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Atrum Coal
COAL FOR STEEL

ASX Release

15 July 2019

Elan South Drilling Update

HIGHLIGHTS

- **First seven boreholes completed at Elan South (Oil Pad Ridge) for 1,400m drilling**
- **Thick coal seam intersections in all holes confirm and extend results from 2018 program**
- **Access road construction continues with more than 10km of new roads completed already**
- **Further coal outcrops exposed in road cuttings**
- **Fish Hook and South East Corner targets to be tested in pending drill phases**

Atrum Coal Ltd ("**Atrum**" or the "**Company**") (**ASX: ATU**) is pleased to provide an update on recent exploration progress at the Elan Hard Coking Coal Project (**"Elan Project"**) in southwest Alberta, Canada.

Managing Director, Max Wang, commented: *"Thick coal seam intersections encountered in the seven boreholes completed to date have already confirmed and extended the resource findings from our 2018 exploration program at Elan South. We plan to continue drilling into unexplored areas of Elan South in the coming weeks and are excited to be testing these new targets, which have been identified from our extensive field geological survey work."*

Current progress and strategy

Initial drilling at Elan South has focussed on the western side of the Oil Pad Ridge area, both infilling and extending the drilling program completed in 2018.

Atrum has completed seven percussion (air-blast) holes with a 4 ½" hammer bit and compressed air (resulting in good rates of penetration). Geophysical wireline logging

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Key Projects

Groundhog	Ownership: 100%
Elan	Ownership: 100%
Bowron River	Ownership: 100%

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has been completed on six of these holes. The location of these boreholes is shown in Figure 2.

The 2019 exploration strategy involves initial drilling of a series of percussion holes in order to confirm coal targets, and assist in definition of the structural geology of the deposit. This drilling helps identify areas where the coal seams of the Jurassic-Cretaceous Mist Mountain Formation (Kootenay Group) occur at depths amenable to open cut mining.

Drill access road construction is continuing to advance. Further progress will allow Atrum to relocate drilling activity into areas where Exploration Targets are identified; these include the Fish Hook and South East Corner areas of Elan South.

The coal seam and structural geology information obtained from drilling will assist in updating the geological model and JORC Resource estimates for Elan South. The boreholes with thick and shallow coal intersections will be twinned with cored holes for coal quality and washability testwork once the coring rig is mobilised to site (core drilling is planned to start in September).

Initial results

Completed boreholes have been geophysically logged by Century Wireline Services with a suite of tools including natural gamma, caliper, long and short spaced density, resistivity and deviation. Most boreholes are drilled inclined rather than vertically in order to intersect inclined seams at steeper angles. The borehole details, including collar co-ordinates (NAD 1983, UTM Zone 11N), total depth, collar inclination and azimuth, and cumulative apparent coal thicknesses are provided in Table 1.

Table 1: Completed drillhole types, locations and cumulative coal thickness (apparent)

Drillhole ID	Drill Type	Easting	Northing	Elevation	Total Depth	Azimuth	Dip	Total Coal Thickness Apparent (m)
ESRAB19-01	RAB	687,329	5,515,472	1,981	158	90	-55	14.7
ESRAB19-02	RAB	687,219	5,515,497	1,950	229.9	90	-60	9.4
ESRAB19-03	RAB	687,281	5,515,354	1,973	197.7	90	-60	18.2
ESRAB19-04	RAB	687,422	5,514,707	2,007	225	90	-60	24.5
ESRAB19-05	RAB	687,422	5,514,707	2,007	194	0	-90	22.1
ESRAB19-06	RAB	687,394	5,514,820	1,999	185	90	-60	TBC*
ESRAB19-07	RAB	687,418	5,514,554	1,996	191	90	-60	23.2

* To be confirmed, borehole ESRAB19-06 is yet to be geophysically logged

A summary of the recorded coal intersections in six of the seven boreholes drilled to date in 2019 is provided in Table 2. The stated coal intervals are interpreted from

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geophysical logs and reflect apparent thicknesses resulting from a combination of factors including inclined boreholes, dipping coal seams and potential thickening of seams on fault and fold zones. Borehole ESRAB19-06 was blocked during wireline logging and will be cleaned out before the hole is re-logged. Borehole profiles showing Seam 1 coal intersections from the six geophysically logged boreholes are shown in Figure 1.

