

# **DOOLGUNNA PROJECT – EXPLORATION UPDATE**

**ANDFIRE** RESOURCES NL

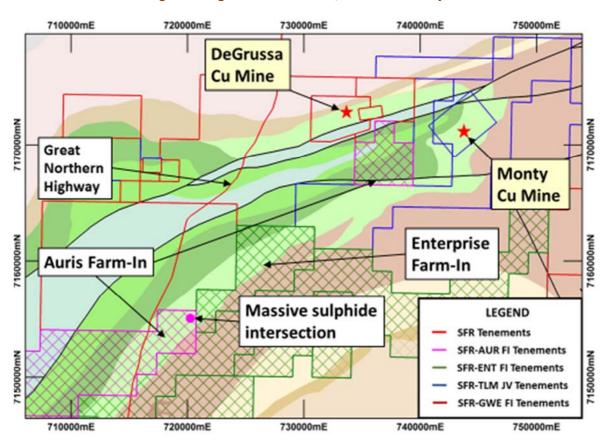
Assays from recent Aircore drilling confirm prospectivity of new VMS corridor at Morck's Well

Sandfire Resources NL (ASX: **SFR**; "Sandfire") advises that it has received assay results for the recently reported Aircore (AC) drill holes which intersected narrow zones of sulphide and supergene copper mineralisation at the Morck's Well Project, part of its Farm-in with Auris Minerals Limited (ASX: AUR; "Auris") and Fe Limited (ASX: FEL; "Fe Limited"). Significant results included:

- MWAC0109 **11m at 3.5% Cu from 73m** including **3m at 9.5% Cu from 81m**
- MWAC0111 6m at 1.3% Cu from 112m including 1m at 4.5% Cu from 113m
- MWAC0112 9m at 2.3% Cu from 146m including 3m at 5.7% Cu from 149m

While the high-grade intersections returned from these AC holes are narrow, the overall tenor and grade of the mineralisation encountered is encouraging and supports continued exploration along this corridor. All intercept length's are down hole, true widths are not known.

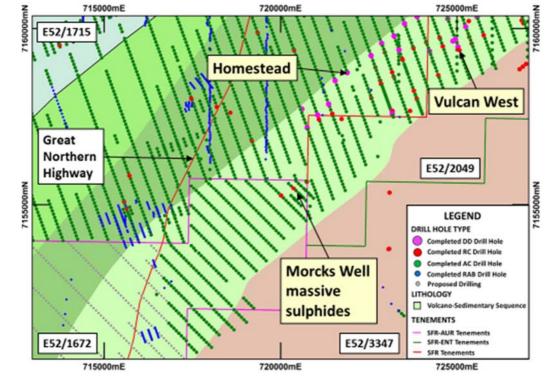
Morck's Well is located ~22km south-west of the DeGrussa Copper Mine in Western Australia. The project area also extends into the Farm-in with Enterprise Metals Limited (ASX: ENT; "Enterprise") (see Figures 1 and 5). Sandfire is progressing a systematic and multi-pronged exploration program across this corridor, with two additional Reverse Circulation (RC) drill-holes completed, each of which have also had Downhole Electromagnetic (DHEM) surveys completed.



#### Figure 1: Regional Location Plan, Morck's Well Project.

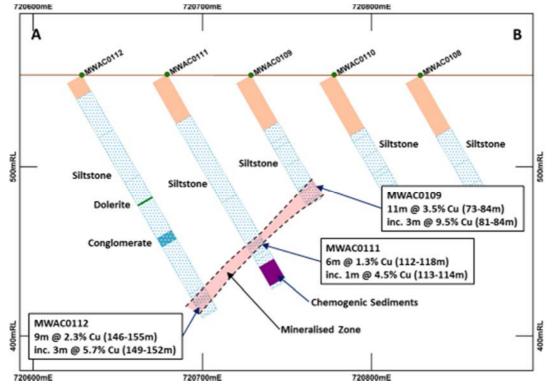
## Assay Results for Recent Sulphide Intersections

Summary assay results for AC holes MWAC0109, MWAC0111, and MWAC0112 (Figure 2) are shown in Table 1 and Figure 3 below with full assay tables available in Appendix 1. For full details of holes MWAC0109, MWAC0111, and MWAC0112 refer ASX release of 15<sup>th</sup> May 2018, "Doolgunna Project Exploration Update").









### Table 1: AC Drilling Significant Assays.

						ntersectior	)	
Hole ID	From (m)	To (m)	Interval (m)	Cu (%)	Au (ppm)	Zn (ppm)	Pb (ppm)	Ag (ppm)
MWAC0109	73	84	11	3.5	0.3	709	142	2.6
Including	81	84	3	9.5	0.8	392	183	7.6
MWAC0111	112	118	6	1.3	0.8	703	155	2.1
Including	113	114	1	4.5	4.1	606	323	10.2
MWAC0112	146	155	9	2.3	0.4	1,408	357	3.5
Including	149	152	3	5.7	0.8	1,428	769	8.5

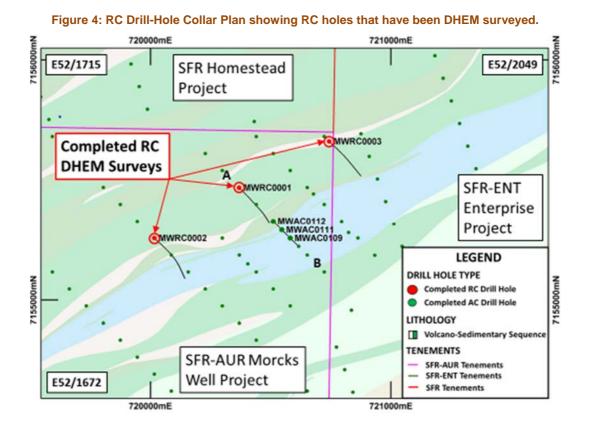
Notes:

- All widths are down-hole, true widths are not known.
- Sandfire cautions that these results are indicative due to being AC samples and the sampling method employed in this style of drilling.
- Data aggregation methodology: calculation based on a 0.5% cut-off, less than 3m of internal dilution and a minimum composite grade of 1% Cu. Cu (%), Au (ppm), Ag (ppm) are rounded to one decimal point. Zn (ppm), Pb (ppm) have no rounding.

