

# Exploration Update: Initial drilling at the new Cade Spodumene **Deposit Completed**

Perth, Western Australia: 16 September 2019: Pioneer Resources Limited ("Company" or "Pioneer") (ASX: PIO) is pleased to advise that the inaugural drilling programme at the 100%-owned Pioneer Dome North group of prospects is complete. Drilling targeted the lithium mineral spodumene, hosted in lithium-caesium-tantalum ("LCT") pegmatite rocks.

All drill samples of intersected pegmatite are in the laboratory for analysis. The laboratory recently provided a timetable that indicates that the assays are scheduled for delivery to the Company prior to the end of next week. These will be compiled and released to the public shortly thereafter.

#### **DRILL PROGRAMME IN BRIEF**

The Company reported earlier this year that spodumene-bearing LCT pegmatites had been discovered by its geologists at two locations within the Dome North Area.

Company geologists record that spodumene mineralisation was intersected beneath the discovery outcrops (see also ASX announcements 30 July, 23 August 2019) on panels of holes generally spaced on a 160m x 80m grid.

This drilling programme saw 29 reverse circulation ("RC") drill holes completed for a total of 4,919m at the initial two targets. 21 of these holes intersected pegmatite.

The programme was subdivided into two drill areas:

- The Cade Deposit (previously Spodumene Target 2) was tested with 24 holes. 14 intersected the tabular pegmatite dyke, which, horizontally, is approximately 800m long, with a maximum thickness of 35m. The dyke extends down plunge to at least 311m. 2 holes intersected a separate, previously unrecognised pegmatite (Spod3) to the northeast of the Cade Pegmatite. (Refer to Figure 2 and Table 1); and
- Spodumene Target 1 had 5 holes completed, all of which intersected pegmatite, with a maximum thickness to date of 15m.

## **Board-Management** Contact Details

Craig McGown Non-Executive Chairman

**David Crook** Managing Director

Wayne Spilsbury Non-Executive Director

Allan Trench Non-Executive Director

**Timothy Spencer CFO/Company Secretary** 

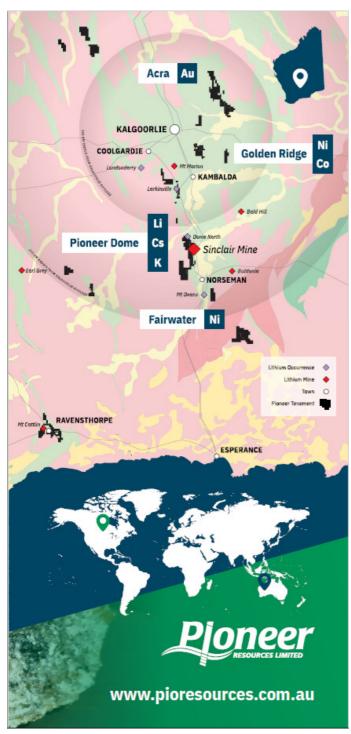
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# Pioneer Dome Lithium-Caesium-Tantalum (LCT) Project

# The Pioneer Dome Project is 100% owned and is the Company's lead asset.



The Project is located ~130km south of Kalgoorlie and 200km north of the Port of Esperance, close to the Goldfields-Esperance Highway and relevant infrastructure, including rail, gas and water, which pass through the Project. Pioneer has a clearly stated strategy, to grow further value at the Pioneer Dome by building on the success of the Sinclair Mine.

# **Pioneer's Latest Discovery**

Pioneer's geology team recently discovered pegmatites containing the premium lithium mineral, spodumene, at the Dome North Area of the Pioneer Dome, located 18kms north of the Sinclair Caesium Mine.

The first pass of drilling has shown that mineralised pegmatite doesn't necessarily outcrop, nor is it always evident in conventional soil geochemistry. This provides the opportunity for further discoveries under shallow cover and an exploration strategy is being implemented accordingly.

This will initially involve detailed interrogation of existing geochemistry looking for subtle multi-element responses, and a trial of Deep Ground Penetrating Radar geophysical technology in areas of alluvial cover where geochemistry is ineffective.

The Company has identified at least 15 LCT or alkali metal-enriched pegmatites that have been emplaced into a 20km corridor of greenstone rocks, along the eastern flank of the Pioneer Dome. Target evaluation and ranking continues.

