Atrum Coal
COAL FOR STEEL

ASX Release 25 September 2018

Substantial high-quality hard coking coal defined at Elan South

HIGHLIGHTS

- **Completion of 16 additional drill holes at Elan South in Phase 2 drilling**
- **Significant coal intersections in most drill holes and exposed in road cuttings, with apparent cumulative intersections of up to 42.8m (hole ESRAB18-14)**
- **Preliminary coal quality analysis indicates high-quality hard coking coal**
- **Large-diameter cored drilling to start in October 2018 with further coal quality testing and a JORC resource estimate update on Elan South expected in late 2018**
- **There has been increased interest in coking coal projects in the Crowsnest Pass, AB area, including the recent Hancock Prospecting acquisition of 19.9% of Riversdale Resources for A$68.9m cash; Riversdale's flagship Grassy Mountain Project borders Atrum's Elan South**

Atrum Coal Ltd ("**Atrum**" or the "**Company**") (**ASX: ATU**) is pleased to update shareholders on recent progress and planning at its 100%-owned Elan Hard Coking Coal Project ("**Elan Project**") in southwest Alberta, Canada.

Recent results from Phase 2 drilling in the Elan South area have delineated a now substantial potential strike extent of coal seam deposition with impressive downhole thicknesses and preliminary analysis indicating high-quality coking coal parameters.

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Key Projects

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

Managing Director, Max Wang, commented: *"The progress of drilling at Elan South has continued at a rapid pace with 28 boreholes completed for over 5,500 metres of drilling. This is the first part of a two-year program targeting the delineation of a substantial, high-quality coking coal resource base in the Elan South tenements.*

"The coal seams intersected in this year's drilling program are highly encouraging. These structures often result in repeated coal seams and localised thickening of the coal measures. These dynamics can be favourable from a mining perspective and are typical of the geology in coal mines of this region, which collectively produces over 25 million tonnes per annum of export coking coal.

"Preliminary coal quality work, combined with historical result review, also indicates that Elan South represents a high quality, mid-volatile hard coking coal product. We are looking forward to the Phase 3 large-diameter cored drilling early next month which will enable us to undertake further detailed coal quality and washability test work, including coke strength testing.

"Newly appointed geological and mining consultants Palaris were on site two weeks ago, reviewing the drilling program and geological information in preparation for issuing a JORC-compliant Resource estimate on Elan South later this year. They are also reviewing the large volume of historical information available on Atrum's other tenement areas within the broader Elan Project."

About the Elan Project and Elan South Area

The Elan Project is located in the Crowsnest Pass area of Alberta, Canada. It consists of several different project areas which are known to contain shallow deposits of high quality hard coking coal of the Mist Mountain Formation (Kootenay Group). The Elan Project has a significant areal footprint comprising 27 coal exploration tenements spread over a 50 x 20 km zone and totalling approximately 22,951 ha (see Figure 1).

Approximately 13 km to the south of the Elan Project are the towns of Coleman and Blairmore, where an existing rail line operated by Canadian Pacific Railway provides direct rail access to coal export terminals in Vancouver and Prince Rupert. Approximately 40km to the west, Teck Resources Ltd operates five mines producing approximately 25Mtpa of predominantly hard coking coal for the global steel industry.

The Elan South area forms the southern part of the broader Elan Project tenement holdings.

Elan South 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 operation producing hard coking coal. Private Australian company, Hancock Prospecting, last month agreed to acquire 19.9% of Riversdale Resources for A$68.9 million cash.

