



ASX Announcement Review

Sunstone Metals (ASX: STM)

El Palmar gold-copper discovery, northern Ecuador

**Strong assays expand known mineralisation and
confirm higher-grade gold & copper zones**

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EXECUTIVE SUMMARY

The Sunstone Metals (STM) announcement of 29 June 2022 with the title “*El Palmar gold-copper discovery, northern Ecuador, Strong assays expand known mineralisation and confirm higher-grade gold & copper zones*” [the **Announcement**] provides assay results and limited context of six drill holes, EPDD012 to EPDD017 drilled at the El Palmar Project in northern Ecuador.

The selected highlighted assay results of EPDD012, EPDD013, EPDD014, EPDD015, and EPDD017 indicate broad downhole intervals of gold and copper mineralisation.

Hole EPDD012 was drilled to a depth of 1,201.06m to test the main El Palma target. It has identified shallow epithermal gold and copper mineralisation from near surface to a down hole depth of 469.0m. Best results within this interval of mineralisation includes 153.4m at 0.47g/t gold and 0.10% copper associated with the main (and central) El Palmar target. Anomalous levels of gold, copper, molybdenum, lead and zinc are also reported in the deeper intervals of EPDD012, but no specific assay results are provided. It is concluded from this, that there is no significant mineralisation associated with the deeper porphyry target (*otherwise such results would have been provided*).

Hole EPDD013 was drilled to a depth of 611.0m to test the SE margin of the El Palma target and to test a SE satellite target. It has identified shallow epithermal mineralisation over five separate intervals from near surface to a down hole depth of 582.0m associated with the main El Palmar target. Best results within this contiguous interval of mineralisation includes 69.0m at 0.39g/t gold and 0.23% copper. The mineralisation associated with the SE satellite target is generally of a lower grade than that at the surface of this (same) target and to that of the main El Palma target.

Hole EPDD014 was drilled to a depth of 342.0m to test the SW margin of the main El Palma target. It has identified shallow epithermal mineralisation, including a down hole interval of 104.6m at 0.47g/t gold and 0.10% copper associated with the main El Palmar target.

Hole EPDD015 was drilled to a depth of 771.0m to test a central part of the El Palma target. It has identified shallow epithermal mineralisation, including a down hole interval of 211.0m at 0.36g/t gold and 0.15% copper associated with the main El Palmar target.

Hole EPDD016 was drilled to a depth of 974.0m to test a NW part of the El Palma target. There is no reported mineralisation from this hole.

Hole EPDD017 was drilled to a depth of 455.0m to test the SE margin of the El Palma target. It has identified shallow epithermal mineralisation, including a down hole interval of 204.5m at 0.39g/t gold and 0.18% copper associated with the main El Palmar target.

Hole EPDD018 is presumably drilled. With no assay resulted mentioned in the Announcement, it is presumed the hole did not intersect significant mineralisation (*otherwise such results would have been provided*). The part of the El Palma target that this hole has tested is therefore potentially downgraded.



The style and characteristics of the gold and copper mineralisation in these holes is not specifically described in this Announcement [not describing whether the copper for example is associated with veins, veinlets, stockwork, or occurs as disseminations, etc...]. Based on a previous STM announcement of earlier holes drilled at El Palma, the gold and copper mineralisation appears to be associated with near vertical, laterally narrow intrusive quartz-diorite and diorite lobes or dykes.

A total of 19 holes have been completed at El Palmar (with an average hole depth of 653.7m). This drilling has somewhat defined a geological target comprising steeply dipping epithermal gold-copper intrusions with a possible deep porphyry.

The gold and copper grade of the El Palma target is modest, neither negative, nor compelling. It is associated with multiple, narrow near-vertical lobes/dykes. The mineralisation does not appear to form a continuous zone of mineralisation but rather forms near-vertical domains associated the intrusive quartz-diorite and diorite lobes or dykes.

Based on drilling to date, the deeper porphyry target (tested in EPDD012 only) does not appear to host significant mineralisation.