# **Ongoing Exploration Activities**

Since the last ASX announcement (25<sup>th</sup> May 2018), Sandfire has continued to aggressively explore the newly-identified VMS corridor along strike from these initial AC results. Following the first deep Reverse Circulation (RC) drill-hole, MWRC0001, a further two deep RC holes have been completed (see ASX release 25<sup>th</sup> May 2018, "Doolgunna Project Exploration Update").

MWRC0002 was drilled 400m south-west of MWRC0001; and MWRC0003 was drilled 400m north-east of MWRC001 (see Figure 4). The holes were completed to a down-hole depth of 448m and were subsequently DHEM surveyed. No anomalous EM response was observed in the DHEM surveys of MWRC0002 or MWRC0003.



MWRC0002, which was collared in dolerite, intersected an upper sedimentary sequence consisting of interbedded mafic breccia, siltstone and basalt (55-196m) before passing through a lower chlorite altered succession of intercalated siltstone and magnetite-rich chemogenic sediments with minor jasper (196-344m). The drill hole was terminated in footwall dolerite (344-448m).

MWRC0003 was collared in the Auris farm-in tenure and entered into the Enterprise Farm-in tenure at roughly 70m depth. The hole intersected siltstone (14-36m) and dolerite (36-340m) before penetrating the mafic breccia unit (340-419m) and terminating in chloritically altered siltstone to EOH (419-448m).

Assays for all RC holes completed on the project to date are pending. Geological logging has not identified any significant sulphide mineralisation.

Aircore drilling is also continuing on the Morck's Well Project and along strike into the Enterprise Farm-In area. Morck's Well is located south-west of Sandfire's 100%-owned Homestead Prospect and the neighbouring Vulcan West Project (SFR-ENT farm-in) (see Figures 1, 2 and 5).

The geological interpretation will be updated as exploration continues and will be used for further targeting in the area. Preliminary drilling has defined an area of geological interest that will be intensively targeted by AC, RC and diamond drilling, supported by multi-element geochemistry, surface and down-hole geophysics.

Sandfire may earn a 70% interest in the Morck's Well Project by the definition of at least 50,000 tonnes of copper contained in a declared JORC Mineral Resource on which it completes a Feasibility Study (for full details of the agreement please see ASX release 27<sup>th</sup> February 2018, "Sandfire Farm-in to Morck's Well East and Doolgunna").

This Project forms part of Sandfire's Greater Doolgunna Project, comprising of a package of 6,276 square kilometres of contiguous tenements surrounding the DeGrussa Copper Mine (Figure 5).

Details and coordinates of the RC drill holes completed by Sandfire at the project to date are provided below.

Hole_ID	EOH Depth	Dip	Azimuth	Grid_ID	East	North	RL	Lease ID	Hole Status
MWRC0001	448m	-60°	135°	MGA94_50	720,369	7,155,469	555	E52/1672	Complete
MWRC0002	448m	-60°	135°	MGA94_50	720,015	7,155,258	556	E52/1672	Complete
MWRC0003	448m	-60°	135°	MGA94_50	720,743	7,155,662	554	E52/1672	Complete

# Table 2: Drill-hole Information Summary, Morck's Well Project.

### ENDS

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#### Competent Person's Statement – Exploration Results Doolgunna

The information in this report that relates to Exploration Results at Doolgunna is based on information compiled by Mr Shannan Bamforth who is a Member of The Australasian Institute of Mining and Metallurgy. Mr Bamforth is a permanent employee of Sandfire Resources and has sufficient experience that is relevant to the style of mineralization and type of deposit under consideration and to the activity which he is undertaking to qualify as Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr Bamforth consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

#### Exploration and Resource Targets

Any discussion in relation to the potential quantity and grade of Exploration Targets is only conceptual in nature. While Sandfire is confident that it will report additional JORC compliant resources for the DeGrussa Project, there has been insufficient exploration to define mineral resources in addition to the current JORC compliant Mineral Resource inventory and it is uncertain if further exploration will result in the determination of additional JORC compliant Mineral Resources.

#### **Forward-Looking Statements**

Certain statements made during or in connection with this statement contain or comprise certain forward-looking statements regarding Sandfire's Mineral Resources and Reserves, exploration operations, project development operations, production rates, life of mine, projected cash flow, capital expenditure, operating costs and other economic performance and financial condition as well as general market outlook. Although Sandfire believes that the expectations reflected in such forward-looking statements are reasonable, such expectations are only predictions and are subject to inherent risks and uncertainties which could cause actual values, results, performance or achievements to differ materially from those expressed, implied or projected in any forward looking statements and no assurance can be given that such expectations will prove to have been correct. Accordingly, results could differ materially from those set out in the forward-looking statements as a result of, among other factors, changes in economic and market conditions, delays or changes in project development, success of business and operating initiatives, changes in the regulatory environment and other government actions, fluctuations in metals prices and exchange rates and business and operational risk management. Except for statutory liability which cannot be excluded, each of Sandfire, its officers, employees and advisors expressly disclaim any responsibility for the accuracy or completeness of the material contained in this statement and excludes all liability whatsoever (including in negligence) for any loss or damage which may be suffered by any person as a consequence of any information in this statement or any error or omission. Sandfire undertakes no obligation to update publicly or release any revisions to these forward-looking statements or eflect events or circumstances after today's date or to reflect the occurrence of unanticipated events other than required by the Corporations Act and ASX Listing Rules. Accordingly you should not place

#### **JORC Compliance Statement**

A summary of the information used in this release is as follows.

The DeGrussa VHMS (volcanic-hosted massive sulphide) copper-gold deposit is located 900 kilometres north of Perth and 150 kilometres north of Meekatharra in the Peak Hill Mineral Field. The system is hosted within a sequence of metasediments and mafic intrusions situated in the Bryah Basin that have been metamorphosed and structurally disrupted.

The sulphide mineralisation consists of massive sulphide and semi-massive sulphide mineralisation. Primary sulphide minerals present are pyrite, chalcopyrite, pyrrhotite and sphalerite, together with magnetite. The sulphide mineralisation is interpreted to be derived from volcanic activity. The deposit shares characteristics with numerous VHMS deposits worldwide.

