

## Outstanding Results from Initial Drilling at South East Corner of Elan South

### HIGHLIGHTS

- Drilling activities at Elan South progressing significantly with 50 drill holes now completed at Oil Pad Ridge and South East Corner areas
- Two rigs currently running in parallel on the highly promising South East Corner area
- Outstanding initial results from South East Corner (data of 24 holes processed) showing significant coal intercepts in all holes and from shallow depths
- Access road construction also exposed thick, shallow coal seams in road cuttings and trenches
- While early stage, South East Corner is now a significant new discovery within Elan South with shallow, low-strip mining potential
- Drilling is to continue at South East Corner and the north end of the Oil Pad trend to further delineate coal deposition extent and continuity in Elan South areas
- Maiden resource estimate for South East Corner expected later this year with Elan South update
- Elan dual-area strategy in action with drilling at Isolation South (Elan North) set to commence in the next two weeks

Atrum Coal Ltd (**Atrum** or the **Company**) (ASX: ATU) is pleased to provide an update on drilling progress at its 100%-owned Elan Hard Coking Coal Project (**Elan Project**) in southern Alberta, Canada.

Managing Director, Max Wang, commented: *"We are very pleased to have established access and drilled a number of holes into the highly anticipated South East Corner area. The initial results have certainly validated our excitement about this prospective zone of Elan South. Significant coal intercepts in all initial 24 holes drilled and processed at South East Corner, with a number showing deposition starting from near the surface, have highlighted the considerable, shallow resource potential that exists. We currently have two rigs operating in parallel at South East Corner to further delineate the coal deposition in this area. An*



**Registered Office**  
Unit 1B, 205-207 Johnston Street  
Fitzroy, VIC 3065  
Phone: +61 (0) 3 9191 0135  
Fax: +61 (0) 3 8678 1747E  
info@atrumcoal.com  
[www.atrumcoal.com](http://www.atrumcoal.com)

**Board of Directors**  
Chairman (Non-Exec)  
Managing Director/CEO  
Non-Executive Director  
Non-Executive Director  
Non-Executive Director  
Company Secretary

C. Blixt  
M. Wang  
R. Barker  
G. Edwards  
C. Fear  
J. Stedwell

**Key Projects**

Elan	100%
Groundhog	100%
(incl Panorama North JV)	(65%)
Bowron River	100%

*initial resource for South East Corner is expected to be incorporated into an overall update of the Elan South resource estimate later this year.”*

### **Strong progress at Elan South**

Drilling activities at Elan South are progressing strongly with a total of 50 drill holes of the 2019 field program having been completed to 15 August 2019. A second drill rig was mobilised to site in recent weeks in order to allow further acceleration of the 2019 field program.

Drilling continues at South East Corner with the two rigs running in parallel. Following completion of further holes in this highly promising area, drilling activity is set to shift to the northern end of the Oil Pad Ridge trend and the Fish Hook area in coming weeks. The coring program for further detailed coal quality and washability testwork for Elan South is also set to commence in the next week, with the initial focus being on the South East Corner area.

Results have now been processed for 41 of the 50 drill holes completed to date at Elan South. This release contains results for Holes 8 to 41 in the Elan South program (see Tables 1 and 2). Results for Holes 1 to 7 of the program were announced in the Atrum ASX release dated 15 July 2019, *Elan South Drilling Update*.

### **Excellent results to date**

***Holes 8 to 17 were drilled at the northern end of Oil Pad Ridge (see Figure 1).*** In this area, the Kootenay Formation coal seams are targeted in two structural zones which include a western thrust fault and an anticline feature. The coal seams become progressively shallower and exposed on the north facing slope of the Oil Pad Ridge, where the topography dips lowertowards Fools Creek.

These holes involved a mixture of extensional targeting and infill drilling. Coal deposition was intercepted in all but one of the holes. Holes 14 and 17 tested the anticline feature and returned cumulative coal thicknesses of 19.9m and 12.1m respectively with thick, shallow coal seams intersected in both holes (Table 1). An area further to the east was also tested (Holes 10, 11, 12 and 16), confirming that the Mist Mountain coal seams extend into a syncline area where the coal seams occur at greater depths.

***Holes 18 to 41 were drilled at the South East Corner prospect (see Figure 1).*** Drilling in this area was targeted to test several identified zones that had the potential to host large, shallow emplacements of coal that might support early-life, low-strip mine designs. Road construction activities in South East Corner this year had already exposed thick outcropping and shallow coal deposition in multiple places.

