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Atrum Coal
COAL FOR STEEL

ASX Release

3 September 2019

Further Excellent Results from South East Corner and Drilling Commenced at Isolation South

HIGHLIGHTS

- **Strong 2019 exploration progress with 63 drill holes now completed at Elan South**
- **Includes 46 holes drilled at new South East Corner discovery; every hole has intersected multi-seam shallow coal, with an average apparent cumulative thickness of 16.4m**
- **Significant coal endowment at South East Corner confirmed; delivers clear potential for shallow, low-strip, early-phase mining area**
- **Initial 5 PQ core holes also completed at South East Corner for coal quality testwork**
- **Exploration drilling has commenced at Isolation South (Elan North) with 7 holes already completed; infill and extensional focus**
- **Updated Elan Project resources plus Elan South Scoping Study expected in 4Q 2019**

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: *"The Elan South drilling activity at South East Corner has been a resounding success. Every one of the 46 holes drilled in this area has intersected significant shallow coal thicknesses, with many of these intervals starting from very near-surface depths. This work has shown South East Corner, which is connected to the south-east end of our existing resource at Oil Pad Ridge, to be a potentially very significant deposit for our future development plans at Elan South.*

"We have now moved our two exploration drill rigs and focus to Isolation South for the next few weeks. Further drill holes in the 2019 program are planned for the northern Oil Pad Ridge and Fish Hook areas of Elan South."

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Key Projects

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

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Current drilling activities and next phases

Drilling activities at Elan South have progressed solidly with a total of 63 rotary air blast holes in the 2019 program now completed. This release contains results for Holes 42 to 63 (all drilled at South East Corner), with results for Holes 1 to 41 having been previously released by Atrum.

Following completion of Hole 63, the two exploration drill rigs were remobilised from Elan South to Isolation South (Elan North) in late August. Drilling has commenced at Isolation South with 7 holes completed to 30 August 2019. See Figure 1 for location of South East Corner and Isolation South.

A total of 35 holes are planned to be drilled at Isolation South through the 2019 program.

The focus of the current phase is both confirmatory/infill and extensional, with the two rigs operating in different areas of Isolation South. One rig is presently located north of the Old Man River (where the existing Isolation South resource is delineated) and the other to the south of the Old Man River (where a lesser amount of historical exploration data is available) (see Figure 3).

The phased drilling approach between Elan South and Isolation South has been adopted to facilitate efficient road construction progress and optimal drill rig utilisation.

Following completion of the current phase at Isolation South (over the next few weeks), exploration drilling activity is planned to return to Elan South – focussing on the northern end of the Oil Pad Ridge trend and Fish Hook. The Fish Hook area has existing drill hole information (three holes from previous exploration in 2014) and appears highly promising.

A third rig was recently mobilised to site to commence drilling PQ size cored holes (83mm diameter) for sampling and analytical testing with respect to coal quality and washability. The coring rig has completed 5 PQ core holes at South East Corner with these samples submitted for laboratory testwork. Following a planned short break, further coring activities at Elan South are scheduled in the coming weeks.

Additional results confirm significant, shallow endowment of South East Corner

Holes 42 to 63 were drilled in the South East Corner area of Elan South. All these holes intersected multiple coal seams commencing from shallow starting depths. They have also confirmed the geological structures (an anticline and syncline) that result in the shallow coal deposition in this area.

Results for these 22 holes (ESRAB19-42 to 63) are provided in Table 1, including collar coordinates (NAD 1983, UTM Zone 11N), total depth, collar inclination and azimuth, and cumulative apparent coal thicknesses. Borehole locations are mapped in Figure 2.

A series of holes were drilled through the syncline axis and onto the western limb of the syncline structure within the South East Bowl feature. These holes were strategically important, as they confirm that the coal seams are present at shallow depths throughout the syncline (generally following topography), and do not extend to deep ground. The seams are also present at shallow depths on the eastern limb of the syncline, near the eastern tenement boundary.

