ASX RELEASE

19 August 2014

2014 ORE RESERVES AND MINERAL RESOURCES STATEMENT

Attached is Arrium's 2014 Ore Reserves and Mineral Resources Statement.

Ends

CONTACTS: Investor & Media
Steve Ashe
General Manager
Investor Relations & External Affairs
Tel: +612 9239 6616
Mob: +61408 164 011
Email: steve.ashe@arrium.com

ORE RESERVES AND RESOURCES STATEMENT

ORE RESERVES AND MINERAL RESOURCES

The information in this report that relates to the Mineral Resources and Ore Reserves is based on, and fairly represents, information compiled by Paul Leevers a member of the Australasian Institute of Mining and Metallurgy.

Paul Leevers is a full time employee of a wholly-owned subsidiary of Arrium Limited and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which is being 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 Leevers approves of this Ore Reserve and Resource Statement as a whole and consents to the inclusion in this report of the matters based on his information in the form and context in which it appears.

ORE RESERVES

	HEMATITE		MAGNETITE	
	2014 (Mt)	2013 (Mt)	2014 (Mt)	2013 (Mt)
Middleback Ranges	49.5	42.2	62.4	66.3
Southern Iron	19.7	24.5	–	–
Middleback Ranges Beneficiated	8.6	–	–	–
Total Ore Reserves	**77.8**	**66.7**	**62.4**	**66.3**
At the beginning of the year	66.7	60.8	66.3	70.5
Additions	21.6	19.3	–	–
Depletions (Depleted through mining and or re-assessment of Modifying Factors)	(10.5)	(13.4)	(3.9)	(4.2)
At the end of the year	**77.8**	**66.7**	**62.4**	**66.3**

MINERAL RESOURCES

	HEMATITE		MAGNETITE	
	2014 (Mt)	2013 (Mt)	2014 (Mt)	2013 (Mt)
Middleback Ranges	171.6	143.8	182.9	187.1
Southern Iron	38.8	40.9	–	–
Total Resouces	**210.4**	**184.7**	**182.9**	**187.1**

MIDDLEBACK RANGES HEMATITE

Middleback Ranges (MBR) Hematite Ore Reserves are associated with direct shipping ore (DSO) and have been derived at a cut off grade of 53% Fe. The MBR Hematite Ore Reserves comprise the following deposits: Iron Chieftain, Iron Duchess South, Iron Knight, Iron Baron, Iron Cavaliar, Iron Queen, Iron Princess and Iron Monarch. The MBR Hematite Ore Reserves have increased by 7.4Mt after depletion of 5.7 Mt with a decrease in Fe grade of 0.9% and corresponding increase in SiO2 of 1.6% and Al2O3 of 0.5%. The increase in MBR Hematite Ore Reserves are due to positive exploration results and technical and economic studies at Iron Chieftain, Iron Princess and Iron Baron Mining Area.

The MBR Hematite Ore Reserves and Mineral Resources are reported as of 30 June 2014. Rounding of tonnes and grade information may result in small differences presented in the totals. Grades are reported uncalcined and tonnages are dry.

WHYALLA (MIDDLEBACK RANGES) HEMATITE RESERVES												AS AT END JUNE 2014					AS AT END JUNE 2013						
CATEGORY		PROVED ORE RESERVE					PROBABLE ORE RESERVE					TOTAL ORE RESERVES					TOTAL ORE RESERVES					ARRIUM INTEREST	COMPETENT PERSON
	ORE TYPE	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	%	
Total Resource (Inclusive of Ore Reserves)	Hematite, Goethite, Limonite, Minor magnetite	6.9	58.8	7.26	3.29	0.07	42.6	57.1	7.42	3.04	0.07	49.5	57.4	7.4	3.1	0.07	42.2	58.3	5.8	2.5	0.08	100	P. Leevers

The table below shows Arrium’s MBR Hematite Project insitu DSO hematite resource base adjacent to existing operations at a cut-off grade of Fe>47%, SiO2<20%. The Total Mineral Resource includes all resources, including those used to derive Ore Reserves.

Mineral Resources that have not been used for estimation of Ore Reserves are shown separately, referred to as Excluded Resource. Hematite Resources have increased by 27.7Mt, due to ongoing exploration at the Iron Princess, Iron Chieftain and Iron Baron Mining Areas, and as a result of change in cut off grade for resource reporting from 50% to 47% Fe. The lowering of cut off grade from 50% to 47% Fe has resulted in a 15.2Mt addition to the total resource. The Total Resource has increased by 27.7 Mt, with a decrease in Fe of 1.5%, an increase in SiO2 of 1.3% and Al2O3 increase of 0.1%. The Excluded Resource category has increased by 14.2 Mt, with a decrease in Fe of 1.6%, an increase in SiO2 of 1.6% and Al2O3 increase of 0.1%. Grades are reported uncalcined and tonnages are dry.

WHYALLA (MIDDLEBACK RANGES) HEMATITE RESOURCES

		AS AT END JUNE 2014																				COMPARED WITH						
CATEGORY		MEASURED RESOURCES					INDICATED RESOURCES					INFERRED RESOURCES					AS AT END JUNE 2014					AS AT END JUNE 2013					ARRIUM INTEREST	COMPETENT PERSON
	TYPE	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	%	
Total Resource (Inclusive of Ore Reserves)	Hematite, Goethite, Limonite, Minor magnetite	17.3	58.8	6.9	2.5	0.1	99.4	56.8	7.4	2.7	0.1	54.9	55.5	10.0	2.3	0.1	171.6	56.6	8.2	2.5	0.1	143.8	58.0	6.9	2.4	0.1	100	P. Leevers
Excluded Resource (Exclusive of Ore Reserves)	Hematite, Goethite, Limonite, Minor magnetite	9.5	58.9	6.5	2.1	0.1	42.4	56.8	7.9	2.3	0.1	44.2	55.3	10.2	2.2	0.1	96.1	56.3	8.8	2.2	0.1	81.9	58.0	7.2	2.1	0.1	100	P. Leevers

ORE RESERVES AND RESOURCES STATEMENT CONTINUED

MIDDLEBACK RANGES MAGNETITE

The Arrium MBR Magnetite Ore Reserve has been derived at a Davis Tube Recovery (DTR) cut off grade of 25% and is inclusive of the Iron Magnet Deposit. The MBR Magnetite Ore Reserves have decreased by 3.9Mt, with a with a resultant decrease in DTR Mass Recovery of 0.7%, Head Fe of 0.4%, and Head SiO2 of 0.6%, which is in line with depletion.

The MBR Magnetite Ore Reserves and Mineral Resources are reported as of 30 June 2014. Rounding of tonnes and grade information may result in small differences presented in the totals. Moisture is estimated at 3% and grades are reported uncalcined.

WHYALLA (MIDDLEBACK RANGES) MAGNETITE RESERVES

										AS AT END JUNE 2014				AS AT END JUNE 2013					
CATEGORY		PROVED ORE RESERVE				PROBABLE ORE RESERVE				TOTAL ORE RESERVES				TOTAL ORE RESERVES				ARRIUM INTEREST	COMPETENT PERSON
	ORE TYPE	TONNES (Mt)	DTR GRADE %	Fe GRADE %	SIO2 %	TONNES (Mt)	DTR GRADE %	Fe GRADE %	SIO2 %	TONNES (Mt)	DTR GRADE %	Fe GRADE %	SIO2 %	TONNES (Mt)	DTR GRADE %	Fe GRADE %	SIO2 %	%	
Total Resource (Inclusive of Ore Reserves)	Magnetite	40.2	42.5	39.2	19.2	22.1	38.7	37.2	20.9	62.4	41.1	38.5	19.8	66.3	41.8	38.9	20.5	100	P. Leevers

The table below shows Arrium's MBR Magnetite Project insitu magnetite resource base adjacent to existing operations at a DTR cut-off grade of greater than 20%. The Total Mineral Resource includes all resources, including those used to derive Ore Reserves. Mineral Resources that have not been used for estimation of Ore Reserves are shown separately and are referred to as Excluded Resource. The Iron Magnet Resource represents a decrease of 4.2Mt, primarily due to the mining depletion of 3.9Mt of Magnetite Reserve.

WHYALLA (MIDDLEBACK RANGES) MAGNETITE RESOURCES

		AS AT END JUNE 2014																COMPARED WITH					
CATEGORY		MEASURED RESOURCES				INDICATED RESOURCES				INFERRED RESOURCES				AS AT END JUNE 2014				AS AT END JUNE 2013				ARRIUM INTEREST	COMPETENT PERSON
	TYPE	TONNES (Mt)	DTR GRADE %	Fe GRADE %	SIO2 %	TONNES (Mt)	DTR GRADE %	Fe GRADE %	SIO2 %	TONNES (Mt)	DTR GRADE %	Fe GRADE %	SIO2 %	TONNES (Mt)	DTR GRADE %	Fe GRADE %	SIO2 %	TONNES (Mt)	DTR GRADE %	Fe GRADE %	SIO2 %	%	
Total Resource (Inclusive of Ore Reserves)	Magnetite	44.4	43.9	40.0	18.3	73.3	36.6	36.5	18.5	65.2	31.8	29.4	35.2	182.9	36.7	34.8	24.4	187.1	36.7	34.9	24.4	100	P. Leevers
Excluded Resource (Exclusive of Ore Reserves)	Magnetite	5.3	47.4	38.3	11.8	45.0	36.9	36.7	15.9	61.6	31.9	29.4	35.2	112.0	34.6	32.8	26.3	112.2	34.6	32.8	26.3	100	P. Leevers

SOUTHERN IRON HEMATITE

The Southern Iron Hematite Ore Reserve (SI Ore Reserves) has been derived at a cut-off grade of 55% Fe. The SI Ore Reserve is currently represented by the Peculiar Knob and the Hawks Nest Deposits of Buzzard and Tui, which are wholly owned by Arrium. The SI Hematite Project Ore Reserve represents a decrease of 4.7Mt including depletion of 3.8Mt. The balance of 0.9Mt is due to revised recovery factors at Peculiar Knob and a re-design of the pit after further technical and economic studies, as well as a decrease of 0.5Mt at the Buzzard deposit due to further technical and economic studies. Fe grade has reduced 0.2% and SiO2 grade has increased 1.2% and Al2O3 increased 0.1% due to ongoing resource review at Hawks Nest. Exploration actively continues in the Hawks Nest Area.

The SI Ore Reserves and Mineral Resources are reported as of 30 June 2014. Rounding of tonnes and grade information may result in small differences presented in the totals. Tonnages reported are dry and grades are reported uncalcined.

SOUTHERN IRON – HEMATITE RESERVES

												AS AT END JUNE 2014					AS AT END JUNE 2013						
CATEGORY		PROVED ORE RESERVE					PROBABLE ORE RESERVE					TOTAL ORE RESERVES					TOTAL ORE RESERVES					ARRIUM INTEREST	COMPETENT PERSON
	ORE TYPE	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	%	
Total Resource (Inclusive of Ore Reserves)	Hematite, Goethite, Limonite, Minor magnetite.	0.4	59.3	13.10	0.63	0.02	19.3	61.9	9.30	0.94	0.03	19.7	61.8	9.37	0.93	0.03	24.5	62.0	8.20	0.82	0.03	100	P. Leevers

The table below shows Arrium's Southern Iron Project insitu DSO hematite resource base adjacent to existing and future operations at a cut-off grade of Fe>50%. The Total Mineral Resource includes all resources, including those used to derive Ore Reserves. It represents a net decrease of 2.1Mt after depletion of 4.2Mt at Peculiar Knob and an increase of 2.1Mt at Hawks Nest due to ongoing exploration, with a total decrease in Fe grade of 1% and increase in SiO2 grade of 0.4%. Mineral Resources that have not been used for estimation of Ore Reserves are shown separately and are referred to as Excluded Resource. Tonnages reported are dry and grades are reported uncalcined.

SOUTHERN IRON – HEMATITE RESOURCES

		AS AT END JUNE 2014																				COMPARED WITH						
CATEGORY		MEASURED RESOURCES					INDICATED RESOURCES					INFERRED RESOURCES					AS AT END JUNE 2014					AS AT END JUNE 2013					ARRIUM INTEREST	COMPETENT PERSON
	TYPE	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	%	
Total Resource (Inclusive of Ore Reserves)	Hematite, Goethite, Limonite, Minor magnetite	0.4	59.3	13.10	0.63	0.02	31.1	61.7	9.14	1.01	0.04	6.9	59.5	11.56	1.04	0.05	38.8	60.7	9.52	1.00	0.04	40.9	61.7	9.1	1.0	0.05	100	P. Leevers
Excluded Resource (Exclusive of Ore Reserves)	Hematite, Goethite, Limonite, Minor magnetite	0.0	0.0	0.00	0.00	0.00	9.8	60.1	10.70	1.25	0.05	6.6	59.4	11.92	1.07	0.05	16.4	59.8	11.19	1.18	0.05	12.0	60.6	10.4	1.9	0.06	100	P. Leevers

ORE RESERVES AND RESOURCES STATEMENT CONTINUED

MIDDLEBACK RANGES BENEFICIATED HEMATITE

The MBR Beneficiated Hematite Ore Reserve has been derived at a cut-off grade of 47% Fe. The MBR Beneficiated Hematite Project is inclusive of all resources of low grade ores currently held on stockpiles in the Middleback Ranges.

These are resources currently held in historically built and newly constructed stockpiles that will be eventually beneficiated to yield saleable ore at the Iron Duke and Iron Baron deposits. The Iron Monarch stockpiles have been declared as Mineral Resources and further studies are in progress to firm up certain modifying factors in order to convert these resources to Ore Reserves.

Ore Beneficiation commenced at the Iron Duke in 2005 and at Iron Baron in 2012 – drawing feed from the low grade stockpiles and mining at the Iron Duke and Iron Baron.

Newly declared Ore Reserves have been derived from Stockpiles at the Iron Duke and Iron Baron Mining Area at a 100% mining recovery and the application of the beneficiation recovery factors and recovery grades described in the table below. All reserve tonnages are reported dry and uncalcined.

ARRIUM ORE BENEFICIATION STOCKPILES RESERVES

																AS AT END JUNE 2014						AS AT END JUNE 2013							
CATEGORY		PROVED ORE RESERVE						PROBABLE ORE RESERVE						TOTAL ORE RESERVES						TOTAL ORE RESERVES						ARRIUM INTEREST	COMPETENT PERSON
				BENEFICIATION						BENEFICIATION						BENEFICIATION						BENEFICIATION					
	ORE TYPE	BENEFICIATION TONNES (Mt)	BENEFICIATION RECOVERY %	Fe %	SIO2 %	AL2O3 %	P %	BENEFICIATION TONNES (Mt)	BENEFICIATION RECOVERY %	Fe %	SIO2 %	AL2O3 %	P %	BENEFICIATION TONNES (Mt)	BENEFICIATION RECOVERY %	Fe %	SIO2 %	AL2O3 %	P %	BENEFICIATION TONNES (Mt)	BENEFICIATION RECOVERY %	Fe %	SIO2 %	AL2O3 %	P %	%	
Total Quantity	Hematite, Goethite, Limonite, Minor magnetite	1.0	54	61.8	5.2	2.1	0.03	7.6	59	61.8	5.0	1.6	0.05	8.6	58	61.8	5.0	1.7	0.05	0.0	0	0.0	0.0	0.0	0.0	100	P. Leevers

The Middleback Range Beneficiated stockpile resource has increased by 7.7Mt from the previous years estimate due to ongoing exploration and identification of additional resources at Iron Monarch and Iron Baron. Resource Fe grade has decreased by 2.6% with a corresponding increase in SiO2 of 3% and Al2O3 of 0.4%

The Ore Beneficiation Stockpiles with a mean estimated grade exceeding 45% Fe that can be beneficiated to meet current export grade specifications comprise the Mineral Resources in the following Table. The estimates are as at 30 June 2014.

ARRIUM ORE TOTAL BENEFICIATION RESOURCE STOCKPILES

		AS AT END JUNE 2014																				COMPARED WITH						
CATEGORY		MEASURED RESOURCES					INDICATED RESOURCES					INFERRED RESOURCES					AS AT END JUNE 2014					AS AT END JUNE 2013					ARRIUM INTEREST	COMPETENT PERSON
	TYPE	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	%	
Total Quantity	Hematite, Goethite, Limonite, Minor magnetite	1.9	50.0	10.2	5.7	0.1	18.1	51.2	13.1	4.9	0.1	6.4	50.2	14.7	5.6	5.1	26.4	50.9	13.3	5.1	0.08	18.7	53.5	10.3	4.7	0.06	100	P. Leevers

ARRIUM ORE EXCLUSIVE OF RESERVES RESOURCE STOCKPILES

		AS AT END JUNE 2014																				COMPARED WITH						
CATEGORY		MEASURED RESOURCES					INDICATED RESOURCES					INFERRED RESOURCES					AS AT END JUNE 2014					AS AT END JUNE 2013					ARRIUM INTEREST	COMPETENT PERSON
	TYPE	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	TONNES (Mt)	Fe GRADE %	SIO2 %	AL2O3 %	P %	%	
Total Quantity	Hematite, Goethite, Limonite, Minor magnetite	0.0	0.0	0.0	0.0	0.0	5.07	50.0	13.6	6.3	0.1	0.77	49.0	16.3	6.0	0.1	5.84	49.8	14.0	6.2	0.1	0.0	0%	0.0	0.0	0.0	100	P. Leevers

GOVERNANCE PROCESSES

Supporting information for this Reserves and Resources Statement is attached.

Arrium applies governance arrangements and internal controls to verify the estimates and estimation process for Mineral Resources and Ore Reserves. These include:

- standard company procedures for public reporting aligned with current regulatory requirements;
- independent audits of all Ore Reserves and Mineral Resources;
- reconciliation of cost and revenue assumptions to validate reserves estimates for operating mines; and
- annual internal technical reviews of resources and reserves estimates.

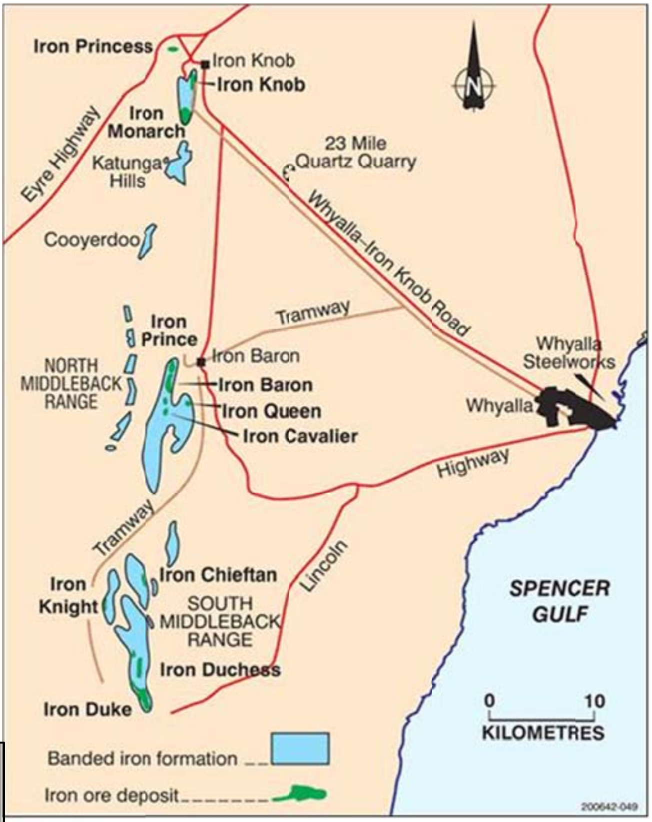
Each of Arrium's material mining projects involves a large number of suppliers, customers and other stakeholders. In carrying out studies of the feasibility of each project, Arrium uses internal and external projections and estimates that are also used more broadly in Arrium business planning. In light of these considerations, Arrium considers the factors and assumptions used for its pre-feasibility and feasibility studies of its mining projects to be commercially sensitive and, in many cases, subject to the confidentiality requirements of third parties. Arrium has, however, described the methodology it has used to determine those factors and assumptions and the basis on which it has estimated its Mineral Resources and ore reserves in the supporting material released to the ASX with this statement on 19 August 2014.

MIDDLEBACK RANGES HEMATITE PROJECT

INTRODUCTION

The Middleback Ranges (MBR) Hematite Project is located on the north eastern Eyre Peninsular, South Australia (Figure 1). They extend from Iron Knob, approximately 50km northwest of Whyalla, to adjacent to the Lincoln Highway, approximately 50km southwest of Whyalla.

Figure 1: Site Location



In 2000, BHP divested the Whyalla steelworks (including the mining operations) and parts of the manufacturing business in the new entity OneSteel Limited, and ceased operations in the MBR under its name. In July 2012, OneSteel Limited changed its name to Arrium Limited. Arrium's MBR hematite operations comprise the following areas:

- Iron Knob Mining Area (IKMA). IKMA lies at the northern end of the MBR, and includes the Iron Knob, Iron Monarch and Iron Princess pits.
- Iron Baron Mining Area (IBMA). IBMA lies approximately at the mid-way point of the MBR, and includes the Iron Baron, Iron Prince, Iron Queen and Iron Cavalier pits.
- South Middleback Range (SMR). SMR lies at the southern end of the MBR, and includes the Iron Knight, Iron Chieftain, Iron Duchess and Iron Duke (now depleted) pits.

GEOLOGY

Regional framework

Hematite in the MBR occurs as stratabound Palaeoproterozoic deposits of the Lower Middleback Iron Formation (LMIF), part of the Hutchison Group. The Hutchison Group forms part of the Cleve Subdomain of the Gawler Craton, and lies on its western edge (Figure 2). The Cleve Subdomain comprises tightly folded high-grade metamorphic rocks that are mainly derived from marine shelf sediments and mafic and acidic volcanics (Parker, 2012b).

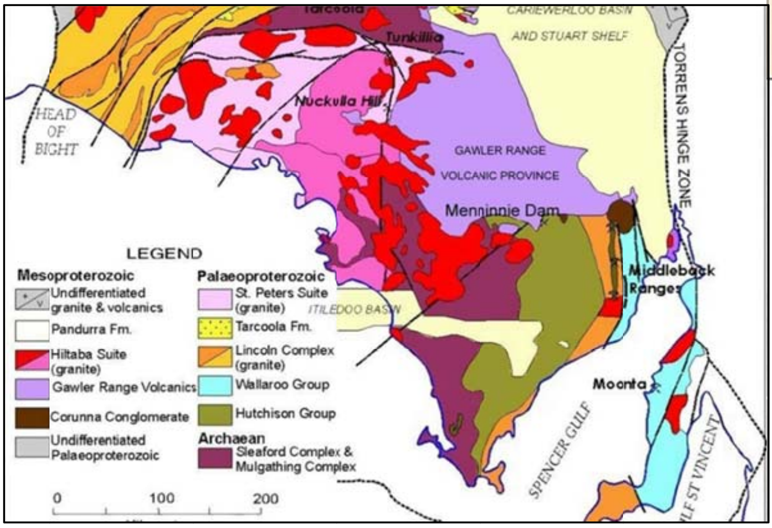


Figure 2: Regional Geology
Source: After Parker 2012b

Middleback Ranges Framework

In the MBR, the Hutchison Group is composed of the Warrow Quartzite and the Middleback Subgroup. However, the Warrow Quartzite is not identified at all locations. The Middleback Subgroup comprises the Katunga Dolomite, the LMIF, the Cook Gap Schist and the Upper Middleback Iron Formation (UMIF).

The LMIF hosts the Middleback Ranges hematite deposits.

Figure 3 provides a schematic of the MBR stratigraphy

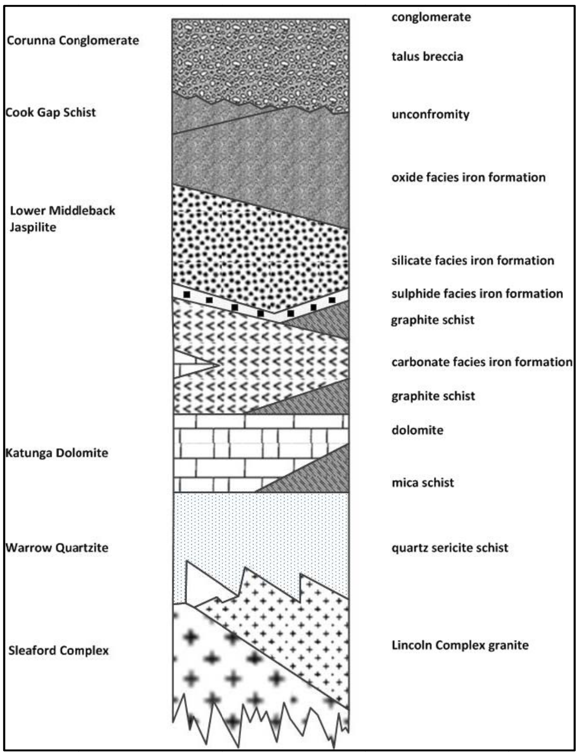


Figure 3: MBR Stratigraphy
Source: After Yeates 1990

Ore Genesis

MBR iron ores formed through supergene enrichment; the process selectively dissolved waste minerals and replaced them with iron ore mineralisation. Preferential enrichment occurred in carbonate facies iron formation, dolomitic marble and to a lesser degree silicate facies iron formation. The silicates were much less soluble than the carbonates, and resulted in patchy mineralisation in the silicate iron facies (Yeates 1990).

Magnetite was recrystallised and remobilised during a period of metamorphism and deformation. Multiple periods of uplift, erosion and weathering resulted in the oxidation of magnetite to hematite and martite through supergene processes. Iron ore formation requires the movement of fluids through the rock. Most deposits (apart from Iron Queen and Iron Chieftain) lie on the western side of the range, adjacent to a major fault or mylonite zone along the western edge of the range, which may have provided this pathway. The process was most intense where the dolomite and carbonate facies were thickened and then subsequently exposed during the supergene process (Yeates 1990). Iron Queen and Iron Chieftain lie on the east side of the range in similar geology; their geneses are thought to be similar.
Yeates (1990) provides a more detailed description of geology and mineralisation.

DRILLING

In addition to Iron Knob, BHP knew of the presence of other hematite mineralisation from the early 1930s. Multiple drilling programs identified the various deposits, with Iron Chieftain the most-recently drilled and developed deposit.

Historical drilling used open-hole percussion (OHP), diamond drilling (DDH) or a combination of OHP precollar and DDH tail. The first reverse circulation (RC) drilling occurred in the late 1980s, and its use increased until late 1999, when it completely replaced OHP (Table 1). Collar locations by deposit are listed in Appendix A.

RC is now the preferred drilling method, with limited use of DDH.

Figure 4 provides schematic cross sections through three of the MBR orebodies.

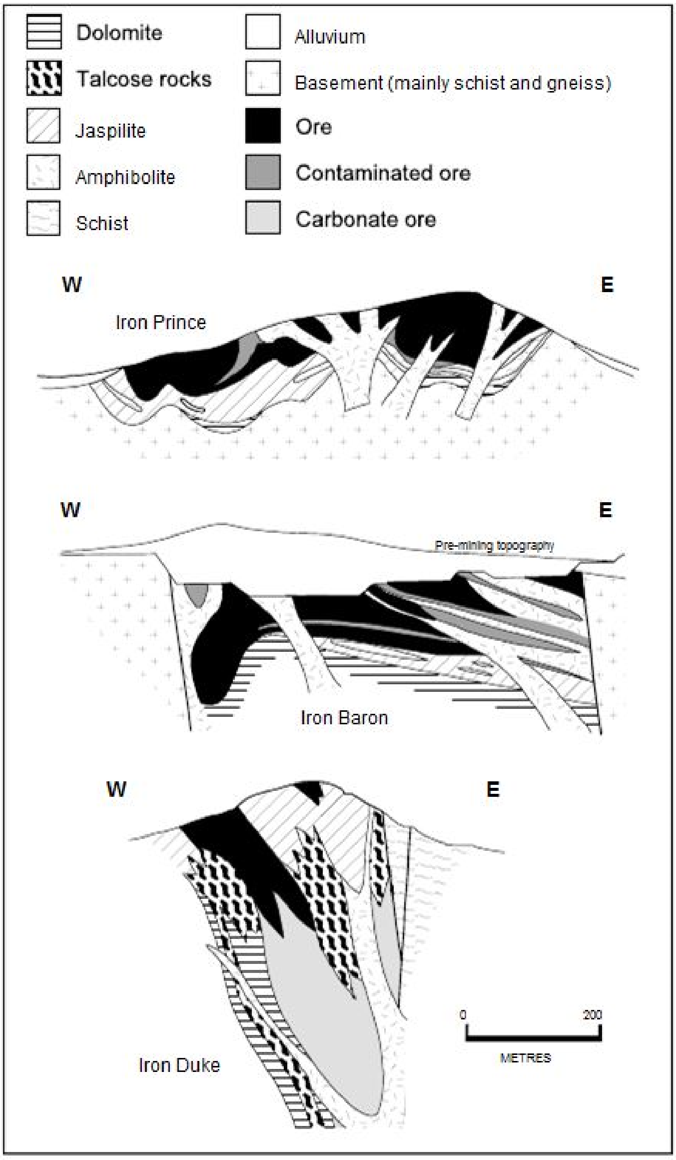


Figure 4: Schematic cross section through MBR orebodies
Source: Bubner et al, 2003

Table 1: Drilling Summary of Material Deposits

Project	OHP (m)	DDH (m)[1]	RC (m)	Method Not Known (m)[2]
Monarch	8,405.6	17,071.43	12,474.2	28,532.28
Princess	-	14,675.73	20,197.57	4,449.49
Baron	-	-	30,433.5	76,257.32
Queen	-	262.5	13,118.00	4,888.33
Cavalier	-	-	7,008	4,370.4
Chieftain	-	1,646.95	88,155.00	778.03
Totals	8,405.6	33,656.61,	172,137.3	130,260

Notes: 1. Includes OHP or RC precollars 2. Includes OHP, RC, DDH

SAMPLING

As can be seen from Table 1, RC and DDH provided the vast majority of samples (more than 90%). Historically the RC sample interval was up to 4m; Arrium now collects RC samples in 2m intervals. DD sample intervals are depended on lithology – maximum interval is 2 m, with shorter intervals collected according to lithology.

No information is available on the OHP sampling methodology. OHP sample intervals varied, and can exceed 9.1m (approximately 30 feet).

RC samples passed through a cyclone fitted with a dust collector, and then split through either a three-stage riffle splitter or a rig mounted cone splitter into pre-numbered calico bags. Prior to sampling, Arrium cuts diamond core in half, with half submitted for analysis and half retained for future reference.

Half drill core for geochemical analysis was crushed, riffle split down, combined within intervals nominated by the logging geologist and then processed in a similar way to RC chips.

ANALYTICAL METHOD

Sample Preparation

Arrium uses Bureau Veritas (BV) for sample analysis. BV Whyalla and BV Adelaide completed the most recent analytical work. BV's sample preparation process involves the following activities:

- Sorting & drying
- Weighing.
- Crushing.
- Pulverising.
- Sizing.

  Where samples weigh more than 3kg the sample is split to provide a nominal 3kg weight for sample pulverising.

Sample Analysis

Samples with Lithium Borate flux to form a glass disc and analysed by X-Ray Fluorescence (XRF). The samples were analysed for the following analytes (with detection limits in ppm):

Fe (100)	SiO_2 (100)	Al_2O_3 (100)	Mn (100)	TiO_2 (100)	CaO (100)
MgO (100)	K_2O (100)	P (10)	S (10)	Na_2O (100)	Cu (10)
Pb (10)	Zn (10)	Ba (10)	V (10)		

To determine Loss on Ignition (LOI), samples dried at 105°C, weighed, placed in a temperature-controlled environment at 1,000°C for one hour, cooled, and re-weighed with LOI reported as a percentage.

QA/QC

Field QA/QC

Limited QA/QC was completed prior to 2003. Arrium introduced field duplicates and Certified Reference Material (CRM) from 2003. The field duplicate results give confidence in sample collection procedures and analytical precision for this period.

Arrium used three in-house CRMs from 2003 through 2006, and used third-party supplied CRMs post-2006, with variable results. The majority of results for the other CRMs lie within the plus / minus two standard deviation range providing confidence in the accuracy of the dataset for this period.

Arrium introduced the use of Field Blanks in 2011, and sources Blank in bulk from its Ardrossan dolomite quarry.

From 2011, Arrium targeted a QA/QC value of 10% of the Primary Samples. To maximise the likelihood of achieving this, Arrium inserts CRMs every 25 samples (i.e. in sample bags ending in 25, 50, 75, 00), and aims for 4% each of field duplicates and field blank samples. Arrium requires drill rig geologists to target ore and near-ore material for duplicates, and to add a field blank immediately after the duplicate pair. Selecting samples for duplication is subjective, and thus the area where most variation occurs in terms of actual assays collected.

Laboratory QA/QC

The objective of the Laboratory QA/QC Program is to measure the precision and accuracy of the analytical data. Quality assurance involves the planned and systematic actions necessary to provide confidence in each analytical result. The QA/QC Program has two components:

- Quality Assurance (QA) - the system used to verify that the entire analytical process is operating within acceptable limits; and
- Quality Control (QC) - the mechanisms established to measure non-conforming method performance

GRADE ESTIMATION METHODOLOGY

The iron enriched zones formed a relatively resistant ironstone horizon,that has tended to be eroded at a slower rate than adjoining geology, resulting in the formation of the Middleback Ranges. The core of the ore body runs approximately North to South and often represents the hinge of a syncline which has structurally thickened the limbs. Intrusive dykes that are un-mineralised are common and they replace the iron enriched mineralisation and are continuous along the length of mineralisation.

The geological interpretation process used geological logging in conjunction with the chemical assays to identify individual lithological units. Fe, SiO_2, Al_2O_3, CaO, LOI and lithology were plotted on drill-hole traces to assist the interpretation. The lithological logging information was used to guide Haematite interpretation, which is appropriate given the strong stratigraphic control on the mineralisation.

The general interpretation methodology as described above was the same for all models. Firstly the predominant lithology of BIF and amphibolite were interpreted in conjunction with the cross cutting faults, after which a mineralisation envelope was developed using a lower grade cut-off of 47% Fe.

For most of the deposits the close spaced drill pattern of approximately a 25 m x 25 m was deemed to be sufficient for an Indicated Resource classification zone, whilst wide drill patterns of 50 m x 50 m or 100 m x 50 m resulted in the assignment of an Inferred Resource classification zone. Lithological interpretations were completed over the entire strike length of each of the deposits on 25 m sections. These sectional interpretations were linked to produce 3-Dimensional solid wireframes. Model extents of the resources are displayed in the Table 2 below.

Project Extents	**X m**	**Y m**	**Z m**
Princess	1,400	1,400	440
Monarch	2,000	1,750	430
Baron	1,560	3,255	318
Cavalier	1,500	2,500	304
Queen	1,000	1,000	304
Chieftain	1,100	2,400	340

Table 2: Resource Extents

A 3-D block model was constructed for resource estimation purposes, using a different parent block sizes, depending on the deposit as shown in Table 3. The selected parent block size was based on the available data, the data characteristics (spacing and variability as defined by variography) and the envisaged mining practises. Sub-blocking was undertaken to allow the effective volume representation of the interpreted wireframes for the various horizons.

Project	**X m**	**Y m**	**Z m**
Princess Block size	25	25	8
Sub cell size	5	5	4
Monarch Block size	25	25	10
Sub cell size	5	5	2
Baron Block size	15	15	6
Sub cell size	3	3	1
Cavalier Block size	10	12.5	8
Sub cell size	2	2.5	1
Queen Block size	10	12.5	8
Sub cell size	2	2.5	1
Chieftain Block size	10	10	8
Sub cell size	2	2	1

Table 3: Block Size Summary

Each lithological unit was assigned an estimation “ZONE” number that was coded into the block model, which was used to constrain grade interpolation. Hard boundaries were used between each zone to further constrain grade interpolation. A three-pass search ellipse strategy was applied with search ellipses aligned with the major, semi-major and minor directions. The primary search ellipse dimensions were approximately equal to the variogram ranges. The secondary ellipse was approximately equal to twice the variogram ranges and the tertiary ellipse was approximately equal to three times the variogram range.

Ordinary kriging (OK) was used to estimate head grade (Fe, SiO_2, Al_2O_3, P, LOI, CaO, MgO, Mn, S, TiO_2, Na, Zn and K_2O) into the block model. Minimum and maximum samples required for grade interpolation vary according to model (typically 6 to 10 and 24 to 32 respectively).

The block model and drill-hole data was loaded into Datamine and coloured by Fe for each of the deposits. Drill-hole grades were initially visually compared with block model grades. Mean drill-hole statistics were then compared to mean block model grades for each estimated constituent on a domain by domain basis. Swath plots were then used to further compare drill-hole and block model grades for sections throughout the different deposits area by easting, northing and elevation.

CRITERIA OF CLASSIFICATION

The accuracy of the tonnage and grade associated with the Mineral Resource is denoted through the Resource Classification assigned to various parts of the deposit. The Mineral Resource estimate has been classified in accordance with the JORC Code, 2012 Edition using a qualitative approach. All factors that have been considered have been set out in JORC Table 1 (see Appendix X), which shows key criteria assessed in the classification process.

The accuracy of the estimates was first accessed using the geostatistical methods of calculated kriging efficiency (KE) and slope of regression (SLOPE) as a guide before wireframes were generated to code the model with Resource Classification code based on all the assessed criteria.

Drilling density in the mineralised horizons is deemed to be sufficient to support a majority of Indicated and Measured Resource classification with some material being classified as an Inferred Resource. Drilling occurs on 25m by 25m sections through the central project area, expanding to 50m by 50m towards the northern area.

Wire frames were created to flag the modelled resource as Inferred, Indicated or Measured based on the criteria and drilling density described above.

CUTOFF GRADE

The cut-off grade used to determine the Hematite Mineral Resource is 47% Fe.This is based on the economic cut-off grade for feed to the existing ore beneficiation process plants that operate at MBR.

ORE RESERVES AND MINING OPERATIONS

Material Assumptions

Arrium derived the Middleback Range Hematite Ore Reserve Estimate from the Mineral Resource estimates for the Middleback Range Hematite Project completed on the 30th of June 2014, with Ore Reserves classified in accordance with the JORC Code, 2012 Edition.

Approximately 15% of the Middleback Range Hematite Ore Reserve was derived from Measured Resources. Down-grading of Measured Resources to Probable Ore Reserves occurred at the Iron Baron Mining Area. This relates to lower confidence in survey accuracy for historical topographic surfaces.

The cut-off grade used to derive the ore reserve estimate is 53% Fe. This cut-off was determined based on detailed financial analysis from mine planning, and takes into account market requirements for current contracts, spot shipments and long-term planning considerations.

The minimum mining width applied to the ore reserve through the resource estimate is 5 m, and is consistent with the equipment and grade control block out methods used at the current operations. Internal dilution is modelled as part of the mining process and is taken into account in the resource model during the estimation process with appropriate recoveries applied to the ore reserve.

Ore recoveries and dilution are applied to the Ore Reserve prior to reporting as a percentage of the resource estimate within the mine design above the reserve cut-off of 53% Fe. This results in a reduction in the Fe value and addition to the SiO_2 and Al_2O_3 values based on the dilution of the host rock. Recovery and dilution factors vary at each location based on:

- review of resource reconciliation of current operations;
- orebody geometry;
- grade distribution;
- selection of mining equipment; and
- local mining conditions.

The reserve model derived from the resource model includes the key contaminants SiO_2, Al_2O_3, P, CaO, MgO, Mn, S, TiO_2, Na_2O, Zn and K_2O. Revenue assumptions are based on the operational model of a blended Lump and Fines product utilising external forecasts in line with those used in the Arrium business planning. These forecasts include expected reductions in iron ore price obtained due to the presence of these contaminants.

Pit designs have been derived based on pit optimisation work using current operating costs from nearby operations and commodity price and foreign exchange rate assumptions derived from independent external forecasts, and in line with those used in the Arrium business plan. The pit optimisation excluded the potential value associated with the Low Grade Ores within the pit shell that could potentially be treated through the beneficiation plants that operate at MBR.

Mining factors and assumptions are based on current operations and mining methods; i.e. conventional open-cut drill and blast, followed by load and haul.

Geotechnical inputs and parameters used in the Pit Optimisation were derived from geotechnical assessments based on:

- geotechnical drill holes at each mine location;
- existing mined slopes; and
- performance at current mining operations over time.

Final mine designs incorporate 8m benches, 16m or 24m high batters with varying berm widths based on local geotechnical conditions. Designed slope angles are based on planned pit depth, structure and geology.

The scale of mining size varies from localised cutback operations at Iron Knight to larger full fleet operations at the Iron Princess and Iron Monarch pits.