Based on drilling to date, the SE satellite target (tested in EPDD013 only) does appear to host significant mineralisation but at a lower grade than the main El Palma target.

STM draws attention to the giant Alpala gold-copper porphyry deposit which occurs within the same regional structural belt as El Palma. Based only on preliminary drill hole assay results of the Announcement, the gold and copper grades are comparable. There is however a lack of geological evidence in the Announcement to draw any material comparison between the style and characteristics of the mineralisation and deposit type between El Palmar and Alpapa.

GENERAL INFORMATION

STM owns 70% of the El Palmar Gold-Copper Project, with an option to acquire 100%.

The El Palmar Gold-Copper Project is located in northern Ecuador, South America.

STM has completed 19 diamond core holes for a total of 12,421.73m at El Palmar. The average depth of hole is 653.78m. Two additional holes are current (EPDD020) and planned (EPDD021).

ACTIVITIES

The Announcement provides partial assay results of five diamond core drill holes, EPDD012, EPDD013, EPDD014, EPDD015, and EPDD017. Core samples were assayed for 48 elements. Only gold and copper values are provided in the Announcement.

The Announcement also refers to current soil sampling program and to historic rock chip results. The soil sampling is being carried out over areas that have previously been rock chip sampled (101 samples) with an average grade of 1.2g/t gold, 25g/t silver and 0.16% copper.



The Announcement also refers to a Magnetotelluric (MT) survey and 3D-DICP survey, which is ongoing and planned, respectively. These geophysical surveys are being deployed by STM to better define potential deep drill targets at El Palma.

RESULTS

The Announcement discusses assay results of drill holes EPDD012, EPDD013, EPDD014, EPDD015, and EPDD017 drilled the El Palmar Project.

Hole EPDD012 was drilled to a depth of 1,201.06m to test the main El Palma target. EPDD0012 has identified shallow epithermal gold and copper mineralisation from near surface to a down hole depth of 469m. Best results within this interval of mineralisation includes 153.4m at 0.47g/t gold and 0.10% copper. EPDD0012 has also intercepted anomalous levels of gold, copper, molybdenum, lead and zinc at greater depths but no specific assay results are provided.

Hole EPDD013 was drilled to a depth of 611.0m to test the SE margin of the El Palma target and to test a SE satellite target. EPDD013 has identified shallow epithermal mineralisation over five separate intervals from near surface to a down hole depth of 582m. Best results within this contiguous interval of mineralisation includes 69.0m at 0.39g/t gold and 0.23% copper. EPDD013 also intersected gold and copper mineralisation associated with the SE satellite target. Best results within this deeper interval of mineralisation includes 40.5m at 0.12g/t gold and 0.06% (or 600ppm) copper.

Hole EPDD014 was drilled to a depth of 342.0m to test the SW margin of the main El Palma target. EPDD0014 has intersected shallow epithermal mineralisation, including a down hole interval of 104.6m at 0.47g/t gold and 0.10% copper.

Hole EPDD015 was drilled to a depth of 771.0m to test a central part of the El Palma target. EPDD0015 has intersected shallow epithermal mineralisation, including a down hole interval of 211.0m at 0.36g/t gold and 0.15% copper.

Hole EPDD016 was drilled to a depth of 974.0m to test a NW part of the El Palma target. There is no reported mineralisation from this hole.

Hole EPDD017 was drilled to a depth of 455.0m to test the SE margin of the El Palma target. EPDD0017 has intersected shallow epithermal mineralisation, including a down hole interval of 204.5m at 0.39g/t gold and 0.18% copper.

The Announcement does not refer to results of drill hole EPDD018 though in Figure 1 it has been drilled and completed to a depth of 801m.

The Announcement refers to the identification of native copper in EPDD019 with local chalcopyrite and bornite. The Announcement also refers to [presumably visual] copper mineralisation at depth in EPDD020. At the time of writing the Announcement STM had not received the assay results of these holes.