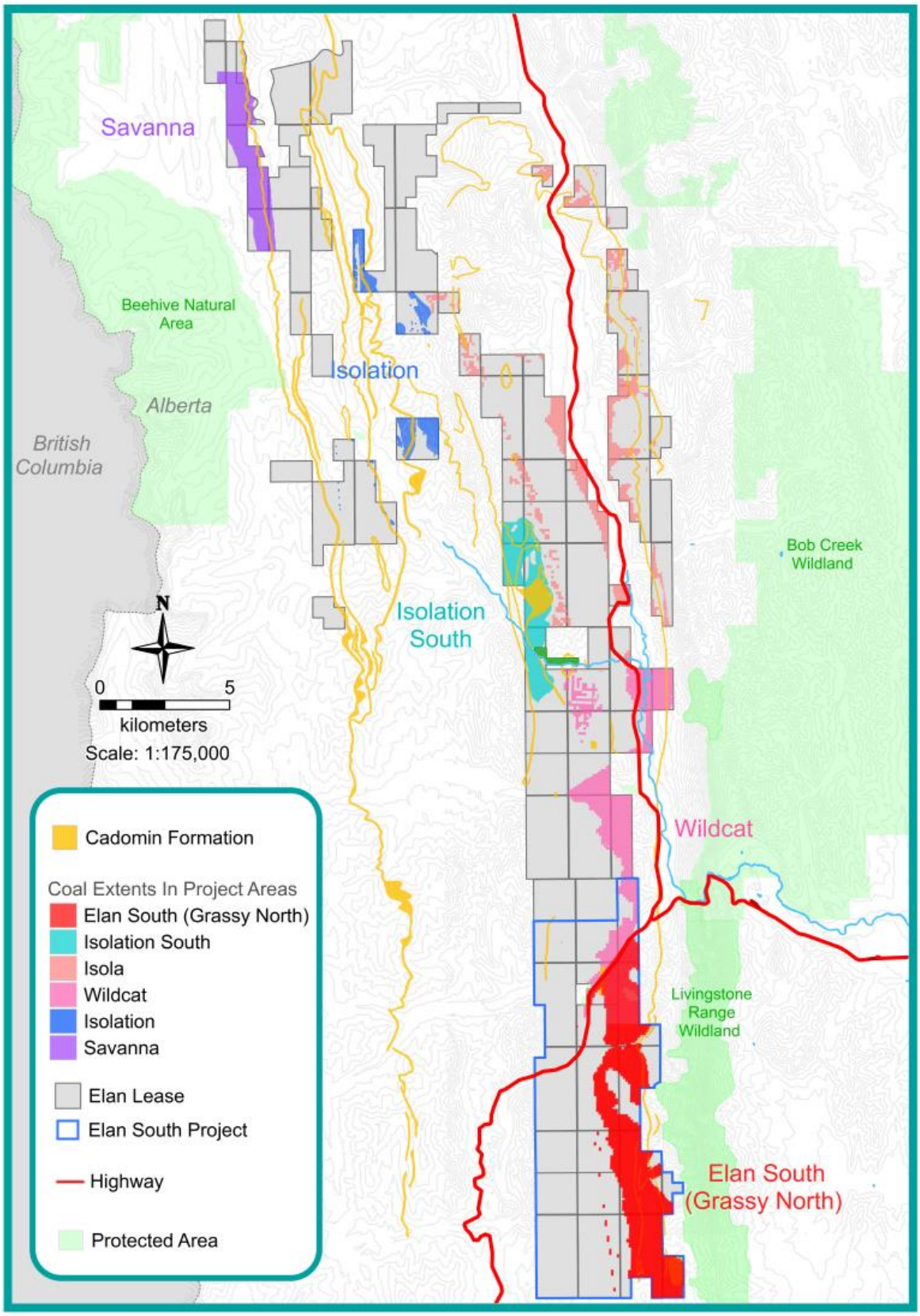

Figure 1: Elan Project Areas - Mist Mountain Formation coal extent (from Dahrouge, 2013)

Elan South Drilling Strategy

The 2018 exploration program at the Elan Project has been focused on the Elan South area. Phase 1 of the program consisted of 12 reverse circulation (RC) boreholes. Phase 2 has seen another 16 percussion (air-blast) holes completed to date. The location of these holes is shown in Figure 2.

The exploration strategy for the 2018 program was to initially drill a series of open holes to help define the structural geology of the deposit. The Company's earlier drilling in 2014 proved the existence of coal in two areas of Elan South but there was insufficient drilling to define the geology.

The 2018 drilling was also targeted to identify areas where the coal seams of the Jurassic-Cretaceous Mist Mountain Formation (Kootenay Group) occur at depths potentially amenable to open cut mining. The coal seam and structural geology information obtained from the drilling will assist in the development of an updated geological model and JORC-compliant Resource estimate targeted for late 2018.

The Phase 1 and 2 drilling has been concentrated along a broadly north-south trending topographic feature at Elan South. A combination of detailed surface mapping and drilling information has shown that the structure of the deposit is characterised by thrust faulting (upthrown on the western side) and an anticline feature, the axis of which runs through the ridge. Inclined coal seams are present on the western fault zone, and eastern and western limbs of the anticline. Boreholes drilled to date have been planned to intersect coal seams along the thrust zone and on the eastern and western limbs on an anticline structure.

Drilling has mostly been undertaken using inclined holes in order to address the inclined geometry of the coal seams. In Phase 2, the drilling rig was changed to a compact, track mounted rig with on-board air compressor, to improve drilling efficiency and reduce access construction cost. The 16 completed holes in Phase 2 have been drilled as percussion (air blast) holes with a 4.5 inch hammer bit and compressed air, resulting in good rates of penetration (Figure 3).

Field mapping has been particularly useful in identifying Mist Mountain Formation coal seam outcrop locations and also the extent of the overlying Cadomin Formation for drill planning. The Cadomin Formation forms resistant beds of conglomerate and coarse sandstone and usually indicates that coal is present below.