Table 2: Completed 2019 drillhole types, locations and cumulative coal thickness (apparent)

Drill hole ID	Hole Dip	From (m)	To (m)	Thickness (m)	Tentative Seam Name
ESRAB19-01	-55	73.8	76.5	2.7	S1C
ESRAB19-01	-55	77.2	77.9	0.7	S1C
ESRAB19-01	-55	80.6	83.0	2.4	S1B
ESRAB19-01	-55	87.8	96.7	8.9	S1A
ESRAB19-01	-55	98.1	98.5	0.4	S1A
ESRAB19-02	-60	165.3	168.7	3.4	S1C
ESRAB19-02	-60	171.3	171.8	0.5	S1C
ESRAB19-02	-60	176.6	178.3	1.7	S1B
ESRAB19-02	-60	183.5	186.6	3.1	S1A
ESRAB19-02	-60	188.4	189.0	0.7	S1A
ESRAB19-03	-60	124.6	129.1	4.5	S1C
ESRAB19-03	-60	130.1	130.5	0.4	S1C
ESRAB19-03	-60	132.3	133.9	1.6	S1B
ESRAB19-03	-60	138.9	146.7	7.8	S1A
ESRAB19-03	-60	148.3	149.0	0.8	S1A
ESRAB19-04	-60	88.5	95.0	6.5	S1C
ESRAB19-04	-60	95.7	102.7	7.0	S1B
ESRAB19-04	-60	108.8	114.3	5.5	S1A
ESRAB19-04	-60	115.2	120.7	5.5	S1A
ESRAB19-05	-90	154.7	163.3	8.6	S1C
ESRAB19-05	-90	164.5	169.2	4.7	S1B
ESRAB19-05	-90	176.7	184.7	8.0	S1A
ESRAB19-05	-90	186.0	186.8	0.8	S1A
ESRAB19-07	-60	107.2	112.5	5.3	S1C
ESRAB19-07	-60	121.3	131.5	10.2	S1A
ESRAB19-07	-60	132.2	139.8	7.7	S1A

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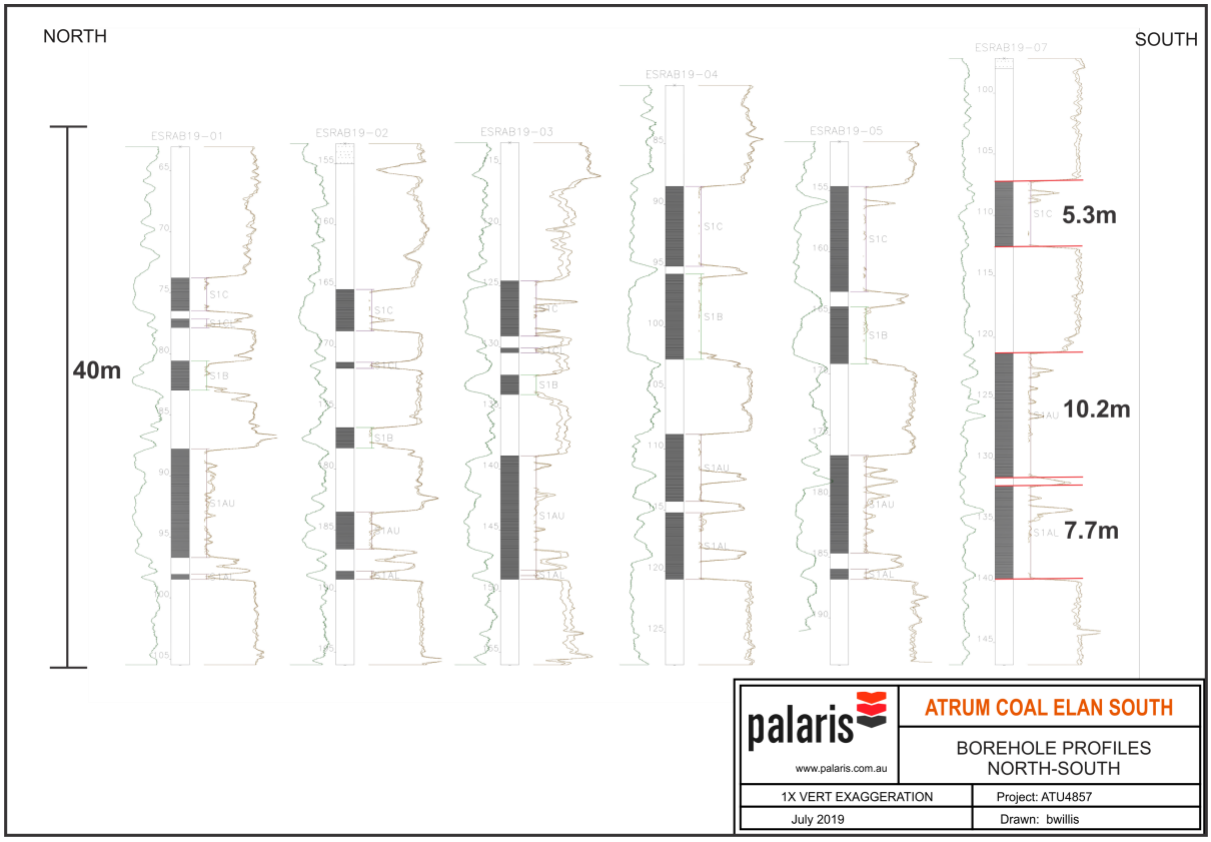