Ore processing uses industry-standard technology, with the processed Lump and Fines DSO products railed to the Whyalla Bulk Material Port for transhipping. A small portion of DSO Lump provides feed to the Whyalla Blast Furnace as part of Arrium's Integrated Steel business.

All necessary approvals and infrastructure is in place to support current and future operations at a production rate of 13Mtpa.

MATERIAL MODIFYING FACTORS

Modifying factors are based on existing operational parameters that include reconciliation of actual production data against previous estimates at Iron Chieftain, Iron Baron, Iron Duchess South and Iron Knight.

Modifying Factors derived for the Iron Princess, Iron Monarch, Iron Queen and Iron Cavalier are based on review of underlying Orebody Geometry, Mining Method and Minimum Mining Widths.

The Iron Knight, Iron Chieftain, Iron Baron, Iron Princess and Iron Monarch are all operating Mines and consequently modifying factors were based on existing operational data. All necessary approvals, plant and infrastructure are in place for these operations. The Iron Cavalier and Iron Queen are at Feasibility status and are in the process of developing applications for all approvals in this area.

EVALUATION

Market Assessment was based on internal and external market projections, with pricing forecasts based on existing contracts, external projections of commodity prices, foreign exchange and freight indices, each adjusted against expected costs and revenue derived from existing operations. Revenue forecasts account for the impact of deleterious elements and variation over project life.
Sales volumes have been taken from Life of Mine Plans; these are derived from current and future infrastructure capacity.
Derivation of mining costs is from existing operations and current service contracts in place. Cost escalation over the mine life is taken into account through CPI adjustment.

Projects are evaluated using Arrium external economic assumptions and NPV modelling in line with Arrium business planning.

REFERENCES

Bubner, G., Dentith, M., Dhu, T., & Hillis, R., 2003. Geophysical Exploration for Iron ore in the Middleback Ranges, South Australia, in *Geophysical Signatures of South Australian Mineral Deposits* (ed: M. C. Dentith), pp 29 – 46

Parker, A.J., 2012a. Gawler Craton. In: Drexel, J.F., Priess, W.V. and Parker, A.J. (Eds), *The geology of South Australia. Vol. 1, The Precambrian*. South Australian Geological Survey Bulletin 54, pp 51-68 (Reprinted with minor corrections 2012)

Parker, A.J., 2012b. Geological Framework. In: Drexel, J.F., Priess, W.V. and Parker, A.J. (Eds), *The geology of South Australia. Vol. 1, The Precambrian*. South Australian Geological Survey Bulletin 54, pp 51-68 (Reprinted with minor corrections 2012)

Parker, A.J. and Lemon, N.M., 1982. Reconstruction of the Early Proterozoic stratigraphy of the Gawler Craton, South Australia. Geological Society of Australia. *Journa*l, 29:221-238

Yeats, G.A., 1990. Middleback Range iron ore deposits, in *Geology of the Mineral Deposits of Australia and New Guinea* (ed: F.E. Hughs. The Australasian Institute of Mining and Metallurgy: Melbourne)

APPENDIX A: DEPOSIT DRILL-HOLE COLLAR LOCATIONS

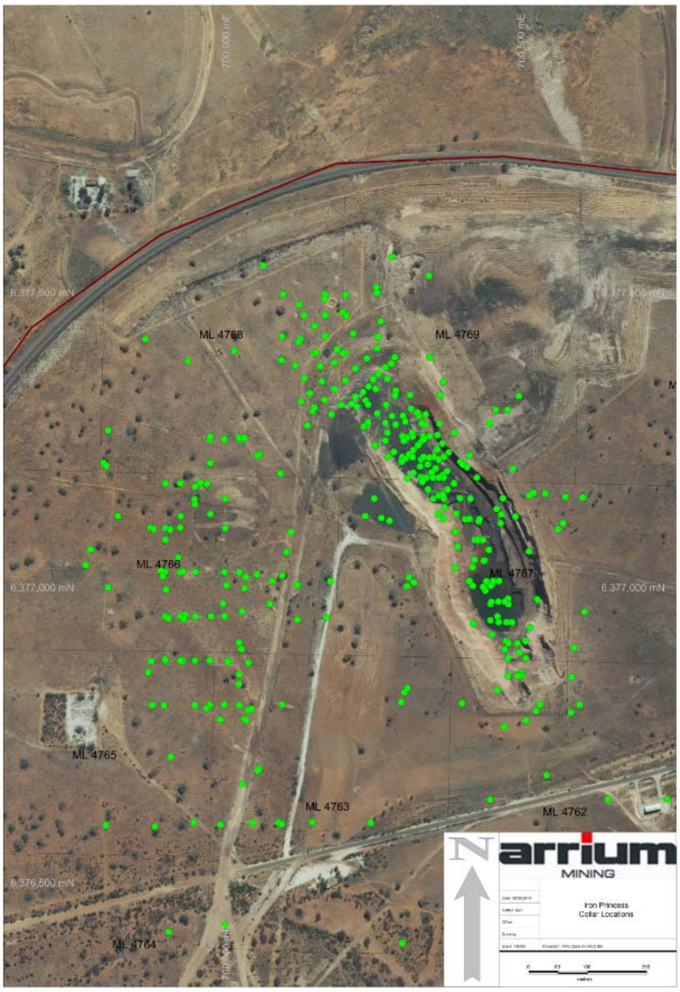


Figure A1: Iron Princess Drill-Hole Collar Locations

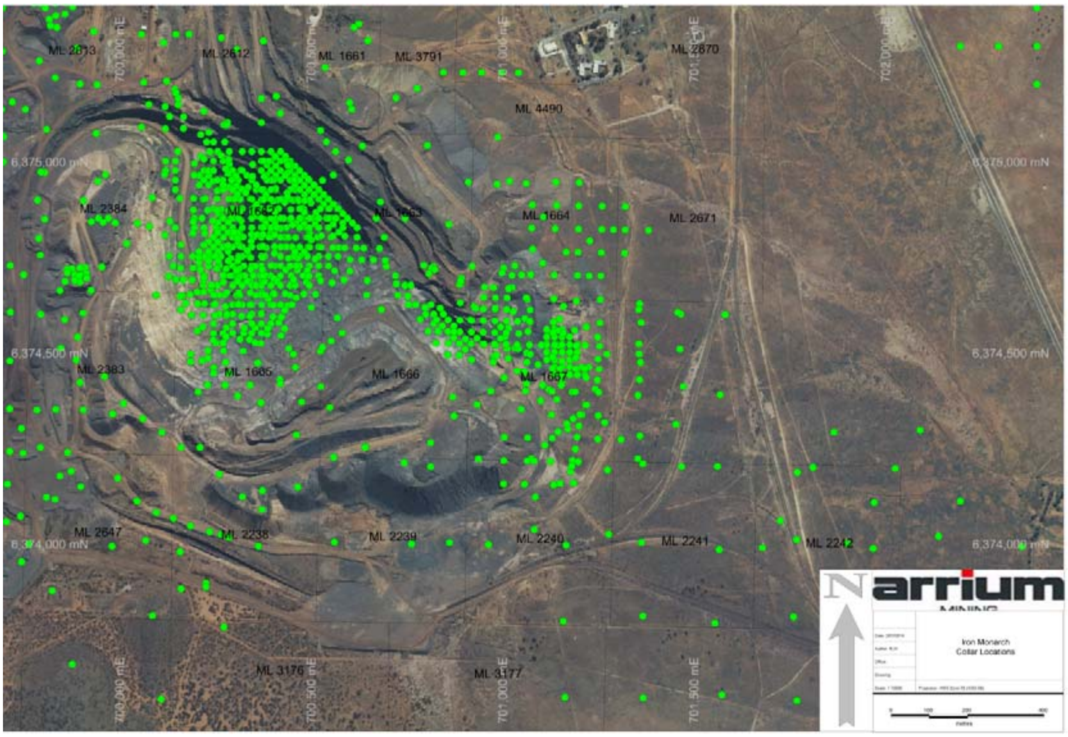


Figure A2: Iron Monarch Drill-Hole Collar Locations

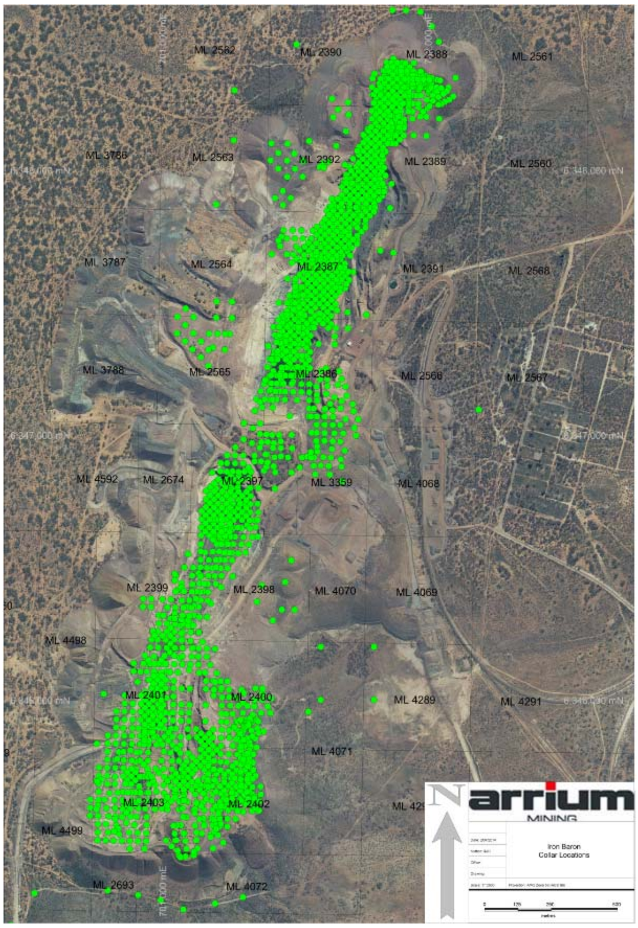


Figure A3: Iron Baron Drill-Hole Collar Locations

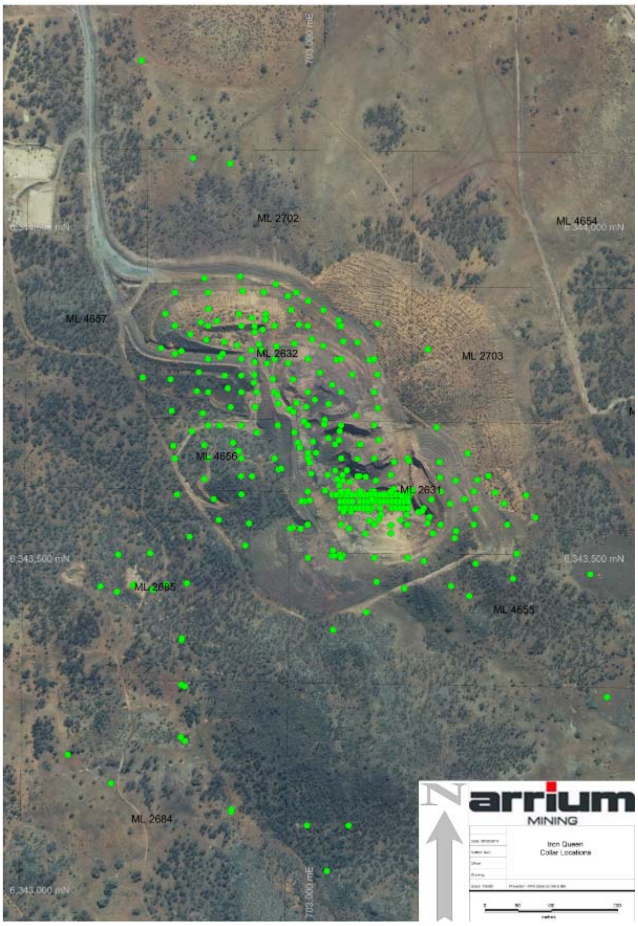


Figure A4: Iron Queen Drill-Hole Collar Locations

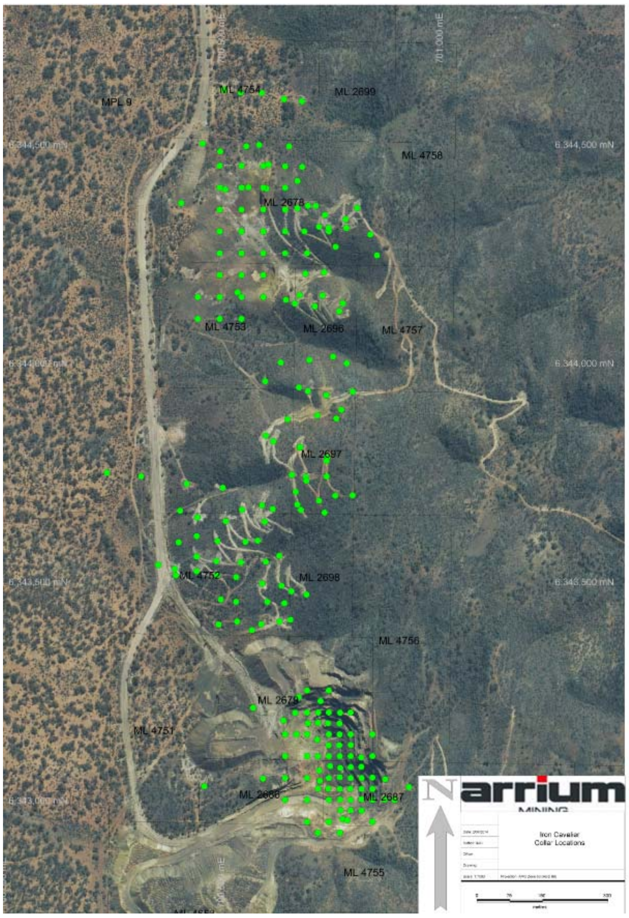


Figure A5: Iron Queen Drill-Hole Collar Locations

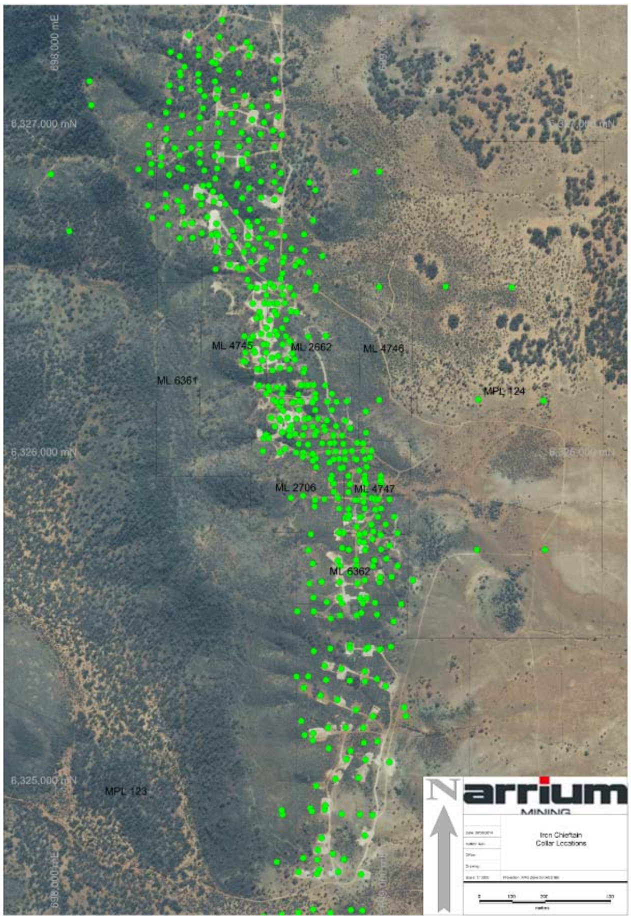


Figure A6: Iron Chieftain Drill-Hole Collar Locations

JORC CODE, 2012 EDITION – TABLE 1

Section 1 Sampling Techniques and Data

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td rowspan="3">Sampling techniques</td><td>Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.</td><td>Reverse circulation (RC) and diamond (DDH) drilling methods make up the bulk of the data set.
<table>
<tr><th>Project</th><th>OHP (m)</th><th>DDH (m)[1]</th><th>RC (m)</th><th>Method Not Known (m)[2]</th></tr>
<tr><td>Totals</td><td>8,405</td><td>33,656,</td><td>172,137</td><td>130,260</td></tr>
</table></td></tr>
<tr><td>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</td><td>Minimal information is available prior to 2003. Between 2003 and 2009 information is variable. From 2009 all drilling was logged with recovery recorded and entered into a sampling database with standardised codes onsite as soon as practically possible after the drill hole was completed.</td></tr>
<tr><td>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 (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</td><td>Pre 2003 – Collection of OHP and RC chips and cut diamond core samples over varying downhole sample intervals for whole rock and beneficiation analysis. Limited information is available on OHP, RC or diamond core sample collection methods.
2003 – Present– Collection of RC chip and diamond composite samples over varying downhole intervals for whole rock.
RC drilling samples were taken at consecutive 2m intervals down hole and split to on the drill rig to provide representative samples. Samples despatched to Amdel Laboratory Adelaide for sample preparation.
DD drilling samples were taken at intervals down hole as specified by the logging geologist for transport to BV Adelaide. BV crushed and split to samples in accordance with their protocols.</td></tr>
<tr><td>Drilling techniques</td><td>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).</td><td>The MBR have a long exploration history, with many historical records not complete. Historical drilling used open-hole percussion (OHP), diamond drilling (DDH) or a combination of OHP precollar and DDH tail. Reverse Circulation (RC) drilling commenced in the MBR in the late 1980s, and finally replaced OHP in late 1999.
RC drilling is now the primary drilling technique (140mm face sampling hammer) with some of DDH (primarily HQ_3 and NQ), and forms the bulk of the drilling program.</td></tr>
<tr><td rowspan="3">Drill sample recovery</td><td>Method of recording and assessing core and chip sample recoveries and results assessed.</td><td>Information on historical sample recovery (prior to 2003) is not available.
RC sample recovery and diamond core recovery is recorded. Logging geologists assessed RC sample recovery visually and recorded on site for transfer to the database for each 2m interval. Sample weights typically exceeded 30kg before splitting using the drill rig-mounted splitter.
Where DDH Recovery was recorded, it averaged 83% (total drilling). Only 69% of DDH records have Recovery listed.
Overall RC sample and core recoveries are considered appropriate.</td></tr>
<tr><td>Measures taken to maximise sample recovery and ensure representative nature of the samples.</td><td>RC samples passed through a cyclone with a dust collector and then split through either a three-stage riffle splitter or a rig mounted cone splitter. Samples were collected in pre-numbered calico bags directly from the splitter.
OHP sample intervals varied; ARI collect 2 m RC samples. DD sample intervals depend on lithology – maximum interval is 2 m, with shorter intervals collected according to lithology.
ARI saws diamond core in half, with half submitted for analysis and half retained for future reference.</td></tr>
<tr><td>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.</td><td>No relationship has been demonstrated between sample recovery and grade. Exploration geologists assess sample recovery visually during logging. Arrium consider sample recovery is appropriate for resource modelling. Any grade bias due to sample recovery (if present) is not material in the context of this Mineral Resource estimate.</td></tr>
<tr><td rowspan="3">Logging</td><td>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.</td><td>RC and DDH drill holes were geologically logged for lithology, colour, weathering, minerals, magnetism, main particle size and general observations in standard company template using a standard code library. The RC logging & sample interval was 2m.
The logging data is sufficiently detailed for the development of robust geological models to support Mineral Resource estimation, mining studies and metallurgical studies.
The company engaged specialist Geotechnical Consultants to undertake studies as required to assist with mine design by recommending appropriate wall design parameters.</td></tr>
<tr><td>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.</td><td>Logging of drill holes is qualitative, recording rock type, mineralogy, texture, alteration, grain size and comments using standardised logging codes originally developed by BHP.</td></tr>
<tr><td>The total length and percentage of the relevant intersections logged.</td><td>All drill holes were geologically logged.</td></tr>
</table>

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.*	ARI saws drill core in half, with half the core submitted for assay and the remaining half retained for future reference.
	If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.	RC samples pass through a cyclone with a dust collector then split using either a three-tier riffle splitter or a rig mounted cone splitter. Samples interval varies from 2 m–4 m, with the majority collected over 2 m. The majority of samples in the mineralised zone were dry. OHP samples were split by riffle splitting.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Coarse residues from crushed half core were riffle split down and combined within intervals nominated by the logging geologist. The composite samples are then processed similarly to RC samples. The laboratory crushes each RC sample and splits samples to nominal 3kg. Each 3kg sample is pulverised to 90% passing 106µm.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Arrium's documented sampling procedures ensure field staff collect samples to maximise representivity. The sampling techniques are considered appropriate, and provide a representative sample for assaying.
	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 QA/QC data (duplicates and internal standards) is available from drill programmes completed since 2003, which constitutes approximately 15% of the dataset at Princess, approximately 50% at Queen, and the bulk of the dataset at Chieftain. In 2006 commercial standards were used, and in 2011 field blanks were introduced. The field QA/QC results give confidence in sample collection procedures and analytical precision.
	Whether sample sizes are appropriate to the grain size of the material being sampled	The sample sizes are appropriate for the grain size of the material being sampled. Two metre sample intervals can determine the internal architecture of broad zones of Fe mineralisation.
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 were fused with Lithium Borate flux to form a glass disc and analysed by XRF for Fe, SiO_2, Al_2O_3, P, CaO, Cu, Pb, Ba, V, MgO, Mn, S, TiO_2, Na_2O, Zn and K_2O. Loss on Ignition (LOI) was determined using thermo-gravimetric methods. Samples were dried to 105° C, weighed, placed in a temperature controlled environment at 1000° C for one hour and then cooled and re-weighed.
	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.	No geophysical tools used in the preparation of this Mineral Resource estimate.
	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.	Laboratory quality assurance/quality control procedures involve the use of blanks to monitor carry-over contamination, splits to monitor precision and certified reference materials (CRMs) to monitor accuracy. Analytical results are not released if an issue is identified in the sample preparation or analysis stages. Arrium introduced field duplicates and CRMs from 2003. The field duplicate results give confidence in sample collection procedures and analytical precision for this period. Arrium used three in-house CRMs from 2003 through 2006, and implemented use of third-party supplied CRMs post-2006. The majority of results for the other CRMs lie within the plus / minus two standard deviation range providing confidence in the accuracy of the dataset for this period. Arrium introduced the use of Field Blanks in 2011, and sources Blank in bulk from its Ardrossan dolomite quarry. Arrium determined sub-sampling and assaying processes provide acceptable levels of accuracy and precision.
Verification of sampling and assaying	*The verification of significant intersections by either independent or alternative company personnel.*	Significant intersections have not been verified by an independent third party. Various deposits are currently in operation (e.g. Iron Chieftain, Iron Baron) and the geometry of the mineralisation from grade control drilling is broadly in line with the geometry expected following exploration drilling. Internal Arrium process review has validated the reported significant intersections
	The use of twinned holes.	No twinning of drillholes has occurred.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Data is either entered into a set of comma-delimited spread sheets on Toughbook laptops in the field or logged on paper and transcribed into Excel spread sheets. The data is then imported into an acQuire database with Arrium standard validation procedures in place prior to import.
	Discuss any adjustment to assay data.	The only adjustments made to the analytical data involved replacing below detection values with a value equal to the negative detection limit. This does not materially impact the Mineral Resource estimate.
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.*	Not all drill collar records identify the method of collar location. From 1973, Survey picked up the collar locations. ARI currently collects collar coordinates using either a hand held GPS or a differential Global Position System (DGPS). ARI considers it reasonable to assume historical collars were located using the best available method at the time. The degree of correlation of lithologies and mineralisation between historical and recent drill hole positions gives confidence this assumption is reasonable. Downhole surveys completed during older RC programs indicated minimal down-hole deviation from planned angle. Consequently more recent drilling programs did not use downhole geophysics, with the set-up angle used.

Criteria	JORC Code explanation	Commentary
Location of data points cont.	*Specification of the grid system used.*	The grid used is AMG66, Zone 53.
	Quality and adequacy of topographic control.	A new digital terrain model (DTM) of the original topographic surface for the various deposit areas was utilised. AAM Hatch Pty Ltd generated the new DTM (incorporating 1 m contour intervals) from Lydar fly-over. The topography data is considered to be high quality and adequate for the preparation of a Mineral Resource estimate.
Data spacing and distribution	*Data spacing for reporting of Exploration Results.*	Grid spacing across these projects are shown in the table below:
	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.	The mineralised domains have sufficient geological and grade continuity to support the definition of Mineral Resource and Ore Reserves classification given the current drill pattern.
	Whether sample compositing has been applied.	The majority RC samples were collected as 2m samples, with older RC samples were composited. OHP samples varied between 5 feet and 30 feet (~1.52m to ~9.14m).
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.*	The vast majority of the drilling is either vertical or designed at angles inclined to intersect mineralisation approximately perpendicularly.
	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.	No orientation based sampling bias has been identified.
Sample security	*The measures taken to ensure sample security.*	Arrium manages Chain of custody. Samples for analysis in Whyalla were delivered direct to the laboratory from the field; samples for analysis in Adelaide were at the Whyalla steelworks (secure site) then transported to the Bureau Veritas laboratory. Bureau Veritas acknowledges receipt of the samples by email. No information is available prior to 2009.
Audits or reviews	*The results of any audits or reviews of sampling techniques and data.*	Maxwell Geoservices Pty Ltd (Maxwell) completed a review of data capture and data management activities in May 2009. Maxwell found the procedures "*…to be of acceptable quality and broadly consistent with industry standards*". Maxwell also completed an audit of the Whyalla laboratory in 2009 and found that "*…practices are satisfactory and compatible with internationally accepted standards*".

Project	Drill holes	Drillhole Spacing
Princess	568	West: Approximately 50m x 25m; East Approximately 25m x 25m
Monarch	1,057	Approximately 25m x 25m
Baron	2,378	Approximately 25m x 10m
Queen	266	Approximately 25m x 25m
Cavalier	163	Approximately 50m x 50m
Chieftain	961	Averages from 50m x 50m to 25m x 25m

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.*	Arrium holds (through its subsidiary OneSteel Manufacturing Pty Ltd) the necessary mining leases (MLs), miscellaneous purpose licences (MPLs) and exploration licences (ELs) for continued operations across the MBR. There are no material issues with any third parties.
	The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.	The various MLs and MPLs generally expire between 2019 and 2032. ELs require renewal in 2015.
Exploration done by other parties	*Acknowledgment and appraisal of exploration by other parties.*	BHP or Arrium completed all exploration.
Geology	*Deposit type, geological setting and style of mineralisation.*	Hematite occurs as stratabound, supergene-enriched Paleoproterozoic deposits of the Lower Middleback Iron Formation (LMIF), part of the Hutchison Group within the Cleve Subdomain of the Gawler Craton. The Cleve Subdomain comprises tightly folded high-grade metamorphic rocks mainly derived from marine shelf sediments and mafic and acidic volcanics. Principal controls on the mineralisation are the Lower Carbonate to Silica

Criteria	JORC Code explanation	Commentary
		Facies Banded Iron of the Lower Middleback, proximity to the amphibolite intrusions and supergene weathering processes.
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:* – *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* – *hole length.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	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.	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
Data aggregation methods	*In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	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.	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
Relationship between mineralisation widths and intercept lengths	*These relationships are particularly important in the reporting of Exploration Results.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	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').	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
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.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
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.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
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.*	No other exploration data is considered material in the context of the Mineral Resource estimate which has been prepared. All relevant data is described elsewhere in Section 1 and Section 3.
Further work	*The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).*	Exploration for hematite is on-going across the MBR in support of mining operation. Resource definition drilling is planned to support mining within the Middleback Ranges. Additional drilling matched to future project and mine planning requirements will be completed as necessary.
	Diagrams clearly highlighting the areas of	Review of extensions to mineralisation will be completed matched to future

Criteria	JORC Code explanation	Commentary
	possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	project and mine planning requirements.

Section 3 Estimation and Reporting of Mineral Resources

Criteria	JORC Code explanation	Commentary
Database integrity	*Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.*	Arrium Mining uses acQuire software to manage the entry, storage and retrieval of exploration data. Arrium Mining staff manage the database. Checks have been conducted on aspects of the data entry. Checks include looking for missing/overlapping intervals, missing data, extreme values. No material issues were noted.
	Data validation procedures used.	Validation processes are in place to ensure that only “clean” data is loaded into the acQuire™ database. Data is then exported from the acQuire database in CSV format. The CSV files were used to create a desurveyed Datamine™ file which was subject to further validation including checking for overlapping samples and sample intervals which extend beyond the drill hole length defined in the collar table.
Site visits	*Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	Paul Leevers (Manager Resource Development, & Arrium’s Competent Person for the Mineral Resource estimate), visited the various deposit area many times since 2001.
	If no site visits have been undertaken indicate why this is the case.	Not applicable as site visits undertaken (see above).
Geological interpretation	*Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.*	Arrium considers the geological interpretations robust and suitable for resource estimation. The broad controls to the mineralisation are well understood, however structural complexity and the presence of intrusives complicates the distribution of mineralisation on a local basis.
	Nature of the data used and of any assumptions made.	Geological logging in conjunction with the chemical assays has been used to identify individual lithological units during the interpretation process. Fe, SiO_2, Al_2O_3, CaO and LOI and lithology were plotted on drillhole traces to assist the interpretation.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	Alternative interpretations are likely to impact the Mineral Resource estimate on a local but not global basis.
	The use of geology in guiding and controlling Mineral Resource estimation. The factors affecting continuity both of grade and geology.	Lithological interpretations were completed over the entire strike length of each of the deposits. These interpretations were linked to produce 3-Dimensional solids. Lithologies included amphibolites, schists, Banded Iron Formation (BIF), hematite / magnetite lithologies (separated according to mineralogy – in particular the abundance of talc, carbonate and silica) and late stage dykes. The lithological interpretation was used to guide Mineral Resource estimation activities, which is appropriate given the strong stratigraphic control on the mineralisation. A cut-off grade of 50% Fe was used to model hematite. The hematite deposits were formed by supergene enrichment of primary magnetite and hematite. Igneous intrusives and local structural offsets have also played a role in localizing the mineralisation. Geological continuity varies according to the relative importance of each of the controls. The deposits’ hematite mineralisation displays low to moderate nugget effect and significant short range grade variability which is largely attributable to supergene and subsequent hydrothermal processes.
Dimensions	*The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	see table below

Project Extents	**X m**	**Y m**	**Z m**
Princess	1,400	1,400	440
Monarch	2,000	1,750	430
Baron	1,560	3,255	318
Cavalier	1,500	2,500	304
Queen	1,000	1,000	304
Chieftain	1,100	2,400	340

Criteria	JORC Code explanation	Commentary
Estimation and modelling techniques	*The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used*	A field was created (“INTECODE”) in the cell model according to the following formula: INTECODE = DOMAIN + GEOZONE Hard boundaries were used between INTECODES when estimation grades into cells. *Variography was completed for each INTECODE.* No upper cuts were applied following statistical analysis. A three pass search ellipse strategy was applied with search ellipses aligned with the major, semi-major and minor directions. Minimum / maximum samples were set to 8 / 25 respectively for the primary, secondary and tertiary search pass.

Criteria	JORC Code explanation	Commentary
		Ordinary kriging (OK) was used to interpolate grades into cells. Nearest neighbour and inverse distance squared methods were also used to validate the OK results. Statistical and geostatistical analysis was completed using Supervisor software. All geological modelling and cell modelling was completed using Datamine™ software. Both software packages are used commonly in the mining industry.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	Previous Mineral Resource estimates are: ▪ Iron Princess – 2008 (Coffey Mining) ▪ Iron Monarch – 2013 (Arrium) ▪ Iron Queen – 2006 (Coffey Mining) ▪ Iron Baron – 2012 (Coffey Mining) ▪ Iron Cavalier – 2012 (Coffey Mining) ▪ Iron Chieftain – 2013 (Arrium) The Mineral Resource estimate has progressively increased over this period primarily due to the completion of drilling programmes. The 2013 work has increased/reduced the Iron Princess and Iron Queen Mineral Resource estimates and increased/reduced the iron Chieftain Mineral Resource estimate.
	The assumptions made regarding recovery of by-products.	No assumptions were made regarding recovery of by-products. Fe is the only chemical constituent of economic interest.
	Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).	The following deleterious chemical constituents were estimated: SiO_2, Al_2O_3, P, CaO, MgO, Mn, S, TiO_2, Na_2O, Zn and K_2O.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	The block size is considered to be appropriate given the dominant drill hole spacing and style of mineralisation for each deposit and are outlined below:

Project	X m	Y m	Z m
Princess Block size	25	25	8
Sub cell size	5	5	4
Monarch Block size	25	25	10
Sub cell size	5	5	2
Baron Block size	15	15	6
Sub cell size	3	3	1
Cavalier Block size	10	12.5	8
Sub cell size	2	2.5	1
Queen Block size	10	12.5	8
Sub cell size	2	2.5	1
Chieftain Block size	10	10	8
Sub cell size	2	2	1

Criteria	JORC Code explanation	Commentary
	Any assumptions behind modeling of selective mining units.	No assumptions were made regarding selective mining units. Selective mining units were not defined or corrected for in the resource estimate. However, a bulk open pit mining scenario using large scale miners targeted at a 5-10m mining bench was considered in selection of the parent block size.
	Any assumptions about correlation between variables	No assumptions were made regarding correlation between estimated variables.
	Description of how the geological interpretation was used to control the resource estimates.	Sectional lithological interpretations were linked to build 3-dimensional lithological models. These models were used to flag the cell model with a GEOZONE code which was used as a hard boundary when interpolating grades into cells.
	Discussion of basis for using or not using grade cutting or capping.	There were no significant outliers in the dataset and therefore grade cutting was not considered necessary.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	The cell model and drill hole data was loaded into Datamine and coloured by Fe. Drill hole grades were initially visually compared with cell model grades. Mean drill hole statistics were then compared to mean cell model grades for each estimated constituent on a domain by domain basis. Swath plots were then used to compare drillhole and cell model grades for slices throughout the deposit area.
Moisture	*Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	Tonnages are estimated on a wet basis. Moisture globally of 3% was determined diamond core and in-pit grab samples. The contract laboratory crushes samples to -8mm and then analyses using standard thermogravimetric methods.
Cut-off parameters	*The basis of the adopted cut-off grade(s) or quality parameters applied.*	The Mineral Resource has been reported above a cut-off grade of 47% Fe. This is the cut-off grade for low-grade ore at MBR operations.
Mining factors or assumptions	*Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is*	MBR deposits are currently mined through conventional drill and blast open pit methods. A minimum mining width of 5 m was applied when interpreting the mineralisation boundaries. This minimum mining width is consistent with the equipment and

Criteria	JORC Code explanation	Commentary
Mining factors or assumptions cont.	*always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.*	grade control block out methods used at MBR operation. The Z block boundaries were aligned with current and planned open pit benches. No internal or external dilution was modelled. Selective mining units were not defined or corrected for in the resource estimate or a recoverable resource estimated. However, a bulk open pit mining scenario possibly using large bench (5m) scale miners was considered and reflected in the block model construction and estimation parameters developed.
Metallurgical factors or assumptions	*The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	Low-grade material (47% Fe–53% Fe) is beneficiated at Arrium's MBR operations. An assumption is therefore made that beneficiation of low-grade material will be possible to produce a >55% Fe product for shipping. The remaining Mineral Resource (>53% Fe) is DSO which does not require any metallurgical processing prior to shipment.
Environmental factors or assumptions	*Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	At current operations waste is disposed on designated stockpiles which will be rehabilitated under the Mine and Rehabilitation Plan approved for each site. It has been assumed for the purpose of this estimate that legislation in this regard will remain similar to current such that future operations will operate in the same way.
Bulk density	*Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.*	Water displacement density determinations from mineralisation samples at each of the resources were used to derive density estimations. Tonnage is estimated on a dry basis and then adjusted to account for moisture. Density determinations taken from similar mineralisation at Iron Duchess were used to derive density values to assign to the cell models for Iron Queen, Baron, Cavalier and Chieftain. The following density assumptions were made: Amphibolite / Background – 2.55 tm^3 Hematite mineralisation – 3.56 tm^3 BIF background – 2.70 tm^3 Density for the Monarch and Iron Princess were derived from Density determinations taken from the Iron Monarch Pit and density values to assign to the cell model. The following density assumptions were made: Amphibolite / Background / Dolerite / BIF – 2.50 tm^3 Heamatite mineralisation – 4.10 tm^3 Scree Ore – 3.10 tm^3 Basement – 2.60 tm^3
	The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.	The host sequence is comprised of high grade metamorphic rocks which generally display low porosity. Some goethitic lithologies are slightly porous. Samples are sealed with hot wax or wrapped in water proof film to prior to water displacement to ensure no influence of measurement due to porosity.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	All mineralisation is informed by fixed bulk density measurements. Density variations within mineralised domains will create some uncertainty with this assumption. This has been considered when classifying the Mineral Resource. 90% of the mineralised domains were interpolated from fixed density data.
Classification	*The basis for the classification of the Mineral Resources into varying confidence categories.*	The Mineral Resources Classification is based on 3 stages of review: ▪ Geostatistical review – nominally Kriging Efficiency and Slope of regression; ▪ Drillhole spacing and number of samples; and ▪ Visual review. The Mineral Resource has been classified following due consideration of all criteria contained in Section 1, Section 2 and Section 3 of JORC 2012 Table 1. Areas of Measured, Indicated and Inferred Mineral Resource are considered by

Criteria	JORC Code explanation	Commentary
Classification cont.		the Competent Person to have been appropriately informed and estimated for the classification determined.
	Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).	The Competent Person has confirmed that appropriate account was taken of all relevant criteria including data integrity, data quantity, geological continuity and grade continuity. Areas of Measured Indicated Resource and Inferred Mineral Resource are considered by the Competent Person to have been appropriately informed and estimated for the classification determined.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The resulting Mineral Resource estimates provide an appropriate global representation of these deposits in the view of the Competent Person
Audits or reviews	*The results of any audits or reviews of Mineral Resource estimates.*	All Mineral Resource estimates are subject to technical review by CSA Global Pty Ltd on an annual basis.
Discussion of relative accuracy/ confidence	*Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.*	Mineral Resource accuracy is communicated through the classification assigned to various parts of the deposits. The Mineral Resource estimates were classified in accordance with the JORC Code, 2012 Edition using a qualitative approach. All factors considered were adequately communicated in Section 1 and Section 3 of this Table. The resource estimate of grade and tonnage is based on the assumption that standard open cut mining methods will be applied and that high confidence grade control (e.g. dedicated RC grade control drilling) will be available for final mining ore-waste delineation.
	The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.	The Mineral Resource estimates are based on a realistic parent cell sizes and should be considered global resource estimates, and not recoverable resource estimates based on SMU blocks (25 m X x 25 m Y x 8 m Z).
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Iron Chieftain, Iron Baron, Iron Duchess South and Iron Knight Mineral Resource estimates have been reconciled by comparing the estimated resource depletion to actual production data. The reconciliation results are consistent with the expected accuracy of the model. The Iron Queen, Iron Monarch, Iron Princess and Iron Cavalier have not been mined to date. The relative accuracy and confidence of the Mineral Resource estimate is inherent in the Mineral Resource Classification.

