974. Rio conducted basic mapping and trenching, and completed five rotary drillholes. Denison undertook a small reconnaissance and trenching program shortly after the original leases were acquired in 1974. Then between 1982 and 1983, Denison conducted an extensive exploration program including helicopter-supported drilling (Denison, 1984).

The local geological mapping undertaken first by Rio and later expanded by Denison, provided good insight into the predictability of these coal seams within a fold and thrust belt environment. Trenching and drilling results reported by both Rio and Denison identified fold-related coal seam thickening when the seams were intersected within anticline or syncline closures. Both studies carried out laboratory analysis of the coal indicating a low volatile coking coal. During 1969, Rio spent a single season evaluating the continuity of these seams and at the time deemed them uneconomic, primarily due the inability to consistently trace them.

6.1 PRIOR OWNERSHIP

In January of 1969, the Alberta Government announced that Coal Reservations to certain areas to the northwest of the town of Hinton would be sold by a public tender. These lands adjoined, and included, part of the Wilmore Wilderness area. Prior to this sale no coal exploration had been permitted in this area. Rio Tinto Canadian Exploration Ltd. entered bids on two blocks of ground in the designated area. On February 12, 1969, the Alberta Department of Mines and Minerals accepted Rio's tender to certain portions of the lands grouped into three separate blocks, known as the Moon Creek, Rock Lake and Hoff Range properties. The rights to explore for coal on these lands were granted for a period of twelve months. The Moon Creek block comprised part of what is now the Moberly Property. The Rock Lake block along the Moosehorn Range, is now covered by parts of the Rock Lake – Solomon Creek Wildland and Wilmore Wilderness Parks. The Hoff Range block had similar boundaries to the Palisades Property coal leases and comprised 9,324 ha. Rio did not explore after 1970 on the Hoff Range block (Benkis, 1970).

In October 1974 Denison Mines Ltd. acquired a total of 12 coal leases, 8 of which comprised the Hoff Range block, and 4 of which comprised the Moosehorn block. In 1978, 4 coal leases were added to the Hoff block. The 12 coal leases of the Hoff block totalled 7,429.5 ha and were all within land use Coal Development Policy Category 4 (1976 Alberta Coal Policy). These leases covered a similar area to the current Palisades Property. The Moosehorn block (3,303 ha) was approximately similar to Rio's Rock Lake block and was all within the 1976 Alberta Coal Development Policy Category 1 and 2 lands (Denison, 1984).

No additional work was carried out after 1983. Denison Mines focused their efforts on mine development in northeastern BC, and subsequently withdrew from the coal business with the sale of their Quintette Mine to Teck in 1991. The Palisades coal leases were allowed to lapse and reverted to the Alberta Government.

6.2 PREVIOUS EXPLORATION AND DEVELOPMENT

Concerted exploration on the Property was conducted by Rio in 1969, and by Denison, in a small reconnaissance program in 1974 and substantial programs in 1982 and 1983. These programs are summarized in Table 6-1 and Figure 6-1.

Table 6-1. Historic Exploration Summary for the Palisades Property.

Operator	Campaign	Core Holes	Rotary Holes	Total Depth (m)	Trenches	Total Length	Mapping	Access Trails (km)
Rio Tinto	1969	-	5	1160	11	4900	1:15,840	12.9
Denison	1982	18	-	1782	9	-	1:10,000	-
Mines	1983	5	-	1187	1	-	1:10,000	-

6.2.1 Rio Tinto Exploration

Rio Tinto conducted exploration on the Hoff Range block between May and November, 1969 (Benkis, 1970). The Hoff Range approximately covered the same area as the Palisades Property. Initial prospecting and mapping was largely helicopter supported, although some roads and cutlines, including the Rock lake Road, Brule Lake-Rock Lake Road (Peppers Lake Road) and the major northwest-trending seismic line ("Spine Line") provided some four wheel drive access. Access roads, trenches and drill pads were constructed using bulldozers in the Coal Hill area, along a branch of Icewater Creek, and from the Brule Road southwest along the north side of the Solomon Creek valley (Figure 6-1). These grades were intact, and were cleared of brush and reopened for Altitude's 2013 exploration program.

Rio's trenching was concentrated on Coal Hill, where several coal showings ("A" through "N") were found and exposed (Figure 6-1, Table 6-4). Trenches were also cut across strike along the central and southern roads, exposing two and three seams respectively. Mapping and trenching indicated repetition of coal seams in a number of thrust fault blocks interpreted as splays of the regional Collie Creek Thrust fault. Trench "M" on the north face of Coal Hill exposed a nearly flat-lying seam up to 5.3 m thick bounded by thrust faults. This thickening was interpreted as evidence of an anticlinal hinge.

Five vertical rotary drillholes (Table 6-2) were drilled on Coal Hill to test seam continuity from trenching. All holes were chip-logged and sampled. In HR-3 and HR-4, two intervals were cored at depth in each hole to clarify bedding attitude (Benkis, 1970). HR-1 was collared in the Mountain Park Formation at the top of Coal Hill and drilled to 435 m for stratigraphic control. It had been intended to reach the Cadomin conglomerate, yielding a complete section of the Gates Formation. The depth capacity of the drill was exceeded before the Cadomin was encountered, indicating substantial structural thickening of the Gates Formation.

Table 6-2. Rio Tinto Drillholes – Coal Hill Area, Palisades Property.

Year	Drillhole	Easting	Northing	Elevation (m)	Azimuth (°)	Inclination (°)	Depth (m)
1969	HR-1	428627	5927365	1662.71	Vertical	-90	434.34
1969	HR-2	428292	5927585	1650.77	Vertical	-90	213.36
1969	HR-3	428344	5927678	1619.72	Vertical	-90	185.93
1969	HR-4	428398	5927711	1602.48	Vertical	-90	235.00
1969	HR-5	428322	5927782	1588.99	Vertical	-90	91.44

Figure 6-1. Historic Exploration and Drilling.
(see end: Large Figures, P-2)

Three major seams have been identified in the Palisades area; from bottom to top they are Solomon, Hoff and Moosehorn. Rio noted more seams in the Coal Hill area and interpreted thrust fault repetition of the Grande Cache member of the Gates Formation on splays of the Collie Creek Thrust. Rio did not attempt to assign seam identification at the stage of exploration undertaken. As coal exposed in trenching was oxidized, cuttings from drillholes HR-1 to HR-4 were sent for proximate analysis to Cyclone Engineering Sales Ltd. of Edmonton, AB (Table 6-3). Samples were mainly low-volatile bituminous coal with variable F.S.I. due in part to contamination, wet seams and near-surface oxidation.

Historic drillhole intersection results were compiled using available geological logs, geophysical logs, and reported coal intersection summary logs. Historic coal intersections were reconciled to geophysical logs where available.

Table 6-3. Proximate Analysis for Rio Tinto Historic 1969 Drill Intersections.

Drillhole	Interval	Width	Ash %	Volatile Matter %	Residual Moisture %	Fixed Carbon %	F.S.I.
HR-1	425’-430’	5.0’	51.52	13.69	0.63	34.16	2, 2, 2½
HR-1	435’-441’	5.0’	20.04	17.67	0.57	61.72	5, 5½, 5½
HR-2	148'-151'	3.0’	31.95	15.75	0.63	51.67	6, 5½, 5½
HR-2	556’-562.5’	6.5’	57.57	11.81	0.86	29.66	1, 1, 1
HR-3	18'-20'	2.0’	50.66	13.74	1.15	35 .45	N.A.
HR-3	20 '-25'	5.0’	22.49	17.16	0.72	59.63	1, 1, 1
HR-3	25'-30 '	5.0’	5.80	18.27	0.69	75.24	3, 3½, 3½
HR-3	30'-36'	6.0’	11.55	18.59	0.54	69.32	6½, 6½, 6½
HR-3	46.9'-52'	5.1’	22.56	17.56	0.54	59.34	5½, 5½, 5½
HR-3	72.5’-78.2’	5.7’	12.55	19.48	0.53	57.44	9, 9, 9
HR-4	8.7’-11’	2.3’	35.83	31.51	3.96	28.70	N.A.
HR-4	11’-15’	4.0’	12.86	20.41	2.15	64.58	N.A.
HR-4	15’-17.5’	2.5’	12.52	1.02	1.02	73.85	½, ½, ½

(after Benkis, 1970)

Table 6-4. Rio Tinto and Denison Surface Coal Intersections from Trenches.

Name	Easting	Northing	Elevation (m AMSL)	Length (m)	Seam	Company	Year	Area
TR-RIO-B	428134	5928024	1531	86.0	Solomon	Rio Tinto	1969	Coal Hill
TR-RIO-D	428452	5927816	1577	30.1	Solomon	Rio Tinto	1969	Coal Hill
TR-RIO-E	428380	5927802	1589	7.0	Hoff	Rio Tinto	1969	Coal Hill
TR-RIO-F	428741	5927493	1617	17.5	Hoff	Rio Tinto	1969	Coal Hill
TR-RIO-M	428311	5927699	1613	45.3	Solomon	Rio Tinto	1969	Coal Hill
TR-RIO-N	428307	5927659	1627	9.1	Hoff	Rio Tinto	1969	Coal Hill
TR-RIO-C	428327	5927875	1569	11.3	Stray	Rio Tinto	1969	Coal Hill
WT-02	427936	5926851	1700	2.0	Moosehorn	Denison	1984	Coal Hill
WT-03	427945	5926873	1697	1.5	Solomon	Denison	1984	Coal Hill
WT-04	427958	5926909	1702	2.5	Solomon	Denison	1984	Coal Hill

6.2.2 Denison Exploration

In 1974, Denison carried out a small reconnaissance and trenching program. A detailed assessment of the Palisades Coal lease area over a 24 month period was undertaken beginning in early 1982 (Denison, 1984) which included:

- Geologic Mapping and Air Photo Interpretation on a 1:10,000 scale
- Trenching and mapping ten coal subcrop locations
- Geophysics: ground magnetometer and ground resistivity profiles
- Diamond drilling: 23 helicopter supported core drilling sites.

The mapping and air photo interpretation identified the major formation boundaries and large scale structural configuration of the Palisades area. Significant differences from the Rio mapping were noted in some areas, but the scarcity of good exposures required some generalization of interpretation. Trenching included re-opening of some Rio trenches as well as new excavation. Nine resistivity test lines totalling 8,050 m were run both along and across structural grain. A single magnetic survey was run to map concealed lithology along resistivity line 3 (2,500 m) across the entire central part of the property. No contrast in magnetic response was noted. The resistivity test line over two exposed seams demonstrated a response and depth of penetration of about 7 to 10 m. An adjacent line about

100 m northwest yielded a similar, more muted response. The rest of the resistivity lines were not successful in identifying subsurface traces of the coal seams.

The helicopter supported diamond drilling program included 18 holes drilled in 1982, many of which were shallow holes, and five holes drilled in 1983 (Table 6-5). Only 10 of the 23 holes intersected coal seams and samples from these were analyzed at General Testing Laboratories in Vancouver, BC to determine coal rank, quality, washability and rheological data.

Table 6-5. Drillholes – Palisades Property.

Year	Drillhole	Easting	Northing	Elevation (m)	Azimuth (°)	Inclination (°)	Depth (m)
1982	WH001DA	430366	5925918	1420	Vertical	-90	9.10
1982	WH002DA	430356	5925998	1427	Vertical	-90	30.80
1982	WH003DA	430403	5926053	1430	Vertical	-90	30.50
1982	WH004DA	430485	5926150	1406	Vertical	-90	30.63
1982	WH005DA	430606	5926078	1397	Vertical	-90	31.09
1982	WH006DN	430615	5923950	1544	41	-60	355.70
1982	WH007DA	429278	5924667	1561	Vertical	-90	30.48
1982	WH008DA	429737	5925281	1596	Vertical	-90	27.43
1982	WH009DA	429707	5925246	1590	Vertical	-90	15.24
1982	WH010DA	429615	5925147	1553	Vertical	-90	30.17
1982	WH011DN	430301	5925980	1426	40	-70	359.05
1982	WH012DA	429373	5924868	1563	Vertical	-90	27.58
1982	WH013DA	429374	5924869	1564	40	-60	29.41
1982	WH014DA	430293	5924334	1485	Vertical	-90	28.50
1982	WH015DN	428331	5927705	1611	Vertical	-90	303.00
1982	WH016DA	430255	5924270	1478	Vertical	-90	24.23
1982	WH017DA	427983	5926878	1699	220	-60	23.77
1982	WH018DN	428829	5926205	1480	220	-70	398.35
1983	WH019DN	427974	5927175	1671	Vertical	-90	271.95
1983	WH020DN	431520	5921750	1615	Vertical	-90	298.78
1983	WH021DN	429362	5924700	1535	Vertical	-90	296.03
1983	WH022DA	428521	5924775	1554	Vertical	-90	138.11
1983	WH023DN	425750	5926242	1382	Vertical	-90	182.01

Denison identified three distinct coal seam horizons: Solomon, Hoff and Moosehorn (from lowest to highest in section). A resource estimate was made for the Hoff lease block using a cross-sectional method and an estimated specific gravity from laboratory determinations. Denison estimated that the total in-place coal to 500 m depth for the three seams on the property was 139,216,000 tonnes.

Denison found that coal from the three seams was at the boundary of ASTM rank classification for low- and medium-volatile bituminous coal. Mean reflectance values (R_o) varied from 1.39% to 1.51%. Sulphur ranged from 0.40 to 0.65%. FSI values ranged from 6.5 to 9. Hardgrove Grindability index exceeded 100. All seams exhibited good swelling properties. One sample from the Solomon seam yielded a fluidity parameter of 111 ddpm and a dilation parameter of 48%. Other samples had poor dilation (Denison, 1984).

6.3 PRODUCTION

To the knowledge of the authors, no production has taken place on the Palisades Property.

7 GEOLOGICAL SETTING AND MINERALIZATION

7.1 REGIONAL GEOLOGY

The Palisades Coal Property is located on the eastern margin of the inner foothills of the Rocky Mountain thrust belt in west central Alberta. The rocks underlying the property occur within the predominantly continental Lower Cretaceous Luscar Group (Langenberg and McMechan, 1985) which is equivalent to the Blairmore Group in Sothern Alberta and Fort St. John Group in northeast B.C. (Figure 7-1). The Group is overlain by dark gray marine shales of the Shaftesbury Formation.

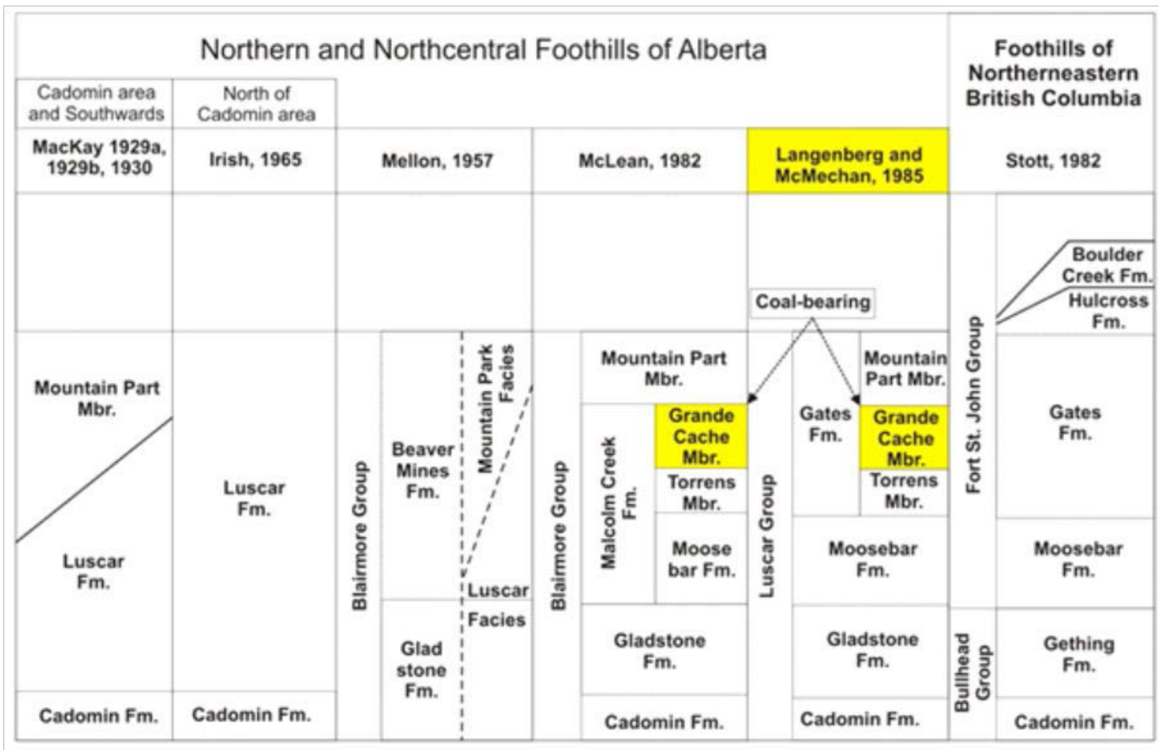

Figure 7-1. Stratigraphic Correlation (Modified from Langenberg et al, 1985).

Strata of the Luscar Group are divided into four Formations identified in ascending order as the Cadomin, Gladstone, Moosebar and Gates Formations. The Cadomin Formation consists of a very hard pebble conglomerate ranging from 5 to 10 m in thickness. It forms a resistant marker in the section but has only been identified in outcrop to the west of the property. The Gladstone Formation consists of a fining upward sequence of fine grained sandstone, shale and minor carbonaceous stringers. The lower part of the formation is interpreted to be braided stream deposits while the upper part appears to be of marine-estuarine origin. The formation ranges from 80 to 100 m in thickness on the property. The Moosebar Formation consists of dark gray marine shales conformably overlying the Gladstone. The formation is 35 to 55 m thick and presents a distinct marker for mapping in the area.

The Gates Formation contains the coal-bearing sequence in the Luscar Group, and consists primarily of sandstones, siltstones and coal cyclothems. The base of the Gates Formation is characterized by a massive medium-grained sandstone unit known as the Torrens Member, which conformably overlies the marine shales of the Moosebar Formation. The Torrens Member ranges from 20 to 40 m in thickness. Overlying the Torrens Member is the coal-bearing unit referred to as the Grande Cache Member. This Member consists of fine sandstones, siltstones and mudstones, and continuous coal seams. The Grande Cache Member is 85 to 95 m thick on the property, and within it, three distinct coal seams have been identified. The Grande Cache Member is overlain by the Mountain Park Member which consists predominantly of thick-bedded, fine- to medium-grained sandstone sequences with distinct siderite grains. This Member ranges from 200 to 275 m in thickness, and forms prominent ridges on the property.

The three distinct coal seam horizons identified in the Grand Cache Member, are the Solomon, Hoff and Moosehorn seams. The lowermost seam, the Solomon, is the most persistent and typically occurs directly above the Torrens Member sandstones. The Hoff seam occurs approximately 23 m above the Solomon Seam and is only locally identified on the central part of the Property. Elsewhere the Hoff seam thins out and grades into carbonaceous mudstone. The uppermost Moosehorn seam occurs approximately 26 m above the Hoff Seam, at or near, the top of the Grande Cache Member. The relative position of these coal seams is shown on Figure 7-2.