Table 1: South East Corner 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)
ESRAB19-42	RAB	688,969	5,512,487	2,089	190.8	0	-90	13.5	6.3
ESRAB19-43	RAB	688,707	5,512,255	2,097	40.7	0	-90	8.1	7.9
ESRAB19-44	RAB	688,622	5,512,956	2,063	115.4	90	-60	17.1	4.6
ESRAB19-45	RAB	688,622	5,512,956	2,063	102.8	0	-90	14.6	20.7
ESRAB19-46	RAB	688,632	5,512,734	2,065	195.7	0	-90	28.9	12.5
ESRAB19-47	RAB	689,109	5,512,832	2,050	81.0	90	-60	9.7	9.2
ESRAB19-48	RAB	689,151	5,512,947	2,043	50.6	90	-60	4.5	11.8
ESRAB19-49	RAB	688,743	5,513,000	1,997	97.3	270	-60	18.9	26
ESRAB19-50	RAB	688,853	5,512,771	2,005	234.1	0	-90	37.1	70.0
ESRAB19-51	RAB	689,012	5,513,102	1,945	105.1	100	-60	14.7	27.7
ESRAB19-52	RAB	689,009	5,513,103	1,945	124.0	0	-90	15.0	34.7
ESRAB19-53	RAB	688,615	5,512,839	2,075	189.9	100	-55	34.2	2.5
ESRAB19-54	RAB	688,610	5,512,868	2,063	148.6	0	-90	18.4	11.9
ESRAB19-55	RAB	688,665	5,512,957	2,068	203.3	0	-90	44.0	7.8
ESRAB19-56	RAB	688,790	5,512,468	2,083	148.0	270	-60	19.0	42.5
ESRAB19-57	RAB	688,624	5,512,733	2,068	104.0	0	-90	14.5	3.4
ESRAB19-58	RAB	688,995	5,512,839	1,985	123.7	90	-60	9.9	40.2
ESRAB19-59	RAB	688,998	5,512,842	1,979	178.9	0	-90	8.7	50.2
ESRAB19-60	RAB	688,969	5,513,168	1,925	116.1	90	-65	14.4	34.3
ESRAB19-61	RAB	688,967	5,513,166	1,925	139.1	0	-90	18.3	40.6
ESRAB19-62	RAB	688,457	5,513,286	1,913	121.1	90	-60	16.6	26.8
ESRAB19-63	RAB	688,452	5,513,285	1,911	145.3	0	-90	14.5	34.8

Reviewing all 46 holes drilled to date at South East Corner (Holes 18 to 63), shallow coal has been intercepted in every hole, with an average apparent cumulative thickness across all these holes of 16.4m (and ranging between a minimum of 4.5 metres up to a maximum of 44.0 metres). Multiple holes evidence coal intervals commencing from less than 5 metres below surface.

In aggregate, these results have demonstrated that the South East Corner (an approx. 2km^2 tenement area that is connected to the south-east end of the current resource boundary at Oil Pad Ridge, see Figure 1) is a significantly endowed and potentially low-strip, early-phase mining area for the Elan Project.

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Processing and interpretation of the geological data is continuing, with updating of geological models underway. Additional drilling may be carried out at South East Corner once a preliminary geological characterisation has been completed and the next most prospective drill targets identified.

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.

Five PQ core holes completed at South East Corner

A specialised coring rig was recently mobilised to Elan South to commence drilling PQ size (83 mm diameter) cored holes for the coal quality and washability testing program. The coring rig has completed an initial five holes at the South East Corner, twinning existing rotary air blast holes to collect core samples for analytical testwork.

Coal coring recoveries range from 43% to 100% linear recovery for individual seams cored, and an overall linear recovery of over 75% achieved. For the initial lower-core-recovery-rate (less than 85%) seams or holes, partial or full re-drills were undertaken (holes 01B, 02B, 04B, 04C and 05B). The first batch of core samples were submitted to the GWIL Birtley laboratory in Calgary to initiate this year's analytical testing program.

Details from these five cored holes are summarised in Table 2. A typical core sample photograph is also shown in Figure 4.