DeGrussa is located wholly within Mining Lease 52/1046. This tenement is subject to the Yugunga-Nya (WC99/046) and Gingirana Claims (WC06/002). A Land Access Agreement was executed with both claimant groups in November 2010. Sandfire is required to make royalty payments to the State and affected Native Title Claimants on a periodical basis.

Drilling of the DeGrussa massive sulphide lens (of which there are four defined lenses of mineralisation) and surrounding area is by diamond drill holes of NQ2 diameter core and, to a lesser extent, by Reverse Circulation (RC) face sampling hammer drilling. The nominal drill-hole spacing is less than 80m x 40m in the inferred areas of the Mineral Resource and increases in density as the classification increases to Measured where nominal 13m x 20m drill hole spacing is achieved. Drilling has been by conventional diamond drilling with a small number holes aided by the use of navigational drilling tools. RC drilling was completed with a nominal 140mm face sampling hammer and split on a cone or riffle splitter. Drill-hole collar locations were surveyed using RTK GPS, and all holes were down-hole surveyed using high speed gyroscopic survey tools.

Sampling of diamond core was based on geological intervals (standard length 0.5 m to 1.3 m). The core was cut into half or quarter (NQ2) to give sample weights up to 3 kg. RC samples were 1.0m samples down-hole, with sample weights between 3.5kg and 7kg depending on material type. Field quality control procedures involved assay standards, along with blanks and duplicates. These QC samples were inserted at an average rate of 1:15.

The sample preparation of diamond core involved oven drying, coarse crushing of the core sample down to ~10 mm followed by pulverisation of the entire sample to a grind size of 90% passing 75 micron. A pulp sub-sample was collected for analysis by either four acid digest with an ICP/OES, ICP/MS (multi element) finish or formed into fused beads for XRF determination on base metals and a fire assay for Au.

All reported assays have been length weighted. No top-cuts have been applied. A nominal 0.3% Cu lower cut-off is applied. High grade intervals internal to broader zones of sulphide mineralisation are reported as included intervals.

The attitude of the ore bodies at DeGrussa is variable but there is a dominant southerly dip from ~40 to 90 degrees flat-lying and is drilled to grid west with drill holes inclined between -60 and -90 degrees. As such the dominant hole direction is north and with varying intersection angles all results are clearly defined as either down hole or approximate true width.

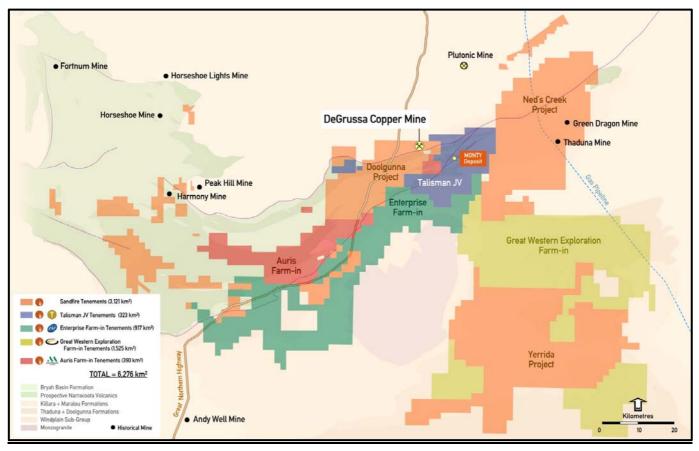
Density of the massive sulphide orebody ranges from 2.8g/cm3 to 4.9g/cm3, with an average density reading of 3.7g/cm3. Geotechnical and structural readings recorded from diamond drilling include recovery, RQD, structure type, dip, dip direction, alpha and beta angles, and descriptive information. All data is stored in the tables Oriented Structure, Geotechnical RQD, Core Recovery, Interval Structure as appropriate.

A suite of multi-element assays are completed on each mineralised sample and include all economic and typical deleterious elements in copper concentrates. This suite includes Cu, Au, Ag, Zn, Pb, S, Fe, Sb, Bi, Cd and As.

Regional drilling has been completed using a combination of RC and AC drilling. A majority of the drilling is preliminary in nature and starts with 800m x 100m AC drilling where the geology and geochemistry is evaluated to determine the requirement for follow 400m x 100m drilling. If significant anomalism is identified in the AC drilling then follow up RC drilling will be conducted to determine the opportunity for delineating potentially economic mineralisation. Whist the main aim of the exploration at Doolgunna is to identify additional VHMS mineralisation in some areas of regional land holding it is currently the interpreted that there is shear zones located on the contact between dolerite and sediments hosting auriferous quartz vein stockworks with some coincident copper.

AC and RC regional samples are prepared at Ultra Trace in Perth with the original samples being dried at 80° for up to 24 hours and weighed, and Boyd crushed to -4mm. Samples are then split to less than 2kg through linear splitter and excess retained. Sample splits are weighed at a frequency of 1/20 and entered into the job results file. Pulverising is completed using LM5 mill to 90% passing 75%µm. Assaying is completed using a Mixed 4 Acid Digest (MAD) 0.3g charge and MAD Hotbox 0.15g charge methods with ICPOES or ICPMS. The samples are digested and refluxed with a mixture of acids including Hydrofluoric, Nitric, Hydrochloric and Perchloric acids and conducted for multi elements including Cu, Pb, Zn, Ag, As, Fe, S, Sb, Bi, Mo. The MAD Hotbox method is an extended digest method that approaches a total digest for many elements however some refractory minerals are not completely attacked. The elements are then determined by ICPOES or ICPMS finish. Samples are analysed for Au, Pd and Pt by firing a 40g of sample with ICP AES/MS finish.

### Figure 5: Sandfire's Greater Doolgunna Project showing 100% owned tenure and farm-in joint ventures including Auris Minerals Ltd Farm-in.



# Appendix 1: MWRC0001-3 Assays

Table 1: Down-hole laboratory assay table.