Figure 1: Elan South borehole profiles for Seam 1 (2019 boreholes)

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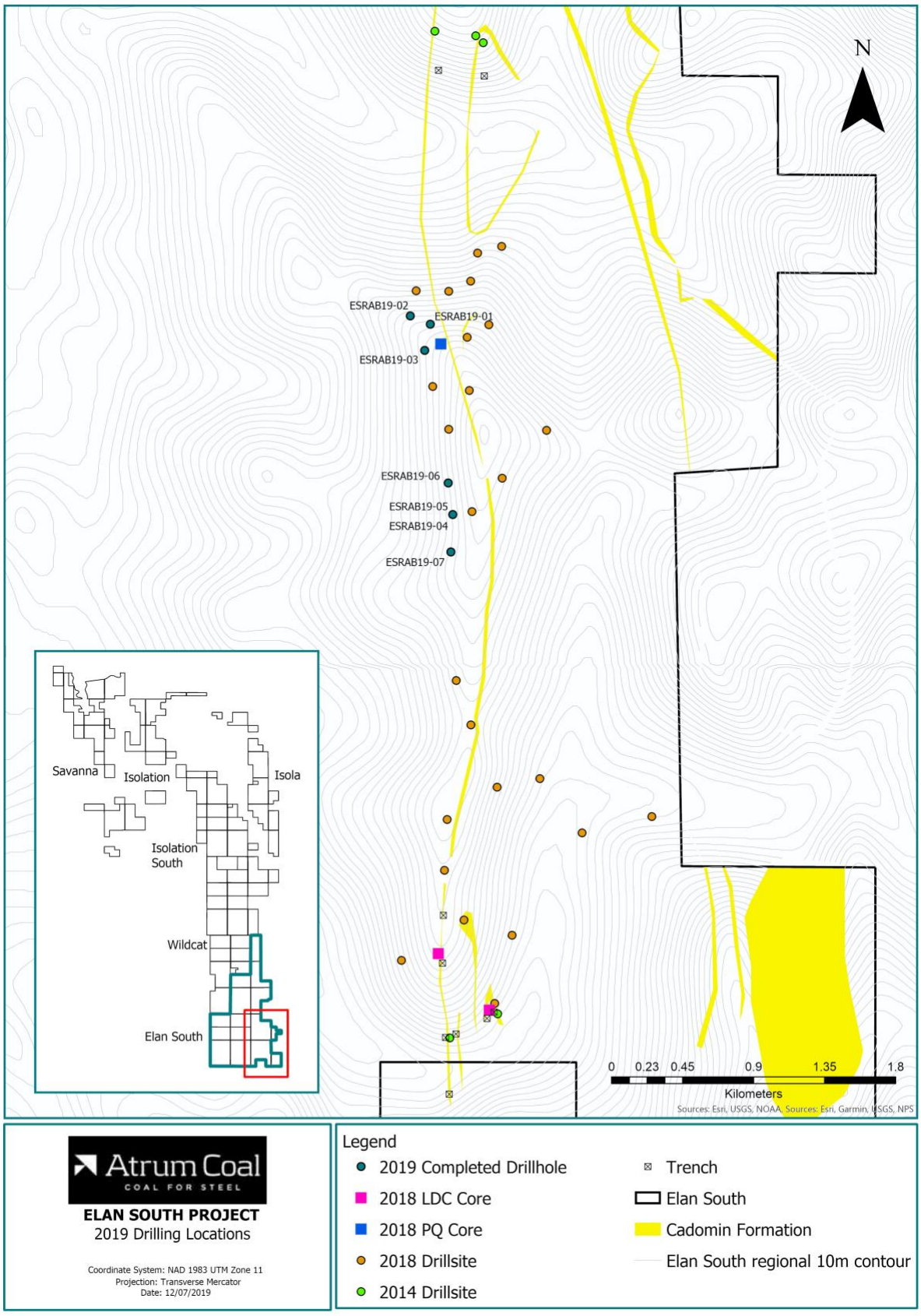