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

Drillhole ID	Drill Type	Easting	Northing	Elevation	Total Depth	Pilot Hole	Seam Group Cored	Core Recovery
ESPQ19-01A	CORED	688,598	5,512,646	2,042	47.9	ESRAB19-33	S4	80%
ESPQ19-01B	CORED	688,598	5,512,648	2,042	57.0	ESRAB19-33	S4	94%
ESPQ19-02A	CORED	688,693	5,512,527	2,055	93.2	ESRAB19-28	S4	49%
ESPQ19-02B	CORED	688,692	5,512,527	2,052	38.2	ESRAB19-28	S4	73%*
ESPQ19-03	CORED	688,815	5,512,080	2,160	154.2	ESRAB19-39	S1 / S2	83%*
ESPQ19-04A	CORED	688,700	5,512,694	2,082	59.7	ESRAB19-29	NA	NA
ESPQ19-04B	CORED	688,701	5,512,693	2,083	114.5	ESRAB19-29	S2	88%
ESPQ19-04C	CORED	688,700	5,512,691	2,082	108.3	ESRAB19-29	S2	64%
ESPQ19-05A	CORED	688,619	5,512,957	2,064	28.8	ESRAB19-45	S2	49%
ESPQ19-05B	CORED	688,617	5,512,955	2,067	42.5	ESRAB19-45	S2	70%

* Recovery is estimated - ESPQ19-02B and 03 still to be geophysically logged

All boreholes detailed in this release (except ESPQ19-02B and 03 due to blockage) 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 rotary air blast boreholes are drilled inclined rather than vertically in order to intersect inclined seams at steeper angles, while the PQ cored holes are drilled vertically.

Isolation South drilling

The Isolation South area has been historically explored by previous owners, particularly in the area north of the Old Man River where a JORC resource totalling 120Mt (39Mt Indicated and 81Mt Inferred) has been estimated by Atrum[1].

The area south of the Old Man River has a limited amount of historical drilling, trenching and mapping data available. Atrum has estimated an Exploration Target[2] range of 60 – 200Mt for this area.

The current phase of drilling at Isolation South is planned to both: (i) validate the historical drill results north of the Old Man River; and (ii) target underexplored zones to the south of the Old Man River with a view to expansion of the overall Isolation South resource estimate.

[1] Other than the drilling results released to ASX included this one in 2019, 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.

[2] 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.

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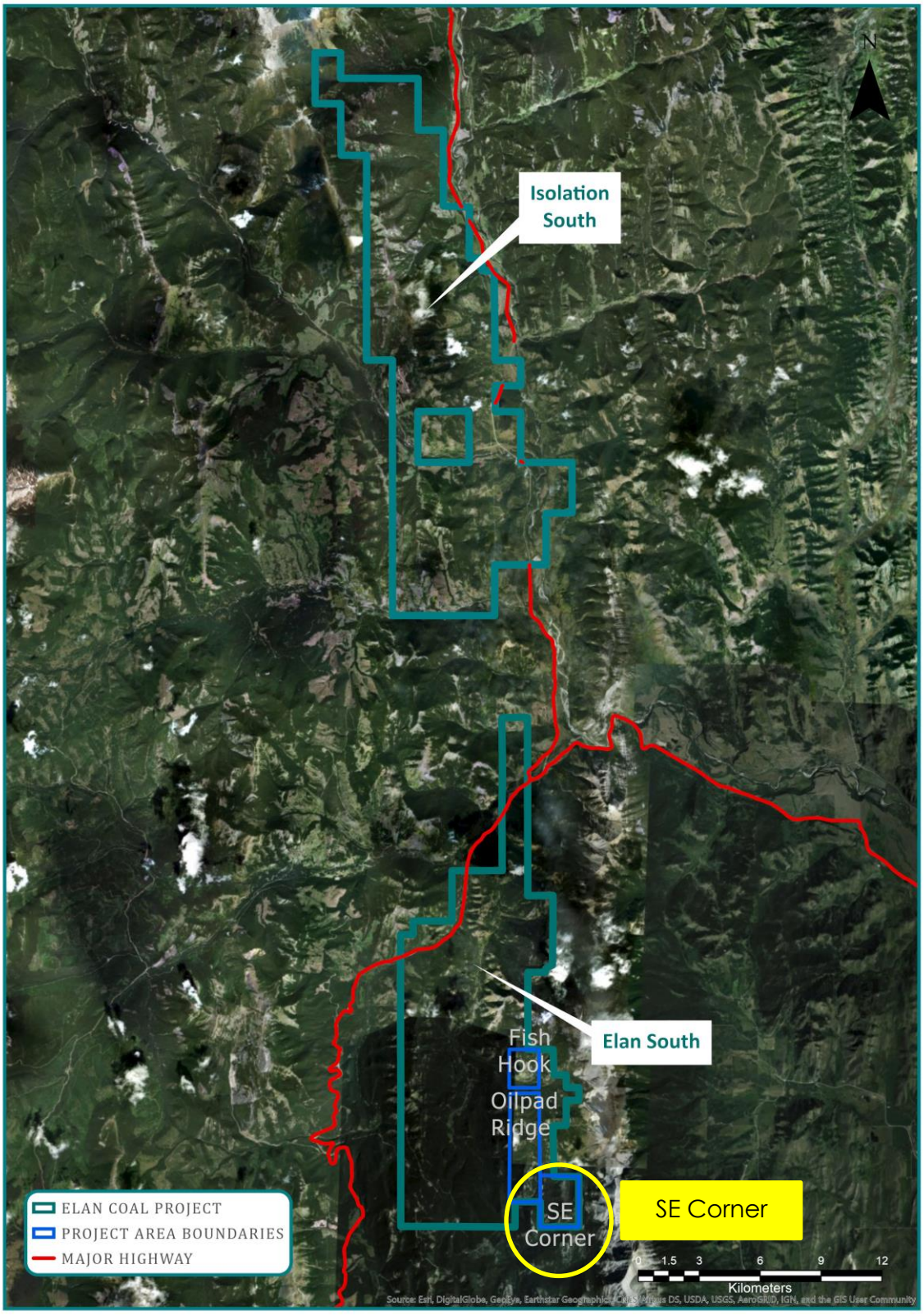