The initial results from drilling at South East Corner have been excellent. Multiple coal seams were intersected in all 24 holes with numerous shallow intercepts. Cumulative apparent coal seam thicknesses range from 5.2 metres to a maximum of 35.5 metres (Table 2). Multiple holes evidence coal intervals commencing from less than 5 metres below surface. The coal seams have been tentatively correlated into the plies of Seam 2 and Seam 4 groups, while Seam 1 (the most common seam at Oil Pad Ridge) appears to be less dominant in the South East Corner.

The drilling success at South East Corner has yielded a new and potentially significant resource zone at Elan South. More holes are being drilled to assist in delineating the extent and continuity of the coal deposition in this area. Atrum plans to incorporate a maiden resource estimate for the South East Corner area in its overall resource estimate update for Elan South later this year.

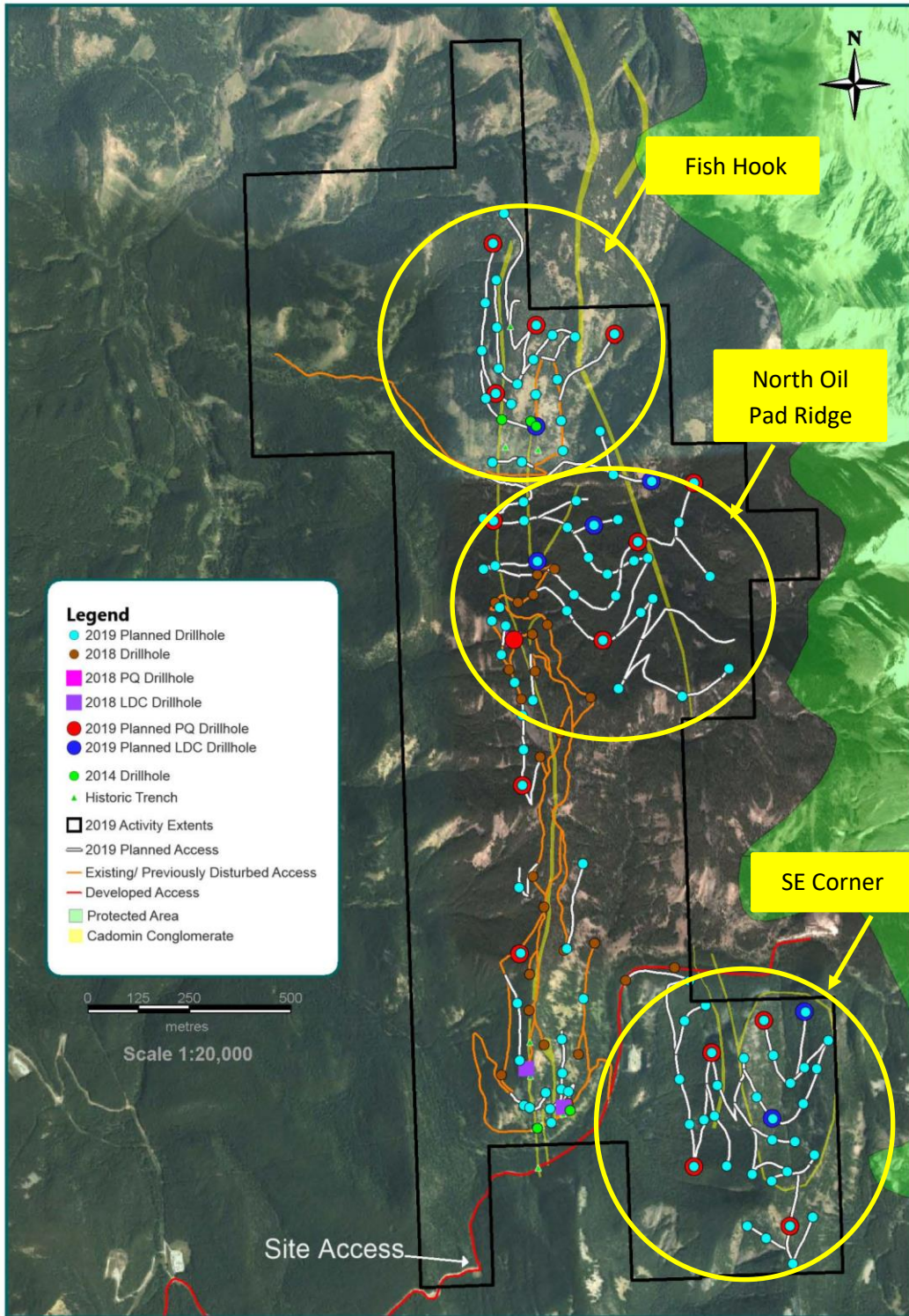


Figure 1: Elan South current drilling areas and the 2019 drilling plan



## Oil Pad Ridge

Exploration activities continued at the northern end of the Oil Pad Ridge area, where an additional 10 drill holes (ESRAB19-08 to ESRAB19-17) were completed since Atrum's last drilling progress update on 15 July 2019.