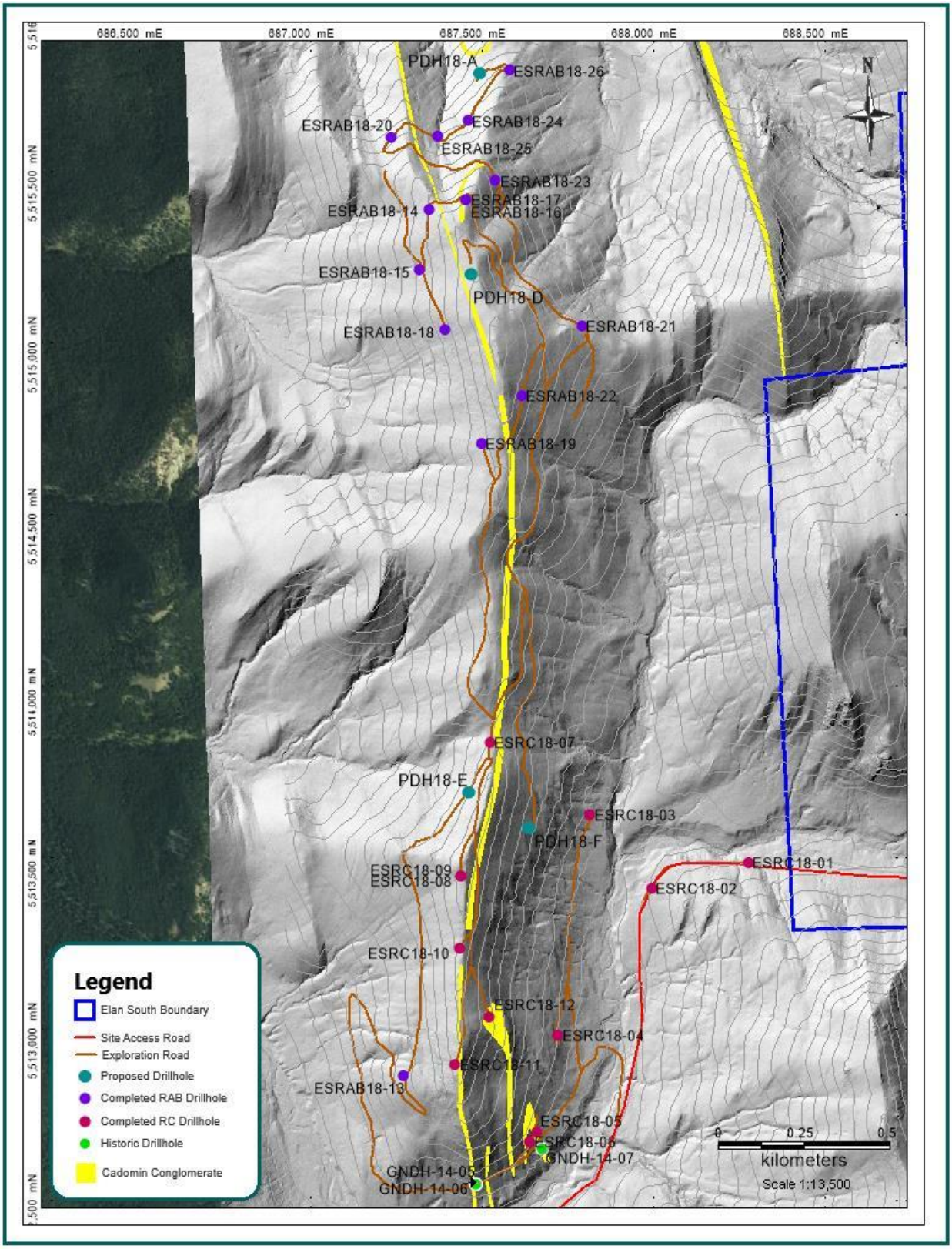

Figure 2: Elan South completed and planned borehole locations

Figure 3: Percussion rig drilling ESRAB-24 at northern end of Oil Pad Trend

Coal seams are also exposed in road cuttings for drilling access tracks, which provide a good illustration and additional geological information of the structure and apparent coal thicknesses. In particular, road cuttings towards the northern end of the ridge expose the coal seams and demonstrate how the coal seams thicken into the folded and faulted zones in the ridge. Photos of these coal outcrops in the road cuttings are shown in Figures 4 to 6.

Figure 4: Road cutting in anticline structure at the southern end of Elan South near ESRC-18-06

Figure 5: Road cutting in anticline structure at northern end of ridge

Figure 6: Coal seam outcrops – northern end of ridge near ESRAB18-24

Strong Initial Drilling Results

A summary of the recorded coal intersections in 26 of the 28 boreholes drilled in Phases 1 and 2 of the program are provided in Table 1 (results from the last two holes are being processed). The stated coal intervals are interpreted from 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.

