

# QUARTERLY ACTIVITIES REPORT FOR THE PERIOD ENDING 30 JUNE 2014

## HIGHLIGHTS

### *Groundhog Anthracite Project:*

#### Completion of Drilling for Early 2014 Field Season

- Atrum completed a four-week drilling program at its flagship Groundhog Anthracite Project targeting infill drilling of the bulk sample location area prior to trial mining in H2 2014
- Complementary ground based seismic program progressed with the main seismic lines through the bulk sample area completed and data interpretation continuing
- Environmental and baseline monitoring studies including hydrogeology, hydrology, geochemical and geotechnical studies continue
- Climatology, mountain ungulate and groundwater hydrology testing and monitoring continue to feed into the environmental baseline study necessary for mine planning and permitting

#### Identification of Bulk Sample location hosting ultra-high grade anthracite

- Completed seam correlation, structural modelling and anthracite quality interpretation from the 64 diamond core drill hole program completed in 2013
- High ranking #70 anthracite seam encountered with thick and shallow intercepts including 3.35m net anthracite from 9.75m below surface in drill hole DHGH13-26 and 3.40m net anthracite from 10.65m below surface in DHGH13-05
- Recent anthracite quality results were excellent and in line with 2012 results with wash yields ranging from 57% to 83% for a range of potential anthracite products
- Primary area has been identified as a shallow entry point into the high quality #70 seam for maiden production of up to a 100,000 tonne bulk sample commencing in 2014, with this area confirmed to host ultra-high grade (UHG) anthracite



**ASX:ATU - Share Information**  
Issued Shares: 161.5m

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#### **Board of Directors**

Chairman  
Executive Director  
Executive Director  
Managing Director  
Non-Executive Director  
Company Secretary

J. Chisholm  
R. Moran  
G. D'Anna  
E. Lilford  
C. Vorias  
G. D'Anna

#### **Key Projects**

Groundhog	Ownership: 100%
Peace River	Ownership: 100%
Naskeena	Ownership: 100%
Bowron River	Ownership: 100%

- Bulk sample permit application finalised and lodged post a meeting held with the Mineral Development Resource Committee (MDRC) in May 2014

#### Completion of Phase 1 Portal Drilling and Seismic Study

- Completion of phase 1 portal drilling as a precursor to portal development and extraction of first anthracite
- Six HQ diamond core drill holes were completed for a total depth of 714m intersecting the UHG and high grade (HG) anthracitic seam #70 at shallow depths between 3.3m and 26.0m below surface with thicknesses up to 4.7m
- Phase 2 portal drilling commenced on 26 May 2014 and included a further 11 drill holes positioned to intersect seam #70 to support portal designs and construction for the bulk sample

#### A\$2.1 Billion Pre-tax NPV for First Stage Production at Groundhog Anthracite Project

- Independent Pre-feasibility Study (PFS) confirms robust economics for peak 5.4Mtpa run-of-mine (ROM) operation at Groundhog Anthracite Coal Project in British Columbia, Canada
- PFS covers less than 5% of Groundhog area and only two of 20+ anthracite seams
- Pre-production capital expenditure for the mine estimated at US\$10 million with ramp-up capital of US\$67.1 million under contract mining and Build-Own-Operate-Transfer (BOOT) arrangements
- Commercial mine development to be funded through strategic offtake financing and debt
- Total infrastructure related CAPEX estimated at US\$99.6 million for coal haulage road and high voltage power to mine site, which could be funded through Atrum Infrastructure and Logistics' business division
- Average all-in mining, processing and transportation charges over life-of-mine (LOM) equates to US\$86.88/t (including royalties) of saleable product under the combined BOOT / Contractor and Owner Operator basis
- Average LOM sales price for combined UHG / HG anthracite lumps and UHG / HG fines equates to US\$192.11/t
- PFS models an initial 75Mt ROM anthracite operation over an initial 16 year LOM, producing HG and UHG anthracite
- Global HG anthracite price trading at US\$187/t compared to US\$120/t for hard coking coal
- Using independent price forecasts and a discount rate of 8% (nominal) the project has a pre-tax Net Present Value (NPV) of A\$2.1 billion (post-tax NPV of A\$1.3 billion)
- Pre-tax Internal Rate of Return (IRR) of 68% (post-tax IRR of 51%) based on power and road infrastructure CAPEX being funded by Atrum

- Atrum well-funded for 2014 with cash at bank to deliver 'first anthracite on ship' through trial mining later this year

#### *Atrum Coal Receives Grant of Additional Coal Licences*

- Atrum receives grant of an additional four coal licences following community, First Nations and ministerial consultation taking its Groundhog Project to 26 coal licences and 11 coal licence applications
- Notice of Work (NOW) has been approved for these additional coal licences with drill target generation continuing
- Drilling continues at Groundhog in anticipation of the bulk sample program with exceptional drill intercepts and core recovery results achieved

#### *Port Capacity Secured at Stewart*

- Terminal Services Agreement and Land Reservation Agreement signed with Stewart Bulk Terminals for the export of 1.5Mtpa on non 'take or pay' terms commencing 2014
- Memorandum of Understanding signed with Stewart World Port for the export of up to a further 5Mtpa with staged export commencing 2016
- Initial trucking strategy to the deep sea Port of Stewart only 150km away is fundamental to the Company's strategy of minimising capital entry to production

#### ***Kuro Coal Limited:***

##### *Appointment of Non-Executive Director to the Board of Kuro Coal*

- Appointment of Mr Andrew Phillipps as Non-Executive Director of Kuro Coal Limited
- 20 years' corporate finance experience, previously serving as an Executive Director for UBS AG in Australia, focused entirely on the coal sector and involved in executing and leading some of Australia's largest coal M&A and financing transactions
- Appointment of Mr John Wasik as Non-Executive Director of Kuro Coal Limited
- 40 years' experience in the coal industry specialising in coal mine development

##### *Kuro Coal Increases Exploration Area at the Panorama Anthracite Project*

- Kuro Coal secures 13 additional contiguous coal licence applications for a total of 18,375 hectares in the Panorama area
- New ground is contiguous with the two coal licences of 850 hectares that are already subject to a proposed joint venture between Atrum Coal and Kuro Coal
- NOW and licence conversion applications initiated with drilling to commence shortly after grant

### *Kuro Coal Completes Strategic Acquisition at the Panorama Anthracite Project*

- Kuro has agreed to acquire 10 coal licence applications totalling 13,787 hectares from Panstone Mines and Minerals Inc contiguous with the existing Panorama Anthracite Project
- Acquisition provides Kuro with a 33,012 hectare foot-print in the Panorama area

### ***Corporate:***

#### *Appointment of VP Marketing and Business Development*

- Appointment of Mr Peter Doyle as VP Marketing and Business Development
- 20 years' experience in international coal marketing and operations

#### *Expansion of Operations Team*

- Appointment of Mr Ben Smith as VP Operations – significant experience in major mine management, risk management and safety culture
- Appointment of Mr Rick Greene as Project Manager (Mining Operations) – significant experience in major mining, civil and mechanical engineering projects

#### *Appointment of Non-Executive Director*

- Atrum Coal appoints highly experienced coal specialist, Mr Cameron Vorias, to the Board as a Non-Executive Director
- Mr Vorias is currently the Managing Director and Chief Executive Officer of Sojitz Coal Mining Pty Ltd and a Non-Executive Director of Coal of Queensland Pty Ltd
- Mr Vorias has 30 years' experience in coal mining operations including new project development, developing greenfield operations, resource management and risk management
- Former Chief Operating Officer – Queensland for Peabody Energy, Australia, managing six large underground and open cut mining operations generating US\$1.8B in revenue annually

### Directors buy more Atrum Coal Shares

- Mr Moran increased his interest in the Company from 20,726,900 fully paid ordinary shares (14.61%) to 32,276,900 fully paid ordinary shares (19.99%)
- Mr D'Anna increased his interest in the Company from 7,785,360 fully paid ordinary shares (5.49%) to 11,885,000 fully paid ordinary shares (7.36%)
- Mr Chisholm increased his interest in the Company from 32,436,000 fully paid ordinary shares (22.87%) to 36,448,500 fully paid ordinary shares (22.57%)

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Atrum Coal NL ("**Atrum**" or the "**Company**") (ASX: **ATU**) is pleased to report the Company's activities for the quarter ended 30 June 2014 in relation to its 100% owned metallurgical coal projects located in British Columbia, Canada.