Cumulative coal seam thicknesses for these 10 holes are summarised in Table 1 below. Drill holes ESRAB19-13 and ESRAB19-16 were blocked due to severe caving and no geophysical logging was possible.

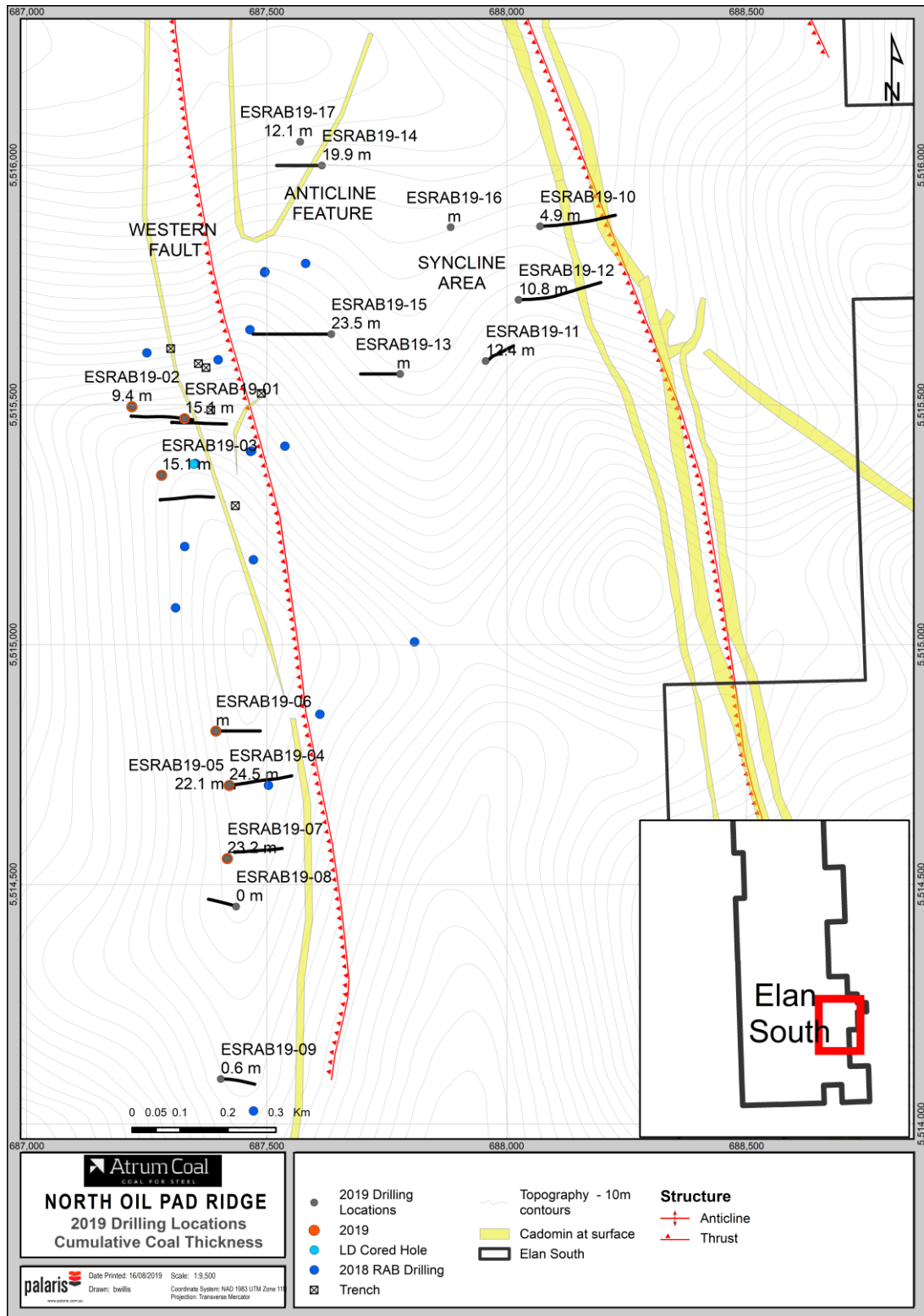
All boreholes detailed in this release (except ESRAB19-13 and ESRAB19-16) have been geophysically logged by Century Wireline Services with a suite of tools including natural gamma, caliper, long and short spaced density, resistivity, deviation and dipmeter. Most boreholes are drilled inclined rather than vertically in order to intersect inclined seams at steeper angles.