Section 4 Estimation and Reporting of Ore Reserves

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	*Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.*	Refer to Section 3. The Ore Reserve estimate is based on the Mineral Resource determined as of 30 June 2014.
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are inclusive of the Ore Reserves.
Site visits	*Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	The Competent person visits the sites on a regular basis, with no material issues identified to date.
	If no site visits have been undertaken indicate why this is the case.	Not applicable.
Study status	*The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves*	Deposits are located in operational mining areas, with the majority of plant and equipment in place.
	The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.	The Iron Chieftain, Iron Knight, Iron Duchess South, Iron Baron, Iron Princess and Iron Monarch are operating mines. The Iron Queen and Iron Cavalier are at Feasibility Study Level with all modifying factors considered based on existing nearby operations.
Cut-off parameters	*The basis of the cut-off grade(s) or quality parameters applied.*	Reserve cut-off grades are based on an Fe value greater than 53%. This has been derived from financial analysis based on detailed mine planning, including mine production schedules that indicated that a saleable product could be produced, taking into account market considerations for current contracts and

Criteria	JORC Code explanation	Commentary
		spot shipments.
Mining factors or assumptions	*The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design)*	Conversion of Mineral Resources to Ore Reserves has been by the application of appropriate mining factors and assumptions based on current mining practices, operating and capital costs based on Arrium's existing mining operations, as well as mine specific factors such as local geotechnical investigations.
	The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc	Arrium currently mines iron ore across the MBR using a conventional open cut, drill and blast, followed by truck and shovel operation. The mining method described is considered appropriate for the deposits in question.
	The assumptions made regarding geotechnical parameters (eg pit slopes, stope sizes, etc), grade control and pre-production drilling.	Geotechnical parameters have been based either on actual pit specific geotechnical investigations or, in the absence of any specific pit geotechnical information, it has been assumed that geotechnical parameters will be similar to historical geotechnical investigations of current mining operations located nearby and/or slope stability observations over time in areas that have been previously mined.
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	The resource models described in Section 3 formed the basis of pit optimisation work.
	The mining dilution factors used.	Dilution factors are applied to the resource prior to reporting of the reserve estimate based on reconciliation data. In general, the reconciliation data indicates that a reduction in the reported Fe value needs to be applied with a corresponding increase in the SiO_2 and Al_2O_3 values. Across the various pits, a 0% to 1% reduction in Fe has been applied with the average Fe reduction being 0.8%. Similarly the corresponding increase in SiO_2 and Al_2O_3 ranges between 0% and 1% with an average increase of 0.6%.
	The mining recovery factors used.	Mining recovery factors are derived from reconciliation data and vary from 90% to 100%.
	Any minimum mining widths used.	With respect to mining selectivity a 5m minimum mining width is applied in line with current mining practices. With respect to the minimum cutback width, 30m has been applied
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Mining of Inferred Mineral Resources is scheduled at the end of mine life and comprises approximately 15% of the total schedule.
	The infrastructure requirements of the selected mining methods	Current infrastructure meets on-going requirements for the selected mining method.
Metallurgical factors or assumptions	*The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.*	All Direct Saleable Ore (DSO) is stockpiled at the Run of Mine (ROM) pad and crushed and screened to deliver a "Fines Product" (-6.3mm) and a "Lump Product" (=6.3mm to -31.5mm). Minor quantities are used as feedstock for the Whyalla Blast Furnace.
	Whether the metallurgical process is well-tested technology or novel in nature.	The metallurgical process of crushing and screening iron ore to produce either Lump or Fines product is industry standard.
Metallurgical factors or assumptions cont.	*The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.*	Metallurgical test work and assumptions are derived from samples taken from diamond core, in-pit samples and production data from nearby operations of similar mineralogy, They have been used to derive Lump / Fines splits and processing characteristics Production data from nearby operations forms the majority of test sampling and is used for existing operations In pit samples have been used for the Queen, Cavaliar and Monarch deposits. Diamond test work is limited to Iron Chieftain. No metallurgical recovery factors are applied.
	Any assumptions or allowances made for deleterious elements.	All DSO and beneficiated product produced at MBR will form part of an overall Arrium blended product with ore from other operations. The impact of deleterious elements is taken into account during the economic assessment as part of the Arrium overall business model.
	The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.	Bulk samples are not used as most of the deposits have an operating history.
	For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?	Operational history is considered an adequate model for new deposits in the same area as they have the same mineralogy and stratigraphy.
Environmental	*The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage*	The Iron Chieftain, Iron Knight, Iron Duchess South, Iron Baron, Iron Princess and Iron Monarch are operating Mines and have all required approvals in place. The Iron Cavalier and Iron Queen pits are at Feasibility status and applications for the various environmental and mining approvals are in progress. Based on discussions with the Department for Manufacturing, Innovation, Trade, Resources and Energy (DMITRE), no issues that would prevent issuing the approvals in the timeframe required are anticipated.

Criteria	JORC Code explanation	Commentary
	and waste dumps should be reported.	
Infrastructure	*The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.*	All infrastructure for mining and beneficiation is currently in place and operating as part of existing MBR operations.
Costs	*The derivation of, or assumptions made, regarding projected capital costs in the study.*	Projected capital costs (including initial waste pre strip) are derived from costs of existing operations and are consistent with the Arrium business plan, projected over the life of mine. Projected mining costs are derived from current service contracts in place with mining contractors, adjusted to take into account projected changes in activity (due to pit depths, haulage distances, etc.) over the life of mine. All costs assumptions are calculated to include inflation and discount rates used are consistent with those used in the Arrium business plan, projected over the life of mine.
	The methodology used to estimate operating costs.	Mine plans and operational schedules are used to derive forecasts for operating costs. Operating costs are based on existing operations.
	Allowances made for the content of deleterious elements.	Reduction of revenue due to the presence of deleterious elements in the Arrium blended product have been factored into revenue assumptions (see further below).
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co- products.	Commodity price projections are based on independent external forecasts and reflect the assumptions made in the Arrium business plan.
	The source of exchange rates used in the study.	Foreign exchange projections are based on independent external forecasts and reflect the assumptions made in the Arrium business plan.
	Derivation of transportation charges.	Shipping and freight charge projections are based on available independent external forecasts, adjusted to reflect shipping from Whyalla to our primary markets in North Asia and to take into account existing contracts of afreightment and reflect the assumptions made in the Arrium business plan.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Treatment and refining charges are based on the cost of existing operations and reflect the assumptions made in the Arrium business plan. The impact of specifications of ore shipped is dealt with in the revenue assumptions as reflected in the Arrium business plan (see further below).
	The allowances made for royalties payable, both Government and private.	Allowances for royalties are based on current legislation and reflect the assumptions made in the Arrium business plan.
Revenue factors	*The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.*	Revenue projections are based on external independent forecasts of commodity prices and foreign exchange, adjusted for expected realised prices derived from current contracts and Arrium blended product specifications (including grade and the presences of any deleterious elements) expected under current life of mine planning.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	See above description of revenue factors.
Market assessment	*The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.*	An assessment of the demand, supply and stock situation is made by Arrium based on its internal market research and internal market sensitivity analysis, which includes market intelligence by its staff based in Asia.
Market assessment cont.	*A customer and competitor analysis along with the identification of likely market windows for the product.*	Analysis of customers and competitors is carried out by Arrium's internal analysts based on internal market research and forecasts and internal market sensitivity analysis, which includes market intelligence by its staff based in Asia.
	Price and volume forecasts and the basis for these forecasts.	Volume forecasts have been based on current and future planned infrastructure capacity and current mine plans. Pricing forecasts are derived in the manner described above under the criterium Revenue factors.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract	Not applicable as iron ore is not considered an industrial material.
Economic	*The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.*	The NPV derived by applying the modifying factors as described in the previous criteria.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	As above.
Social	*The status of agreements with key stakeholders and matters leading to social licence to operate.*	All mining approvals and an indigenous land use agreement are in place and are inclusive of all regulatory requirements needed to support the reported Ore Reserves.
Other	*To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:*	

Criteria	JORC Code explanation	Commentary
	Any identified material naturally occurring risks.	No material natural occurring risks, e.g. geological risks, were identified.
	The status of material legal agreements and marketing arrangements.	MBR is an existing operation and sales will continue through existing marketing arrangements, including a mix of term and spot contracts. Contracts are in place with BGC Contracting Pty Ltd, Lucas Earthmovers Pty Ltd for mining operations and Genesee & Wyoming Australia Pty for rail haulage.
	The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent	Iron Duchess South, Iron Baron, Iron Princess and Iron Monarch are operating mines and have all necessary approvals in place for operations. The Iron Cavalier and Iron Queen are at Feasibility status and applications for mining leases are currently being prepared. Heritage agreements are in place for all relevant areas.
Classification	*The basis for the classification of the Ore Reserves into varying confidence categories.*	The classification of the Ore Reserves into varying confirdence categories based on operating history and commensurate with the Ore Reserve classification as defined in JORC 2012.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The Ore Reserve classification reflects the views of the Competent Person.
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	Approximately 15% of Probable Ore Reserves are derived from Measured Mineral Resources and were down-graded due to uncertainties related with historical survey information.
Audits or reviews	*The results of any audits or reviews of Ore Reserve estimates.*	An external audit of the Ore Reserve estimates has been completed by Coffey Mining Pty Ltd, an independent consultant and no material issues were identified.
Discussion of relative accuracy/ confidence	*Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.*	The relative accuracy and confidence level in the Ore Reserve estimate is in line with that of the Ore Reserve classification and has been validated through reconciliation of current mining operations. Where concern exists in the confidence of the Ore Reserve estimate it has been downgraded to a Probable Ore Reserve.
	The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.	Statement relates to global estimates within the MBR Hematite project.
Discussion of relative accuracy/ confidence cont.	*Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.* *It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	The modifying factors are based on existing operational parameters that include reconciliation of actual production data.

MIDDLEBACK RANGES MAGNETITE INTRODUCTION

Arrium's Middleback Ranges Magnetite project ("Iron Magnet") lies at the southern end of the Middleback Ranges (MBR), on the northeast of the Eyre Peninsular, South Australia (Figure 1). Iron Magnet is approximately 50kms southwest of Whyalla.

The OneSteel Limited group was established in 2000, after being spun out of the BHP group. The assets of the OneSteel Limited group included the Whyalla Steelworks and port and the former BHP mining operations in the MBR. In July 2012, OneSteel Limited was renamed Arrium Limited

GEOLOGY AND GEOLOGICAL INTERPRETATION

Regional framework

Iron Magnet is a stratabound Palaeoproterozoic magnetite deposit of the Lower Middleback Iron Formation (LMIF), part of the Hutchison Group. The Hutchison Group forms part of the Cleve Subdomain of the Gawler Craton, and lies on its western edge (Figure 2). The Cleve Subdomain comprises tightly folded high-grade metamorphic rocks mainly derived from marine shelf sediments and mafic and acidic volcanics (Parker, 1993).

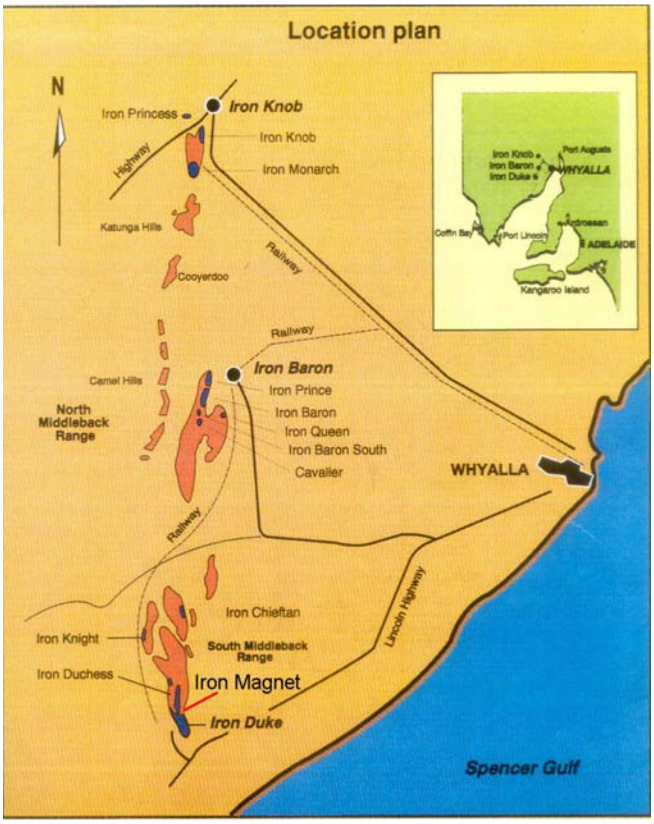


Figure 1: Site Location

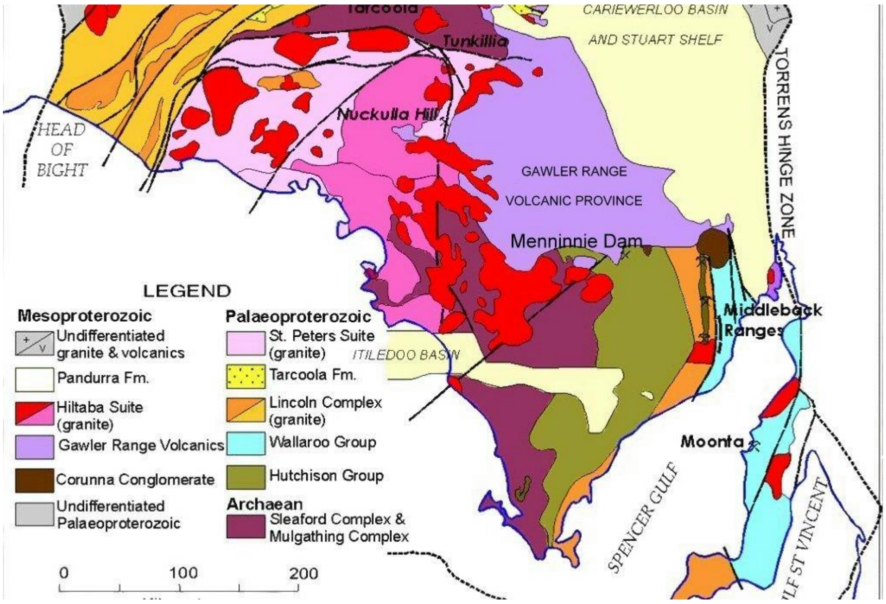


Figure 2: Regional Geology
After Parker 2012b

Middleback Ranges Framework

In the South Middleback Range (SMR), the Hutchison Group is composed of the Middleback Subgroup. The Middleback Subgroup comprises the Katunga Dolomite, the LMIF, the Cook Gap Schist and the Upper Middleback Iron Formation (UMIF). The LMIF hosts the Middleback Ranges iron deposits.

Iron Magnet

Iron Magnet lies adjacent to and below the now depleted Iron Duke hematite deposit. The predominant gangue mineral plus magnetite forms the basis for the Iron Magnet rock and ore classification. Classification boundaries are gradational, laterally and up-sequence, particularly from carbonate to talc dominated and talc to silica dominated gangue. Major north-south shear zones (Eastern and Western Shear Zones) provide the east and west limits to the magnetite host sequence (Figure 4). East-west meso- and macroscopic parasitic folds on the easterly dipping west limb of a much larger syncline are dominant structural features controlling the distribution and morphology of host rock units, as are the north-striking, steeply westerly dipping amphibolite dykes (Leevers et al 2005).

Levers et al (2005) provides a more detailed description of geology and mineralisation.

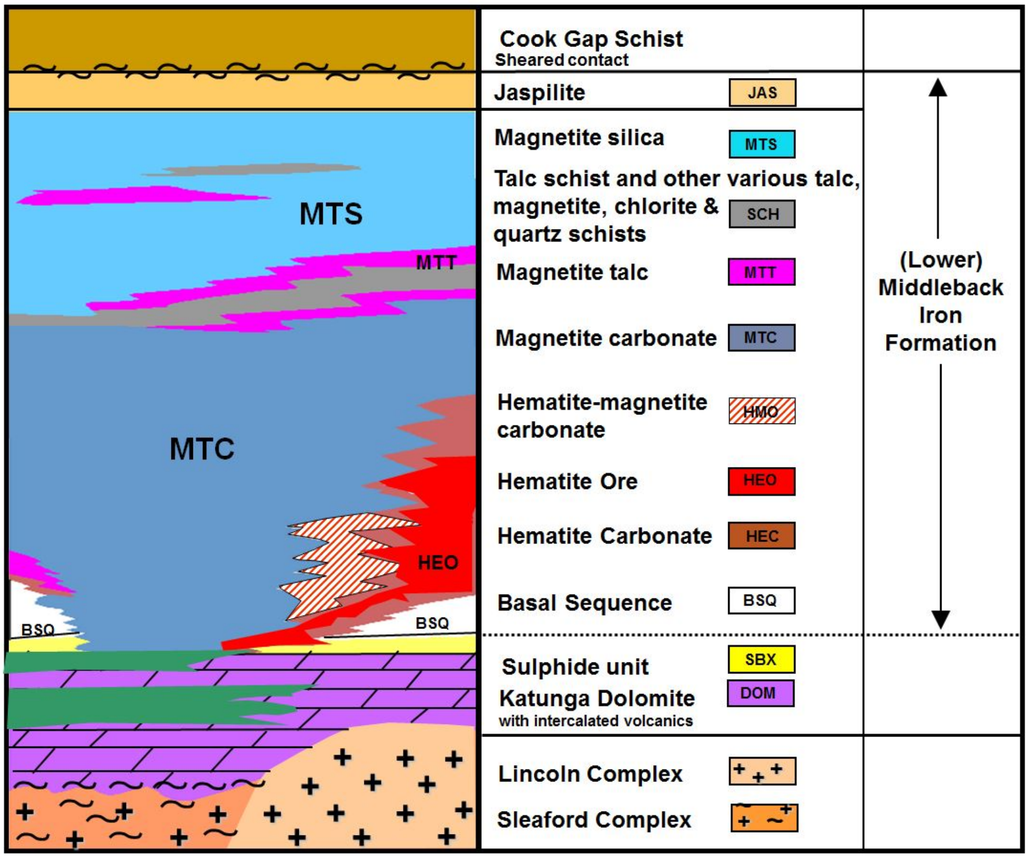


Figure 3: Iron Magnet Stratigraphy

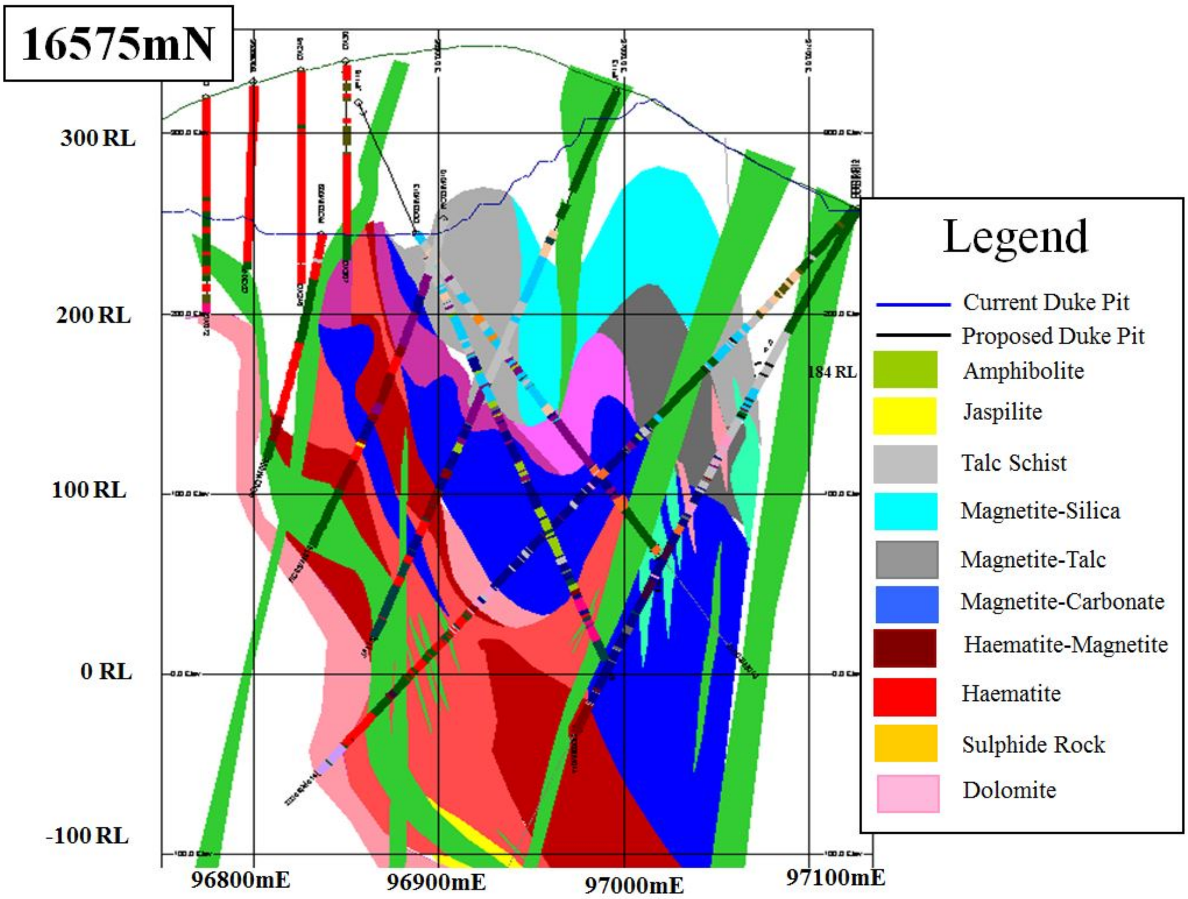


Figure 4: Iron Magnet Geology Section 16,575 m N

DRILLING

Historical drilling at Iron Magnet used open-hole percussion (OHP), diamond drilling (DDH) or a combination of OHP precollar and DDH tail. The first reverse circulation (RC) drilling occurred in 1988, and its use increased until late 1999, when it completely replaced OHP.

In 1989, BHP established the Iron Duchess low-grade project to examine the feasibility of developing a high-grade Fe concentrate from the magnetite-bearing rocks. The project drilled 10,700m of diamond core that included beneficiation test work.

In 2002, OneSteel (the new tenement owner) initiated Project Magnet, establishing the viability of targeting magnetite as the primary feed source for the blast furnace. This included:

- logging and assay of 18,000m of new drilling (14,000m NQ DDH, 4,000m RC). This drilling programme complemented and infilled the 1992 drilling;
- migration of existing assay and geological databases; and
- re-logging and re-assay of all old drill core intersecting the deposit.

The development of the Iron Duke pit over the Iron Magnet, while useful for drill hole planning, resulted in the development of a high wall on the eastern side of the ridge. This high wall limited access to approximately 600m strike length of the interpreted upper area of the Iron Magnet deposit, resulting in Inferred Resource being declared for the upper areas in this region of the deposit (Leevers et al, 2005).

In order to improve resource definition, in 2011 and 2012 Arrium drilled an additional 132 reverse circulation (RC) drillholes (18,887m), and added diamond tails to 9 of these (972.6m). Appendix 1 Shows drillholes at Iron Magnet.

SAMPLING

RC and DD drilling methods provided the vast majority of samples (approximately 80%). ARI collected RC samples in 2m intervals. DD sample intervals depended on lithology, with a maximum interval of 2 m. No information is available on the OHP sampling methodology. OHP sample intervals varied, and can exceed 9.1m (approximately 30 feet).

RC samples passed through a cyclone fitted with a dust collector, and then split through either a three-stage riffle splitter or a rig mounted cone splitter into pre-numbered calico bags. Prior to sampling, ARI cuts diamond core in half, with half submitted for analysis and half retained for future reference.

Half drill core for geochemical analysis was crushed, riffle split down and combined within intervals nominated by the logging geologist, after which it is processed in a similar way to RC chips.

Magnetite sample preparation varied slightly over the project's history:

- Pre-2003. No available information on sample preparation.
- 2003 – 2010. Samples crushed to 850µm and riffle split to 1 kg, then ground in a rod/ball mill for 15 minutes to 80% passing 38µm.
- 2011 – 2013. Samples dried to 60°C, crushed to 100% passing 1.7 mm. then rotary/riffle split to 1 kg and ground in the rod mill at 73% solids to 80% passing 38µm.

Davis Tube Recovery (DTR)

Nominated samples from all programmes were analysed using DTR. After grinding, a 20g sample passed through the DTR for separation into magnetic and non-magnetic fractions. The fractions were filtered, dried and analysed by X-ray fluorescence (XRF) spectrometer.

SAMPLE ANALYSIS METHODS

Sample Preparation

ARI uses Bureau Veritas (BV) for sample analysis. BV Whyalla and BV Adelaide completed most recent analytical work. BV's sample preparation process was:

- Sorting & drying
- Weighing.
- Crushing.
- Where samples weigh more than 3kg weight the sample is split to provide a nominal 3kg weight for sample pulverising.
- Pulverising.
- Sizing.

Sample Analysis

BV fused samples with Lithium Borate flux to form a glass disc and analysed by XRF for all analytes apart from loss on ignition (LOI). The XRF4 suite analysed (with detection limits in ppm) was:

Fe (100)	SiO_2 (100)	Al_2O_3 (100)	Mn (100)	TiO_2 (100)	CaO (100)
MgO (100)	K_2O (100)	P (10)	S (10)	Na_2O (100)	Cu (10)
Pb (10)	Zn (10)	Ba (10)	V (10)		

To determine LOI, BV dried samples at 105°C, weighed, placed in a temperature-controlled environment at 1,000°C for one hour, cooled, and re-weighed. LOI was reported as a percentage.

QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

Field QA/QC

Limited QA/QC was completed prior to 2003. Arrium introduced field duplicates and CRMs from 2003. The field duplicate results give confidence in sample collection procedures and analytical precision for this period.

Arrium used three in-house CRMs from 2003 through 2006, and implemented use of third-party supplied CRMs post-2006, with variable results. The majority of results for the other CRMs lie within the plus / minus two standard deviation range providing confidence in the accuracy of the dataset for this period. Arrium introduced the use of Field Blanks in 2011, and sources Blanks in bulk from its Ardrossan dolomite quarry. From 2011, Arrium targeted a QA/QC value of 10% of the Primary Samples from equal numbers of CRMs, field duplicates and field blank samples.

Laboratory QA/QC

The goal of the Laboratory QA/QC Program is to guarantee the generation of precise and accurate analytical data. Quality assurance involves the planned and systematic actions necessary to provide confidence in each analytical result. The QA/QC Program has two components:

- Quality Assurance (QA) - the system used to verify that the entire analytical process is operating within acceptable limits; and
- Quality Control (QC) - the mechanisms established to measure non-conforming method performance

ESTIMATION METHODOLOGY

Magnetite mineralisation forms a relatively continuous stratabound zone with gradational contacts. The magnetite mineralisation is hydrothermal in origin with the classification of associated magnetite ore types based on the predominant gangue mineral and magnetite content. Gangue minerals associated with magnetite host rocks show a broad zonation upwards from carbonate to talc to silica. These three main gangue minerals are predominantly layer-selective, with lesser vein and fracture fill, and are considered alteration products. Several intrusives dykes stope out the mineralisation and are continuous along the length of mineralisation.

Within the main portion of the deposit drill spacing approximates a 25m x 25m pattern, which widens to 50m x 50m past northing 17,000mN. Lithological interpretations were completed over the entire strike length of the deposit on 25m sections. These sectional interpretations were linked to produce 3-Dimensional solid wireframes. Wireframes were created for the following lithologies amphibolites, schists, Banded Iron Formation (BIF), hematite / magnetite lithologies (separated according to mineralogy – in particular the abundance of talc, carbonate and silica) and late stage dykes. Wireframes were created from the lowest lithology in the sequence to the highest, being the amphibolite intrusives, with each successive wireframe over printing the previous. This method was used to prevent gaps in interpreted lithology and misclassification of ore type.

A DTR cut-off grade 20% was used to interpret magnetite lithologies and the relative chemical concentration of elements Calcium and Silica. Variography was completed for head grade constituents, mass recovery and Fe (concentrate). The magnetite mineralisation displays low to moderate nugget effect and significant short range grade variability, largely attributable to supergene and subsequent hydrothermal processes.

A 3-dimensional block model was constructed for resource estimation purposes, based on a 25 m E x 25 m N x 8 m RL (east x north x RL) parent block size. The selected parent block size is considered to be consistent with the available data, the data characteristics (spacing and variability as defined by variography) and the envisaged mining practises. Sub-blocking to a cell size of 2.5mE x 5mN x 2mRL was undertaken to allow the effective volume representation of the interpreted wireframes for the various horizons.

Hard boundaries were used between each zone to further constrain grade interpolation. A three- pass search ellipse strategy was applied with search ellipses aligned with the major, semi-major and minor directions. The primary search ellipse dimensions were approximately equal to the variogram ranges. The secondary ellipse was approximately equal to twice the variogram ranges and the tertiary ellipse was approximately equal to three times the variogram range.

Ordinary kriging (OK) was used to estimate head grades (Fe, SiO_2, Al_2O_3, P, LOI, CaO, MgO, Mn, S, TiO_2, Na, Zn and K_2O), density and concentrate grades (same chemical constituents as the head grades) into the block model. Minimum and maximum samples vary according to domain (typically 6 to 10 and 24 to 32 respectively).

CRITERIA FOR RESOURCE CLASSIFICATION

The Mineral Resource accuracy is communicated through the classification assigned to various parts of the deposit. The Mineral Resource estimate has been classified in accordance with the JORC Code, 2012 Edition using a qualitative approach. All factors that have been considered have been set out in JORC Table 1, which shows key criteria assessed in the classification process. The accuracy of the estimates was first accessed using the geostatistical methods of calculated kriging efficiency (KE) and slope of regression (SLOPE) as a guide before wireframes were generated to code the model with Resource Classification.

Drilling density in the mineralised horizons is sufficient to support an Indicated and Measured Resource classification with some Inferred Resources. Drilling occurs on 25 m by 25 m sections through the central project area, expanding to 50 m by 50 m towards the northern area.

Wire frames were created to flag the resource model as Inferred, Indicated or measured based on all criteria assessed as described in JORC 2012 Table 1 and in conjunction with the option of the competent person and drilling sample density.

Examples of key criteria assessed in the classification process are, Quality of the assay data, the location and accuracy of drill-hole data, the confidence in the geological interpretation, the appropriateness of estimation technique used and the quality of the final estimated values. The classification of the Iron Magnet Resource has not been limited to only these criteria.

Areas of Measured Indicated Resource and Inferred Mineral Resource are considered by the Competent Person to have been appropriately informed and estimated for the classification determined.

CUTOFF GRADE

The cut-off grade used to develop the Iron Magnet Mineral Resource is >20% DTR Mass Recovery and <50% SiO_2 derived from metallurgical test work, concentrator production reconciliation and orebody lithology.

ORE RESERVES AND MINING OPERATIONS

Material assumptions

Arrium derived the Middleback Range Magnetite Ore Reserve Estimate from the Resource estimate for the Middleback Range Magnetite Project completed on the 30th of June 2014, with Reserves classified in accordance with the JORC Code, 2012 Edition. No measured resources have been downgraded to Probable Reserves.

The cut-off grade used to derive the ore reserve estimate is SiO2</= 50% and a DTR Mass Recovery of >20%. This cut-off was determined based on detailed financial analysis from mine planning, and takes into account concentrator capability and market considerations for the quality of concentrate produced.

The minimum mining width applied to the ore reserve through the resource estimate is 5 m, and is consistent with the equipment and grade control block out methods used at the operation. The vertical block dimension and origin was selected to align with planned open pit benches. Internal dilution is modelled as part of the mining process and is taken into account in the resource model during the estimation process with appropriate recoveries applied to the ore reserve.

No dilution factors are applied to the Magnetite Reserve Estimate. Ore recoveries are applied to the Ore Reserve prior to reporting as a percentage of the resource estimate within the Mine Design above the reserve cut-off of is SiO2</= 50% and a DTR Mass Recovery of >20%.

Recovery factors are based on:

- review of resource reconciliation of current operations;
- orebody geometry;
- grade distribution;
- selection of mining equipment; and
- local mining conditions.

The reserve model derived from the resource model includes the key contaminants SiO_2, Al_2O_3, P, CaO, MgO, Mn, S, TiO_2, Na_2O, Zn and K_2O. Revenue assumptions are based on the full downstream benefit of the use of Magnetite through the Whyalla Integrated Steelworks expected under current life of mine planning, in line with the assumptions used in Arrium business planning and projected over the life of mine.

Excess concentrate revenue projections are based on external independent forecasts of commodity prices and foreign exchange. Pit designs have been derived by pit optimization using current operating costs and commodity price and foreign exchange rate assumptions derived from independent external forecasts, in line with those used in Arrium business planning.

Mining factors and assumptions are based on current operations and mining practices; i.e. open-cut drill and blast mines utilising standard truck and shovel fleets.

Geotechnical inputs and parameters used in the Pit Optimization were derived from:

- 12 geotechnical drillholes at the Iron Magnet Mine Site;
- existing mined slopes; and performance at the existing Iron Duke Mine at the same location.

Final mine designs incorporate 8m benches, 16 or 24m high batters with varying berm widths based on local geotechnical conditions, and designed slope angles based on planned pit depth, structure and geology.

Further review of pit design, mine economics and associated mining factors is based on Detailed Mine Planning, infrastructure design and capital estimates as considered appropriate by the Competent Person for feasibility level study.

The Iron Magnet Pit is inclusive of the Iron Duke Pit (depleted) and has a strike length of 2,500m a width of 800m and a maximum depth of 220m (Figure 5). The 5- Staged design allows concurrent or independent mining of each stage. Stages Idp A and Idp B are the Iron Duke Pit and Stages Mag C, Mag D and Mag E are the Iron Magnet Pit (Figure 5).

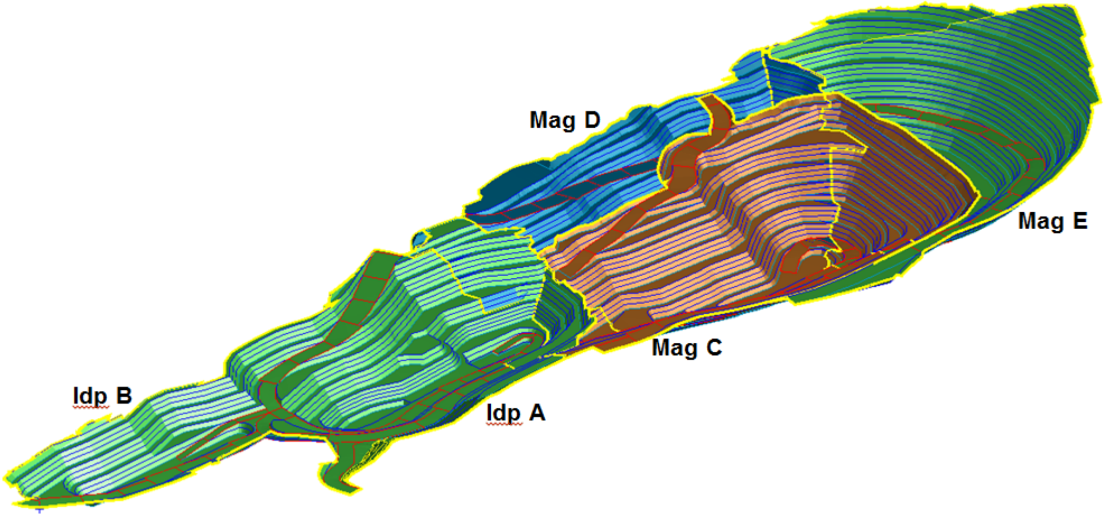


Figure 5. Magnet Pits C, D and E and Iron Duke Pits A and B – oblique view.

Ore processing uses industry-standard technology for magnetite concentration, with the resultant concentrate slurred to Whyalla by pipeline where it is converted to Iron Ore Pellets for use in the Whyalla Concentrator or exported through the Whyalla Port.

Necessary infrastructure is in place to support current and future operations.

MATERIAL MODIFYING FACTORS

Modifying factors are based on existing operational parameters that include reconciliation of actual production data against previous estimates at Iron Magnet.

All necessary approvals, plant and infrastructure are in place for ongoing operations.

EVALUATION

Market Assessment is based on the delivery of concentrate as iron making feed to the Whyalla Steelworks. It is assumed that excess concentrate produced is sold as shipments on the spot market. Revenue forecasts account for the impact of deleterious elements and variation over project life.

Exchange rate projections are based on external forecasts.

Concentrator Targets have been set at a production rate of 1.75Mt (Dry) of concentrate per annum and is the key target on which the Life of Mine Plan is based.

Derivation of costs is from the existing operation and current service contracts in place. Cost escalation over the mine life is taken into account through CPI adjustment.

The MBR Magnetite Project has been evaluated using the group economic assumptions and internal NPV Targets set for the Whyalla Integrated Steelworks.

REFERENCES

Hand, M., Reid, A., Jagodzinski, L., 2007. Tectonic framework and evolution of the Gawler Craton, southern Australia. *Economic Geology* 102 (8), 1377–1395.