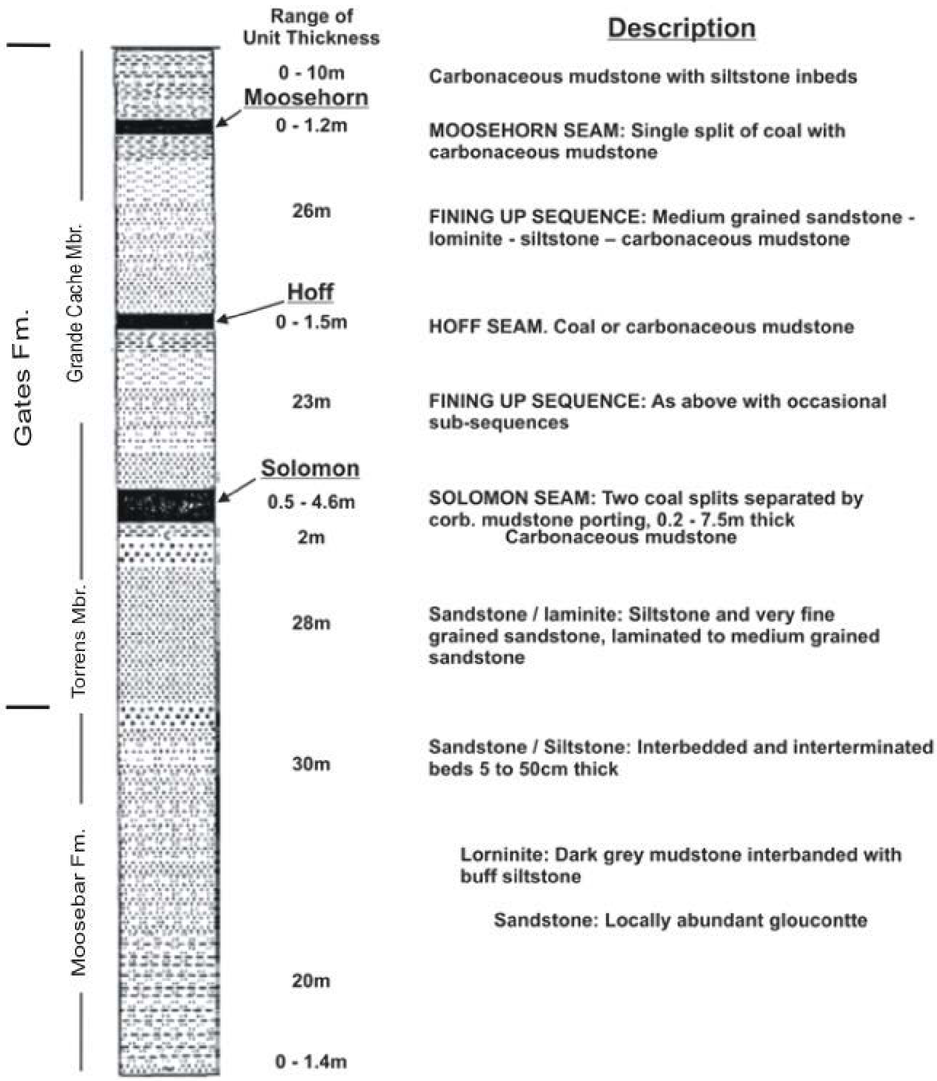

Figure 7-2. Generalized Stratigraphic Column in Palisades Area **(after Denison, 1984)**

Structural geology in the Foothills area of the Rocky Mountain Thrust Belt is characterized by west-dipping sub-parallel thrust faults of varying displacement, with generally northwest-southeast traces (Figure 7-3). These are accompanied by asymmetrical to overturned folds often with steep west to southwest-dipping axial planes which also trend northwest-southeast. Coal-bearing sediments of the Luscar Group are exposed in a northwest-trending belt bounded by over-thrust Paleozoic or pre-Jurassic Fernie Group sediments to the southwest, and younger mid to upper Cretaceous marine sediments of the Shaftsbury, Dunvegan and Kaskapau Formations to the northeast (Langenberg et al, 1987).

Figure 7-3. Regional Geology Map.

(see end: Large Figures, P-3)

7.2 PROPERTY GEOLOGY

Figure 7-4 presents the geology of the central and south Palisades Property. Detailed geology of the Coal Hill area south of the Wildhay River is presented in Figure 7-5. Exposure on the Property is generally limited to road cuts and along creeks, due to the recessive nature of much of the stratigraphic units, although more resistant sandstones of the Mountain Park and Torrens Members, as well as the chert-pebble conglomerate of the Cadomin Formation do outcrop locally on hillsides.

7.3 STRATIGRAPHY

The lowest observed strata on the property are quartzitic sandstones of the Lower Cretaceous Nikanassin Formation which underlie the Cadomin Formation. These are exposed along the Rock Lake and Collie Creek roads and along the southwest edge of the Property. The Cadomin conglomerate which is well-cemented and forms a distinctive marker unit containing abundant rounded chert pebbles. It is exposed along the Collie creek and Rock Lake road, as well as along the Moosehorn Creek trail, and on the northwest slope of Coal Hill. The best exposure on the Rock Lake road is about 10 m thick with, two conglomerate units separated by about 4 m of cross-bedded sandstone and siltstone showing fining-upward sequences.

The Gladstone Formation consists of rusty weathered, interbedded sandstones and mudstones, which were frequently bioturbated, and contain pelecypods shells and fragments. Its upper contact with the Moosebar Member is placed at a thin layer of glauconite-rich pebble conglomerate. Observed exposures of the Gladstone Formation on the Property, are limited to Moosehorn Creek north of Coal Hill and the creek south of Coal Hill, anecdotally called Trail Camp Creek.

The Moosebar Member of the Gates Formation is about 45 m thick in the area of the Wildhay River, based on drilling by Denison. It consists of a lower unit of laminated dark-grey siltstone or very fine-grained sandstone, overlain by interbedded siltstone and very fine-grained sandstone, becoming sandstone dominant and grading into the Torrens Member above. Bioturbation and slump features are common. Due to its recessive nature, outcrop is poor. Exposures of a dark grey shale-siltstone containing pelecypods casts on the Icewater Creek access, were interpreted to be the Moosebar Formation; however, these exposures may in fact be the Shaftsbury Formation in fault contact with the Grande Cache Member.

The Torrens Member of the Gates Formation is 25 to 28 m thick in the Palisades area. It is dominantly fine- to coarse-grained, grey to grey-green, well-cemented sandstone, in beds up to 2 m thick which can be cross-bedded, with subordinate interbedded or interlaminated siltstone and mudstone. Generally the upper contact is picked at the base of the first coal seam in the Grande Cache Member (Solomon), however in the Coal Hill-Icewater Creek area of the Property, 8 to 10 m of interbedded siltstone, shale and thin sandstone characteristic of the Grande Cache were noted between the well-cemented sandstones and the lowest coal seam, both in exposure along the Central Drill access road and in drill intersections. The prevalence of thrusting at various scales within the Grande Cache member makes this interpretation uncertain. Best exposures of the Torrens member were at and just uphill of the end of the drill access road the north side of Coal Hill at about N 5927500; E 427500.

The Grande Cache Member of the Gates Formation ranges from 74 to 92 m thick (based on drilling by Denison) on the Palisades Property. Substantial thickening through folding and thrusting, particularly in the Coal Hill area, has increased this to as much as 450 m. In other studies, the base of the Grande Cache is placed at the base of the Solomon seam, or the carbonaceous mudstone below it. As noted above, the transition from Torrens Member to Grande Cache Member on the Property appears gradational. The upper contact of the Grande Cache is placed at the base of the first massive sandstone above the upper Moosehorn seam. In the central part of the Property about 22 m of sandstones interbedded with siltstone and coaly shale characteristic of the Grande Cache overlie the Moosehorn seam, although it is roofed by about three metres of massive to cross-bedded sandstone. In the Coal Hill area at drillhole AP13-017, about 5 m of interbedded siltstone, shale and minor sandstone, overlie the Moosehorn seam. Denison (1984) observed fining-upwards cycles between the Solomon, Hoff and Moosehorn seams north of WH-006 in the central Palisades area. These cycles grade from clean, light-grey medium- to coarse-grained sandstone exhibiting a sharp contact with the underlying coal seam, through siltstone to carbonaceous mudstone and finally coal. In the area immediately north of Solomon (AP13-007, and trenches TR-AP13-024 and TR-AP13-025), sandstones containing chert grit or pebble conglomerate were observed above the Solomon seam.

The Mountain Park Member of the Gates Formation is defined by McLean (1982) as "thick to massive (sandstone) beds, with abrupt bases and usually a decrease in mean grain size upward." It ranges from 87 to 165 m in thickness on the Palisades Property, but is thicker in regionally. The sandstones are frequently resistant, thick, cross-bedded, fine-to medium-grained and often a distinct grey-green colour. Three dominantly sandstone units separated by mudstone are fairly consistent across the Property. Each sandstone unit contains laminations of siltstone and sandstone near the top. Thin, discontinuous coal seams may be present (Denison, 1984). The base is generally taken as the first major sandstone above the Moosehorn seam, and the top is placed at a thin (~½ m) chert pebble conglomerate at the base of the Shaftsbury Formation.

The Shaftsbury Formation is at least 175 m thick in the Palisades area. It subcrops extensively on the southern and eastern parts of the Property. It is mainly recessive dark-grey mudstone, with subordinate interbedded siltstone and sandstone. The basal chert-pebble conglomerate is a distinctive marker observed along the most southerly branch of Icewater Creek, and above Collie Creek along the 'Spine Line' on the North Palisades extension. Mapping and drilling in 2013 showed that the area underlain by Shaftsbury in the central and southern portion of the Property is even more extensive than previous mapping had inferred (Figure 7-4).

Figure 7-4. Property Geology – Central and South Palisades.
(see end: Large Figures, P-4)

Figure 7-5. Property Geology – Coal Hill Area.
(see end: Large Figures, P-5)

7.4 STRUCTURAL GEOLOGY

The Luscar Group sediments on the Palisades Coal Property are exposed in a northwest to southeast trending fold belt bounded on both margins by major thrust faults (Figure 7-4, Figure 7-5). The southwest boundary is marked by the Folding Mountain Thrust Fault which over-thrusts carbonate rocks of Mississippian age onto much younger Cretaceous strata. The northeast boundary is marked by the Collie Creek Thrust Fault which over-thrusts the Luscar Group strata onto younger Upper Cretaceous formations.

The large-scale structures containing the Luscar Group between these two major bounding faults, from west to east are the Moosehorn Syncline, Solomon Creek Anticline and Coal Hill Syncline. The south west limb of the Moosehorn Syncline is nearly vertical to slightly overturned. The axial hinge of this fold runs parallel to the Folding Mountain Thrust, suggesting deformation took place at the time this thrust fault was active.

The Solomon Creek Anticline appears to be asymmetric with the northeast dipping limb inclined at higher angles than the south west dipping limb. There is also some evidence that this fold is faulted locally along the axial hinge line by a steeply southwest dipping thrust fault. The adjacent Coal Hill Syncline is also asymmetric, dipping more steeply on the southwest limb.

The Collie Creek Thrust which marks the north-eastern boundary of the property is sub-parallel to the axial hinges of the fold structures, suggesting this major dislocation was subsequent to and not contemporaneous with the initial deformation events. Smaller splays above the Collie Creek Thrust dissect the folding and stack the Gates Formation, particularly in the area of Coal Hill. One of these splays (CH-8) brings the Grande Cache Member over the Mountain Park Member on the east side of Coal Hill. Trenching exposed tight drag folding adjacent to faults in several locations on Coal Hill. Repetition of coal seams in drillholes (e.g. AP13-007, AP13-016) appears to be the result of tight folding

While evidence from the current drilling on the property is not sufficient to accurately define structure on a local scale, except in restricted areas, there is apparent over-thickening, local thinning, and repetition of the coal section which supports a model of severe deformation and faulting in high compression zones at or near the axial hinges of these folds. (See Figure 7-6; Figure 14-2 to Figure 14-7)

Mapping at the workings of the old underground mines at Brule adjacent to the southeast (McKay, 1927) shows plastic deformation and over-thickening of the coal seams in anticline crowns and syncline hinges (Figure 7-6). The style of deformation is related to the mechanical nature of the Gates Formation. Effectively, the relatively weak coal-bearing Grande Cache Member is sandwiched between the resistant Torrens Member sandstone and the equally massive Mountain Park Member sandstone. During severe folding events, the weaker shale and coal units will literally detach and compress along bedding planes and flow towards hinge axes. This type of deformation, along with moderate displacement accommodating thrusts, appears to be dominant on the Property.

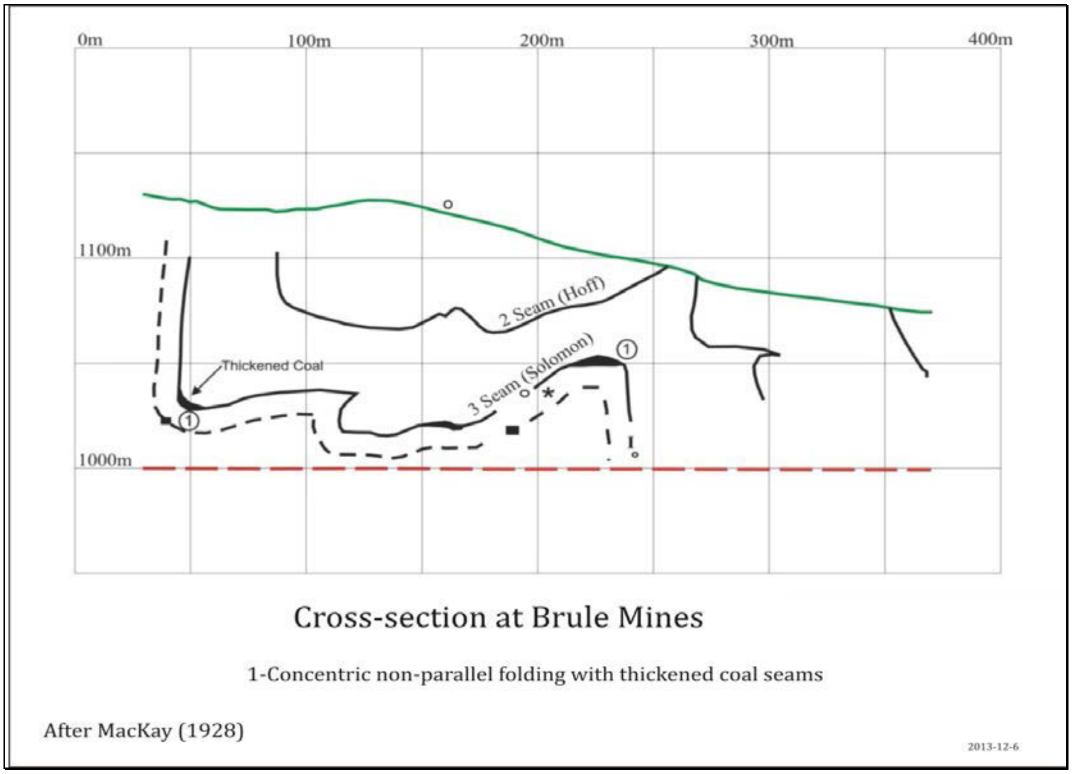

Figure 7-6. Cross-Section (Brule Mines) showing coal thickening at fold hinges.

7.5 MINERALIZED ZONES

The terminology used for identifying coal zones and individual seam plies has been adopted from Denison. Figure 7-2 shows a composite section of the Grande Cache Member including the main coal zones on the Property.

There are three coal zones recognized within the Grande Cache Member, identified in ascending order as the Solomon, Hoff, and Moosehorn. While these individual zones maintain relative stratigraphic position in the Palisades area, the thickness of individual seams and proportion of coal plies to rock partings in each zone is variable. The variation is both depositional and in some cases caused by structural distortion. Coal zones are often shared and appear to be preferred loci for thrust faulting. It should also be noted that observations regarding the continuity and character of these zones is based on very limited drill data spaced over a wide area, except in the Coal Hill area.

The Solomon Zone is the best developed coal zone on the property. It was intersected in twenty 2013 drillholes, and ten historic drillholes. Typically, it lies directly above the Torrens Member sands and consists of two major sub-seams separated by a carbonaceous mudstone parting. In the central and northern parts of the Property, there appears to be 8 to 10 m of interbedded siltstone, shale and sandstone below the seam. Seam thickness varies from hole to hole. In the southeast, (drillhole WH020DN), the zone contains 1.07 m of coal. In AP13-007, intersections of 2.7 and 4.4 m on opposite limbs of an anticline were oblique and not representative of true thickness. In trench TR-AP13-024, coal splits of 0.7 and 2.9 m were observed but are affected by thickening in the hinge of the anticline. In TR-AP13-025 the splits are 0.8 and 0.9 m which are likely close to true thickness. In the central area (drillhole WH021DN,) the seam thins to 0.53 m. Drillholes AP13-002 and AP13-003 cut split seams of about 1.1 and 0.3 m true thickness. In the northwest (drillhole WH023DN) the seam is 0.65 m thick.

The maximum development occurs in the Coal Hill area along the hinge of the Solomon Creek Anticline where seam thickness averages over 3 m (drillhole WH019DN, WH015DN and WH018DN and HR-3, HR-4). The thickest intersection is in WH015DN, at 4.6 m; this is likely showing the effect of structural thickening. In 2013, drilling aggregate thicknesses for the Solomon seam of up to 4 m were intersected in AP13-009, AP13-014, AP13- 015, AP13-016, AP13-026, AP13-027, but these included many shaley partings. A second area of thick coal is recorded in drillholes WH006DN and WH014DA where the seam averages over 2 m in thickness. Again this follows the crown of the Solomon Creek Anticline.

An unnamed stray seam, approximately 1 m thick, was intersected about 10 m below the Hoff seam in AP13-002 and AP13-003. This may correlate with the banded coal and coaly shale units intersected below the Hoff seam at Coal Hill (TR-AP13-013, TR-AP13-015 and AP13-017). A similar unit below the Moosehorn seam (TR-AP13-011, AP13-017) is also observed at Coal Hill.

The Hoff Zone occurs approximately 23 m above the Solomon Zone where no structural thickening is observed. The zone consists of a single seam which was only intersected in two historic drillholes in the central part of the Property: WH006DN (1.5 m thick) and WH019DN (0.9 m thick). The Hoff Zone was also intersected in AP13-002 (4.6 m thick, probably over-thickened) and AP 13-003 (2.3 m thick). In the Coal Hill area, the Hoff seam appears to split into two thin seams (estimated true thicknesses on 0.4 m and 1.0 m) separated by about 1 m of shale parting. Elsewhere, the zone deteriorates into thin coal stringers and carbonaceous shale.

The upper most coal zone, the Moosehorn Zone**,** is approximately 26 m above the Hoff Zone near the top of the Grande Cache Member. It is typically a single coal seam ranging from 0.9 to 1.2 m in thickness. In the Coal Hill area where there is significant fault repetition of the Grand Cache Member, the upper part containing the Moosehorn Zone is missing in some sequences.

8 DEPOSIT TYPES

A coal deposit, unlike most mineral deposits, is a distinct entity. As such, its characteristics are not defined by mineralization type, distribution and grade. Key characteristics contributing to the classification of a coal seam, or multiple seams, as a coal deposit, include seam thickness, seam continuity and correlation, and coal quality. Deposit type will also refer to the probable extraction method (i.e. surface or underground) and to the ultimate use for the coal (i.e. metallurgical or thermal), due to the fact that physical coal properties, such as the potential to coke, will restrict end use.

Coal deposit types are defined in Geological Survey of Canada (GSC) Paper 88-21, a core reference for coal deposits as specified in NI 43-101. Four categories are proposed:

1) surface mineable - extracted by removing overburden from surface using dragline, truck and shovel, or other techniques;
2) underground mineable - extracted using room-and-pillar, longwall, shortwall, hydraulic or other techniques from surface drivages;
3) non-conventional - deposits too deep or inaccessible by first two methods, requiring in situ gasification or other techniques; or
4) sterilized - unavailable for mining due to legislative, environmental or other restrictions. Section 2.2 of the NI 43-101 requires the disclosure of coal resources or reserves to follow the categories set out in CIM Definition Standards (2010), although the framework of GSC Paper 88-21 can be used for development and characterization of estimates which must then be converted to equivalent CIM Definition categories.

GSC Paper 88-21 also refers to geology types, which define the amount of geological complexity, usually imposed by the structural complexity of the area. This classification helps determine the approach to be used for resource estimation methodology, as well as limits to be applied to certain key estimation criteria. Four classes are provided:

1) 'low' - essentially flat-lying deposits of the Alberta plains type with low tectonic disturbance (deposits of Ravenscrag and Judith River Formations);
2) 'moderate' - characterized by broad folds and homoclines (wavelength >15 km, dips <30°) typical of outer foothills (Obed, Marsh, McLeod River, Ram River, Bullmoose deposits);
3) 'complex' - high tectonic disturbance, tight, steep, sometimes overturned folds, fault offsets present but individual fault-bounded plates (Harmer, Fording River, Grassy Mountain, Smokey River deposits);
4) 'severe' - extreme tectonic disturbance, tight, overturned folds, large-displacement faults, stratigraphic discontinuities, structurally thickened or thinned coal seams (Byron Creek Deposit, parts of Grassy Mountain Deposit).

The Property contains low- to medium- volatile bituminous coal suitable for metallurgical uses. Potential for both surface and underground-mineable resources exist. Resources fall mainly in the 'complex' category with some in the 'severe' category (Coal Hill area).

Defining resources in a 'complex' coal deposit requires close-spaced drilling. Typically, Measured Resources require cross-sectional drilling lines 150 m apart, Indicated Resources require lines 300 m apart, and Inferred Resources require lines 600 m apart. Drillhole data along these lines should be at a mean spacing of 100 m, 200 m and 400 m, respectively. Pit design requires measured and indicated resources at minimum in order to estimate tonnage and potential recovery. These criteria have been used in the resource estimation described in Section 14 of this report.

9 EXPLORATION

This technical report presents results of Altitude's 2013 exploration program on the Property. Site visits by the authors are described in Section 12. Details of the historic exploration programs on the Palisades Property are presented in Sections 6.

Work completed in 2013 on the Property included:

- Geological mapping at 1:10,000 scale was completed in areas of natural exposure. The road and trail network, reopened or constructed in 2013, exposed near-surface rock outcroppings and some coal seams (Figure 7-4, Figure 7-5)
- Trenching to define surface coal orientation and thickness along access trails and roads. Drill collar and trench locations are provided in Figure 9-1,
- Figure 9-2, Figure 10-1 and Figure 10-2.
- Reverse circulation drilling: 27 holes totalling 4,464 m (Details in Section 10)
- Sonic core drilling: 3 holes totalling 116 m (Details in Section 10)

9.1 MAPPING

Geological mapping across the property was undertaken by two geologists during the last week in July and first week in August, 2013. Additional mapping was carried out by site geologists as additional exposure was created by access construction. The focus of this effort was to verify and expand upon previous mapping, with particular attention to areas of proposed drilling. Outcrop is generally sparse on the Property except along creeks or where resistant sandstone units outcrop along ridge-tops. Coal-bearing units are recessive and seldom exposed except during access construction.