In the southern area of the ridge line, borehole ESRAB-11 illustrates how coal can be thickened within the anticline zone, as the No.2 seam has an apparent thickness of 30m (in a vertical hole) at shallow depths.

In the northern area of the ridgeline, boreholes including ESRAB-14, ESRAB-15, ESRAB-16 and ESRAB-26 show thick sequences of coal (up to 42.8m cumulative thickness as shown in ESRAB-14) that result from thrust repeated coal seams in the geological and geophysical logs.

The coal seams have only been broadly correlated by seam group at this stage and more detailed correlation work will be required to correlate the seams according to seam plies, capturing any seam splitting or coalescing present. However, Atrum is highly encouraged by the indication of the potential of significant coal deposit strike extending further north from the 2018 drilling area.

Table 1: Completed 2018 drillhole types, locations and cumulative coal thickness (apparent)

Drillhole ID	Drill Type	Easting	Northing	Elevation	Total Depth	Azimuth	Dip	Total Coal Thickness Apparent (m)
ESRC18-01	RC	688,278	5,513,486	1,839	273	83	-65	6.2
ESRC18-02	RC	687,995	5,513,410	1,822	271	90	-63	6.5
ESRC18-03	RC	687,803	5,513,621	1,821	278	280	-60	1.8
ESRC18-04	RC	687,719	5,513,003	1,805	247	280	-65	7.0
ESRC18-05	RC	687,660	5,512,712	1,789	115	280	-60	24.1
ESRC18-06	RC	687,640	5,512,684	1,790	121	0	-90	23.3
ESRC18-07	RC	687,530	5,513,859	1,941	108	0	-90	-
ESRC18-08	RC	687,441	5,513,481	1,980	245	90	-70	-
ESRC18-09	RC	687,439	5,513,482	1,981	154	0	-90	-
ESRC18-10	RC	687,439	5,513,256	1,956	100	0	-90	1.0
ESRC18-11	RC	687,433	5,512,963	1,946	142	0	-90	34.8
ESRC18-12	RC	687,502	5,513,066	1,919	241	285	-60	-
ESRAB18-13	RAB	687,285	5,512,845	1,866	276	90	-55	-
ESRAB18-14	RAB	687,350	5,515,378	2,005	168	90	-60	42.8
ESRAB18-15	RAB	687,329	5,515,205	1,987	254	80	-55	33.8
ESRAB18-16	RAB	687,466	5,515,403	2,015	180	270	-55	38.1
ESRAB18-17	RAB	687,468	5,515,404	2,015	296	100	-85	-
ESRAB18-18	RAB	687,310	5,515,077	1,973	185	90	-55	21.0
ESRAB18-19	RAB	687,504	5,514,707	2,035	119	80	-60	0.5
ESRAB18-20	RAB	687,250	5,515,609	1,912	176	112	-60	10.1
ESRAB18-21	RAB	687,808	5,515,006	2,008	334	265	-58	-
ESRAB18-22	RAB	687,611	5,514,855	2,054	191	270	-70	-
ESRAB18-23	RAB	687,535	5,515,420	1,976	313	0	-90	12.9
ESRAB18-24	RAB	687,466	5,515,644	1,890	248	0	-90	6.1
ESRAB18-25	RAB	687,399	5,515,594	1,894	243	0	-90	5.6
ESRAB18-26	RAB	687,581	5,515,796	1,861	188	270	-60	21.4

Structural interpretation of existing borehole and surface mapping data has commenced. A cross section showing a conceptual structural interpretation by Atrum Coal geologists in the northern area of the ridge is shown in Figure 7.