Leevers, P., Gaughan, C., & Bubner, G., 2005. The Iron Magnet Deposit. In: *Proceedings, Iron Ore Conference 2005* pp 1-13

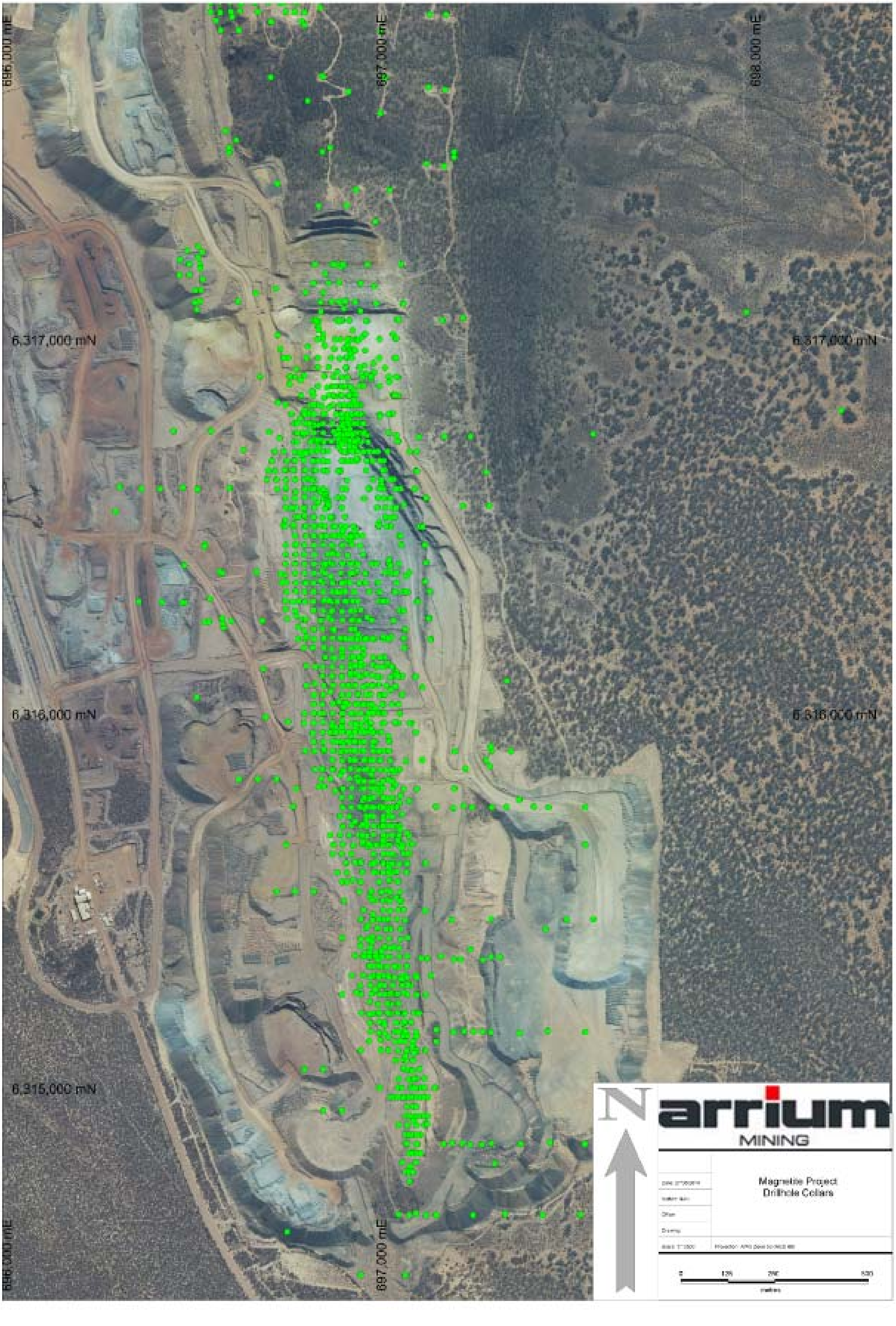
Parker, A.J., 2012a. Gawler Craton. In: Drexel, J.F., Priess, W.V. and Parker, A.J. (Eds), *The geology of South Australia. Vol. 1, The Precambrian*. South Australian Geological Survey Bulletin 54, pp 51-68 (Reprinted with minor corrections 2012)

Parker, A.J., 2012b. Geological Framework. In: Drexel, J.F., Priess, W.V. and Parker, A.J. (Eds), *The geology of South Australia. Vol. 1, The Precambrian*. South Australian Geological Survey Bulletin 54, pp 51-68 (Reprinted with minor corrections 2012)

Parker, A.J. and Lemon, N.M., 1982. Reconstruction of the Early Proterozoic stratigraphy of the Gawler Craton, South Australia. Geological Society of Australia. *Journa*l, 29:221-238

Yeats, G.A., 1990. Middleback Range iron ore deposits, in *Geology of the Mineral Deposits of Australia and New Guinea* (ed: F.E. Hughs) (The Australasian Institute of Mining and Metallurgy: Melbourne)

APPENDIX A: IRON MAGNET DRILL-HOLE COLLARS



JORC CODE, 2012 EDITION – TABLE 1

Section 1 Sampling Techniques and Data

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td><i>Sampling techniques</i></td><td><i>Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.</i></td><td>Reverse circulation (RC) and diamond (DD) drilling methods provided samples on a nominal 50m x 25m grid spacing.
<table>
<tr><th>Method</th><th>Drill holes</th><th>Metres</th><th>Metres %</th></tr>
<tr><td>OHP</td><td>503</td><td>31,641.98</td><td>21%</td></tr>
<tr><td>DDH</td><td>155</td><td>27,130.79</td><td>18%</td></tr>
<tr><td>RC</td><td>823</td><td>92,647.80</td><td>61%</td></tr>
<tr><td>Total</td><td>1,481</td><td>151,420.57</td><td>100%</td></tr>
</table></td></tr>
<tr><td></td><td><i>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</i></td><td>All drilling was logged with recovery recorded and entered into a sampling database with standardised codes onsite soon as practically possible after the drill hole was completed
For further detail, refer to the <i>Drill sample recovery</i> section, below.</td></tr>
<tr><td></td><td><i>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 (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</i></td><td>Pre 2003 – Collection of OHP and RC chips and cut diamond core samples over varying downhole sample intervals for whole rock and beneficiation analysis. No information is available on OHP, RC or diamond core sample collection.
2003 – Present – Collection of RC chip and diamond composite samples over varying downhole intervals for whole rock and beneficiation analyses using Davis Tube Recovery (DTR) methods. Most pre-2011 beneficiation samples collected over 4 m intervals; two metre samples collected from 2011 through 2012.
RC drilling samples were taken at consecutive 2m intervals down hole and split to on the drill rig to provide representative samples. Samples despatched to Amdel Laboratory Adelaide for sample preparation.
DD drilling samples were taken at intervals down hole as specified by the logging geologist for transport to BV Adelaide. BV crushed and split to samples in accordance with their protocols.</td></tr>
<tr><td><i>Drilling techniques</i></td><td><i>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).</i></td><td>The Iron Magnet deposit has a long exploration history.
Drilling commenced in 1958. Historical drilling used open-hole percussion (OHP), diamond drilling (DDH) or a combination of OHP precollar and DDH tail.
The first use of Reverse Circulation (RC) drilling was in 1988, with OHP phased out over time. RC fully replaced OHP in late 1999. RC drilling is the primary drilling technique (5.25” or 5.5” face sampling hammer) with a significant amount of DD (primarily A, HQ3 and NQ) drilling.
<table>
<tr><th>Method</th><th>Metres</th><th>%</th></tr>
<tr><td>OHP</td><td>31,641.98</td><td>21%</td></tr>
<tr><td>DDH</td><td>27,130.79</td><td>18%</td></tr>
<tr><td>RC</td><td>92,647.80</td><td>61%</td></tr>
<tr><td>Total</td><td>151,420.57</td><td>100%</td></tr>
</table></td></tr>
<tr><td><i>Drill sample recovery</i></td><td><i>Method of recording and assessing core and chip sample recoveries and results assessed.</i></td><td>RC sample recovery and diamond core recovery is recorded. Logging geologists assessed RC sample recovery visually and recorded on site for transfer to the database for each 2m interval. Sample weights typically exceeded 30kg before splitting using the drill rig-mounted splitter.
Recovery of diamond drilling was recorded on site and averaged 95% (total hole) and 95% for the main mineralised zones.
Overall RC sample and core recoveries are considered appropriate.</td></tr>
<tr><td></td><td><i>Measures taken to maximise sample recovery and ensure representative nature of the samples.</i></td><td>RC samples pass through a cyclone with a dust collector and then split through either a three-stage riffle splitter or a rig mounted cone splitter. Samples are collected in pre-numbered calico bags directly from the splitter.
OHP sample intervals varied; ARI collect 2 m RC samples. DD sample intervals depend on lithology – maximum interval is 2 m, with shorter intervals collected according to lithology. ARI saws diamond core in half, with half submitted for analysis and half retained for future reference.</td></tr>
<tr><td></td><td><i>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.</i></td><td>No relationship has been demonstrated between sample recovery and grade. Exploration geologists assess sample recovery visually during logging. Arrium consider sample recovery is appropriate for resource modelling. Any grade bias due to sample recovery (if present) is not material in the context of this Mineral Resource estimate.</td></tr>
<tr><td><i>Logging</i></td><td><i>Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource</i></td><td>RC and DD drill holes were geologically logged for lithology, colour, weathering, minerals, magnetism, main particle size and general observations in standard company template using a standard code library. The RC logging & sample interval was 2m.</td></tr>
</table>

Criteria	JORC Code explanation	Commentary
Logging cont.	*estimation, mining studies and metallurgical studies.*	The logging data is sufficiently detailed for the development of a robust geological model to support Mineral Resource estimation, mining studies and metallurgical studies. Geotechnical studies on the Magnet pit have been performed by Peter O'Bryan & Associates. A geotechnical investigation for the west wall of the Magnet Stage D pit undertaken in 2012-2013 included geotechnical domain and televiewer logging of 8 x diamond drill holes, review of photogrammetric mapping data, as well as major defect mapping of the west wall exposures of the existing Magnet pit (and Duke North), which collectively formed the basis for assessment and recommendation of appropriate wall design parameters (WDP's). A similar investigation (including geotechnical drill holes) was completed for the east wall of the Magnet pit in 2011; this data was also used to provide appropriate WDPs.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.	Logging of drill holes is qualitative, recording rock type, mineralogy, texture, alteration, grain size and comments using standardised logging codes originally developed by BHP.
	The total length and percentage of the relevant intersections logged.	All drill holes were geologically logged.
Sub-sampling techniques and sample preparation	*If core, whether cut or sawn and whether quarter, half or all core taken.*	ARI saws drill core in half, with half the core submitted for assay and the remaining half retained for future reference.
	If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.	RC samples pass through a cyclone with a dust collector then split using either a three-tier riffle splitter or a rig mounted cone splitter. Samples interval varies from 2 m–4 m, with the majority collected over 2 m. The majority of samples in the mineralised zone were dry.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Coarse residues from crushed half core were riffle split down and combined within intervals nominated by the logging geologist. The laboratory crushes each RC sample and splits samples to nominal 3kg. Each 3kg sample is pulverised to 90% passing 106µm. Magnetite sample preparation has varied slightly over the project's history: ▪ 1993 – 2010. Samples crushed to 850 µm and riffle split to 1 kg, then ground in a rod/ball mill for 15 minutes to 80% passing 38 µm. ▪ 2011 – Present. Samples dried to 60° C, crushed to 100% passing 1.7 mm. then rotary/riffle split to 1 kg and ground in the rod mill at 73% solids to 80% passing 38 µm. *Davis Tube Recovery (DTR)* Samples from all programmes were then filtered and dried. DTR analysis was completed on 20 g samples employing a stroke frequency of 60/minute, stroke length of 38 mm, magnetic field strength of 3,000 Gauss, tube angle of 45°, tube diameter of 25 mm, water flow rate of 540ml/min, and washing for approximately 15 minutes or until the wash water is clear.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Arrium's documented sampling procedures ensure field staff collect samples to maximise representivity. The sampling techniques are considered appropriate, and provide a representative sample for assaying.
	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 QA/QC data (duplicates and internal standards) is available from drill programmes completed since 2003, which constitutes approximately half of the dataset. In 2006 commercial standards were used, and in 2011 field blanks were introduced. The field QA/QC results give confidence in sample collection procedures and analytical precision.
	Whether sample sizes are appropriate to the grain size of the material being sampled	The sample sizes are considered appropriate for the grain size of the material being sampled. A broad zone of Fe mineralisation exists with internal architecture which is able to be discerned using 2 m sample intervals.
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.*	Head grade Samples were fused with Lithium Borate flux to form a glass disc and analysed by XRF for Fe, SiO_2, Al_2O_3, P, CaO, Cu, Pb, Ba, V, MgO, Mn, S, TiO_2, Na_2O, Zn and K_2O. Loss on Ignition (LOI) was determined using thermo-gravimetric methods. Samples were dried to 105° C, weighed, placed in a temperature controlled environment at 1000° C for one hour and then cooled and re-weighed. DTR DTR methods are used to determine magnetite content of drill samples. A magnetite concentrator is used to process the ore at Iron Magnet, hence the DTR method is considered appropriate. Head (total sample) and concentrate (magnetic fraction) assays are by XRF.
	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.	No geophysical tools used in the preparation of this Mineral Resource estimate.
	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.	Laboratory quality assurance / quality control procedures involve the use of blanks to monitor carry-over contamination, splits to monitor precision and certified reference materials (CRMs) to monitor accuracy. Analytical results are not released if an issue is identified in the sample preparation or analysis stages. Arrium introduced field duplicates and CRMs from 2003.

Criteria	JORC Code explanation	Commentary
Quality of assay data and laboratory tests cont.		The field duplicate results give confidence in sample collection procedures and analytical precision for this period. Arrium used three in-house CRMs from 2003 through 2006 and implemented use of third-party supplied CRMs post-2006, with variable results. The majority of results for the other CRMs lie within the plus / minus two standard deviation range providing confidence in the accuracy of the dataset for this period. Arrium introduced the use of Field Blanks in 2011, and sources Blank in bulk from its Ardrossan dolomite quarry. Arrium determined sub-sampling and assaying processes provide acceptable levels of accuracy and precision.
Verification of sampling and assaying	*The verification of significant intersections by either independent or alternative company personnel.*	Significant intersections have not been verified by an independent third party. The Iron Duke / Iron Magnet deposit is currently in operation however and the geometry of the mineralisation from grade control drilling is broadly in line with the geometry expected following exploration drilling.
	The use of twinned holes.	No twinning of drill holes has been completed at Iron Duke / Iron Magnet.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Data is either entered into a set of comma-delimited spreadsheets on Toughbook laptops in the field or logged on paper and transcribed into Excel spreadsheets. The data is then imported into an acQuire database with appropriate Arrium validation procedures in place prior to import.
	Discuss any adjustment to assay data.	The only adjustments made to the analytical data involved replacing below detection values with a value equal to the negative detection limit. This does not materially impact the Mineral Resource estimate.
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.*	Not all drill collar records identify the method of collar location. From 1973, Survey picked up the collar locations. ARI currently collects collar coordinates using either a hand held GPS or a differential Global Position System (DGPS). ARI considers it reasonable to assume historical collars were located using the best available method at the time. The degree of correlation of lithologies and mineralisation between historical and recent drill hole positions gives confidence this assumption is reasonable. Down-hole surveys completed during older RC programs indicated minimal down-hole deviation from planned angle. Consequently more recent drilling programs did not use down-hole geophysics, with the set-up angle used.
	Specification of the grid system used.	The grid used is AMG66, Zone 53.
	Quality and adequacy of topographic control.	A new digital terrain model (DTM) of the original topography surface for the Iron Duke / Iron Magnet area was utilised. AAM Hatch Pty Ltd generated the new DTM (incorporating 1 m contour intervals) from fly-over. The topography data is considered to be high quality and adequate for the preparation of a Mineral Resource estimate.
Data spacing and distribution	*Data spacing for reporting of Exploration Results.*	Drill coverage is somewhat variable along strike and down-dip. From 14,800 m N (the southern model limit) through 17,000 m N, the drill pattern approximates 25 m along strike (north-south) x 25 m down-dip. From 17,000 m N through 17,200 m N the drill pattern approximates 50 m along strike x 50 m down-dip. From 17,200 m N through 17,700 m N (the northern model limit) there is only limited drilling. At depth, the drilling is less dense. Beneath approximately 100 m RL, drill holes are often spaced 50 m apart (or wider). The original surface RL is approximately 210 m RL – 290 m RL.
	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.	The mineralised domains have sufficient geological and grade continuity to support the definition of Mineral Resource and Ore Reserves classification given the current drill pattern.
	Whether sample compositing has been applied.	Magnetite samples were composited to 4 m prior to grade interpolation. This was considered appropriate given that samples have either been collected at 2 m or 4 m intervals.
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.*	The mineralisation (hematite and magnetite) dips moderately-steeply to the east. The vast majority of the drilling is either vertical or inclined to the west to intersect the mineralisation approximately perpendicularly.
	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.	No orientation based sampling bias has been identified.
Sample security	*The measures taken to ensure sample security.*	Arrium manages Chain of custody is managed by Arrium Mining. Samples are stored in core yard at the Whyalla steelworks (secure site) then transported to Bureau Veritas in Whyalla. Bureau Veritas then either complete the analysis in Whyalla or transport the samples to Adelaide for analysis.
Audits or reviews	*The results of any audits or reviews of sampling techniques and data.*	Maxwell Geoservices Pty Ltd (Maxwell) completed a review of data capture and data management activities in May 2009. Maxwell found the procedures “to be of acceptable quality and broadly consistent with industry standards”. Maxwell also completed an audit of the Whyalla laboratory in 2009 and found that “practices are satisfactory and compatible with internationally accepted

Criteria	JORC Code explanation	Commentary
		standards”.

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.*	Arrium holds ownership to all tenements necessary for on-going Iron Magnet operations through its subsidiary OneSteel Manufacturing Pty Ltd. There are no material issues with any third parties.
	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 MLs apart from ML6167 require renewal in 2029; ML 6167 requires renewal in 2032. MPLs require renewal between 2029 and 2033.
Exploration done by other parties	*Acknowledgment and appraisal of exploration by other parties.*	All exploration has been carried out by Arrium or BHP.
Geology	*Deposit type, geological setting and style of mineralisation.*	Iron Magnet is a stratabound Paleoproterozoic magnetite deposit of the Lower Middleback Iron Formation (LMIF), part of the Hutchison Group. It lies at the southern end of the Middleback Ranges within the Cleve Subdomain of the Gawler Craton. The Cleve Subdomain comprises tightly folded high-grade metamorphic rocks mainly derived from marine shelf sediments and mafic and acidic volcanics. Magnetite mineralisation is hydrothermal in origin, pervasive and shows selective replacement at all scales from laminae to beds.
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:* – *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* – *hole length.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	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.	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
Data aggregation methods	*In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	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.	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
Relationship between mineralisation widths and intercept lengths	*These relationships are particularly important in the reporting of Exploration Results.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	If it is not known and only the down hole lengths are reported, there should be a	Exploration results have not been reported separately, therefore not relevant

Criteria	JORC Code explanation	Commentary
	clear statement to this effect (eg 'down hole length, true width not known').	for the reporting of Mineral Resource estimates.
Diagrams ***Diagrams cont.***	*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.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
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.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
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.*	No other exploration data is considered material in the context of the Mineral Resource estimate which has been prepared. All relevant data has been described elsewhere in Section 1 and Section 3.
Further work	*The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).*	Subsequent resource definition drilling, matched to future project and mine planning requirements may be completed but is not proposed at this time.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Review of extensions to mineralisation will be completed matched to future project and mine planning requirements.

Section 3 Estimation and Reporting of Mineral Resources

Criteria	JORC Code explanation	Commentary
Database integrity	*Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.*	Arrium Mining uses acQuire software to manage the entry, storage and retrieval of exploration data. Arrium Mining staff manage the database. Internal checks have been conducted on aspects of the data entry. Checks include looking for missing/overlapping intervals, missing data, extreme values. No material issues were noted.
	Data validation procedures used.	Validation processes are in place to ensure that only "clean" data is loaded into the acQuire™ database. Data is then exported from the acQuire™ database in CSV format. The CSV files were used to create a desurveyed Datamine™ file which was subject to further validation including checking for overlapping samples and sample intervals which extend beyond the drill hole length defined in the collar table.
Site visits	*Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	Paul Leevers (Arrium Mining Manager Resource Development), who is acting as Competent Person for the Mineral Resource estimate, has carried out many site visits to the deposit area since 2005.
	If no site visits have been undertaken indicate why this is the case.	Not applicable as site visits undertaken (see above).
Geological interpretation	*Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.*	Arrium considers the geological interpretation robust and suitable for resource estimation. The broad controls to the mineralisation are well understood, however structural complexity and the presence of intrusives complicates the distribution of mineralisation on a local basis. Magnetite mineralisation forms a relatively continuous stratabound zone with gradational contacts. Intrusives stope out the mineralisation. The orientation of these intrusives is quite well known and many of them are very continuous.
	Nature of the data used and of any assumptions made.	Geological logging in conjunction with the chemical assays has been used to identify individual lithological units during the interpretation process. Fe, SiO_2, Al_2O_3, CaO and LOI and lithology were plotted on drill hole traces to assist the interpretation.
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	Alternative interpretations are likely to impact the Mineral Resource estimate on a local but not global basis.
	The use of geology in guiding and controlling Mineral Resource estimation. The factors affecting continuity both of	Lithological interpretations were completed over the entire strike length of the Iron Duke / Iron Magnet deposit. These interpretations were linked to produce 3-Dimensional solids. Lithologies included amphibolites, schists, Banded Iron

Criteria	JORC Code explanation	Commentary
	grade and geology.	Formation (BIF), hematite / magnetite lithologies (separated according to mineralogy – in particular the abundance of talc, carbonate and silica) and late stage dykes. The lithological interpretation was used to guide Mineral Resource estimation activities, which is appropriate given the strong stratigraphic control on the mineralisation. A cut-off grade of 50% Fe was used to model hematite lenses and a cut-off grade of 20% DTR was used to interpret magnetite lithologies. The hematite deposit has been formed from supergene enrichment and magnetite has formed from hydrothermal bedding replacement. Igneous intrusives and local structural offsets have also played a role in localizing the mineralisation. Geological continuity varies according to the relative importance of each of the controls. The hematite and magnetite mineralisation displays low to moderate nugget effect and significant short range grade variability which is largely attributable to supergene and subsequent hydrothermal processes.
Dimensions	*The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	The Mineral Resource extends over an area of 1300 m E (across-strike) x 3,000 m N (along strike) x 440 m RL (down-dip).
Estimation and modelling techniques	*The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used*	Each lithological unit was assigned a "ZONE" number that was coded into the block model and used to constrain grade interpolation. Hard boundaries were adopted. No upper cuts were applied following statistical analysis. Variography was completed for head grade constituents, mass recovery and Fe (concentrate). A three pass search ellipse strategy was applied with search ellipses aligned with the major, semi-major and minor directions. The primary search ellipse dimensions were approximately equal to the variogram ranges. The secondary ellipse was approximately equal to twice the variogram ranges and the tertiary ellipse was approximately equal to three times the variogram range. Search parameters were based on variography carried out on the composites and supported by geological knowledge gained from field mapping and drill hole data Ordinary kriging (OK) was used to estimate head grade (Fe, SiO_2, Al_2O_3, P, LOI, CaO, MgO, Mn, S, TiO_2, Na, Zn and K_2O), density and concentrate grades (same chemical constituents as the head grade) into the block model. Minimum / Maximum samples vary according to domain (typically 6–10 and 24–32 respectively). Statistical and geostatistical analysis was completed using Supervisor software. All geological modelling and cell modelling was completed using Datamine/Supervisor™ software. Both software packages are used commonly in the mining industry.
Estimation and modelling techniques cont.	*The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.*	Mineral Resource estimates for Iron Magnet were previously completed in 2005 and 2011. The 2005 Mineral Resource estimate was globally similar in tonnes and grade. The 2013 Mineral Resource estimate has increased marginally in tonnage due to the completion of additional drilling. Current reconciliation/production data supports the estimate in terms of tonnage and grade
	The assumptions made regarding recovery of by-products.	No assumptions were made regarding recovery of by-products. The only chemical constituent of economic interest in Fe.
	Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).	The following deleterious chemical constituents were estimated: SiO_2, Al_2O_3, P, CaO, MgO, Mn, S, TiO_2, Na_2O, Zn and K2O.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	A 25 m E x 25 m N x 8 m RL parent cell size was used with sub-celling to 2.5 m E x 5 m N x 2 m RL to honour wireframe boundaries. The block size is considered to be appropriate given the dominant drill hole spacing and style of mineralisation.
	Any assumptions behind modeling of selective mining units.	No assumptions were made regarding selective mining units. Selective mining units were not defined or corrected for in the resource estimate. However, a bulk open pit mining scenario using large scale miners targeted at a 5m - 10m mining bench was considered in selection of the parent block size
	Any assumptions about correlation between variables	No assumptions were made regarding correlation between estimated variables.
	Description of how the geological interpretation was used to control the resource estimates.	Sectional lithological interpretations were linked to build 3-dimensional lithological models. These models were used to flag the cell model with a ZONE code which was used as a hard boundary when interpolating grades into cells.
	Discussion of basis for using or not using grade cutting or capping.	There were no significant outliers in the dataset and therefore grade cutting was not considered necessary.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	The cell model and drill hole data was loaded into Datamine and coloured by Fe. Drill hole grades were initially visually compared with cell model grades. Mean drill hole statistics were then compared to mean cell model grades for each estimated constituent on a domain by domain basis. Swath plots were

Criteria	JORC Code explanation	Commentary
		then used to compare drill hole and cell model grades for slices throughout the deposit area.
Moisture	*Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	Tonnages are estimated on a wet basis. Moisture globally of 3% was determined using diamond core and in-pit grab samples. The contract laboratory crushes samples to -8mm and then analyses using standard thermogravimetric methods.
Cut-off parameters	*The basis of the adopted cut-off grade(s) or quality parameters applied.*	The magnetite Mineral Resource was reported using a cut-off grade of > 20% Mass Recovery and < 50% SiO2.
Mining factors or assumptions	*Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.*	The Iron Magnet deposit is currently mined through conventional drill and blast open pit methods. A minimum mining width of 5 m was applied when interpreting the mineralisation boundaries. This minimum mining width is consistent with the equipment and grade control block out methods used at the operation. The Z (vertical) block dimension and origin was selected to align with planned open pit benches. No internal or external dilution was modelled. Selective mining units were not defined or corrected for in the resource estimate or a recoverable resource estimated. However, a bulk open pit mining scenario possibly using large bench (5m) scale miners was considered and reflected in the block model construction and estimation parameters developed
Metallurgical factors or assumptions	*The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	The Magnetite Mineral Resource utilises DTR results from drill hole sample composites. It is assumed that the grind size used completing the DTR analyses is consistent with that achieved in the Arrium Concentrator.
Environmental factors or assumptions	*Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	Iron Magnet is an operating mine. Waste is disposed on designated stockpiles for rehabilitation under the Mine and Rehabilitation Plan approved for the site.It has been assumed for the purpose of the estimates that legislation in this regard will remain similar to current such that future operations will operate in the same way.
Bulk density	*Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.*	Bulk Density is estimated on a wet basis. Density was estimated into the block model within each ZONE using wireline density logging data collected from 2003 through 2005. Any blocks that were not estimated were assigned the mean value for that particular domain. A total of 2,998 density samples at 4 m composites were available for the magnetite domains and 2,979 composites were available for the hematite domains. The following density assumptions were made where cells were not informed by the geophysical data: Amphibolite – 2.65 tm^3 Quartz BIF – 3.02 tm^3 Schist – 2.98 tm^3 Hematite Carbonate Mineralisation – 3.73 tm^3 Hematite Magnetite Mineralisation – 3.73 tm^3 Magnetite Schist – 3.37 tm^3 Magnetite Talc – 3.48 tm^3 Magnetite Ore – 3.84 tm^3 Magnetite Carbonate – 3.80 tm^3 Hematite Carbonate – 3.65 tm^3 Basal Sequence – 3.65 tm^3 Hematised Amphibole – 2.65 tm^3

Criteria	JORC Code explanation	Commentary
		Footwall – 2.65 tm^3
	The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.	The host sequence comprises high grade metamorphic rocks with generally low porosity. Some goethitic lithologies are slightly porous, which is accounted for during geophysical logging.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	All mineralisation outside the area informed by the geophysical data is assumed to have a fixed bulk density. The density varies within the mineralised domain and creates some uncertainty with this assumption. This has been considered when classifying the Mineral Resource. 80% of the mineralised domains were interpolated from geophysical density data.
Classification	*The basis for the classification of the Mineral Resources into varying confidence categories.*	The Mineral Resources Classification is based on 3 stages of review: ▪ Geostatistical review – nominally Kriging Efficiency and Slope of regression; ▪ Drillhole spacing and number of samples; and ▪ Visual review. The Mineral Resource has been classified following due consideration of all criteria contained in Section 1, Section 2 and Section 3 of JORC 2012 Table 1. Areas of Measured, Indicated and Inferred Mineral Resource are considered by the Competent Person to have been appropriately informed and estimated for the classification determined.
	Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).	The Competent Person has confirmed that appropriate account has been taken of all relevant criteria including data integrity, data quantity, geological continuity and grade continuity. Areas of Measured Indicated Resource and Inferred Mineral Resource are considered appropriately by the Competent Person to have been informed and estimated for the classification determined.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The resulting Mineral Resource estimate provides an appropriate global representation of this deposit in the view of the Competent Person.
Audits or reviews	*The results of any audits or reviews of Mineral Resource estimates.*	All Mineral Resource estimates are subject to technical review by CSA Global Pty Ltd on an annual basis.
Discussion of relative accuracy/ confidence ***Discussion of relative accuracy/ confidence cont.***	*Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.*	The Mineral Resource accuracy is communicated through the classification assigned to various parts of the deposit. The Mineral Resource estimate has been classified in accordance with the JORC Code, 2012 Edition using a qualitative approach. All factors that have been considered have been adequately communicated in Section 1 and Section 3 of this Table. The resource estimate of grade and tonnage is based on the assumption that standard open cut mining methods will be applied and that high confidence grade control (e.g. dedicated grade control drilling) will be available for final mining ore-waste delineation.
	The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.	The Mineral Resource estimate is based on a realistic parent cell size and should be considered a global resource estimate, and not a recoverable resource estimate based on SMU block (25 m X x 25 m Y x 8 m Z).
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	The Mineral Resource estimate has been reconciled with production data. The reconciliation results are consistent with the expected accuracy of the model. The relative accuracy and confidence of the Mineral Resource estimate is inherent in the Mineral Resource Classification.

Section 4 Estimation and Reporting of Ore Reserves

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	*Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.*	Refer to Section 3. The Ore Reserve estimate is based on the Mineral Resource determined as of 30 June 2014.
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are inclusive of the Ore Reserves
Site visits	*Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	The Competent person visits site on a regular basis, with no material issues identified to date
	If no site visits have been undertaken	Not applicable.

Criteria	JORC Code explanation	Commentary
	indicate why this is the case.	
Study status	*The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves*	Iron Magnet is an operational mine site with necessary plant and equipment in place.
	The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.	Iron Magnet is an operating mine.
Cut-off parameters	*The basis of the cut-off grade(s) or quality parameters applied.*	Reserve cut-off grades are based on a Mass Recovery of greater than 25% and Silica less than 50% This has been derived from detailed financial analysis taking into account, mine planning, concentrator capability and market considerations for the quality of concentrate produced.
Mining factors or assumptions	*The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design*	Conversion of Mineral Resources to Ore Reserves has been by the application of appropriate mining factors and assumptions based on current mining practices, operating and capital costs based on Arrium's existing mining operations, as well as mine specific factors such as local geotechnical investigations.
	The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc	Arrium currently mines Iron Magnet using a conventional open cut, drill and blast, followed by truck and shovel operation. The mining method described is considered appropriate for Iron Magnet.
	The assumptions made regarding geotechnical parameters (eg pit slopes, stope sizes, etc), grade control and pre-production drilling.	Geotechnical parameters have been based either on actual pit specific geotechnical investigations or, in the absence of any specific pit geotechnical information, it has been assumed that geotechnical parameters will be similar to historical geotechnical investigations and monitoring of slope stability over time in areas that have been previously mined.
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	The resource model described in Section 3 formed the basis of pit optimisation work.
	The mining dilution factors used.	Dilution was incorporated in the resource modelling and grade estimation process and no additional dilution is applied based on current concentrator reconciliation.
	The mining recovery factors used.	A 95% recovery factor has been applied to the mining process. This is in line with current reconciliation data.
	Any minimum mining widths used.	With respect to mining selectivity a 5m minimum mining width is applied, in line with current mining practices. With respect to the minimum cutback width, 30m has been applied.
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Mining of Inferred Mineral Resources scheduled at the end of mine life and comprises approximately 4% of total schedule.
	The infrastructure requirements of the selected mining methods	Iron Magnet's current infrastructure meets on-going requirements for the selected mining method.
Metallurgical factors or assumptions	*The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.*	The Iron Magnet Ore is processed through the magnetite concentrator using a process of magnetic separation to produce a concentrate that is slurried to Whyalla.
	Whether the metallurgical process is well-tested technology or novel in nature.	The existing concentrator has been operating for 5 years at a feed rate of between 4.0Mtpa and 5.2Mtpa, utilising industry standard technology
	The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.	Derived from initial metallurgical test work and updated as a result of concentrator production reconciliation.
	Any assumptions or allowances made for deleterious elements.	All concentrate produced is processed into iron ore pellets for use as feedstock to the Whyalla Integrated Steelworks with excess pellets sold on the spot market. The impact of deleterious elements is taken into account.
Metallurgical factors or assumptions cont.	*The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.*	Bulk samples are used to derive concentrator performance for portions of the ore body on a regular basis.
	For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the	Ore Reserves have been based on the current concentrate specification derived from metallurgical testwork in order to meet integrated steelworks demand and quality requirements.

Criteria	JORC Code explanation	Commentary
	specifications?	
Environmental	*The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.*	All Mining Leases are in place for on-going operations.
Infrastructure	*The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.*	All infrastructure for crushing, concentration, and transport to the Whyalla dewatering filter plant are in place and operating as part of the current Southern Middleback Magnetite operations.
Costs	*The derivation of, or assumptions made, regarding projected capital costs in the study.*	Projected capital costs (including initial waste pre strip) are derived from costs of existing operations and are consistent with the Arrium business plan, projected over the life of mine. Costs associated with processing and transport are based on the existing Arrium Southern Middleback Magnetite operations Projected mining costs are derived from current service contracts in place with BGC Contracting, adjusted to take into account projected changes in activity (due to pit depths, haulage distances, etc.) over the life of mine. All costs assumptions are calculated to include inflation and discount rates consistent with those used in the Arrium business plan.
	The methodology used to estimate operating costs.	Mine plans and operational schedules are used to derive forecasts for operating costs. Operating costs are based on existing operations.
	Allowances made for the content of deleterious elements.	Reduction of revenue due to the presence of deleterious elements in the product have been factored into revenue assumptions (see further below).
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co- products.	Concentrate price projection is based on the downstream benefit for use of magnetite concentrate as pellets to the Whyalla Integrated Steelworks and independent external forecasts for concentrate sales. They reflect assumptions made in the Arrium business plan.
	The source of exchange rates used in the study.	Foreign exchange projections are based on independent external forecasts and reflect the assumptions made in the Arrium business plan.
	Derivation of transportation charges.	Cost of transport of concentrate is based on operating costs for the magnetite slurry pipeline. Pellet sales on the spot iron ore market, shipping and freight charge projections are based on available independent external forecasts, adjusted to reflect shipping from Whyalla to our primary markets in North Asia and to take into account existing contracts of afreightment and reflect the assumptions made in the Arrium business plan.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Treatment and refining charges are based on the cost of existing operations and reflect the assumptions made in the Arrium business plan. The impact of specifications of ore shipped is dealt with in revenue assumptions (see further below).
	The allowances made for royalties payable, both Government and private.	Allowances for royalties are based on current legislation and reflect the assumptions made in the Arrium business plan.
Revenue factors	*The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.*	Revenue assumptions are based on the full downstream benefit of the use of magnetite through the Whyalla Integrated Steelworks under current life of mine planning assumptions. Pellet revenue projections are based on external independent forecasts of commodity prices and foreign exchange, adjusted for expected realised prices derived from current contracts and pellet specifications (including Fe grade and the presences of any deleterious elements) expected under current life of mine planning.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	See above description of revenue factors.
Market assessment	*The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.*	An assessment of the demand, supply and stock situation is made by Arrium based on the Whyalla Integrated Steelworks demand forecast. Pellet for sale on the spot market is then derived from the remainder of total forecast concentrate production.
	A customer and competitor analysis along with the identification of likely market windows for the product.	The current magnetite life of mine is matched to the life of the Whyalla Steelworks assumptions and the additional concentrator capacity that exists in the magnetite concentrator facilities.
	Price and volume forecasts and the basis for these forecasts.	Volume forecasts have been based on current and future magnetite concentrator capability. Pricing forecasts are derived in the manner described above under the criterion revenue factors.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract	Not applicable as iron ore concentrate is not considered an industrial material.

Criteria	JORC Code explanation	Commentary
Economic	*The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.*	The NPV used was derived by applying the modifying factors as described in the previous criteria. The details of this process are commercially sensitive and are not disclosed.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	As above.
Social	*The status of agreements with key stakeholders and matters leading to social licence to operate.*	All mining approvals and an indigenous land use agreement are in place and are inclusive of all regulatory requirements needed to support the reported ore reserves.
Other	*To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:*	
	Any identified material naturally occurring risks.	No material naturally occurring risks e.g. geological risks, were identified.
	The status of material legal agreements and marketing arrangements.	Magnetite concentrate product as Pellets is the major feed to the Whyalla Integrated Steelworks and export sales of the pellet production will continue through the life of mine. A contract is in place with BGC Contracting Pty Ltd for the mining operations, whilst all other processes are owned by Arrium.
	The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent	Full Mining and Tenement approvals are in place.
Classification	*The basis for the classification of the Ore Reserves into varying confidence categories.*	The classification of the Ore Reserves into varying confidence categories was based on operating history and commensurate with the ore reserve classification as defined in JORC 2012
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The ore reserve classification appropriately reflects the views of the Competent Person
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	Approximately 1.4Mt of Probable Reserves are derived from Measured Mineral Resources and were down-graded because…
Audits or reviews	*The results of any audits or reviews of Ore Reserve estimates.*	An external audit of the ore reserve estimates has been completed Coffey, an independent consultant, and no material issues were identified.
Discussion of relative accuracy/ confidence	*Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.*	The relative accuracy and confidence level in the Ore Reserve estimate is in line with that of the Ore Reserve classification and has been validated through reconciliation of current mining operations. Where concern exists in the confidence of the Ore Reserve estimate that was based on Measured Mineral Resources it has been downgraded to a Probable Ore Reserve.
Discussion of relative accuracy/ confidence cont.	*The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.*	Statement relates to global estimates within the MBR Magnetite project.
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage. *It is recognised that this may not be*	The modifying factors are based on existing operational parameters that include reconciliation of actual production data.

Criteria	JORC Code explanation	Commentary
	possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	

SOUTHERN IRON HEMATITE INTRODUCTION

Arrium Mining acquired Southern Iron Pty Ltd and Central Iron Pty Ltd as part of the purchase of several tenements from Western Plains Resources Ltd (WPG) in October 2011 (Figure 1).

At the time of its acquisition, Central Iron was the Licensee of Exploration Licence 4248 (EL 4248, Hawks Nest (HN)). Central Iron subsequently applied to renew this tenement, and the Minister for Manufacturing, Industry Trade and Mineral Resources (DMITRE) renewed this tenement as EL 5399 for a period of two years from April 2014.

Southern Iron is the Tenement Holder of Mineral Lease 6314 (ML6314) and through this ML the owner of the Peculiar Knob Mine (PK). The ML expires in June 2022. Southern Iron is also the Licencee of Exploration Licences 4422 (Mt Brady) & 4423 (Windy Valley), and Tenement Holder for Mineral Claims MC 3809 & 3810, located on EL 5399. ELs 4422 and 4423 expire in January 2015.

Woomera Prohibited Zone

Hawks Nest lies within the Woomera Prohibited Area (WPA; Figure 2). Access to the WPA for mineral exploration or mining requires companies to:

- Hold a relevant licence/lease issued by DMITRE.
- Enter into a Deed of Access with the Commonwealth of Australia (Commonwealth).
- Request exploration and mining access permission for each activity.

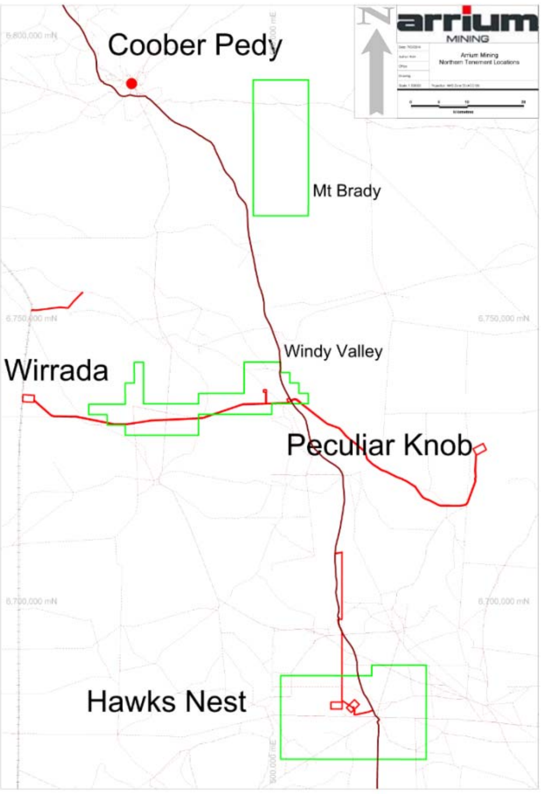


Figure 1: Location of Arrium's northern tenements

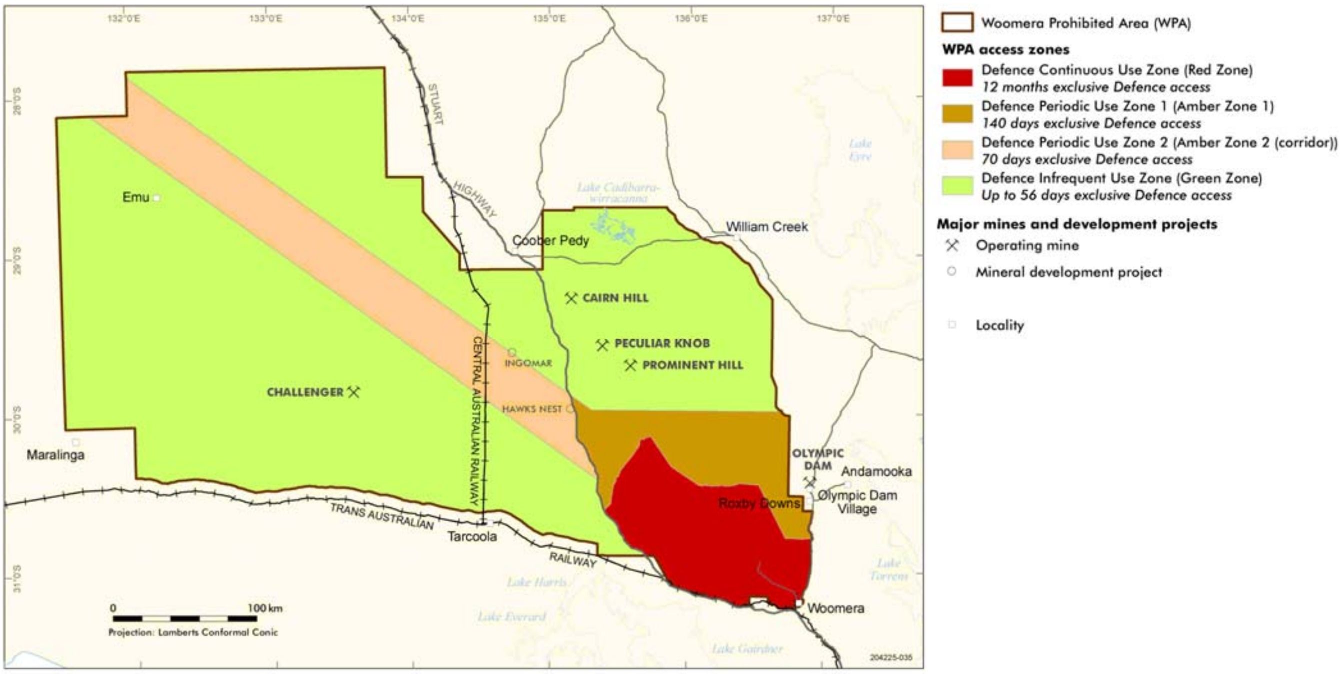


Figure 2: Woomera Prohibited Area Access Zones
(Source: http://www.defence.gov.au/woomera/zones.html)

Southern Iron Pty Ltd and Central Iron Pty Ltd jointly entered into a Deed of Access with the Commonwealth on 1 December 2012; this Deed of Access allows Central and Southern Iron access to their various tenements. EL 5399 lies within WPA Periodic Defence Use Zones 1 and 2; Peculiar Knob lies within WPA infrequent Defence Use Zone. MCs 3809 & 3810 lie within WPA periodic Defence Use Zone 2.

GEOLOGY AND GEOLOGICAL INTERPRETATION

Regional framework

Arrium's northern tenements lie in the northern Gawler Craton, (Figure 3) with likely basement comprising a varied Archaean to Middle Proterozoic sequence, probably belonging to the Wilgena Subdomain. Basement is largely concealed beneath Cretaceous sediments and recent colluvium.