	From	То				Intersectior	)	
Hole_ID	(m)	(m)	Interval	Ag_ppm	Au_ppb	Cu_ppm	Pb_ppm	Zn_ppm
MWAC0109	0	1	1	BDL	1	34	7	49
MWAC0109	1	2	1	BDL	1	32	7	34
MWAC0109	2	3	1	BDL	2	33	8	33
MWAC0109	3	4	1	BDL	2	45	9	34
MWAC0109	4	5	1	BDL	3	48	8	42
MWAC0109	5	6	1	BDL	3	43	7	21
MWAC0109	6	7	1	BDL	2	44	9	15
MWAC0109	7	8	1	BDL	3	23	11	7
MWAC0109	8	9	1	BDL	2	22	12	6
MWAC0109	9	10	1	BDL	2	21	12	5
MWAC0109	10	11	1	BDL	3	23	11	5
MWAC0109	11	12	1	BDL	4	23	11	9
MWAC0109	12	13	1	BDL	7	23	11	4
MWAC0109	13	14	1	BDL	4	27	10	5
MWAC0109	14	15	1	BDL	5	23	9	4
MWAC0109	15	16	1	BDL	1	42	10	29
MWAC0109	16	17	1	0.1	4	14	4	7
MWAC0109	17	18	1	0.05	6	12	4	6
MWAC0109	18	19	1	BDL	7	13	4	3
MWAC0109	19	20	1	BDL	8	15	5	2
MWAC0109	20	21	1	0.15	6	20	6	2
MWAC0109	21	22	1	BDL	3	25	10	3
MWAC0109	22	23	1	BDL	3	28	14	5
MWAC0109	23	24	1	BDL	2	49	12	5
MWAC0109	24	25	1	BDL	5	84	8	3
MWAC0109	25	26	1	BDL	6	94	9	3
MWAC0109	26	27	1	BDL	4	111	16	2
MWAC0109	27	28	1	BDL	2	81	11	6
MWAC0109	28	29	1	BDL	2	114	12	13
MWAC0109	29	30	1	0.05	1	169	9	7
MWAC0109	30	31	1	0.1	14	782	14	93
MWAC0109	31	32	1	BDL	3	924	25	194
MWAC0109	32	33	1	0.05	12	930	28	116
MWAC0109	33	34	1	BDL	BDL	244	12	21
MWAC0109	34	35	1	BDL	BDL	268	11	14
MWAC0109	35	36	1	BDL	BDL	251	9	12
MWAC0109	36	37	1	BDL	4	214	11	11
MWAC0109	37	38	1	BDL	BDL	178	10	10
MWAC0109	38	39	1	BDL	BDL	313	12	28
MWAC0109	39	40	1	BDL	BDL	241	19	11
MWAC0109	40	41	1	BDL	BDL	384	24	18
MWAC0109	41	42	1	BDL	2	229	12	10
MWAC0109	42	43	1	BDL	3	631	19	33
MWAC0109	43	44	1	BDL	2	609	13	31
MWAC0109	44	45	1	BDL	5	931	11	62

	From	То				Intersection	n	
Hole_ID	(m)	(m)	Interval	Ag_ppm	Au_ppb	Cu_ppm	Pb_ppm	Zn_ppm
MWAC0109	45	46	1	0.05	3	1010	6	49
MWAC0109	46	47	1	0.2	1	676	4	31
MWAC0109	47	48	1	0.4	BDL	412	2	23
MWAC0109	48	49	1	0.25	BDL	405	2	21
MWAC0109	49	50	1	0.1	BDL	613	2	30
MWAC0109	50	51	1	BDL	1	814	2	40
MWAC0109	51	52	1	0.15	BDL	834	2	50
MWAC0109	52	53	1	0.05	BDL	512	2	32
MWAC0109	53	54	1	BDL	BDL	525	2	28
MWAC0109	54	55	1	0.1	BDL	767	2	33
MWAC0109	55	56	1	0.1	2	1100	3	59
MWAC0109	56	57	1	0.1	3	3510	2	459
MWAC0109	57	58	1	0.15	2	3420	2	684
MWAC0109	58	59	1	0.1	2	4400	2	1510
MWAC0109	59	60	1	0.15	1	2830	2	517
MWAC0109	60	61	1	0.05	1	2580	1	388
MWAC0109	61	62	1	BDL	1	1530	1	191
MWAC0109	62	63	1	BDL	1	1010	1	140
MWAC0109	63	64	1	BDL	BDL	664	2	111
MWAC0109	64	65	1	BDL	BDL	541	1	107
MWAC0109	65	66	1	BDL	BDL	508	1	109
MWAC0109	66	67	1	BDL	BDL	987	5	152
MWAC0109	67	68	1	BDL	BDL	719	2	112
MWAC0109	68	69	1	BDL	1	881	2	111
MWAC0109	69	70	1	BDL	BDL	1370	4	158
MWAC0109	70	71	1	BDL	BDL	2290	22	248
MWAC0109	71	72	1	BDL	BDL	1560	26	264
MWAC0109	72	72	1	0.4	99	4070	236	2010
MWAC0109	73	74	1	4.25	1180	19100	529	3030
MWAC0109	74	75	1	2.05	367	11400	205	1480
MWAC0109	75	76	1	0.2	40	10300	33	572
MWAC0109	76	70	1	BDL	11	15300	12	317
MWAC0109 MWAC0109	70	78	1	BDL	7	20400	9	335
MWAC0109 MWAC0109	78	78	1	BDL	5	15500	9 10	247
MWAC0109 MWAC0109	78	80	1	BDL	2	7050	67	247
MWAC0109 MWAC0109	80	80	1	BDL	9	6930	144	392
					9 409			
MWAC0109	81	82	1	9.6		85200	384	534
MWAC0109	82	83	1	6.45	979	139000	121	323
MWAC0109	83	84	1	6.7	427	59800	44	318
MWAC0111	0	100	100		-	composites	-	1
MWAC0111	100	101	1	BDL	7	139	6	628
MWAC0111	101	102	1	BDL	5	123	4	685
MWAC0111	102	103	1	BDL	7	83	4	451
MWAC0111	103	104	1	BDL	5	144	8	1050
MWAC0111	104	105	1	BDL	4	74	5	545
MWAC0111	105	106	1	BDL	41	142	5	491
MWAC0111	106	107	1	BDL	15	124	4	310
MWAC0111	107	108	1	BDL	4	174	4	338