Commenting on the quarterly achievements, Chairman James Chisholm stated:

*"This past quarter has been a very active and busy time for Atrum. We have been progressing with our bulk sample plans and building our operational team to deliver 'first anthracite on ship'."*

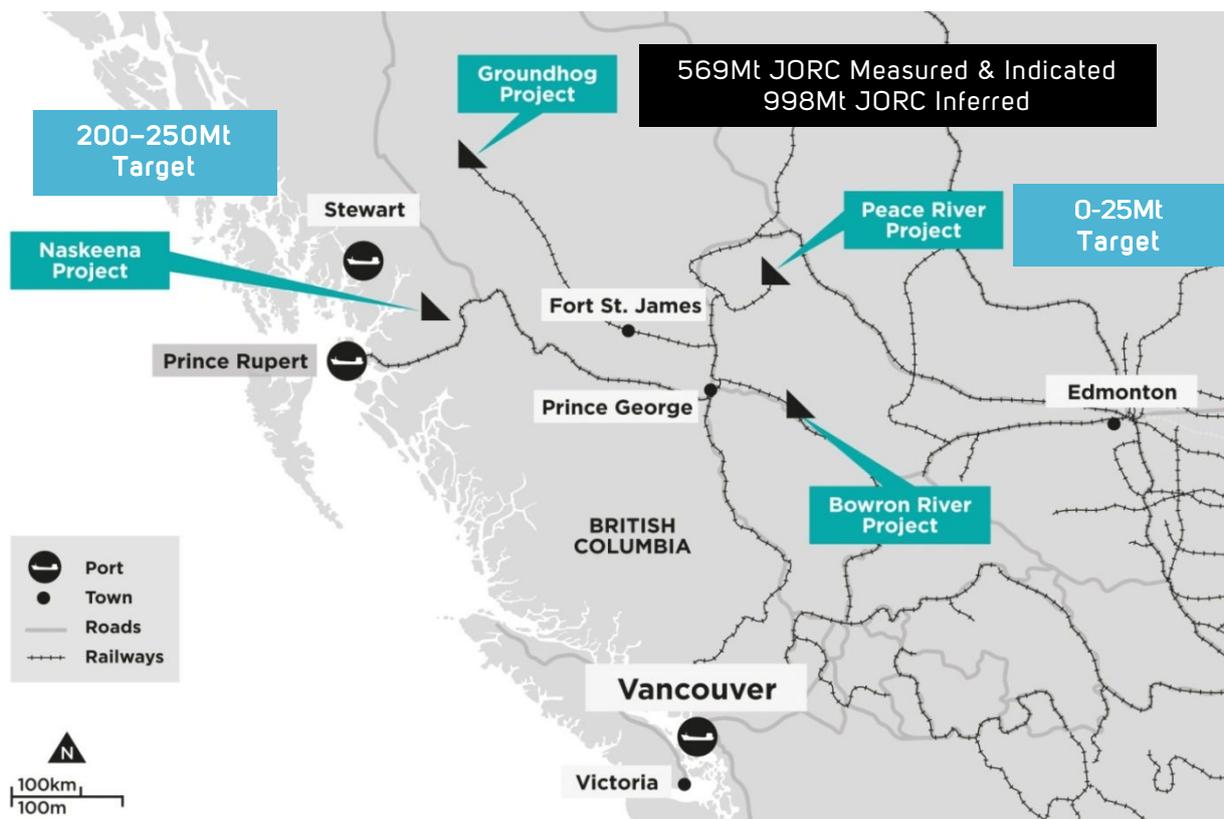
*"Our recent PFS demonstrated the potential for significant economic returns at Groundhog and we are now building on our experience and capability with the appointment of additional directors to the board."*

*"We are focused on commencement of trial mining through a bulk sample program and delivery of 'first anthracite on ship' by the end of the year."*

## **GROUNDHOG ANTHRACITE PROJECT**

The Groundhog Anthracite Project (**Groundhog**) is located in the Groundhog Coalfield in the northern part of the Bowser Basin in north-western British Columbia, approximately 890 km northwest of Vancouver, 150 km northeast of Stewart, and 300 km northeast of Prince Rupert. The Groundhog project comprises 22 granted coal licenses covering an area of 13,776 hectares and 4 coal licence applications covering an area of 9,039 hectares, providing a total land holding of 22,815 hectares.

In January 2014, the Company announced the acquisition of an additional eleven (11) coal licence applications covering an area of 15,554 hectares, providing for an expanded strategic land holding of 38,369 hectares.



Groundhog Anthracite Project – location map

Groundhog is prospective for high grade (HG) and ultra-high grade (UHG) anthracite suitable for application in the steel and ferro-alloy industries.

The Groundhog Project is located in close proximity to key mining infrastructure including rail, port, road, power and water facilities. A rail easement or 'right-of-way' completed by the British Columbia Railway ("BCR") foundation runs adjacent to the Project for approximately 30km southwards. At this point it connects with existing rail, at the Minaret Terminus, and continues on to the dedicated coal terminals at the deep sea ports of Prince Rupert and Port Metro Vancouver. CN Rail operates under a long term lease arrangement with BCR, and operates the rail line between Prince George and Port of Prince Rupert and on the Dease Lake Line to Minaret.

### ANTHRACITE RESOURCES

The JORC resources at Groundhog are currently 1.57Bt, as summarised in the table below:

JORC Category	Upgraded Resource (Mt)
Measured	16
Indicated	553
Inferred	998
<b>Total</b>	<b>1,567Mt</b>

#### JORC Resource at Groundhog

Anthracite resource estimation parameters:

- 0.3m seam thickness cut-off
- 100m river setback

Groundhog is amenable to both shallow adit / underground and open cut mining with 415Mt of anthracite occurring between 0 and 100m depth below surface and 90% of the total 1.57Bt resource occurring between 0 and 300m depth.

The table below illustrates the depth cut-off of the JORC resource at Groundhog:

JORC Resource Breakdown By Depth (Mt)	
< 50m	154
< 100m	415
< 200m	993
< 300m	1,420
Unrestricted	1,567

*JORC Resource at Groundhog by depth*

## ANTHRACITE QUALITY

The anthracite quality results received from the 2013 PFS / infill drilling program at Groundhog were excellent and are in line with 2012 results. Wash yields on the anthracite produced at Groundhog range from 57% to 83% for a range of potential HG and UHG anthracite, and ultra-low volatile (ULV) pulverised coal injection (PCI) products.

Sub 10% ash anthracite lumps and fines target product mix for the bulk sample is expected to achieve yields of >57% (with further optimisation expected), very low inherent moisture, volatile matter content of less than 5%, fixed carbon in excess of 84% and low sulphur content (~0.6%).

Anthracite quality results at the two preferred bulk sample locations, based on 2013 data, is shown in the table below and clearly demonstrates the occurrence of UHG anthracite:

	Bulk Sample A (adb)	Bulk Sample B (adb)	High-Grade Anthracite (adb)	Ultra-High Grade Anthracite (adb)	Chinese BF Coke (adb)
Moisture	1.4%	1.2%	15% (max)	13% (max)	12% (max)
Ash	9.9%	9.7%	15% (max)	12% (max)	12% (max)
Volatiles	4.8%	4.4%	10% (max)	5% (max)	2% (max)
Fixed Carbon	84%	85%	75% (min)	80% (min)	86% (min)
Sulphur	0.6%	0.6%	1% (max)	0.6% (max)	0.6% (max)
Classification			Metallurgical Coal	Metallurgical Coal	Metallurgical Coke

A comparison of the potential anthracite specifications (notably carbon) at Groundhog with Chinese BF Coke, which is an essential input into blast furnace steel production, indicates an exceptional product on

all specifications. HG and UHG anthracite is a widely used input in the steel manufacturing process replacing between 10% and 30% of metallurgical coke used in the blast furnace.

Anthracite is also used in the manufacture of specialty steels and alloys, electric arc furnaces, ore sintering, charge carbon, reductant and cathode pastes as an alternative to graphite.

### ***COMPLETION OF SEISMIC PROGRAM***

A seismic program consisting of 9 lines for a total of 9,350m of “shallow focus reflection seismic survey” was completed within the North-West zone of Groundhog in Q1 of this year.

The purpose of the seismic program was to:

- define the structural form of the anthracite seams;
- assist as a predictive tool for further drilling and mine planning; and
- define the depth of unconsolidated material and anthracite seam sub-crops (where the seams come to surface and meet the unconsolidated overlying surface material).

The quality of the data collected was excellent and preliminary processing shows good reflectors at depth, confirming the general structural interpretation in the North-West zone of Groundhog. Reprocessing is ongoing to focus on specific horizons, including very shallow features to map the depth to bedrock and clearly delineate anthracite seam surface traces.

### ***ENVIRONMENTAL AND GEOCHEMICAL STUDIES***

Knight Piésold Consulting continues hydrology testing to support the bulk sample and to transition to small scale mining and into commercial production. Knight Piésold has installed vibrating wire piezometers and pressure transducers / data loggers and is continuing the collection of the groundwater samples from the monitoring wells. Groundwater samples from the wells are being taken on a regular basis monitoring any seasonal changes, with the results being analysed to facilitate long term mine management.

In addition, SRK Consulting continues with the geochemical characterisation and hydrogeological model. The results of the geochemical characterisation program will assist in the finalisation of the environmental management plan for Groundhog to ensure mining occurs in an environmentally sound manner.

### ***COMPLETION OF DRILLING FOR EARLY 2014 FIELD SEASON***

The early 2014 field season drilling program was completed during late April 2014 at the Groundhog Project. The program was designed to delineate the strike length and direction of the main structure of the key seam #70. The Company continues to map the extent of the sub-crop and further enhance confidence around the portal and bulk sample locations where it plans to extract up to 100,000t of anthracite.

Following completion of this concentrated drilling program, the Company ramped up its full summer drilling program in June 2014. This early drilling program consisted of a combination of open rotary holes and cored holes with approximately one in every four holes being targeted for coring.