Observations of bedding attitudes and such structural information as cleavage, lineation and fault traces were made using a Brunton compass and hand-held Garmin 60CSx GPS units. A total of 261 stations were taken, primarily in the south drill access, central drill access, and north drill access (Coal Hill) (Figure 7-4, Figure 7-5).

Significant changes to geological interpretation made by Rio (Benkis, 1970) and Denison (1984) in the southern and eastern part of the property were noted. Areas mapped as Grande Cache and Mountain Park Members of the Gates Formation in the central and south Palisades areas are actually Shaftsbury Formation. The overturned anticline in the crossed by the central drill access road appears to translate laterally into a thrust fault, truncating Grande Cache sediments against the younger Shaftsbury Formation. The Coal Hill Syncline and Coal Hill Anticline are dissected by several splays from the Collie Creek Thrust which increases the thickness of Grande Cache Member and causes numerous seam repeats.

9.2 TRENCHING

Trenches were laid out in the south and central areas of the Property to cross-cut geology and facilitate refinement of drillhole location and orientation. Construction of the south access was delayed due to heavy rains in July and August and ultimately small trenches along the road cut to expose coal seams encountered during road rehabilitation were employed as an alternative (Table 9-1). These were marked and later surveyed by differential GPS (DGPS) at the same time as the drill collar locations. Central access trenches were constructed essentially as a road cut, mapped, surveyed and reclaimed (Figure 9-1).

Several seam intersections along the central drill access road were exposed in the cut bank, marked, measured and surveyed by DGPS as well to control surface expression for modelling. A similar approach was used on Coal Hill to constrain seam exposures in cut banks along drill access. In addition, seams in some of the historic trenches were added into the model in the same manner (Table 9-1). Selected trenches with clean coal intersections were sampled at 1.0 m maximum true thickness and sent to Birtley Laboratories in Calgary for proximate analysis.

Table 9-1. 2013 Surface Coal Intersections from Trenches.

Name	Easting	Northing	Elevation (m AMSL)	Length (m)	Seam	Company	Year	Area
TR-AP13-001	430658	5924322	1589	12.1	Carb. Shale	Altitude	2013	Central
TR-AP13-002	430625	5924328	1590	6.7	Carb. Shale	Altitude	2013	Central
TR-AP13-003	430621	5924142	1572	5.0	Stray	Altitude	2013	Central
TR-AP13-004	430465	5924109	1511	7.9	Stray	Altitude	2013	Central
TR-AP13-005	430277	5924301	1479	14.6	Moosehorn	Altitude	2013	Central
TR-AP13-006	430300	5924360	1479	11.9	Hoff	Altitude	2013	Central
TR-AP13-007	430319	5924492	1475	29.4	Solomon	Altitude	2013	Central
TR-AP13-008	431766	5921480	1553	19.2	Solomon	Altitude	2013	South
TR-AP13-009	431773	5921523	1548	11.4	Solomon	Altitude	2013	South
TR-AP13-010	427758	5927463	1613	11.1	Moosehorn	Altitude	2013	Coal Hill
TR-AP13-011	427781	5927471	1604	7.6	Stray	Altitude	2013	Coal Hill
TR-AP13-012	427918	5927492	1588	13.4	Solomon	Altitude	2013	Coal Hill
TR-AP13-013	427950	5927531	1593	4.9	Stray	Altitude	2013	Coal Hill
TR-AP13-014	427962	5927543	1589	3.7	Hoff	Altitude	2013	Coal Hill
TR-AP13-015	427994	5927547	1584	3.3	Stray	Altitude	2013	Coal Hill
TR-AP13-016	428022	5927551	1582	12.5	Solomon	Altitude	2013	Coal Hill
TR-AP13-017	428067	5927616	1573	4.9	Hoff	Altitude	2013	Coal Hill
TR-AP13-018	428238	5927853	1542	3.1	Solomon	Altitude	2013	Coal Hill
TR-AP13-019	428252	5927855	1546	5.1	Solomon	Altitude	2013	Coal Hill
TR-AP13-020	428263	5927937	1555	5.1	Solomon	Altitude	2013	Coal Hill
TR-AP13-021	428218	5927929	1536	2.6	Moosehorn	Altitude	2013	Coal Hill
TR-AP13-022	428429	5927857	1583	6.4	Solomon	Altitude	2013	Coal Hill
TR-AP13-023	428419	5927585	1609	6.7	Solomon	Altitude	2013	Coal Hill
TR-AP13-024	431799	5921433	1564	8.5	Solomon	Altitude	2013	South
TR-AP13-025	431790	5921417	1563	11.0	Solomon	Altitude	2013	South

Figure 9-1. Exploration – Central and South Palisades.

(see end: Large Figures, P-6)

Figure 9-2. Exploration – Coal Hill Area.

(see end: Large Figures, P-7)

10 DRILLING

A total of 27 rotary drillholes and 3 sonic core holes, were drilled during the 2013 exploration program (Table 10-1; Figure 10-2) in order to constrain the current geological interpretation. In addition, 28 historic drillholes and 10 historic trenches (Table 6-1; Table 6-2; Table 6-4) were used in the interpretation and modelling. Drill collars and access were surveyed using a DGPS, and down-hole deviation surveys and borehole geophysics were conducted on all rotary holes. Sonic core holes were surveyed by chain and compass from adjacent rotary pilot holes.

Data compiled from the historic reports displayed some uncertainties in the drillhole dataset. Historic drillhole locations were extracted from original exploration reports, geological logs, and geophysical logs when available. Local grid locations were converted to a UTM NAD 83 Zone 12N projection format and confirmed against exploration maps. If collar locations were not provided, approximate locations were georeferenced from exploration maps and validated against cross-sections and topography. Rotary and core hole collar information was generally well constrained for X-Y co-ordinates, but less reliable for Z co-ordinates. Down-hole directional information was limited to inclination and azimuth.

Table 10-1. 2013 Drill Campaign Drillhole Summary.

Drillhole	Easting	Northing	Elevation (m AMSL)	Depth (m)	Azimuth	Inclination	Area	Type
AP13-001	430560.49	5924778.49	1499.90	175.00	50	-60	Central	Rev. Circ
AP13-002	430271.84	5924220.64	1477.70	180.90	50	-60	Central	Rev. Circ
AP13-003	430290.53	5924352.77	1477.52	202.20	50	-60	Central	Rev. Circ
AP13-004	430841.62	5925141.36	1410.21	211.80	230	-60	Central	Rev. Circ
AP13-005	431924.77	5921199.42	1481.70	212.00	50	-60	South	Rev. Circ
AP13-006	432042.85	5921369.52	1501.87	185.00	50	-60	South	Rev. Circ
AP13-007	431827.95	5921425.10	1563.33	105.00	24	-60	South	Rev. Circ
AP13-008	432484.15	5922019.90	1433.26	157.50	Vertical	-90	South	Rev. Circ
AP13-009	428207.31	5927932.48	1533.54	230.70	Vertical	-90	Coal Hill	Rev. Circ
AP13-010	428250.73	5927998.99	1563.14	212.40	50	-55	Coal Hill	Rev. Circ
AP13-011	428366.39	5927870.33	1574.90	185.00	50	-60	Coal Hill	Rev. Circ
AP13-012	428370.52	5927871.39	1574.93	160.50	Vertical	-90	Coal Hill	Rev. Circ
AP13-013	428169.93	5927815.72	1534.70	166.50	50	-60	Coal Hill	Rev. Circ
AP13-014	428166.11	5927814.12	1534.66	218.50	Vertical	-90	Coal Hill	Rev. Circ
AP13-015	428010.60	5927787.00	1550.14	233.80	Vertical	-90	Coal Hill	Rev. Circ
AP13-016	428011.59	5927787.59	1550.30	178.60	50	-60	Coal Hill	Rev. Circ
AP13-017	427747.48	5927471.91	1609.61	153.50	50	-60	Coal Hill	Rev. Circ
AP13-018	427945.22	5927539.35	1588.63	120.90	40	-60	Coal Hill	Rev. Circ
AP13-019	428567.36	5927732.82	1531.10	102.60	50	-70	Coal Hill	Rev. Circ
AP13-020	428500.85	5927673.56	1556.35	96.50	Vertical	-90	Coal Hill	Rev. Circ
AP13-021	428498.25	5927672.85	1556.35	111.75	240	-70	Coal Hill	Rev. Circ
AP13-022	428433.28	5927574.02	1598.04	160.50	Vertical	-90	Coal Hill	Rev. Circ
AP13-023	428361.33	5927511.29	1663.33	163.80	Vertical	-90	Coal Hill	Rev. Circ
AP13-024	428361.93	5927511.82	1663.39	148.50	50	-60	Coal Hill	Rev. Circ
AP13-025	428100.87	5927822.99	1530.29	151.40	Vertical	-90	Coal Hill	Rev. Circ
AP13-026	428046.34	5927660.05	1564.30	148.30	Vertical	-90	Coal Hill	Rev. Circ
AP13-027	428046.34	5927660.05	1564.30	93.50	50	-70	Coal Hill	Rev. Circ
APC13-007	431767.45	5921437.96	1562.00	33.54	Vertical	-90	Coal Hill	Sonic Core
APC13-016	428011.59	5927787.59	1550.30	50.31	50	-60	Coal Hill	Sonic Core
APC13-020	428500.85	5927673.56	1556.35	32.01	50	-50	Coal Hill	Sonic Core

Figure 10-1. 2013 Drillhole Locations – Central & South Palisades.

(see end: Large Figures, P-8)

Figure 10-2. 2013 Drillhole Locations – Coal Hill Area.

(see end: Large Figures, P-9)

10.1 REVERSE CIRCULATION DRILLING

Boart Longyear of Calgary, AB were contracted to provide a track-mounted Foremost MPD 1500 reverse circulation rotary drill rig for the 2013 program. Drilling began August 15 and ended September 17, 2013. Twenty-seven 5½" diameter holes totalling 4,466.7 m were drilled. Depths ranged from 93.5 to 233.8 m. Seven inch casing was set and removed following downhole logging. Each hole was cemented. Collars were marked with treated 4x4" posts set into the concrete and marked with metal tags.

Drillhole collar locations were surveyed by Foothills Surveys Ltd. of Hinton, AB using DGPS methods. Downhole azimuth and deviation surveys using APS and Reflex Gyro systems were run in rods, by DGI Geoscience Inc of Toronto, ON. Borehole geophysical logging tools for density and natural gamma were run in rods by DGI, and where conditions permitted, density, natural gamma, guard resistivity and single-arm caliper were also run in the open hole. Several holes had either partial or no open-hole logs due to blockage or collapse.

Drilling chips were collected from a 32" diameter cyclone and a 32" diameter "Anaconda" style rotating 16 vane wet splitter. Chips were logged lithologically. Coal intersections greater than 0.5 m were sampled in cloth bags at 0.5 or 1.0 m intervals, and composited in the field. Composites were sent to Loring Laboratories of Calgary, AB for proximate analysis.

Table 10-2. Samples for Proximate Analysis: Reverse Circulation Coal Intersections.

Sample	Drillhole	From (m)	To (m)	Length (m)	Seam	Comments
AP003-001	AP13-003	63.8	66.3	2.50	Solomon	
AP003-002	AP13-003	189.0	194.0	5.00	Solomon	
AP007-001	AP13-007	21.0	24.7	3.65	Solomon	
AP009-001	AP13-009	66.4	68.0	1.60	Solomon	
AP014-002	AP13-014	120.7	126.0	5.30	Solomon	
AP014-003	AP13-014	154.9	164.2	9.30	Moosehorn	Excludes parting 156-162.80
AP014-004	AP13-014	168.6	170.5	1.90	Hoff	
AP014-005	AP13-014	178.2	180.5	2.30	Hoff	
AP014-006	AP13-014	206.0	214.0	8.00	Solomon	Excludes parting 206-207
AP015-001	AP13-015	118.4	119.8	1.40	Hoff	
AP016-001	AP13-016	17.2	19.2	2.00	Solomon	
AP016-002	AP13-016	36.0	43.3	7.30	Solomon	Excludes 4 m parting
AP017-001	AP13-017	49.9	50.7	0.80	Hoff	
AP017-002	AP13-017	138.3	140.8	2.50	Solomon	Includes parting 139.2-140m
AP020-001	AP13-020	27.0	29.0	2.00	Solomon	
AP021-001	AP13-021	82.0	83.5	1.50	Solomon	
AP024-001	AP13-024	54.5	56.7	2.20	Hoff	
AP024-002	AP13-024	109.2	111.9	2.70	Solomon	Excludes Parting 109.5-110.6
AP026-001	AP13-026	62.8	65.0	2.20	Solomon	
AP026-002	AP13-026	69.0	75.0	6.00	Solomon	
AP026-003	AP13-026	91.0	93.0	2.00	Solomon	

Drilling in the south area of the Property was planned to investigate two separate areas of the Grande Cache Member shown by Denison mapping to be brought near surface by parallel anticlines (Ulry, 2012). Three drillholes in the western area (AP13-005, AP13-006, AP13-007) confirmed the presence of a tight anticline supporting the Solomon seam exposed in trench WT-10, but determined that the Gates Member is cut off by a thrust fault (Figure 7-4) which limits the extent of the area underlain by coal-bearing strata to the east. Drillhole AP13-008 showed that the eastern area mapped as Grande Cache member is in fact Shaftsbury Formation (Figure 7-4).

Drilling in the Central area demonstrated a similar situation in which drillholes AP13-002 and AP13-003 penetrated the Grande Cache Member and intersected all three seams; however, drillholes AP13-001 and AP13-004 only intersected Shaftsbury shales. The anticline supporting the exposure of the Grande Cache Member is once again cut off by a thrust fault, placing it over the younger Shaftsbury Formation to the east (Figure 7-4).

Drilling in the Coal Hill area totalled 19 holes on two lines trending nominally at 050°. Lines followed contours and so some holes had to be projected into section (Figure 14-2 to Figure 14-7). At several sites, a vertical and an inclined hole were drilled in an effort to constrain dips and true thickness of coal seams (Figure 7-5; Table 10-1). At least four repetitions of parts of the Grande Cache Member due to thrust fault splays of the Collie Creek Thrust are present. This increases the thickness of the Grande Cache to as much as 450 m on Coal Hill, and results in numerous seam repetitions and dissection of folds (Figure 7-5). It appears that thrusting favours less competent coal seams and coaly shales, causing shearing, attenuation and intercalation of shale. For this reason, the lower part of the Grande Cache section, including the Solomon seam, is preferentially represented. All three major seams are present. Both the Solomon and Hoff seams are split with numerous shale partings. In most drill intersections, only 1.0 to 1.5 m of clean coal was cut.

10.2 SONIC CORE DRILLING

Boart Longyear of Calgary, AB were contracted to provide a track-mounted SR 160 sonic drill rig, capable of drilling 4” and 6” core and inclined holes. The sonic program began September 23 and ended September 29 with demobilization on September 30. Three holes totalling 115.9 m were drilled in order to twin rotary holes AP13-020, AP13-016 and AP13-007 for the purpose of obtaining unoxidized coal core intersections for detailed analysis. Holes were drilled to intersect coal as close to true thickness as possible. Expected coal intervals were drilled dry to reduce potential washout. Core was extruded into plastic liners and placed in wooden boxes. Lithologies were logged and photographed, and coal and coaly shale partings and transitional beds were sampled in their entirety, and placed in sealed plastic bags (Table 10-3). Some coal intervals were dry, and others wet due to formational water. Partial washout of a seam in both APC13-007 and APC13-016 was suspected. Thrusting and adjacent drag folding displaced and removed part of the Solomon seam in APC13-016, which was intersected in AP13-016.

Table 10-3. 2013 Sonic Core Samples.

Sample	Drillhole	From (m)	To (m)	Length (m)	Description
APC020-001	APC13-020	27.64	28.90	1.26	Coal
APC016-001	APC13-016	16.60	16.91	0.31	Coal
APC016-003	APC13-016	17.56	18.55	0.99	Shale-coaly shale
APC016-004	APC13-016	18.55	18.95	0.40	Coal
APC016-005	APC13-016	18.95	19.35	0.40	Coaly shale
APC016-006	APC13-016	32.00	32.20	0.20	Coal
APC016-007	APC13-016	32.20	33.15	0.95	Shale
APC016-008	APC13-016	33.15	33.60	0.45	Coaly shale -shale
APC016-009	APC13-016	33.60	34.25	0.65	Coal
APC016-010	APC13-016	34.25	34.40	0.15	Coaly shale
APC016-011	APC13-016	35.95	36.30	0.35	Coaly shale
APC016-012	APC13-016	36.30	37.80	1.50	Coal
APC016-017	APC13-016	37.80	38.40	0.60	Coaly Shale
APC016-013	APC13-016	44.20	44.40	0.20	Coaly shale
APC016-014	APC13-016	44.40	44.60	0.20	Coal
APC016-015	APC13-016	44.60	45.72	1.12	Coal-coaly shale
APC016-016	APC13-016	46.95	47.24	0.29	Coal
APC007-001	APC13-007	30.48	30.98	0.50	Coal
APC007-002	APC13-007	30.98	31.28	0.30	Shaley Coal
APC007-003	APC13-007	31.28	32.05	0.77	Brown Coal
APC007-004	APC13-007	32.05	32.31	0.26	Coal
APC007-005	APC13-007	32.31	32.71	0.40	Brown Coal

11 SAMPLE PREPARATION, ANALYSES, AND SECURITY

Coal samples were collected during the 2013 exploration program from reverse circulation drilling, core drilling and trenches. Different protocols were used for sampling and analysis. They are described below.

11.1 REVERSE CIRCULATION SAMPLING

Lithologic chip samples were collected by the driller's helper, from the cyclone sample stream several times for each 3 m run. They were rinsed and placed in a chip tray with the drillhole number and interval marked. Trays were collected by the site geologist and logged. Coal chip samples were collected by members of the drill crew from the cyclone sampling output stream under supervision of a site geologist. The driller was instructed to stop drilling at first signs of coal, circulate and drill at 0.5 m intervals. Each interval was bagged separately in a cloth bag to allow wet samples to drain. Each bag was marked and tagged with the appropriate interval at the drill. Samples were collected by the site geologist from the drill, taken to camp, allowed to drain and inspected. Seam samples under 0.5 m were rejected, as were dominantly shale samples. Samples were composited for each seam, packed in sealed labeled plastic bags. The bags were placed in sealed plastic pails and transported by a Dahrouge geologist directly to Loring Laboratories Ltd. in Calgary, AB for analysis (Table 10-2).

11.2 CORE SAMPLING

Sonic core was extruded into plastic liners from the core tube in nominal 5 ft (1.52 m) lengths and placed in core boxes for logging and photographing by the site geologist. Coal intervals, adjoining coaly shale intervals and partings less than one metre were sampled separately and placed immediately into sealed plastic bags with sample number and interval marked. The site geologist transported the samples to camp, where they were sealed in plastic pails. Samples were transported by the site geologist back to the Dahrouge office in Edmonton, AB, and shipped via courier to the Birtley Coal and Mineral Testing Division of GWIL Industries Inc. in Calgary, AB (Table 10-3).

11.3 TRENCH SAMPLING

Trenches with coal exposure that was not obviously degraded were sampled with continuous chips by the site geologist. Seams were sampled as one, or in some cases two samples where thickness or lithologic variation was apparent. Samples were sealed in plastic bags and labelled. They were sealed into plastic pails and transported by the site geologist back to the Dahrouge office in Edmonton, AB, and shipped via courier to the Birtley Coal and Mineral Testing Division of GWIL Industries Inc. in Calgary, AB (Table 9-1).

11.4 PETROGRAPHIC SAMPLES

Petrographic analysis was conducted on seven composite washed sonic core samples and six full seam washed trench samples to ascertain coal rank and composition. The samples were prepared and analyzed by David Pearson and Associates in Victoria, BC.

11.5 LABORATORY SAMPLE PREPARATION AND ANALYSIS

Composited reverse circulation samples were delivered directly to Loring Laboratories Ltd. of Calgary AB. Upon receipt, samples were weighed and air-dried. Samples were crushed to minus 9.5 mm if required, and a representative split of 2.5 kg was selected for analysis. A raw proximate analysis (air-dried moisture, ash, volatile matter, fixed carbon) and sulphur was determined according to ASTM specifications (Table 13-1). Sink/float determination was made at 1.60 SG and both fractions weighed. The clean float samples were subjected to full proximate analysis, as well as sulphur, and FSI (Free Swelling Index). HGI (Hardgrove Grindability Index) was not determined as samples were too fine. These results are discussed in Section 13.

Composited sonic core samples were sent via courier to Birtley Coal and Mineral Testing in Calgary, AB. As with reverse circulation, samples were weighed, air-dried and crushed to pass minus 9.5 mm if required. Samples were weighed, air-dried, and then re-weighed. A proximate analysis plus sulphur was performed on the air-dried raw composites (Table 13-4). Centrifuge float/sink analysis was performed at 1.50 SG and 1.60 SG and both fractions were analyzed for proximate analysis, sulphur and FSI). All seven composite float samples were further tested for Gieseler fluidity, Ruhr dilatation, and ash chemistry (Table 13-6). Two samples, 134069 and 134095 showed no activity for either fluidity or dilatation tests and were likely oxidized. A third sample, 134068 was partially oxidized. These results are discussed in Section 13.