The Pioneer Dome sits along an increasingly important 'lithium corridor' which includes three lithium mines: Mt Marion (Gangfeng, Mineral Resources), Bald Hill (Alita Resources) and Mt Cattlin (Galaxy Resources); as well as the emerging Buldania deposit (Liontown Resources).

# Naming the Cade Pegmatite.

John FJ Cade AO was an Australian psychiatrist credited with discovering the effects of lithium carbonate as a mood stabilizer in the treatment of bipolar disorder.









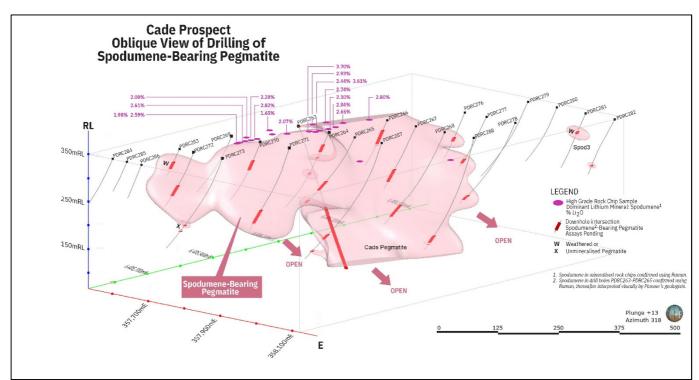


Figure 2: Schematic representation of the Cade pegmatite dyke based on drill intersections. In most intersections (except where marked 'W' or 'X') Pioneer's geologists observed the lithium mineral, spodumene. Spodumene was substantiated for drill holes PDRC263-PDRC265, as it was for earlier rock chips, using Raman spectrometery<sup>3</sup>.

Pioneer's Managing Director David Crook said "The inaugural drilling programme at Dome North has been an unqualified success, identifying the presence of multiple spodumene-bearing pegmatite dykes. This provides the basis for an intensive exploration programme to delineate what we hope will be a substantial group of deposits. With the proceeds from the sale of Sinclair Pollucite, the Company is well funded to advance the Project."

Notes 1-3. The Company provided information in respect of its use of the portable Raman spectrometer to the ASX on 30 July 2019. The Company uses the Raman to assist Company geologists with the identification of a number of minerals including spodumene, however cautions that the Raman does not give an indication of the proportion of spodumene in a drill sample, nor grade.

Drill holes completed are listed in Table 1 below.

Table 1           Preliminary Drill Hole Collar Summary						
Hole ID	East (m)	North (m)	Dip (°)	Azimuth (°)	Depth (m)	Prospect
PDRC263	367,680	6,486,000	-60	90	311	Cade
PDRC264	367,760	6,486,000	-60	180	204	Cade
PDRC265	367,840	6,486,000	-60	180	204	Cade
PDRC266	367,780	6,486,160	-60	180	120	Cade
PDRC267	367,860	6,486,160	-60	180	168	Cade
PDRC268	367,940	6,486,160	-60	180	258	Cade
PDRC269	367,640	6,485,840	-60	180	156	Cade
PDRC270	367,720	6,485,840	-60	180	156	Cade
PDRC271	367,800	6,485,840	-60	180	204	Cade
PDRC272	367,680	6,485,680	-60	180	150	Cade
PDRC273	367,760	6,485,680	-60	180	256	Cade
PDRC274	365,620	6,486,600	-60	180	150	Spod1
Cs Australia's only Caesium producer Upside for Battery Metals: Li, Ni, Co Fully funded Exploration High Impact Projects Proven Explorer with Project delivery						

Table 1 Preliminary Drill Hole Collar Summary						
Hole ID	East (m)	North (m)	Dip (°)	Azimuth (°)	Depth (m)	Prospect
PDRC275	365,660	6,486,600	-60	180	126	Spod1
PDRC276	367,850	6,486,320	-60	180	126	Cade
PDRC277	367,910	6,486,320	-60	180	138	Cade
PDRC278	367,995	6,486,320	-60	180	234	Cade
PDRC279	367,880	6,486,480	-60	180	210	Cade
PDRC280	367,960	6,486,480	-60	180	150	Cade
PDRC281	368,040	6,486,480	-60	180	210	Spod3
PDRC282	368,120	6,486,480	-60	180	150	Spod3
PDRC283	367,640	6,485,680	-60	180	72	Cade
PDRC284	367,600	6,485,520	-60	180	126	Cade
PDRC285	367,640	6,485,520	-60	180	78	Cade
PDRC286	367,680	6,485,520	-60	180	90	Cade
PDRC287	367,910	6,486,000	-60	180	318	Cade
PDRC288	368,020	6,486,160	-60	180	312	Cade
PDRC289	365,440	6,486,520	-60	180	96	Spod1
PDRC290	365,510	6,486,440	-60	180	150	Spod1
PDRC291	365,520	6,486,510	-60	180	66	Spod1

NB.