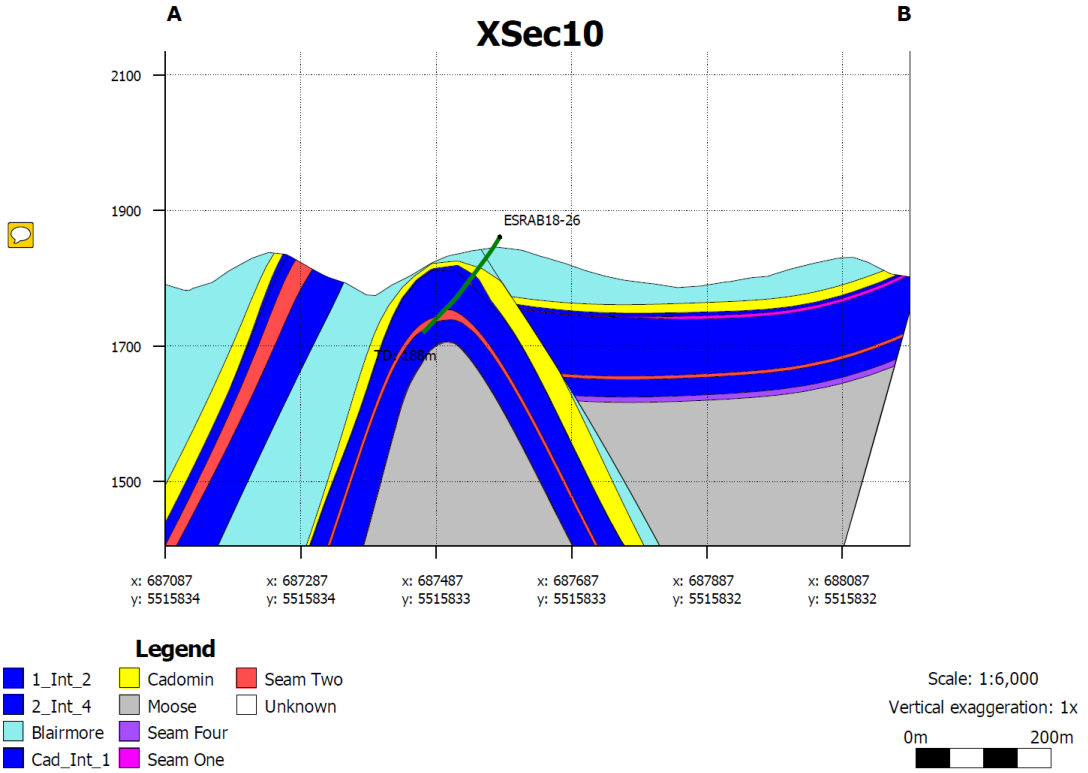

Figure 7: Conceptual interpretation of structure at Elan South (northern area of ridge)

Geological modelling software will capture the borehole inclination and deviation, and structural modelling will assist in correcting the apparent seam thicknesses to true thicknesses in model grids. With the volumes of data being acquired and the faulted style of deposit, it will take some time to fully interpret the structure and provide an accurate representation of the geology. However, this type of geological structure is common for Western Canadian coking coal deposits, including those of currently producing mines.

Coal Quality Indications

Existing Understanding

Based on existing coal quality data and a review of coal quality in 2017 by Bob Leach Pty Ltd (reported to the ASX on 2 November 2017), Elan South rank indicators (RoMax and VM%DAF), coupled with the fluidity and dilatation results, suggest blends of coals in the resource with these properties could meet a mid-volatile, hard coking coal (MVHCC) product specification. Coal rank, as measured by vitrinite reflectance (RoMax %) increases from south to north (from 1.19% to 1.36% for Seam 2).

Canadian coking coals are some of the highest quality coking coals on the global market, including low sulphur and phosphorous. Mist Mountain Formation coking coals typically have high coke strength after reaction with CO_2 (CSR) values, even

though the coal often has relatively low fluidity. One of the key reasons for this is the base-acid ratio (basicity index), which is typically low in Mist Mountain Formation coals.

Preliminary Test Results (Phase 1 RC Samples)

The Company delivered reverse circulation (RC) samples from Phase 1 of the Elan South drill program to GWIL Birtley coal laboratory in Calgary for preliminary and indicative testing. The samples were taken in half metre sample increments and then composited into thicker seam intervals that generally represent the top and base of the seam. RC composite samples have a lower degree of accuracy relative to core samples as they contain more loosely defined ratios of coal and non-coal parting material.

Raw quality testing of the RC samples has confirmed earlier data and reports demonstrating coking properties in the raw coal, with CSN (FSI) values ranging from 1 up to a maximum of 7. Higher CSN values in those samples generally correlated with lower raw ash results. The volatile matter range was variable, based on the raw ash of the samples, and ranged from 26.5 - 34.4% on a dry ash-free basis.

These preliminary results provide initial confirmation that the Elan South coal has similar quality characteristics to those found in the historical data available for the Elan Project (as previously reported to the ASX on 2 November 2017).

Context and Next Steps

Combining the Elan South drilling and coal quality results with historical results from other Elan Project areas highlights the increasing long-term potential for the Elan Project to host 3 or 4 discrete high-quality coking coal mines. A similar development model is evidenced at the 25Mtpa Teck Resources production hub approximately 40km to the west.

The following activities on the Elan Project are underway or planned to be undertaken by Atrum over the remainder of 2018.

Phase 3 Drilling

A drilling rig is set to be mobilised to site in the first week of October to commence the large diameter (LD) coring program that comprises Phase 3 of the 2018 exploration program at Elan South.