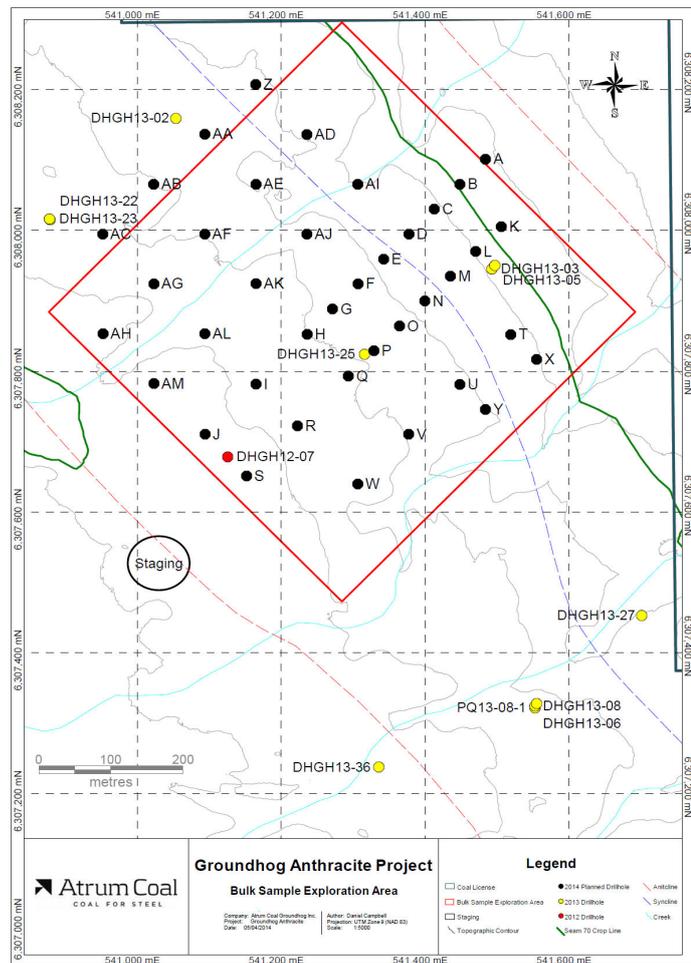
Each drill hole was positioned to:

- Confirm the depth and thickness of the #70 seam and increase the confidence in the geology / structural model to progress with bulk sample mine construction;
- Categorise the material above the target #70 seam including other coal seams, consolidated material and unconsolidated surficial material;
- Run an extensive suite of geophysical logs including density, neutron, gamma, dipmeter, sonic, and possibly televiewer assessments; and
- Categorize the stratigraphy of the #70 seam and #40 seam.

The cored holes were selected to ensure that:

- They are fully described, photographed and sampled as required;
- At least three coal seam intersections are sampled for coal quality analysis, to deliver at least 5kg samples of quality anthracite from the target #70 seam to assist ongoing coal marketing and offtake discussions; and
- A representative selection of cored holes will be forwarded for additional geotechnical and geochemical testing.

In late March 2014, the Company completed its ground based seismic program designed to model the different coal seams above and below the key #70 seam based on the different densities and conductivity attributes of each seam.



Completed and Current drilling program - A through F (inclusive)

This data was used in conjunction with the geophysical logs of the early drilling program to enhance the geological confidence around the proposed portal locations for the bulk sample.

The following map identifies the locations of the drill holes which were completed within the planned bulk sample location in the north-west zone at Groundhog.

## COMPLETION OF PHASE 1 PORTAL DRILLING AT GROUNDHOG

Following completion of the pre-production drilling program and contemporaneous with the bulk sample program, the Company plans to relocate the drill rigs to undertake a combination of mine plan drilling as well as drilling on newly granted coal licences where further resource upside has been identified. The phase 1 portal drilling program included six HQ cored drill holes for a total distance of 714m ranging from 50m to 115m in drill depth. These were drilled in the bulk sample mine plan area and access portal location.

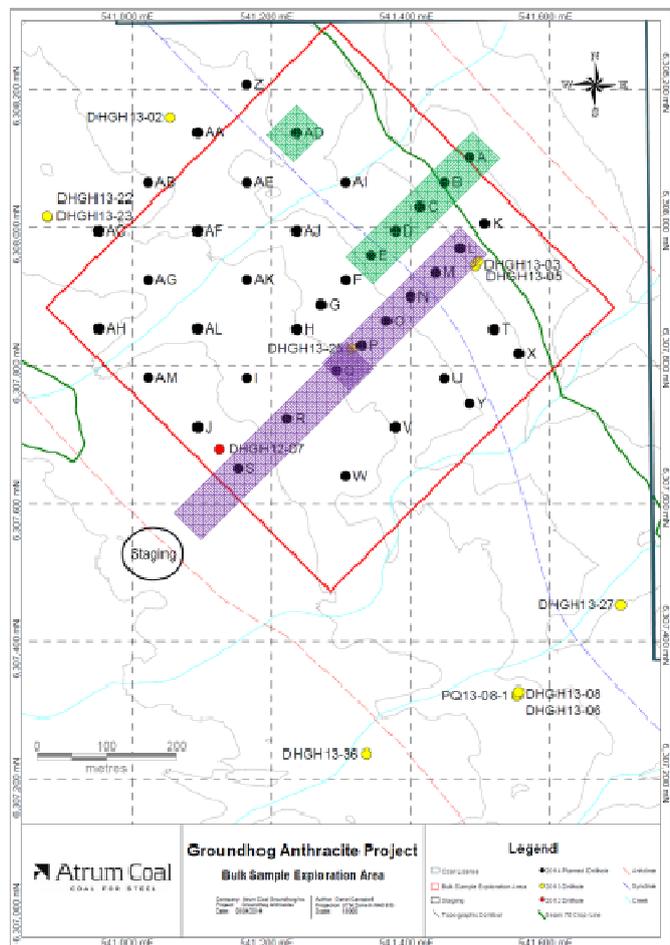
All holes were photographed as well as geophysically and descriptively logged for lithology and geotechnical purposes.

Samples were collected for anthracite quality and geotechnical analysis. A total of 18 geotechnical samples, including roof and floor samples, and 109 anthracite seam samples were submitted to ALS laboratory in Canada for quality and roof/floor geotechnical analysis.

Geophysical logging included acoustic televiwer and sonic assessments, to provide detailed geotechnical characterization results which will increase understanding of the roof and floor conditions immediately above and below the target #70 seam, enabling the Company to finalise its portal design specifications for the bulk sample.

Seam #70 was encountered at shallow depths ranging from 3.3m to 26.0m below surface with no evidence of oxidisation. Phase 2 portal drilling commenced before the end of May and tracked seam #70 in a dip direction to the west within the bulk sample area. Within this area and its immediate surrounds, and based on our most recent results, seam #70 thicknesses range from 1.25m to 4.70m at an average of 2.13m, which is an excellent result for mine planning purposes.

The previous map identifies the locations of the drill holes both completed (under **phase 1**) and planned (under **phase 2**) within the bulk sample location in the north-west zone at Groundhog.



Portal and bulk sample drilling plan (completed & planned)

The drilling program will continue to fully define the bulk sample area in the summer program.

## ***MOBILISATION OF HEAVY EQUIPMENT TO GROUNDHOG SITE***

The Company recently mobilised heavy equipment to the staging platform in the North-West zone at Groundhog. This equipment included an articulated dump truck, excavator and dozer. The equipment will be used to complete mechanical trenching.

The Company received approval to complete mechanical trenching near the bulk sample location under its extended NOW, and has commenced this activity.



**Trenching and portal development machinery**

## ***IDENTIFICATION OF BULK SAMPLE LOCATION***

The geological model at Groundhog has been updated to include seam correlation and anthracite quality interpretation of exploration results from the 64 diamond drill hole program completed in 2013.

Drilling targeted the thicker, near surface, higher quality #70 coal seam in the north-west zone where initial production is anticipated to commence with extraction of up to a 100,000 tonne bulk sample.

The bulk sample permit application at Groundhog was finalised and lodged.

The mine design and associated mine plan for the bulk sample is complete, utilising a simple room and pillar mining method accessed through an adit to provide the Company with a low-capital entry to production. It is likely that the adit will double as the access point for the commencement of small scale mining and future commercial production.

The preferred location of the bulk sample has been identified on the basis of seam thickness, anthracite quality, structural geology, shallow floor dip, ease of access and high product yield.

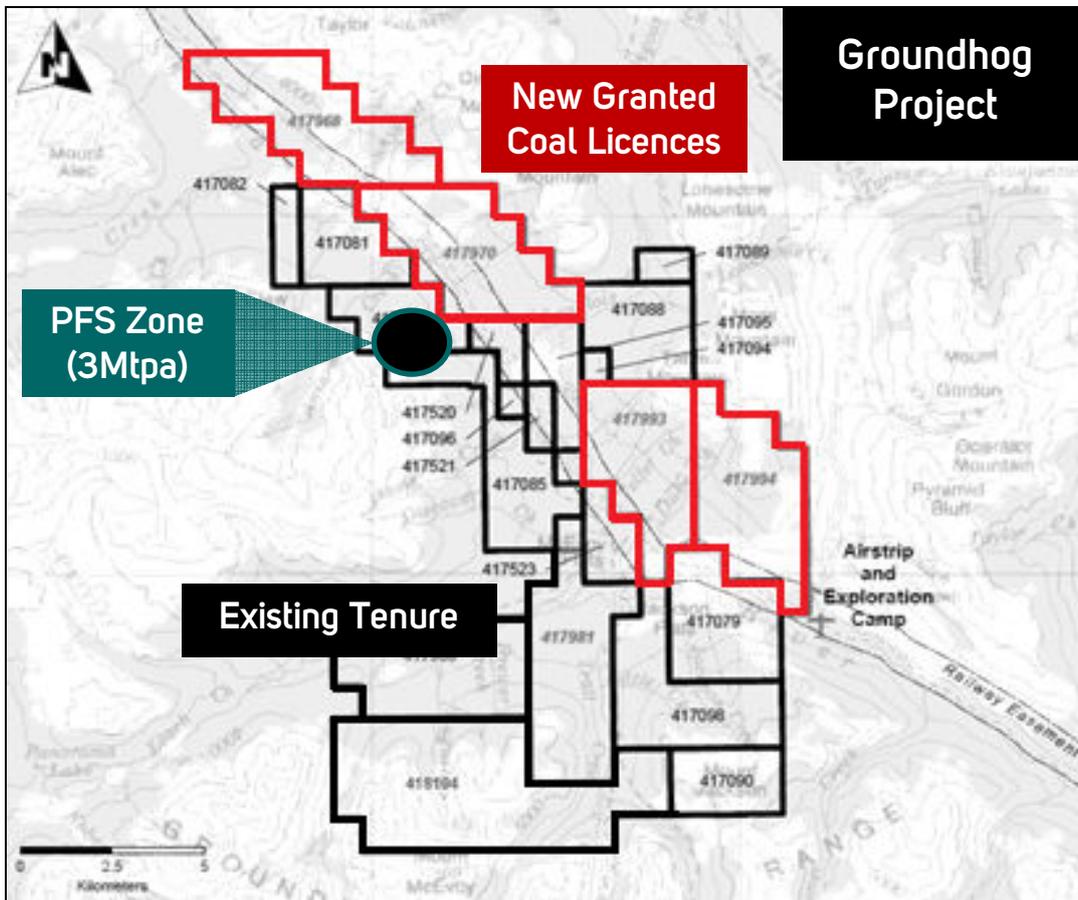
## ***ATRUM COAL RECEIVES GRANT OF ADDITIONAL COAL LICENCES***

During the quarter, the Company received approval from the BC Ministry of Energy and Mines in relation to the granting of additional coal licences at the Groundhog Project.