Interim coordinates and orientations (GDA94-51 grid) are nominal for the drill hole collar setup.

### **About Pioneer Resources Limited**

Having successfully completed its first mining operation at the Sinclair Caesium Mine, and now well-funded through the sale of pollucite, Pioneer returns to being an active explorer focused on key global demand-driven commodities, looking for its next mining opportunity.

The Company operates a portfolio of strategically located lithium, caesium, potassium ("alkali metals"), nickel, cobalt and gold projects in mining regions in Western Australia, plus a high-quality lithium asset in Canada.

**Lithium**: In addition to the Pioneer Dome LCT Project, the Company holds a 51% Project interest in the Mavis Lake Lithium Project, Canada where Company drilling has intersected spodumene.

**Nickel**: The Company owns the Golden Ridge Project which includes the suspended Blair Nickel Sulphide Mine, located between Kalgoorlie and Kambalda, WA. Near-mine target generation is continuing, with the Company announcing a new disseminated nickel sulphide drilling discovery at the Leo's Dam Prospect in 2018, highlighting the prospectivity of the greater project area.

**Gold**: Pioneer's key gold projects are free carried with well credentialed JV partners:

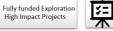
**Acra JV Project** near Kalgoorlie W.A.: Northern Star Resources limited has earned a 75% Project Interest and continues to fully fund exploration programmes until a decision to mine.

**Kangan JV Project** in the West Pilbara W.A: Novo Resources Corp and Sumitomo Corporation will fully fund gold exploration programmes until a decision to mine is made, with Pioneer retaining a significant free-carried position.

**Balagundi JV Project** a new joint venture where Black Cat Syndicate Limited may earn a 75% interest in the Project located at Bulong, near Kalgoorlie, W.A.









#### REFERENCES

Pioneer Dome: Refer Company's quarterly activity reports and announcements to ASX dated 19 May 2016, 27 July 2016, 28 August 2016, 1 September 2016, 4 October 2016, 17 October 2016, 14 November 2016, 2 December 2016, 13 December 2016, 13 January 2017, 24 January 2017, 23 February 2017, 20 March 2017, 22 March 2017, 20 May 2017, 21 February 2018, 19 April 2018, 20 May 2018, 25 July 2018, 26 July 2018, 30 July 2018, 30 August 2018, 8 November 2018 (Mineral Resource update), 28 November 2018, 12 December 2018, 22 January 2019, 1 February 2019, 26 March 2019, 17 April 2019, 27 May 2019, 25 June 2019, 17 July 2019, 30, July 2019, 15 August 2019, 22 August 2019, 23 August 2019, 11 September 2019.

The Company is not aware of any new information or data that materially affects the information included in this Report.

#### **COMPETENT PERSON**

The information in this report that relates to Exploration Results is based on information supplied to and compiled by Mr David Crook. Mr Crook is a full-time employee of Pioneer Resources Limited. Mr Crook is a member of The Australasian Institute of Mining and Metallurgy and the Australian Institute of Geoscientists and has sufficient experience which is relevant to the exploration processes undertaken to qualify as a Competent Person as defined in the 2012 Editions of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'.

The reports listed in the References are available to review on the ASX website and on the Company's website at www.PIOresources.com.au. The Company confirms that it is not aware of any new information or data that materially effects the information included in the original market announcement, and, in the case of estimates of Mineral Resources, that all market assumptions and technical assumptions underpinning the estimates in the relevant market announcement continue to apply and have not materially changed.

#### CAUTION REGARDING FORWARD LOOKING INFORMATION

This Announcement may contain forward looking statements concerning the projects owned or being earned in by the Company. Statements concerning mining reserves and resources may also be deemed to be forward looking statements in that they involve estimates based on specific assumptions.