Petrographic samples were forwarded directly from the analytical labs to David E. Pearson & Associates Ltd. of Victoria BC

11.6 QUALITY CONTROL AND QUALITY ASSURANCE

Laboratories used for coal analysis during the Palisades program have established industry experience. Loring Laboratories Ltd. has been providing coal analytical services for more than 40 years. They are ISO 9001 Certified and the Palisades coal samples were analyzed using ASTM D2013, D3173, D3174, D3175, D4239, D720 standards. Birtley Coal and Minerals Testing have provided coal analytical testing for 35 years. They also adhere to ASTM and ISO preparation and testing specifications and have quality control processes in place. They have participated in the International Canadian Coal Laboratories Round Robin Series (CANSPEX) since its inception. Pearson Coal Petrography has provided services in Victoria since 1981. They operate to ISO standards, undertake routing calibration of photometers and potentiometers, and employ two methods of vitrinite reflectance as a means of quality assurance. They also perform a monthly internal round robin check between their four labs worldwide. Vitrinite reflectance was employed in part to provide an independent valuation of coal rank.

Reverse circulation and core intervals containing coal were sampled in 2013 using project-defined procedures, processed as raw and clean coal samples, and analysed as described. The major issues affecting coal quality analyses during the program were:

i. the imprecise nature of the reverse circulation sampling (thin coal intersections were poorly recovered or grossly over-contaminated with out-of-seam rock) as reflected by the high ash content (typically greater than 50%) and the fine size of the material which did not allow for a reasonable clean 1.60 SG separation. As such the value of this RC sample information is limited to the determination of coal rank only (expressed as DAF (dried, ash-free) volatile matter content).

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ii. the pulverized nature of the sonic core material which did not allow for representative screen sizing of the recovered core section. While the sonic technique provided the necessary 100% recovery of the total seam section, washability testing of the coarse and fine fractions of the coal was not possible; so two simple 1.50 SG and 1.60 SG float sink fractions were recovered from the whole core sample to serve as proxies for clean coal testing. This consisted of full proximate analysis, fluidity, dilatation, ash chemistry and petrography.

The seven full seam trench samples collected during the program were oxidized and of no practical use for FSI testing. Two of the samples were below 9.5% ash and regarded as "clean coal" The other five higher ash samples were crushed to minus 9.5 mm and washed at 1.60 SG to create clean proxies. All seven were then analyzed for petrographic composition to compare with the sonic core data.

The results are discussed in Section 13.

12 DATA VERIFICATION

Author Robert Engler visited the Property on August 18-20, September 19-21 and September 28-29, 2013. He reviewed geology and stratigraphy, reverse circulation drilling and sampling methodology, as well as sonic core sampling and methodology. Author John Gorham visited the Property August 11-21, 28-31 and September 1-6 and 12-30, 2013. He reviewed and supervised drill and trench site location, and sampling, as well as shipping and security of trench, reverse circulation and sonic core samples. He also reviewed surface mapping by site geologists. Author William Miller did not visit the Property.

Historical data including mapping, geophysical logs, location data and coal intersections were reviewed and verified for consistency. As mentioned in the previous section, original logs and analytical data were not always available. The authors have relied on the professional quality of the historic work. The authors have concluded that work completed by Rio Tinto and Denison was completed in a professional manner that was consistent with the data collection and reporting standards of the time.

Some limitations to the data set generated during the program were noted. These included sampling inconsistencies in the reverse circulation program, and missing (3) or incomplete (5) open-hole geophysical surveys due to poor ground conditions and collapse of the open holes. Some difficulty in seam and structural correlation resulted.

Potential issues affecting quality control during the program included variability in lithologic sampling and coal interval sampling. Although protocols were established for both procedures, site geologists found drill personnel were at times varying the procedures. The regularity, with which chips were retrieved, sieved, and washed varied from shift to shift, and even within shifts, so lithologies in some cases were effectively averaged to a 3 m run. Coal sample intervals were found to have been arbitrarily changed to 1.0 m from 0.5 m on more than one occasion. The 0.5 m protocol was chosen to minimize contamination while being practical for drilling rates. It must be assumed that some part of the top of a seam would be lost, as the driller must react quickly to an increase in penetration rates and stop drilling, circulate to observe cuttings for coal and initiate coal sampling. Similarly, the last sample of a given seam has potential to include some of the floor rock before the driller can react and stop cutting. As the sample interval approaches the actual seam thickness, under-reporting and rock contamination increase. It must be assumed that this was a factor in the Palisades program.

Lithologic chip sampling during rotary drilling is by its nature imprecise, as circulation return time varies with depth. Some depth correction, especially for sharp lithologic changes such as coal seams, can be achieved with downhole geophysical logs, which provide more accurate depth picks and thicknesses for seams. Of the 27 reverse circulation holes drilled in the 2013 program, three holes (AP13-010, AP13-013 and AP13-025) had no open-hole logs due to collapse when rods were pulled. Five holes (AP13-003, AP13-005, AP13-006, AP13-014 and AP13-018) had only partial open-hole logs due to blockages after rods were pulled. Seam and lithologic picks for these holes were either unavailable, or incomplete, reducing confidence in geological and seam correlations.

Selected historic drillhole and trench information from programs by Rio Tinto and Denison was used to support geologic interpretation from 2013 drilling information. This integrated interpretation was used in the current resource estimation. Altitude and Dahrouge were not involved in the historic coal quality sampling programs. Original logs and analytical information for the historic drilling and trenching were not available. Although the Rio Tinto program employed conventional theodolite surveying of collars and trenches in the Coal Hill area, details for Denison program were unavailable, therefore collar locations were georeferenced. The authors acknowledge some uncertainty, especially in elevations for this information. Reliance on seam picks and thickness was based on the assumption of employment of best practices on the part of geological professionals for both companies.

The authors note that inconsistencies in adherence to sampling protocols may have reduced sample quality and contributed to some of the relatively high ash contents observed in some reverse circulation samples. Washout in two sonic core seam intersections may have contributed to under-reporting of seam thickness. The lack of open-hole geophysical logs in three drillholes, and the partial blockage of other holes reduced the ability to interpret subsurface geology and seam correlation, reducing somewhat the robustness of the geological model upon which resource estimation is based. The lack of outcrop in many areas of the Property also hampers geological and structural interpretation.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 COAL QUALITY ASSESSMENT

This section deals with an assessment of coal quality for the Palisades Property based on previous work Reported by Denison Mines Ltd in 1983 and the results of coring and sampling undertaken during the 2013 exploration campaign.

13.1.1 COKING COAL QUALITY ASSESSMENT PARAMETERS

The main analytical criteria for coking coal evaluation are:

Coal Rank and Petrographic Composition

Coking coals only occur within a certain coal rank window as measured by vitrinite reflectance (R_o Max). The range is from R_0 1.0 to 1.6 (high-volatile to low-volatile bituminous). Palisades coking coals are typically low-volatile bituminous (R_0 1.45 to 1.53).

As a general statement, the value of a particular coking coal is related its ability to form a hard coke product during carbonization. The mechanical strength of produced coke is measured by its resistance to abrasion. The ASTM coke stability test places 3 inch lump coke in a tumbler drum and screens the coal on a 1 inch screen after 1400 revolutions. The amount remaining on the screen (expressed as a percent of total sample) is the Stability Index. In general, results over 55% are good, 60 to 65% are excellent. The Japanese run a similar test; the JIS drum Index D1 30/15; where 50 mm top size coke is rotated for 30 revolutions and the percentage of -15 mm is measured. Both tests do essentially the same thing and the results from one can be "translated" into the other format.

The strength of coke produced can be determined by the petrographic composition of the organic elements of the coal, called macerals. These are divided into reactive macerals (those that melt during coke making) and inert macerals (those that don't). It is important to have the right ratio of reactives to inerts to produce a strong coke.

Research conducted by US Steel proved that the ASTM coke stability Index could be predicted with a high degree of accuracy using petrographic (microscopic) analysis to determine two key criteria:

- coal rank as determined by the reflectance of vitrinite in a coal sample (R_0 Max)
- the amount of inert (non-melting) macerals within a coal sample.

The advantage to this technique is that it allows for a very accurate, cost effective test without the expense of having to physically produce a coke sample.

The following chart produced by David Pearson and Associates shows this fundamental relationship between rank, inerts and coke stability:

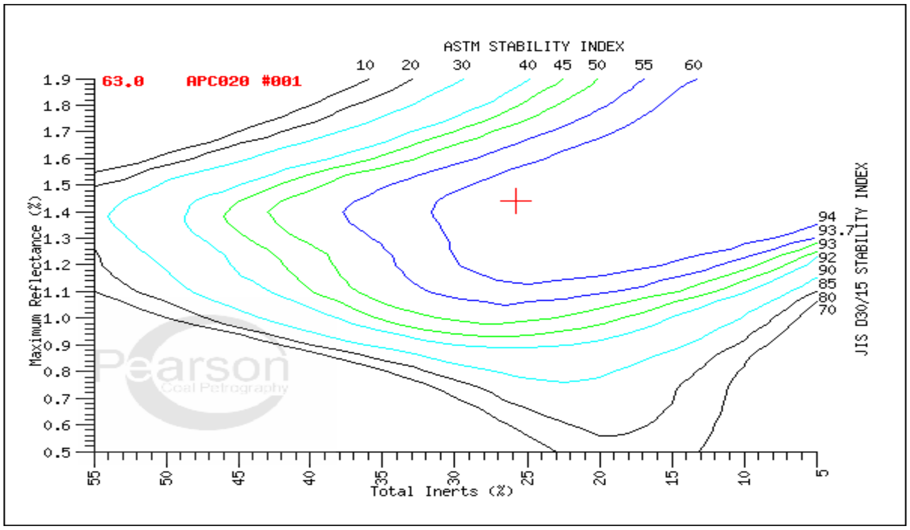

Figure 13-1. Relationship between Rank (R_0 Max), percent Inerts, and Coke Stability

The diagram shows that plotting the petrographic indices for rank (R_0 Max) and total inerts for any coal sample will allow a prediction of coke stability. In this particular example the plotted red cross is a sample from the Solomon seam (Sonic core APC13-020); with a stability of 63, which is excellent. One may also observe that if the level of Inerts increases or the R_0 value starts to go up, the stability decrease.

The breakdown of coal macerals into reactives and Inerts is based on whether they melt during the carbonization process. The reactives melt; the inerts as the name implies do not. Reactive macerals are typically vitrinite, half of the semifusinite, and exinite. Inert macerals are half of the semifusinite, fusinite (which is charcoal), micrinite and mineral matter. The relative proportion of these maceral types is determined by the composition of the original source materials.

Free Swelling Index (FSI)

This test measures the caking/swelling property of a coal sample when heated in a crucible in the absence of air. The resulting coke button is measured for expansion on a scale of 1 to 9. A good coking coal will have an FSI greater than 5. This is an easy test to perform and is used as an initial screening tool.

Rheology

The Gieseler Fluidity and Arnu Dilatation tests measure the plastic properties of coking coal through the heating cycle from initial melting temperature through to final solidification temperature. The fluidity test measures the viscosity of the coal when melted in a fluid state (measured in ddpm) and the dilatometer measures expansion and contraction during devolatization. Coals with higher fluidity properties are good for blending, and low-pressure expansion and contraction on final coking are desirable in coke ovens.

Ash Chemistry

In addition to the stability index, coke stability after reaction (CSR) is an important evaluation parameter for evaluating a coking coal type.

When coke descends in the blast furnace, it is subjected to reaction with countercurrent carbon monoxide (CO), and abrasion. These concurrent processes weaken the coke and chemically react with it to produce excess fines that can decrease the permeability of the blast furnace burden.

The CRI/CSR test measures coke reactively in carbon monoxide at elevated temperatures and its strength after reaction by tumbling. In the test, 200g of $^{+}$19 x $^{-}$22 mm sized coke is reacted in a vessel with CO gas for 2 hours at 1100°C. The weight loss after the reaction equals the CRI. The reacted coke is then tumbled in an I-shaped tumbler for 600 revolutions at 20 rpm and then weighed. The weight percent of the $^{+}$ 10mm coke equals the CSR. Most blast furnaces will require a coke with a CSR greater than 60 and CRI less than 25.

Research has shown that ash chemistry is a key factor in determining CSR values. The presence of alkaline elements such as Fe, Ca, Na and K has a catalytic effect on the reaction of CO with coke, resulting in an accelerated breakdown in the blast furnace. Consequently, coals with low alkaline content will have the highest, most desirable CSR characteristics.

Nippon Steel and Kobe Steel have developed formulas to predict CSR and CRI values. The input parameters are coal rank (R_0), fluidity and ash chemistry.

The other evaluation aspect that warrants consideration is the phosphorous content of the coke. The acceptable maximum limit is 0.27% P_2O_5 in coke; which means the coal should have less than 2.5% P_2O_5 in the ash.

13.2 COKING COAL QUALITY TESTING RESULTS

13.2.1 HISTORIC RESULTS (DENISON)

The historic Denison work conducted in 1981/82 was summarized in the Technical Report *Resource Estimate for the Palisades Coal Property* (Engler and Morris, 2011) filed on SEDAR. The report concluded:

- The coal underlying the Palisades Coal Property is low-volatile bituminous coking coal as defined by ASTM D-388 and confirmed by an average R_0 value of 1.51.
- The raw, in situ coal ash content varied from 48.24 to 11.41% with an average value of 29.8%. Limited washability testing showed that a clean coal product in the 10% ash range could be produced at a 1.50 SG cut-point.
- The clean coal had a volatile matter content of 19 to 20% dry basis and a sulphur content averaging 0.50%. The phosphorous level in coal was low, ranging from a high of 0.085% to a low of 0.005%. FSI values ranged from 7 to 9, indicating good coking capacity.
- The coal had low fluidity values and acceptable dilatation values.
- Petrographic analysis indicated a good predicted stability factor of plus 50 at a reactives/inerts ratio of 70%/30%.

The primary historic data was based upon 10 HQ diamond drillholes. The recovery was poor in general due to the friable nature of these coals and as such only ten of the twenty seven cored sections could be considered representative.

13.3 2013 RESULTS

The 2013 program was designed to extend the known quality information of the Palisades deposit from the northern Coal Hill prospect area, where most of the previous Denison/Rio historic data was concentrated, southward to Solomon Creek. Coal quality confirmation was to be achieved by sonic coring (which has excellent full-seam recovery) and detailed trench sampling of previously documented near surface coal outcrops. As outlined in Section 9, exploration drilling south of Coal Hill proved that the coal bearing section as previously mapped was in error and consequently only limited coal intersections were encountered. The limited number of intersections in turn limited the opportunity to collect representative seam cores, so the 2013 data set is small.

13.3.1 Reverse Circulation Samples

Reverse circulation chip samples were collected from each coal intersection encountered. In almost all cases, these samples were high in ash content, suggesting considerable rock contamination. The raw samples were floated at 1.60 SG and both proximate analysis and FSI were conducted on the floats. The results are shown on the following Table 13-1.

Table 13-1. Reverse Circulation Composite Proximate Analyses (air dried).

Sample	Seam	% Moisture	% Ash	% Volatiles	% DAF Volatiles	% Fixed Carbon	1.60 float Ash	1.60 float FSI	% Sulphur
AP003-001	Solomon	7.2	65.56	10.78	17.76	23	29.58	3.5	0.43
AP003-002	Solomon	13.1	59.45	12.06	18.25	27.69	21.01	7.5	0.36
AP007-001	Solomon	15.2	54.97	13.14	16.66	30.88	17.25	2.5	0.3
AP009-001	Solomon	16	54.98	12.82	18.85	31.51	15.2	5	0.33
AP014-002	Solomon	16.3	34.94	16.98	19.70	47.47	16.84	4	0.76
AP014-003	Moosehorn	12.4	65.52	12.69	27.03	21.03	31.71	7	0.34
AP014-004	Hoff	11.9	60.57	12.01	16.64	26.67	26.39	6.5	0.3
AP014-005	Hoff	11.8	60.37	11.33	18.88	27.5	16.8	8.5	0.32
AP014-006	Solomon	12.8	44	13.75	19.01	41.62	16.89	7	0.53
AP015-001	Hoff	8.7	45.23	13.27	17.17	40.76	26.47	2.5	0.44
AP016-001	Solomon	10.5	58.06	12.32	15.11	28.56	33.82	0	0.28
AP016-002	Solomon	12.3	56.79	12.7	15.75	29.77	30.65	3.5	0.69
AP017-001	Hoff	7.7	70.89	10.7	17.45	17.66	29.41	4.5	0.31
AP017-002	Solomon	3.8	59.24	12.64	18.14	27.54	18.94	6.5	1.09
AP020-001	Solomon	9.7	31.28	16.68	20.07	51.6	12.86	7	0.4
AP021-001	Solomon	6.4	47.28	14.19	20.38	37.88	17.14	8.5	0.4
AP024-001	Hoff	12.2	53.81	12.79	18.79	32.8	22.79	3.5	0.3
AP024-002	Solomon	17.7	50.02	13.84	15.72	35.55	40.68	2	0.33
AP026-001	Solomon	15.6	50.11	13.68	16.22	35.52	27.89	3.5	2.54
AP026-002	Solomon	14.8	53.36	13.56	18.31	32.32	26.29	7.5	1.57
AP026-003	Solomon	15.8	54.19	14.09	17.37	30.97	26.08	5	1.91

Most of the samples fall in the low-volatile bituminous rank on a dry, ash-free (DAF) volatile matter basis (average 18.5% volatiles). One sample, (AP014-003) falls into the mid-volatile category. Ash content is generally high, with 16 of 21 samples containing over 50% ash on an air dried basis. The 1.60 float separation did not achieve a good ash separation due to the fine particle size of the material and therefore should not be considered representative of washing performance. Sulphur values are low, generally below 0.5% and FSI values range from 2 to 8.5, with an average of 5. The low-volatile rank determination by DAF volatile matter is the key parameter of values from these chip samples as it is the least affected by bias in this imperfect sampling technique.

13.3.2 Trench Samples

Seven full seam trench samples were excavated on the property, five in the Coal Hill area and two in the south near Solomon Creek. As these were all near-surface samples, the coal was oxidized and therefore had no rheological properties (FSI, fluidity, and dilatation). As these sampled sections are complete in terms of recovery, they are useful in characterizing the in situ ash content and petrographic makeup of the coal. Proximate analysis and sulphur content was conducted on the raw and 1.60 SG clean coal material. The results are shown in the following table.

Table 13-2. Trench Sample Proximate Analysis

Sample	Thickness (m)	Raw Ash% dry basis (db)	Clean Coal Proximate Analysis 1.60 SG float					
			Yield %	Ash % db	VM % db	VM% daf	S % db	FSI
Solomon Seam								
TRAP012-001 Coal Hill	1.2	22.75	77.14	13.39	27.81	32.11	0.44	0
TRAP012-002 Coal Hill	2.4	10.05	100	10.05	26.46	29.42	0.43	0
TRAP019-001 Coal Hill	1.4	7.56	100	7.56	29.99	32.44	0.43	0
TRAP023-001 Coal Hill	1.3	30.75	61.24	11.76	25.34	28.72	0.49	0
TRAP024-001 South	2	24.16	52	13.58	26.52	30.69	0.39	0
TRAP025-001 South	1.8	28.43	45.5	14.64	24.78	29.03	0.37	0
Moosehorn Seam								
TRAP010-001 Coal Hill	1.4	29.44	47.2	10.96	29.32	32.93	0.42	0

The results show that the surface trench samples are lower in ash content than the contaminated reverse circulation samples. The raw coal in situ ash content ranges from 7.56% to 30.75%. The 1.60 SG yield values are encouraging but should not be regarded as definitive. The volatile matter and FSI results are distorted by oxidation and should be disregarded.

In order to establish coal rank, these samples were analyzed for petrographic composition. The results are shown in the Table 13-3.

Table 13-3. Trench Sample Petrographic Analysis

Trench Samples Petrographic Analysis, Clean Coal										
Sample	Reflectance	Reactive Macerals			Inert Macerals					
	Ro Max	Vitrinite	Semi-Fusinite	Total Reactives	Semi-Fusinite	Fusinite	Inerts	Macrinite	Mineral Matter	Total Inerts
Solomon Seam										
TRAP012-001 Coal Hill	1.35	68.6	7.9	76.5	7.9	2.3	6		7.3	23.5
TRAP012-002 Coal Hill	1.47	60.8	11.9	72.7	11.9	4.5	5.1	0.2	5.6	27.3
TRAP019-001 Coal Hill	1.49	58.4	14.2	72.6	14.2	7.3	1.7		4.2	27.4
TRAP023-001 Coal Hill	1.37	71.1	8.4	79.5	8.4	3.2	2.4		6.5	20.5
TRAP024-001 South	1.5	53.5	15	68.5	15	5.2	3.5	0.4	7.4	31.5
TRAP025-001 South	1.49	50.4	14.9	65.3	14.9	8.3	2.8	0.7	8	34.7
Moosehorn Seam										
TRAP010-001 Coal Hill	1.34	71.6	7.9	79.5	7.9	3.4	3.2		6	20.5

The results show R_0 Values ranging from 1.34 for the Moosehorn seam, to 1.50 for the Solomon seam near the southern boundary of the property. It is not surprising to see a rank of 1.34 for the Moosehorn as it is stratigraphically at the top of the section and should have a lower rank (in this case mid - volatile) than the lower Solomon seam. What is surprising is the two mid-volatile R_0 values for the Solomon seam (1.35 and 1.37 respectively) and it may be possible these seams are misidentified in this complex structural regime. The compositional ratio of reactives to inerts averages 72%/28% which is excellent and should result in a high ASTM stability coke product, with a predicted value of 64.