A total of six coal quality boreholes are planned for the Phase 3 program. These planned drill holes will be partly cored using triple tube core barrel for collection of 150mm diameter core samples through coal seams. The LD cored intersections will twin coal seams intersected in the previously drilled holes, and are targeting shallow, unoxidised coal seam intersections.

LD core samples will be taken on a ply-by-ply basis, before being transported to the GWIL Birtley coal laboratory in Calgary.

Further Coal Quality Testing

GWIL Birtley has been instructed to prepare clean coal composites on the Phase 1 RC samples at CF1.45, to allow testing of clean coal properties, which will include proximate analysis, Total Sulphur, phosphorus, CSN, maceral analysis and vitrinite reflectance.

The planned Phase 3 LD core samples will be subjected to raw coal analysis before being composited for the purposes of sizing analysis, float sink testing and detailed analytical testing on clean coal composites. Clean coal samples are also planned to be sent to several reputable laboratories in the US and Europe for coal characterisation and carbonisation test work including coke strength testing (CSR).

Geological Modelling and Elan South Resource Estimate

Additional geological expertise is now being provided to Atrum via newly appointed consultants, Palaris Australia Pty Ltd ("**Palaris**"). The Company facilitated a site visit with a Palaris representative to Elan South and other Elan Project areas in mid-September. Palaris will be providing assistance with the collection and interpretation of geological data, geological modelling, resource estimation and preparation of technical reports.

Palaris has been reviewing all historical sampling results (a total of 216 holes and more than 200 field adits and trenches) in preparation for the development of updated structural and coal quality models. The aim is to update 3D geological models of the respective areas which include Wildcat, Isolation South, Isolation, Isola and Savanna. This work, along with the results of the 2018 drilling program in progress, is targeted at significantly increasing the JORC-compliant Resources and refining the definition of the coal coking properties on the Elan Project.

A JORC-compliant Resource estimate on Elan South is also expected to be released in late 2018, following completion of the Phase 3 drilling and coal quality test work.

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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 during September, 2018 during the current exploration program.

APPENDIX A: DRILLHOLE DETAILS FROM 2018 ELAN DRILLING AND HISTORICAL ELAN COAL QUALITY AND EXPLORATION DATA

All 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 2.

Table 2: Completed 2018 drillhole types, locations and cumulative coal thickness (apparent)