Forward-looking statements are not statements of historical fact and actual events and results may differ materially from those described in the forward-looking statements as a result of a variety of risks, uncertainties and other factors. Forward-looking statements are inherently subject to business, economic, competitive, political and social uncertainties and contingencies. Many factors could cause the Company's actual results to differ materially from those expressed or implied in any forward-looking information provided by the Company, or on behalf of, the Company. Such factors include, among other things, risks relating to additional funding requirements, metal prices, exploration, development and operating risks, competition, production risks, regulatory restrictions, including environmental regulation and liability and potential title disputes.

Forward looking statements in this document are based on the Company's beliefs, opinions and estimates of the Company as of the dates the forward looking statements are made, and no obligation is assumed to update forward looking statements if these beliefs, opinions and estimates should change or to reflect other future developments.

There can be no assurance that the Company's plans for development of its mineral properties will proceed as currently expected. There can also be no assurance that the Company will be able to confirm the presence of additional mineral deposits, that any mineralisation will prove to be economic or that a mine will successfully be developed on any of the Company's mineral properties. Circumstances or management's estimates or opinions could change. The reader is cautioned not to place undue reliance on forward-looking statements.









#### Appendix: Section 1 - Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

# Dome North Project – Geological Observations of Drill Chips:

Criteria	JORC Code explanation	Commentary
Sampling techniques	<ul> <li>Nature and quality of sampling (eg cut Faces, 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> </ul>	<ul> <li>Industry-standard RC samples from 1m intervals which are taken primarily for laboratory analysis.</li> <li>For this report, geological observations are broadly made and use of a BRAVO Handheld Raman Spectrometer ("Raman") for specific mineral identification is referred to.</li> </ul>
	• Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	• The Raman requires a reference material library which has been developed by the geochemical consultancies, pXRF Services Pty Ltd and Geochemical Services Pty Ltd.
	<ul> <li>Aspects of the determination of mineralisation that are Material to the Public Report.</li> <li>In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.</li> </ul>	<ul> <li>No assays are reported</li> <li>Spodumene identified by Geologist when the sample is logged.</li> <li>Selected samples have had spodumene mineralisation identified using the Raman Spectrometer, operated by pXRF Services</li> </ul>
Drilling techniques	<ul> <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> <li>Reverse circulation drilling using industry standard face sampling tools. Hammer diameter approximately 5 1/4 inches.</li> </ul>
Drill sample recovery	• Method of recording and assessing core and chip sample recoveries and results assessed.	Visual comparison with adjacent bags.
	• Measures taken to maximise sample recovery and ensure representative nature of the samples.	• Booster and auxiliary compressors, face sampling hammer to maximise sample return and exclude or minimise water contamination.
	• 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.	Not measured
Logging	<ul> <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> </ul>	<ul> <li>Drill samples photographed and lithology logged. Includes notes on spodumene occurrence when evident.</li> </ul>
	• Whether logging is qualitative or quantitative in nature. Core (or costean, Face, etc) photography.	Logging is qualitative.
	• The total length and percentage of the relevant intersections logged.	All samples were described.
Sub-sampling techniques and sample preparation	<ul> <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> </ul>	• RC samples are split using a rotary splitter, which is used dry or wet.
	<ul> <li>Quality control procedures adopted for all sub-sampling stages to maximise representability of samples.</li> </ul>	No subsampling undertaken.