TABLES & FIGURES

This announcement provides two tables containing: mineralised intervals in holes EPDD012, EPDD013, EPDD014, EPDD015, and EPDD017 (Table 1 – copied unmodified below); and drill hole details of the holes drilled at the El Palmar Projects (Table 2 - copied unmodified below).

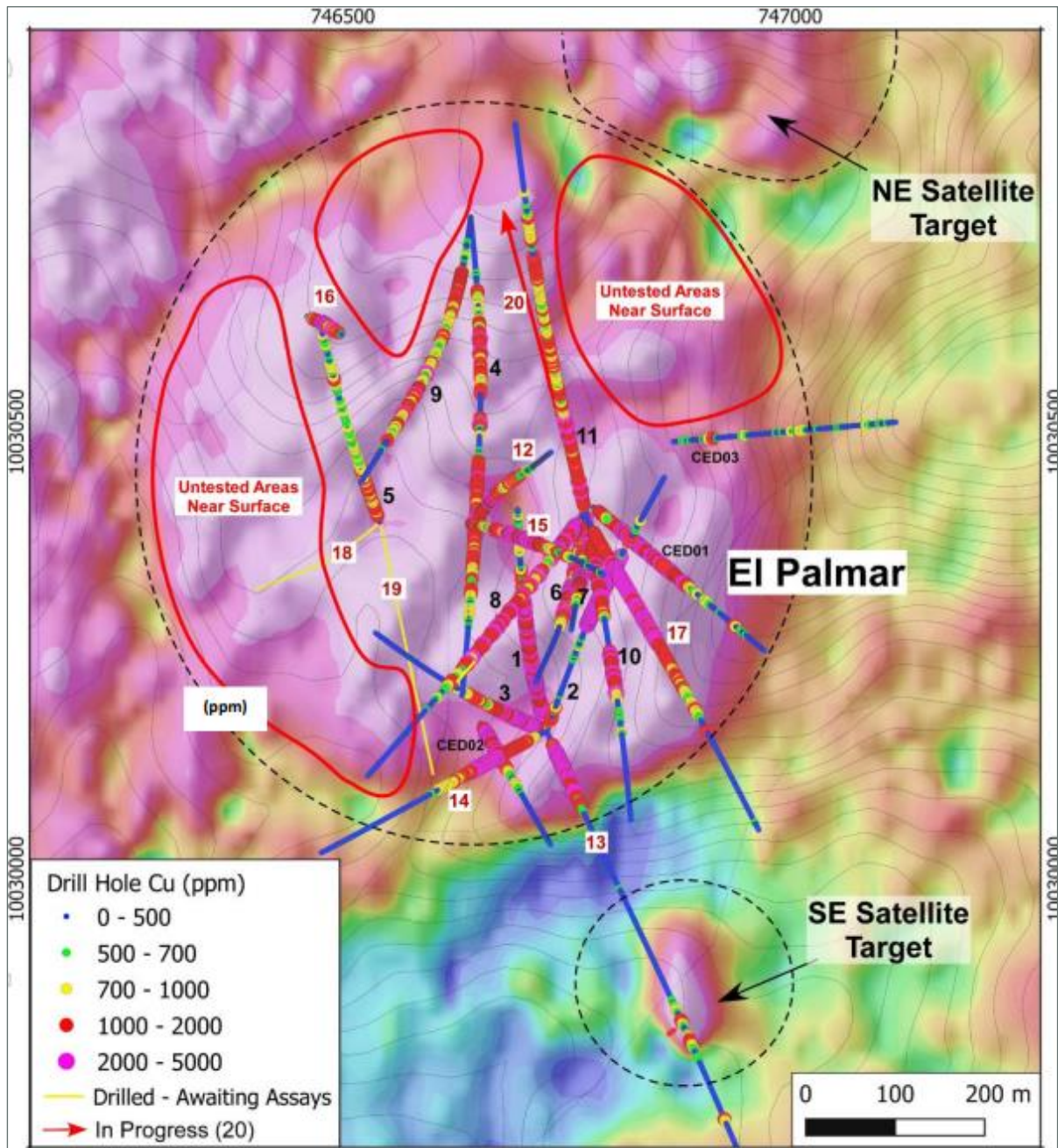
Drill Hole	EOH (m)	From (m)	To (m)	Interval (m)	Au (g/t)	Cu (%)	Mo (ppm)	Ag (g/t)
EPDD012	1201.06	6.10	469.00	462.90	0.34	0.10	3.05	0.41
	<i>Incl</i>	6.10	159.50	153.40	0.47	0.10	1.6	0.6
	<i>Incl</i>	88.00	120.95	32.95	0.92	0.16	1.7	0.7
	<i>and</i>	203.00	225.50	22.50	0.45	0.10	8.4	0.5
		501.00	545.00	44.00	0.16	0.08	4.9	0.2
EPDD013	611	29.00	98.00	69.00	0.39	0.23	2.7	0.6
	<i>Incl</i>	29.00	47.00	18.00	0.64	0.23	1.2	0.7