The additional coal licences granted at Groundhog offer Atrum the opportunity to increase the anthracite inventory. Recent PFS results focused on only two of more than twenty anthracite seams in an area representing less than 5% of the total Groundhog Project. Longer term, the Company will seek to identify further areas at Groundhog, including the areas recently granted, that can provide low impact, mine expansion opportunities.

The newly granted coal licences are contiguous with the current coal licences at Groundhog and were approved following detailed consultation with the Tahltan and Gitksan First Nations.

The map below illustrates the four additional licences that have recently been granted.



Groundhog Anthracite Project Tenure Map

A **NOW** has been approved which enables the Company to commence drilling on these licences.

Atrum owns 100% of a total of 26 coal licences and 11 coal licence applications at Groundhog. The Company has incorporated these newly granted licences into its broader 2014 exploration program.

The Company has also received approval from the BC Ministry of Energy and Mines to construct ground access trails at Groundhog.

Drilling continues at the PFS site with encouraging results in terms of anthracite seam thicknesses, depth of occurrence below surface and product yields.

## GROUNDHOG PRE-FEASIBILITY STUDY

The PFS was independently authored by Valzan Pty Ltd (Valzan) and includes independent financial modelling undertaken by Deloitte Touche Tohmatsu. A summary of results is tabled below:

### Production

Anthracite ROM – North West Area	Mt	87.4
Life of Mine ROM Production – North West Area	Mt	75.0
Life of Mine – North West Area	Years	16
ROM Production Rate (Peak)	Mtpa	5.4
LOM Yield	%	60
Anthracite Lumps Production – LOM / Annual (ROM)	Mt / Mtpa	39.3 / 2.62
Anthracite Fines Production – LOM / Annual (ROM)	Mt / Mtpa	35.7 / 2.38

Source: Valzan

### Capital Expenditure

Mining Equipment (Contractor)	US\$M	N/A
Water and Waste Management Facilities (Initial)	US\$M	14.7
Office Buildings / Man Camp / Portal Facilities (Leased)	US\$M	N/A
Surface Infrastructure	US\$M	52.4
Coal Haulage Road	US\$M	47.6
Mains Power Transmission Infrastructure	US\$M	52.0
Clean Coal Storage Silo / Conveyor System / Truck Dump (Leased)	US\$M	N/A
CHPP (under BOOT)	US\$M	N/A
Waste Management Expansion (funded from Free Cash Flow) – Year 7 and Year 12	US\$M	34.9
Mine Closure (funded from Free Cash Flow)	US\$M	22.8

### CAPEX Responsibility Scenario

Pre-Production Capital – Atrum (2014 requirement)	US\$M	10.0
Ramp-up Production Capital – Atrum	US\$M	67.1
Infrastructure Capital – Atrum Infrastructure & Logistics (Low-High Range)	US\$M	100-154

Source: Valzan

### Operational Expenditure

Mining (Owner Operator v Contractor basis)	US\$/Product t	47.3 - 70.9
Processing (BOOT arrangement)	US\$/Product t	8.2
Waste and Water Management	US\$/Product t	1.2
Haulage / Transportation	US\$/Product t	17.1
Port Handling Charges (Contractor basis)	US\$/Product t	5.9
Power Consumption Charges	US\$/Product t	4.1
Site Administration & Marketing	US\$/Product t	3.0
Legacy Production Royalty (ex-mine gate)	%	1.0
Long Term FOB costs including royalty (Contractor / Owner Operator Basis)	US\$/Product t	87

Source: Valzan - US\$/Product tonne based on the road and power infrastructure CAPEX being funded by Atrum Coal NL

### Financial Summary

Average weighted anthracite sales price	US\$/Product t	194
NPV <sub>8</sub> (nominal/pre-tax)	A\$M	2,063

NPV <sub>8</sub> (nominal/post-tax)	A\$M	1,256
IRR (nominal/pre-tax)	%	67.6
IRR (nominal/post-tax)	%	51.4

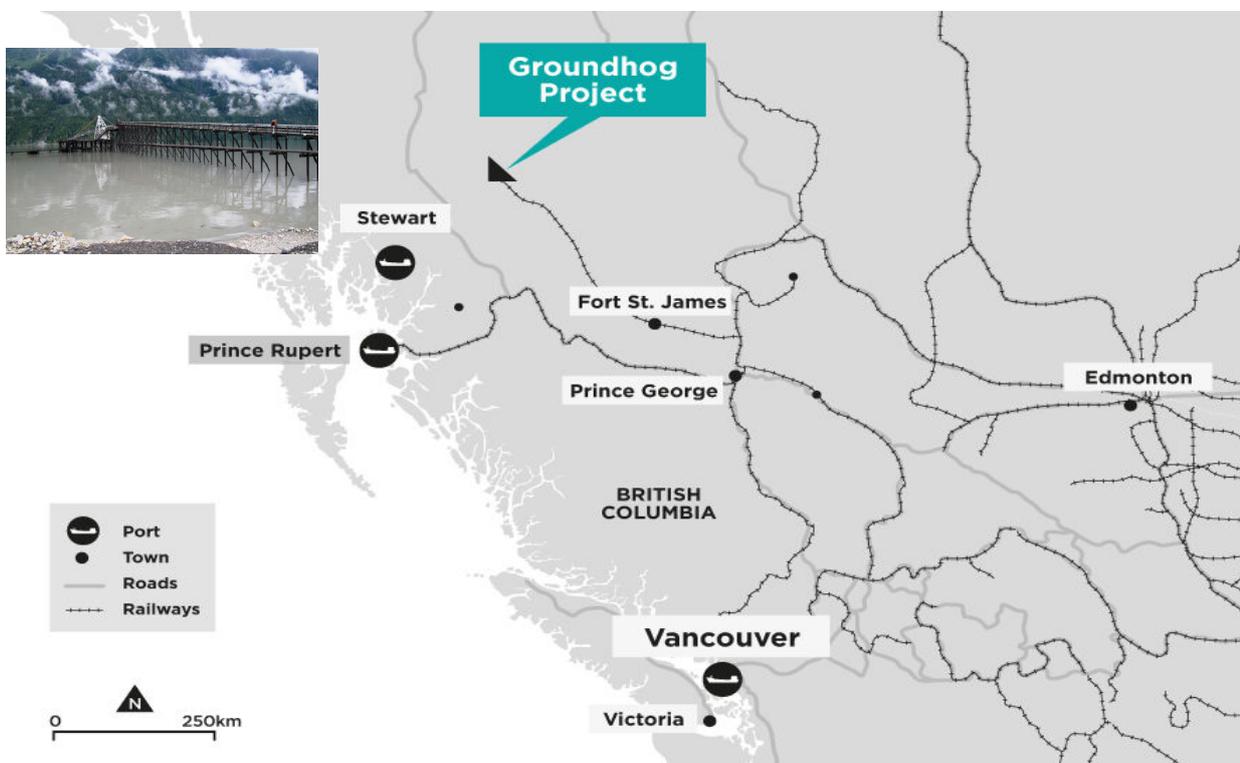
Source: Financial Model - based on the road and power infrastructure CAPEX being funded by Atrum Coal NL

## BACKGROUND

Atrum commissioned leading Australian-based mining and engineering consultants Valzan to carry out an independent PFS for the development of a steady-state 5Mtpa / peak 5.4Mtpa ROM operation at Groundhog. Although the deposit is shallow and amenable to large scale open-cut mining, in order to fast-track a low impact and low cost entry to production, an initial 'adit style' or 'cut and cover' underground mine methodology has been adopted.

The PFS is based on the underground mining of the #70 seam and the #40 seam in the north-west area of Groundhog, which represents less than 5% of the aerial extent of Groundhog and models only two seams out of a potential 20+ anthracite seams. Using bord and pillar roadway development and productive mini-wall mining techniques, an initial 87.4Mt of ROM anthracite has been defined with 75Mt of this modelled for extraction. Groundhog hosts a global JORC Resource of 1.57 billion tonnes of HG and UHG anthracite.

Groundhog is located approximately 150km away from the deep sea port of Stewart where Atrum has secured 1.5Mtpa of port capacity under 'non-take or pay' terms at the existing Stewart Bulk Terminal and a further 5Mtpa secured under Memorandum of Understanding at the Stewart World Port (currently under construction).