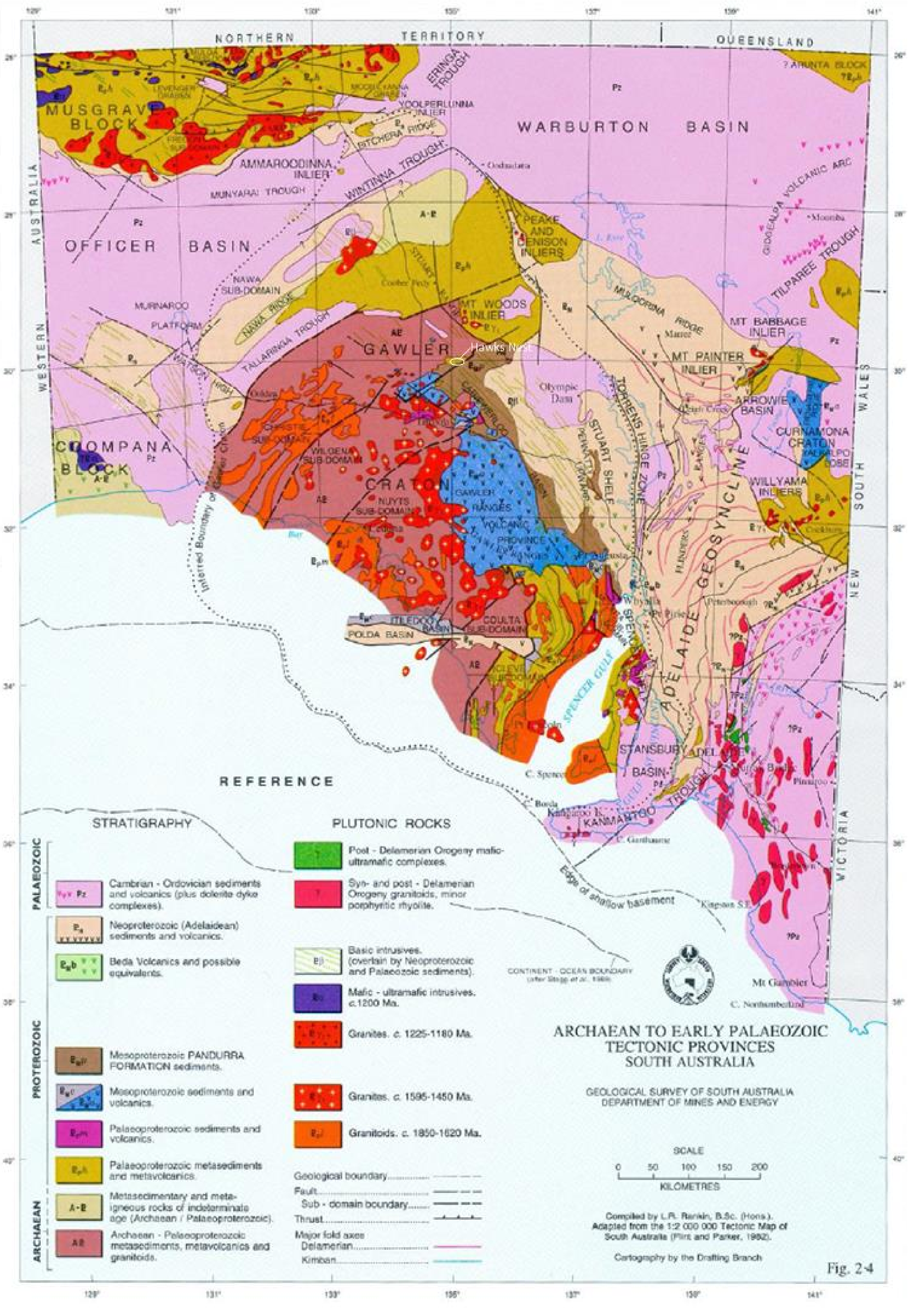


Figure 3: Regional Geology
Source: Parker 2012 p. 24

Department of Mines and Energy South Australia (1997) (DME) suggests the Hawks Nest area is part of an uplifted fault block. Regional aeromagnetic maps show Banded Iron Formation (BIF) as a strong north-northeast linear anomaly. The BIF is largely concealed; several small areas of BIF outcrop occur within the tenement area forming low rocky ridges with steep dips on exposed bedding.

The Bulgunnia Fault Zone runs through EL 4248 from southwest to northeast and delineates the tectonic boundary between the Wilgena, Christie Domain to the northwest, and the Olympic Domain to the southeast. The main magnetic anomaly sits along the fault zone and appears to lie largely within the Wilgena Domain.

Local Geology

Peculiar Knob

Quaternary re-brown clay, sand and silt forms the local surface at Peculiar Knob (PK), and overlies the relatively flat Cretaceous Bulldog Shale. The Shale is moderately to highly weathered, pale brown to grey with minor gypsum. Thin wedges of Cadna-Owie Formation (sandstone/ conglomerate) occur at the base of the shale in faulted areas. Elsewhere the shale sits unconformably on the bedrock. Bedrock comprises the steeply dipping hematite orebody, magnetic quartzite, granite, aplite and minor basic dykes.

Hawks Nest

Hawks Nest area (HN) currently has 2 hematite deposits identified, Buzzard and Tui. These are located along strike from each other and are approximately 500 m apart (Figure 5).
Scattered outcrops of BIF and isolated granite occur in the south-western 6 km of the main magnetic anomaly along the Bulgunnia Shear Zone. Sedimentary cover deepens towards the northeast (to >100 m). Rare granite outcrops could be young intrusives associated with the Hiltaba Granite suite (Davies et al, 2008).

Geophysical modelling verifies that dips are gentle to vertical and implies that the depth of the BIF is around 500 m to 1000 m or deeper (Davies et al, 2008). Recent drill holes also confirm that the dips vary from gentle to near vertical with the number of mineralized vertically stacked lenses increasing towards the northeast of Buzzard.

Drilling at Buzzard has intersected mainly soil and clay at surface, underlain by Banded Iron Formation, interspersed with hematite enrichment and occasional goethite. Further to the south east, holes usually begin in clay followed by shale. Depth of cover ranges from 20 m to 60 m, deeper toward the south and northeast. Drilling intersected abundant groundwater at the south-western end of the deposit.

Tui is relatively similar in lithology with soil and clay cover ranging from 40 m to 60 m, deeper towards the south and north east, underlain by BIF with zones of hematite-enriched lenses steeply dipping to the southeast. In drill hole TU002RC, the cover overlies shale, similar to holes in Buzzard drilled further southeast.

The fault separating the banded iron formation and hematite from the shale is folded in plan indicating northeast – southwest compression.

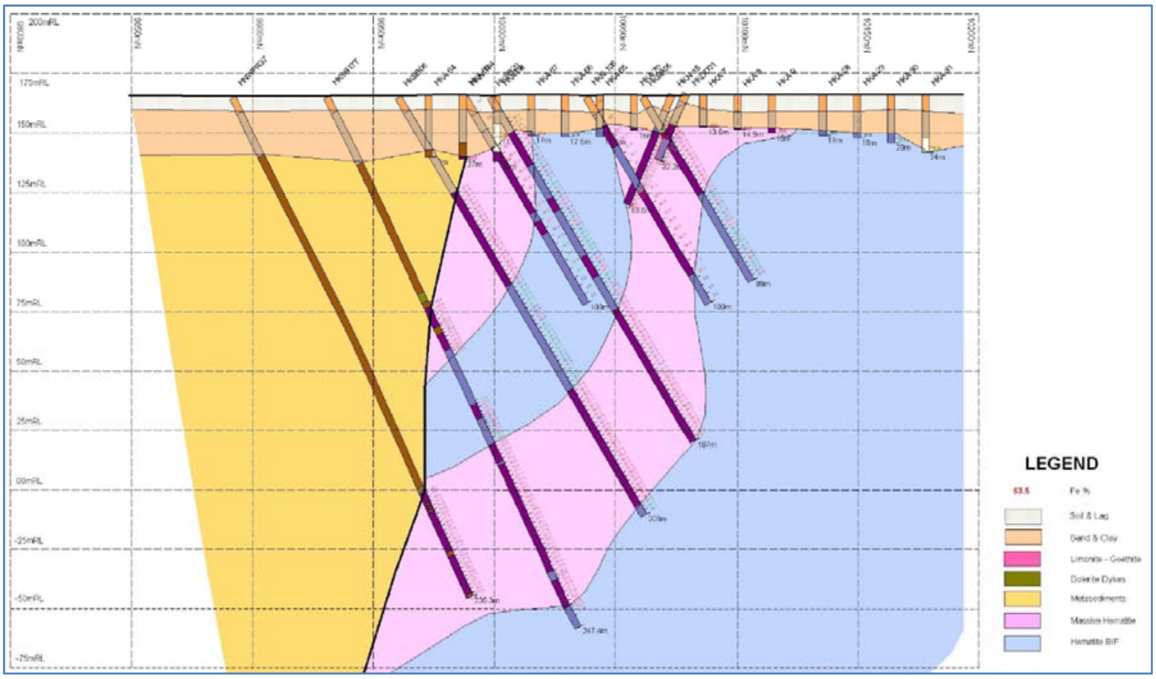


Figure 3: Buzzard Geology Section 10,000 m E
(Looking Southwest)

DRILLING

Historical drilling at Peculiar Knob used diamond drilling (DDH), some possibly with an open hole percussion (OHP) or precollar reverse circulation (RC, RC drilling precollar, or a combination of RC drillhole and DDH tail. The method of drilling for 16 drill holes was not identified (thought to be RC)and did not include any analytical data. These holes were discarded from the model and are not discussed further.

Historical drilling at HN used Rotary Air Blast (RAB), reverse circulation (RC), diamond drilling (DDH) or a combination of RC precollar and DDH tail. The first identified reverse circulation (RC) drilling occurred in the mid-1990s. RAB drilling was not used in the preparation of the resource, and is not discussed further. The drilling method could not be identified for approximately 43% of drillholes (Table 1).

Peculiar Knob

Peculiar Knob is located approximately 75 km southeast of Coober Pedy. Western Plains Resources (WPR) drilled 61 drillholes across the Peculiar Knob deposit between January and March 2007 (Table 2), and used this drilling to develop a resource for the deposit. WPR collected drill chips in one metre intervals, and collected assay samples as either one metre samples or two metre composite. Spear sampling produced analytical samples of nominal 2 kg to 3 kg weight. PQ drill core was despatched as whole core to IML Laboratories in Perth for metallurgical test work. Remaining DDH core was marked for sampling and transported to Adelaide for cutting. Half-core samples were returned to Amdel Whyalla (now Bureau Veritas, BV) for assay.

Table 1: Drillhole summary

Project	Drill Type	Number of Drill Holes	Total Metres
Peculiar Knob	**DDH**[1]	18	4,218.56
	RC	183	18,129.7
	Method Not Known[2]	16	2201.28
	Total	**217**	**24,549.54**
Hawks Nest	**DDH**[1]	31	4,845.35
	RC	208	31,924.60
	Method Not Known[3]	270	27,850
	Total	**509**	**64,619.95**

Notes: 1. Includes OHP/RC precollars. 2. 16 drillholes probably RC 3. Includes DDH, OHP, & RC but excludes known RAB

Following the sale of the tenement to Arrium in 2011, Arrium completed a further 110 drillholes between January 2012 and February 2014 (Table 2) to improve our understanding of the resource. RC samples were assayed at BV Adelaide until late October 2013, when analysis transferred to BV's new Whyalla laboratory.
Drillhole locations are shown in Figure 4.

Figure 4: Peculiar Knob collar locations

Table 2: Summary of ARI & WPR drilling at Peculiar Knob

Drill Type	Arrium				Western Plains			
	No. Drill Holes	Drillhole %	Metres	Metre %	No. Drill Holes	Drillhole %	Metres	Metre %
DDH	11	10.0%	3095.9	26.2%	5	8.2%	561	7.5%
RC	1839	90.0%	8724	73.8%	56	91.8%	6,873.00	92.5%
Total	110		10567.9		61		7434	

Hawks Nest

EL4248 is situated approximately 125kms south of Coober Pedy, on the Stuart Highway, straddling the highway and the common boundary of McDouall Peak Station and Bulgunnia Station. There are currently two areas of interest at Hawks Nest – Buzzard and Tui (Figure 5).

In 2007, Western Plains Resources (WPR) commenced drilling at the Buzzard and Tui Prospects at Hawks Nest and generated a resource for the deposits. Following the project's sale to Arrium in 2012, Arrium commenced infill drilling at Buzzard and Tui in late 2012. WPR and ARI drilling informed the bulk of the geological and analytical data used for the resource (Table 3). Figure 4 shows collar locations and interpreted wireframes.

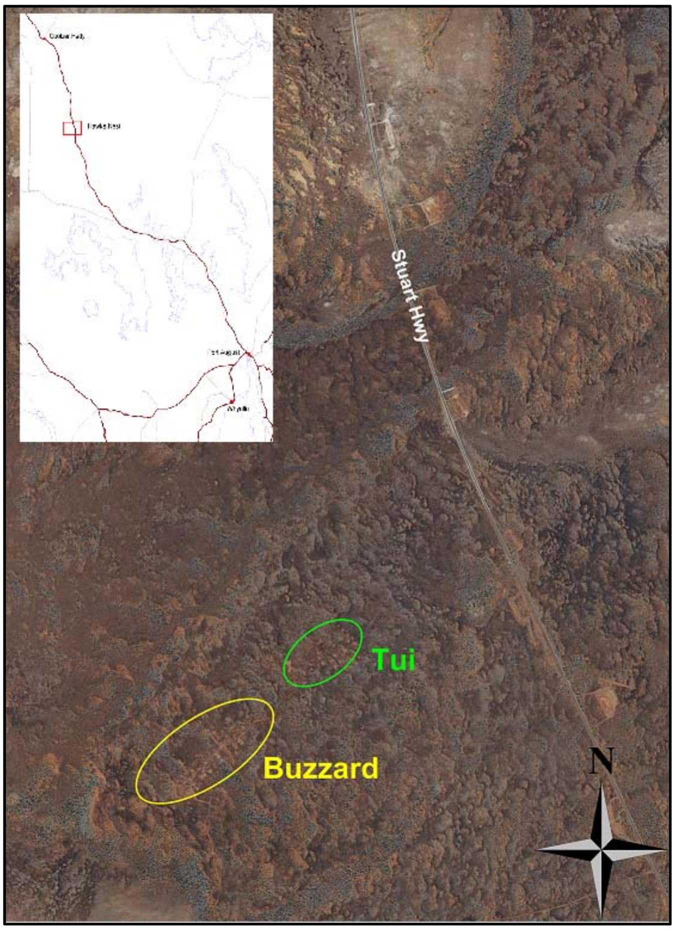


Figure 5: Site Location

Table 3: Summary of ARI & WPR Drilling at Buzzard & Tui

Drill Type	Arrium				Western Plains			
	No. Drill Holes	Drillhole %	Metres	Metre %	No. Drill Holes	Drillhole %	Metres	Metre %
DDH	10	0.9%	213.8	1.2%	6	5.6%	1160.3	8.0%
RC	107	99.1%	17578	98.8%	101	94.4%	13,346.60	92.0%
Total	108	50.2%	17791.8	55.1%	107	49.8%	14506.9	44.9%

Historical drill core was quartered or halved, with one quarter or half dispatched to the laboratory for crushing, sample preparation and analysis. Arrium drill core for geochemical analysis has been sawn in half, with one half crushed, riffle split down and combined within intervals nominated by the logging geologist, after which it is processed in a similar way to RC chips.

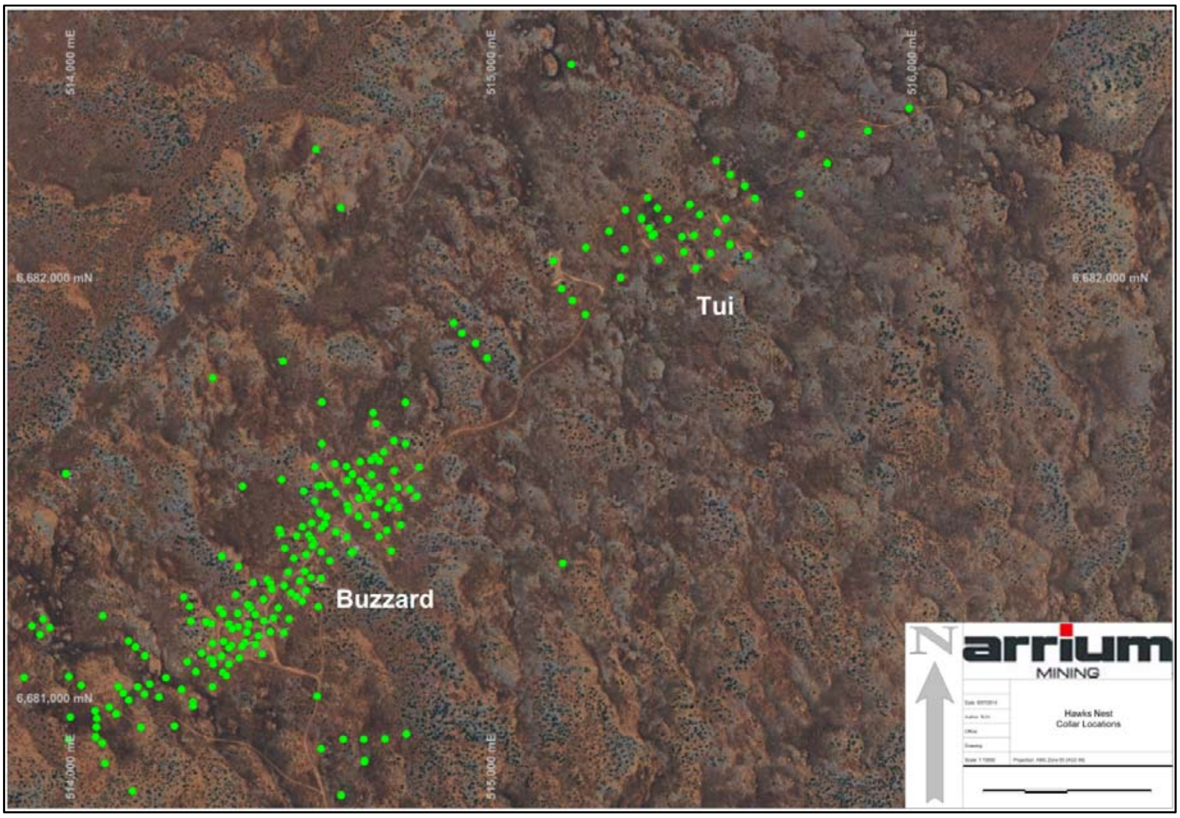


Figure 6: Hawks Nest collar locations

SAMPLE ANALYSIS METHODS

Sample Preparation

WPR used Amdel's old Whyalla laboratory for sample analysis of PK samples.

ARI uses Bureau Veritas (BV, previously Amdel) for sample analysis. From 2012 to late 2013 BV Adelaide analysed samples; this changed to BV Whyalla following the opening of their new facility. BV's sample preparation process was:

- Sorting & drying
- Weighing.
- Crushing.
- Where samples weigh more than 3kg weight the sample is split to provide a nominal 3kg weight for sample pulverising.
- Pulverising.
- Sizing.

Sample Analysis

BV fused samples with Lithium Borate flux to form a glass disc and analysed by XRF for all analytes apart from loss on ignition (LOI). The XRF4 suite analysed (with detection limits in ppm) was:

Fe (100)	SiO_2 (100)	Al_2O_3 (100)	Mn (100)	TiO_2 (100)	CaO (100)
MgO (100)	K_2O (100)	P (10)	S (10)	Na_2O (100)	Cu (10)
Pb (10)	Zn (10)	Ba (10)	V (10)		

To determine LOI, BV dried samples at 105°C, weighed, placed in a temperature-controlled environment at 1,000°C for one hour, cooled, and re-weighed; LOI reported as a percentage.

QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

Field QA/QC

Limited QA/QC was completed prior to 2007. In 2007 and 2008 WPR drilled at PK and Buzzard and Tui, and used standards (origin unknown) and field duplicate and triplicate samples for QA/QC.

Arrium commenced drilling at PK in early 2012 and Hawks Nest in late 2012, and used third-party supplied certified reference materials CRMs, Field Duplicates, Field blanks and limited repeat assays at a second laboratory for QA/QC. Arrium targets a field QA/QC value of 10% primary assays on each project. Over the project to date the actual result is approximately 9.8%
Field QA/QC results give confidence in sample collection procedures and analytical precision

Laboratory QA/QC

The goal of the Laboratory QA/QC Program is to guarantee the generation of precise and accurate analytical data. Quality assurance involves the planned and systematic actions necessary to provide confidence in each analytical result. The QA/QC Program has two components:

- Quality Assurance (QA) - the system used to verify that the entire analytical process is operating within acceptable limits; and
- Quality Control (QC) - the mechanisms established to measure non-conforming method performance

ESTIMATION METHODOLOGY

The Southern Iron area deposits are located in the Mount Woods Inlier of the Gawler Craton within a sequence of Paleoproterozoic to Mesoproterozoic metasediments, deformed granitoids and granite.

The host rocks comprise weakly metamorphosed metasediments. These metasediments are intruded by dolerite dykes. At Buzzard and Tui, hematite mineralisation is associated with north-east-south-west trending faults. The thickness of the lenses generally varies between 2 m and 35 m. At Peculiar Knob hematite mineralisation trends east-west direction and the thickness varies between 2 to 40 m.

The interpretation process used geological logging in conjunction with the chemical assays to identify individual lithological units. Fe, SiO_2, Al_2O_3, CaO and LOI and lithology were plotted on drillhole traces to assist the interpretation. The lithological logging information was used to guide hematite interpretation, which is considered appropriate given the strong stratigraphic control on the mineralisation.

Drill coverage approximates 25 m along strike x 25 m–100 m down-dip for both Buzzard and Tui deposits. Beneath approximately 0 m RL, there is limited drilling (surface is at approximately 170 m RL). Peculiar Knob drill coverage approximates 25 m along strike, approx. 25 m x 50 m down dip.

Lithological interpretations were completed over the entire strike length of the deposit on 25 m sections. These sectional interpretations were linked to produce 3-Dimensional solid wireframes. Wireframes were created for the following lithologies cover sediments, shale, BIF and hematite mineralisation.

Variography was completed for Fe only and no assumptions about correlation between variables have been made. The hematite mineralisation displays low to moderate nugget effect and significant short range grade variability, largely attributable to supergene and subsequent hydrothermal processes.

Buzzard and Tui uses a 3-dimensional block model that was constructed for resource estimation purposes, based on a 10 m E x 25 m N x 8 m RL (east x north x RL) parent block size, whereas the Peculiar Knob model is based on 15 m E x 10 m N x 8 m RL. The selected parent block sizes are considered to be consistent with the available data, the data characteristics (spacing and variability as defined by variography) and the envisaged mining practises. Sub-blocking to a cell size of 2 m E x 2.5 m N x 2 m RL was undertaken to allow the effective volume representation of the interpreted wireframes for the various horizons.

Each lithological unit was assigned an estimation “GEOZONE” number that was coded into the block model, which was used to constrain grade interpolation. Hard boundaries were used between each zone to further constrain grade interpolation. A three-pass search ellipse strategy was applied with search ellipses aligned with the major, semi-major and minor directions. The primary search ellipse dimensions were approximately equal to the variogram ranges. The secondary ellipse was approximately equal to twice the variogram ranges and the tertiary ellipse was approximately equal to three times the variogram range.

Ordinary kriging (OK) was used to estimate all elements (Fe, SiO_2, Al_2O_3, P, LOI, CaO, MgO, Mn, S, TiO_2, Na, Zn and K_2O) into the block model. Minimum and maximum are typically 5 to 25.

The block model and drill-hole data was loaded into Datamine and coloured by Fe. Initially, drill-hole grades were compared visually with block model grades. Mean drill-hole statistics were then compared to mean block model grades for each estimated constituent on a domain by domain basis. Swath plots were then used to further compare drill-hole and block model grades for slices throughout the deposit area by easting, northing and elevation.

CRITERIA FOR RESOURCE CLASSIFICATION

The Mineral Resource accuracy is communicated through the classification assigned to various parts of the deposit. The Mineral Resource estimate has been classified in accordance with the JORC Code, 2012 Edition using a qualitative approach. All key criteria have assessed in the classification process.

The accuracy of the estimates was first accessed using the geostatistical methods of calculated kriging efficiency (KE) and slope of regression (SLOPE) as a guide before wireframes were generated to code the model with Resource Classification code based on all the assessed criteria.

Drilling density in the mineralised horizons is sufficient to support an Indicated and Measured Resource classification with some Inferred Resources. Buzzard Drilling occurs on 25 m by 25 m sections through the central project area, expanding to 50 m by 50 m towards the northern area.

Peculiar Knob drilling density is more sufficient in the Western and Mid Mineralisation supporting more Indicated resources, whereas the Eastern zone contains more Inferred Resources due to the limited drilling in that area.

Wire frames were created to flag the modelled resource as inferred, indicated or measured based on these criteria and drilling density.
Areas of Measured Indicated Resource and Inferred Mineral Resource are considered by the Competent Person to have been appropriately informed and estimated for the classification determined.

CUTOFF GRADE

The cut-off grade used to develop the Hematite Mineral Resource is Fe >= 50%. This is the current economic cut-off grade used for low grade ore at Arrium Mining's Southern Iron operation.

ORE RESERVES AND MINING OPERATIONS

Material Assumptions

Arrium derived the Southern Iron Hematite Ore Reserve Estimate from the Resource estimates for the Southern Iron Project completed on the 30th of June 2014, with Reserves classified in accordance with the JORC Code, 2012 Edition.
No probable reserves have been derived from Measured Resources.

The cut-off grade used to derive the ore reserve estimate is Fe>/= 55%. This cut-off was determined based on detailed financial analysis from mine planning, and takes into account market requirements for current contracts, spot shipments and long-term planning considerations.

The minimum mining width applied to the ore reserve through the resource estimate is 5 m, and is consistent with the equipment and grade control block out methods used at the operation. The vertical block dimension and origin was selected to align with planned open pit benches. Internal dilution is modelled as part of the mining process and is taken into account in the resource model during the estimation process with appropriate recoveries applied to the ore reserve.

Ore recoveries and dilution are applied to the Ore Reserve prior to reporting as a percentage of the resource estimate within the Mine Design above the reserve cut-off of 55% Fe. This results in a reduction in the Fe value and addition to the SiO_2 and Al_2O_3 based on the dilution of the host rock. Recovery and dilution factors vary at each location based on:

- review of resource reconciliation of current operations;
- orebody geometry;
- grade distribution;
- selection of mining equipment; and
- local mining conditions.

The reserve model derived from the resource model includes the key contaminants SiO_2, Al_2O_3, P, CaO, MgO, Mn, S, TiO_2, Na_2O, Zn and K_2O. Revenue assumptions are based on the operational model of a blended Lump/Fines product utilising external forecasts in line with those used in Arrium business planning. These forecasts include expected reductions in revenue due to the presence of these contaminants.

Pit designs have been derived by pit optimization using current operating costs from nearby operations and commodity price and foreign exchange rate assumptions derived from independent external forecasts, in line with those used in Arrium business planning.

Mining factors and assumptions are based on current operations and mining practices; i.e. open-cut drill and blast mines utilising standard truck and shovel fleets,
Geotechnical inputs and parameters used in the Pit Optimization were derived from:

- geotechnical drill holes at each mine location;
- existing mined slopes; and performance at The Peculiar Knob Operation since mine commencement.

Arrium mines the DSO Hematite Reserve at Peculiar Knob s as a drill and blast open-cut mine with standard truck and shovel operations. The Mine is approximately 1700 m x 500 m and will extend to a depth of approximately 180 m.

The final mine design at Peculiar Knob incorporate 5 m and 8 m benches, 16 m or 24 m high batters with varying berm widths based on local geotechnical conditions and designed slope angles based on planned pit depth, structure and geology.
Mined ore from Peculiar Knob is Road Trained along the 130km Arrium haul road to Wirrada Siding where it is crushed to a fines (-6.3mm) product utilising industry standard crushing technology. The Product is then railed to Whyalla where it is blended with Fines Ore from The Middleback Ranges prior to transhipping.

All necessary infrastructure is in place at Peculiar Knob and Wirrada siding to support ongoing operations.

At Hawks Nest the Buzzard Mine is at the feasibility stage. It will be operated as a drill and blast open cut mine utilising standard truck and shovel operations and is projected to commence at the end of the Life of Peculiar Knob. The proposed mine is approximately 900 m long x 600 m wide and approximately 160m deep.

Final Mine design incorporates 8 m benches and 24 m high batters with varying berm widths based on local geotechnical conditions and designed slope angles based on planned pit depth, structure and geology.

Mined ore will be trucked to Wirrada Siding by road train utilising the Stuart Highway and then the existing Peculiar Knob Haul Road (Figure 1) where it will be crushed to a fines (-6.3mm) and lump (+6.3mm, -31.5mm) product utilising the existing Peculiar Knob crushing infrastructure. The Product will then be railed to Whyalla to be blended with Fines Ore from The Middleback Ranges prior to transhipping.

DELETERIOUS ELEMENTS ASSUMPTIONS

The following deleterious chemical constituents were estimated: SiO_2, Al_2O_3, P, CaO, MgO, Mn, S, TiO_2, Na_2O, Zn and K_2O. The impact of deleterious elements on the final product is accounted for in the derivation of revenue for the final product.

MATERIAL MODIFYING FACTORS

Modifying factors are based on existing operational parameters that include reconciliation of actual production data against previous estimates at Peculiar Knob.

Modifying Factors used in the feasibility study for the Hawks Nest deposit are based on the review of underlying Orebody Geometry, Mining Method and Minimum Mining Widths.

Peculiar Knob is an operating mine and consequently modifying factors have been based on existing operational data. All necessary approvals, plant and infrastructure are in place for Peculiar Knob.

The Hawks Nest Mine consisting of the Buzzard Deposit is at Feasibility status and process for mining approval is currently in progress.

EVALUATION

Market Assessment was based on internal and external market projections, with pricing forecasts based on existing contracts, external projections of commodity prices, foreign exchange and freight indices, each adjusted against expected costs and revenue derived from existing operations. Revenue forecasts account for the impact of deleterious elements and variation over project life.

Sales volumes have been taken from Life of Mine Plans; these are derived from current and future infrastructure capacity.
Derivation of mining costs is from existing operations and current service contracts in place. Cost escalation over the mine life is taken into account through CPI adjustment.

Projects are evaluated using Arrium external economic assumptions and NPV modelling in line with Arrium business planning.

REFERENCES

Department of Mines and Energy South Australia 1997, South Australian Steel and Energy Project Coober Pedy Iron Ore Investigation Hawks Nest Project, 1:50000 SA Steel and Energy Project Hawks Nest Project Pre 1995 Company Drillhole Locations, Tenement History Summary, Previous Investigations and Hawks Nest Summary of Drilling, Report Book 97/11, Department of Mines and Energy South Australia.

Parker, A.J., 2012a. Gawler Craton. In: Drexel, J.F., Priess, W.V. and Parker, A.J. (Eds), *The geology of South Australia. Vol. 1, The Precambrian*. South Australian Geological Survey Bulletin 54, pp 51-68 (Reprinted with minor corrections 2012)

Parker, A.J., 2012b. Geological Framework. In: Drexel, J.F., Priess, W.V. and Parker, A.J. (Eds), *The geology of South Australia. Vol. 1, The Precambrian*. South Australian Geological Survey Bulletin 54, pp 9-32 (Reprinted with minor corrections 2012)

Davies, M., Fairclough, M., Dutch, R., Katona, L., South, R. and McGeough, M., 2008. Mineralisation and mineral potential of the Woomera Prohibited Area, central Gawler Province, South Australia, 1:3,000,000 Regional Tectonic Domains, 1:2,000,000 Major Structure and Total Magnetic Intensity Department of Primary Industries and Resources, Report Book 2008/18. Government of South Australia, PIRSA.

JORC CODE, 2012 EDITION – TABLE 1

Section 1 Sampling Techniques and Data

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td><i>Sampling techniques</i></td><td><i>Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.</i></td><td>Samples were collected using Reverse Circulation (RC) or diamond (DDH) drilling methods. Select drillholes were down-hole surveyed using a gyroscope.
<table>
<tr><th></th><th>Drillholes</th><th>Metres</th><th>Metres %</th></tr>
<tr><td>Peculiar Knob</td><td></td><td></td><td></td></tr>
<tr><td>DDH[1]</td><td>18</td><td>4,218.56</td><td>17.2%</td></tr>
<tr><td>RC</td><td>183</td><td>18,129.7</td><td>73.8%</td></tr>
<tr><td>Method Not Known[2]</td><td>16</td><td>2201.28</td><td>9.0%</td></tr>
<tr><td>Total</td><td>217</td><td>24,549.54</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td>Hawks Nest</td><td></td><td></td><td></td></tr>
<tr><td>DDH</td><td>31</td><td>4,845.35</td><td>7.5%</td></tr>
<tr><td>RC</td><td>208</td><td>31,924.6</td><td>49.4%</td></tr>
<tr><td>Method Not Known[1]</td><td>270</td><td>27,850</td><td>43.1</td></tr>
<tr><td>Total</td><td>509</td><td>64,619.95</td><td>100%</td></tr>
</table>
Note: 1. May include Open Hole Percussion (OHP), RC & DDH; excludes known Rotary Air Blast (RAB) drilling.</td></tr>
<tr><td></td><td><i>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</i></td><td>Limited data and metadata is available for historical (pre-2007) drilling.
From 2008 – 2009 Western Planes Group (WPG) logged primary geology only.
From 2012 drilling was logged in detail with recovery recorded and entered into a sampling database with standardised codes onsite soon as practically possible after the drill hole was completed.
For further detail, refer <i>Drill sample recovery</i> section, below.</td></tr>
<tr><td></td><td><i>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 (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</i></td><td>Pre 2007 – Collection of OHP, RC chips and cut diamond core samples over varying downhole sample intervals for whole rock and beneficiation analysis. No information is available on OHP, RC or diamond core sample collection.
2007 – 2008 – WPG collected RC chip and DDH samples for whole rock analyses. DDH sample interval 1m; RC sample interval 2m.
2012 –2014 Arrium collected consecutive 2m RC samples down hole and split to on the drill rig to provide representative samples. Samples despatched to Amdel Laboratories in Adelaide (to late 2013) and Whyalla (post late-2013) for sample preparation.
DD drilling samples were taken at intervals down hole as specified by the logging geologist for transport to BV Adelaide. BV crushed and split to samples in accordance with their protocols.</td></tr>
<tr><td><i>Drilling techniques</i></td><td><i>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).</i></td><td>Drilling at Peculiar Knob (PK) commenced in the mid-1980s when CRAE drilled 4 DDH to a maximum depth of 296.6m. Mines & Energy SA drilled 14 RC & 3 DDH (NQ), and in 2005 Mt Gibson Iron drilled 12 RC holes for a total of 1,285m; these holes were logged and sampled, but not analysed. Following WPG's acquisition of the tenement they arranged for a contractor to obtain representative splits for assay, and collect and photograph chip trays. WPG commenced drilling operations in January 2007.
A total of 217 drillholes were available for preparation of the Mineral Resource estimate.
Drilling commenced at the Hawks Nest project in 1980, with 10 shallow holes drilled (to 78m). The first deep drilling (DDH to 295.6m) occurred in 1987. Exploration drilling commenced in 1995. Drilling was first completed by MESA from 1995 through 1996, then SASE Pty Ltd (2000), WPG Resources Pty Ltd from 2007 through 2008 and Arrium Mining from 2012-.The majority of samples were obtained through RC or DD drilling methods.
A total of 509 drill holes for 64,619.95 m were available for use in preparing the Mineral Resource estimate.</td></tr>
<tr><td><i>Drill sample recovery</i></td><td><i>Method of recording and assessing core and chip sample recoveries and results assessed.</i></td><td>RC recoveries were not recorded prior to 2013. Arrium geologists visually assess RC sample recovery in the field. RC sample recovery is moderate to high; groundwater encountered in some holes occasionally reduced recovery. Arrium drilled one DDH at HN, with a core recovery of 94%. Core recoveries are recorded for earlier DDH.</td></tr>
<tr><td></td><td><i>Measures taken to maximise sample recovery and ensure representative nature of the samples.</i></td><td>RC samples passed through a cyclone with a dust collector and were split using either a three-tier riffle splitter or a rig mounted cone splitter. Samples were collected in pre-numbered calico bags directly from the splitter. Arrium uses a face sampling hammer to reduce contamination in RC holes.</td></tr>
</table>

Criteria	JORC Code explanation	Commentary
Drill sample recovery cont.	*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 relationship has been demonstrated between sample recovery and grade. Sample recovery has generally been good hence any grade bias due to sample recovery is not material in the context of this Mineral Resource estimate.
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.*	Geological and geotechnical logging data is considered to be of sufficient detail to enable the development of robust geological models to support Mineral Resource estimation, mining studies and metallurgical studies.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.	Geologists use standardised codes for geological logging with lithology, mineralogy, texture, alteration, grainsize and weathering recorded. The level of detail varies throughout the history of the project (records prior to 2012 contain primary geology only).
	The total length and percentage of the relevant intersections logged.	All drill holes were geologically logged.
Sub-sampling techniques and sample preparation	*If core, whether cut or sawn and whether quarter, half or all core taken.*	Available information indicates historical DDH core at PK and HN was quartered or halved, with analysis on select intervals. Arrium saws drill core in half at intervals designated by the logging geologist. Half of the core is submitted for assay with the remaining half retained for future reference.
	If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry.	RC samples pass through a cyclone with a dust collector and are split through either a three stage riffle splitter or a rig mounted cone splitter. Only Arrium recorded sample moisture; the majority of samples in the mineralized zone were dry.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	RC drill holes drilled completed from 1995 through 1996 were sampled from piles by spearing. RC drill holes drilled completed during 2000 were sampled from piles by spearing. RC drill holes completed from 2007 through 2008 were initially sampled at 1 m intervals via a sealed dust collector and cyclone and then often combined using spear sampling to generate 2 m samples for assay. Sample preparation involved crushing the sample and then riffle splitting to 3 kg. Samples are then pulverised to 85% passing 75 µm. A sub-sample of the pulp was submitted for analysis. RC drill holes completed from 2012 through 2014 were collected at 2 m intervals via a sealed dust collector and cyclone. Sample preparation involved crushing the sample to a nominal 2 mm then rotary splitting to 500 gms. Samples are then dried at 100° C and pulverised using an LM1/LM5 pulveriser to 90% passing 75 µm. A sub-sample of the pulp was submitted for analysis. Available information indicates historical DDH core at PK and HN was quartered or halved, with analysis on select intervals. Arrium saw DDH core in half and sample at intervals designated by the project geologist. Sample preparation involved crushing the sample to a nominal 2 mm then rotary splitting to 500 grams. Samples are then dried at 100° C and pulverised using an LM1/LM5 pulveriser to 90% passing 75 µm. A sub-sample of the pulp was submitted for analysis. Sample collection and sample preparation is considered suitable for the preparation of Resource Models.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Sampling procedures ensure field staff collects samples in a manner that maximises representivity.
	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	Limited data is available prior to 2007. WPG used field duplicates, triplicates and company standards for field QA/QC. Results gives confidence in sample collection processes, laboratory sample preparation and analytical precision for this period. Arrium targets field 10% QA/QC as part of its operational requirements using Field Duplicates, Field Blanks and third party supplied CRM. From 2012 through 2014 field duplicates were collected at the rig geologist's direction, targeting ore and marginal ore (target 4%). A field blank was inserted in the next calico bag to assess potential for cross-contamination during laboratory processing and analysis (target 4%). CRMs were inserted every 25 samples (target 4%. At HN the program achieved 7.5% Field QA/QC in 2013 and 11.3% in 2014 Results gives confidence in sample collection processes, laboratory sample preparation and analytical precision for this period.
	Whether sample sizes are appropriate to the grain size of the material being sampled	The sample sizes are considered appropriate given the style and geometry of mineralisation observed at PK & HN and the current sampling methodology. The majority of samples have been taken at 1 m or 2 m intervals.
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 fused with lithium borate flux to form a glass disc and analysed by XRF for Fe, SiO_2, Al_2O_3, P, CaO, Cu, Pb, Ba, V, MgO, Mn, S, TiO_2, Na_2O, Zn and K_2O. Loss on Ignition (LOI) was determined using thermo-gravimetric methods. Samples are dried to 105° C, weighed, placed in a temperature controlled environment at 1000° C for one hour and then cooled and re-weighed.