Figure 2: Elan South completed borehole locations

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Figure 3: Percussion rig drilling at northern end of Oil Pad Trend

Figure 4: A sample thick coal outcrop/seam exposed at the north end of Oil Pad Trend during road construction in 2019

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About Atrum and the Elan Project

Atrum Coal is an ASX-listed metallurgical coal development company. In late 2017 the Company acquired its 100%-owned flagship Elan Hard Coking Coal Project, which is located in the Crowsnest Pass area of southern Alberta, Canada.

The Elan Project hosts large-scale, shallow, thick, premium hard coking coal (HCC) deposits of the Mist Mountain Formation. These deposits stretch from Elan South through to Savanna in the north, over a substantial areal footprint of approximately 50 km long by 20 km wide.

Following a significant exploration and field work program in 2018, Atrum announced a 298 Mt JORC Resource Estimate (70 Mt Indicated and 228 Mt Inferred) for the Elan Project in January 2019.[1] Comprehensive quality testing of Elan South coal in early 2019, combined with review of substantial historical testwork data for the broader Elan Project, has also confirmed the Tier 1 HCC qualities present at Elan.

The initial focus for development at Elan is the Elan South area, which is located approximately 13 km north of the townships of Coleman and Blairmore. An existing rail line operated by Canadian Pacific Railway, with significant excess capacity, runs through these townships and provides direct rail access to export terminals in Vancouver and Prince Rupert. Elan South also shares its southern boundary with Riversdale Resources' flagship Grassy Mountain Project, which is in the final permitting stage for a 4.5 Mtpa open-cut HCC operation.

Around 30km to the west of the Elan Project, Teck Resources Ltd operates 4 mines (the Elk Valley complex) producing approximately 25 Mtpa of Tier 1 HCC for the global steel industry. The coal seams at Elan correspond to those horizons of the same Mist Mountain Formation found in the Elk Valley HCC mines, and have similar rank ranges.

The 2019 field program

The 2019 field program at Elan is aimed at rapidly unlocking the potential of this asset. The program encompasses a phased 20,000m drilling campaign focussed on Elan South (primarily) and Isolation South (part of the Elan North tenements). Further extensive coal quality testing is planned for HCC product specification development and advancing coal preparation plant design.

Full-scope, comprehensive environmental baseline study and impact analyses are underway with a view to finalisation of an Environmental Impact Assessment (EIA) in early 2021.

A Scoping Study to evaluate development of Elan South is also underway with targeted completion in 4Q 2019. This work is to feed into completion of a Pre-Feasibility Study (PFS) by 2H 2020.

The decision to concurrently progress evaluation of Isolation South, alongside accelerated progression of Elan South, reflects Atrum's strategy to rapidly advance multiple, large Tier 1 HCC developments across the highly endowed Elan Project.

[1] Atrum confirms that it is not aware of any new information or data that materially affects the information included in its ASX releases dated 6 January 2019 (*Elan South Hard Coking Coal Resource increased by 170% to 97Mt*) and 22 January 2019 (*Additional 201Mt JORC Resources defined for Elan Project*). All material assumptions and technical parameters underpinning the estimates in these releases continue to apply and have not materially changed.