Groundhog Anthracite Project – Location Map

## PFS RESULTS

### JORC Anthracite Resources

The anthracite resources contained within the north-west zone of Groundhog, as at 31 March 2014, are reported in accordance with the JORC Code 2012 and outlined in the table below. The relatively small focus area contains an estimated total resource of 305Mt of in situ anthracite with 128Mt of this resource contained in the main target seams, the #40 and #70 seams.

The resources contained in the north-west zone, according to JORC (2012) classification and category are outlined in the table below:

	Depth (m)	Measured (Mt)	Indicated (Mt)	Inferred (Mt)	Total (Mt)
Open Cut Mining	< 100	40.7	32.1	18.5	91.3
Underground Mining	> 100	59.4	97.0	57.5	213.9
<b>Total by JORC Category</b>		<b>100.1</b>	<b>129.1</b>	<b>76.0</b>	<b>305.2</b>

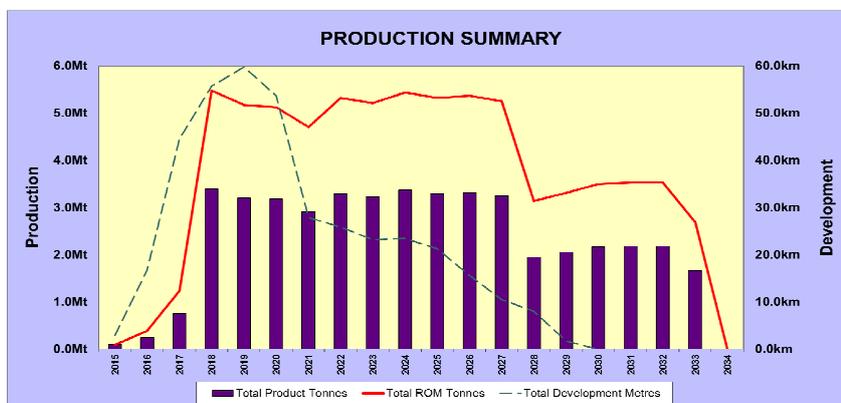
*#Confidence in the estimate of 'Inferred' Mineral Resources is not sufficient to allow the results of the application of technical and economic parameters to be used for detailed planning in pre-feasibility studies, due to insufficient geological confidence. For this reason, there is no direct link from an 'Inferred' Mineral Resource to any category of Ore Reserve. Caution should be exercised if 'Inferred' Mineral Resources are used to support technical and economic studies.*

#### *Groundhog Anthracite JORC Resources – North-West Zone - Gordon Geotechniques*

For the purposes of the PFS, a total of 87.4Mt ROM anthracite has been estimated to be contained in the north-west zone, of which 75Mt has been modelled and reflected in the ROM production schedule, meaning that an additional 12.4Mt remains as extractable anthracite, yet to be included in the production schedule from this small focus area.

### Mining & Processing

The shallow underground mine, accessed via an 'adit style' or 'cut and cover' portal, will utilise a system of mini-walls, conveyors, shuttle cars and dump trucks to mine and haul the anthracite. At peak production, the mine will produce approximately 5.4Mt/pta ROM anthracite which, after washing through a coal handling and preparation plant (CHPP), is forecast to produce approximately 3.4Mt/pta of product (saleable) anthracite. The proposed production schedule including ramp up is outlined in the graph below:



*PFS Production Schedule - Valzan*

The mining and processing of anthracite at Groundhog requires the design and construction of purpose built facilities including:

- mine office and workshop facilities;
- a feed hopper, rock breaker and crusher;
- a CHPP with dense medium cyclones and concentrators;
- accommodation camp;
- fuel storage facilities;
- diesel power generators and associated electrical reticulation;
- clean anthracite stockpiling facilities;
- tailings and water treatment facilities;
- mine access road; and
- facility pads.

### Coal Handling and Preparation Plant (CHPP)

The CHPP has been introduced as a two-phased approach designed to provide the project with flexibility in its ramp up and also its ability to produce tailored specialty anthracite products. The first phase of the CHPP is designed to process 2.5Mtpa ROM with the second phase designed to process an additional 2.5Mtpa ROM. The CHPP will be financed through an off-balance BOOT arrangement and will comprise an enclosed plant, stockpiles of ROM anthracite, product anthracite and coarse reject, feed and product conveyors.

The CHPP is to be located at the mine site in a centralised location which will service the two entry portals into seam #70 and the single entry into seam #40, with the final anthracite product trucked to the deep sea port of Stewart for seaborne export to Asia.

The CHPP has been designed to produce a sub-10% ash product with a composite make up of 52.4% HG and UHG anthracite lumps across three size fractions and 47.6% HG and UHG anthracite fines. The overall yield over the life-of-mine has been projected to be 60%.

As part of the pre-production phase and to enable the Company to wash anthracite on site as part of the small scale mining phase, a separate 400,000tpa wash plant will also be commissioned at Groundhog. This wash plant will be used to batch wash the specialised UHG grade anthracite which will then be supplied to the filter media, high tensile metals, cathode and electrode paste and pellet plant fuel markets. Prices for UHG anthracite in these markets range from US\$1,000/t up to US\$1,400/t.

### Mine Site Infrastructure

Mine site infrastructure at Groundhog includes:

- office facilities located at the central mining industrial area;
- portal workshops located at the access / entry point of the #70 seam in the north and south location within the north west area;
- mine industrial area including the tailings storage facility, water treatment facility, clean anthracite storage facility and the sediment control pond;
- light vehicles for personnel transportation;
- mine and office personnel man camp; and
- site access roads.

## Anthracite Haulage and Transportation

Clean anthracite will be transported from the mine site along a dedicated anthracite haulage road, which will connect with Highway 37, a provincially maintained highway, and continue south onwards to the deep sea port of Stewart Bulk Terminals.

The overall length of the road route, including the dedicated haul road is 219 km. Anthracite will be transported in B-double trucks with net carrying capacity of 50t each. A single shift will see anthracite loaded onto the trucks through the truck load-out at the mine site, driven to Stewart Bulk Terminal, at which point it will be unloaded at the clean anthracite stockpile facilities.

Atrum will not be required to fund construction of the haul road. Instead, Atrum Infrastructure and Logistics (ATIL) will fund construction of the road and charge Atrum a service fee. ATIL will also seek secondary customers to charge for use of the road. The road is expected to double as a potential easement for the power line extension and, if required, a new dedicated railway line to Stewart once production at Groundhog exceeds 'truckable' volumes. It is envisaged that ATIL will fund the construction and maintenance of any rail line, and will seek secondary customers for additional revenue. ATIL is currently in discussions with Kuro Coal Limited in relation to the infrastructure requirements for the development of the Panorama project.

The Company is assessing a number of options to fund ATIL, including an option to 'spin-out' the infrastructure unit through a public market transaction, where Atrum shareholders would receive a significant in specie stake. ATIL provides Atrum with a means of avoiding shareholder dilution by quarantining infrastructure capital expenditure and financing it in an external structure and simultaneously allowing Atrum to focus on its core activities, being mining, processing, marketing and selling anthracite.

The PFS results and the financial model have assumed that Atrum will fund the road infrastructure CAPEX associated with the mine site.

## Power Infrastructure at Mine Site

Initially, Groundhog will use diesel generators to power the mine site, mining equipment and surface infrastructure.

Following the initial two years of operation, the Company will require a power transmission line to extend from Groundhog to the North-West Transmission Line (NTL) near Highway 37. The total length of the power transmission line is estimated at 103 km and will follow the road haulage route.

The NTL delivers low cost hydropower which is expected to save Groundhog US\$10 million per annum in operating costs when compared to the sole use of diesel generators.

Atrum will not be required to fund the extension of the NTL. Instead, ATIL will fund construction of the power lines and charge Atrum an annual service fee. For cost efficiencies, the power lines will follow the easement created by the haulage road. ATIL may seek secondary customers for additional revenue, including Kuro Coal Limited.

The PFS results and the financial model have assumed that Atrum will fund the power infrastructure CAPEX associated with the mine site.

## Port Optimisation and Anthracite Stockpiling Facility

As part of the PFS, the Company engaged a port and logistics engineering consultant to undertake a review of the current loading facility, including the ship loader and conveyor systems, and clean anthracite stockpiling area available at Stewart Bulk Terminal. The current facilities are capable of handling 1.5Mtpa with minimal upgrade.

The Company considered a number of options for expansion of the port facilities to efficiently handle larger volumes, well beyond the modelled annual anthracite throughput.

Atrum will not be required to fund any optimisation or upgrade associated with the port facilities. However, as an option, ATIL, SBT or Stewart World Port (SWP) could fund an optimisation including all engineering and construction and charge Atrum an annual service fee. If ATIL was to fund the optimisation, it could seek secondary port customers for additional revenue including Kuro Coal Limited and other mining operations in the region.

The PFS financial model includes an optimisation option with a CAPEX budget of US\$54 million that could be applied to optimising the current ship loading system, conveyors and clean anthracite storage facilities.

## Anthracite Product Suite and Quality

The PFS for Groundhog has been modelled on the assumption of four sized HG and UHG anthracite products being 'Lumps', 'Large Nuts', 'Small Nuts' and 'Duff/Fines'. It is estimated that 52.4% of the anthracite produced at Groundhog will be made up of the three top sizes with the balance of 47.6% being Duff / Fines.

The overall yield at Groundhog over the life-of-mine is estimated at 60%. Indicative anthracite quality specifications for Groundhog are as follows:

Property	Value
Inherent Moisture (air dried)	< 2%
Volatile Matter (air dried)	3 - 6%
Fixed Carbon (air dried)	85-97%
Ash (air dried)	10%
Sulphur (air dried)	0.4 - 0.7%
HGI	45
Calorific Value (kcal/kg)	7,200 - 8,000
<b>Classification</b>	<b>HG/UHG</b>

### *Indicative Groundhog Anthracite Specifications - Valzan*

Commencement of trial mining later this year will allow the Company further opportunity to refine its understanding of the anthracite quality at Groundhog.