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td rowspan="2"><i>Quality of assay data and laboratory tests cont.</i></td><td><i>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.</i></td><td>No geophysical tools have been used in the preparation of this Mineral Resource estimate.</td></tr>
<tr><td><i>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.</i></td><td>Minimal information is available prior to 2007.
From 1995 through 1996, samples were sent to Analabs Pty Ltd or Amdel (now to Bureau Veritas) in Adelaide.
In 2000, samples were sent to Bureau Veritas in Adelaide.
From 2007 through 2008, samples were submitted to ALS-Chemex in Adelaide.
From 2012 samples were analysed by Bureau Veritas Adelaide or Whyalla.
All laboratories have internal quality assurance / quality control procedures which include the use of blanks to monitor carry-over contamination splits to monitor precision and certified reference materials (CRMs) to monitor accuracy. Analytical results are not released if an issue is identified in the sample preparation or analysis stages.
WPG used company CRMs; Arrium uses external CRMs.
WPG submitted three different CRMs from 2007 through 2008. No standard deviation data has been sourced for these CRMs, hence the results are difficult to interpret. Triplicates samples were submitted to Amdel which compared well with the primary laboratory results.
Arrium used 11 CRMs from 2012 through 2014. Results were reasonable (the vast majority of values were within the expected error range) for all standards except GIOP-19. The manufacturer withdrew this CRM from sale in September 2013 following investigation of client feedback.</td></tr>
<tr><td rowspan="4"><i>Verification of sampling and assaying</i></td><td><i>The verification of significant intersections by either independent or alternative company personnel.</i></td><td>Significant intersections have not been verified by an independent third party.</td></tr>
<tr><td><i>The use of twinned holes.</i></td><td>No twinning of drill holes has been completed at PK or HN.</td></tr>
<tr><td><i>Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</i></td><td>Data is either entered into a set of comma-delimited spreadsheets on Toughbook laptops in the field or logged on paper and transcribed into Excel spreadsheets. The data is then imported into an acQuire database with Arrium standard validation procedures in place prior to import.</td></tr>
<tr><td><i>Discuss any adjustment to assay data.</i></td><td>The only adjustments made to the analytical data involved replacing below detection values with a value equal to the negative detection limit. This does not materially impact the Mineral Resource estimate.</td></tr>
<tr><td rowspan="3"><i>Location of data points</i></td><td><i>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.</i></td><td>It is unclear how collars were located prior to 2007.
Collar coordinates were surveyed using a DGPS from 2007 through 2008 and from 2012 through 2014.
Drill holes completed from 2007 through 2008 were surveyed using a gyroscope after casing with PVC pipe.
Select Arrium drillholes used either down-hole gyro or Ezi-Shot to locate drill-hole; drill set-up dip and azimuth data were used for the remainder of the dataset.</td></tr>
<tr><td><i>Specification of the grid system used.</i></td><td>The grid used is MGA94 Zone 53.</td></tr>
<tr><td><i>Quality and adequacy of topographic control.</i></td><td>Arrium developed a new topographic surface from LIDAR data collected in 2012.</td></tr>
<tr><td rowspan="3"><i>Data spacing and distribution</i></td><td><i>Data spacing for reporting of Exploration Results.</i></td><td>Grid spacing across these projects are shown in the table below:
<table>
<tr><th>Project</th><th>Drill holes</th><th>Drillhole Spacing</th></tr>
<tr><td>Peculiar Knob</td><td>217</td><td>25 x 50</td></tr>
<tr><td>Buzzard[1]</td><td>197</td><td>25 x 25</td></tr>
</table>
Note: 1. Tui included in Buzzard Resource</td></tr>
<tr><td><i>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.</i></td><td>The mineralised domains have sufficient geological and grade continuity to support the definition of Mineral Resource and Ore Reserves given the current drill pattern.</td></tr>
<tr><td><i>Whether sample compositing has been applied.</i></td><td>Prior to 2012 samples were composited to 2 m prior to grade interpolation. This was considered appropriate given that the vast majority of the samples have been collected over this interval. From 2012 RC samples were collected in 2 m intervals.</td></tr>
<tr><td rowspan="2"><i>Orientation of data in relation to geological structure</i></td><td><i>Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.</i></td><td>The mineralisation dips steeply to the north at Peculiar Knob, to the south at Buzzard and is near vertical at Tui. The majority of the drilling has been completed at an angle of -60° and perpendicular to the ore-body strike. There are some vertical holes and some holes at an angle of 60° down dip.</td></tr>
<tr><td><i>If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to</i></td><td>No orientation based sampling bias has been identified.</td></tr>
</table>

Criteria	JORC Code explanation	Commentary
	have introduced a sampling bias, this should be assessed and reported if material.	
Sample security	*The measures taken to ensure sample security.*	Chain of custody is managed by Arrium Mining. Samples transported from the laydown yard direct to BV in Whyalla for analysis. When samples were analysed by BV Adelaide, samples were transported directly from the Laydown Yard to BV Adelaide.
Audits or reviews	*The results of any audits or reviews of sampling techniques and data.*	No audits or reviews of the database have been carried out.

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.*	Arrium's subsidiary Central Iron Pty Ltd holds tenure to Hawks Nest through Exploration Licence 5399. Southern Iron Pty Ltd holds tenure to Peculiar Knob though Mining Lease 6314.
	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.	ML6314 is current to June 2022. EL5399 is current to April 2016.
Exploration done by other parties	*Acknowledgment and appraisal of exploration by other parties.*	Exploration has been carried out by several parties at PK and HN prior to Arrium acquiring the deposits. CRAE, MESA, Mt Gibson Iron & WPG contributed to PK exploration; MESA, SASE and WPG contributed to HN exploration activities. Work since 2007 was carried out to a high standard; there is insufficient detail to quantify the standard of earlier work.
Geology	*Deposit type, geological setting and style of mineralisation.*	Hawks Nest & Peculiar Knob lie in the Mount Woods Inlier of the Gawler Craton within a sequence of Paleoproterozoic to Mesoproterozoic metasediments, deformed granitoids and granite. The host rocks comprise weakly metamorphosed metasediments. These metasediments are intruded by dolerite dykes. At Hawks Nest, hematite mineralisation is associated with north-east-south-west trending faults. The thickness of the lenses generally varies between 2 m and 35 m.
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:* *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* *hole length.*	Exploration results have no been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	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.	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
Data aggregation methods	*In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	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.	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
Relationship between mineralisation	*These relationships are particularly important in the reporting of Exploration Results.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.

Criteria	JORC Code explanation	Commentary
widths and intercept lengths		
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	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').	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
Diagrams **Diagrams cont.**	*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.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
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.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
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.*	No other exploration data is considered material in the context of these Mineral Resource estimates. All relevant data has been described elsewhere in Section 1 and Section 3.
Further work	*The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).*	Further exploration at Hawks Nest is anticipated, and will be planned on the basis of data currently being analysed. No further exploration is currently planned at Peculiar Knob.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Review of extensions to mineralisation will be completed matched to future project and mine planning requirements.

Section 3 Estimation and Reporting of Mineral Resources

Criteria	JORC Code explanation	Commentary
Database integrity	*Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.*	Arrium Mining uses *acQuire* software to manage the entry, storage and retrieval of exploration data. Arrium Mining staff manage the database. Checks have been conducted on aspects of the data entry. Checks include looking for missing/overlapping intervals, missing data, extreme values. No material issues were noted.
	Data validation procedures used.	Validation processes are in place to ensure that only "clean" data is loaded into the *acQuire*™ database. Data is then exported from the acQuire database in CSV format. The CSV files were used to create a desurveyed Datamine™ file which was subject to further validation including checking for overlapping samples and sample intervals which extend beyond the drill hole length defined in the collar table.
Site visits	*Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	Paul Leevers (Manager Resource Development, & Arrium's Competent Person for the Mineral Resource estimate), visited the deposit areas multiple times since 2012.
	If no site visits have been undertaken indicate why this is the case.	Not applicable as site visits undertaken (see above).
Geological interpretation	*Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.*	Arrium considers the geological interpretations robust and suitable for resource estimation; the broad controls to the mineralisation are well understood. A cut-off grade of 50% Fe was used (following statistical analysis) to define the boundaries to the mineralisation. Thirteen mineralised domains were interpreted at Buzzard and 5 mineralised domains were interpreted at Tui, 4 mineralised domains at Peculiar Knob. The lenses all have a similar orientation.
	Nature of the data used and of any assumptions made.	Geological logging in conjunction with the chemical assays was used to identify individual lithological units during the interpretation process. Fe, SiO_2, Al_2O_3, CaO and LOI and lithology were plotted on drillhole traces to assist the interpretation.
	The effect, if any, of alternative interpretations on Mineral Resource	Alternative interpretations are likely to impact the Mineral Resource estimate on a local but not global basis.

Criteria	JORC Code explanation	Commentary
	estimation.	
	The use of geology in guiding and controlling Mineral Resource estimation. *The factors affecting continuity both of grade and geology.*	Lithological interpretations were completed over the entire strike length of each of the deposits. These interpretations were linked to produce 3-Dimensional solids. Lithologies included cover sequence, shale, Banded Iron Formation (BIF), and hematite. The lithological interpretation was used to guide Mineral Resource estimation activities, which is appropriate given the strong stratigraphic control on the mineralisation. A cut-off grade of 50% Fe was used to model hematite. The hematite deposits were formed by supergene enrichment of primary magnetite and hematite. Local structural offsets have played a role in localizing the mineralisation. Geological continuity varies according to the relative importance of each of the controls. The deposits' hematite mineralisation displays low to moderate nugget effect and significant short range grade variability which is largely attributable to supergene and subsequent hydrothermal processes.
Dimensions	*The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	Buzzard -The Mineral Resource extends over an area of 2,650 m E (along-strike) x 1,000 m N (across-strike) x 300 m RL (down-dip). Peculiar Knob - The Mineral Resource extends over an area of 1980 m E (along-strike) x 800 m N (across-strike) x 264 m RL (down-dip).
Estimation and modelling techniques	*The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used*	A field was created ("INTECODE") in the cell model according to the following formula: INTECODE = DOMAIN + GEOZONE Hard boundaries were used between INTECODES when estimation grades into cells. Variography was completed for each INTECODE. Variography was completed for Fe only. No upper cuts were applied following statistical analysis. A three pass search ellipse strategy was applied with search ellipses aligned with the major, semi-major and minor directions. Minimum / maximum samples were set to 5 / 25 respectively for the primary and secondary search pass and 3 / 35 for the tertiary search pass. Ordinary kriging (OK) and inverse distance squared (ID2) were used to interpolate Fe, SiO_2, Al_2O_3, P, LOI, Mn, S, TiO_2, CaO, MgO, Zn, Na_2O and K_2O into blocks. Final block grades assigned according to a priority system (OK given priority over ID2). Mean domain grades are assigned if blocks have not been informed by either method. Statistical and geostatistical analysis was completed using Supervisor™ software. All geological modelling and cell modelling was completed using Datamine™ software. Both software packages are used commonly in the mining industry.
Estimation and modelling techniques cont.	*The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.*	Peculiar Knob is currently being mined and the Model takes into account mining data, for example grade control data, blastholes logging and facemapping etc. The Hawks Nest deposits have not been mined. Previous Mineral Resource estimates are: ▪ WPG – Peculiar Knob (2007), Buzzard & Tui (2008) ▪ Arrium – Peculiar Knob (2013), Buzzard & Tui (2013)
	The assumptions made regarding recovery of by-products.	No assumptions were made regarding recovery of by-products. The only chemical constituent of economic interest in Fe.
	Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).	The following deleterious chemical constituents were estimated: SiO_2, Al_2O_3, P, CaO, MgO, Mn, S, TiO_2, Na_2O, Zn and K_2O.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	A 10 m E x 25 m N x 8 m RL parent cell size was used with sub-celling to 2 m E x 2.5 m N x 2 m RL to honour wireframe boundaries for Buzzard Model, Peculiar knob is a 15 m E x 10 m N x 8 m RL parent cell size. The block size is considered to be appropriate given the dominant drill hole spacing and style of mineralisation.
	Any assumptions behind modeling of selective mining units.	No assumptions were made regarding selective mining units. Selective mining units were not defined or corrected for in the resource estimate. However, a bulk open pit mining scenario using large scale miners targeted at a 5-10m mining bench was considered in selection of the parent block size.
	Any assumptions about correlation between variables	No assumptions about correlation between variables have been made.
	Description of how the geological interpretation was used to control the resource estimates.	Sectional lithological interpretations were linked to build 3-dimensional lithological models. These models were used to flag the cell model with a GEOZONE code which was used as a hard boundary when interpolating grades into cells.
	Discussion of basis for using or not using grade cutting or capping.	There were no significant outliers in the dataset and therefore grade cutting was not considered necessary.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	The cell model and drill-hole data was loaded into Datamine™ and coloured by Fe. Drill-hole grades were initially visually compared with cell model grades. Mean drill hole statistics were then compared to mean cell model grades for each estimated constituent on a domain by domain basis. Swath plots were used to compare drillhole and cell model grades for slices throughout the

Criteria	JORC Code explanation	Commentary
		deposit area.
Moisture	*Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	Tonnages are estimated on a dry basis. Moisture globally of 3% was determined diamond core and in-pit grab samples. The contract laboratory crushes samples to -8mm and then analyses using standard thermogravimetric methods.
Cut-off parameters	*The basis of the adopted cut-off grade(s) or quality parameters applied.*	The Mineral Resource has been reported above a cut-off grade of 50% Fe. This is the economic cut-off grade for low grade ore at Arrium Mining's Southern Iron operations.
Mining factors or assumptions	*Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.*	Peculiar Knob is currently mined using conventional drill and blast open pit methods; the Hawks Nest deposits have not been mined. Mining at Hawks Nest is assumed to be by conventional drill and blast open pit methods. A minimum mining width of 5 m was applied when interpreting the mineralisation boundaries. This minimum mining width is consistent with the equipment and grade control block out methods used at Peculiar Knob. The Z block boundaries were aligned with current and planned open pit benches. No internal or external dilution was modelled. Selective mining units were not defined or corrected for in the resource estimate or a recoverable resource estimated. However, a bulk open pit mining scenario possibly using large bench (5m) scale miners was considered and reflected in the block model construction and estimation parameters developed.
Metallurgical factors or assumptions	*The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	Low-grade material (50% Fe–55% Fe) is stockpiled at Arrium's Southern Iron operation. An assumption is therefore made that beneficiation of low-grade material will be possible to produce a >55% Fe product for shipping. The remaining Mineral Resource (>55% Fe) is DSO which does not require any metallurgical processing prior to shipment.
Environmen-tal factors or assumptions ***Environmen-tal factors or assumptions cont.***	*Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	At Peculiar Knob waste is disposed on designated stockpiles which will be rehabilitated under the Mine and Rehabilitation Plan. It has been assumed for the purpose of this estimate that legislation in this regard will remain similar to current such that future operations will operate in the same way.
Bulk density	*Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.*	The following density assumptions were made following the collection and review of 40 measurements from the Hawks Nest deposits: Cover – 2.5 tm^3 Shale – 2.80 tm^3 BIF – 3.50 tm^3 Mineralisation – 4.50 tm^3 Density for the Peculiar Knob deposit has been derived from the collection and review of over 100 measurements from diamond core and review and reconciliation of current mining operations. Cover – 1.8 tm^3 Host – 2.70 tm^3 Granite – 3.50 tm^3 Mineralisation – 4.64 tm^3
	The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.	The host sequences are comprised of high grade metamorphic rocks which generally display low porosity. Samples are sealed with hot wax or wrapped in water proof film to prior to water displacement to ensure no influence of measurement due to porosity.
	Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.	All mineralisation is informed by fixed bulk density measurements. Density variations within mineralised domains will create some uncertainty with this assumption. This has been considered when classifying the Mineral Resource.

Criteria	JORC Code explanation	Commentary
Classification	*The basis for the classification of the Mineral Resources into varying confidence categories.*	The Mineral Resources Classification is based on 3 stages of review: ▪ Geostatistical review – nominally Kriging Efficiency and Slope of regression; ▪ Drillhole spacing and number of samples; and ▪ Visual review. The Mineral Resource has been classified following due consideration of all criteria contained in Section 1, Section 2 and Section 3 of JORC 2012 Table 1. Areas of Measured, Indicated and Inferred Mineral Resource are considered by the Competent Person to have been appropriately informed and estimated for the classification determined.
	Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).	The Competent Person has confirmed that appropriate account was taken of all relevant criteria including data integrity, data quantity, geological continuity and grade continuity. Areas of Measured Indicated Resource and Inferred Mineral Resource are considered by the Competent Person to have been appropriately informed and estimated for the classification determined.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The Competent Person considers the resulting Mineral Resource estimate provides an appropriate global representation of this deposit.
Audits or reviews	*The results of any audits or reviews of Mineral Resource estimates.*	The current models were audited by CSA Global Pty Ltd (CSA). CSA considered the Mineral Resource estimates for Buzzard and Peculiar Knob "*… likely to be a reasonable representation of the mineralisation which exists* "
Discussion of relative accuracy/ confidence	*Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.*	The Mineral Resource accuracy is communicated through the classification assigned to various parts of the deposit. The Mineral Resource estimate has been classified in accordance with the JORC Code, 2012 Edition using a qualitative approach. All factors that have been considered have been adequately communicated in Section 1 and Section 3 of this Table. The resource estimate of grade and tonnage is based on the assumption that standard open cut mining methods will be applied and that high confidence grade control (e.g. dedicated RC grade control drilling) will be available for final mining ore-waste delineation.
	The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.	The Mineral Resource estimates are based on a realistic parent cell sizes and should be considered global resource estimates, and not recoverable resource estimates based on SMU blocks (10 m X x 25 m Y x 8 m Z).
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	Peculiar Knob Resource estimates have been reconciled with production data. The reconciliation results are consistent with the expected accuracy of the model No production data is available for Buzzard or Tui.

Section 4 Estimation and Reporting of Ore Reserves

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	*Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.*	Refer to Section 3. The Ore Reserve estimate is based on the Mineral Resource determined as of 30 June 2014.
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are inclusive of the Ore Reserves
Site visits	*Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	The Competent person visits the sites on a regular basis, with no material issues identified to date.
	If no site visits have been undertaken indicate why this is the case.	Not applicable.
Study status	*The type and level of study undertaken to enable Mineral Resources to be converted to Or Reserves*	The Peculiar Knob (PK)mine is in operating mine, with all infrastructure and equipment in place. The Hawks Nest Deposits will utilise the majority of infrastructure (crusher, camp, haul road) from the Peculiar Knob mine.
	The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically	Peculiar Knob is an operating mine. The Hawks Nest is at Feasibility study level with all modifying factors considered based on the PK mine.

Criteria	JORC Code explanation	Commentary
	viable, and that material Modifying Factors have been considered.	
Cut-off parameters	*The basis of the cut-off grade(s) or quality parameters applied.*	Reserve cut-off grades are based on a Fe value greater than 55%. This has been derived from financial analysis based on detailed, including mine production schedules that indicated that a saleable product could be produced taking into account market considerations for current contracts and spot shipments.
Mining factors or assumptions	*The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design*	Conversion of Mineral Resources to Ore Reserves has been by the application of appropriate mining factors and assumptions based on current mining practices, operating and capital costs based on Arrium's existing mining operations, as well as mine specific factors such as local geotechnical investigations..
	The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc	Arrium currently mines Iron Ore at the Peculiar Knob Mine using a conventional open cut, drill and blast, followed by truck and shovel operation. The same mining methods will be applied at the Hawks Nest Deposits. The mining method described is considered appropriate for the deposits in question.
	The assumptions made regarding geotechnical parameters (eg pit slopes, stope sizes, etc), grade control and pre-production drilling.	Geotechnical Investigations have been completed at Peculiar Knob and Hawks Nest with wall parameters derived from Diamond Drill Core and existing mine slopes at Peculiar Knob.
	The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).	The resource models described in Section 3 formed the basis of pit optimisation work..
	The mining dilution factors used.	Dilution factors are applied to the resource prior to reporting of the reserve estimate based on reconciliation data. In general, the reconciliation data indicates that a reduction in the reported Fe value needs to be applied with a corresponding increase in the SiO_2. A 0.5% loss of Fe is applied for dilution during the mining process for Peculiar Knob and a 1% loss of Iron is applied to Hawks Nest with a 0.8% increase applied to the SiO_2 for both Peculiar Knob and Hawks Nest. .
	The mining recovery factors used.	Mining recoveries are derived from reconciliation data and were set at 95% of the resource within the designed pit shell at an Fe cut off grade of 55% for Peculiar Knob Ore recovery is set at 90% for the Hawks Nest within the designed pit shell at an Fe cut off grade of 55%.
	Any minimum mining widths used.	With respect to mining selectivity a 5m minimum mining width is applied, in line with current mining practices. With respect to the minimum cutback width, 25m has been applied
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Mining of Inferred Mineral Resource is scheduled at the end of mine life and comprises approximately 2% of total schedule for Peculiar Knob and Hawks Nest.
	The infrastructure requirements of the selected mining methods	Current infrastructure meets on-going requirements for the selected mining method.
Metallurgical factors or assumptions	*The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.*	Direct Saleable Ore (DSO) will be stockpiled at the Run of Mine (ROM) pad and crushed and screened to deliver a "Fines Product" (<6.3mm) and a "Lump Product" (6.3mm to 31.5mm).
	Whether the metallurgical process is well-tested technology or novel in nature.	The metallurgical process of crushing and screening iron ore to produce either a Lump or Fines product is industry standard.
Metallurgical factors or assumptions cont.	*The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.*	Metallurgical test work and assumptions are derived from samples taken from diamond core, in-pit samples and production data from Peculiar Knob. They have been used to derive Lump / Fines splits and processing characteristics. Production data from the nearby Peculiar Knob operations forms the majority of test sampling and is used for the Hawks Nest area as well as core from two diamond holes. No metallurgical recovery factors are applied.
	Any assumptions or allowances made for deleterious elements.	As well as being marketed as "Opal" blend, DSO from the Southern Iron Operations will also form part of an overall "Whyalla" blend with product from other Arrium's operations. The impact of deleterious elements is taken into account during the economic assessment as part of the Arrium overall business model.
	The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.	No bulk sample or pilot testwork has been completed for the Hawks Nest Deposits.
	For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?	Metallurgical testwork and assumptions are derived from samples taken from diamond core and in-pit samples (taken from Peculiar Knob). They have been used to derive Lump and Fines splits and processing characteristics.
Environmental	*The status of studies of potential*	The Peculiar Knob Deposit is an operating Mine that has all required approvals

Criteria	JORC Code explanation	Commentary
	environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.	in place. The Hawks Nest Deposits are at Feasibility status and applications for mining and associated Waste Rock Storage approvals are currently being progressed with DMITRE.
Infrastructure	*The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.*	All infrastructures for mining Peculiar Knob are in place and operating as part of the existing Southern Iron Operations. Hawks Nest deposits planned to utilise existing infrastructure already in place.
Costs	*The derivation of, or assumptions made, regarding projected capital costs in the study.*	Costs associated with processing and transport based on existing operations. Projected capital costs for Peculiar Knob operations (including initial waste pre strip) and the Hawks Nest deposit are derived from costs of existing operations and are consistent with the Arrium business plan, projected over the relevant life of mine. Mining costs at Hawks Nest and Peculiar Knob deposits are derived from current service contracts in place with service providers at Peculiar Knob, adjusted to take into account projected changes in activity (due to pit depths, haulage distances, etc.) over the life of mine. All costs assumptions are calculated to include inflation and discount rates used are consistent with those used in the Arrium business plan, projected over the life of mine.
	The methodology used to estimate operating costs.	Mine plans and operational schedules are used to derive forecasts for operating costs. Operating costs are based on existing operations.
	Allowances made for the content of deleterious elements.	Reduction of revenue due to the presence of deleterious elements in the “Whyalla” blend and “Opal” blend products have been factored into the revenue assumptions (see further below).
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co- products.	Commodity price projections are based on independent external forecasts and reflect the assumptions made in the Arrium business plan.
	The source of exchange rates used in the study.	Foreign exchange projections are based on independent external forecasts and reflect the assumptions made in the Arrium business plan.
	Derivation of transportation charges.	Shipping and freight charge projections are based on available independent external forecasts, adjusted to reflect shipping from Whyalla to our primary markets in North Asia and to take into account existing contracts of afreightment and reflect the assumptions made in the Arrium business plan.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Treatment and refining charges are based on the cost of existing operations at Peculiar Knob and reflect the assumptions made in the Arrium business plan. The impact of specifications of ore shipped is dealt with in the revenue assumptions as reflected in the Arrium business plan (see further below).
	The allowances made for royalties payable, both Government and private.	Allowances for royalties are based on current legislation and reflect the assumptions made in the Arrium business plan.
Revenue factors	*The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.*	Revenue projections are based on external independent forecasts of commodity prices and foreign exchange, adjusted for expected realised prices derived from current contracts and product specifications (including grade and the presences of any deleterious elements) expected under current life of mine planning.
	The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.	See above description of revenue factors.
Market assessment	*The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.*	An assessment of the demand, supply and stock situation is made by Arrium based on its internal market research and internal market sensitivity analysis, which includes market intelligence by its staff based in Asia.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Analysis of customers and competitors is carried out by Arrium’s internal analysts based on internal market research and forecasts and internal market sensitivity analysis, which includes market intelligence by its staff based in Asia.
	Price and volume forecasts and the basis for these forecasts.	Volume forecasts have been based on current and future planned infrastructure capacity and mine plans. Pricing forecasts are derived in the manner described above under the criterion Revenue factors.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract	Not applicable as iron ore is not considered an industrial materials.
Economic	*The inputs to the economic analysis to*	The NPV was derived by applying the modifying factors as described in the

Criteria	JORC Code explanation	Commentary
	produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.	previous criteria. .
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	As above
Social	*The status of agreements with key stakeholders and matters leading to social licence to operate.*	At Peculiar Knob all necessary mining approvals are in place and are inclusive of all regulatory requirements to underpin the Ore Reserve estimate. Negotiations are progressing with current Stakeholders as part of the Mining Approvals process for the Hawks Nest Project.
Other	*To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:*	
	Any identified material naturally occurring risks.	No material naturally occurring risks, e.g. geological risks, were identified.
	The status of material legal agreements and marketing arrangements.	The Southern Iron Operations are an existing business line and sales will continue through existing marketing arrangements, including a mix of term and spot contracts. Contracts are in place with MACA Limited and Giacci Holdings Pty Ltd for mining and haulage operations. Sufficient rail paths have been obtained from Australian Rail Track Corporation and contracts are in place with Genesee & Wyoming Australia Pty for rail wagons and haulage to support the Ore Reserve estimate.
	The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent	All mining and tenement approvals necessary for the Ore Reserve estimate are in place for Peculiar Knob. Hawks nest area is at Feasibility status and applications for Mining Applications are currently in progress.
Classification	*The basis for the classification of the Ore Reserves into varying confidence categories.*	Ore Reserve classifications are based on operating history and commensurate with the Ore Reserve classification as defined in JORC 2012
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The Ore Reserve classification appropriately reflects the views of the Competent Person
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	No Probable Ore Reserves are derived from Measured Mineral Resources.
Audits or reviews	*The results of any audits or reviews of Ore Reserve estimates.*	An audit of the Ore Reserve estimate has been completed by Coffey Mining Pty Ltd, an independent consultant and no material issues were identified.
Discussion of relative accuracy/ confidence	*Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.*	The relative accuracy and confidence level in the Ore Reserve estimate accuracy is in line with that of the Ore Reserve classification and has been validated through reconciliation of current mining operations. The accuracy of the Hawks Nest Deposits is in line with Ore Reserve Classification.
	The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.	Statement relates to global estimates
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the	The modifying factors are based on existing operational parameters that include reconciliation of actual production data at Peculiar Knob. The Modifying Factors derived for Hawks Nest are based on a review of the underlying orebody geometry, mining method and minimum mining widths.

Criteria	JORC Code explanation	Commentary
	current study stage. *It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	

ORE BENEFICIATION STOCKPILES INTRODUCTION

The Middleback Ranges (MBR) lies on the north eastern Eyre Peninsular, South Australia (Figure 1). They extend from Iron Knob, approximately 50 km northwest of Whyalla, to adjacent to the Lincoln Highway, approximately 50 km southwest of Whyalla.

Prior to the early 1960s material mined was either classified as ore or waste, with the ore railed to Whyalla, and the waste tipped onto waste stockpiles at the mine sites. In the early 1960s the mining procedure was changed so that material not railed to Whyalla as ore was classified as waste or one of several types of Low Grade Ore (LGO). The LGO ores were accumulated into separate stockpiles to allow future reclamation should a beneficiation plant be established to process the ore.

Arrium Mining collated information on 16 different LGO stockpiles at the Iron Knob Mining Area (IKMA), Iron Baron Mining Area (IBMA) and at the Southern Middleback Range (SMR) operations. Using this information, Arrium Mining assessed whether there was sufficient data to estimate recoverable Mineral Resources and Ore Reserves. The data collected for each stockpile comprised sonic drilling samples, trenching samples or stockpile build and reclaim information. Additional stockpiles will be included in future Mineral Resource estimates as data is upgraded through the implementation of future drilling programmes.

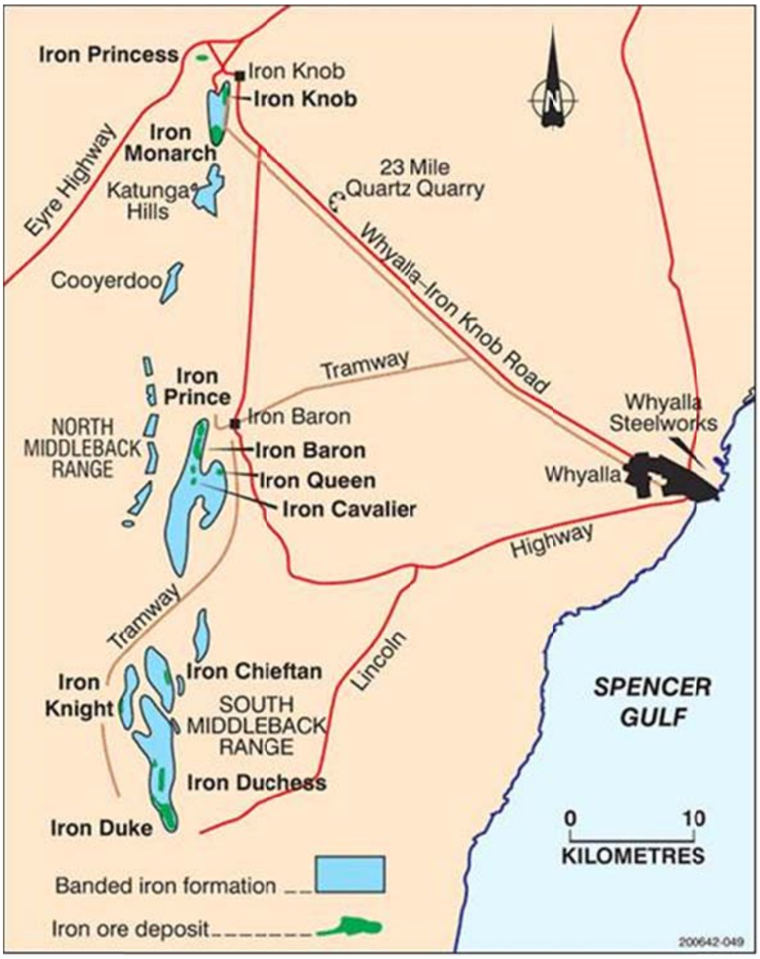


Figure 1: Site Location

GEOLOGY AND GEOLOGICAL INTERPRETATION

The 16 stockpiles as described above are located at or near existing mining areas as shown in Appendix A. Hence, the geology and mineralogy is a direct correlation to the local geology of each respective mining area.

For a more detailed description of the MBR geology refer to the summary document for the Middleback Ranges Hematite project.

LGO Stockpile Construction

Development of low grade stockpiles have been established by creating a working tip edge at or near the planned top elevation of the site and commonly tipping material down the natural hill slopes on the side of a haul road along the flanks of the hills. Less commonly, stockpile construction has involved the building of a ramp up to the top elevation of a stockpile from a lower surface in incremental layers. Growth generally occurred radially from an initial starting area, with trucks tipping rock down the leading edge.

In 2012, investigation into the suitability to upgrade the tails of the Iron Duke beneficiation plant identified the SMR Ore Beneficiation Plant (OBP) Tails Dam as an additional LGO stockpile. The SMR OBP Tails Dam has been constructed by the deposition of processing rejects from the Iron Duke beneficiation plant spiral circuit since plant commencement in 2005.

SAMPLING AND DRILLING TECHNIQUES AND DATA COLLECTION

Data used to generate the resource estimate for the LGO stockpiles was derived from the sources outlined below:

- **Transactional Data**. Records of the tonnes and grade of material used to build the LGO stockpiles from pit locations and the amount and grade of LGO material reclaimed from the final LGO stockpiles. Sources included Arrium's Pit to Port mine production system and transactional data from pre 2002 reports. The Mineral Resource estimates for SMR stockpiles DCDU05 and IDDU05 were derived exclusively from this data
- **Trenching**. Trenches were excavated parallel to the direction of construction (perpendicular to the tip face), with representative samples collected along the faces of the trench. Table 1 shows a summary of trenching data, whilst Appendix B shows the trench locations.
- **Sonic Drilling (SD)**. SD penetrates the substrate using a vibration frequency of approximately 150Hz, causing a thin layer of particles directly surrounding the drill string to lose structure and "fluidise". Samples are collected within the barrel at 1 metre intervals before being split into pre-numbered calico bags for assaying. Table 2 shows a summary of drilling, with collar locations shown in Appendix B.

All trench and Sonic Drill locations have been surveyed from local Mine Survey Control.

Table 1: Trenching Data

	No of Trenches	No of Assay	Av.Metres/ Sample	Total Metres
IKMA				
K05	1	6	15	88
K02	7	21	12	243
K03	21	54	20	1,078
K06	1	4	13	50
Subtotal	30	85	17	1,459
IBMA				
PC East	7	122	11	1,357
6C	5	24	19	457
8A	2	14	14	202
IBDU7	3	7	13	89
Subtotal	17	167	13	2,105
SMR				
KL14	5	151	4	604
TOTAL	**52**	**403**	**14**[1]	**4,168**

Note: 1. Excludes data for KL14 due to bias and treatment in the resource estimate

Table 2: Sonic Drilling Data

	No of Collars	No of Assay	Total Metres
IKMA			
K05	13	184	184
K02	5	213	213
K03	56	867	867
Subtotal	**74**	**1,264**	**1,264**
IBMA			
PC East	3	92	92
IBDU07	4	154	154
6B	2	49	49
Subtotal	**9**	**295**	**295**
SMR			
DU5DC/DU6DC	16	521	521
KL09	25	546	546
KL14	12	58	58
KL07	8	56	56
Subtotal	61	1,181	1,,181
TOTAL	154	2972	2,972

SAMPLE ANALYSIS METHODS

Sample Preparation

Arrium uses Bureau Veritas (BV) for sample analysis. BV Whyalla and BV Adelaide completed the most recent analytical work. BV's sample preparation process involves the following activities:

- Sorting & drying
- Weighing.
- Crushing.
- Pulverising.
- Sizing.

Where samples weigh more than 3kg the sample is split to provide a nominal 3kg weight for sample pulverising.

Sample Analysis

Samples are fused with Lithium Borate flux to form a glass disc and analysed by X-Ray Fluorescence (XRF). The samples were analysed for the following analytes (with detection limits in ppm):

Fe (100)	SiO_2 (100)	Al_2O_3 (100)	Mn (100)	TiO_2 (100)	CaO (100)
MgO (100)	K_2O (100)	P (10)	S (10)	Na_2O (100)	Cu (10)
Pb (10)	Zn (10)	Ba (10)	V (10)		

To determine Loss on Ignition (LOI), samples were dried at 105°C, weighed, placed in a temperature-controlled environment at 1,000°C for one hour, cooled, and re-weighed, with LOI reported as a percentage.

Further metallurgical testing were completed on a minority of the LGO Stockpiles, with the intention of more testing to be completed on all LGO stockpiles in the future. 2 Metallurgical test types were conducted, namely Mini-Jig and Heavy Liquid Separation (HLS), with the methodology for each test type being described below.

Mini Jig

The crusher Mini-jig samples are processed on a stockpile basis through a rotary splitter to initially homogenise the sample. It is then split into a lump and fines fraction to replicate current plant feed conditions.

The Mini-jig "jigging" operation takes about 20 minutes and uses an approximately 50kg sample. The sample is pulsed with water. This separates the higher density (iron) rock from the lower density material (silica, alumina etc). The heavier material sinks to the bottom of the jig whilst the lighter material is carried to the top. After the 20 minute "jigging" process the material is removed from the jig resulting in the development of 5 layers which are indicative of grade boundaries within the sample being tested. Each layer is weighed and assayed for the standard analytic suite described above. The data is used to construct a grade / yield curve, which is indicative of the metallurgical performance of the material tested under varying conditions in the beneficiation process.

HSS

Heavy liquids have wide use in the laboratory for the appraisal of gravity-separation techniques on beneficiable low grade ores. Ore samples are separated into a series of fractions according to density to establish the relationship between the high and low specific gravity minerals. The crushed sample particles either 'sink' or 'float' in the heavy liquid selected and are then recovered for further analysis.

Where practicable, bulk samples from LGO stockpiles that are close to the beneficiation plants but have not been used for beneficiation feed previously were fed through either the Iron Duke or Iron Baron Ore beneficiation plants as trial parcels to test the metallurgical behaviour of the stockpiles. Test parcels trialled have varied in size from 10,000 tonnes to 40,000 tonnes..

QA/QC

Field QA/QC

Limited field QA/QC data is available for the sonic drilling, and involved the use of duplicate and Certified Reference Material (CRM). Recent trench sampling collected duplicates every 5th sample.

Arrium targets a QA/QC value of 10% of the primary samples. Arrium inserts CRMs regularly every 25 samples (i.e. in sample bags ending in 25, 50, 75, 00), and aims for 4% each of field duplicates and field blank samples. Arrium requires drill rig geologists to target ore and near-ore material for duplicates, and to add a field blank immediately after the duplicate pair. Selecting samples for duplication is subjective, and thus the area where most variation now occurs in terms of actual numbers of duplicates collected.

Laboratory QA/QC

The objective of the Laboratory QA/QC Program is to measure the precision and accuracy of the analytical data. Quality assurance involves the planned and systematic actions necessary to provide confidence in each analytical result. The QA/QC Program has two components:

- Quality Assurance (QA) - the system used to verify that the entire analytical process is operating within acceptable limits; and
- Quality Control (QC) - the mechanisms established to measure non-conforming method performance

GRADE ESTIMATION METHODOLOGY

Since LGO Stockpiles were constructed from material with an Fe grade range of between 45% Fe to 55% Fe, no lithology or geological wireframes are required to estimate geological features. Basic models were constructed within defined topographic surfaces to determine the area of each of the stockpiles. To estimate the grade within the LGO stockpile either or both sonic drill-hole and trenching data was used. All stockpiles were modelled considering the natural rill angle of the stockpile tip head of 37 degrees and the build direction of each stockpile.

Drill-holes were composited to 4m intervals to match a common sample interval length.

A 3-Dimensional (3-D) block model was constructed for resource estimation purposes, based on a 10mE x 10mN x 4mRL (east x north x RL) parent block size.

The selected parent block size was based on the available data, the data characteristics (spacing and variability as defined by variography) and the envisaged mining practises. Sub-blocking to a cell size of 2mE x 2mN x 1mRL was undertaken to allow the effective volume representation of the selected stockpile sizes.

Ordinary Kriging (OK) is one of the more common geostatistical methods for estimating the block grade. In this interpolation technique, contributing composite samples are identified using a search volume applied from the centre of each block.

Weights are determined so as to minimise the error variance; considering both the spatial location of the selected composites and the modelled variogram. Variography describes the correlation between composite samples as a function of distance and direction. The weighted composite sample grades are then combined to generate a block estimate and variance.

The search parameters define the volume in which the samples for estimation are selected. Search ellipses were defined with dimensions and orientation to reflect the nature and orientation of the mineralisation and were derived from the variography modelling on the constituent Fe. These variograms were also used to determine the search ellipse shape and values for distances of the ellipse axes.

The search orientation for Low Grade stockpiles uses dynamic anisotropy, which allows the rotation angles for the search volume and variogram to be defined individually for each model block. The search volume can be oriented to follow the build trend of the stockpile precisely. A hard coded 37 degree angle was used to mimic the natural rill of tip-head stockpiles.

Gr Grade estimation was completed with three search passes. All passes utilised the OK grade estimation methods.