	From	То				Intersection	n	
Hole_ID	(m)	(m)	Interval	Ag_ppm	Au_ppb	Cu_ppm	Pb_ppm	Zn_ppm
MWAC0111	108	109	1	BDL	24	539	9	531
MWAC0111	109	110	1	BDL	3	234	7	453
MWAC0111	110	111	1	BDL	2	208	4	455
MWAC0111	111	112	1	0.25	65	2110	17	473
MWAC0111	112	113	1	1.05	319	7260	149	836
MWAC0111	113	114	1	10.2	4150	44800	323	606
MWAC0111	114	115	1	0.25	37	7290	39	708
MWAC0111	115	116	1	0.2	53	3860	44	698
MWAC0111	116	117	1	0.4	45	8230	115	620
MWAC0111	117	118	1	0.65	23	6090	260	752
MWAC0111	118	119	1	0.05	13	2500	82	605
MWAC0111	119	120	1	BDL	9	914	33	509
MWAC0111	120	121	1	BDL	4	1470	12	363
MWAC0111	121	122	1	0.05	5	1380	15	499
MWAC0111	122	123	1	BDL	2	247	4	656
MWAC0111	123	124	1	BDL	3	135	4	448
MWAC0111	124	125	1	BDL	3	66	7	485
MWAC0111	125	126	1	BDL	2	140	2	471
MWAC0111	126	127	1	BDL	7	606	10	976
MWAC0111	127	128	1	BDL	8	728	6	796
MWAC0111	128	129	1	BDL	3	501	3	466
MWAC0111	129	130	1	0.05	10	1210	13	791
MWAC0111	130	131	1	BDL	5	371	9	280
MWAC0111	131	132	1	BDL	6	348	5	302
MWAC0111	132	133	1	BDL	26	205	4	205
MWAC0111	133	134	1	BDL	9	310	13	244
MWAC0111	134	135	1	0.05	9	194	13	170
MWAC0111	135	136	1	0.1	9	499	54	149
MWAC0111	136	137	1	BDL	3	148	21	119
MWAC0111	137	138	1	BDL	1	74	9	128
MWAC0111	138	139	1	BDL	2	66	14	121
MWAC0111	139	140	1	BDL	2	88	28	130
MWAC0111	140	141	1			Im sample a		
MWAC0112	0	130	130	A		composites	•	s
MWAC0112	130	131	1	BDL	3	66	2	144
MWAC0112	131	132	1	BDL	1	97	3	207
MWAC0112	132	133	1	BDL	2	160	3	213
MWAC0112	132	133	1	BDL	2	100	2	199
MWAC0112	134	135	1	BDL	5	146	3	389
MWAC0112 MWAC0112	135	136	1	BDL	2	140	3	398
MWAC0112 MWAC0112	136	130	1	BDL	6	125	2	478
MWAC0112 MWAC0112	130	137	1	BDL	5	92	2	529
MWAC0112 MWAC0112	137	139	1	BDL	3	215	3	686
MWAC0112 MWAC0112	138	139	1	BDL	1	171	2	358
MWAC0112 MWAC0112	139	140	1	BDL	2	159	2	336
MWAC0112 MWAC0112	140	141	1	BDL	4	276	6	617
MWAC0112 MWAC0112	141	142	1	0.05	4 2	708	9	1100
		143		-				941
MWAC0112	143 URCES NI	144	1	0.1	8	763	11	941

	From	То				Intersection	า	
Hole_ID	(m)	(m)	Interval	Ag_ppm	Au_ppb	Cu_ppm	Pb_ppm	Zn_ppm
MWAC0112	144	145	1	0.1	3	688	12	1070
MWAC0112	145	146	1	0.35	6	1980	59	3580
MWAC0112	146	147	1	1.6	419	9880	234	1560
MWAC0112	147	148	1	2.15	241	14100	107	1660
MWAC0112	148	149	1	0.7	57	2850	290	2560
MWAC0112	149	150	1	8.75	1150	45700	890	2000
MWAC0112	150	151	1	4	644	22900	575	1470
MWAC0112	151	152	1	12.9	617	101000	842	815
MWAC0112	152	153	1	0.5	42	4320	102	718
MWAC0112	153	154	1	0.2	8	3320	73	978
MWAC0112	154	155	1	0.3	10	5170	102	909
MWAC0112	155	156	1	0.1	5	1750	86	1080
MWAC0112	156	157	1	0.05	4	629	60	1090
MWAC0112	157	158	1	0.1	14	1560	32	920
MWAC0112	158	159	1	BDL	19	551	12	768
MWAC0112	159	160	1	0.35	78	3070	24	1760

 $\frac{\text{Notes:}}{\text{BDL} = \text{below detection limit.}}$ 

# **Appendix 2: DHEM Specifications**

Table 1: DHEM system specifications and configuration for first repeat of MWRC0001 using loop 18NE\_L1.

Morck's Well DHEM specifications: repeat 1	MWRC0001
SIGNAL	
Base Frequency (Hz)	1
Current (A)	150
Tx Power	-
Stacks	Minimum 64
Readings	Minimum three repeatable
Turn On (ms)	0.0
Turn Off (ms)	1.6
Window Timing	SMARTem Standard
GEOMETRY	
Station Spacing (m)	20m with infill over peaks and cross-overs. EOH to 30m.
Loop Dimensions (m)	300 x 400
Loop Turns	1
Coordinate System(s)	GDA94, MGA Zone 50
SYSTEM	
Transmitter	MT400P
Sensor	DigiAtlantis probe
Receiver	SMARTem 24

# Table 2: DHEM system specifications and configuration for second repeat of MWRC0001 using loop LMRC001 and first repeats of MWRC0002-3 using loops LMRC002-3.