## Forecast Anthracite Pricing

Wood Mackenzie provided independent price forecasts for Groundhog's anthracite through the compilation of international trade statistics and benchmarks. For modelling simplicity and to be conservative, it was assumed that the three Lump size fractions of high grade anthracite command a uniform price in the global market, whilst the Duff / Fines material has a lower price due to the 'unsized' nature and application of the product. It is expected that with more detailed market research, higher prices could be achieved for individual sizes.

There is an opportunity for the Company to capitalise on significantly higher pricing for its sized anthracite products once specialty markets are defined and penetrated.

The opportunity for Atrum to supply UHG anthracite into the specialty markets including filter media, high tensile metals, cathode and electrode paste and pellet plant fuel presents additional significant upside for the project. Prices for UHG anthracite in these markets range from US\$1,000/t up to US\$1,400/t.

The anthracite market remains strong with HG anthracite lumps currently trading at US\$187/t compared to US\$120/t for hard coking coal.

Current forecast prices (in 2014 real US dollar terms) FOB Western Canada, are as follows:

Year	Export Quality Coke (Benchmark)	Anthracite Lumps / Large Nuts / Small Nuts	Anthracite Duff / Fines	Blended Sales Forecast
2014	\$330.6/t	\$187.9/t	\$123.9/t	\$157.4/t
2015	\$345.7/t	\$202.0/t	\$133.3/t	\$169.3/t
2016	\$352.7/t	\$209.0/t	\$138.2/t	\$175.3/t
2017	\$356.5/t	\$214.1/t	\$142.0/t	\$179.8/t
2018	\$358.0/t	\$217.7/t	\$146.9/t	\$184.0/t
2019	\$357.6/t	\$220.3/t	\$153.1/t	\$188.3/t
2020	\$357.0/t	\$223.0/t	\$159.5/t	\$192.8/t
2021	\$354.3/t	\$224.8/t	\$161.1/t	\$194.5/t
2022	\$349.9/t	\$225.2/t	\$162.0/t	\$195.1/t
2023	\$348.8/t	\$227.9/t	\$164.3/t	\$197.6/t
2024	\$345.8/t	\$225.7/t	\$165.9/t	\$197.2/t
2025	\$344.4/t	\$224.7/t	\$168.3/t	\$197.9/t

Source: Wood Mackenzie 2014

## Anthracite Uses and Applications

Groundhog anthracite can be sold into the steel manufacturing and specialty high tensile metals industries. Within these markets, HG anthracite can replace between 10% and 15% of metallurgical coke requirements in a blast furnace and can be used as the sole input in an electric arc furnace. Recently, Atrum has been contacted by steel mills modelling higher replacement ratios. The market for these products is heavily supply constrained and Atrum is anticipating unconstrained seaborne demand.

In addition, the UHG anthracite produced at Groundhog can be used within the water filtration / filtration media sector, electrode and cathode paste and as a pellet plant fuel. These products command prices well over US\$1,000/t (not modelled in the PFS).

### Production Ramp-up Capital Funding

Atrum has multiple funding options for ramp-up production capital expenditure including:

- Offtake funding
- Conventional debt facilities
- A separately funded infrastructure company funding all infrastructure items (see 'ATIL')
- Atrum owns 100% of the Groundhog project and could consider direct minority investment in the project or into specific coal licences across the +38,000ha or 380sqkm Groundhog site.

Importantly, Atrum is well funded with cash at bank to deliver "first anthracite on ship" later this year.

### Project Economics

The financial modelling indicates that when incorporating a nominal discount rate of 8%, the Groundhog project has a pre-tax NPV of approximately A\$2.1 billion and a pre-tax IRR of 68%, assuming the road works and power capex is funded by Atrum rather than ATIL. The post-tax NPV and IRR is A\$1.3 billion and 51% respectively. Total free cashflow is A\$3.2 billion.

The following tables illustrate sensitivity analyses dictated by the financial model:

Discount Rate	Post-tax NPV (A\$M)
-2% / 6% (nominal)	1,564
<b>Base Case / 8% (nominal)</b>	<b>1,256</b>
+2% / 10% (nominal)	1,015

*Source: Financial Model*

Yield	Post -tax NPV (A\$M)
-10% / 54%	993
<b>Base Case / 60%</b>	<b>1,256</b>
+10% / 66%	1,518

*Source: Financial Model*

Financial modelling was completed by Deloitte Touche Tohmatsu.

Given the magnitude of the Groundhog project, the fact that less than 5% of the aerial extent of the project has been modelled in this PFS, and that the PFS only models 2 of the 20+ anthracite seams, significant upside is expected.

## PORT CAPACITY SECURED AT STEWART

On 28 July 2013, the Company executed a Land Reservation and Terminal Services Agreement with Stewart Bulk Terminals (SBT) and separately executed a Memorandum of Understanding with Stewart World Port (SWP).

Mayor of Stewart, Galina Durant, stated:

*"Stewart is ready for the opportunities presented by the clean, environmentally friendly mining industry. Mining is an important part of our economy and we look forward to working with Atrum to unlock the economic potential of the region."*

## STEWART BULK TERMINALS

The Company has executed a Terminal Services Agreement and Land Reservation Agreement with SBT (SBT Agreements).

This secures the shipping requirements for storage and loading of anthracite mined and transported from the proposed Groundhog mine approximately 150km away, through the Port of Stewart, British Columbia.

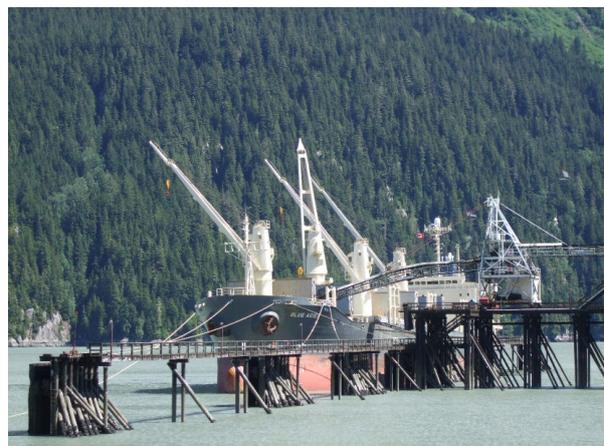
Under the SBT Agreements, Atrum can export up to 1.5Mtpa of anthracite from SBT at agreed and competitive port handling charges, on a non 'take or pay' arrangement.

There are also provisions for the allocation to Atrum of higher coal handling volumes at SBT in the event that an upgrade to capacity beyond its allocated 1.5Mtpa occurs.

Anthracite extracted from the proposed Groundhog mine can be transported by truck initially using a coal haulage road from the mine site to Highway 37, an existing paved two-lane highway used by other resource companies to transport commodities such as copper and nickel concentrate to SBT.

SBT has a berthing structure that can receive panamax and handymax vessels, ideally suited to the transport of high value anthracite lump and fines. Vessel loading rates are currently 700 to 800 tonnes per hour equating to a full ship loading cycle of 31.3 to 57.1 hours.

There is scope to optimise the berth handling and loading rates.



Stewart Bulk Terminal existing loading berth



Stewart Bulk Terminal existing storage facility

The SBT Agreements include provisions for the reservation of land and appropriate space for the construction and maintenance of a coal storage silo(s) including an area of approximately 2,500m<sup>2</sup>, as well as the use of the existing loading facilities to meet the anticipated monthly loading requirements of the proposed Groundhog mine.

Under the SBT Agreements, SBT will construct and maintain the anthracite storage silo(s) for exclusive use by Atrum. The proposed expansion area at SBT provides the ideal location for the anthracite storage silo(s) due to its close proximity to the loading berth. SBT is currently excavating and building the foundations at the expansion site.

## STEWART WORLD PORT

The Company has signed a Memorandum of Understanding (MOU) with SWP for the export of up to a further 5Mtpa of anthracite and associated high quality anthracite products from the proposed Groundhog mine. SWP is currently under construction and is expected to be able to supply the Company's planned expanding anthracite handling needs from 2016.

SWP is currently accessible by barge and has started the first of two construction phases, as follows:

- Phase I construction will extend the existing Cassiar Dock to deep water and will significantly improve barge access to the port. Phase I construction is complete and operational.
- Permitting for Phase II construction is underway. Once Phase II construction is complete, the facility will provide for mineral concentrate loading, RORO, and all manner of inbound and outbound break bulk cargo.



**Stewart World Port dock under construction**



**Stewart World Port aerial view**

SWP will be a modern facility offering the latest in loading, storage, and crane technology to ensure customer cargo is handled efficiently and effectively.

The MOU with SWP provides Atrum with the flexibility required during the ramp up phases of production at Groundhog. It is proposed that anthracite will similarly be transported by road from the Groundhog mine to SWP using a combination of existing paved highways, Forest Service Roads and private coal haulage roads, the majority of which are already constructed and being maintained.

The deep sea Port of Stewart provides anthracite handling capacity for 365 days of the year with no freezing restrictions. It has the depth capacity of handling panamax and cape size vessels and is in close proximity to the proposed Groundhog mine. SBT and SWP will enable the Company to maintain a low capital entry to production and take advantage of cost-effective transportation and export of its high quality anthracite and ULV PCI coals to key consumers.

## KURO COAL LIMITED

### *APPOINTMENT OF NON-EXECUTIVE DIRECTOR TO THE BOARD OF KURO COAL*

#### *Appointment of Mr Andrew Phillipps*

During the quarter, Kuro appointed Mr Andrew Phillipps as Non-Executive Director on the board.