Figure 1: Plan showing the location of the various project areas

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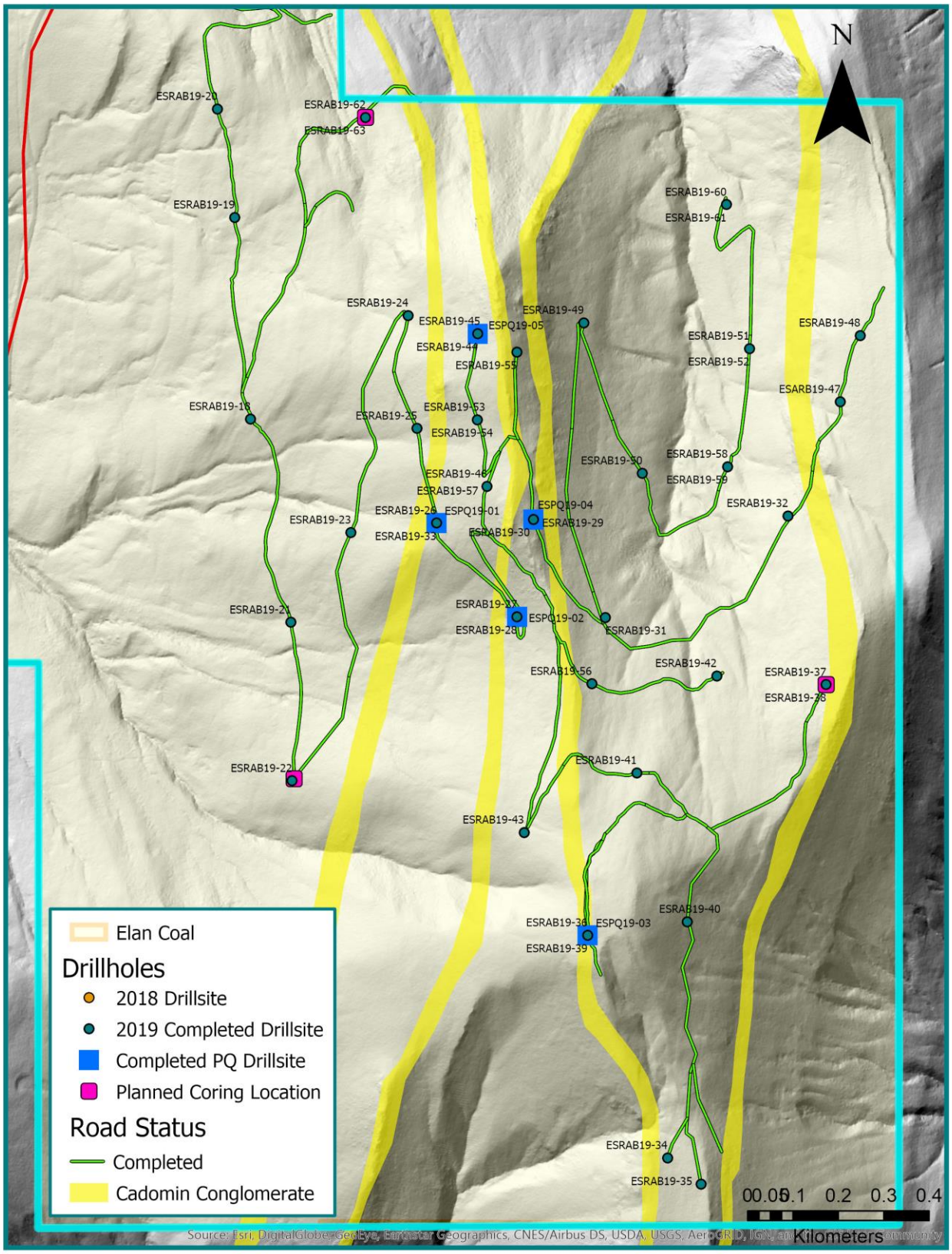