13.4 Sonic Core Samples

Three sonic core holes were completed on the property, two in the northern Coal Hill area, and one near a large trench exposure in the south near Solomon Creek with mixed results. In drillhole APC13-020, a relatively clean 1.26 m Solomon seam was collected with excellent recovery.

Drillhole, APC13-016 intersected five fault-repeats, or in some cases splits of the Solomon seam. The initial split seam was intersected at 16.6 m with poor recovery and oxidised coal (Sample 001). The next intersection from 18.5 to 19.5 m was also oxidized and high ash (Samples 004 and 005). The third section from 32 to 34.4 m was a mixture of coal and shaley coal (Samples 006 to 010). The fourth section, from 36.3 to 37.8 m was a full 1.50 m of coal (Sample 012). The final section was recovered from 42.0 to 43.9 m. This section was predominantly shaley coal (Samples 014 to 016).

The third hole, APC13-OO7 was drilled near trench TR-AP13-024 where a 2 m thick Solomon intersection was measured. The sonic hole intersected this same zone at 50 m, but the recovered 2.2 m section was almost entirely shaley coal.

As a consequence of this, only drillhole APC13-020 and sample interval 012 from drillhole APC13-016 could be considered "coal sections". The remaining samples had a large amount of shaley coal. The results of the raw coal proximate analysis are shown in the following table:

Table 13-4. Sonic Core Composite Head Raw Analysis (air dried basis).

Seam	Sample	Moisture%	Ash%	Volatiles%	F.C.%	S%	FSI*
Solomon Coal Hill	**APC020-001**	0.41	*16.66	18.65	64.28	0.49	7
			+16.73	18.73	64.54	0.49	
Solomon Coal Hill	**APC016-001**	0.38	*37.77	13.29	48.56	0.35	0
			+37.91	13.34	48.75	0.35	
Solomon Coal Hill	**APC016-004 to 005**	0.58	*47.96	12.48	38.98	0.28	0
			48.24	12.55	39.21	0.28	
Solomon Coal Hill	**APC016-006 + 008 to 010**	1.2	*52.45	12.42	33.93	0.49	0
			+53.09	12.57	34.34	0.5	
Solomon Coal Hill	**APC016-012**	1.73	*43.17	12.48	42.62	0.88	1
			+43.93	12.7	43.37	0.9	
Solomon Coal Hill	**APC016-014 to 016**	0.97	*47.41	13.16	38.46	0.54	1
			47.87	13.29	38.84	0.55	
Solomon South	**APC007-001 to 005**	0.8	*63.13	9.67	26.4	0.27	0
			+63.64	9.75	26.61	0.27	

*adb: air dried basis
+ db: dry basis

In order to assess the potential clean coal coking characteristics of these sonic core samples, the raw samples were washed at 1.60 SG and if required, 1.50 SG in an attempt to produce a 10% ash clean product (Table 13-5).

Table 13-5. Sonic Core Washability Analysis

Sample	Thickness (m)	Raw Ash% db	Float SG	Clean Coal Proximate Analysis					
				Yield %	Ash % *db	VM % *db	VM% *daf	S % *db	FSI
Solomon Seam									
APC13-020 Coal Hill	1.26	16.73	1.6	82.25	8.67	17.03	18.65	0.53	8
APC13-016 001 Coal Hill	0.31	37.91	1.5	27.85	12.5	17.08	19.52	0.53	0
APC13-016 004-005 Coal Hill	0.8	48.28	1.5	11.6	10.75	17.56	19.68	0.48	0
APC13-016 006, 008-010 Coal Hill	1.45	53.09	1.5	17.21	8.75	20.03	21.95	0.75	8.5
APC13-016 012 Coal Hill	1.5	43.17	1.5	28	11.05	17.41	19.57	0.64	4.5
APC13-016 014-016 South	1.61	47.87	1.6	28.3	9.92	19.94	22.14	0.68	9
APC13-007 South	2.23	63.64	1.5	3.47	13.94	17.33	20.14	0.52	0.5

* db = dry basis

+daf = dry, ash-free

The results show an excellent yield, clean product ash and high FSI value of 8 for APC13-020. Lower yields were expected from the high ash samples of APC13-016 and the 0 FSI value in the upper section of the hole confirms that these samples are oxidized. The lower section samples show good FSI and ash values. The sample from sonic core hole APC13-007 is mostly shale and the small amount of clean coal recovered at 1.50 SG is only useful in determining rank by reflectance. The low FSI also confirms oxidation in this seam.

These clean coal samples were analyzed for fluidity and dilatation to get some values for the plastic properties of this coal. The results of these test is shown in Table 13-6. These same samples were analysed for petrographic composition (Table 13-7).

The results show low fluidity values ranging from 7 to over 40 which is typical of western Canadian low volatile coal. The dilatation test shows these coals are contracting (-22% average) and have positive dilatation, both of which are good for coke-making. The oxidized samples exhibit no plastic properties at all.

Table 13-6. Sonic Core Samples Rheology

Sample	Gieseler Fluidity: Initial Soft (Ddpm*)	Max. Fluidity (Ddpm*)	Solidif-ication	Range	Max. Ddpm	Dilatation: Soft Temp °C T1	Max. Contr. Temp °C T2	Max. Dil. Temp °C T3	Contrac-tion %	% SD 2.5
APC13-020	445	469	494	49	6.9	400	463	487	23	5.7
APC13-016 001	Oxidized									
APC13-016 004-005	Oxidized									
APC13-016 006,008-010	438	475	500	62	40.5	421	451	484	21	38
APC13-016 012	450	475	501	51	3.7	400	500	-	23	-
APC13-016 014-016	436	466	497	61	47.3	406	445	476	21	51.1
APC13-07 South	Oxidized									

* Ddpm = dial divisions per minute

Table 13-7. Sonic Core Petrographic Analysis

Solomon Seam	Reflectance: R_0 Max	Reactive Macerals: Vitrinite	Semi-Fusinite	Total Reactives	Inert Macerals: Semi-Fusinite	Fusinite	Inerts	Macrinite	M.M.*	Total Inerts	Pred. Stab.
APC13-020	1.44	61.1	13.1	74.2	13.1	6.3	1	0.6	4.8	25.8	**63**
APC13-016 001	1.47	53.4	15.8	69.2	15.8	5.4	1.5	1.1	7	30.8	**60**
APC13-016 004-005	1.49	45.7	20.1	65.8	20.1	5.8	2.1	0.2	6	34.2	**56**
APC13-016 006,08-010	1.49	92.2	0.8	93	0.8	1	0.4		4.8	7	**65**
APC13-016 012	1.49	47.3	18.6	65.9	18.6	6.9	1.3	1.1	6.2	34.1	**56**
APC13-016 014-016	1.52	80.7	4	84.7	4	4	1.5	0.4	5.4	15.3	**65**
APC13-007 south	1.53	67.8	10.2	78	10.2	3.3	0.4	0.06	7.5	22	**63**

*M.M. = Mineral Matter

The results show a consistent trend in rank increasing slightly from R_0 1.44 in the north to 1.53 in the south. This is a relatively consistent rank for the Solomon Seam and agrees with trench sample petrography and historic Denison results. The relatively clean seam in drillhole APC13-020 shows an excellent ratio of reactives/inerts of 74/26 and an excellent predicted stability of 63. The lower stability in the two samples from APC13-016 (samples 004-005, and 012) are attributed to low vitrinite content in these same samples. The drillhole APC13-007 sample shows similar reactives/inerts composition to drillhole APC13-020 and the same excellent predicted stability of 63.

The last phase of lab testing was for the determination of coal ash chemistry. The results for the ten element ash analysis conducted on the clean sonic core samples are shown in Table 13-8.

Table 13-8. Sonic Core Ash Chemistry

Sonic Core Petrographic Analysis, Clean Coal												
Sample	Acid Elements			Basic Elements								
Solomon Seam	SiO_2	Al_2O_3	TiO_2	CaO	BaO	SrO	Fe_2O_3	MgO	Na_2O	K_2O	P_2O_5	Un-det.
APC13-020	61.41	27.68	1.37	1.02	0.3	0.09	2.56	0.88	0	1.49	0.52	0.57
APC13-016 001	68.24	22.47	1.95	0.38	0.17	0.03	1.83	0.7	0.08	1.47	0.26	0.05
APC13-016 004-005	67.49	20.82	1.27	0.57	0.13	0.01	5.1	1.21	0.97	1.72	0.33	0.05
APC13-016 006,008-010	60.47	24.26	2.51	0.59	0.39	0.03	4.3	1.89	0.35	2.82	0.29	0.1
APC13-016 012	70.27	19.27	1.25	0.7	0.17	0.03	3.77	0.75	0.18	0.92	0.22	0.3
APC13-016 014-016	61.26	26.02	1.97	0.43	0.19	0.03	3.63	1.66	0.42	2.72	0.28	0.12
APC13-007 south	61.41	27.68	1.37	1.02	0.3	0.09	2.56	0.88	0	1.49	0.52	0.57
Average Value	64.86	23.42	1.72	0.62	0.23	0.04	3.53	1.18	0.33	1.86	0.32	0.2
STD	4.28	3.18	0.51	0.23	0.1	0.03	1.18	0.5	0.35	0.76	0.11	0.2

The results shown very low alkaline element content, averaging 7.8% with a maximum of 10.4%. The base/acid ratio averages 0.010 ± 0.002 which is excellent and should produce a coke with high CSR values of at least 70. The Phosphorous level is extremely low. Expressed on a whole coal basis as Phosphorous in Coal, the value is 0.014 ± 0.003. Both the low alkaline and phosphorous content are very positive attributes for steel making coking coals

The relatively small population of samples collected in 2013 make it difficult to characterize the quality attributes of the Palisades coal on a definitive basis. However the results achieved are supported by historical work and as such are considered indicative of the expected coking coal that could be produced from the property. In summary:

1. The rank of the coal has been confirmed as low-volatile bituminous coking coal for the Solomon Seam. The DAF volatile matter content averages 18.5% and the R_0 Max values range from 1.47 to 1.53
2. The coal can be washed to a 10% clean product with FSI values ranging from 7 to 9, The sulphur content is low, averaging 0.5%
3. The fluidity values are low ranging from 7 to 40 which is typical of western Canadian low volatile coal. The dilatation test shows these coals are contracting (-22% average) and have positive dilatation, both of which are good from a coke making perspective
4. Petrographic analysis shows an average maceral composition of 70% reactives/30% inerts which results in a predicted stability value of 63 which is excellent
5. Ash analysis shows a very low total alkaline content of 10% ± 2%. The expectation based on this chemistry is for a high CSR value (estimated at 70)
6. The coal has an extremely low phosphorous content , averaging 0.014% on a whole coal basis

All of the foregoing would confirm this is a very good low-volatile hard coking coal (HCC) which would be ranked with the first tier international brands in terms of market value.

14 MINERAL RESOURCE ESTIMATES

Geological Classification

As the stratigraphic and structural complexity of a coal deposit increases, a greater number of data points are required to assign the coal to measured, indicated, or inferred resource categories. Data points are defined as locations where a coal seam, or a marker horizon indicating the proximity to a coal seam, is exposed. Valid data points were obtained from drillhole intersections, trenches, and surface outcrop. Table 14-1 outlines the resource classification criteria for different geology types. Figure 14-3 through Figure 14-7 present cross-sections through various parts of the property. These are indexed to geology in

Figure 14-2.

Table 14-1. Resource Classification Categories (Hughes et al., 1989).

Geology Type	Resource Classification (Distance from Point)		
	Measured	Indicated	Inferred
Moderate	0-450 m	450-900 m	900-2,400 m
Complex	0-100 m	100-200 m	200-400 m
Severe	0-50 m	50-100 m	100-200 m

A **moderate geology** type occurs where the deposit has only been subjected to limited tectonic deformation. This may include faults with displacements of less than 10 m, although these should be uncommon. Homoclines and broad open folds with wavelengths less than 1.5 km may also be present and bedding should not exceed 30°.

A **complex geology** type occurs where a deposit has been subjected to relatively high levels of tectonic deformation. Fault bounded blocks within this deposit type generally retain their normal stratigraphic sequence and seams will have only rarely been modified from their pre-deformational thickness. Tight folds with steeply dipping or overturned limbs can be present and offsets by faults are common.

A **severe geology** type occurs where extreme tectonic deformation has occurred. The stratigraphic sequence is commonly disturbed and difficult to ascertain, whereas coal seams are often structurally thickened and thinned from their pre-deformational state. Tight folds, steeply inclined and overturned beds, and large displacement faults are common.

Density

Reverse circulation and sonic core samples taken in 2013 were too fine for meaningful density determinations. Historic density information for deposits on the Property is limited to determinations from whole core made by Denison. The bulk density values compare reasonably to estimates suggested in GSC Paper 88-21, which shows low volatile bituminous coal with bulk densities ranging from 1.52 g/cm^3 to 1.66 g/cm^3 having ash contents of 25% to 35%.

A lower bulk density value of 1.52 g/cm^3 was used as a conservative estimate, although ash contents determined from coal samples taken in 2013 suggest that higher densities for some seam intersections could be supported.

Geological Interpretation and Block Modelling

The modelling methodology used for the resource estimation for all areas of the Property consisted of the following steps:

- Import data into the mining software package (Maptek Vulcan 8.2™).
- Database validation and error checking.
- Create fault surface triangulations using surface fault traces as well as fault/drillhole intersections.
- Create area data subsets and blank fault block triangulations.
- Correlate drillholes, trenches, and surface exposures on or directly adjacent to the Property.
- Create final fault blocks by applying a Boolean Test to a blank fault block solid using the fault surface triangulations.
- Grid the topography and base of weathering triangulation surfaces (10 m). Base of weathering was created at a depth 8 m below topography.
- Run FixDHD on each sub area to create Mapfile Databases.
- Create seam grids (10 or 25 m) and triangulations in Model Stratigraphy using the FixDHD Mapfile Databases, topography grid, and base of weathering grid. Seam grids were cropped against the base of weathering grid to remove oxidized coal. Fault blocks were modelled using a combination of stacking surfaces and trending types.
- Create HARP (Horizon Adaptive Rectangular Prism) block models for each sub area using the parting and thickness grids as qualities. Blocks were 20 x 20 m with a sub-blocking of 2 (x and y directions) in the Coal Hill area, and 50 x 50 m with a sub-blocking of 2 in the regional area.
- Classify block confidence using the distance of the block centroid to the nearest data point based on the criteria in Table 14-1.
- Determine the cumulative stripping ratio for each block of coal within the model (total volume of waste/total tonnage of product).
- Apply a parting factor (coal thickness/aggregate seam thickness).
- Calculate the coal resources for each sub area based on the criteria in Table 14-2.
- Constrain resource estimation by the current Altitude lease boundaries.
- Constrain resource estimation to coal bed thickness greater than 0.6 m for measured, indicated, and inferred classification.

Table 14-2. Resource Reporting Criteria for Surface-Mineable Resources.

Area	Resource Criteria			
	Coal Bed Thickness	Partings	Stripping Ratio	Geology Type
Coal Hill	> 0.6 m	Not Included	< 1:20	Complex
Central-South Palisades	> 0.6 m	Not Included	< 1:20	Complex

Probable Method of Extraction

For the purpose of resource classification in this report, only surface minable resources were considered. Surface resources were considered to be those with a cumulative stripping ratio of less than 1:20 (tonne coal to cubic metre of waste) and coal bed thicknesses greater than 0.6 m.

14.1 RESOURCE SUMMARY

The in-place resources for the Coal Hill and regional areas of the Palisades Property are summarized in Table 14-3 . These areas are outlined in Figure 14-1. Seam thickness was adjusted to exclude partings. An average estimated depth of oxidization of 8 m was used as this is the depth of weathering determined at the nearby Grande Cache Coal mine (van Eendenburg et al, 2011).

Table 14-3. In-Place Surface-Mineable Coal Resources Summary for Palisades Property.

Area	Seam	In-Place Coal Resources (TONNES) Stripping Ratio Cutoff 20:1			
		ASTM Group	**Measured**	**Indicated**	**Inferred**
Coal Hill	Moosehorn	Low-Volatile Bituminous	360,086	28,526	22,204
	Hoff	Low-Volatile Bituminous	1,039,122	177,362	28,020
	Solomon	Low-Volatile Bituminous	2,764,818	588,687	108,156
Central-South Palisades	Moosehorn	Low-Volatile Bituminous	164,411	395,533	433,008
	Hoff	Low-Volatile Bituminous	435,873	500,751	690,076
	Solomon	Low-Volatile Bituminous	1,250,401	1,783,363	3,295,427
	Total Property		**6,014,711**	**3,474,222**	**4,576,891**

Figure 14-1. Palisades Coal Resource Projections and Exploration Targets.

(see end: Large Figures, P-10)

Figure 14-2. Cross-section Line Locations.

(see end: Large Figures, P-11)

Figure 14-3. Cross-Section A-A' – Coal Hill (see Figure 14.2 for location)

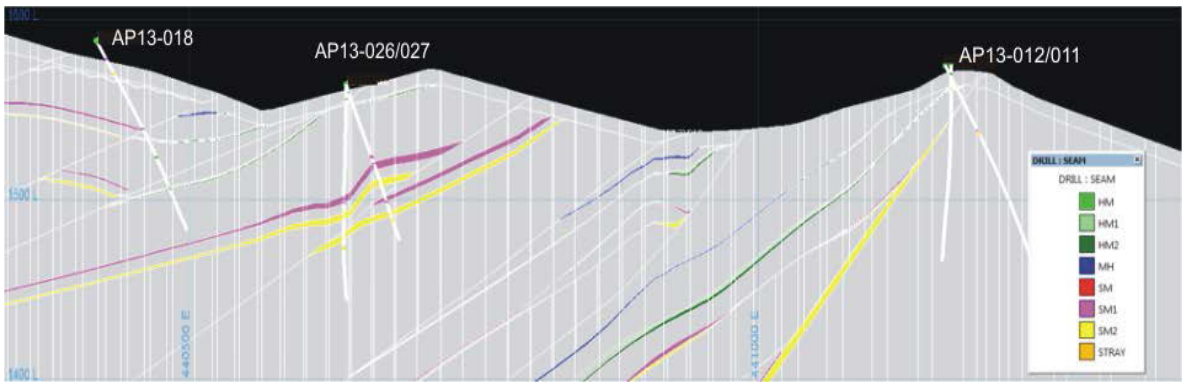

Figure 14-4. Cross-Section B-B' – Coal Hill (see Figure 14.2 for location)

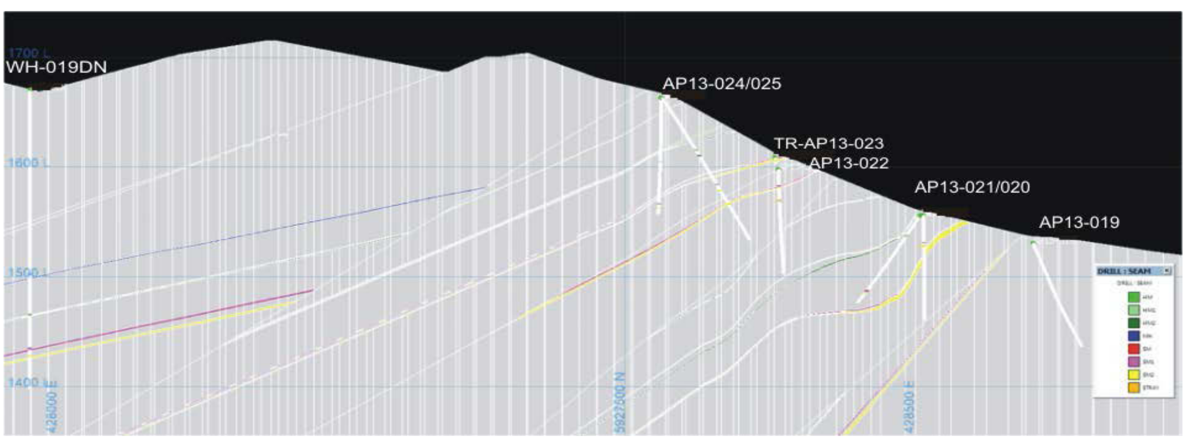

Figure 14-5. Cross-Section C-C' – Coal Hill (see Figure 14.2 for location)