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 Tables 1 and 2, with the borehole locations provided in Figures 2 and 5.

**Table 1: Northern Oil Pad Ridge completed drill hole locations and cumulative coal thickness (apparent)**

Drillhole ID	Drill Type	Easting	Northing	Elevation	Total Depth	Azimuth	Dip	Total Coal Thickness Apparent (m)	Start Depth of Coal (m)
ESRAB19-08	RAB	687,436	5,514,454	2,021	243.2	290	-80	0	-
ESRAB19-09	RAB	687,404	5,514,094	1,940	135.8	90	-60	0.6	113.42
ESRAB19-10	RAB	688,070	5,515,873	1,811	245.3	90	-60	4.9	30.1
ESRAB19-11	RAB	687,957	5,515,592	1,822	324.5	70	-86	12.4	219.4
ESRAB19-12	RAB	688,025	5,515,720	1,821	266.5	90	-60	10.8	110.0
ESRAB19-13	RAB	687,778	5,515,565	1,842	165.0	270	-60	TBC	TBC (Note)
ESRAB19-14	RAB	687,615	5,516,000	1,792	189.0	270	-60	19.9	49.9
ESRAB19-15	RAB	687,635	5,515,648	1,852	326.3	270	-60	23.5	145.1
ESRAB19-16	RAB	687,883	5,515,871	1,778	267.0	0	-90	TBC	TBC (Note)
ESRAB19-17	RAB	687,570	5,516,050	1,753	218.4	0	-90	12.1	0.7

Note: Details of Holes ESRAB19-01 to 07 were reported in the "Elan South Drilling Update" announced to ASX on 15 July 2019. Coal seam interceptions were observed in Holes ESRAB19-13 and 16 during drilling, but attempted geophysical logging failed due to caving.



**Figure 2: Completed borehole locations and cumulative coal thickness – Oil Pad Ridge** (Note: Coal seam interceptions were observed in Hole ESRAB19-6 during drilling, but initial attempt to geophysically log the hole failed due to caving)

## South East Corner

Exploration access to the South East Corner prospect was established in July 2019 and involved construction of a road from the Oil Pad Ridge area. During the construction of the road, which involves several switchbacks up the western side of the ridge, thick and shallow coal seams were encountered in the road cuttings (Figure 3). These coal exposures continued over the ridgetop and into a bowl-shaped valley in the south-eastern area of the Elan South tenement base.



Figure 3: Coal exposures from road cutting at the South East Corner



The South East Corner prospect was previously identified by Atrum as a prime target area for the 2019 drilling program at Elan South. Surface mapping had revealed outcropping coal seams and a large area of the Cadomin Formation exposed at the surface, which overlies the coal bearing Kootenay Formation.

In January 2019, Atrum reported an Exploration Target Range of 30 – 120 Mt for the eastern Elan South area (refer Atrum ASX release dated 8 January 2019, *Elan South Hard Coking Coal Resource Increased by 170% to 97Mt*). *The potential quantity and quality of the Exploration Target is conceptual in nature. Insufficient exploration has been undertaken to estimate a Mineral Resource and it is uncertain that further exploration will result in the estimation of a Mineral Resource.*

Cumulative coal seam thicknesses for the initial 24 holes drilled at South East Corner (ESRAB19-18 to ESRAB19-41) are summarised in Table 2 below.