		282.00	288.90	6.90	0.13	0.02	1.8	0.4
		402.00	442.50	40.50	0.12	0.06	7.9	0.4
		450.50	461.10	10.60	0.11	0.08	7.5	1.4
		554.00	582.00	28.00	0.22	0.05	2.7	0.5
EPDD014	342	15.00	119.60	104.60	0.45	0.15	1.0	1.2
	<i>Incl</i>	24.00	73.76	49.76	0.67	0.12	1.3	1.7
	<i>Incl</i>	24.00	58.58	34.58	0.72	0.11	1.3	1.9
EPDD015	771	6.00	150.50	144.50	0.27	0.08	1.8	0.6
		198.00	503.00	305.00	0.29	0.13	4.2	0.4
	<i>Incl</i>	198.00	409.00	211.00	0.36	0.15	3.6	0.5
	<i>Incl</i>	225.00	260.00	35.00	0.49	0.18	5.0	0.6
	<i>and</i>	292.00	362.25	70.25	0.36	0.18	3.6	0.5
		553.00	557.00	4.00	0.29	0.13	21.2	0.4
EPDD017	455	25.50	230.00	204.50	0.39	0.18	1.9	0.9
	<i>Incl</i>	73.00	194.00	121.00	0.46	0.22	2.1	1.0
		354.00	358.00	4.00	0.37	0.02	9.7	0.3