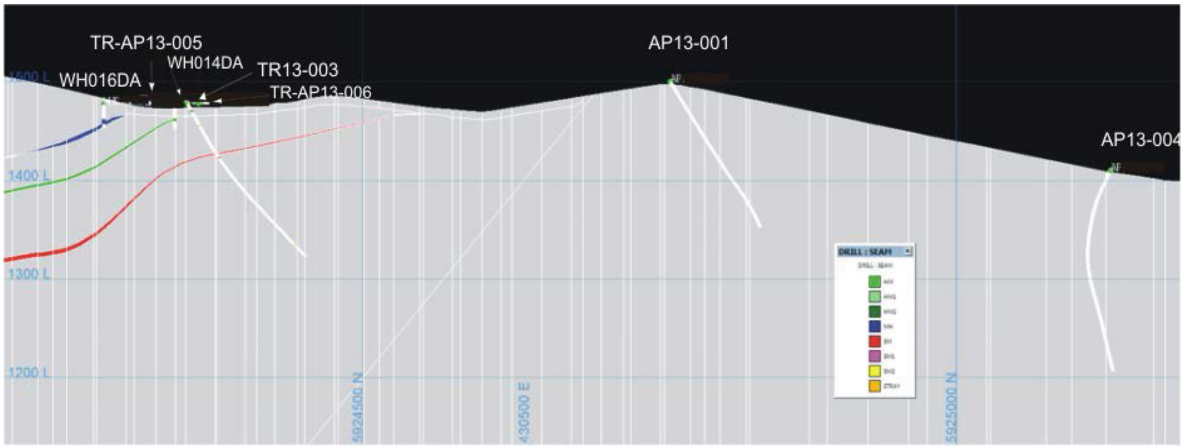

Figure 14-6. Cross-Section D-D' – Central Palisades (see Figure 14.2 for location)

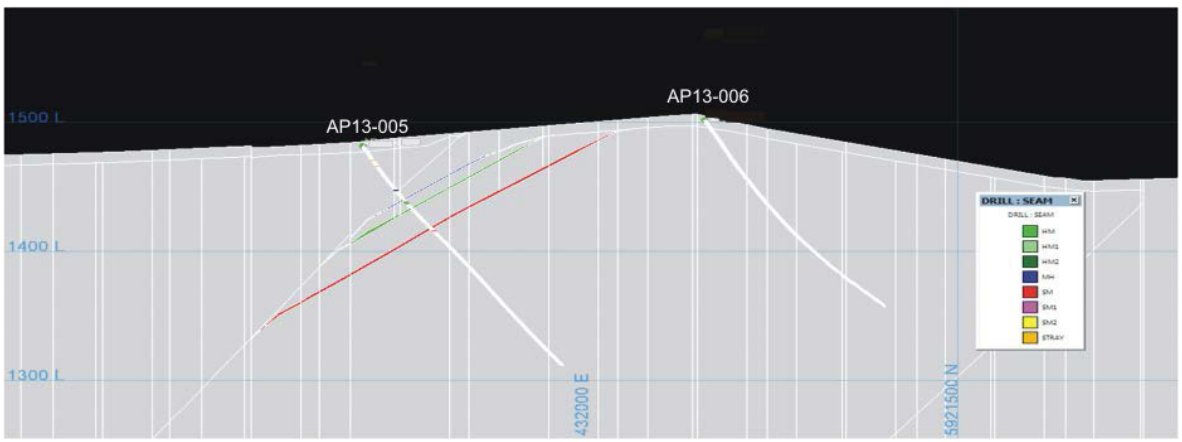

Figure 14-7. Cross-Section E-E' – South Palisades (see Figure 14.2 for location)

*note AP13-007 is out of section to north between AP13-005 and AP13-006)

14.2 EXPLORATION TARGET SUMMARY

The exploration targets for the Palisades property are summarized in Table 14-4 and Figure 14-1. Coal was classified as exploration target if it was between 400 and 1,000 m from data point intersections. These targets remain conceptual in nature, as seam thickness and quality have not been constrained. Consequently seam thickness was not adjusted to remove partings and no stripping ratio limit was used in defining the exploration targets. It is uncertain whether further exploration would delineate a resource.

Table 14-4. Palisades In-Place Exploration Targets (million metric tonnes)

Area	Exploration Target* (TONNES) *rounded-down*
Coal Hill	1,000,000
Central-South Palisades	31,000,000
Total Property	**32,000,000**

*conceptual in-place coal with no stripping ratio cutoff

15 Mineral Reserve Estimates

There are no mineral reserves, as defined by NI 43-101 criteria, on the Property at this time.

16 MINING METHODS

Given the stage of exploration on the Property, mining methods have not yet been considered.

17 RECOVERY METHODS

Given the stage of exploration on the Property, recovery methods have not yet been considered.

18 PROJECT INFRASTRUCTURE

Given the stage of exploration on the Property, project infrastructure requirements have not yet been considered.

19 Marketing Studies and Contracts

Given the stage of exploration on the Property, marketing studies and contracts have not yet been considered.

20 Environmental Studies, Permitting and Social or Community Impact

Given the stage of exploration on the property, environmental studies, permitting and social or community impact have not yet been considered.

21 CAPITAL AND OPERATING COST

Given the stage of exploration on the Property, capital and operating cost have not yet been considered.

22 ECONOMIC ANALYSIS

Given the stage of exploration on the Property, an economic analysis has not been performed.

23 ADJACENT PROPERTIES

The Palisades Coal Property is directly adjacent to the north of Teck Corporation's Brule Property. The Brule Property was developed by the Blue Diamond Coal Company as an underground mine and operated continuously over the period 1914 through 1928, producing a total of 1.8 million tonnes. The Geologic Survey of Canada conducted a detailed survey of the Brule Property in 1927 during active operations and established the stratigraphy and seam nomenclature which extends north into the Palisades Coal Property.

There are currently two active mining operations producing metallurgical coal from the same Gates Formation; the Cheviot Mine operated by Teck 68 km to the southeast and the Grande Cache Mine, 90 km to the northwest. Other than an estimate for depth of weathering, information from these properties has not been used to complete the resource estimate for the Palisades Property.

24 OTHER RELEVANT DATA AND INFORMATION

The authors are unaware of any other relevant information.

25 INTERPRETATION AND CONCLUSIONS

The results of the 2013 exploration program show that previous geological interpretation by Rio (Benkis, 1970) and Denison (1984) in the southern and eastern part of the property are not accurate. Areas mapped as Grande Cache and Mountain Park Members of the Gates Formation in the central Icewater Creek area and the area north of Solomon Creek are actually Shaftsbury Formation. The overturned anticline in the Icewater Creek N. area appears to translate laterally into a thrust fault, truncating Grande Cache sediments against the younger Shaftsbury Formation. The Coal Hill Syncline and Coal Hill Anticline are dissected by several splays from the Collie Creek Thrust which increase the thickness of Grande Cache Member rocks and cause numerous seam repeats. These observations suggest that the coal bearing Grande Cache Member is shifted further to the west than previously mapped.

The conclusions drawn from the 2013 exploration program are that coal seams in the eastern part of the property, while thickened in places by folding, and repeated by thrust faulting, especially in the area of Coal Hill, are generally thinner and contain more partings than was previously thought. The recommended approach therefore is to implement a detailed field assessment in the western part of the property to confirm the existence and structural configuration of the coal bearing section prior to initiating any further drilling on the property. This program would include field mapping and trenching to the west of the drill access in the south of the property, and over the Solomon Creek anticline in the central part of the property. This two-phase approach should result in a much more focused drilling campaign on the assumption that target areas can be identified by the initial program.

The limited number of core samples collected in 2013 confirms that the Solomon Seam is a high quality, low-volatile hard coking coal, justifying further work. Future quality confirmation should be undertaken with more coring. Due to the poor performance of sonic core technology on the Property, any future work should be conducted with conventional rotary large-diameter (150 mm) coring equipment.

26 RECOMMENDATIONS

A two-phase program of follow-up on the Palisades Property is recommended.

Phase One would entail detailed mapping and possibly bulldozer trenching selected areas west of the 2013 exploration program to confirm the existence and structural configuration of the coal-bearing section prior to initiating any further drilling. In the southern part of the property, in the area west of drillholes AP13-005 to AP13-007, the apparent shift of Grande Cache outcrop/subcrop to the west should be investigated, initially by mapping and trenching if exposure and dips justify. A similar approach is recommended in the area south of Denison drillhole WH018DN to investigate the anticline which could confirm an area of shallow-dipping near-surface Grande Cache Member. This area was included in drilling plans for 2013 but was left due to budget constraint. Mapping should also extend to both limbs of the anticline west of Coal Hill to check dips.

Phase Two would be contingent upon successful identification of drill targets during Phase One, and would consist of up to 3,000 m reverse circulation drilling and 500 m of coring if justified (Figure 26-1). In addition, a detailed reconnaissance mapping and sampling program on the Palisades North extension north of the Wildhay River is recommended. Proposed budgets for each phase are presented in Table 26-1 and Table 26-2

Table 26-1. First Phase Proposed Budget.

Item	Estimated Cost
Planning and Permitting	$25,000
Access and Trenching Layout	$25,000
Geological Mapping & Sampling	$30,000
Access Development and Trenching	$200,000
Laboratory, Coal Testing	$10,000
Drill Plan Targeting	$15,000
Data Compilation / Final Reports	$20,000
Contingency 15%	**$45,000**
Total Estimate	**$370,000**

Table 26-2. Second Phase Proposed Budget.

Item	Estimated Cost
Permitting	$75,000
Access Constructions and Reclamation	$300,000
Geological Mapping & Sampling – N. Palisades	$100,000
RC Drilling	$500,000
Coring / Bulk Sampling	up to $1,000,000
Geological Supervision	$200,000
Geophysical Logging	$120,000
Drill Site Survey	$15,000
Laboratory, Coal Testing	$80,000
Geological 3-D Modelling	$30,000
Data Compilation / Final Reports	$40,000
Contingency 15%	**$370,000**
Total Estimate	**$2,830,000**

Figure 26-1. Recommended Drilling.

(see end: Large Figures, P-12)

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DATE AND SIGNATURE PAGE

This report entitled "**Technical Report on the Palisades Coal Property**" with an effective date of February 3rd, 2014, was prepared on behalf of Altitude Resources Inc. and is signed by the authors, Robert Engler; John Gorham, and William Miller.

Robert F. Engler, P. Geol.

28 Hummingbird Road

Sherwood Park, Alberta

April 2nd, 2014

John H Gorham, P. Geol.

Suite 18 – 10509 81st Avenue

Edmonton, Alberta

T6E 1X7

April 2nd, 2014

William S Miller, P. Geo.

Suite 18 – 10509 81st Avenue

Edmonton, Alberta

T6E 1X7

April 2nd, 2014

CERTIFICATE OF QUALIFIED PERSONS

I, Robert F. Engler, of 28 Hummingbird Road, Sherwood Park, Alberta do hereby certify that:

- I, Robert F. Engler, P. Geol. am a Principal of Moose Mountain Technical Services.
- This certificate applies to the Technical Report titled "Technical Report on the Palisades Coal Property" with an effective date of February 3rd, 2014 (the "Technical Report").
- I graduated with a B.Sc. from the University of Alberta in 1974.
- I am a member of the Association of Professional Engineers, Geologists and Geophysicists of Alberta. (#M24009).
- I have worked as a geologist for a total of thirty-nine years since my graduation from university. My past experience includes work with all of the coal mines in Alberta, Saskatchewan and British Columbia as well as exploration projects in western Canada, and western US, Mexico, Mongolia, and China. I also held senior marketing positions for fifteen years with Luscar Ltd, a major Canadian coal producer.
- I have read the definition of "qualified person" set out in NI 43-101 and certify that by reason of my education, affiliation with a professional association and past relevant work experience, I fulfill the requirements to be a "qualified person". I am independent of Altitude Resources Ltd in accordance with section 1.5 of NI 43-101.
- I inspected the property on August 18-20, September 19-21 and September 28-29, 2013. I have worked extensively on nearby Sherritt-owned mining operations. I work as a geological consultant to the mining industry.
- I am responsible for Section 13 and jointly responsible for Sections 1, 12, 25 and 26 of this Technical Report.
- I am independent of the issuer of this report, Altitude Resources Inc. as defined by Section 1.5 of NI 43-101.
- I have read NI 43-101 and Form 43-101F1, and the Technical Report has been prepared in compliance with that instrument and form.
- As of the effective date of this report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

"Signed and sealed"

PROFESSIONAL GEOLOGIST R. F. ENGLER ALBERTA

Robert F. Engler, B.Sc., P.Geol.

Dated: April 2nd, 2014

I, John Gorham, of #18- 10509 81st Avenue, Edmonton, Alberta, hereby certify that

- I, John Gorham, P.Geol, am employed as a Senior Geologist with Dahrouge Geological Consulting Ltd.
- This certificate applies to the Technical Report titled "Technical Report on the Palisades Coal Property" with an effective date of February 3rd, 2014 (the "Technical Report").
- I graduated from the University of Calgary, Canada with a B.Sc. degree in Geology in 1976.
- I am a Professional Geoscientist in the Provinces of Alberta, British Columbia and the Northwest Territories, Canada.
- I have practiced my profession for 37 years since graduation. I have been directly involved in green fields and brown fields exploration, and consulting, with experience in gold, base metals, precious and rare metals and rare earth deposits, coal, industrial and precious gem minerals.
- As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43–101 *Standards of Disclosure for Mineral Projects* (NI 43–101).
- I inspected the Palisades Coal Property during field operations from August 11-21, August 28-31 and September 1-6 and September 12-30, 2013
- I am jointly responsible for Sections 1 to 13, and 15 to 27 of this Technical Report.
- I am independent of the issuer of this report, Altitude Resources Inc. as defined by Section 1.5 of NI 43-101.
- I have no prior involvement with the Palisades Coal Property.
- I have read NI-43-101 and this report has been prepared in compliance with this Instrument.
- As of the effective date of this report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

'Signed and Sealed"

PROFESSIONAL GEOLOGIST JOHN H. GORHAM ALBERTA

John Gorham, P. Geol
Dated: April 2nd, 2014

I, William Miller, of #18- 10509 81st Avenue, Edmonton, Alberta, hereby certify that

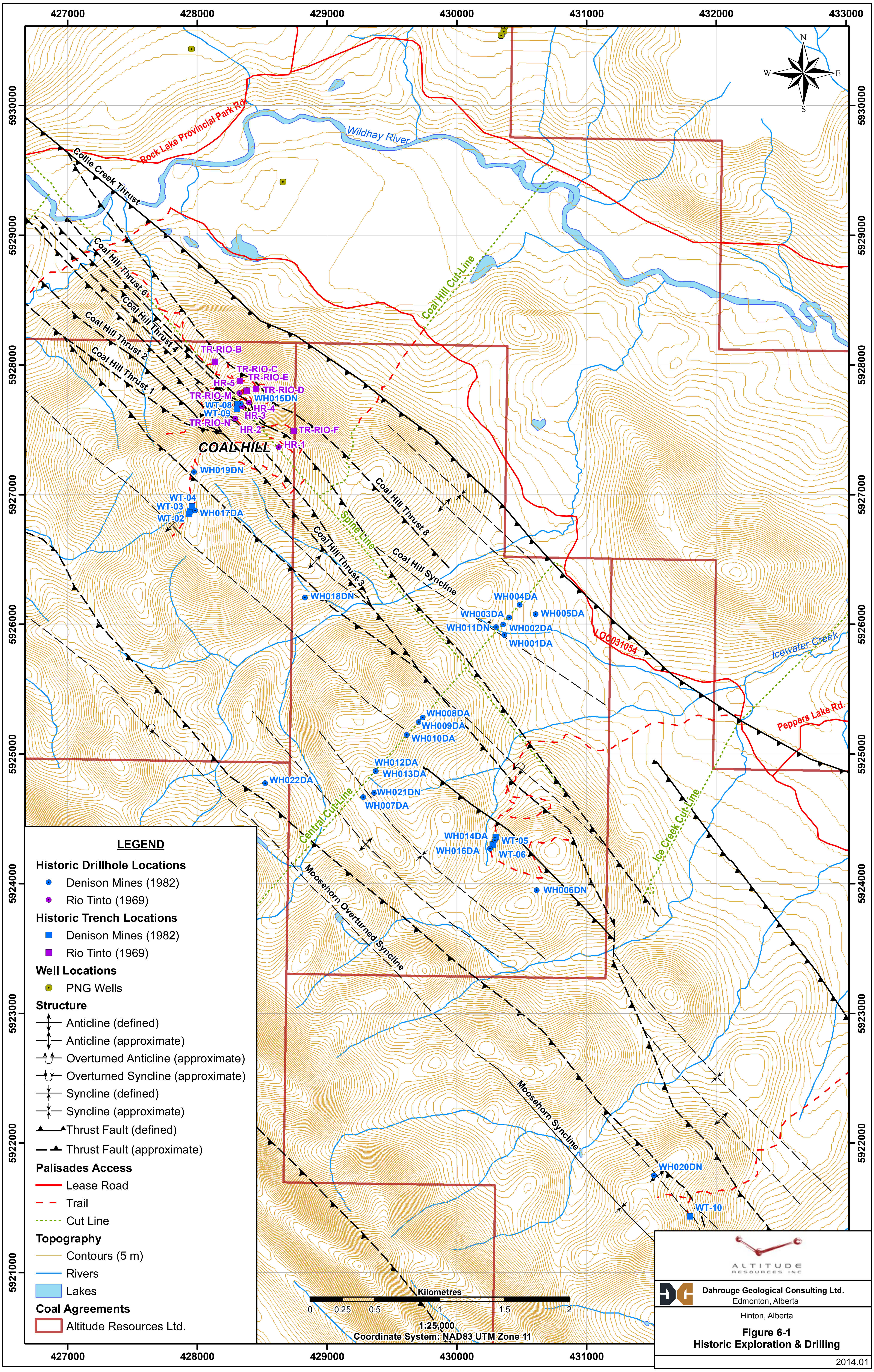
- I, William Miller, P.Geo, am employed as a Project Geologist with Dahrouge Geological Consulting Ltd.
- This certificate applies to the Technical Report titled "Technical Report on the Palisades Coal Property" with an effective date of February 3rd, 2014 (the "Technical Report").
- I graduated from the University of Alberta, Canada with a B.Sc. degree in Geology in 2009.
- I am a Professional Geoscientist in the Province of Alberta, Canada.
- I have practiced my profession for 4 years since graduation. I have been directly involved in green fields and brown fields exploration, and consulting, with experience including industrial minerals, phosphate, gold, nickel-PGEs, rare earths and coal.
- As a result of my experience and qualifications, I am a Qualified Person as defined in National Instrument 43-101 Standards of Disclosure for Mineral Projects (NI 43-101).
- I have not visited the Palisades Coal Property.
- I am jointly responsible for Sections 1, 14, 25 and 26 of this Technical Report.
- I am independent of the issuer of this report, Altitude Resources Inc. as defined by Section 1.5 of NI 43-101.
- I have no prior involvement with the Palisades Coal Property.
- I have read NI-43-101 and this report has been prepared in compliance with this Instrument.
- As of the effective date of this report, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

'Signed and Sealed"