Criteria	JORC Code explanation	Commentary
	• 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.	• Field duplicates are taken at the time of primary sampling, and batches are periodically assayed .
	• Whether sample sizes are appropriate to the grain size of the material being sampled.	• 3.5 kg is considered fit for purpose.
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.	• Drill samples are assayed for a range of elements by Industry Standard 4 acid digest, ICP-MS finish, which is considered to be a near total digestion technique.
-	<ul> <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> </ul>	<ul> <li>Spodumene mineralisation has been identified by pXRF Services using a BRAVO Handheld Raman Spectrometer. This work has been in collaboration with Geochemical Services Pty Ltd and is the subject of a company Research and Development project. The company has developed its own reference mineral library for the Bravo Raman of minerals including spodumene from collections including the WA Museum Mineral Collection, private mineral collections and samples from lithium projects sourced from within Australia and overseas. Spectra have been validated using publicly sourced research information (e.g. Charoy, B., Noronha, F. and Lima, A., (2001))</li> </ul>
	<ul> <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>	No quality assurance process employed for information noted here-in.
Verification of sampling and assaying	<ul> <li>The verification of significant intersections by either independent or alternative company personnel.</li> <li>The use of twinned holes.</li> </ul>	<ul><li>Not at this stage of the project development.</li><li>No duplicate rock chip samples were taken.</li></ul>
	• Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	<ul> <li>The Company has a digital SQL database where information is stored.</li> <li>The Company uses a range of consultants to load and validate data; and appraise quality control samples.</li> </ul>
	Discuss any adjustment to assay data.	• The Company does not adjust any assay data, other than to convert 'elemental determinations' to oxides when this is the industry norm i.e. lithium (ppm) to Li <sub>2</sub> O (%)
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.	<ul> <li>Nominal collar locations reported here-in. These will be updated by DGPS by a licenced surveyor at the end of the job.</li> <li>Down-hole surveys by north-seeking gyroscopic tool.</li> </ul>
	Specification of the grid system used.	GDA94 Zone 51.
	Quality and adequacy of topographic control.	Fit for purpose.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	• Orientation drill hole spacings are nominally 160m x 80m. Infill drilling will eventually be at a regular spacing.
	• 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.	• No.
	Whether sample compositing has been applied.	• No.
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	<ul> <li>PDRC263 apparently drilled down a mineralised pegmatite dyke. Subsequent drilling is orientated closer to normal to the mineralised pegmatite.</li> <li>Sampling bias will be considered when Mineral Resource estimations are undertaken.</li> </ul>







Criteria	JORC Code explanation	Commentary
	mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.	
Sample security	The measures taken to ensure sample security.	<ul> <li>The Company uses standard industry practices when collecting, transporting and storing samples for analysis.</li> <li>Rock chip samples: Lab pulps are kept on site and stored in a designated pulp storage container.</li> </ul>
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	<ul> <li>Not undertaken at this early stage</li> </ul>

#### **Appendix: Section 2 - Reporting of Exploration Results**

(Criteria listed in the preceding section also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	<ul> <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</li> </ul>	<ul> <li>The sampling reported herein is within E15/1515, which is a granted exploration licence.</li> <li>The tenement is located approximately 120km S of Kalgoorlie, WA.</li> <li>Title is registered in the name of Pioneer Resources Limited.</li> <li>The exploration licence is within an area of land determined as having exclusive Native Title in favour of the Ngadju People.</li> </ul>
	• 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.	• At the time of this Statement the exploration licence is in Good Standing. To the best of the Company's knowledge, other than industry standard permits to operate there are no impediments to Pioneer's operations within the tenement.
Exploration done by other parties	<ul> <li>Acknowledgment and appraisal of exploration by other parties.</li> </ul>	This report refers to data generated by Pioneer Resources Limited.
Geology	<ul> <li>Deposit type, geological setting and style of mineralisation.</li> </ul>	• LCT pegmatites that are prospective for lithium, caesium, tin, tantalum and rare pegmatite minerals and gemstones.
Drill hole Information	<ul> <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, including easting and northing of the drill hole collar, elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar, dip and azimuth of the hole, down hole length and interception depth plus hole length.</li> <li>If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.</li> </ul>	<ul> <li>Refer to Table 1. Collar data will be updated by a certified surveyor and provided in subsequent releases</li> <li>No assay data is provided in this release as data has not yet been received.</li> </ul>
Data aggregation methods	<ul> <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> </ul>	<ul> <li>Rockchip geochemical results: Individual assays have been reported for each sample, chemical elements have been reported in Table 1 Li ppm and converted to Li<sub>2</sub>O % and other key elements associated with this style of mineralisation.</li> <li>Raman results are of the crystal(s) presented to the spectrometer window.: The mineral is reported as occurring only. No concentration of the mineral is suggested.</li> </ul>

Proven Explorer with Project delivery







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Criteria	JORC Code explanation	Commentary
	• The assumptions used for any reporting of metal equivalent values should be clearly stated.	
Relationship between mineralisation widths and intercept lengths	<ul> <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> <li>Rock chip sampling provides a point at surface and does not relate to any drilling widths or intersections.</li> </ul>
Diagrams	<ul> <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>	• Map in this report. No section is reported as the section and interpretation cannot be completed until analytical results are received.
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.	Not relevant to geological observations.
Other substantive exploration data	<ul> <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>	• All meaningful and material exploration data has been reported.
Further work	<ul> <li>The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).</li> <li>Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.</li> </ul>	<ul> <li>Fences of drill holes, on a nominal 80 x 80m grid are planned to test geochemical and geological targets.</li> </ul>