Drill hole ID	Hole Dip	From m	To m	Coal Thick	Seam Group		Drill hole ID	Hole Dip	From m	To m	Coal Thick	Seam Group
ESRC18-01	-65	81.6	82.1	0.6	S1		ESRAB18-15	-55	70.8	71.1	0.3	S1
ESRC18-01	-65	112.7	113.2	0.5	S2		ESRAB18-15	-55	71.8	72.2	0.5	S1
ESRC18-01	-65	115.0	117.2	2.3	S2		ESRAB18-15	-55	83.1	86.1	3.0	S2
ESRC18-01	-65	147.6	148.4	0.8	S4		ESRAB18-15	-55	87.4	88.2	0.8	S2
ESRC18-01	-65	154.3	155.4	1.2	S4		ESRAB18-15	-55	89.4	90.1	0.8	S2
ESRC18-01	-65	160.5	161.4	0.9	S4		ESRAB18-15	-55	95.4	101.4	6.0	S2
TOTAL				**6.2**			ESRAB18-15	-55	104.8	105.1	0.3	S2
ESRC18-02	-63	238.3	240.0	1.7	S1		ESRAB18-15	-55	133.7	138.3	4.6	S2
ESRC18-02	-63	241.9	242.6	0.7	S1		ESRAB18-15	-55	142.4	145.2	2.8	S2
ESRC18-02	-63	247.5	249.0	1.5	S1		ESRAB18-15	-55	149.0	150.0	1.1	S2
ESRC18-02	-63	258.1	258.6	0.5	S2		ESRAB18-15	-55	152.1	165.9	13.8	S2
ESRC18-02	-63	261.4	263.6	2.2	S2		**TOTAL**				**33.8**	
TOTAL				**6.5**			ESRAB18-16	-55	48.6	49.2	0.5	S2
ESRC18-03	-60	272.4	274.1	1.8	S1		ESRAB18-16	-55	49.7	50.0	0.3	S2
TOTAL				**1.8**			ESRAB18-16	-55	51.6	67.7	16.1	S2
ESRC18-04	-65	229.3	230.1	0.8	S2		ESRAB18-16	-55	70.0	71.3	1.3	S2
ESRC18-04	-64	231.4	236.3	4.9	S2		ESRAB18-16	-55	77.1	85.4	8.3	S2
ESRC18-04	-63	238.0	239.0	1.0	S2		ESRAB18-16	-55	138.5	139.2	0.7	S2
ESRC18-04	-62	239.8	240.2	0.3	S2		ESRAB18-16	-55	144.2	155.1	10.9	S2
TOTAL				**7.0**			**TOTAL**				**38.1**	
ESRC18-05	-60	19.7	20.1	0.4	S2		**ESRAB18-17**	**-85**			**-**	
ESRC18-05	-60	21.7	25.7	4.0	S2		ESRAB18-18	-55	114.4	118.4	4.0	S2
ESRC18-05	-60	27.3	30.0	2.7	S2		ESRAB18-18	-55	119.9	121.3	1.5	S2
ESRC18-05	-60	38.0	48.8	10.8	S2		ESRAB18-18	-55	122.9	124.2	1.3	S2
ESRC18-05	-90	81.7	83.6	1.9	S2		ESRAB18-18	-55	124.7	125.8	1.1	S2
ESRC18-05	-90	86.4	90.8	4.4	S2		ESRAB18-18	-55	134.8	139.8	9.4	S2
TOTAL				**24.1**			ESRAB18-18	-55	140.4	144.2	3.8	S2
ESRC18-06	-90	0.0	8.8	8.8	S2		**TOTAL**				**21.0**	
ESRC18-06	-90	16.4	27.4	11.1	S2		ESRAB18-19	-60	35.5	36.0	0.5	S1
ESRC18-06	-90	28.7	31.2	2.6	S2		**TOTAL**				**0.5**	
ESRC18-06	-90	94.9	95.8	0.9	S4		ESRAB18-20	-60	82.6	86.5	3.9	S2
TOTAL				**23.3**			ESRAB18-20	-60	88.8	89.1	0.3	S2
ESRC18-07	**-90**			**-**			ESRAB18-20	-60	94.5	96.9	2.4	S2
ESRC18-08	**-70**			**-**			ESRAB18-20	-60	98.8	102.3	3.4	S2
ESRC18-09	**-90**			**-**			**TOTAL**				**10.1**	
ESRC18-10	-90	27.2	28.2	1.0	S1		**ESRAB18-21**	**-58**			**-**	
TOTAL				**1.0**			**ESRAB18-22**	**-70**			**-**	
ESRC18-11	-90	20.8	21.9	1.0	S2		ESRAB18-23	-90	280.0	284.6	4.6	S2
ESRC18-11	-90	22.6	23.9	1.3	S2		ESRAB18-23	-90	290.1	297.4	7.3	S2
ESRC18-11	-90	24.9	54.7	29.8	S2		ESRAB18-23	-90	303.4	304.4	1.0	S2
ESRC18-11	-90	61.8	64.5	2.7	S2		**TOTAL**				**12.85**	
TOTAL				**34.8**			ESRAB18-24	-90	196.2	202.3	6.1	S2
ESRC18-12	-60			-			**TOTAL**				**6.1**	
ESRAB18-13	-55			-			ESRAB18-25	-90	204.2	204.6	0.4	S2
ESRAB18-14	-60	39.5	43.0	3.5	S2		ESRAB18-25	-90	205	206.5	1.5	S2

ESRAB18-14	-60	43.5	43.8	0.3	S2		ESRAB18-25	-90	209.8	212.1	2.3	S2
ESRAB18-14	-60	44.5	45.1	0.6	S2		ESRAB18-25	-90	212.5	213	0.5	S2
ESRAB18-14	-60	48.2	50.4	2.2	S2		ESRAB18-25	-90	213.4	214.3	0.9	S2
ESRAB18-14	-60	56.2	71.9	15.7	S2		**TOTAL**				**5.6**	
ESRAB18-14	-60	73.3	73.6	0.3	S2		ESRAB18-26	-60	90.2	90.6	0.4	S1
ESRAB18-14	-60	94.9	95.9	1.0	S2		ESRAB18-26	-60	91.1	91.8	0.7	S1
ESRAB18-14	-60	96.7	106.8	10.1	S2		ESRAB18-26	-60	154.4	167.9	13.5	S2
ESRAB18-14	-60	110.8	111.1	0.3	S2		ESRAB18-26	-60	168.3	169.2	0.9	S2
ESRAB18-14	-60	113.3	117.7	4.5	S2		ESRAB18-26	-60	170	175.9	5.9	S2
ESRAB18-14	-60	129.2	132.2	3.0	S2		**TOTAL**				**21.4**	
ESRAB18-14	-60	134.6	135.9	1.3	S2							
TOTAL				**42.8**								

Historical coal quality data from 2014 exploration by Kuro Coal, as summarised in the 2017 Tamplin Resources JORC resource report (Table 6) is shown in Table 3 below.