William Miller, P. Geo

Dated: April 2nd, 2014

LARGE FIGURES



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HR-4
WT-09
HR-3
TR-RIO-N
HR-2
TR-RIO-F
HR-1
COAL HILL
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WT-04
WT-03
WH017DA
WT-02
Coal Hill Thrust 8
Spine Line
Coal Hill Thrust 3
Coal Hill Syncline
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WH003DA
WH005DA
WH011DN
WH002DA
WH001DA
LOC031054
Icewater Creek
Peppers Lake Rd.
WH008DA
WH009DA
WH010DA
WH012DA
WH013DA
WH022DA
WH021DN
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Central Cut-Line
Ice Creek Cut-Line
WH014DA
WT-05
WH016DA
WT-06
WH006DN
Moosehorn Overturned Syncline
Moosehorn Syncline
WH020DN
WT-10
LEGEND
Historic Drillhole Locations
Denison Mines (1982)
Rio Tinto (1969)
Historic Trench Locations
Denison Mines (1982)
Rio Tinto (1969)
Well Locations
PNG Wells
Structure
Anticline (defined)
Anticline (approximate)
Overturned Anticline (approximate)
Overturned Syncline (approximate)
Syncline (defined)
Syncline (approximate)
Thrust Fault (defined)
Thrust Fault (approximate)
Palisades Access
Lease Road
Trail
Cut Line
Topography
Contours (5 m)
Rivers
Lakes
Coal Agreements
Altitude Resources Ltd.
Kilometres
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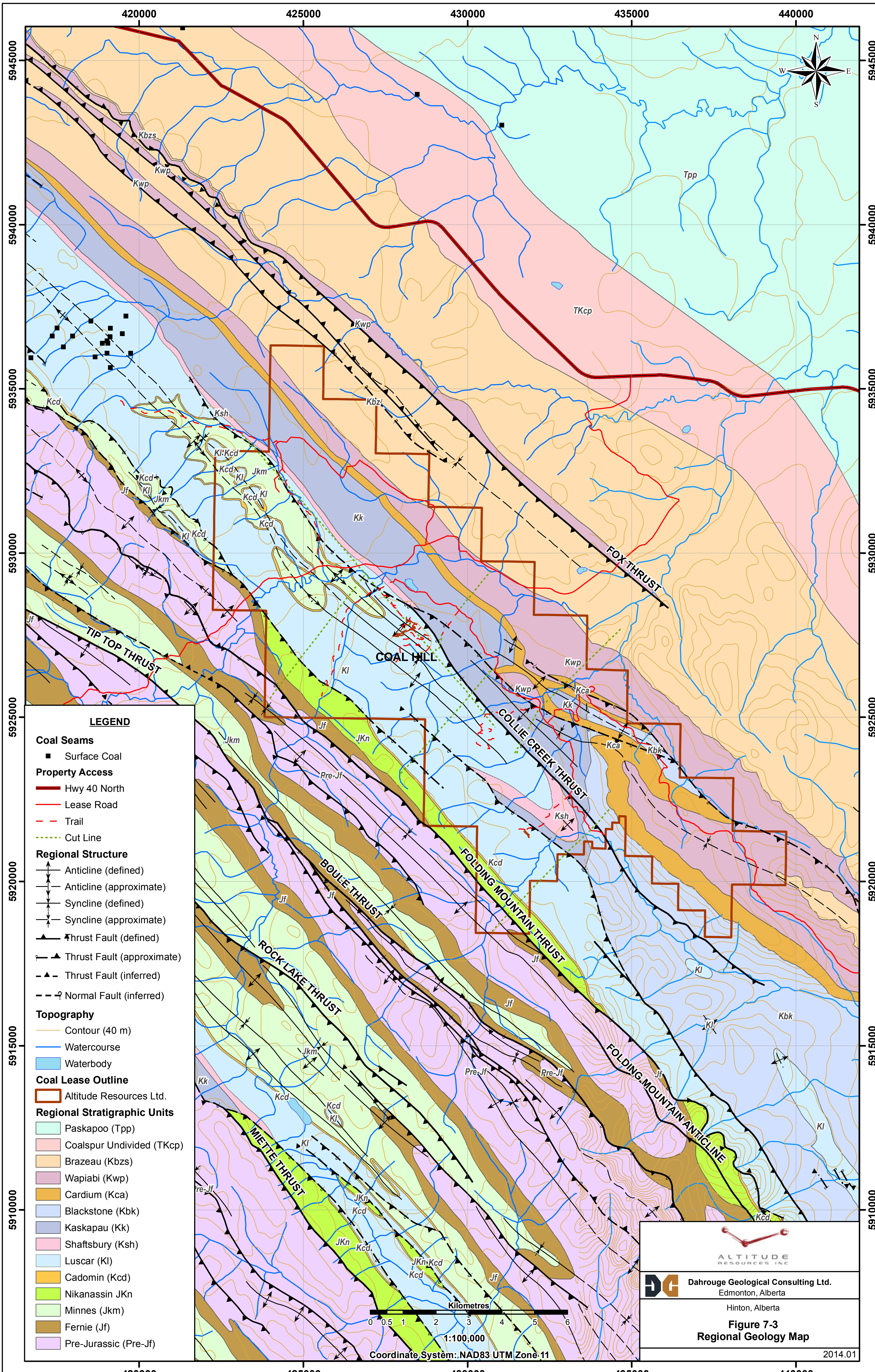
Coordinate System: NAD83 UTM Zone 11
ALTITUDE RESOURCES INC
Dahrouge Geological Consulting Ltd.
Edmonton, Alberta
Hinton, Alberta
Figure 6-1
Historic Exploration & Drilling
2014.01



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Kbk
JKn
Pre-Jf
FOX THRUST
TIP TOP THRUST
COAL HILL
COLLIE CREEK THRUST
FOLDING MOUNTAIN THRUST
BOULE THRUST
ROCK LAKE THRUST
FOLDING MOUNTAIN ANTICLINE
MIETTE THRUST
LEGEND
Coal Seams
Surface Coal
Property Access
Hwy 40 North
Lease Road
Trail
Cut Line
Regional Structure
Anticline (defined)
Anticline (approximate)
Syncline (defined)
Syncline (approximate)
Thrust Fault (defined)
Thrust Fault (approximate)
Thrust Fault (inferred)
Normal Fault (inferred)
Topography
Contour (40 m)
Watercourse
Waterbody
Coal Lease Outline
Altitude Resources Ltd.
Regional Stratigraphic Units
Paskapoo (Tpp)
Coalspur Undivided (TKcp)
Brazeau (Kbzs)
Wapiabi (Kwp)
Cardium (Kca)
Blackstone (Kbk)
Kaskapau (Kk)
Shaftsbury (Ksh)
Luscar (Kl)
Cadomin (Kcd)
Nikanassin JKn
Minnes (Jkm)
Fernie (Jf)
Pre-Jurassic (Pre-Jf)
Kilometres
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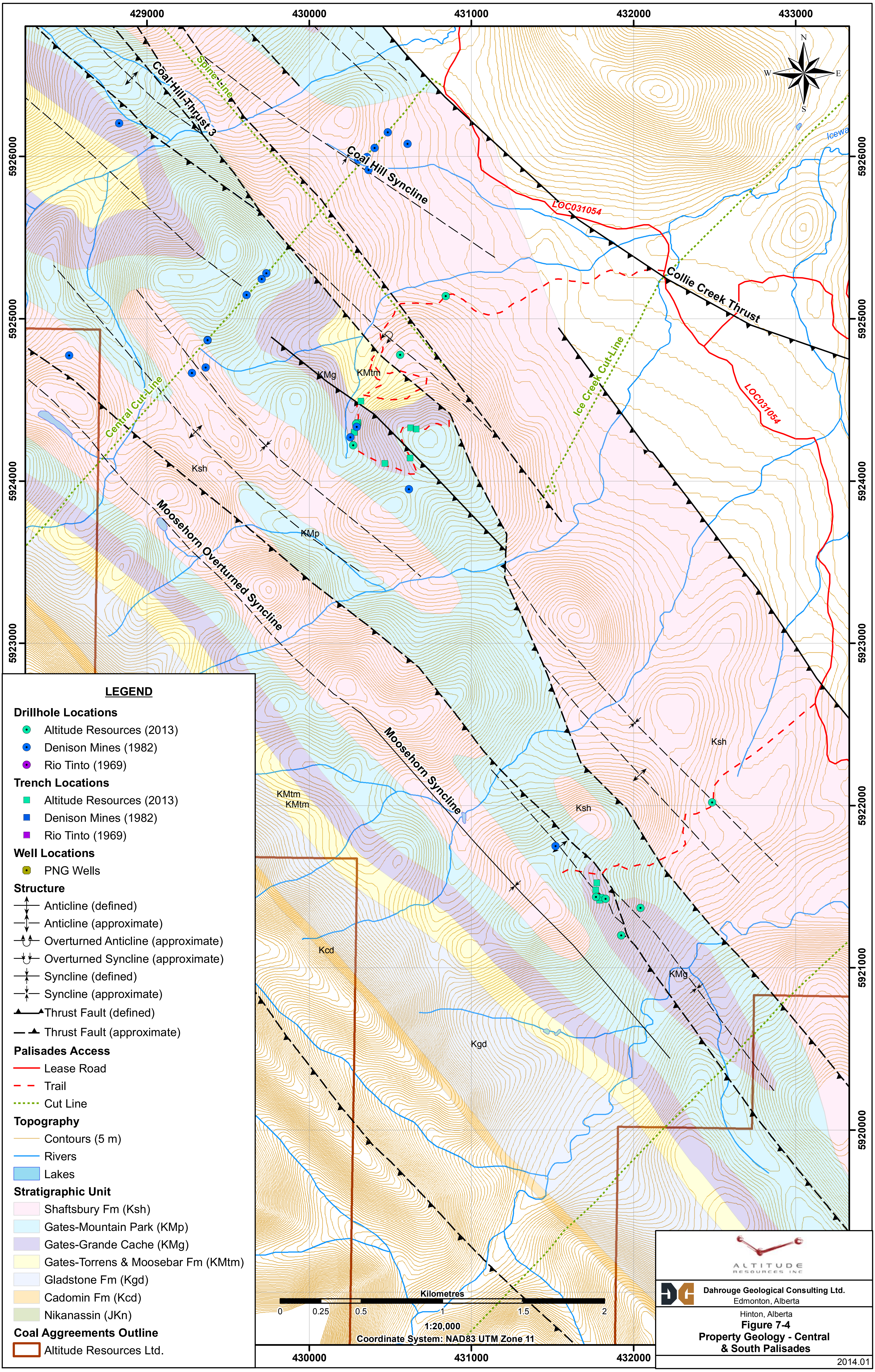
ALTITUDE RESOURCES INC
Dahrouge Geological Consulting Ltd.
Edmonton, Alberta
Hinton, Alberta
Figure 7-3
Regional Geology Map
2014.01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Moosehorn Syncline
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LEGEND
Drillhole Locations
Altitude Resources (2013)
Denison Mines (1982)
Rio Tinto (1969)
Trench Locations
Altitude Resources (2013)
Denison Mines (1982)
Rio Tinto (1969)
Well Locations
PNG Wells
Structure
Anticline (defined)
Anticline (approximate)
Overturned Anticline (approximate)
Overturned Syncline (approximate)
Syncline (defined)
Syncline (approximate)
Thrust Fault (defined)
Thrust Fault (approximate)
Palisades Access
Lease Road
Trail
Cut Line
Topography
Contours (5 m)
Rivers
Lakes
Stratigraphic Unit
Shaftsbury Fm (Ksh)
Gates-Mountain Park (KMp)
Gates-Grande Cache (KMg)
Gates-Torrens & Moosebar Fm (KMtm)
Gladstone Fm (Kgd)
Cadomin Fm (Kcd)
Nikanassin (JKn)
Coal Aggreements Outline
Altitude Resources Ltd.
Kilometres
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ALTITUDE
RESOURCES INC
Dahrouge Geological Consulting Ltd.
Edmonton, Alberta
Hinton, Alberta
Figure 7-4
Property Geology - Central
& South Palisades
2014.01

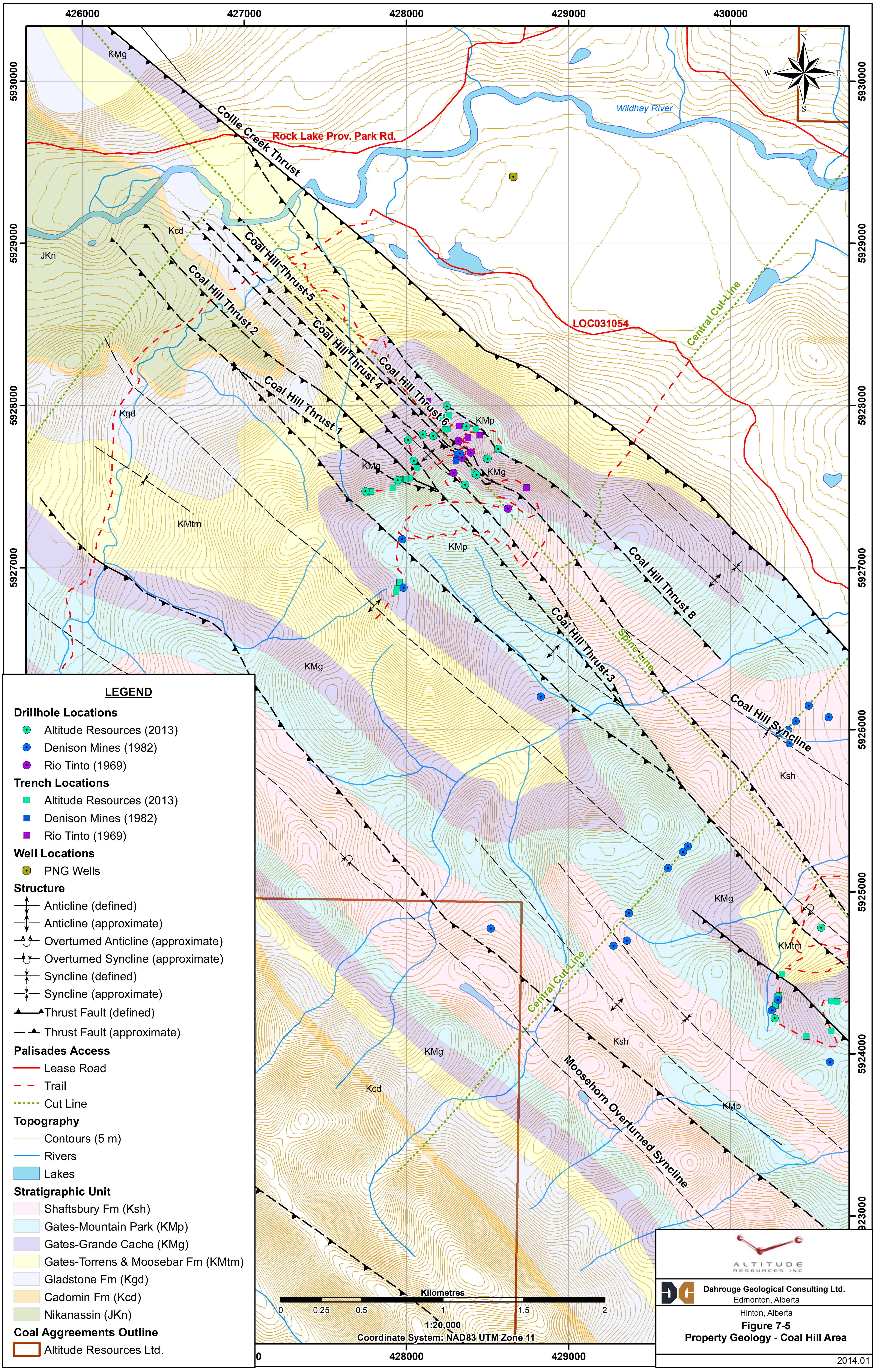
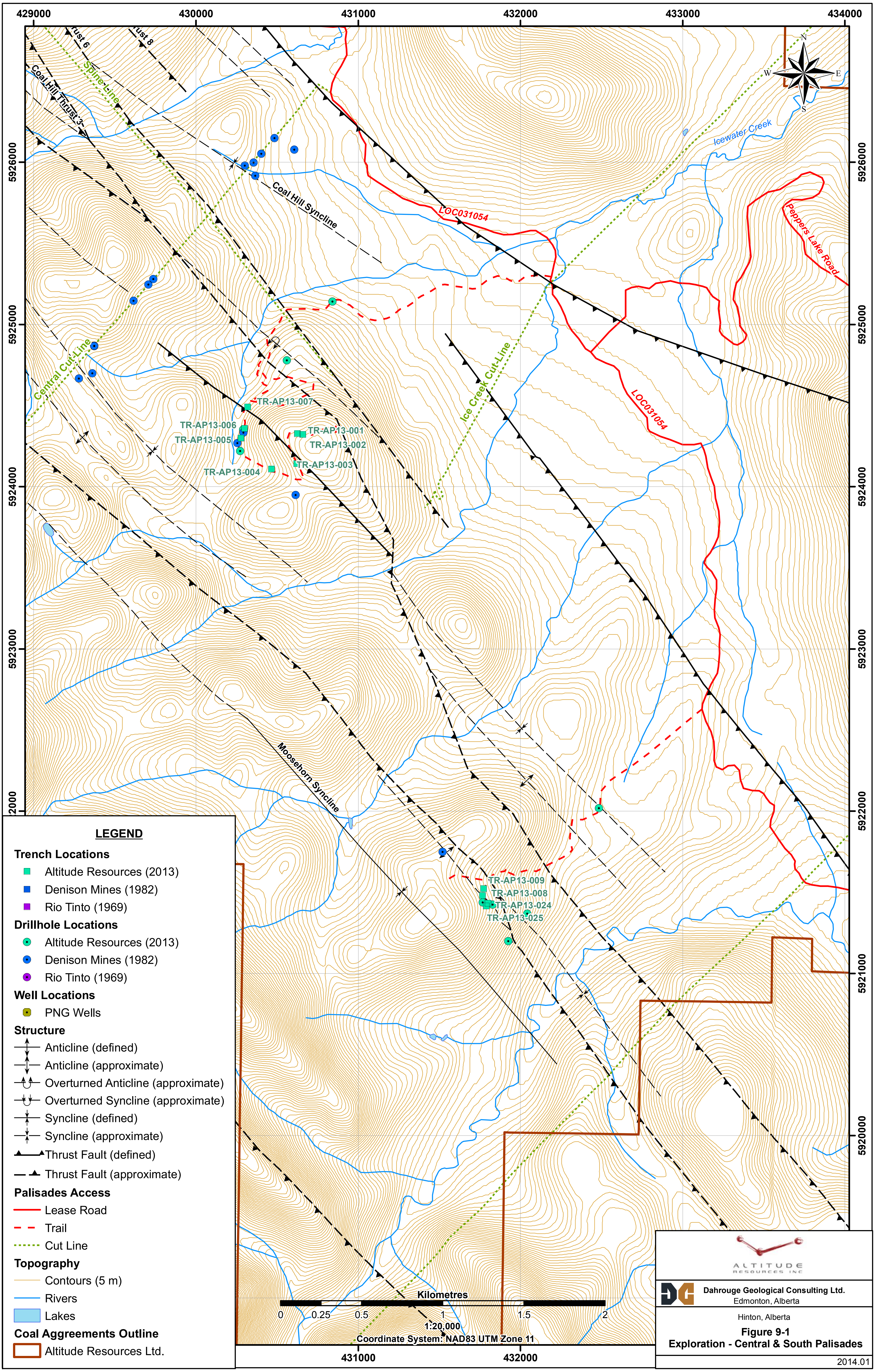


Figure 7-5
Property Geology - Coal Hill Area



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Trench Locations
Altitude Resources (2013)
Denison Mines (1982)
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Palisades Access
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Topography
Contours (5 m)
Rivers
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Coal Aggreements Outline
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ALTITUDE RESOURCES INC
Dahrouge Geological Consulting Ltd.
Edmonton, Alberta
Hinton, Alberta
Figure 9-1
Exploration - Central & South Palisades
2014.01