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Competent Persons Statement

Exploration Results

The information in this document that relates to Exploration Results of Elan South project area is based on, and fairly represents, information and supporting documentation prepared by Mr Brad Willis, who is a Member of the Australasian Institute of Mining and Metallurgy (#205328) and is a full-time employee of Palaris Australia Pty Ltd.

Mr Willis has read and understands the requirements of the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Exploration Targets, Mineral Resources and Ore Reserves (JORC Code, 2012 Edition). Mr. Willis is a Competent Person as defined by the JORC Code, 2012 Edition, having twenty years' experience that is relevant to the style of mineralisation and type of deposit described in this document.

Neither Mr. Willis nor Palaris Australia Pty Ltd has 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. Willis has visited the Elan project site with Atrum coal personnel in 2018 and will be visiting site again during the current exploration program.

The JORC Code (2012) Table 1 – Reporting of Exploration Results

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	▪ *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.* ▪ *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.*	▪ The Elan South Project consists of 4 coal exploration permits encompassing an area of approximately 6,574 ha, as shown with the original project boundaries per Elan vendor The A13 coal agreements that contain the resources for this report are held by Elan Coal. ▪ The coal leases were acquired on January 20, 2012 and are held by Elan Coal Ltd. Coal Lease Applications provide the right to exclusively explore the land within the boundaries of the Lease and are granted for a term of 15 years (with an option to extend at expiry). ▪ A coal lease does not grant surface rights; a surface lease or grant is required. ▪ The Property falls within the Rocky Mountain Forest Reserve, which is managed by the Alberta Government. As such, no road use agreements with private companies are required for access to the Property. ▪ The project is located in an area that has been classified as Category 2 in accordance with the Coal Development Policy for Alberta. Surface mining is not traditionally considered in Category 2 areas either because it is an area where infrastructure is inadequate to support mining activities or it is an area associated with high environmental sensitivity
Exploration by other parties in Elan South Area	▪ *Acknowledgment and appraisal of exploration by other parties.*	▪ During the late 1940s and early 1950s, Western Canadian Collieries undertook dozer assisted surface geological mapping of the Elan South area which resulted in 16 recorded outcrop sections. ▪ NorthStar Energy Corporation drilled four HQ (63.5mm core) Coal Bed Methane gas wells within the Project boundaries in 2001. These holes targeted the deeper coal seam occurrences and are useful in establishing the regional structural interpretation at depth. All holes were geophysically logged and some limited coal quality data is also available. ▪ In 2014, Elan Coal in partnership with Kuro Coal completed 4 PQ/HQ boreholes, 3 RC open holes and 7 costean trenches. The exploration was principally conducted in two Elan South areas proximal to prospective areas identified by the earlier Western Canadian Colliers Mapping. The 2014 PQ/HQ Drilling program completed a total of 454 meters in four holes. Thirty three coal samples were collected and later composited into