Figure 2: Completed drill hole locations – South East Corner of Elan South

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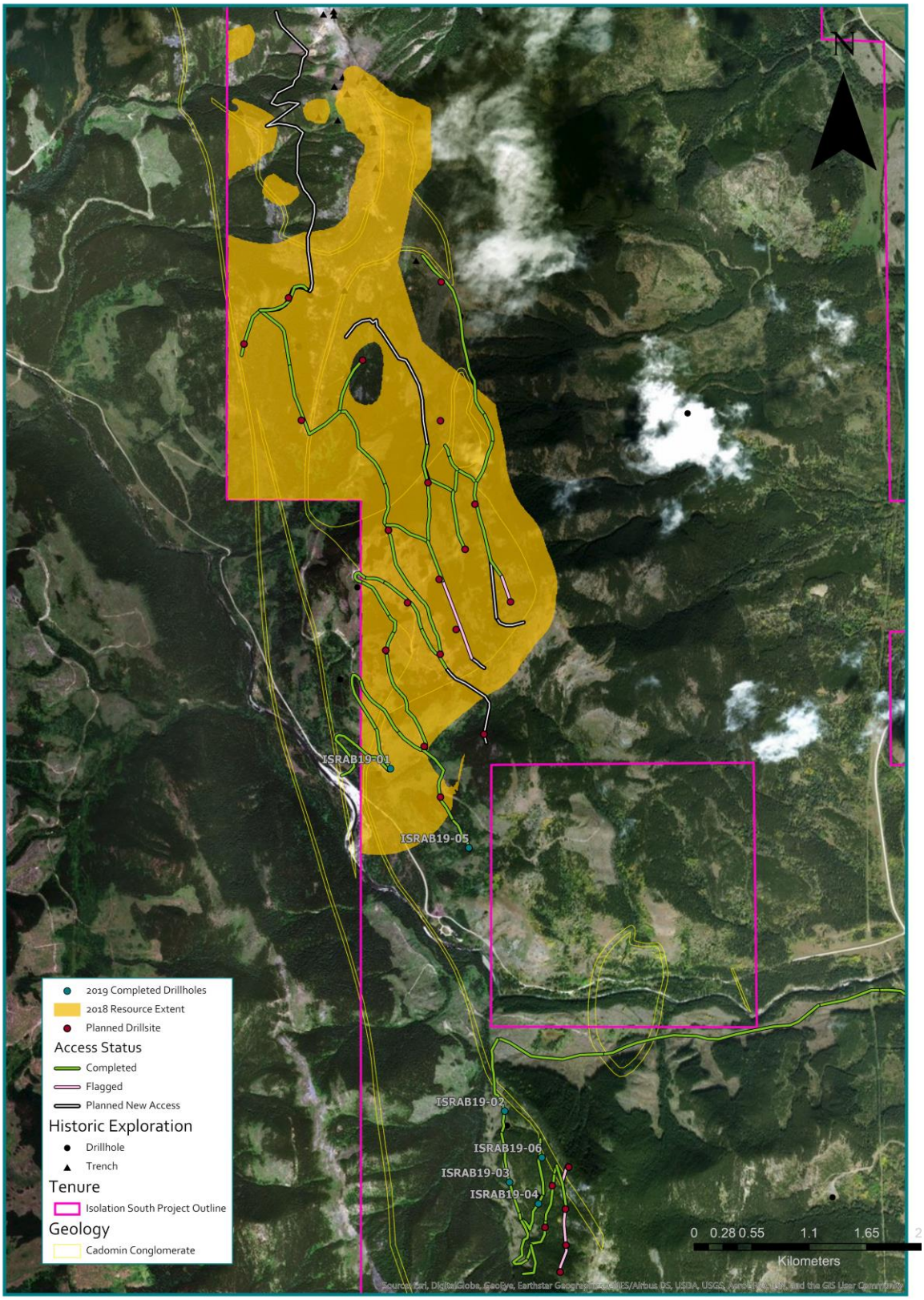