Original Table 1 of the Announcement.

The announcement also provides four figures: various drill hole location plans (Figures 1 and 2) and regional project location plans (Figures 3 and 4).

Figure 1 is a drill hole location plan showing colour-coded copper assays results on a total magnetics plan. This figure is useful in showing the drill coverage and copper values, projected to surface, in relation to the magnetic signature of the El Palmar, SW Satellite and NW satellite targets.





Original Figure 1 of the Announcement (unmodified).

Figure 2 is a drill hole location plan showing coloured-coded copper and arsenic assays results on a copper results soil sampling plan (with current and future soil sample locations). This figure is useful in showing the clear correlation between surface copper anomalism and the presence of the El Palmar target.

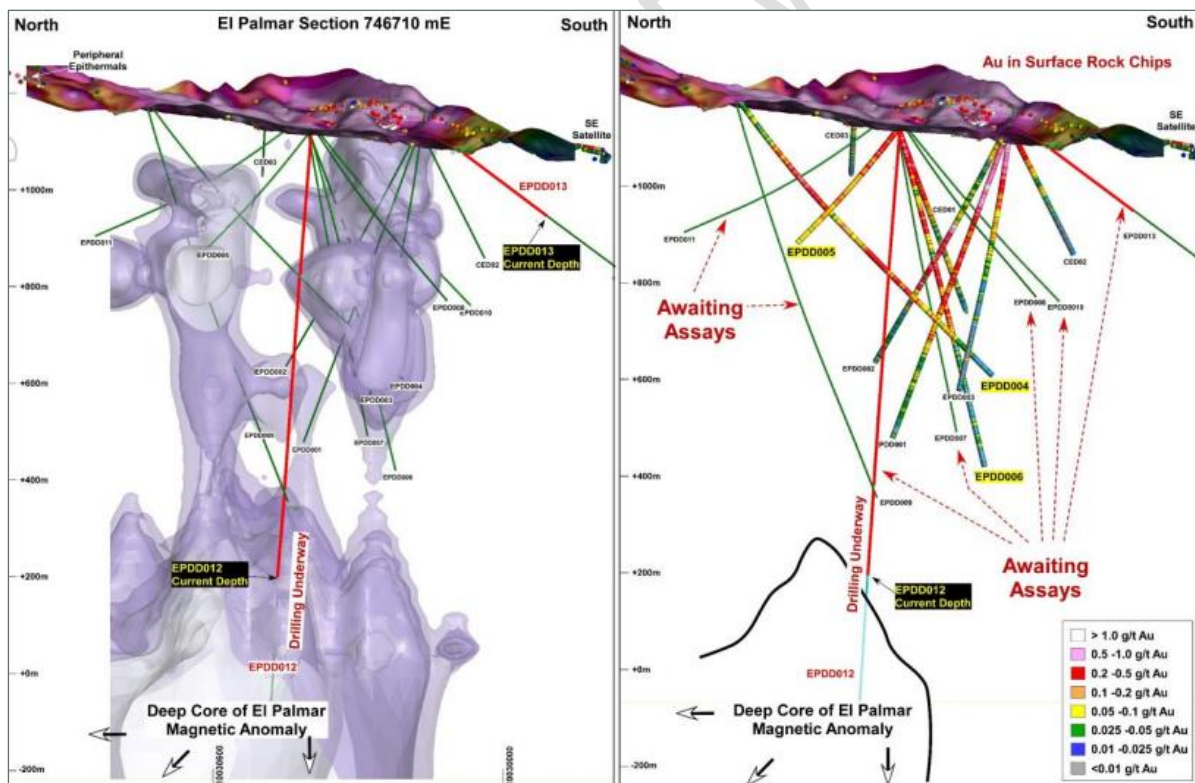


SIGNIFICANCE OF RESULTS

STM have now drilled 19 diamond core holes into the El Palma target and satellite targets for a total of 12,421.73 metres. El Palma is circular in shape (plan view) with a diameter of approximately 750m. The average depth of the completed holes is 653.78m. The drill hole density (number of holes drilled per unit area) is approaching the point of being adequate in terms of providing a possible JORC compliant Exploration Target (*Australasian Code for Reporting of Exploration Results, Minerals Resources and Ore Reserves, The JORC Code 2012*). Should analysis of the grades prove positive, look to STM for providing this in the near-future.

The gold and copper epithermal mineralisation resulted in the Announcement appears to be related to multiple near-vertical intrusions. No specific detail of how the mineralisation occurs has been provided.

The deep porphyry target drilled in EPDD012 appears not to contain significant mineralisation as no assay results of this part of EPDD012 are mentioned in the Announcement. The figure provided unmodified below appears in a previous STM announcement (23 February 2022). It shows the drill coverage of EPDD012.



Original Figure 5 of the STM ASX announcement dated 23 February 2022. This diagram is unmodified.

The SE satellite target drilled in PDD0013 appears to contain marginally lower grade gold and copper mineralisation as compared to the main El Palma target.



That part of the El Palma target that was tested by EPDD018 does not appear to contain significant mineralisation. This hole has been drilled (Refer to Table 2 of the Announcement) but no reference to assay results is made in the Announcement.

STM draws attention to the giant Alpala gold-copper porphyry deposit which occurs within the same regional structural belt as El Palma. Alpala has a measured and indicated mineral resource estimate of 2,663 Mt tonnes at 0.25g/t gold, 0.37% copper and 1.08g/t silver.