Morck's Well DHEM specifications: repeat 2 MWRC0002 repeat 1 MWRC0003 repeat 1	MWRC0001
SIGNAL	
Base Frequency (Hz)	1
Current (A)	150
Tx Power	-
Stacks	Minimum 64
Readings	Minimum three repeatable
Turn On (ms)	0.0
Turn Off (ms)	1.6
Window Timing	SMARTem Standard
GEOMETRY	
Station Spacing (m)	10m with infill over peaks and cross-overs
Loop Dimensions (m)	300 x 300
Loop Turns	1
Coordinate System(s)	GDA94, MGA Zone 50
SYSTEM	
Transmitter	MT400P
Sensor	DigiAtlantis probe
Receiver	SMARTem 24

# Table 3: DHEM system specifications and configuration for second repeat of MWRC0001 using loop LMRC001a.

Morcks Well DHEM specifications: repeat 3	MWRC0001
SIGNAL	
Base Frequency (Hz)	1
Current (A)	150
Tx Power	·
Stacks	Minimum 64
Readings	Minimum three repeatable
Turn On (ms)	0.0
Turn Off (ms)	1.6
Window Timing	SMARTem Standard
GEOMETRY	
Station Spacing (m)	10m with infill over peaks and cross-overs. EOH to 200m.
Loop Dimensions (m)	400 x 400
Loop Turns	1
Coordinate System(s)	GDA94, MGA Zone 50
SYSTEM	
Transmitter	MT400P
Sensor	DigiAtlantis probe
Receiver	SMARTem 24

## Table 4: DHEM transmit loops for MWRC0001 repeats 1, 2 & 3, MWRC0002-3 both repeat 1.

Loop	LVX1	LVY1	LVX2	LVY2	LVX3	LVY3	LVX4	LVY4	RL
18NE_L1	720518	7155073	720306	7155285	720589	7155568	720801	7155356	554.4
LMRC001	720200	7155650	720500	7155650	720500	7155350	720200	7155350	554.4
LMRC001a	720000	7155850	720400	7155850	720400	7155450	720000	7155450	554.4
LMRC002	719800	7155450	720100	7155450	720100	7155150	719800	7155150	554
LMRC003	720550	7155850	720850	7155850	720850	7155550	720550	7155550	554

# Table 5: Transmitter specifications.

MT400P Transmitter					
Generator	Merlin 40KVA genset				
Power	40 kVA				
Max Current	200 A				
Max Voltage	200 V				

# Appendix 3: Detailed RC Drill logs for MWRC0001-3

Hole_ID	From (m)	To (m)	Lithology	Description
MWRC0001	0	7	Cover	Ferruginous alluvium/colluvium with minor pisoliths
	7	10	Dolerite	Ferruginous saprolite after dolerite
	10	23	Dolerite	Saprock after fine to medium grained dolerite
	23	213	Dolerite	Fine to medium grained dolerite
	213	297	Mafic Breccia	Sedimentary breccia comprising basalt and dolerite clasts within a siltstone matrix
	297	306	Basalt	Chlorite altered basalt
	306	312	Siltstone	Chlorite altered siltstone with finely disseminated pyrite and minor hematite
	312	313	Siltstone	Chlorite altered siltstone with minor sulphide layers (10% Sulphide: 10% pyrite)
	313	320	Siltstone	Strongly chlorite altered siltstone with finely disseminated pyrite and minor hematite
	320	335	Siltstone	Finely bedded, magnetite bearing siltstone. Minor colloidal jasper clasts.
	335	359	Siltstone	Foliated siltstone with moderate chlorite alteration. Minor quartz-carbonate veining.
	359	360	Siltstone/Semi-Massive Sulphide	Chlorite altered siltstone with subordinate sulphide. (35% Sulphide: 30% Pyrite, 5% Chalcopyrite).
	360	363	Siltstone	Finely laminated, strongly chlorite altered siltstone.
	363	364	Siltstone with hydrothermal magnetite replacement	Strongly chlorite altered siltstone containing 40% massive magnetite and 1% disseminated chalcopyrite.
	364	367	Siltstone	Finely laminated, strongly chlorite altered siltstone.
	367	373	Siltstone	Moderately chlorite altered siltstone with minor pyrite
	373	385	Siltstone	Siltstone with silicification towards base of unit
	385	448	Basalt	Weakly foliated basalt with silica alteration.

Hole_ID	From (m)	To (m)	Lithology	Description
MWRC0002	0	4	Cover	Ferruginous alluvium/colluvium with minor pisoliths.
	4	7	Dolerite	Ferruginous saprolite after dolerite.
	7	17	Dolerite	Saprolite after dolerite.
	17	55	Dolerite	Saprock after fine to medium grained dolerite.
	55	76	Mafic Breccia	Saprock after sedimentary breccia comprising of basalt and dolerite clasts within a siltstone matrix.
	76	80	Siltstone	Weakly foliated siltstone.
	80	168	Siltstone and Mafic Breccia	Interbedded chlorite altered siltstone and sedimentary breccia comprising of basalt and dolerite clasts within a siltstone matrix.
	168	174	Basalt	Chlorite rich basalt.
	174	196	Siltstone and Mafic Conglomerate	Interbedded chlorite altered siltstone and sedimentary conglomerate comprising conglomerate comprising basalt, dolerite, chert and siltstone clasts, within a siltstone matrix.
	196	232	Chemogenic sediment and siltstone	Hematite-rich chemogenic sediment with beds of weakly foliated chlorite siltstone.
	232	286	Siltstone and Mafic Conglomerate	Interbedded chlorite altered siltstone and sedimentary conglomerate comprising basalt, dolerite, chert and siltstone clasts, within a siltstone matrix.
	286	288	Chemogenic sediment	Hematite and jasper-rich chemogenic sediment.
	288	314	Siltstone	Moderately foliated chlorite altered siltstone.
	314	316	Magnetite-rich chemogenic sediment	Magnetite-rich chemogenic sediment (40% disseminated magnetite).
	316	330	Siltstone	Moderately foliated siltstone.
	330	332	Chemogenic sediment	Siltstone with colloidal jasper and trace magnetite
	332	344	Siltstone	Moderately foliated chlorite altered siltstone.
	344	448	Dolerite	Medium-grained dolerite.

Hole_ID	From (m)	To (m)	Lithology	Description
MWRC0003	0	12	Cover	Ferruginous alluvium/colluvium with minor pisoliths.
	12	14	Dolerite	Ferruginous saprolite after dolerite.
	14	27	Siltstone	Ferruginous saprolite after siltstone.
	27	36	Siltstone	Saprolite after siltstone.
	36	45	Dolerite	Saprock after dolerite.
	45	340	Dolerite	Fine-to-medium grained dolerite.
	340	419	Mafic Conglomerate	Sedimentary conglomerate comprising basalt, dolerite and chert clasts within a siltstone matrix.
	419	438	Siltstone	Chlorite altered, weakly foliated siltstone.
	438	440	Siltstone	Chlorite altered siltstone with trace magnetite.
	440	448	Siltstone	Chlorite altered, laminated siltstone.