**Table 2: South East Corner completed drill hole locations and cumulative coal thickness (apparent)**

Drillhole ID	Drill Type	Easting	Northing	Elevation	Total Depth	Azimuth	Dip	Total Coal Thickness Apparent (m)	Start Depth of Coal (m)
ESRAB19-18	RAB	688,320	5,512,806	1,924	198.2	90	-60	11.7	115.6
ESRAB19-19	RAB	688,273	5,513,105	1,890	204.8	90	-60	11.3	141.1
ESRAB19-20	RAB	688,247	5,513,245	1,884	220.9	90	-60	10.5	132.9
ESRAB19-21	RAB	688,349	5,512,572	1,932	182.0	90	-60	8.2	79.5
ESRAB19-22	RAB	688,375	5,512,313	1,954	160.5	90	-60	11.5	67.7
ESRAB19-23	RAB	688,452	5,512,675	1,976	137.2	90	-60	13.2	25.5
ESRAB19-24	RAB	688,506	5,513,006	2,004	272.4	90	-60	27.7	35.2
ESRAB19-25	RAB	688,542	5,512,771	2,026	261.3	90	-60	35.5	0.0
ESRAB19-26	RAB	688,602	5,512,646	2,042	262.8	90	-60	16.2	4.4
ESRAB19-27	RAB	688,695	5,512,526	2,055	126.8	90	-60	18.1	33.2
ESRAB19-28	RAB	688,693	5,512,526	2,053	196.9	0	-90	25.7	5.9
ESRAB19-29	RAB	688,701	5,512,687	2,083	230.6	0	-90	31.9	4.9
ESRAB19-30	RAB	688,699	5,512,690	2,082	152.9	270	-60	26.1	3.3
ESRAB19-31	RAB	688,819	5,512,537	2,064	171.7	270	-60	12.7	65.5
ESRAB19-32	RAB	689,036	5,512,637	2,051	132.2	90	-60	9.7	43.8
ESRAB19-33	RAB	688,598	5,512,645	2,043	82.9	0	-90	8.9	13.5
ESRAB19-34	RAB	688,909	5,511,788	2,104	123.3	270	-70	6.6	60.7
ESRAB19-35	RAB	688,970	5,511,761	2,111	125.5	0	-90	5.2	44.9
ESRAB19-36	RAB	688,805	5,512,084	2,160	155.6	270	-70	14.5	50.4
ESRAB19-37	RAB	689,126	5,512,459	2,133	119.4	90	-60	12.1	27.0
ESRAB19-38	RAB	689,124	5,512,458	2,131	98.0	0	-90	6.7	39.6
ESRAB19-39	RAB	688,819	5,512,081	2,160	213.4	0	-90	15.3	76.8
ESRAB19-40	RAB	688,943	5,512,126	2,122	211.0	0	-90	16.0	102.2
ESRAB19-41	RAB	688,796	5,512,345	2,114	161.7	270	-65	10.5	57.9

The geology of the South East Corner is dominated by an anticline feature (see Figure 4), which regionally appears to be a northern extension of the Turtle Mountain Anticline. The axis of the anticline is expressed as a topographical high, with seams dipping to the west on the western side of the ridge. Exposed in the ridgeline is a very tight anticline nose that can be seen in Figure 6 below, with Cadomin and the coal seams of the Kootenay Formation tightly folded.

Between this anticlinal ridgeline and the regional-scale Livingstone Thrust to the east (just outside the eastern Elan tenement boundary), is a crescent shaped synclinal valley feature referred to as the South East Bowl. This valley is largely capped with the Cadomin Formation, a coarse sandstone and conglomerate that overlies the coal seams of the Kootenay Formation.

The initial drilling has demonstrated that the coal seams are consistent through the western side of the anticline and through the ridgeline itself, while ESRAB19-32 confirmed that the coal seams are present on the eastern limb of South East Bowl. Further drilling in the coming weeks will aim to confirm that the coal seams are continuous throughout the syncline, with the seams expected to follow the topographical surface. Two of the holes drilled (ESRAB19-24 and 25) encountered repeated coal seams, indicating that thrust repeats and stacking of the coal seams is likely in some areas.