Based only on preliminary drill hole assay results of the Announcement, the gold and copper grades at El Palma are comparable (in value) to the grades presented in the Alpapa resource table. The similarity of the tenor of grade between El Palma and Alpapa is highly encouraging.

There is general lack of geological evidence in the Announcement to draw any material comparison between the style and host of mineralisation and deposit type of El Palmar and Alpapa.

SUMMARY SNAPSHOT

STM's El Palma Project hosts the El Palmar Target (and two satellite targets) that hosts modest grade gold and copper epithermal mineralisation associated with a near-vertical narrow quartz and quartz-diorite dyke swarm that has a corresponding circular magnetic signature 750m in diameter. Drilling is still required to identify a possible mineralised porphyry rootzone. The NE target and other areas with surface mineralisation elsewhere in the project area requires drill testing.

WHAT MIGHT COME NEXT

STM refers to a current hole, EPDD020 and a planned future hole EPDD021 in the Announcement. It will be reasonable to assume that news of these holes will be made available relatively soon.

As well as the continuation of the drilling program, STM has referred to several ongoing programs being conducted at the El Palma Project. These include:

- Geological modelling.
- Soil sampling.
- Interpretation of the MT survey data and integration of the magnetic models.
- A 3D-DCIP (geophysical) survey.

It is reasonably expected that results from these programs will filter through to ASX announcements during the year as and when each program is completed.



SUGGESTED QUESTIONS TO ASK MANAGEMENT

- ❓ What are the silver grades of the drilling at El Palmar?
- ❓ What are molybdenum grades of the drilling El Palmar?
- ❓ Are there any other elements of potential economic interest occurring at El Palmar?
- ❓ When will the metallurgy results be completed? And made available?
- ❓ When will the soil sample results be ready?
- ❓ When will the geophysical survey results be ready?
- ❓ Does STM intend further evaluating the deeper porphyry target? The NE satellite target? Or any yet undrilled part of the main El Palmar target? If so, when?
- ❓ How much more drilling will be required before a possible JORC-compliant Exploration Target (Chapter 17) may be defined? And released to the market?
- ❓ Has there been any age-dating of El Palmar mineralisation? If so, what are the results?



COMPETENT PERSON STATEMENT

The comments made in this review, which are based on information contained in ASX-listed exploration companies' activities, reported in publicly available ASX announcements, are compiled by Mr Ross Brown BSc (Hons), MAusIMM, SEG, senior exploration consultant, sole director of Riviere Minerals Pty Ltd (Riviere), who has been a Member of the Australasian Institute of Mining and Metallurgy since 1986. Mr Brown has sufficient experience, which is relevant to the exploration activities, style of mineralisation and types of deposits under review, and to the exploration activity which has been undertaken, to qualify as a Competent Person as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Mr Brown is not an employee of the company's announcement subject of this review.

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KEY WORDS AND PHRASES

Mineralisation: A general term describing the process or processes by which a mineral or minerals are introduced into a rock, or geological feature such as a vein, fault, etc. In the strictest sense, mineralisation does not necessarily involve a process or processes involving ore-forming minerals. Nevertheless, mineralisation is very commonly used to describe a process or processes in which Ore-forming Minerals are introduced into a rock at concentrations that are economically valuable or potentially valuable.

Ore-forming Minerals: Minerals which are economically desirable, as contrasted to Gangue Minerals.

Gangue Minerals: Valueless minerals in ore.

Porphyry [Deposit]: A type of deposit containing ore-forming minerals occurring as disseminations and veinlets in a large volume of rock. The rock is typically porphyritic (a texture of large crystals in a fine groundmass). Porphyry deposits are economically significant.

Target: A non-mining, informal term taken to mean an area of specific interest that warrants further exploration.

Domain: A non-mining informal term taken to mean to a zone or part of mineralisation with a specific type.

Chalcopyrite: A copper iron sulphide (and ore-forming mineral) with the chemical formula $CuFeS_2$ with 34.63% Cu by mol. weight. In other words, a piece of drill core with 1% chalcopyrite has the equivalent of 0.346% copper.