# JORC 2012 TABLE 1 – EXPLORATION RESULTS

# Section 1: Sampling Techniques and Data

Criteria	JORC Code Explanation	Commentary
Sampling techniques	Nature and quality of sampling (e.g. 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.	AC samples are collected using spear techniques for both composite and single metre samples. RC samples are collected by a cone splitter for single metre samples or a sampling spear for first pass composite samples using a face sampling hammer with a nominal 140mm hole.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	Sampling is guided by Sandfire protocols and Quality Control (QC) procedures as per industry standard.
	Aspects of the determination of mineralisation that are Material to the Public Report. In cases where 'industry standard' work has been done this would be relatively simple (e.g. '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 (e.g. submarine nodules) may warrant disclosure of detailed information.	AC and RC samples are crushed to -4mm through a Boyd crusher and representative subsamples pulverised via LM5. Pulverising is to nominal 90% passing -75µm and checked using wet sieving technique. Samples are assayed using Mixed 4 Acid Digest (MAD) 0.3g charge and MAD Hotbox 0.15g charge methods with ICPOES or ICPMS. Fire Assay is completed by firing 40g portion of the sample with ICPMS finish.
Drilling techniques	Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc.) and details (e.g. 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.).	<ul> <li>All AC drilling was completed with a Drillboss 300 with on-board compressor (700cfm at 400psi) using a nominal 90mm diameter air core drill bit.</li> <li>AC drill collars are surveyed using a Garmin GPS Map 64.</li> <li>All RC drilling was completed with a Schramm T685 drill rig using a sampling hammer with a nominal 140mm hole diameter. Downhole surveying is undertaken using a gyroscopic survey instrument.</li> <li>RC drill collars are surveyed using RTK GPS with down hole surveying.</li> </ul>
Drill sample recovery	Method of recording and assessing core and chip sample recoveries and results assessed.	AC and RC sample recoveries are logged and captured into the database.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	Appropriate measures are taken to maximise sample recovery and ensure the representative nature of the samples. Recovery and moisture content are routinely recorded for composite and 1m samples. The majority of AC and RC samples collected are of good quality with minimal wet sampling in the project area.
	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.	No sample recovery issues are believed to have impacted on potential sample bias. When grades are available the comparison can be completed.
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.	AC and RC chips are washed and stored in chip trays in 1m intervals. Geological logging is completed for all holes and representative across the project area. All geological fields (i.e. lithology, alteration etc.) are logged directly to a digital format following procedures and using Sandfire geological codes. Data is imported into Sandfire's central database after validation in Ocris.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Logging is both qualitative and quantitative depending on field being logged. All chip trays are photographed.
	The total length and percentage of the relevant intersections logged.	All drill holes are fully logged.

Criteria	JORC Code Explanation	Commentary
Sub-sampling techniques and sample preparation	If core, whether cut or sawn and whether quarter, half or all core taken.	No core drilled as part of this report
	If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.	AC samples consist of 5m composite spear samples produced from 1m sample piles. Additional 1m sampling is completed depending on results from 5m composite samples or where mineralisation is observed while drilling is occurring.
		RC 1m samples are split using a cone or riffle splitter. The majority of RC samples are dry. On occasions that wet samples are encountered they are dried prior to splitting with a riffle splitter.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	All samples are sorted, dried at 80° for up to 24 hours and weighed. Samples are Boyd crushed to - 4mm and pulverised using LM5 mill to 90% passing 75µm.
		Sample splits are weighed at a frequency of 1:20 and entered into the job results file. Pulverising is completed using LM5 mill to 90% passing 75%µm using wet sieving technique.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	1:20 grind quality checks are completed for 90% passing 75%µm criteria to ensure representativeness of sub-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.	Sampling is carried out in accordance with Sandfire protocols as per industry best practice.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	The sample sizes are considered appropriate for the VHMS and Gold mineralisation types.
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.	Samples are assayed using Mixed 4 Acid Digest (MAD) 0.3g charge and MAD Hotbox 0.15g charge methods with ICPOES or ICPMS. The samples are digested and refluxed with a mixture of acids including Hydrofluoric, Nitric, Hydrochloric and Perchloric acids and conducted for multi elements including Cu, Pb, Zn, Ag, As, Fe, S, Sb, Bi, Mo, Re, Mn, Co, Cd, Cr, Ni, Se, Te, Ti, Zr, V, Sn, W and Ba. The MAD Hotbox method is an extended digest method that approaches a total digest for many elements however some refractory minerals are not completely attacked. The elements S, Cu, Zn, Co, Fe, Ca, Mg, Mn, Ni, Cr, Ti, K, Na, V are determined by ICPOES, and Ag, Pb, As, Sb, Bi, Cd, Se, Te, Mo, Re, Zr, Ba, Sn, W are determined by ICPMS. Samples are analysed for Au, Pd and Pt by firing a 40g of sample with ICP AES/MS finish. Lower sample weights are employed where samples have very high S contents. This is a classical FA process and results in total separation of Au, Pt and Pd in the samples. The analytical methods are considered appropriate for this mineralisation style.
	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	<ul> <li>No geophysical tools were used in the analysis.</li> <li>For RC drilling downhole Electromagnetic (DHEM) Geophysical Surveys have been completed for Sandfire by Merlin Geophysical Solutions. Geophysical survey parameters include:         <ul> <li>Merlin Geophysical Solutions MT-200 transmitter, DigiAtlantis probe and receiver</li> <li>300m x 300m single turn loop, or as appropriate to the geological context.</li> </ul> </li> </ul>
	Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.	Sandfire DeGrussa QAQC protocol is considered industry standard with standard reference material (SRM) submitted on regular basis with routine samples. SRMs and blanks are inserted at a minimum of 5% frequency rate.
	The verification of significant intersections by either independent or alternative company personnel.	Significant intersections have been verified by alternative company personnel.