**Figure 4: Aerial view of South East Corner ridgetop (Grassy Mountain in background)**



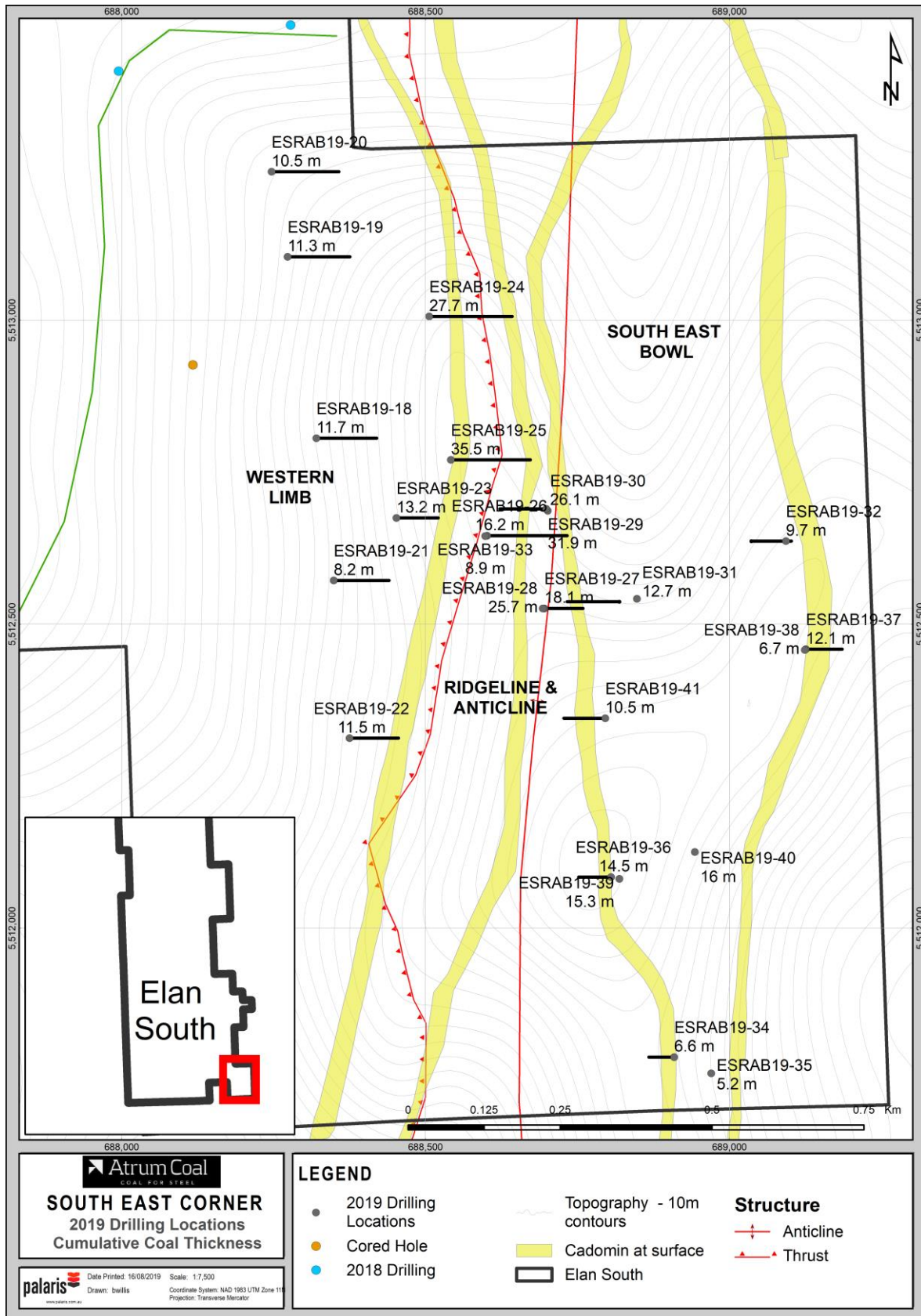


Figure 5: Completed borehole locations and cumulative coal thickness – South East Corner



Figure 6: Coal seams in road cuttings – South East Corner ridgeline

**For further information, contact:**

**Max Wang**

Managing Director/CEO

**M** +1 403 973 3137

[mwang@atrumcoal.com](mailto:mwang@atrumcoal.com)

**Justyn Stedwell**

Company Secretary

**P** +61 3 9191 0135

[jstedwell@atrumcoal.com](mailto:jstedwell@atrumcoal.com)

**Michael Vaughan**

IR Advisor, Fivemark Partners

**P** +61 422 602 720

[michael.vaughan@fivemark.com.au](mailto:michael.vaughan@fivemark.com.au)

**About Atrum Coal**

Atrum Coal (ASX: ATU) is a metallurgical coal developer. The Company's flagship asset is the 100%-owned Elan Hard Coking Coal Project in southern Alberta, Canada. Elan hosts large-scale, shallow, thick, hard coking coal (HCC) deposits with a current JORC Resource Estimate of 298 Mt (70 Mt Indicated and 228 Mt Inferred).<sup>1</sup> Comprehensive quality testing of Elan South coal on samples from the 2018 exploration program, combined with review of substantial historical testwork data for the broader Elan Project, has confirmed Tier 1 HCC quality.

The initial focus for development is the Elan South area, which is located approximately 13 km from an existing rail line with significant excess capacity, providing direct rail access to export terminals in Vancouver and Prince Rupert. Elan South shares its southern boundary with Riversdale Resources' Grassy Mountain Project, which is in the final permitting stage for a 4.5 Mtpa open-cut HCC operation. Around 30 km to the west, Teck Resources operates five mines (the Elk Valley complex) producing approximately 25 Mtpa of premium HCC for the seaborne market.

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

<sup>1</sup> Atrium 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.