Mr Phillipps has 20 years' corporate finance experience, previously serving as an Executive Director for UBS AG in Australia, focused entirely on the coal sector and involved in executing and leading some of Australia's largest coal M&A and financing transactions.

#### *Appointment of Mr John Wasik*

During the quarter, Kuro appointed Mr John Wasik as Non-Executive Director on the board.

Mr Phillipps has in excess of 40 years' experience in the coal industry specialising in coal mine development.

### *KURO INCREASES EXPLORATION AREA AT THE PANORAMA ANTHRACITE PROJECT*

During the quarter, Kuro Coal secured an additional 13 coal licence applications in the Panorama area, 20km west of Atrum's Groundhog Project.

The newly secured coal licence applications are contiguous with the two granted coal licences that are already the subject of a proposed joint venture between Atrum and Kuro.

The new tenure secured adds a further 18,375 hectares of exploration ground to an existing 850 hectares and represents a substantial increase.

Kuro is preparing a NOW for the new ground and expects to lodge this together with an application to convert to coal licence status shortly in an effort to fast-track exploration. A maiden drill program is being designed and we are hopeful that exploration can commence later this year.

### *KURO COMPLETES STRATEGIC ACQUISITION AT THE PANORAMA PROJECT*

During the quarter, Kuro completed the 100% acquisition of a substantial coal licence package contiguous with its existing Panorama Anthracite Project ("**Panorama**") located in British Columbia, Canada.

The acquisition includes 10 coal licence applications ("**Panstone Applications**") covering a total of 13,787 hectares. It provides Kuro with a substantial consolidated footprint totalling 33,012 hectares in the Panorama Coalfield.

The Company will immediately commence the transition of the Panstone Applications to granted coal licences as part of the preparation for the 2014 exploration activities.

The new acquisition provides Kuro with a strategic foothold within the project area, which is expected to host HG anthracite.

## CORPORATE

### *Appointment of VP Marketing and Business Development*

During the quarter, Atrum appointed Mr Peter Doyle as VP Marketing and Business Development.

Peter has in excess of 20 years' experience in international coal marketing and operations.

### *Expansion of Operations Team*

During the quarter, Atrum expanded its operational team with the appointment of Mr Ben Smith as VP Operations, who possesses significant experience in major mine management, risk management and safety culture.

In addition, Atrum appointed Mr Rick Greene as Project Manager (Mining Operations), with significant experience in major mining, civil and mechanical engineering projects.

### *Appointment of Non-Executive Director*

During the quarter, Atrum Coal appointed a highly experienced coal specialist, Mr Cameron Vorias to the Board as a Non-Executive Director. Mr Vorias is currently the Managing Director and Chief Executive Officer of Sojitz Coal Mining Pty Ltd and a Non-Executive Director of Coal of Queensland Pty Ltd.

Mr Vorias has 30 years' experience in coal mining operations including new project development, developing greenfield operations, resource management and risk management.

Mr Vorias is also former Chief Operating Officer – Queensland for Peabody Energy Australia managing six large underground and open cut mining operations generating US\$1.8B in revenue annually.

### *Directors buy more Atrum Coal Shares*

During the quarter, Mr Moran increased his interest in the Company from 20,726,900 fully paid ordinary shares (14.61%) to 32,276,900 fully paid ordinary shares (19.99%).

In addition, Mr D'Anna increased his interest in the Company from 7,785,360 fully paid ordinary shares (5.49%) to 11,885,000 fully paid ordinary shares (7.36%).

Furthermore, Mr Chisholm increased his interest in the Company from 32,436,000 fully paid ordinary shares (22.87%) to 36,448,500 fully paid ordinary shares (22.57%).

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## **Competent Person Statement**

### *Coal Resources*

The coal resources documented in this report were estimated in accordance with the guidelines set out in the JORC Code, 2012. They are based on information compiled and reviewed by Mr Nick Gordon, who is a Member of the Australasian Institute of Mining and Metallurgy and is a full-time employee of Gordon Geotechniques Pty Ltd.

With more than 28 years of experience in open cut and underground coal mining, Mr Gordon has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration to qualify him as a Competent Person as defined in the JORC Code, 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves."

Neither Mr Gordon nor Gordon Geotechniques Pty Ltd have any material interest or entitlement, direct or indirect, in the securities of Atrum or any companies associated with Atrum. Fees for the preparation of this report are on a time and materials basis.

Mr Gordon recently visited the Groundhog project area on 21st March 2014 whilst exploration personnel were preparing for the next drilling program. Two days were also spent with Atrum geological personnel in Victoria, British Columbia evaluating the geological, coal quality and geotechnical information relevant to the Groundhog project area.

Mr Gordon consents to the inclusion in the report of the matters based on the information, in the form and context in which it appears.

### *Exploration Results*

The information in this document that relates to Exploration Results is based on information compiled by Brad Van Den Bussche B.Sc P.Geo, who is a Member of a Recognised Overseas Professional Organisation (ROPO) included in a list promulgated by the ASX from time to time, being the Canadian Institute of Mining and Metallurgy. Mr Van Den Bussche has read and understands the requirements of the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012 Edition). Mr Van Den Bussche is a Competent Person as defined by the JORC Code, 2012 Edition, having five years' experience that is relevant to the style of mineralisation and type of deposit described in this document, and to the activity for which I am accepting responsibility.

Mr Van Den Bussche is Chief Technical Officer of Atrum Coal NL and has sufficient experience which is relevant to the style of mineralisation and type of deposit and mineralisation under consideration and to the activity which they are undertaking. Mr Van Den Bussche consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

## **Forward Looking Statements**

This release includes forward looking statements. Often, but not always, forward looking statements can generally be identified by the use of forward looking words such as "may", "will", "expect", "intend", "plan", "estimate", "anticipate", "continue", and "guidance", or other similar words and may include, without limitation statements regarding plans, strategies and objectives of management, anticipated production or construction commencement dates and expected costs or production outputs. Forward looking statements in this release include, but are not limited to, the capital and operating cost estimates and economic analyses from the Study.

Forward looking statements inherently involve known and unknown risks, uncertainties and other factors that may cause the company's actual results, performance and achievements to differ materially from any future results, performance or achievements. Relevant factors may include, but are not limited to, changes in commodity prices, foreign exchange fluctuations and general economic conditions, increased costs and demand for production inputs, the speculative nature of exploration and project development, including the risks of obtaining necessary licences and permits and diminishing quantities or grades of resources or reserves, political and social risks, changes to the regulatory framework within which the company operates or may in the future operate, environmental conditions including extreme weather conditions, recruitment and retention of personnel, industrial relations issues and litigation.

Forward looking statements are based on the company and its management's good faith assumptions relating to the financial, market, regulatory and other relevant environments that will exist and affect the company's business and operations in the future. The company does not give any assurance that the assumptions on which forward looking statements are based will prove to be correct, or that the company's business or operations will not be affected in any material manner by these or other factors not foreseen or foreseeable by the company or management or beyond the company's control.

Although the company attempts to identify factors that would cause actual actions, events or results to differ materially from those disclosed in forward looking statements, there may be other factors that could cause actual results, performance, achievements or events not to be anticipated, estimated or intended, and many events are beyond the reasonable control of the company. Accordingly, readers are cautioned not to place undue reliance on forward looking statements.

Forward looking statements in this release are given as at the date of issue only. Subject to any continuing obligations under applicable law or any relevant stock exchange listing rules, in providing this information the company does not undertake any obligation to publicly update or revise any of the forward looking statements or to advise of any change in events, conditions or circumstances on which any such statement is based.

**TABLE 1 - SAMPLING TECHNIQUES AND DATA**

Criteria	JORC Code explanation	Commentary
Sampling techniques	<ul style="list-style-type: none"> <li>Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.</li> <li>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</li> <li>Aspects of the determination of mineralisation that are Material to the Public Report.</li> <li>In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.</li> </ul>	<ul style="list-style-type: none"> <li>For the Atrum Coal 2013 exploration program all coal seams intersected were sampled. Coal plies were sampled discretely on the basis of lithological characteristics and quality. All non-coal material and partings were included with the lower coal ply and noted in the lithological description. Non-coal interburden was sampled separately.</li> <li>The immediate roof and floor samples were submitted for geotechnical testing.</li> <li>All coal and roof and floor dilution samples were double bagged at site and marked with sample number, date, hole and project. These were retained on site until geophysical corrections confirmed representative core recovery of the seam and samples. The qualified samples were then transported to the laboratory via courier.</li> <li>Coal Quality samples from the Atrum Coal Drilling program were sent to Loring Laboratories and ALS Laboratories in Calgary and Vancouver, respectively.</li> <li>All coal quality samples were prepared and analysed using Canadian and International Standard testing methodologies.</li> </ul>
Drilling techniques	<ul style="list-style-type: none"> <li>Drill type (eg core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).</li> </ul>	<ul style="list-style-type: none"> <li>All coal quality holes were cored (partially or fully) using a HQ size core barrel producing a 63.3 mm core diameter.</li> <li>Large diameter drill holes for bulk material extraction were cored using a PQ size core barrel producing an 83.1 mm core diameter.</li> </ul>
Drill sample recovery	<ul style="list-style-type: none"> <li>Method of recording and assessing core and chip sample recoveries and results assessed.</li> <li>Measures taken to maximise sample recovery and ensure representative nature of the samples.</li> <li>Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential</li> </ul>	<ul style="list-style-type: none"> <li>An assessment of core recovery was completed by comparing the recovered thickness measured during geological logging and by the driller, to geophysical picked thicknesses from the geophysical logs.</li> <li>Volumetric analysis of samples was conducted on the Atrum Coal exploration program</li> <li>The analysis was based on sample mass received versus expected sample mass derived from sample length by</li> </ul>