Table 3: Raw and FC1.50 Clean coal quality results from Core and RC samples taken in 2014 Drill holes (Tamplin, 2017)

Elan South Coal Quality Summary							Raw (ad)		Cumulative Floats - 1.50SG (ad)						
HQ Cored Holes	**Seam**	**From (m)**	**To (m)**	**Coal Thickness (m)**	**Sampled**	**Recovery**	**ASH %**	**FSI**	**Yield %**	**Moisture %**	**Ash %**	**VM %**	**FC %**	**Sul %**	**FSI**
DH GN 14-04	1	25.21	28.56	1.92	0.14	7%	20.8	8.0	68.73	0.5	4.9	26.7	67.9	0.76	8.5
DH GN 14-04	2	77.85	94.6	12.47	4.33	35%	26.5	1.5	50.65	0.5	8.2	20.9	70.5	0.45	7.0
DH GN 14-01 upper	2	64.64	67.7	3.06	1.17	38%	23.0	5.5	67.65	0.5	7.0	23.6	69.0	0.71	7.5
DH GN 14-01 lower	2	68.7	73.8	5.1	4.6	90%	35.0	1.5	44	0.5	12.0	20.3	67.2	0.71	1.5
DH GN 14-02 upper	2	61.44	66.14	4.7	2.97	63%	16.3	4.0	75.55	0.4	8.2	23.0	68.5	0.58	7.0
DH GN 14-02 lower	2	67.44	80.67	13.23	5.77	44%	14.9	3.0	76.05	0.4	9.7	22.9	67.1	0.47	5.0
DH GN 14-01	4	125.45	126.11	0.66	0.26	39%	7.7	7.0	100	0.5	7.7	21.7	70.1	7.00	
DH GN 14-03	4	100.4	103.18	2.78	1.83	66%	52.8	1.0	Not Analysed						
Reverse Circulation Holes															
DH GN 14-06 RC	1	6.15	10.85	4.33		N/A	21.0	1.5	Oxidized Coal						
DH GN 14-06 RC upper	2	28.9	30.28	1.38		N/A	30.8	2.5	51.52	0.7	10.2	23.5	65.7	0.49	7.0
DH GN 14-06 RC lower	2	30.7	33.08	2.38		N/A	24.4	6.0	50.76	0.7	8.0	27.0	64.3	0.61	7.0

Table 4 below is a summary of the historical exploration data available at Elan, extracted from a Dahrouge Geological Consulting report from 2013 (Table 6-1).

Table 4: Historical exploration across the various Elan projects, Alberta, Canada

Area	Operator	Campaign	Core holes	Bore holes/ Wells	Adits	Trenches	Mapping	Access Trails (km)
OMR (Isolation South)	Scurry	1970	19	-	3	24	-	22.5
Savanna	Bralorne	1969-72	8	57	5	15	1:4,800 ft	-
Savanna	CIGOL	1971	2	-	-	-	-	-
Isolation	CanPac	1969-71	76	5	6	76	1:12,000 / 1:2,400	~117.5
Isolation	Granby	1974	18	9		45	1:2,400	
Regional-OMR	W.C.C	1949-55	-	-	-	33	1:12000	Extensive
Regional-Isola	CCL	1971	3	-	-	15	-	-
Regional-OMR	Consol	1976	-	-	-	-	1:12,000	-
Regional	CHE & Devon	1989	-	1	-	-	-	-
Regional	NEC	2001-02	-	20	-	-	-	-
Total			**126**	**92**	**14**	**208**		

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 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.
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

Criteria	JORC Code explanation	Commentary
		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 interception depth* o *hole length.*	▪ This information is provided for all boreholes completed in 2018 at Elan South, in Tables 1 and 2 of this ASX announcement
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 RC samples tested, individual samples are taken at 0.5m sample increments ▪ Individual samples were combined into seam composite samples for analytical testing at GWIL Birtley coal laboratory ▪ No compositing of coal quality test results has been undertaken against drillholes at this stage
Relationship between mineralisation widths and	▪ *These relationships are particularly important in the reporting of Exploration Results.* ▪ *If the geometry of the mineralisation with respect to*	▪ 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

Criteria	JORC Code explanation	Commentary
intercept lengths	*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').*	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 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 2018 program ▪ Work has commenced on rebuilding geological models incorporating the recent drilling results and historical drilling data ▪ 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 2 and 3 include all boreholes drilled in 2018, including those holes which did not contain any coal seams of significance
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, 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 areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	▪ The drilling of percussion (air-blast) structure holes will continued in September / October 2018, with up to seven more holes to be completed ▪ Six LD boreholes will be drilled between September and November, 2018 with six 150mm (6C) cored boreholes planned ▪ The LD cores will be subjected to detailed raw quality sizing and washability test work, including comprehensive testing of clean coal composites and coke strength testing ▪ Palaris has commenced with reviews of geological data and creating new 3D geological models of Elan South