## 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 during the exploration programs in 2018 and 2019.

### The JORC Code (2012)

**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> </ul>	<ul style="list-style-type: none"> <li>▪ From the 45 completed boreholes in the 2019 program, open cut cuttings have been sampled at 1m depth intervals. These samples are not intended to be used for coal quality testwork,</li> <li>▪ The preference is for a coring program to be undertaken this year, twinning selected open holes</li> <li>▪ Selected holes will be twinned for coring and sampling for coal quality testwork</li> <li>▪ Within the existing data set, sampling has previously been undertaken on the following borehole types: <ul style="list-style-type: none"> <li>▪ 11 reverse circulation (RC) holes</li> <li>▪ 20 percussion (rotary air blast) holes</li> <li>▪ 1 HQ (63mm) size cored holes</li> <li>▪ 3 PQ (85mm) size cored holes</li> <li>▪ 4 LD (150mm) cored holes</li> <li>▪ 1 CSG well (mixture of core and cuttings)</li> </ul> </li> <li>▪ Samples were taken on ply intervals and composited in the laboratory</li> <li>▪ All holes have been geophysically logged with sample intervals adjusted and aligned to the geophysical log depths</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>▪ The 50 boreholes completed in 2019 are percussion (rotary air blast) boreholes with a 4 1/2" diameter hammer drill bit</li> <li>▪ All of the boreholes completed in 2019 were geophysically logged to total depth in the open hole, with boreholes ESRAB19-06, 13 and 16 to be re-logged due to hole blockages</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 loss/gain of fine/coarse material.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Not relevant for the cuttings samples taken in 2019, as they will not be tested (core samples provide much better sample representivity and will be used for coal quality testwork, with a coring and testing included in this years drill program )</li> <li>▪ All 15 boreholes drilled at South East Corner in 2019 were geophysically logged and seam intervals have been determined from the geophysical log data</li> </ul>

Criteria	JORC Code explanation	Commentary
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>Open hole cuttings (rotary air blast) are logged in 1m sample intervals taken</li> <li>Boreholes were geophysically logged with geophysical sondes including density, caliper and gamma, deviation and dipmeter</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>Not applicable to the 2019 program</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, calibrations factors applied and their derivation, etc.</li> <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>	<ul style="list-style-type: none"> <li>Not applicable to the 2019 program</li> </ul>
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>Geological data is collected in line with Atrum Coal's exploration procedures and guidelines</li> <li>No coring or sampling for coal quality testwork has been undertaken in 2019</li> <li>Twining of selected existing rotary air blast holes will be undertaken later in the year. The twinned holes will also incorporate geophysical logging</li> <li>Sample interval depths and thicknesses are as measured by the field geologist (drillers depths), and adjusted to align with geophysical log depths</li> <li>GWIL Birtley undertakes preliminary checks of assay data using regression analysis, and checked by Atrum Coal and Palaris geologists</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>The locations of boreholes drilled in 2019 and trenches have been surveyed using DGPS</li> <li>The co-ordinate system is UTM projected grid NAD83 Zone 11N</li> <li>The topographical surface is sourced from a LiDAR survey and has a reasonable correlation with borehole collars</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</li> </ul>	<ul style="list-style-type: none"> <li>Boreholes ESRAB19-01 to ESRAB19-17 were located on the Oil Pad Ridge at Elan South and are typically within 200-300m of each other</li> <li>These 17 boreholes completed are infilling the resource areas identified during 2018, and the coal seams are</li> </ul>

Criteria	JORC Code explanation	Commentary
	<p><i>Resource and Ore Reserve estimation procedure(s) and classifications applied.</i></p> <ul style="list-style-type: none"> <li>Whether sample compositing has been applied.</li> </ul>	<p>directly correlatable</p> <ul style="list-style-type: none"> <li>Boreholes ESRAB19-18 to ESRAB19-41 were drilled in the South East Corner of Elan South and are generally spaced at 80 and 200 m between boreholes</li> <li>The borehole locations are shown in Figure 2 and Figure 2 of this announcement</li> <li>The 2019 program will continue infilling at the South East Corner, increasing the level geological confidence</li> </ul>
<p><i>Orientation of data in relation to geological structure</i></p>	<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 if material.</li> </ul>	<ul style="list-style-type: none"> <li>With the exception of ESRAB19-16, 17, 28, 29, 33, 35, 38, 39 and 40 (vertical), the holes drilled in 2019 at South East Corner are inclined as shown in Table 1 and 2</li> <li>Inclined holes are used in areas where dipping seams exist, in order to intersect the seams closer to their true thickness</li> <li>Almost every borehole has electronic deviation data available that has been imported into the Minex borehole database. The geological modelling software captures the borehole inclination and deviation, and structural modelling assists in correcting the apparent seam thicknesses to true thicknesses in model grids</li> <li>Boreholes tend to be accumulated near the subcrop zones but 3D representation is improving with the 2019 infill program.</li> </ul>
<p><i>Sample security</i></p>	<ul style="list-style-type: none"> <li>The measures taken to ensure sample security.</li> </ul>	<ul style="list-style-type: none"> <li>Not applicable to the 2019 program</li> </ul>
<p><i>Audits or reviews</i></p>	<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>Reviews by Elan Coal and metallurgical consultants have been undertaken and recognised the shortcomings of the 2014 program with regard to core recovery issues</li> <li>Metallurgical consultants have been involved in the sampling and testing protocols for the 2018 LD program</li> <li>Palaris representatives were on site in July 2019 to oversee the drilling program, and ensure a high standard of geological data is provided by Atrum Coal's geologists</li> </ul>