Criteria	JORC Code explanation	Commentary
	<i>loss/gain of fine/coarse material.</i>	<p>core diameter by apparent Relative Density</p> <ul style="list-style-type: none"> <li>If sample mass was below 95% a separate exercise interrogating the linear recovery via photos and logs was undertaken to decide whether the sample could be included and not bias the results.</li> </ul>
Logging	<ul style="list-style-type: none"> <li>Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.</li> <li>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.</li> <li>The total length and percentage of the relevant intersections logged.</li> </ul>	<ul style="list-style-type: none"> <li>All core was geologically logged, marked and photographed before sampling. Geological and geotechnical features were identified and logged.</li> <li>All drill holes have been geophysical logged with a minimum density, calliper, gamma and verticality unless operational difficulties prevented full or partial logging of the drill hole.</li> <li>The calibration of the geophysical tools was conducted by the geophysical logging company. Century Wireline Services</li> </ul>
Sub-sampling techniques and sample preparation	<ul style="list-style-type: none"> <li>If core, whether cut or sawn and whether quarter, half or all core taken.</li> <li>If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.</li> <li>For all sample types, the nature, quality and appropriateness of the sample preparation technique.</li> <li>Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.</li> <li>Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.</li> <li>Whether sample sizes are appropriate to the grain size of the material being sampled.</li> </ul>	<ul style="list-style-type: none"> <li>All core samples were double bagged on site and transported to the Laboratory for testing.</li> <li>Loring Laboratories and ALS Laboratories comply with Canadian and International Standards for sample preparation and sub sampling.</li> <li>Large wash samples were pre-treated and dry sized and various sizes before sample splitting and analysis. Proximate analysis was completed on a portion of the original sample.</li> <li>Raw analysis procedure keeps ½ of the sample as reserve.</li> </ul>
Quality of assay data and laboratory tests	<ul style="list-style-type: none"> <li>The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.</li> <li>For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times,</li> </ul>	<ul style="list-style-type: none"> <li>Loring Laboratories and ALS Laboratories comply with the Canadian and International Standards for coal quality testing and are certified.</li> <li>Geophysical tools were calibrated by the logging company Century Wireline Services.</li> <li>The density measurement is calibrated to precise standards and where</li> </ul>

Criteria	JORC Code explanation	Commentary
	<p>calibrations factors applied and their derivation, etc.</p> <ul style="list-style-type: none"> <li>Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.</li> </ul>	<p>possible validated in a calibration hole.</p>
Verification of sampling and assaying	<ul style="list-style-type: none"> <li>The verification of significant intersections by either independent or alternative company personnel.</li> <li>The use of twinned holes.</li> <li>Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</li> <li>Discuss any adjustment to assay data.</li> </ul>	<ul style="list-style-type: none"> <li>Loring Laboratories and ALS Laboratories comply with the Canadian and International Standards for coal quality testing and as such conduct the verifications for coal quality analysis outlined in the standards.</li> <li>Coal Quality results were verified by Xstract Mining Consultants Pty Ltd before inclusion into the geological model and resource estimate.</li> <li>No adjustments have been made to the Coal quality data.</li> </ul>
Location of data points	<ul style="list-style-type: none"> <li>Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.</li> <li>Specification of the grid system used.</li> <li>Quality and adequacy of topographic control.</li> </ul>	<ul style="list-style-type: none"> <li>Professional Survey of the coal quality boreholes for the Atrum Coal exploration program was completed by DMT Geosciences.</li> </ul>
Data spacing and distribution	<ul style="list-style-type: none"> <li>Data spacing for reporting of Exploration Results.</li> <li>Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.</li> <li>Whether sample compositing has been applied.</li> </ul>	<ul style="list-style-type: none"> <li>Data spacing sufficient to establish the degree of geological and grade continuity for inclusion as Inferred, Indicated and Measured Resource estimation procedures were employed.</li> <li>Multiple samples were obtained for some seams within the Groundhog Project area. As such, where appropriate, sample compositing has been completed. Samples were weighted against sample thickness and in situ RD.</li> </ul>
Orientation of data in relation to geological structure	<ul style="list-style-type: none"> <li>Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.</li> <li>If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported</li> </ul>	<ul style="list-style-type: none"> <li>A combination of vertical and inclined drill holes were completed from the same drill pad to ensure that a suitable understanding of the geological structure and orientation of the geology was captured.</li> </ul>

Criteria	JORC Code explanation	Commentary
	<i>if material.</i>	
Sample security	<ul style="list-style-type: none"> <li>The measures taken to ensure sample security.</li> </ul>	<ul style="list-style-type: none"> <li>Sample Security was ensured under a chain of custody between Atrum Coal personnel on site and Loring and ALS laboratories.</li> </ul>
Audits or reviews	<ul style="list-style-type: none"> <li>The results of any audits or reviews of sampling techniques and data.</li> </ul>	<ul style="list-style-type: none"> <li>Sampling was undertaken by Atrum Coal personnel. Loring and ALS undertook internal audits and checks in line with the Canadian and International standards</li> </ul>

## TABLE 2 - REPORTING OF EXPLORATION RESULTS

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	<ul style="list-style-type: none"> <li>Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.</li> <li>The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.</li> </ul>	<ul style="list-style-type: none"> <li>Coal tenures relate to the Groundhog Anthracite project, which is 100% owned by Atrum Coal</li> <li>The project consists of 18 granted coal licences and 8 coal licence applications totalling 22,815 hectares</li> <li>Security of tenure is not compromised and there is no known impediments</li> </ul>
Exploration done by other parties	<ul style="list-style-type: none"> <li>Acknowledgment and appraisal of exploration by other parties.</li> </ul>	<ul style="list-style-type: none"> <li>Exploration drilling within and in close proximity to the Groundhog project has been reviewed and evaluated for data purposes</li> </ul>
Geology	<ul style="list-style-type: none"> <li>Deposit type, geological setting and style of mineralisation.</li> </ul>	<ul style="list-style-type: none"> <li>The Groundhog Project lies within the Bowser Basin.</li> <li>The Bowser Basin, which is the largest contiguous basin in the Canadian Cordillera, developed as a result of tectonic compression and uplift of the Coast Mountains during the Upper Jurassic.</li> <li>The dominant structural feature is the northwest-southeast trending Biernes Synclinorium. It resulted from northeast-southwest compression during the first phase of deformation ("F1"). Thrusting related to the F1 deformation is more intense in the southern part of the Groundhog Coalfield than in the northern part.</li> </ul>

Criteria	JORC Code explanation	Commentary
		<ul style="list-style-type: none"> <li>The second, less intense, phase of deformation ("F2") resulted from northwest-southeast compression. The F2 deformation is superimposed on the broad, open type of F1 folding. The F2 imprint is visible in a series of plunge changes in the F1 folds in the order of up to 5°.</li> <li>F2 thrusts are generally flat lying and related to the hanging wall of drag folds. Displacement tends to be along bedding surfaces. The F2 fold structures superimposed on the major F1 synclorium vary in wave length from 100 m to 700 m and vary in amplitude up to 100 m.</li> </ul>
Drill hole Information	<ul style="list-style-type: none"> <li>A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: <ul style="list-style-type: none"> <li>easting and northing of the drill hole collar</li> <li>elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar</li> <li>dip and azimuth of the hole</li> <li>down hole length and interception depth</li> <li>hole length.</li> </ul> </li> <li>If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.</li> </ul>	<ul style="list-style-type: none"> <li>All drill holes have been modelled from vertical, although hole deviation (from vertical) has been recorded for all drill holes.</li> </ul>
Data aggregation methods	<ul style="list-style-type: none"> <li>In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.</li> <li>Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.</li> <li>The assumptions used for any reporting of metal equivalent values should be clearly</li> </ul>	<ul style="list-style-type: none"> <li>All seams where multiple coal quality samples were taken were given a composite coal quality value. This composite value was generated within the Minescape software and was weighted on thickness and in situ RD. In situ RD was only weighted against thickness.</li> </ul>

Criteria	JORC Code explanation	Commentary
	stated.	
Relationship between mineralisation widths and intercept lengths	<ul style="list-style-type: none"> <li>• These relationships are particularly important in the reporting of Exploration Results.</li> <li>• If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.</li> <li>• If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').</li> </ul>	<ul style="list-style-type: none"> <li>• The inclusion of boreholes from neighbouring areas has given the model a reasonable amount of lateral continuity in all directions.</li> <li>• Point of observation spacing has been extrapolated in a maximum of a 2,000 m radius from the drill hole.</li> <li>• Seam thicknesses have been corrected to geophysics to ensure accuracy</li> </ul>
Diagrams	<ul style="list-style-type: none"> <li>• Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.</li> </ul>	<ul style="list-style-type: none"> <li>• All appropriate diagrams are contained within the main body of the report</li> </ul>
Balanced reporting	<ul style="list-style-type: none"> <li>• Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.</li> </ul>	<ul style="list-style-type: none"> <li>• All available exploration data for the Groundhog Project area have been collated and reported.</li> </ul>
Other substantive exploration data	<ul style="list-style-type: none"> <li>• Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.</li> </ul>	<ul style="list-style-type: none"> <li>• No further exploration data were gathered and or utilised.</li> </ul>
Further work	<ul style="list-style-type: none"> <li>• The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).</li> <li>• Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.</li> </ul>	<ul style="list-style-type: none"> <li>• Further work consisting of additional drilling and seismic activity is being evaluated.</li> </ul>