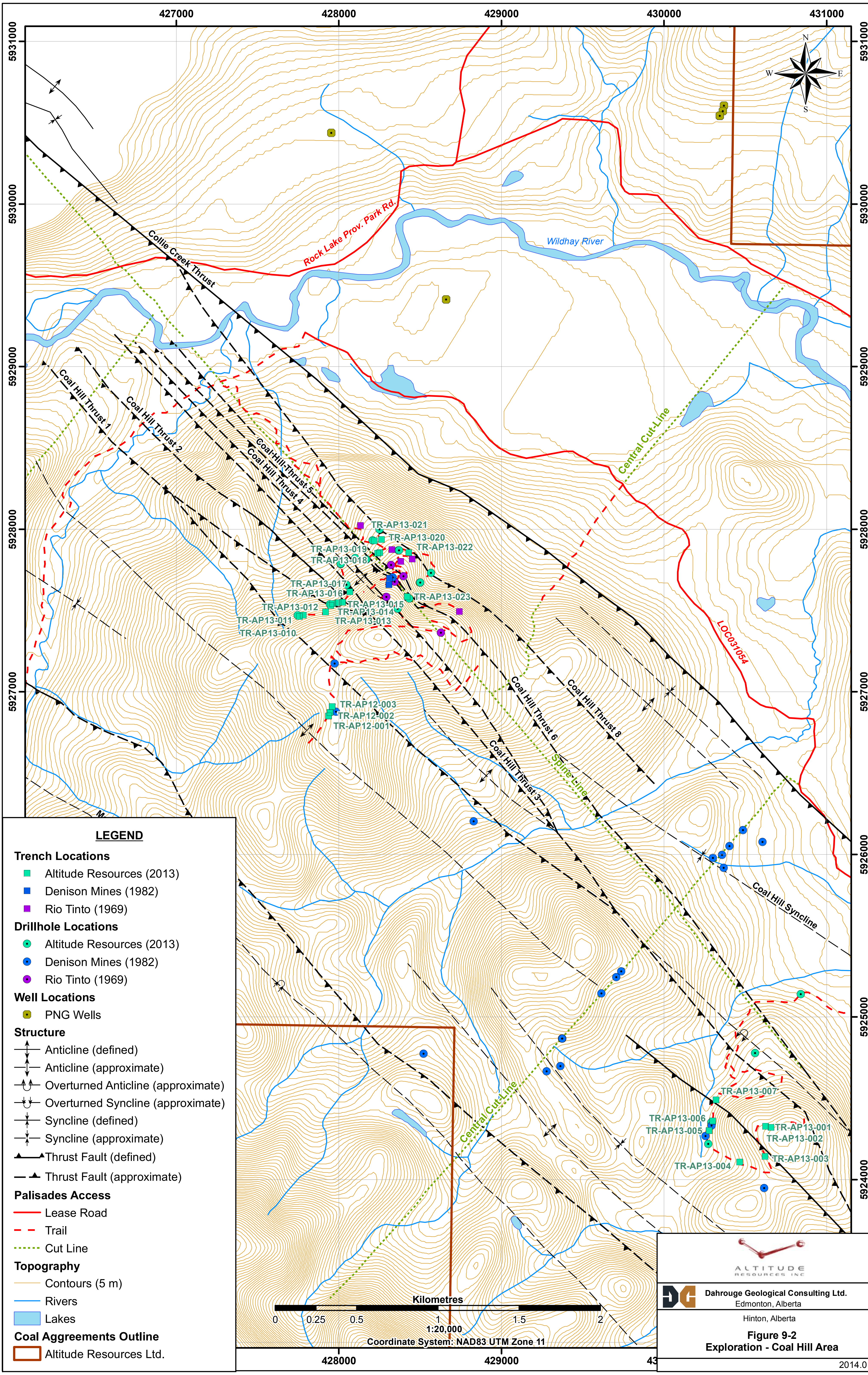
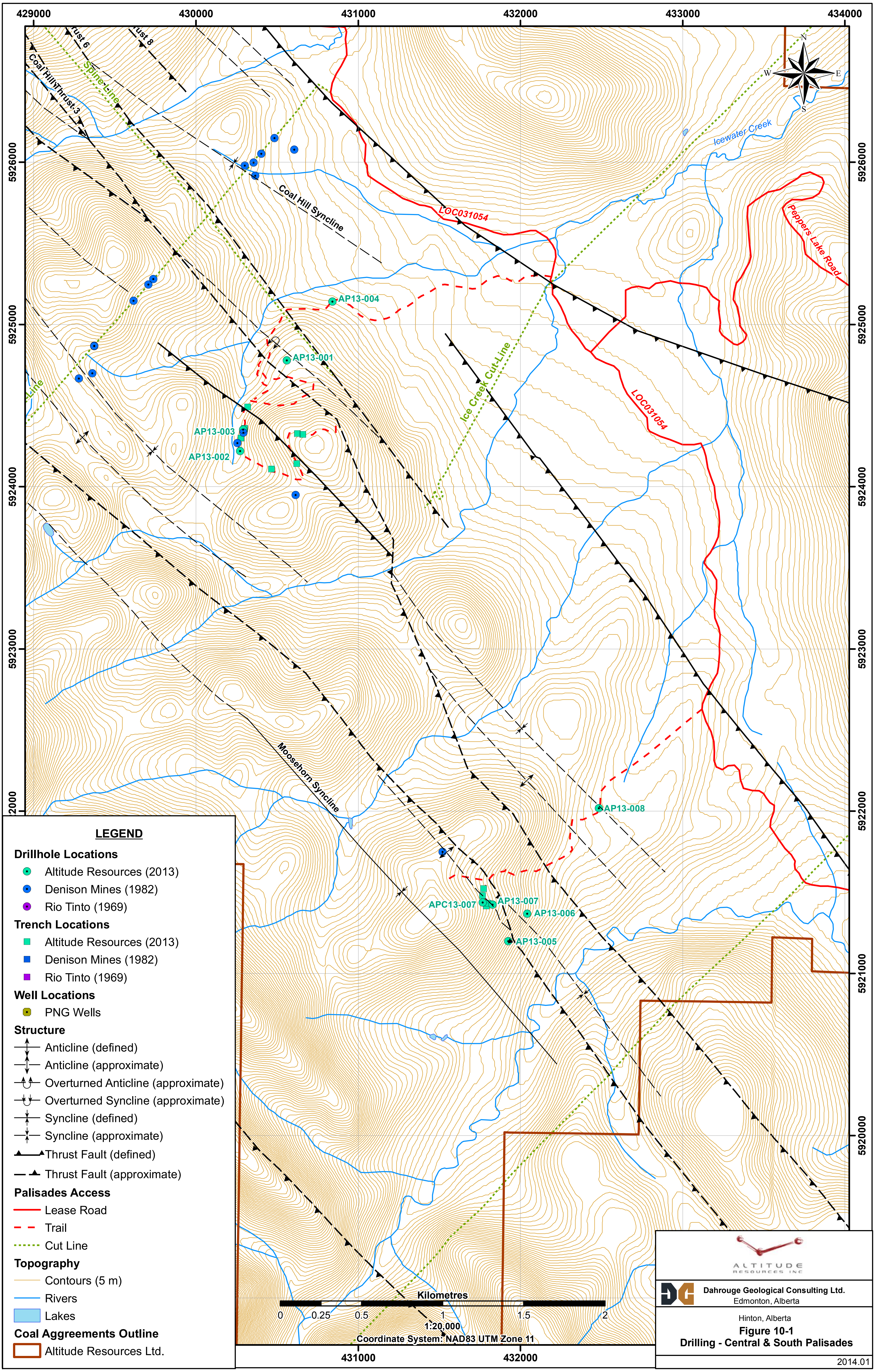


Figure 9-2
Exploration - Coal Hill Area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Ice Creek Cut-Line
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LEGEND
Drillhole Locations
Altitude Resources (2013)
Denison Mines (1982)
Rio Tinto (1969)
Trench Locations
Altitude Resources (2013)
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Well Locations
PNG Wells
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Thrust Fault (defined)
Thrust Fault (approximate)
Palisades Access
Lease Road
Trail
Cut Line
Topography
Contours (5 m)
Rivers
Lakes
Coal Agreements Outline
Altitude Resources Ltd.
Kilometres
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ALTITUDE RESOURCES INC
Dahrouge Geological Consulting Ltd.
Edmonton, Alberta
Hinton, Alberta
Figure 10-1
Drilling - Central & South Palisades
2014.01

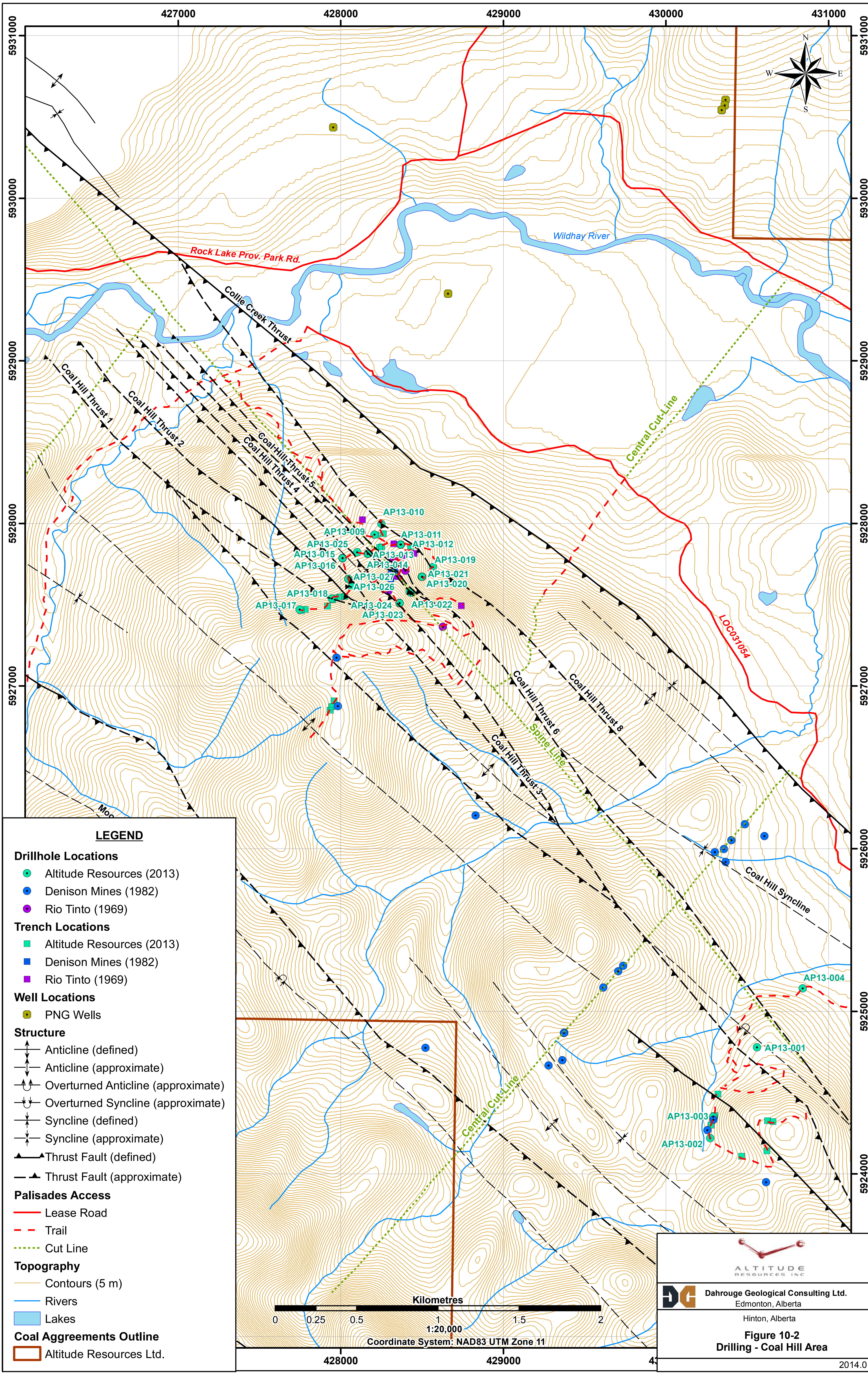
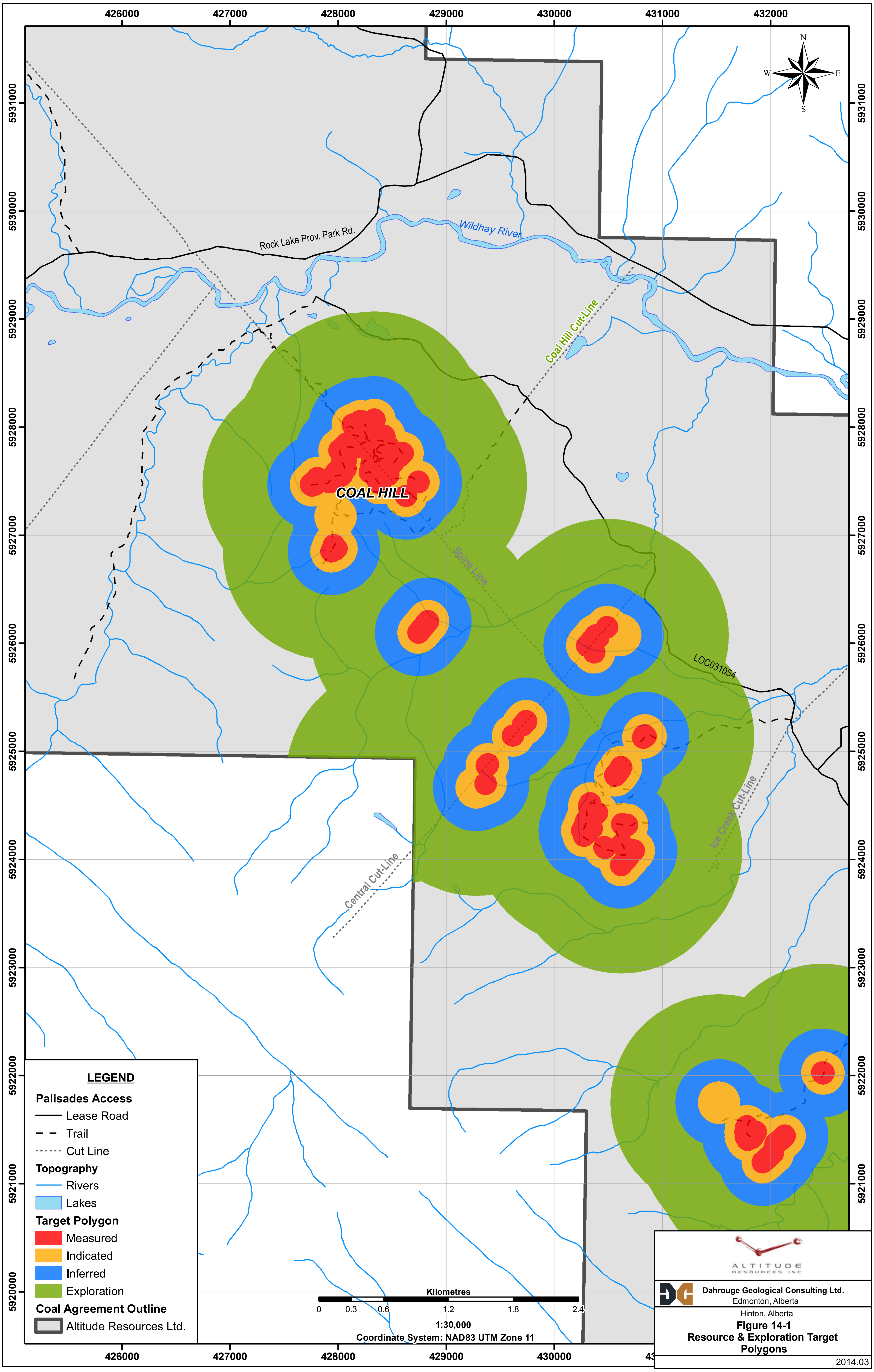


Figure 10-2
Drilling - Coal Hill Area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Palisades Access
Lease Road
Trail
Cut Line
Topography
Rivers
Lakes
Target Polygon
Measured
Indicated
Inferred
Exploration
Coal Agreement Outline
Altitude Resources Ltd.
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ALTITUDE RESOURCES INC
Dahrouge Geological Consulting Ltd.
Edmonton, Alberta
Hinton, Alberta
Figure 14-1
Resource & Exploration Target Polygons
2014.03

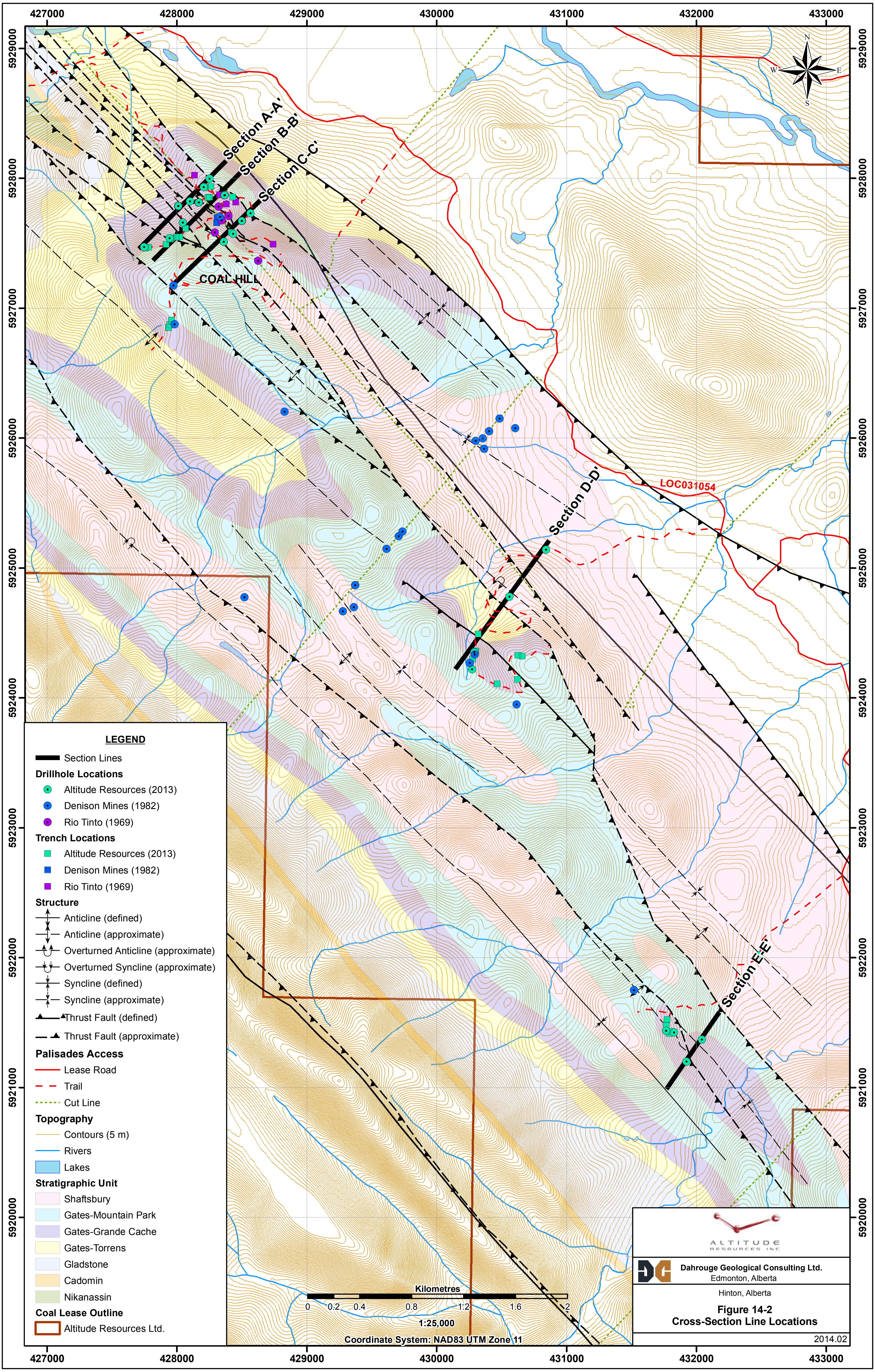
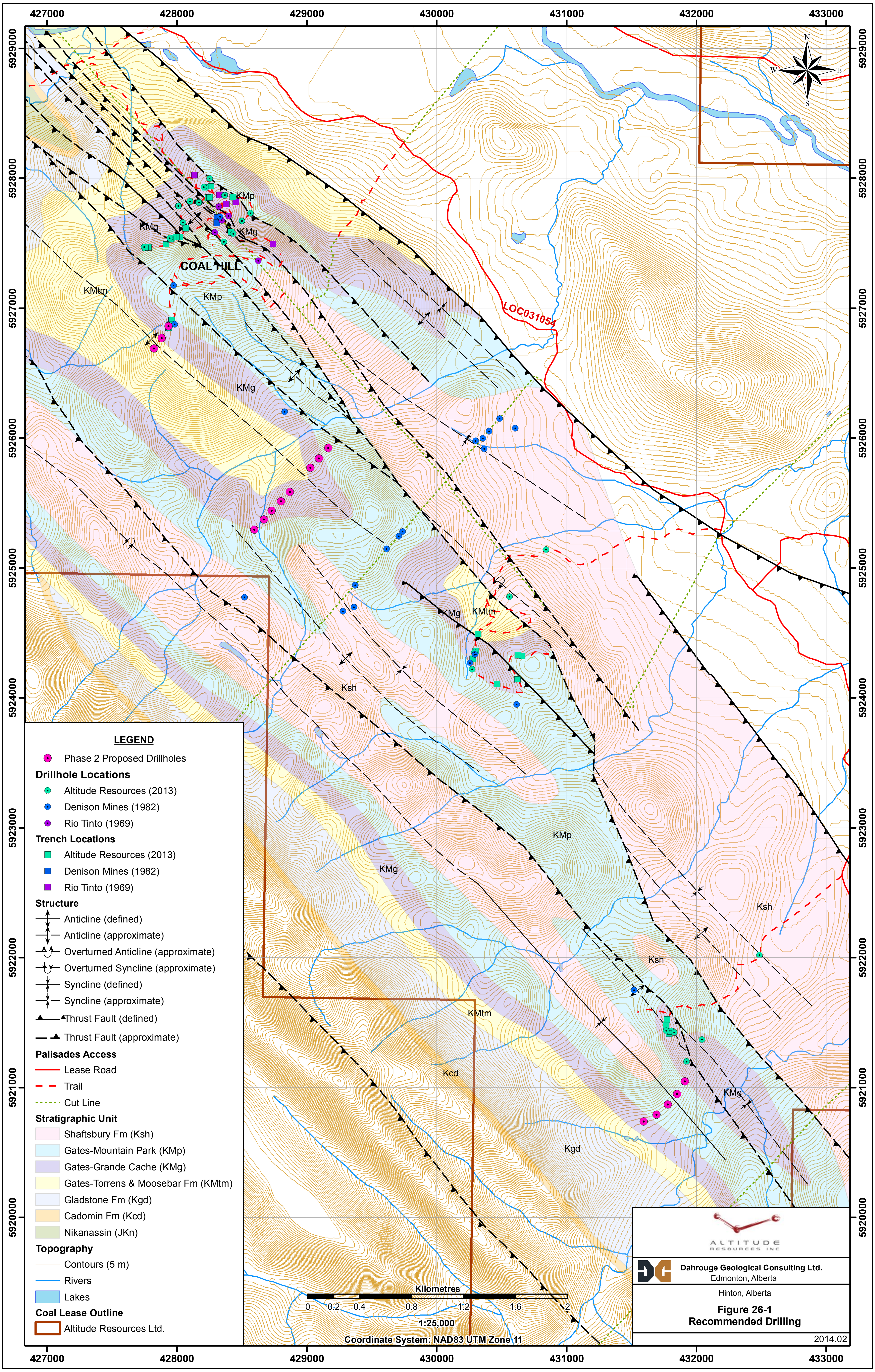


Figure 14-2
Cross-Section Line Locations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LEGEND
Phase 2 Proposed Drillholes
Drillhole Locations
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Trench Locations
Altitude Resources (2013)
Denison Mines (1982)
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Gates-Mountain Park (KMp)
Gates-Grande Cache (KMg)
Gates-Torrens & Moosebar Fm (KMtm)
Gladstone Fm (Kgd)
Cadomin Fm (Kcd)
Nikanassin (JKn)
Topography
Contours (5 m)
Rivers
Lakes
Coal Lease Outline
Altitude Resources Ltd.
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Coordinate System: NAD83 UTM Zone 11
ALTITUDE RESOURCES INC
Dahrouge Geological Consulting Ltd.
Edmonton, Alberta
Hinton, Alberta
Figure 26-1
Recommended Drilling
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