Project Extents	X m	Y m	Z m
IKMA K03	280	350	36
IKMA K02	220	260	44
IKMA K05	170	160	40
IKMA K06	150	130	48
IBMA CAV	200	140	36
IBMA IBDU7	300	320	64
IBMA 8A	180	230	52
IBMA PC	500	500	60
IBMA 6C	260	440	52
SMR KL07	300	230	40
SMR KL14	350	550	36
SMR KL09	460	550	68
SMR DCDU06	320	290	68
SMR DCDU05	400	350	72
SMR IDDU05	250	310	36
OBP TAILINGS	580	830	36

Table 2: Stockpile Extents

CRITERIA FOR CLASSIFICATION

The low grade stockpiles have a sufficient amount of data to support an Indicated and Inferred Mineral Resource classification. The amount of sonic, build and trenching data that support the size of the stockpiles were reviewed for each individual stockpile to determine the level confidence associated with the classification status. Where data was available the reclaim transactions were compared to model estimation results as a further guide to the most appropriate classification.

CUTOFF GRADE

The Mineral Resource reported for stockpiles were based on an Fe grade of greater than 45%, which is in line with the current beneficiation feed grade target.

ORE RESERVES AND MINING OPERATIONS

Material Modifying Factors

Arrium derived the Middleback Range beneficiated LGO Ore Reserve estimate from the LGO Mineral Resource estimates for the Middleback Range Hematite Project completed on the 30th of June 2014, with Ore Reserves classified in accordance with the JORC Code, 2012 Edition.

No Probable Ore Reserves have been derived from LGO Measured Mineral Resources.

Stockpiles used to derive the Ore Reserve estimate have an iron grade of greater than 47% Fe. This cut-off was determined based on detailed financial analysis from mine planning and beneficiation operations, taking into account market requirements for current contracts, spot shipments and long-term planning considerations.

Each stockpile will be reclaimed in its entirety with no selective mining assumed. This is based on reconciliation of operational practices employed at the Southern Middleback Range for the past 10 years and the Iron Duke and Iron Baron beneficiation operations for the past 10 and 5 years respectively..

The reserve model is inclusive of metallurgical recovery factors and beneficiated ore grades, where recovered grades vary for each stockpile based on the results of the metallurgical test work for each stockpile.

The key contaminants SiO2, Al2O3, P, CaO, MgO, Mn, S, TiO2, Na2O, Zn and K2O were considered with regards to therevenue assumptions and are based on the operational model of a blended Lump / Fines product, utilising external forecasts in line with those used in Arrium's business plan. These forecasts include expected reductions in revenue due to the presence of these contaminants.

Stockpiles are reclaimed in 4m flitches, using front-end loaders and haul trucks, which is in line with current mining methods. Stockpile size varies between 0.1Mt and 2Mt with the extents outlined in Table 2.

Geotechnical considerations have been based on the natural angle of repose for the tip head of the stockpiles.

The ores reclaimed from stockpiles are crushed to an -32mm all in feed stockpiles through crusher infrastructure located at the Iron Baron and SMR mine sites.

Ore is then beneficiated through the OBP utilising density (Jigs and Spirals) separation to produce a high grade Lump (-32mm, +6.3mm) and Fines (-6.3mm) product. This technology is considered industry standard. The plants are located adjacent to the crushing facilities at the Iron Baron and SMR mine sites.

The processed Lump and Fines DSO products are railed to the Whyalla Bulk Material Port for transhipping.

Further review of additional material to be considered for beneficiation will be based on detailed mine planning, metallurgical testwork, infrastructure design and capital estimates as considered appropriate for a feasibility level study.

MATERIAL MODIFYING FACTORS

Modifying factors are based on existing operational parameters that include reconciliation of actual production data against previous Beneficiation Performance estimates at the Iron Duke and Iron Baron Ore Beneficiation Plants and differing ore mineralogy and results from metallurgical test-work performed for each Low Grade.

The Iron Duke and Iron Baron Ore Beneficiation Plants have been operational for 10 and 5 years respectively and all necessary approvals, plant and infrastructure are in place

EVALUATION

Market Assessment was based on internal and external market projections, with pricing forecasts based on existing contracts, external projections of commodity prices, foreign exchange and freight indices, each adjusted against expected costs and revenue derived from existing operations. Revenue forecasts account for the impact of deleterious elements and variation over project life. Sales volumes have been taken from Life of Mine Plans; these are derived from current and future infrastructure capacity.

Derivation of mining costs is from existing operations and current service contracts in place. Cost escalation over the mine life is taken into account through CPI adjustment.

Projects are evaluated using Arrium external economic assumptions and NPV modelling in line with Arrium business planning.

REFERENCES

Bubner, G., Dentith, M., Dhu, T., & Hillis, R., 2003. Geophysical Exploration for Iron ore in the Middleback Ranges, South Australia, in *Geophysical Signatures of South Australian Mineral Deposits* (ed: M. C. Dentith), pp 29 – 46

Francis, G.L, 2010. Minerals of the Iron Monarch.

Hand, M., Reid, A., Jagodzinski, L., 2007. Tectonic framework and evolution of the Gawler Craton, southern Australia. *Economic Geology* 102 (8), 1377–1395.

Parker, A.J., 2012a. Gawler Craton. In: Drexel, J.F., Priess, W.V. and Parker, A.J. (Eds), *The geology of South Australia. Vol. 1, The Precambrian*. South Australian Geological Survey Bulletin 54, pp 51-68 (Reprinted with minor corrections 2012)

Parker, A.J., 2012b. Geological Framework. In: Drexel, J.F., Priess, W.V. and Parker, A.J. (Eds), *The geology of South Australia. Vol. 1, The Precambrian*. South Australian Geological Survey Bulletin 54, pp 51-68 (Reprinted with minor corrections 2012)

Parker, A.J. and Lemon, N.M., 1982. Reconstruction of the Early Proterozoic stratigraphy of the Gawler Craton, South Australia. Geological Society of Australia. *Journa*l, 29:221-238

Yeats, G.A., 1990. Middleback Range iron ore deposits, in *Geology of the Mineral Deposits of Australia and New Guinea* (ed: F.E. Hughs. The Australasian Institute of Mining and Metallurgy: Melbourne)
Keith, J Henley, "Improved heavy-liquid separation at fine particles sizes", The Australian Mineral Development Laboratories (AMDEL), 1977

D, Fortin, “ORE BENEFICIATION PLANTS Feed Grade Modeling” 4 Feb 2014, Report no 417-PM001, Mineral Technologies