Figure 3: Location of the current planned drilling at Isolation South

Figure 4: PQ core samples from cored hole ESPQ19-05B

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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).[1] 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.

[1] Other than the drilling results released to ASX included this one in 2019, 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 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	▪ *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.* ▪ *Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.* ▪ *Aspects of the determination of mineralisation that are Material to the Public Report.*	▪ From the 63 rotary air blast holes completed 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, ▪ The preference is for the coring program to be undertaken, twinning selected open holes ▪ Selected holes are twinned for coring and sampling for coal quality testwork, with five PQ size cored holes completed in 2019 (ESPQ19-01 to ESPQ19-05) ▪ Samples were taken on ply intervals and composited in the laboratory ▪ All holes have been geophysically logged with sample intervals adjusted and aligned to the geophysical log depths (note ESPQ19-02B and 03 are still to be geophysically logged)
Drilling techniques	▪ *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).*	▪ The 63 rotary air blast boreholes completed in 2019 are percussion (rotary air blast) boreholes with a 4 1/2" diameter hammer drill bit ▪ All of the boreholes completed in 2019 were geophysically logged to total depth in the open hole, with boreholes ESRAB19-06, 13 and16 to be re-logged due to hole blockages ▪ Drill holes ESPQ19-01 to 05 are partially cored holes, drilled vertically with PQ size (83 mm) coring
Drill sample recovery	▪ *Method of recording and assessing core and chip sample recoveries and results assessed.* ▪ *Measures taken to maximise sample recovery and ensure representative nature of the samples.*	▪ Core recoveries are measured by the geologists and compared relative to seam thicknesses from geophysical log depths in order to estimate linear recoveries ▪ Core recoveries are summarised in Table 2 of this announcement ▪ Rotary air blast holes are geophysically logged

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Criteria	JORC Code explanation	Commentary
	▪ *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.*	and seam intervals have been determined from the geophysical log data ▪ Samples are weighed at the testing laboratory and compared against calculated volumetric recovery
Logging	▪ *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.* ▪ *Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.* ▪ *The total length and percentage of the relevant intersections logged.*	▪ Open hole cuttings (rotary air blast) are logged in 1m sample intervals taken and seam intervals adjusted to depths from geophysical log interpretation ▪ Boreholes were geophysically logged with geophysical sondes including density, caliper and gamma, deviation and dipmeter ▪ Core samples have been logged in detail by the field geologists and adjusted to geophysical log depths where necessary
Sub-sampling techniques and sample preparation	▪ *If core, whether cut or sawn and whether quarter, half or all core taken.* ▪ *If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.* ▪ *For all sample types, the nature, quality and appropriateness of the sample preparation technique.* ▪ *Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.* ▪ *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.* ▪ *Whether sample sizes are appropriate to the grain size of the material being sampled.*	▪ Core samples are photographed, labelled and bagged as whole core samples (no sub-sampling undertaken) ▪ Cores are submitted to the laboratory for analytical testing, following an established sample preparation and testing guideline provided by Atrum Coal ▪ Sub-sampling techniques used by the laboratory are commonly adopted in the coal industry and are not expected to result in non-representative raw or clean coal samples
Quality of assay data and laboratory tests	▪ *The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.* ▪ *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.* ▪ *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.*	▪ Not applicable to the 2019 program ▪ Testwork is undertaken by a nationally accredited laboratory (GWIL Birtley of Calgary), generally to ASTM standards. The lab participates in International Canadian Coal Laboratories Round Robin series (CANSPEX) and test results are consistently ranked in preferred groupings. ▪ The Competent Person undertook a site visit and tour of the GWIL Birtley laboratory in 2018 ▪ Sizing and float sink testing is being undertaken on LD samples according to testing protocols designed by metallurgical consultants A&B Mylec
Verification of sampling and assaying	▪ *The verification of significant intersections by either independent or alternative company personnel.* ▪ *The use of twinned holes.* ▪ *Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.* ▪ *Discuss any adjustment to assay data.*	▪ Geological data is collected in line with Atrum Coal's exploration procedures and guidelines ▪ Sample interval depths and thicknesses are as measured by the field geologist (drillers depths), and adjusted to align with geophysical log depths ▪ GWIL Birtley undertakes preliminary checks of assay data using regression analysis, and checked by Atrum Coal and Palaris geologists ▪ All data has been encoded, collated and cross checked by Atrum Coal and later by Palaris