Criteria	JORC Code Explanation	Commentary
Verification of	The use of twinned holes.	None of the drill holes in this report are twinned.
sampling and assaying	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Primary data is captured on field "tough book" laptops using Ocris Software. The software has validation routines and data is then imported into a secure central database.
	Discuss any adjustment to assay data.	The primary data is always kept and is never replaced by adjusted or interpreted data.
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.	The Sandfire Survey team undertakes survey works under the guidelines of best industry practice. All AC holes are surveyed in the field using a Garmin GPS Map 64. Estimated accuracy of this device is +/- 4m's . All RC drill collars are accurately surveyed using an RTK GPS system within +/-50mm of accuracy (X,Y,Z). Downhole surveys are completed by gyroscopic downhole methods at regular intervals.
	Specification of the grid system used.	Coordinate and azimuth are reported in MGA 94 Zone 50.
	Quality and adequacy of topographic control.	Topographic control was established using LiDar laser imagery technology.
Data spacing and distribution	Data spacing for reporting of Exploration Results.	First pass AC and drilling is completed at a spacing of 400 m x 100 m. Infill drilling may be completed at 200 m x 100 m dependant on results. In areas of observed mineralisation and adjacent to it, hole spacing on drill may be narrowed to 50m. RC drilling is completed as required to test geological targets. A set pattern is adopted once a zone of economic mineralisation has been broadly defined
	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.	Data spacing and distribution is not sufficient to establish the degree of geological and grade continuity appropriate for Mineral Resource estimation.
	Whether sample compositing has been applied.	AC samples consist of 5m composite spear samples produced from 1m sample piles. Additional 1m sampling is completed depending on results from 5m composite samples or where visible mineralisation is observed while drilling is occurring. No compositing is applied to RC samples
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.	There is no significant orientation based sampling bias known at this time in the Morck's Well project area.
	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 drill hole may not necessarily be perpendicular to the orientation of the intersected mineralisation. Orientation of the mineralisation is not currently known. All reported mineralised intervals are downhole intervals not true widths.
Sample security	The measures taken to ensure sample security.	Appropriate security measures are taken to dispatch samples to the laboratory. Chain of custody of samples is being managed by Sandfire Resources NL. Samples are stored onsite and transported to laboratory by a licenced transport company in sealed bulker bags. The laboratory receipts received samples against the sample dispatch documents and issues a reconciliation report for every sample batch.
Audits or reviews	The results of any audits or reviews of sampling techniques and data.	No external audits or reviews of the sampling techniques and data have been completed, on this project.

# Section 2: 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 Morcks Well project encompasses E52/1672, E52/1613 and E51/1033 which are jointly owned by Auris Minerals Limited (80%) and Fe Limited (20%). Sandfire is currently farming into the project with the right to earn 70% interest in the project area. (Refer to terms of Farm-In Agreement dated 27th February 2018).
		The adjacent tenement, E52/2049, is part of Enterprise Minerals' wholly owned Doolgunna project, which covers 975km <sup>2</sup> . Sandfire is currently farming into the project with the right to earn 75% in the project area (Refer to terms of Farm-In Agreement dated 12th October 2016).
		The Project is centred ~120km north-east of Meekatharra, in Western Australia and forms part of Sandfire's Doolgunna Project, comprising of a package of 6,276 square kilometres of contiguous tenements surrounding the DeGrussa Copper Mine.
	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.	All tenements are current and in good standing.
Exploration done by other parties	Acknowledgment and appraisal of exploration by other parties.	Aside from Sandfire Resources and Auris Minerals Limited there has been no recent exploration undertaken on the Morcks Well Project.
		Exploration work completed prior to Auris's tenure included geochemical soil, stream sediment, laterite and rock chip sampling combined with geological mapping.
		Exploration work on E52/2049 of the Doolgunna Project by Enterprise included a detailed fixed wing airborne magnetic survey in 2007, re-assaying of pulps from a 1km x 1km spaced Maglag geochemical survey in 2009, a heli borne VTEM survey in 2009, 100m x 100m soil sampling and multielement geochemical analysis, and a 400m line spaced Slingram Moving Loop EM (MLEM) survey conducted in 2015.
Geology	Deposit type, geological setting and style of mineralisation.	The Morcks Well Project lies within the Proterozoic-aged Bryah rift basin enclosed between the Archaean Marymia Inlier to the north and the Proterozoic Yerrida basin to the south.
		The principal exploration targets in the Doolgunna Project area are Volcanogenic Massive Sulphide (VMS) deposits located within the Proterozoic Bryah Basin of Western Australia. Secondary targets include orogenic gold deposits.
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:	Refer to Tables 1 in the main body of this release: Morcks Well Project Drill hole Information Summary.
	<ul> <li>easting and northing of the drill hole collar;</li> <li>elevation or RL (Reduced Level – elevation above sea level in metres);</li> <li>of the drill hole collar;</li> <li>dip and azimuth of the hole;</li> <li>down hole length and interception depth; and</li> <li>hole length.</li> </ul>	
	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.	
Data aggregation methods	In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.	Significant intersections are based on a cut-off grade of 0.5% Cu and may include up to a maximum of 3m of internal dilution, with a minimum composite grade of 1.0% Cu. Cu grades used for calculating significant intersections are uncut.

Criteria	JORC Code Explanation	Commentary
	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.	Reported intersections are based on 1m samples from AC drilling.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	No metal equivalents are used in the intersection calculation.
Relationship between mineralisation	These relationships are particularly important in the reporting of Exploration Results.	Downhole intercepts of mineralisation reported in this release are from a drillhole orientated approximately perpendicular to the understood regional stratigraphy. The drillhole may not necessarily be perpendicular to the mineralised zone. All widths are reported as downhole intervals.
widths and intercept lengths	If the geometry of the mineralisation with respect to the drill-hole angle is known, its nature should be reported.	The geometry of the mineralisation, relative to the drillhole, is unknown at this stage.
	If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').	All intersections reported in this release are downhole intervals. True widths are not known at this stage.
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.	Appropriate maps are included within the body of the accompanying document.
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.	The accompanying document is considered to represent a balanced report.
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.	Downhole Electromagnetic Surveying was completed by Merlin Geophysics. Details for the configuration of the survey can be seen in Appendix 1 of this release.
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.	Additional work including additional drilling, downhole geophysics and surface geophysics is being planned.