Appendix A: Stockpile Locations

Figure A1: Iron Monarch LGO Stockpile Locations

Figure A2: Iron Baron LGO Stockpile Locations

Figure A3: Iron Knight LGO Stockpile Locations

Figure A4: Iron Duke LGO Stockpile Locations

Appendix B: LGO Stockpile Trench & Drill-hole Collar Locations

Iron Knob Mining Area

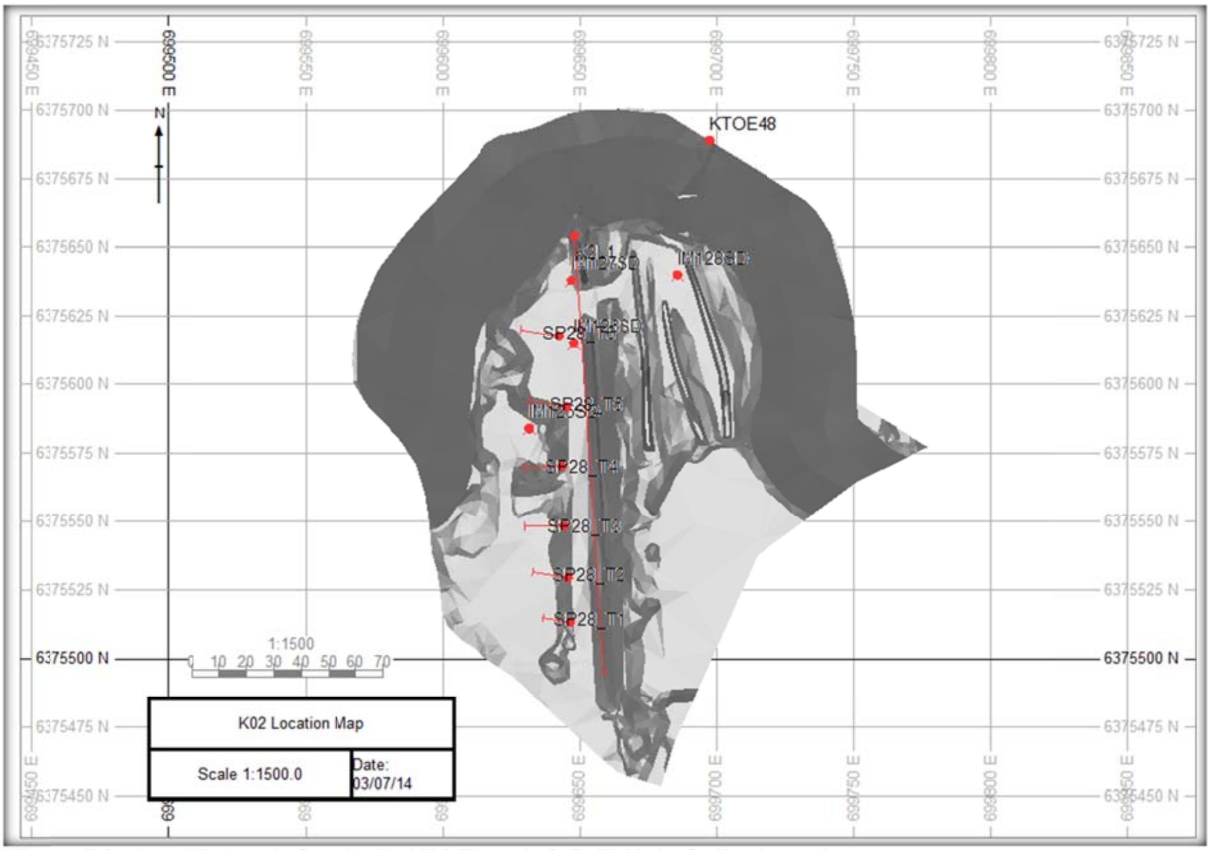


Figure B1: Iron Monarch Stockpile K02 Trench & Drill-Hole Collar Locations

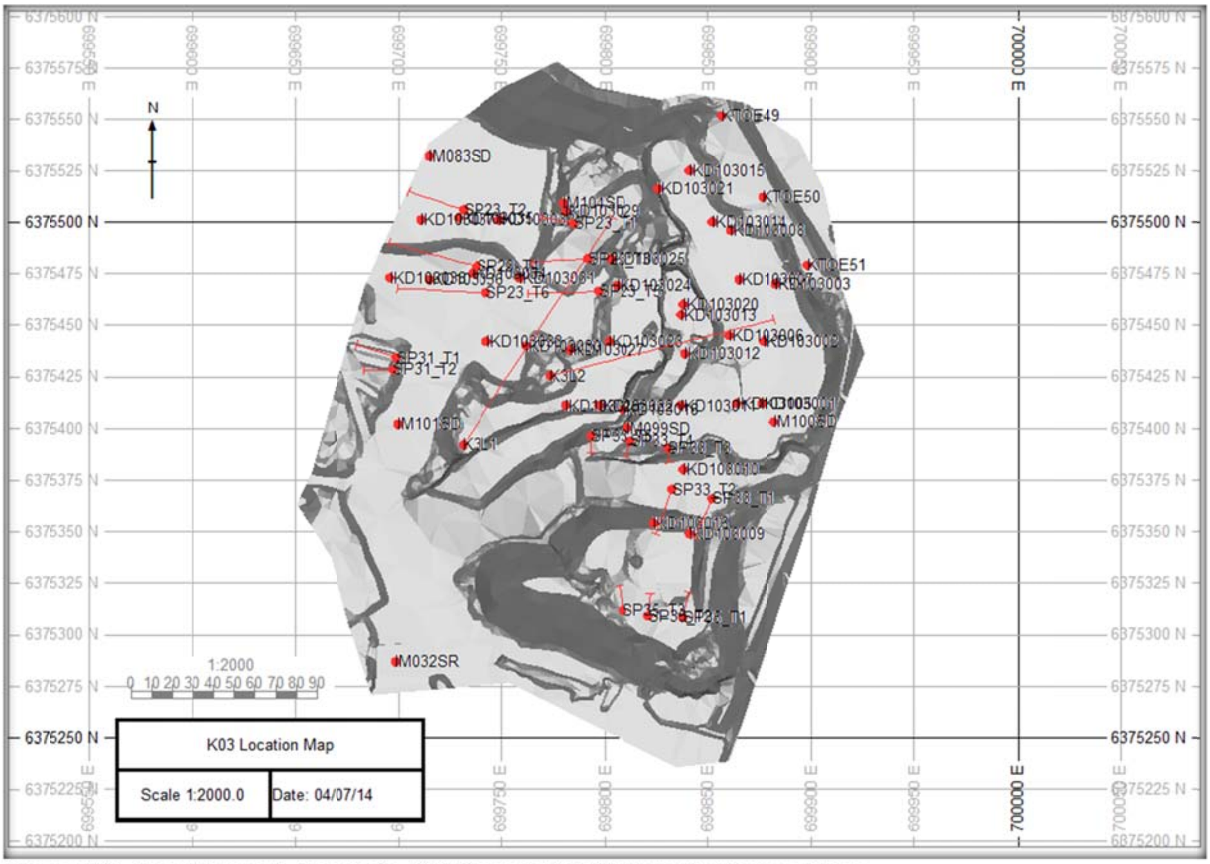


Figure B2: Iron Monarch Stockpile K03 Trench & Drill-Hole Collar Locations

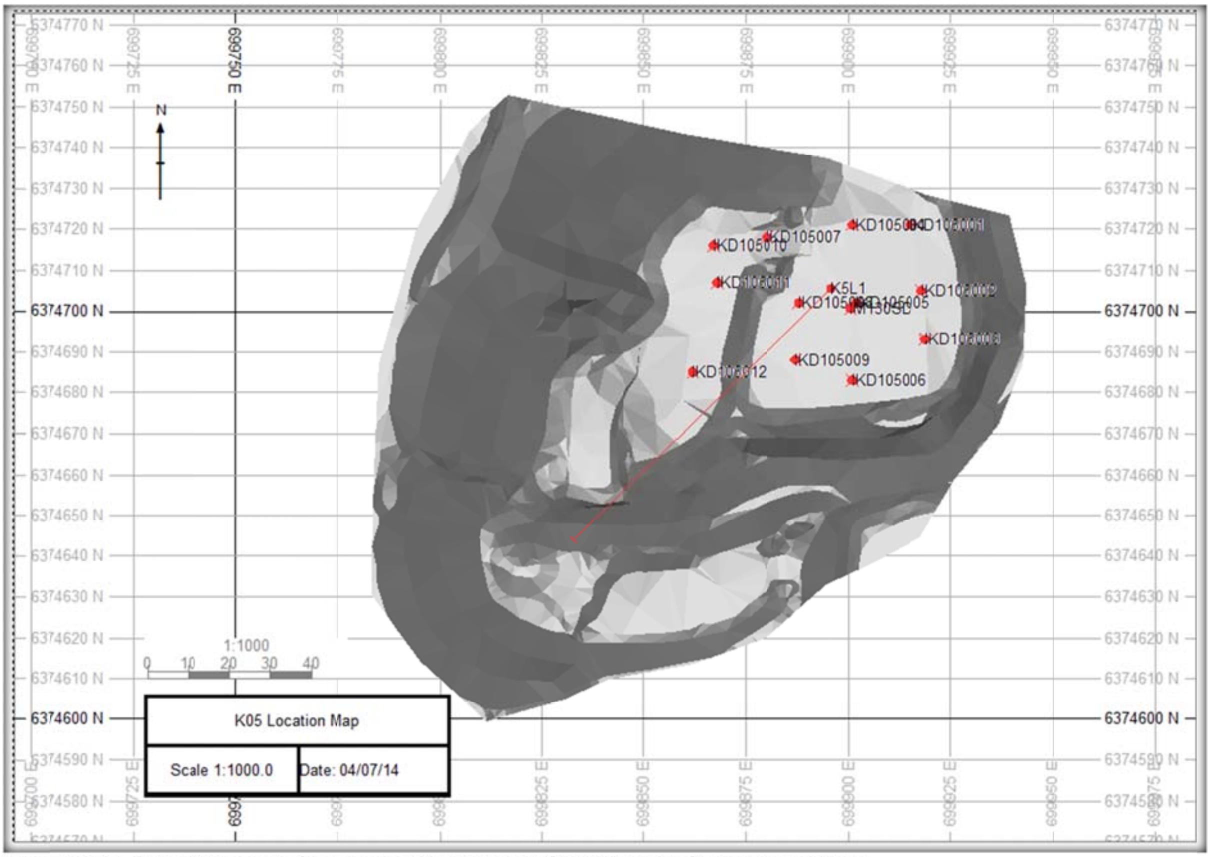


Figure B3: Iron Monarch Stockpile K05 Trench & Drill-Hole Collar Locations

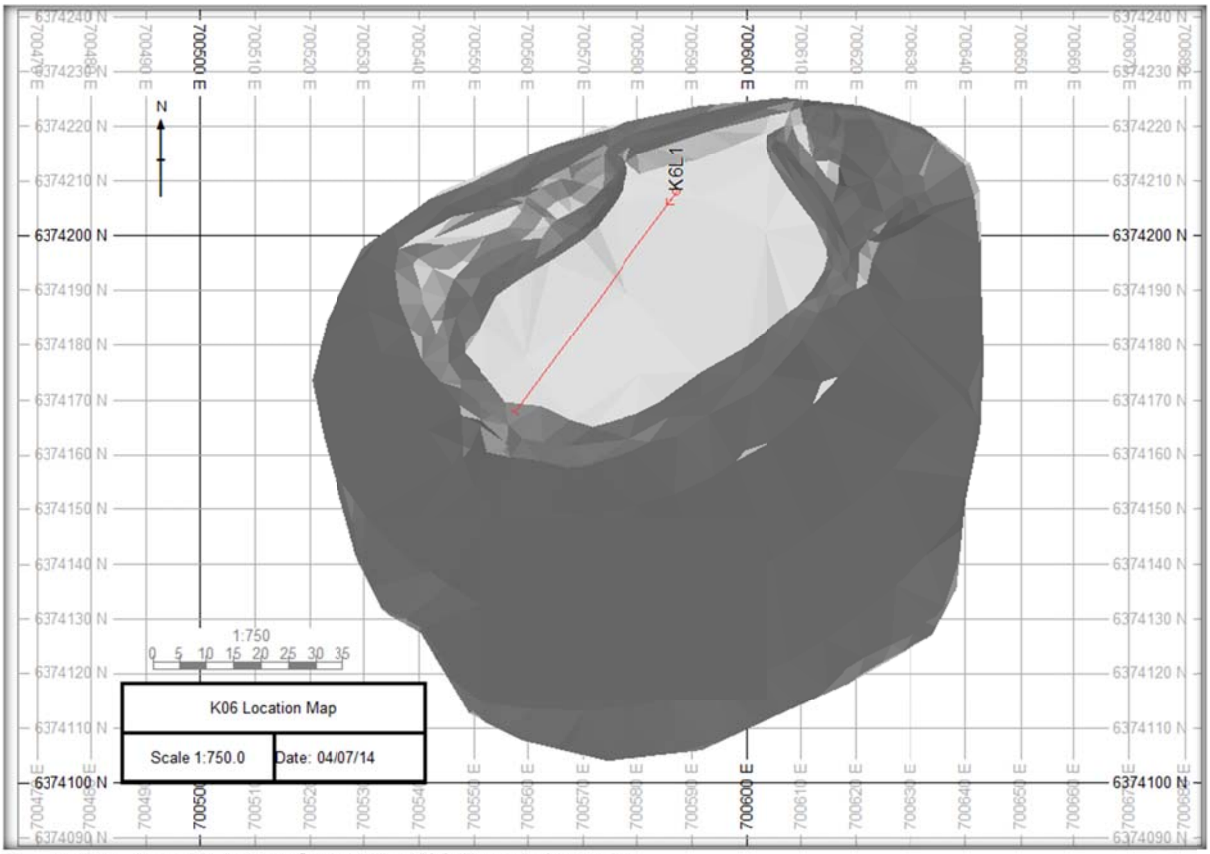


Figure B4: Iron Monarch Stockpile K06 Trench Location

Iron Baron Mining Area

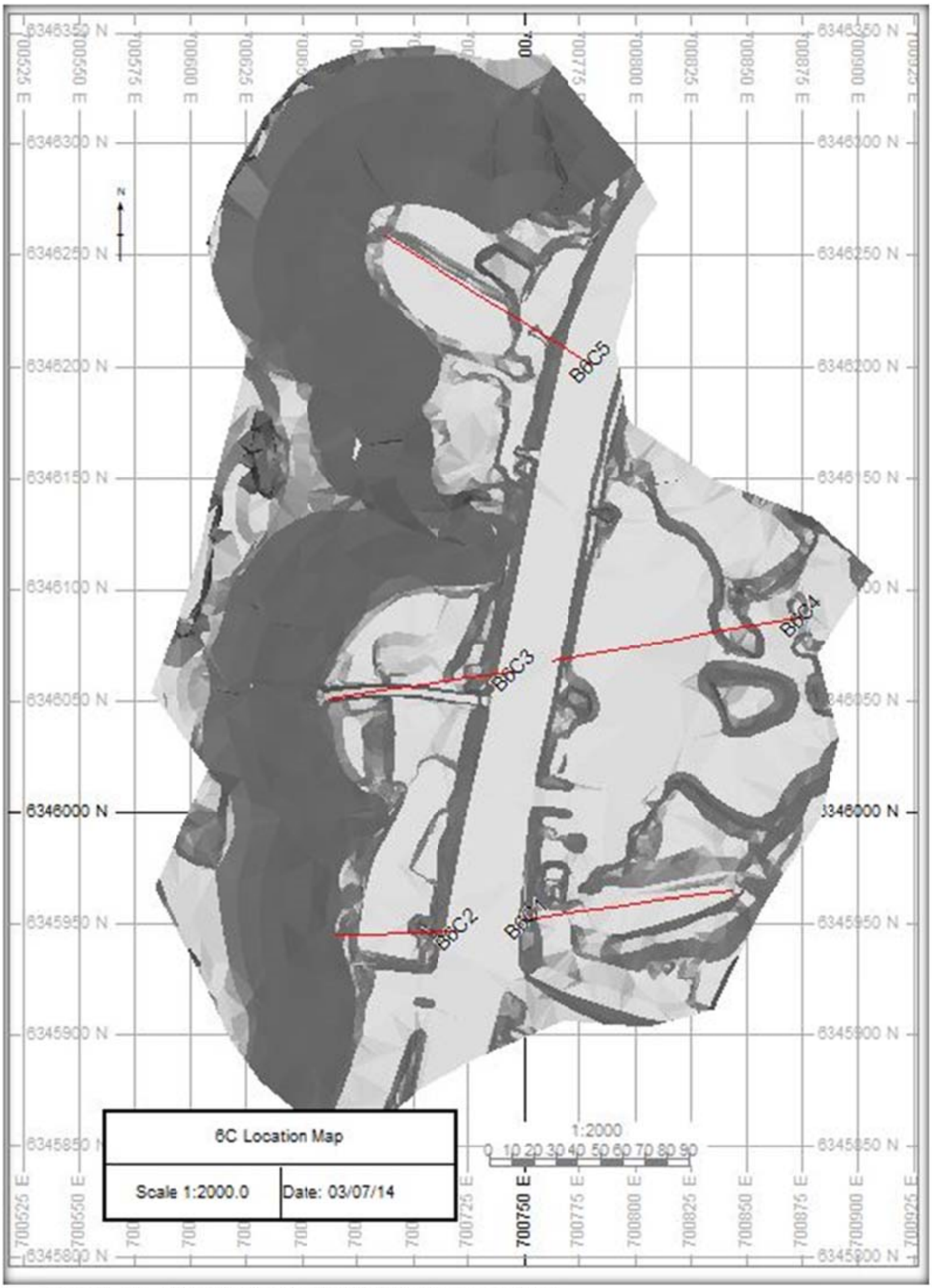


Figure B5: Iron Baron Stockpile 6C Trench Locations

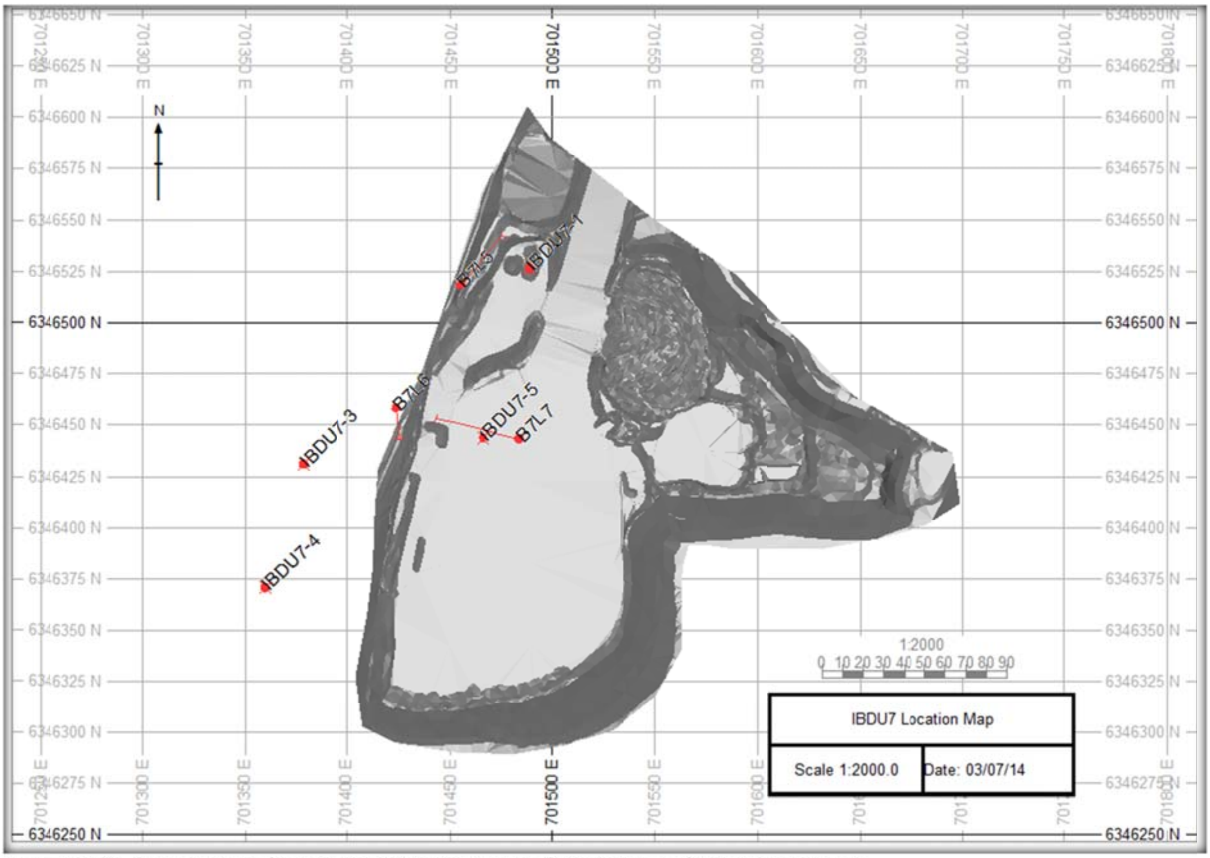


Figure B6: Iron Baron Stockpile IBDU7 Trench & Drill-Hole Collar Locations

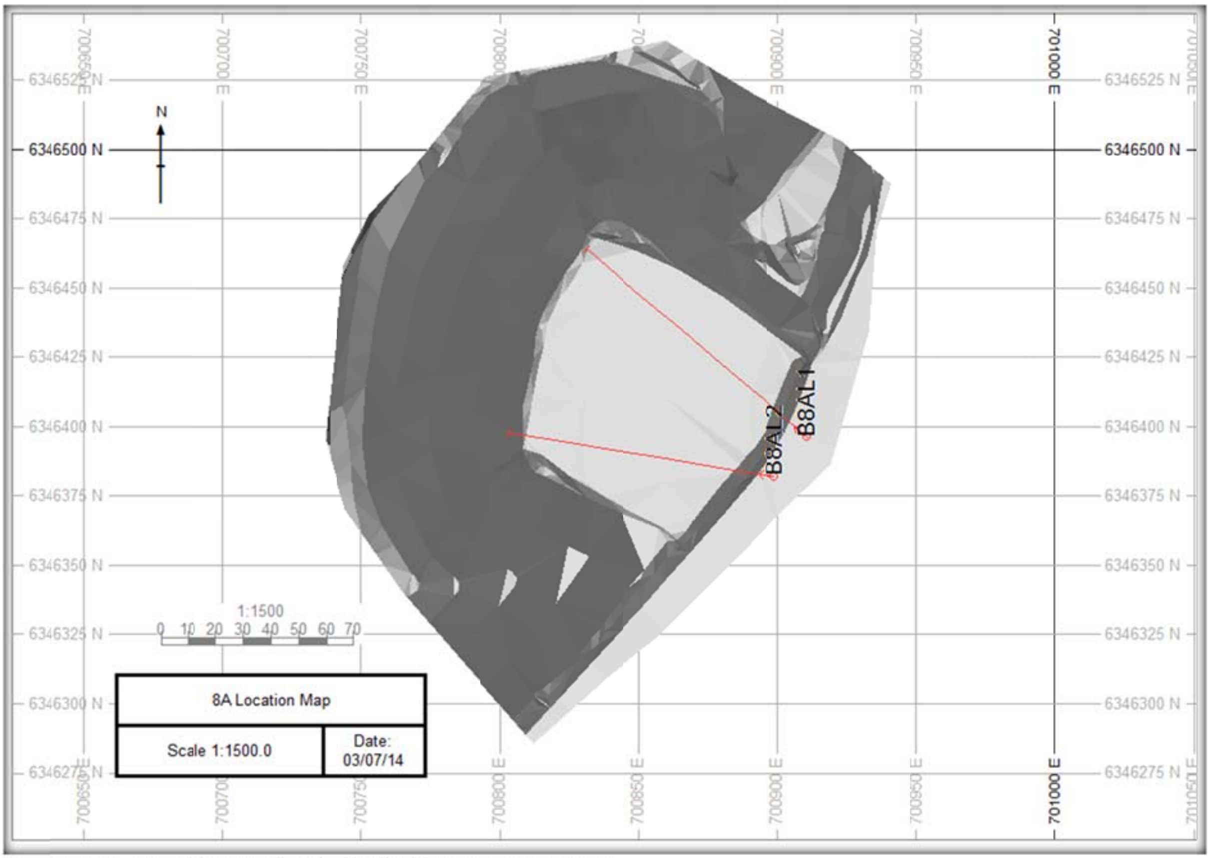


Figure B7: Iron Baron Stockpile 8A Trench Locations

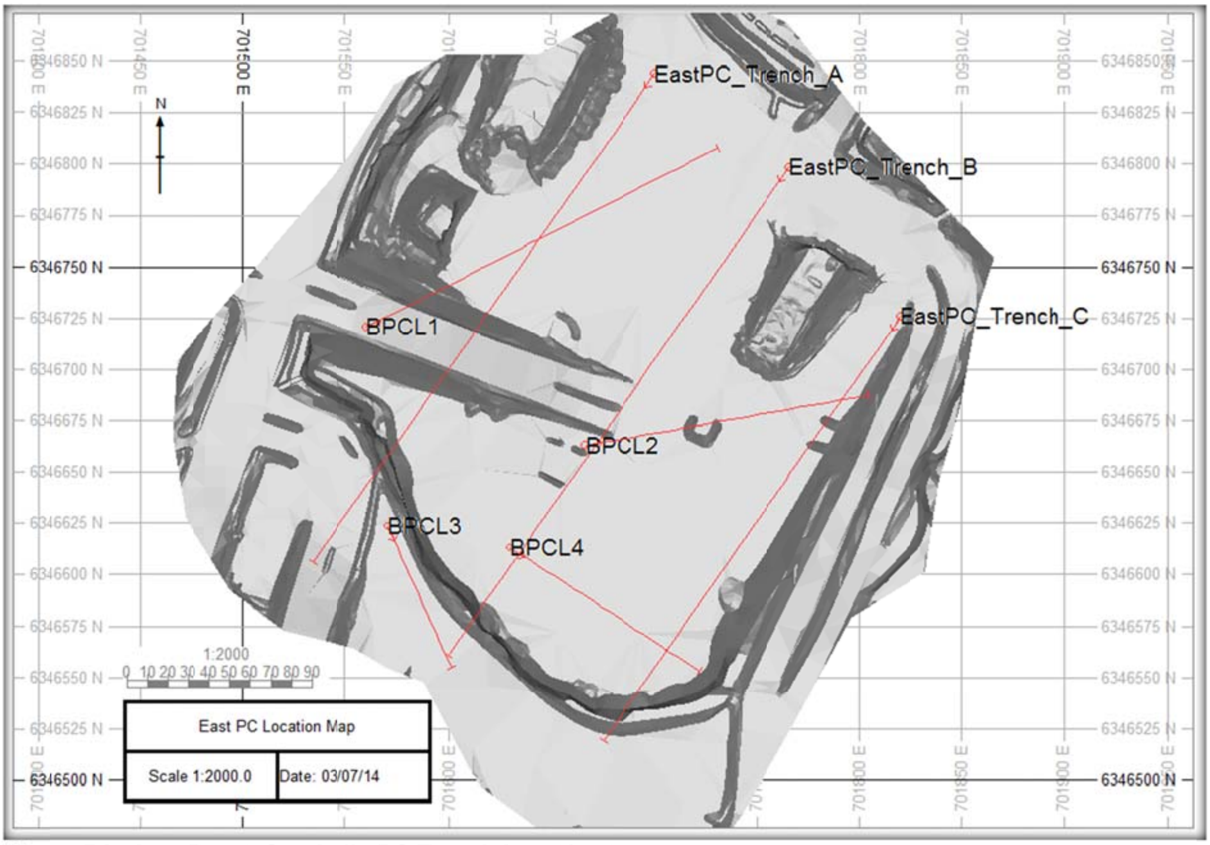


Figure B8: Iron Baron Stockpile PC Trench Locations

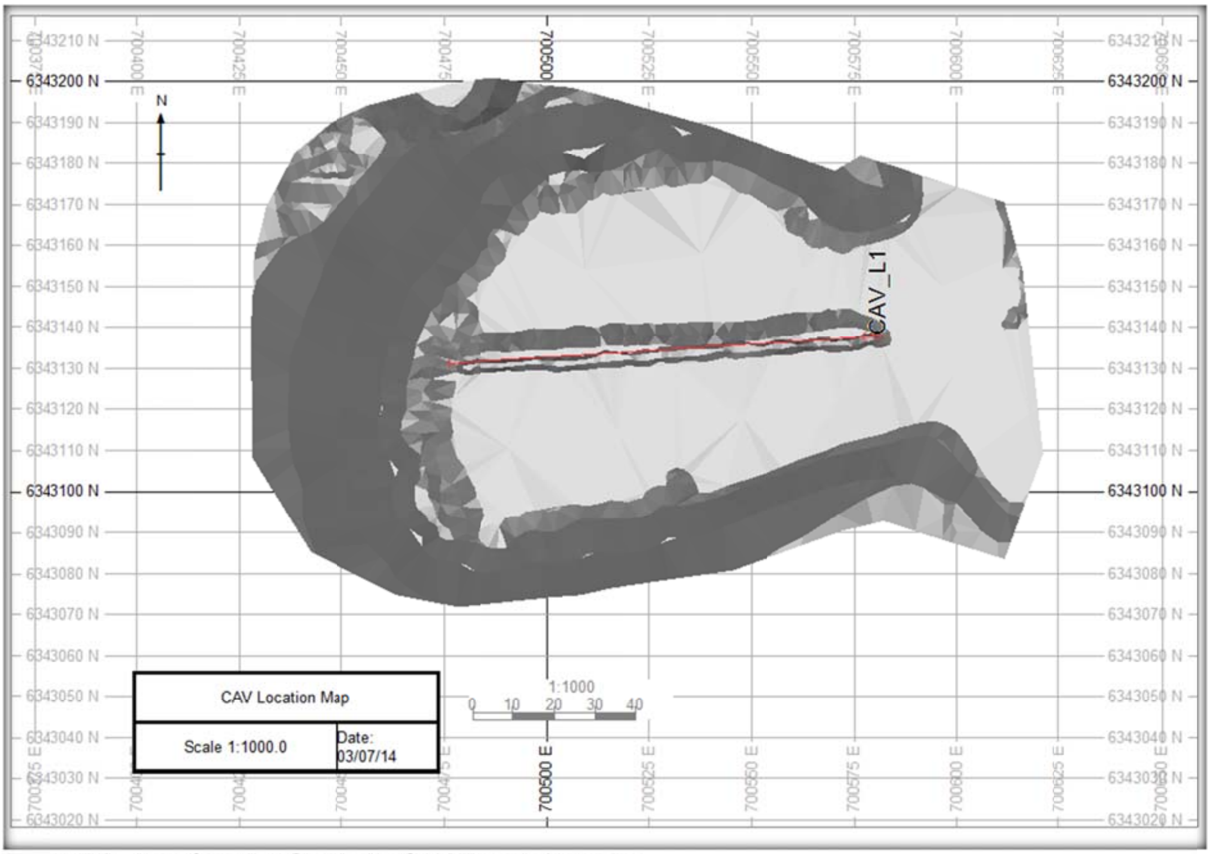


Figure B9: Iron Cavalier Stockpile CAV Trench Location

Southern Middleback Ranges

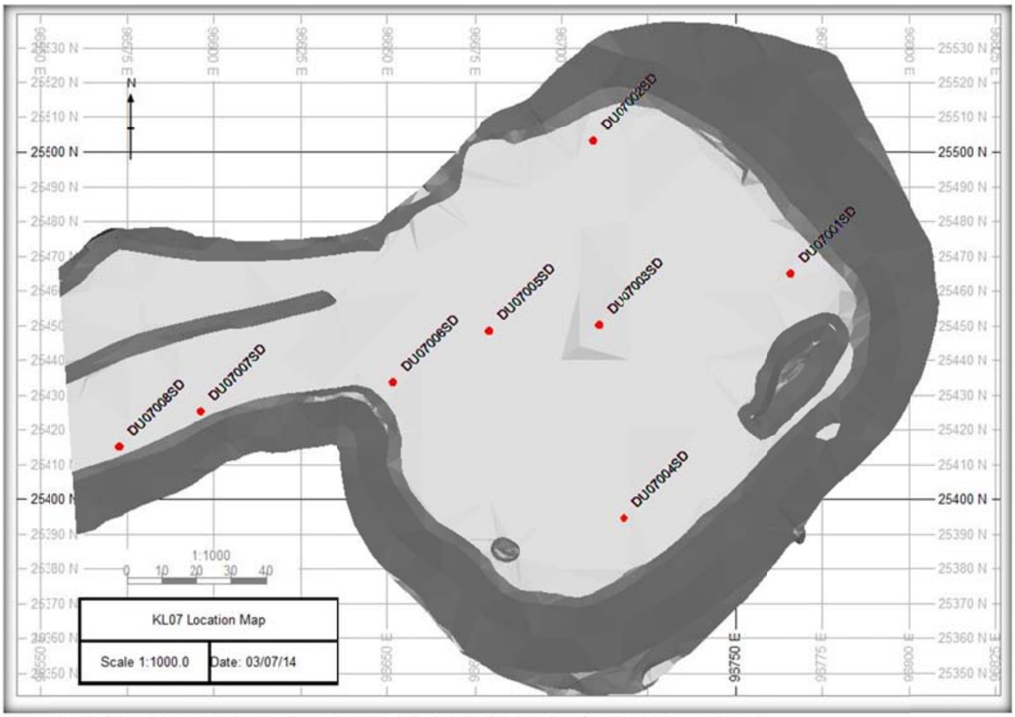


Figure B10: Iron Knight Stockpile KL07 Drill-Hole Collar Locations

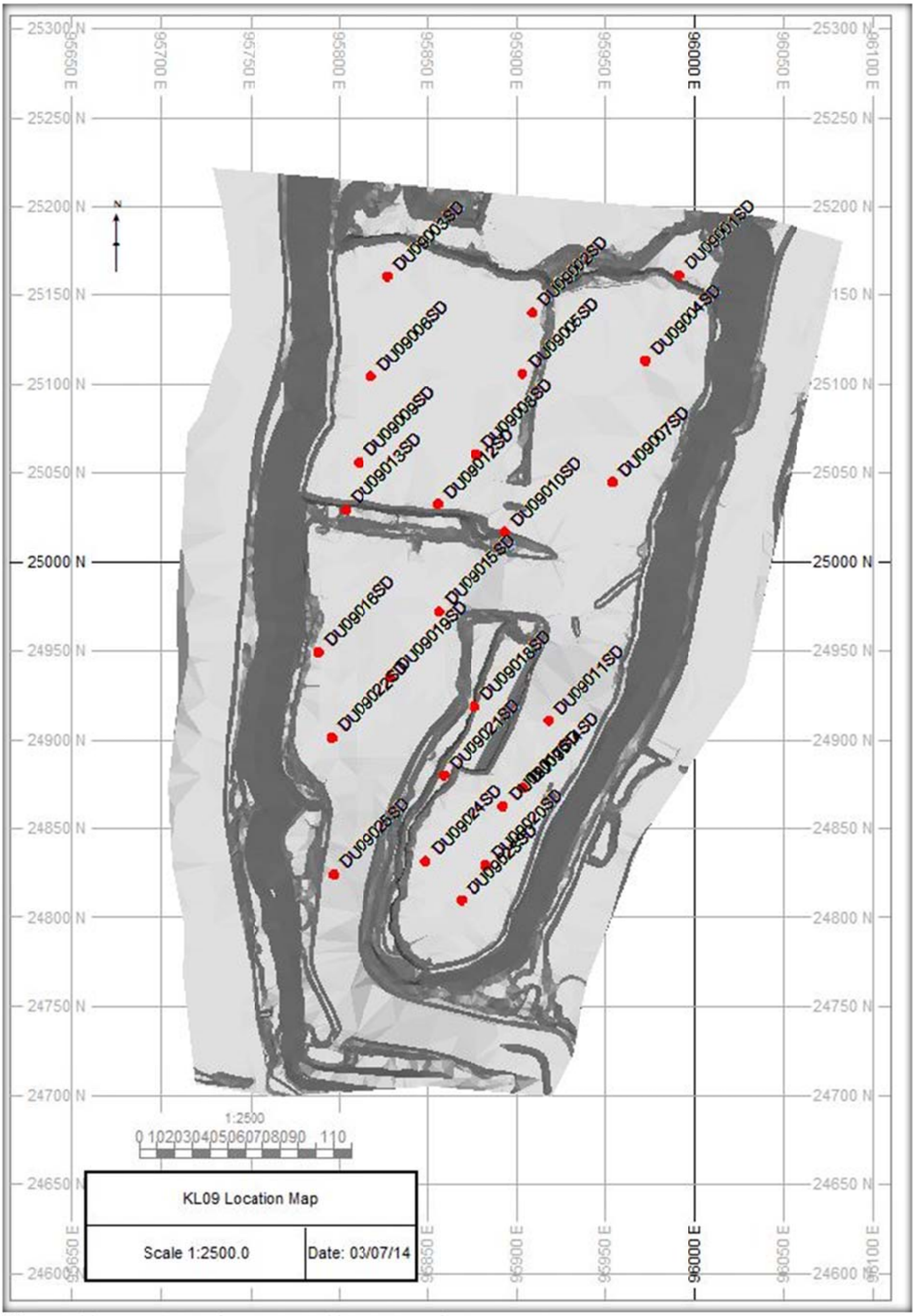


Figure B11: Iron Knight Stockpile KL09 Drill-Hole Collar Locations

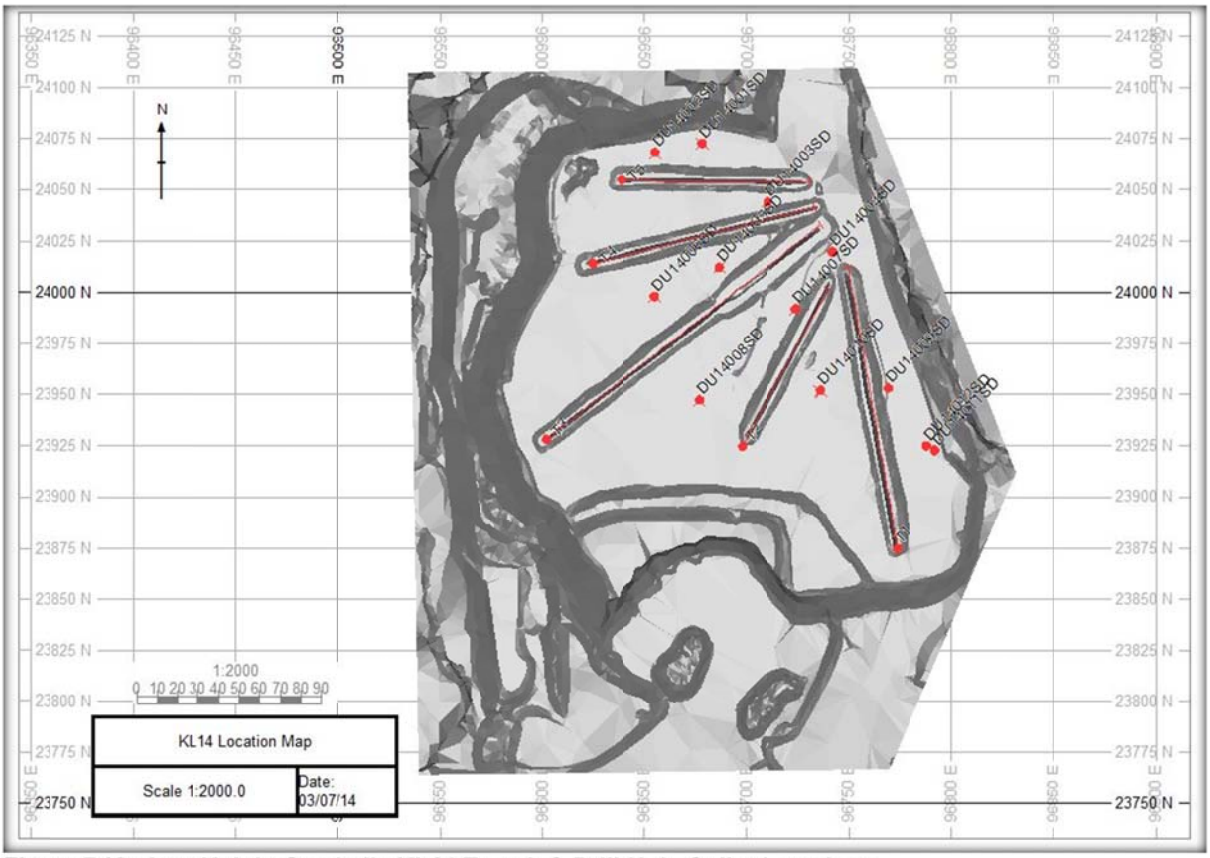


Figure B12: Iron Knight Stockpile KL14 Trench & Drill-Hole Collar Locations

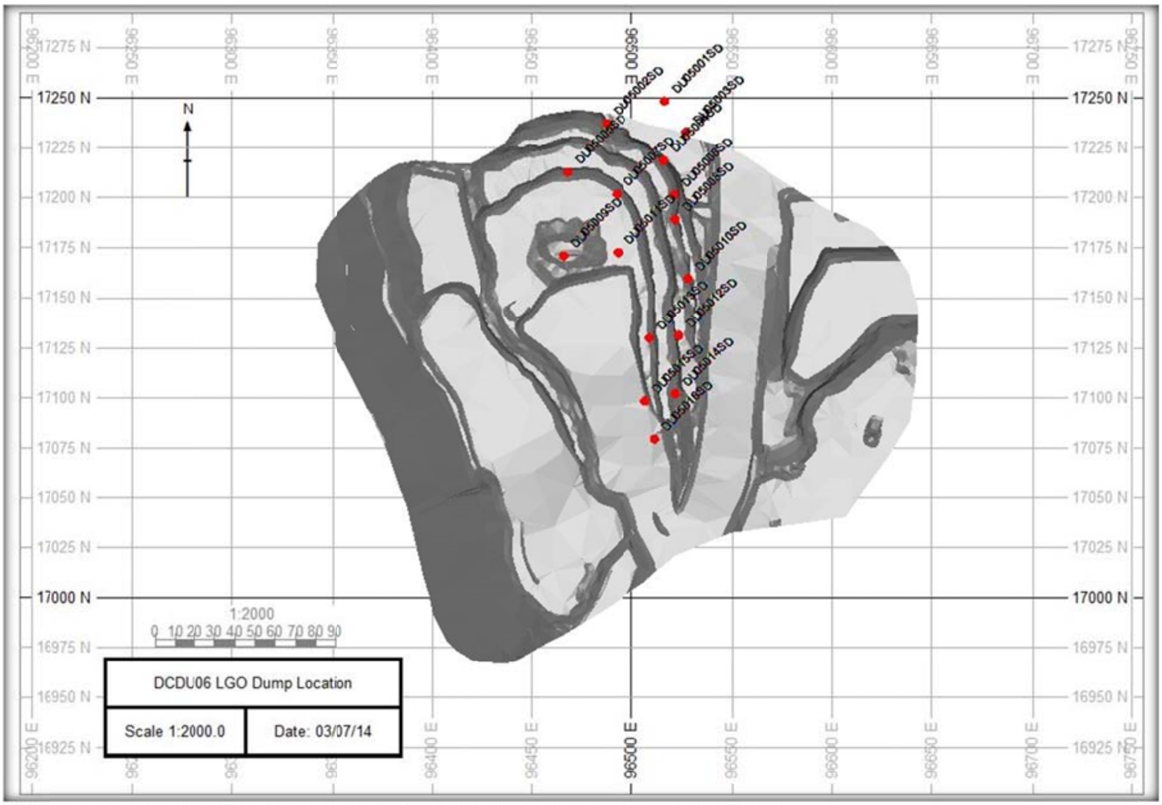


Figure B13: Iron Duke Stockpile DCDU06 Drill-Hole Collar Locations

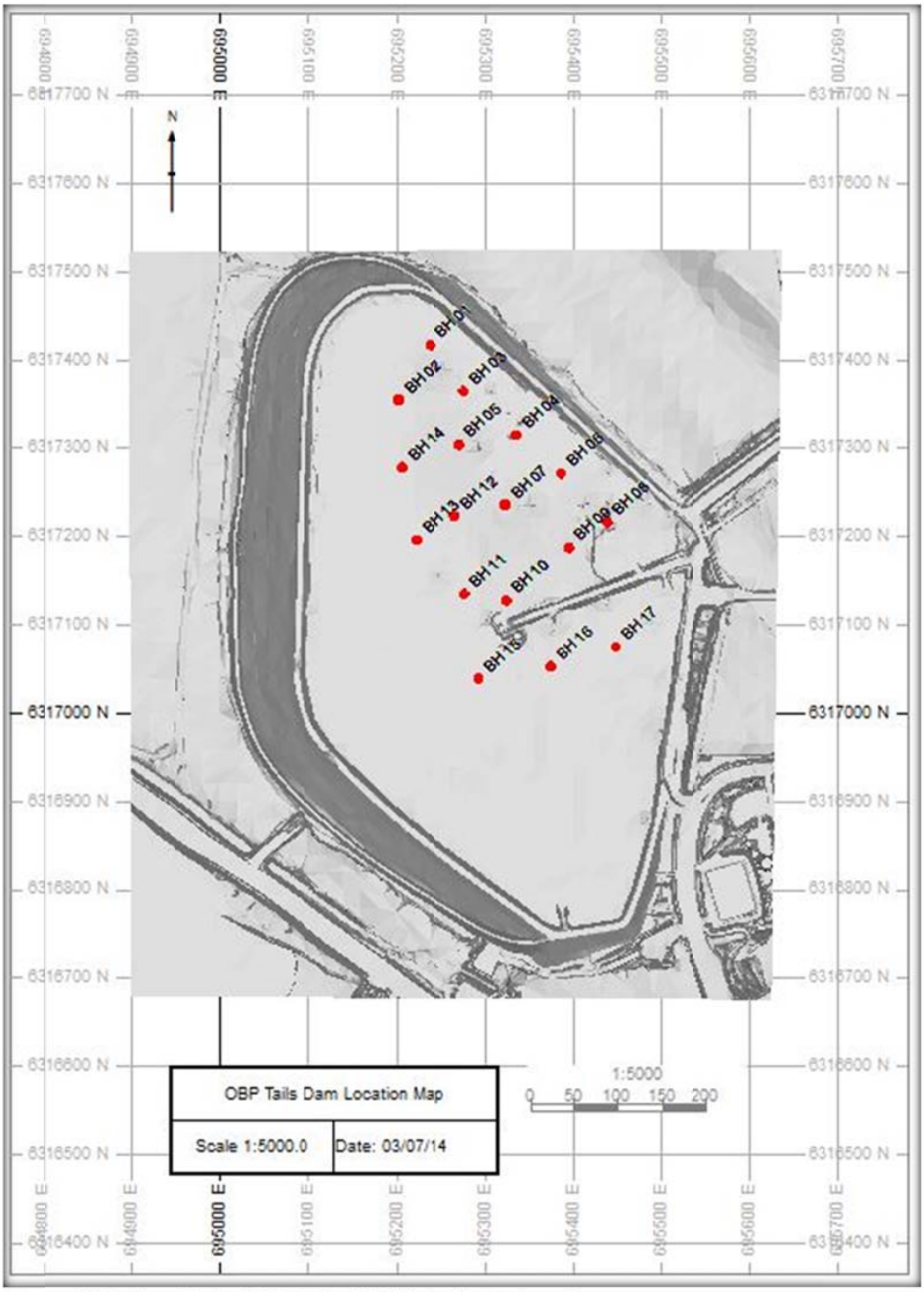


Figure B14: Iron Duke OPB Tails Drill-Hole Collar Locations

JORC CODE, 2012 EDITION – TABLE 1

Section 1 Sampling Techniques and Data

<table>
<tr><th>Criteria</th><th>JORC Code explanation</th><th>Commentary</th></tr>
<tr><td><i>Sampling techniques</i></td><td><i>Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.</i></td><td>The vast majority of samples were collected through sonic drilling (SD) or trenching (TR) methods.
<table>
<tr><th></th><th colspan="2">Sonic Drilling</th><th colspan="2">Trenching</th></tr>
<tr><th></th><th>Drillholes</th><th>Metres</th><th>Trenches</th><th>Metres</th></tr>
<tr><td>IKMA</td><td>74</td><td>1,264</td><td>31</td><td>1,459</td></tr>
<tr><td>IBMA</td><td>19</td><td>527</td><td>18</td><td>2,105</td></tr>
<tr><td>SMR</td><td>61</td><td>1,181</td><td>5</td><td>604</td></tr>
<tr><td>Total</td><td>154</td><td>2,972</td><td>54</td><td>4,168</td></tr>
</table>
</td></tr>
<tr><td></td><td><i>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</i></td><td>Sonic drilling was logged with recovery recorded and entered into a sampling database with standardised codes onsite as soon as practically possible after the drill hole was completed
Trenches were sampled by representative grab samples along the sample windrow.</td></tr>
<tr><td></td><td><i>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 (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</i></td><td>Sonic Drilling (SD)
SD drilling was used to obtain consecutive 1 m – 4 m samples with samples split to provide representative sample. The majority of sonic samples were collected as one metre intervals. Samples were despatched to Amdel Laboratory Adelaide for XRF analysis.

Trenching
Early 1990s – A beneficiation test work programme was completed by Broken Hill Pty Ltd (now BHP Billiton).
Middleback Ranges (MBR) LGO target stockpiles were systematically trenched with representative samples taken along the windrow with 1 representative bulk sample collected for 14m of trench line on average. Samples were despatched to Amdel Whyalla for XRF analysis.</td></tr>
<tr><td><i>Drilling techniques</i></td><td><i>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).</i></td><td>The MBR LGO stockpiles have a long assessment history, with information including construction and recovery details, trenching and sonic drilling.
SD drilling completed from 2011 onwards accounts for all of the drilling for LGO Stockpiles in the database.</td></tr>
<tr><td><i>Drill sample recovery</i></td><td><i>Method of recording and assessing core and chip sample recoveries and results assessed.</i></td><td>Sonic samples were recovered in 3m lengths of plastic tube. Samples were manually divided into one metre intervals and split using a three-tier riffle splitter. SD sample recovery was visually assessed and recorded. Overall SD sample recoveries were medium to high.</td></tr>
<tr><td></td><td><i>Measures taken to maximise sample recovery and ensure representative nature of the samples.</i></td><td>Sonic samples were collected in pre-numbered calico bags directly from the splitter.
No recovery issues from trench sampling.</td></tr>
<tr><td></td><td><i>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.</i></td><td>No relationship has been demonstrated between sample recovery and grade. Sample recovery was appropriate for the data collection method hence any grade bias due to sample recovery (if present) is not likely to be material.</td></tr>
<tr><td><i>Logging</i></td><td><i>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.</i></td><td>The logging data is considered to be of sufficient detail to enable the development of a robust LGO Stockpile model to support Mineral Resource estimation, mining studies and metallurgical studies.
Geological logging is carried out by trained Arrium Mining personnel.</td></tr>
<tr><td></td><td><i>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography.</i></td><td>Geological logging is qualitative, recording rock type, mineralogy, texture, alteration, grain size and comments using standardised logging codes originally developed by BHP.
Trench logging recorded colour and mineralogy percent and estimated possible coarse size fraction ratios.</td></tr>
<tr><td></td><td><i>The total length and percentage of the relevant intersections logged.</i></td><td>All SD drill holes and trenches were geologically logged in full.</td></tr>
<tr><td><i>Sub-sampling techniques and sample preparation</i></td><td><i>If core, whether cut or sawn and whether quarter, half or all core taken.</i></td><td>Not applicable as no core sampling.</td></tr>
<tr><td></td><td><i>If non-core, whether riffled, tube sampled, rotary split, etc and whether</i></td><td>Sonic drilling is a soil penetration technique that fluidizes porous materials. Samples were collected over 1 m intervals and riffle split.</td></tr>
</table>

Criteria	JORC Code explanation	Commentary
Sub-sampling techniques and sample preparation cont.	*sampled wet or dry.*	The vast majority of samples were damp to dry, this has had no material impact on the quality of samples.
	For all sample types, the nature, quality and appropriateness of the sample preparation technique.	Sample preparation involves sorting and drying in a gas-fired oven at a nominal 105° C for a minimum of 4 hours. Samples are then weighed and crushed to a nominal 5 mm particle size. If samples are greater than 3 kg, samples are split to achieve a 3 kg mass. 3 kg samples are then pulverised to 90% passing 106 µm. Two pulps are taken (one forwarded to the laboratory for assay and the other returned to Arrium Mining along with coarse residues).
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Arrium's documented sampling procedures ensure field staff collect samples to maximise representivity. The sampling techniques are considered appropriate, and provide a representative sample for assaying.
	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	In addition to the limited field QA/QC data available from the sonic programs, the analytical laboratory undertakes an extensive QA/QC program involving duplicates, replicates, certified reference materials and silica blanks. These results give confidence in sample collection procedures and analytical precision for this period. Recent trench sampling collected duplicates every 5th sample.
	Whether sample sizes are appropriate to the grain size of the material being sampled	The sample sizes are considered to be appropriate to the grain size of the material being sampled.
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 fused with Lithium Borate flux to form a glass disc and analysed by XRF for Fe, SiO_2, Al_2O_3, P, CaO, MgO, Mn, S, TiO_2, Na_2O, Zn and K_2O. Loss on Ignition (LOI) was determined using thermo-gravimetric methods. Samples are dried to 105° C, weighed, placed in a temperature controlled environment at 1,000° C for one hour and then cooled and re-weighed..
	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.	No geophysical tools have been used in the preparation of this Mineral Resource estimate
	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.	Laboratory internal quality control procedures involve the use of blanks to monitor carry-over contamination, splits to monitor precision and certified reference materials (CRMs) to monitor accuracy. Analytical results are not released if an issue is identified in the sample preparation or analysis stages. Arrium targets 10% quality assurance / quality control samples - field duplicates, field blanks and external certified reference materials (CRMs, also known as Standards).
Verification of sampling and assaying	*The verification of significant intersections by either independent or alternative company personnel.*	Significant intersections have not been verified by an independent third party however internal Arrium review has validated any significant intersections.
	The use of twinned holes.	No twinning of sonic drill holes has been completed
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Data is entered into a set of comma-delimited spreadsheets on Toughbook laptops in the field. The data is then imported into an acQuire database with appropriate validation procedures in place prior to import.
	Discuss any adjustment to assay data.	The only adjustments made to the analytical data involved replacing results below detection values with a value equal to the negative detection limit. This does not materially impact the Mineral Resource estimate.
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.*	Sonic collar coordinates are currently surveyed using a differential Global Position System (DGPS) instrument. Some older sonic collars were located using a hand-held GPS. All drillholes were vertical, and relatively short; down-hole surveys were not undertaken. Trenches were located by mine survey Teams.
	Specification of the grid system used.	The grid used is AMG66, Zone 53.
	Quality and adequacy of topographic control.	Digital terrain models (DTM) of the original topography surfaces for each Stockpile were utilised. Then a series of 6 monthly flyover topographies were used to help understand the Stockpile construction over time. The topography data is considered to be high quality and adequate for the preparation of a Mineral Resource estimate.
Data spacing and distribution	*Data spacing for reporting of Exploration Results.*	Drill coverage varies between the various stockpiles. Where trenching was used, all trenches were excavated in the Stockpile build direction.
	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.	The available topographic data (sourced from historical information based on aerial photos from1967, 1977, 1990 & 2002), and the March 2014 aerial photograph, build and recovery data, drillhole spacing and trenching data are considered adequate to establish global grade of the stockpiles.
	Whether sample compositing has been applied.	The majority of the sonic samples were collected as 1m intervals and not composited further in the sample collection process.

Criteria	JORC Code explanation	Commentary
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.*	The combination of deep horizontal trenches and vertical sonic drillholes ensures sampling of possible construction artefacts are unbiased.
	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.	No orientation based sampling bias has been identified.
Sample security	*The measures taken to ensure sample security.*	Chain of custody is managed by Arrium Mining. Samples are stored at the Whyalla steelworks (secure site) then (depending on sample date) transported to either Amdel in Whyalla (trench samples) or Amdel Adelaide (sonic samples) for analysis.
Audits or reviews	*The results of any audits or reviews of sampling techniques and data.*	Maxwell Geoservices Pty Ltd (Maxwell) completed a review of data capture and data management activities in May 2009. Maxwell found the procedures "to be of acceptable quality and broadly consistent with industry standards". Maxwell also completed an audit of the Whyalla laboratory in 2009 and found that "practices are satisfactory and compatible with internationally accepted standards".

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.*	Arrium holds (through its subsidiary OneSteel Manufacturing Pty Ltd) the necessary mining leases (MLs) and miscellaneous purpose licences (MPLs) for continued operations across the MBR. There are no material issues with any third parties.
	The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.	The various MLs and MPLs generally expire between 2019 and 2032.
Exploration done by other parties	*Acknowledgment and appraisal of exploration by other parties.*	All exploration has been carried out by Arrium or BHP.
Geology	*Deposit type, geological setting and style of mineralisation.*	The LGO stockpiles were mined from Low Grade Ores from the MBR Hematite deposits located nearby. The geology of the LGO stockpile is reflective of the MBR Geology. Construction details are known. The LGO stockpiles were constructed from historical LGO at Fe cutoff grades greater than 50% and less than 55%; most LGO stockpiles fall within this range of grade, but some are more variable than others.
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:* *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* *hole length.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	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.	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
Data aggregation methods	*In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.

Criteria	JORC Code explanation	Commentary
	procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.	
	The assumptions used for any reporting of metal equivalent values should be clearly stated.	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
Relationship between mineralisation widths and intercept lengths	*These relationships are particularly important in the reporting of Exploration Results.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
	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').	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
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.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
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.*	Exploration results have not been reported separately, therefore not relevant for the reporting of Mineral Resource estimates.
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.*	No other exploration data is considered material in the context of the Mineral Resource estimate which has been prepared. All relevant data is described elsewhere in Section 1 and Section 3.
Further work	*The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling).*	Further sonic drilling or trenching may occur on LGO stockpiles lacking build data.
	Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	Review of further stockpiles will be completed matched to future project and mine planning requirements.

Section 3 Estimation and Reporting of Mineral Resources

Criteria	JORC Code explanation	Commentary
Database integrity	*Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.*	Arrium Mining uses acQuire software to manage the entry, storage and retrieval of exploration data. Arrium Mining staff manage the database. Checks have been conducted on aspects of the data entry. Checks include looking for missing/overlapping intervals, missing data, extreme values. No material issues were noted.
	Data validation procedures used.	Validation processes are in place to ensure that only "clean" data is loaded into the acQuire™ database. Data is then exported from the acQuire database in CSV format. The CSV files were used to create a desurveyed Datamine™ file which was subject to further validation including checking for overlapping samples and sample intervals which extend beyond the drill hole length defined in the collar table.
Site visits	*Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	Paul Leevers (Manager Resource Development, & Arrium's Competent Person for the Mineral Resource estimate), visited the various deposit area many times since 2001
	If no site visits have been undertaken indicate why this is the case.	Not applicable as site visits undertaken (see above).
Geological interpretation	*Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.*	Due to the nature of LGO Stockpiles builds, no geological interpretation was utilised. Estimation was defined by Stockpile construction over time.

Criteria	JORC Code explanation	Commentary
	Nature of the data used and of any assumptions made.	Geological logging in conjunction with the chemical assays was used to identify grade trends within the Stockpiles after modelling
	The effect, if any, of alternative interpretations on Mineral Resource estimation.	Alternative interpretations are likely to impact the Mineral Resource estimate on a local but not global basis.
	The use of geology in guiding and controlling Mineral Resource estimation. *The factors affecting continuity both of grade and geology.*	Not applicable to the nature of LGO Stockpile builds. Survey data was used to define Stockpile construction and hence resource estimation used.
Dimensions	*The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.*	The various MBR LGO stockpiles are relative small in size compared to the pit deposits they were built from. Stockpile tonnages vary between 1.9Mt to less than 0.1Mt. Variability within each Stockpile is considered moderate to high based on review of reclaim of Stockpiles to date.
Estimation and modelling techniques	*The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a description of computer software and parameters used*	One “ZONE” number that was coded into the block model and used to constrain grade interpolation. No upper cuts were applied following statistical analysis. All Sonic samples below natural surface were removed from the LGO data set. Dynamic Search Estimation was used to distribute the grade within the Stockpile build directions, with a natural 37 degree rill angle applied. A three pass search ellipse strategy was applied with search ellipses aligned with the major, semi-major and minor directions. The primary search ellipse dimensions were one quarter the size of the stockpile area to reduce the smearing of the grade. The secondary ellipse was approximately equal to twice the variogram ranges and the tertiary ellipse was approximately equal to three times the variogram range. Inverse Distance (ID) was used to estimate head grade (Fe, SiO_2, Al_2O_3, P, LOI, CaO, MgO, Mn, S, TiO_2, Na, Zn and K_2O). Minimum / maximum samples vary according to domain (typically 6–10 and 24–32 respectively). Statistical and geostatistical analysis was completed using Supervisor™ software. All geological modelling and cell modelling was completed using Datamine™ software. If necessary, the model grade can be modified where build data exists for the stockpile and is significantly different from the estimate.
	The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.	In 2003, Hatch Limited completed a LGO Benefication Project to review the then current LGO stockpiles. Those estimates have been used as the baseline for further review.
	The assumptions made regarding recovery of by-products.	No assumptions were made regarding recovery of by-products. The only chemical constituent of economic interest is Fe.
	Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation).	The following deleterious chemical constituents were estimated: SiO_2, Al_2O_3, P, CaO, MgO, Mn, S, TiO_2, Na_2O, Zn and K2O.
	In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.	A regular 10 m E x 10 m N x 4 m RL parent cell size was used with sub-celling to 2 m E x 2 m N x 1 m. The parent block size is considered appropriate given the size of the LGO stockpiles.
	Any assumptions behind modeling of selective mining units.	No assumptions were made regarding selective mining units.
	Any assumptions about correlation between variables	No assumptions were made regarding correlation between estimated variables.
Estimation and modelling techniques cont.	*Description of how the geological interpretation was used to control the resource estimates.*	Not applicable due to the nature of LGO stockpile grade distributions.
	Discussion of basis for using or not using grade cutting or capping.	There were no significant outliers in the dataset and therefore grade cutting was not considered necessary. SD samples below the natural surface in the stockpile areas were removed prior to modelling.
	The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	The cell model and drillhole data was loaded into Datamine™ and coloured by Fe. Drill hole grades were initially visually compared with cell model grades. Mean drill hole statistics were then compared to mean cell model grades for each estimated constituent on a domain by domain basis. Histograms of both input drillhole and output model were compared for each LGO Model update.
Moisture	*Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.*	Tonnages are estimated on a wet basis. Moisture globally of 3% was determined using truck payload information from historical production data.
Cut-off parameters	*The basis of the adopted cut-off grade(s) or quality parameters applied.*	The Beneficiated Mineral Resource was reported for stockpiles with an Iron Grade of greater than 45% Fe. This is in line with current beneficiation feed grade targets.
Mining factors or assumptions	*Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process*	Recovery from LGO stockpiles is by truck and loader/excavator. Selective mining units were not defined or corrected for in the resource estimate or a recoverable resource estimated. It is assumed that all of the Stockpiles will be reclaimed for beneficiation.

Criteria	JORC Code explanation	Commentary
	of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	
Metallurgical factors or assumptions	*The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.*	Low-grade material from current Low Grade Stockpiles(45–55% Fe) is beneficiated at Arrium Mining's MBR operations utilising Jig and Spiral Technology. Metallurgical test work from samples obtained from sonic drilling and trenching of Low Grade Stockpiles based on Mini Jig, Heavy Media separation and bulk samples indicate that the Stockpiles are amenable to beneficiation.
Environmen-tal factors or assumptions	*Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.*	At current operations waste is disposed on designated stockpiles which will be rehabilitated under the Mine and Rehabilitation Plan approved for each site. It has been assumed for the purpose of this estimate that legislation in this regard will remain similar to current such that future operations will operate in the same way.
Bulk density	*Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.*	Tonnage is estimated on a wet basis. Density Ranges – 2.5 tm^3 – 2.8 tm^3
	The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.	Bulk density assigned to stockpiles has been derived from reconciliation of mining of low grade stockpiles previously, production data of LGO ores mined to stockpiles and survey data.
Bulk density cont.	*Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.*	Bulk Density has been assigned as a constant to each Low Grade Stockpile.
Classification	*The basis for the classification of the Mineral Resources into varying confidence categories.*	Classification was based on the amount of information available for each stockpile - build data, reclaim data, and trenching and sonic drilling results.
	Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).	The Competent Person has confirmed that appropriate account was taken of all relevant criteria including data integrity, data quantity, geological continuity and grade continuity. Areas of Measured, Indicated and Inferred Mineral Resource are considered by the Competent Person to have been appropriately informed and estimated for the classification determined.
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The resulting Mineral Resource estimates provide an appropriate global representation of these deposits in the view of the Competent Person
Audits or reviews	*The results of any audits or reviews of Mineral Resource estimates.*	Coffey Mining has audited the resource estimate in 2014. No issues impacting the integrity of the estimate have been noted.
Discussion of relative accuracy/	*Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using*	The Mineral Resource estimate has been classified in accordance with the JORC Code, 2012 Edition using a qualitative approach after due consideration of all classification criteria contained in Section 1 and Section 3 of this Table.

Criteria	JORC Code explanation	Commentary
confidence	*an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.*	The Mineral Resource has not been reported within confidence limits as this would require conditional simulation techniques to be employed. The Competent Person believes that the benefit does not support the significant cost involved in the application of these techniques at this point in time. The Competent Person believes that the main factors that could affect the accuracy of the Mineral Resource estimate are greater than expected grade distribution complexity and uncertainties surrounding the density assumptions.
	The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.	The Mineral Resource estimates are based on a realistic parent cell sizes and should be considered global resource estimates, and not recoverable resource estimates based on SMU blocks. The parent block is (10 m x 10 m Y x 4 m Z).
	These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	The Mineral Resource estimates of most of the stockpiles at SMR were reconciled with production data. The reconciliation results are consistent with the expected accuracy of the model. The remaining LGO stockpiles rely on Trench and SD Drilling until recovery commences. The relative accuracy and confidence of the Mineral Resource estimate is inherent in the Mineral Resource Classification.

Section 4 Estimation and Reporting of Ore Reserves

Criteria	JORC Code explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	*Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.*	Refer to Section 3. The Ore Reserve estimate is based on the Mineral Resource estimate determined as of 30 June 2014.
	Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.	The Mineral Resources are inclusive of the Ore Reserves
Site visits	*Comment on any site visits undertaken by the Competent Person and the outcome of those visits.*	The Competent person visits the sites on a regular basis, with no material issues identified to date
	If no site visits have been undertaken indicate why this is the case.	Not applicable.
Study status	*The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves*	Stockpiles are located in active mining areas, with all plant and equipment in place and schedules developed for future reclaim.
	The Code requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.	All material modifying factors have been considered, as set out in this Table 1.
Cut-off parameters	*The basis of the cut-off grade(s) or quality parameters applied.*	The beneficiated LGO Ore Reserve was reported for stockpiles with an Fe grade of greater than 47%. This is in line with current beneficiation feed grade targets.
Mining factors or assumptions	*The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimisation or by preliminary or detailed design*	Each Stockpiles will be reclaimed in its entirety with no selective mining assumed. This is based on current operational practices. Metallurgical recovery factors are then applied to derive the MBR beneficiated LGO Ore Reserve utilising appropriate mining factors and assumptions based on current operations and mining practices as described in this Table 1.
	The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc	Stockpile recovery in 4m flitches using front-end loaders and haul trucks in line with current mining methods.
	The assumptions made regarding geotechnical parameters (eg pit slopes, stope sizes, etc), grade control and pre-production drilling.	Base slope in line with natural angle of repose for the tip-head of the stockpiles.
	The major assumptions made and Mineral Resource model used for pit	The resource models described in Section 3 formed the basis of the Ore Reserve determination.

Criteria	JORC Code explanation	Commentary
	and stope optimisation (if appropriate).	
	The mining dilution factors used.	No dilution has been applied to the reserve estimate due to the assumption that the entire stockpile will be reclaimed and no selective mining to be applied.
	The mining recovery factors used.	Mining recovery factors are derived from reconciliation data.
	Any minimum mining widths used.	Not applicable as all of the Stockpile will be reclaimed.
	The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.	Inferred Mineral Resources associated with stockpiles form 25% of the current total LGO stockpile resource. After a processing recovery of 58% is applied they contribute to approximately 2% of the total DSO tonnes as contained within the Arrium Business Plan. They have been included in the Business Plan at the end of the mine life, but are not included in the estimate of Ore Reserves.
	The infrastructure requirements of the selected mining methods	Current infrastructure meets on-going requirements for the selected mining method.
Metallurgical factors or assumptions	*The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.*	The material reclaimed from stockpiles is crushed to -32mm through crusher infrastructure located at the Iron Baron and SMR minesites. Ore is then beneficiated through the OBP utilising density (Jigs and Spirals) separation to produce a high grade Lump (-32mm, +6.3mm) and Fines (-6.3mm) product. The plants are located adjacent to the crushing facilities at the Iron Baron and SMR minesites.
	Whether the metallurgical process is well-tested technology or novel in nature.	The metallurgical process described above are used industry wide and have been operating in the Middleback Ranges for over 10 years.
Metallurgical factors or assumptions cont.	*The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.*	Recovery factors and product grades applied to the Ore Reserve are based on operational history and metallurgical test work from bulk samples taken from trenches and sonic drilling. Metallurgical test work completed is inclusive of Heavy Liquid Separation, Mini Jig Tests and bulk samples through the current OBP plants. Metallurgical testwork reflects the operational process described. Recovery factors applied are dependent upon the test work results of each individual LGO stockpile and range between 40% and 63%.
	Any assumptions or allowances made for deleterious elements.	All DSO and beneficiated product will form part of an overall “Whyalla” blend that is derived from a number of operations. The impact of deleterious elements is taken into account during the scheduling of the “Whyalla” Blend and the economic assessment as part of the Arrium overall business model.
	The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.	Samples have been sourced from sonic drilling, trenching and as bulk samples. They are considered representative of the LGO stockpiles.
	For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?	Bulk samples for LGO are considered representative of the stockpile based on the mineralogy, stockpile build and recovery data where available.
Environmental	*The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste Stockpiles should be reported.*	All Mining Leases are in place for on-going operations inclusive of tailings storage.
Infrastructure	*The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided, or accessed.*	All infrastructure for mining and beneficiation is currently in place and operating as part of the existing MBR operations.
Costs	*The derivation of, or assumptions made, regarding projected capital costs in the study.*	Currently existing beneficiation plant capacity underpins the LGO Ore Reserve estimate. Costs associated with processing and transport are derived from existing operations. Projected mining costs are derived from current service contracts in place with mining contractors, adjusted to take into account projected changes in activity (e.g. haulage distances, etc.) over the life of mine plan. All costs assumptions are calculated to include inflation and discount rates used are consistent with those used in the Arrium business plan, projected over the life of mine.
	The methodology used to estimate operating costs.	Mine plans and operational schedules are used to derive forecasts for operating costs, based on existing operations.
	Allowances made for the content of deleterious elements.	Reduction of revenue due to the presence of deleterious elements in the Arrium blend products has been factored into revenue assumptions (see further below).

Criteria	JORC Code explanation	Commentary
	The derivation of assumptions made of metal or commodity price(s), for the principal minerals and co- products.	Commodity price projections are based on independent external forecasts and reflect the assumptions made in Arrium business planning.
	The source of exchange rates used in the study.	Foreign exchange projections are based on independent external forecasts and reflect the assumptions made in the Arrium business plan.
	Derivation of transportation charges.	Shipping and freight charge projections are based on available independent external forecasts, adjusted to reflect shipping from Whyalla to our primary markets in North Asia and to take into account existing contracts of afreightment and reflect the assumptions made in the Arrium business plan.
	The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.	Treatment and refining charges are based on the cost of existing operations and reflect the assumptions made in the Arrium business plan. The impact of specifications of ore shipped is dealt with in the revenue assumptions as reflected in the Arrium business plan (see further below).
	The allowances made for royalties payable, both Government and private.	Allowances for royalties are based on current legislation and reflect the assumptions made in the Arrium business plan.
Revenue factors	*The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.*	Revenue projections are based on external independent forecasts of commodity prices and foreign exchange, adjusted for expected realised prices derived from current contracts and Arrium blended product specifications (including grade and the presences of any deleterious elements) expected under current life of mine planning.
Revenue factors cont.	*The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co- products.*	See above description of revenue factors.
Market assessment	*The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.*	An assessment of the demand, supply and stock situation is made by Arrium based on its internal market research and internal market sensitivity analysis, including by its staff based in Asia.
	A customer and competitor analysis along with the identification of likely market windows for the product.	Analysis of customers and competitors is carried out by Arrium's internal analysts based on internal market research and forecasts and internal market sensitivity analysis, which includes market intelligence by its staff based in Asia.
	Price and volume forecasts and the basis for these forecasts.	Volume forecasts have been based on current and future planned infrastructure capacity and reclamation schedules. Pricing forecasts are derived in the manner described above under the criterion Revenue factors.
	For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract	Not applicable as iron ore is not considered industrial materials.
Economic	*The inputs to the economic analysis to produce the net present value (NPV) in the study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.*	The NPV used was derived by applying the modifying factors as described in the previous criteria.
	NPV ranges and sensitivity to variations in the significant assumptions and inputs.	As above
Social	*The status of agreements with key stakeholders and matters leading to social licence to operate.*	All mining approvals and an indigenous land use agreement are in place and are inclusive of all regulatory requirements needed to support the reported LGO Ore Reserves.
Other	*To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:*	
	Any identified material naturally occurring risks.	No material naturally occurring risks e.g. geological risks, were identified..
	The status of material legal agreements and marketing arrangements.	MBR is an existing operation and sales will continue through existing marketing arrangements, including a mix of term and spot contracts. Contracts in place with BGC Contracting Pty Limited and Lucas Earthmovers Pty Limited for mining operations.
	The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent	All necessary mining and tenement approvals are in place.

Criteria	JORC Code explanation	Commentary
Classification	*The basis for the classification of the Ore Reserves into varying confidence categories.*	The classification of the Ore Reserves into varying confidence categories was based on operating history and commensurate with the Ore Reserve classification as defined in JORC 2012
	Whether the result appropriately reflects the Competent Person's view of the deposit.	The Ore Reserve classification appropriately reflects the views of the Competent Person
	The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).	No Probable Ore Reserves have been derived from Measured Mineral Resources
Audits or reviews	*The results of any audits or reviews of Ore Reserve estimates.*	An external audit of the Ore Reserve estimates has been completed by Coffey Mining Pty Ltd, an independent consultant, and no material issues were identified.
Discussion of relative accuracy/ confidence ***Discussion of relative accuracy/ confidence cont.***	*Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.*	Accuracy is in line with that of the Ore Reserve classification and has been validated through reconciliation of current mining operations.
	The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.	The statement relates to global estimates
	Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage. *It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.*	The modifying factors are based on existing operational parameters that include reconciliation of actual production data from a long operational history.