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Criteria	JORC Code explanation	Commentary
		▪ Twinned holes have been used for the PQ coring program. The twinned holes also incorporate geophysical logging
Location of data points	▪ *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.* ▪ *Specification of the grid system used.* ▪ *Quality and adequacy of topographic control.*	▪ The locations of boreholes drilled in 2019 have been surveyed using Trimble DGPS ▪ The co-ordinate system is UTM projected grid NAD83 Zone 11N ▪ The topographical surface is sourced from a LiDAR survey and has a reasonable correlation with borehole collars
Data spacing and distribution	▪ *Data spacing for reporting of Exploration Results.* ▪ *Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.* ▪ *Whether sample compositing has been applied.*	▪ Rotary air blast holes ESRAB19-42 to ESRAB19-63 and cored holes ESPQ19-01 to 05 are located at South East Corner of Elan South and are typically within 100-300m of each other ▪ These boreholes completed are infilling the resource areas identified during 2018, and the coal seams are directly correlatable ▪ The borehole locations are shown in Figure 3 of this announcement ▪ The 2019 program will continue infilling at the South East Corner once initial drilling at Isolation South and Fish Hook has been completed, increasing the level geological confidence
Orientation of data in relation to geological structure	▪ *Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.* ▪ *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.*	▪ The rotary air blast holes drilled in 2019 at South East Corner are a mixture of inclined and vertical, as shown in Table 1 of this announcement. Cored holes in Table 2 are drilled vertically. ▪ Inclined holes are used in areas where dipping seams exist, in order to intersect the seams closer to their true thickness ▪ 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
Sample security	▪ *The measures taken to ensure sample security.*	▪ Core was sampled, labelled and bagged before being submitted to the testing laboratories Samples have a unique sample number that is provided on tags in the bag, outside the bag and in separate digital and hard copy sample advice. Each item of advice lists project name, borehole, top and base of sample and sample number ▪ The laboratory records provided include sample identification numbers and weighed sample mass
Audits or reviews	▪ *The results of any audits or reviews of sampling techniques and data.*	▪ Reviews by Atrum Coal and metallurgical consultants have been undertaken and recognised the shortcomings of the 2014 program with regard to core recovery issues ▪ Metallurgical consultants have been involved in the sampling and testing protocols for the 2018 and 2019 programs ▪ Palaris representatives were on site in September 2018 and August 2019 to oversee the drilling program, and ensure a high standard of geological data is provided by Atrum Coal's geologists

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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. ▪ 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

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Criteria	JORC Code explanation	Commentary
		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 interception depth* o *hole length.*	▪ This information is provided for all boreholes completed at the South East Corner including rotary air blast holes (ESRAB19-42 to ESRAB19-63 inclusive) and cored holes (ESPQ1901 to ESPQ19-05), in Tables 1 and 2 of this ASX announcement ▪ Downhole thicknesses are provided for the rotary air blast holes in Table 1
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*	▪ 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, and core samples taken on a ply by ply basis ▪ No compositing of sample results has been undertaken in 2019

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	such aggregations should be shown in detail. ▪ *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	
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 at South East Corner since the previous announcement (18 August 2019)
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 ▪ Along with surface mapping and trenching, 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 be continued in 2019, with up to 20,000m to be completed ▪ Cored boreholes will continue to be drilled in 2019 with around 20 PQ size cored boreholes planned ▪ The 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 updating 3D geological models of Elan South