**Table 1 – Reporting of Exploration Results**

Criteria	JORC Code explanation	Commentary
<p><i>Mineral tenement and land tenure status</i></p>	<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>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.</li> <li>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).</li> <li>A coal lease does not grant surface rights; a surface lease or grant is required.</li> <li>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.</li> <li>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</li> </ul>
<p><i>Exploration by other parties in Elan South Area</i></p>	<ul style="list-style-type: none"> <li>Acknowledgment and appraisal of exploration by other parties.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>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</li> </ul>



Criteria	JORC Code explanation	Commentary
		<p>the regional structural interpretation at depth. All holes were geophysically logged and some limited coal quality data is also available.</p> <ul style="list-style-type: none"> <li>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 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.</li> <li>In 2017 Atrum Coal supervised a limited exploration program consisting of three trenches and field mapping.</li> <li>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)</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 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.</li> <li>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</li> <li>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).</li> <li>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.</li> <li>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.</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</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>This information is provided for all boreholes completed at the North Oil Pad Trend (ESRAB19-08 – ESRAB19-17) and South East Corner (ESRAB19-18 to ESRAB19-41 inclusive) at Elan South, in Tables 1 and 2 of this ASX announcement</li> <li>Downhole intersections are provided for all holes in Appendix 1</li> </ul>

Criteria	JORC Code explanation	Commentary
	<p>metres) of the drill hole collar</p> <ul style="list-style-type: none"> <li>○ dip and azimuth of the hole</li> <li>○ down hole length and interception depth</li> <li>○ hole length.</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 stated.</li> </ul>	<ul style="list-style-type: none"> <li>▪ No cut-off grades were applied to the exploration results in this announcement</li> <li>▪ For rotary air blast holes, individual samples are taken at 0.5m sample increments</li> <li>▪ No lab testing has been undertaken in 2019</li> </ul>
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>▪ Discrepancies between apparent and true seam thickness are an important consideration for interpretation of the drilling results in this announcement</li> <li>▪ 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.</li> <li>▪ 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</li> <li>▪ Reported seam intersections in boreholes and as evidenced by seam outcrops (road cuttings) show evidence of fault thickening, and / or thickening through folded zones</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>▪ Borehole locations plans are provided along with drill hole locations and seam intersects from the 2019 program</li> <li>▪ Work has commenced on updating geological models incorporating the recent drilling results</li> <li>▪ 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</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>▪ To ensure balance reporting of Exploration Results, Tables 1 and 2 include all boreholes drilled at the Oil Pad Trend and South East Corner in 2019</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>▪ 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</li> <li>▪ Along with surface mapping and trenching, road and track cuttings have provided a very useful source of outcrop measurements</li> <li>▪ 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</li> </ul>
Further work	<ul style="list-style-type: none"> <li>▪ The nature and scale of planned further work (e.g. 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</li> </ul>	<ul style="list-style-type: none"> <li>▪ The drilling of percussion (air-blast) structure holes will be continued in 2019, with up to 20,000m to be completed</li> <li>▪ Cored boreholes will be drilled in 2019 with around 20 cored boreholes planned</li> <li>▪ The cores will be subjected to detailed raw quality sizing and washability test work, including comprehensive testing of clean coal composites and coke</li> </ul>

Criteria	JORC Code explanation	Commentary
	<i>main geological interpretations and future drilling areas, provided this information is not commercially sensitive.</i>	<p>strength testing</p> <ul style="list-style-type: none"> <li>▪ Palaris has commenced with updating 3D geological models of Elan South</li> </ul>