Bornite: A copper iron sulphide (and ore-forming mineral) with the chemical formula Cu_5FeS_4 with 63.31% Cu by mol. weight. In other words, a piece of drill core with 1% bornite has the equivalent of 0.633% copper.

“Sheeted Quartz Veining”: Sheet like, often repeating, vein structures comprising quartz, which is a gangue mineral associated with hydrothermal activity.

Metallurgical Results / Metallurgy: The science, or process, of separating metals from their ores by mechanical and/or chemical means. The results, or recoveries, are often expressed as percentages of the original content. The recovery of 1 gram of gold from a tonne of ore that has a grade 2g/t gold is a recovering of 50%.

Gold-equivalent: means the value of gold and other metals expressed as gold ounces at the price of gold and the other metals at the time of feasibility. Unless metallurgical studies are completed (determining recovery rates of the metals of an ore) metal equivalents, including gold equivalents, are not permitted to be used in reporting assay results and/or mineralised intervals.

“Maiden JORC Mineral Resource Estimate”: An informal term taken to mean the company’s first JORC compliant Mineral Resource and estimates of its size (tonnage) and grade. The AusIMM 2012 JORC Mining Code defines various forms of Minerals Resource.



“Regional structural belt”: An informal term taken to mean a specific area that shares very large-scale structural features, including similarly orientated faults, sheers and/or folds.

Stockwork: A mineral deposit in the form of a network of veinlets diffused in the country rock.

“Geological Modelling” [also Exploration Model]: An informal term taken here to mean a framework of understanding of the geological setting of a deposit and exploration development of the deposit. A geological model is often used to represent a deposit for the purposes of illustration and exploration planning.

Intrusion / Intrusive: The process of emplacement of magma in pre-existing rock.

Fault: A surface or zone of rock fracture along which there has been displacement.

Geochemistry and “geochemical signatures”: The study of the distribution and amounts of the chemical elements in minerals, ores, rocks, soils, water and the atmosphere. Geochemical sampling programs may include stream sampling, soil sampling, rock chip sampling.

Alteration cap [also lithocap]: A term used to describe subsurface, broadly strata bound alteration domains that are laterally and vertically extensive. Alteration or lithocaps often form above preserved porphyry system and may contain economic concentrations of ore-forming minerals.

“Peak values”: An informal, non-statistical, term simply meaning the highest value of the population of results the subject of discussion.

Magnetotelluric (MT) survey: A geophysical exploration method that measures the natural electric and magnetic fields of the earth over a certain area. The benefit of MT is that it can measure and interpret the electric fields (resistivity for example) to tens of kilometres depth. This is useful for mineral systems that have deep roots, such as porphyry systems.

Magnetic model(s): A model that provides a framework of understanding, often as a 2D or 3D shape of magnetic data.

3D-DCIP survey: Distributed array Induced Polarization is a geophysical exploration method that acquires measuring resistivity and IP using a data simultaneously on a network of orthogonal receiver dipoles laid out over the survey area, rather than a unidirectional array of receivers.

Soil sampling: An exploration method to obtain geochemical data from the [upper] soil profile. This program type is often deployed over a grid, grid sampling, which may cover very large areas or very small area. It is usually deployed over targets relatively well defined.

Rock chip sampling: An exploration method to obtain geochemical data from rock outcrop. This program type is often deployed as part of reconnaissance exploration [mapping and sampling] but may also be deployed over targets that are relatively well defined.

Anomalism: An informal term referring to data (and the location of that data), whether it be assay data, geophysical data, which is sufficiently different from the rest of a data from the same dataset.





Epithermal [gold system]: Said of hydrothermal processes occurring at temperatures ranging from 50°C to 200°C, and within 1,000m of the Earth's surface. An epithermal gold system is an area/zone of rock that hosts gold mineralisation formed at these temperatures.

SAMPLE REVIEW ONLY