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Criteria	JORC Code explanation	Commentary
		logical seam units in accordance with the geophysical logs for each hole. Coal recovery was poor ranging from a low of 7% to a high of 90% for the identified seam groups. ▪ In 2017 Atrum Coal supervised a limited exploration program consisting of three trenches and field mapping. ▪ In 2018, Atrum Coal completed 32 open holes (reverse circulation and rotary air-blast) and five cored holes (four 8C large diameter holes and one PQ cored hole)
Geology	▪ *Deposit type, geological setting and style of mineralisation.*	▪ The Jurassic-Cretaceous Mist Mountain Formation (Kootenay Group), which contains the major coal deposits in the Front Ranges of south eastern British Columbia and south western Alberta, was deposited within a broad coastal plain environment as part of a north- to northeast-prograding clastic wedge along the western margin of the Jurassic epicontinental Fernie Sea during the first of two major episodes of the Columbian Orogeny. ▪ The Mist Mountain Formation consists of interbedded sandstone, siltstone, mudstone and coal up to 1000 m thick and is interpreted as deltaic and/or fluvial-alluvial-plain deposits. Regionally, economically important coal seams occur throughout the succession. Regionally, the seams are up to 18 m thick and vary in rank from south to north, from high volatile bituminous to semi-anthracite. Progressive south to north changes in depositional environments causes the Mist Mountain Formation to grade into the contemporaneous but mainly coal- - Nikanassin Formation to the north of Clearwater River ▪ The Mist Mountain Formation at Elan South contains a multi-seam resource consisting of a cyclic succession of carbonaceous sandstone, mudstone, siltstone, coal, and some conglomerate. This formation is directly overlain by the massive Cadomin Conglomerate which is a readily recognizable marker horizon throughout the area. The Cadomin Formation, a resistant, chert-pebble conglomerate up to about 100 m thick (although generally much thinner). The Cadomin Formation is overlain by continental deposits consisting of interbedded dark mudstone, siltstone and sandstone of the Gladstone Formation (Blairmore Group). ▪ There are at least three major coal horizons in the Mist Mountain formation at Elan South. The uppermost No. 1 Seam occurs immediately below the Cadomin and ranges in thickness from 1 m to 4 m. The No. 1 Seam may be eroded by the overlying conglomerate in some places. The thick No. 2 Seam is typically 35 m below the No. 1 and the ranges in thickness from 5 m to 15m. The lower No. 4 Seam is typically 30 m below the No. 2 and consists of multiple coal plies up to 1m thick with in rock parting material. These seams were mined on the Grassy Mountain open pit mine which 5km to the south of the Project. ▪ Tectonic deformation of coal measures is the major factor that controls the present areal extent, thickness variability, lateral continuity, and geometry of coal beds at Elan South. The strata is characterized by broad upright to overturned concentric folds, cut and repeated by major to minor thrust and tear faults, and late extensional faults. Extensive shearing and structural thickening and thinning of coal beds in the cores of flexures are common in highly deformed regions.
Drill hole Information	▪ *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:* o *easting and northing of the drill hole collar* o *elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar* o *dip and azimuth of the hole* o *down hole length and*	▪ This information is provided for all boreholes completed in 2019 at Elan South, in Tables 1 and 2 of this ASX announcement

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Criteria	JORC Code explanation	Commentary
	interception depth o *hole length.*	
Data aggregation methods	▪ *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.* ▪ *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.* ▪ *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	▪ No cut-off grades were applied to the exploration results in this announcement ▪ For rotary air blast holes, individual samples are taken at 0.5m sample increments ▪ No lab testing has been undertaken in 2019
Relationship between mineralisation widths and intercept lengths	▪ *These relationships are particularly important in the reporting of Exploration Results.* ▪ *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* ▪ *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').*	▪ Discrepancies between apparent and true seam thickness are an important consideration for interpretation of the drilling results in this announcement ▪ The results tabulated in this announcement are apparent thicknesses as recorded in drill holes, and may be significantly different to the true thickness of the seams. ▪ More work will need to be undertaken to understand how true thicknesses are represented in the deposit, and will be addressed through use of borehole deviation survey data, and updated structural interpretation / fault modelling ▪ Reported seam intersections in boreholes and as evidenced by seam outcrops (road cuttings) show evidence of fault thickening, and / or thickening through folded zones
Diagrams	▪ *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.*	▪ Borehole locations plans are provided along with drill hole locations and seam intersects from the 2019 program ▪ Work has commenced on updating geological models incorporating the recent drilling results ▪ The Competent Person has deemed it would be appropriate to update the geological model before providing updated cross sections and other geological plans in this release
Balanced reporting	▪ *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.*	▪ To ensure balance reporting of Exploration Results, Tables 1 and 2 include all boreholes drilled in 2019, including those holes which did not contain any coal seams of significance (ESRAB19-06 is still be to be geophysically logged)
Other substantive exploration data	▪ *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.*	▪ Atrum Coal geologists have undertaken a significant surface mapping program in 2018 and 2019, collecting data points from outcrops of the Blairmore Group and Cadomin Formation, coal seams of the Mist Mountain Formation ▪ Road and track cuttings have provided a very useful source of outcrop measurements ▪ This will be included with the volumes of geological data that will be used for geological model updates and to assist in controlling the structure of the coal seams
Further work	▪ *The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).* ▪ *Diagrams clearly highlighting the*	▪ The drilling of percussion (air-blast) structure holes will be continued in 2019, with up to 20,000m to be completed ▪ Cored boreholes will be drilled in 2019 with around 20 cored boreholes planned ▪ The cores will be subjected to detailed raw quality sizing and

Criteria	JORC Code explanation	Commentary
	areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	washability test work, including comprehensive testing of clean coal composites and coke strength testing ▪ Palaris has commenced with updating 3D geological models of Elan South

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