



CSN

Reserve Audit - REV 1.1

Project No. B001093

Casa de Pedra/Engenho

February 2015

Final

SNOWDEN

www.snowdengroup.com

Office Locations

Perth

87 Colin St, West Perth WA 6005
AUSTRALIA

PO Box 77, West Perth WA 6872
AUSTRALIA

Tel: +61 8 9213 9213

Fax: +61 8 9322 2576

ABN: 99 085 319 562

perth@snowdengroup.com

Brisbane

2 Burke Street
Wooloongabba QLD 4102 AUSTRALIA
PO Box 2207, Brisbane QLD 4001
AUSTRALIA

Tel: +61 7 3249 0800

Fax: +61 7 3868 6515

ABN: 99 085 319 562

brisbane@snowdengroup.com

Johannesburg

Technology House ,Greenacres Office
Park, Cnr. Victory and Rustenburg
Roads, Victory Park
JOHANNESBURG 2195
SOUTH AFRICA

PO Box 2613, Parklands 2121
SOUTH AFRICA

Tel: +27 11 782 2379

Fax: +27 11 782 2396

Reg No. 1998/023556/07

johannesburg@snowdengroup.com

Vancouver

Suite 550, 1090 West Pender St,
VANCOUVER BC V6E 2N7 CANADA

Tel: +1 604 683 7645

Fax: +1 604 683 7929

Reg No. 557150

vancouver@snowdengroup.com

Calgary

Suite 850, 550 11th Avenue SW
CALGARY, ALBERTA T2R 1M7

Tel +1 403 452 5559

Fax +1 403 452 5988

calgary@snowdengroup.com

Belo Horizonte

Afonso Pena 2770, CJ 201 A 205
Funcionários, 30.130-007,
BELO HORIZONTE MG BRASIL

Tel: +55 (31) 3222-6286

Fax: +55 (31) 3222-6286

belohorizonte@snowdengroup.com

London

1 Kingdom Street, Paddington Central,
LONDON W2 6BD, UK

Tel: +44 (20) 3402 3022

oxford@snowdengroup.com

Website

www.snowdengroup.com

This report has been prepared by Snowden Mining Industry Consultants ('Snowden') on behalf of CSN.

© 2015

All rights are reserved. No part of this document may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of Snowden.

Prepared By Fabiano Araujo
 General Manager Latin America
 B.Sc. Mining Engineering - FAusimm

Reviewed By Bruno Farah
 B.Sc Mining Engineering
 Consultant - Snowden Brasil

 Adriano Carneiro
 B.Sc Mining Engineering
 Senior Consultant – Snowden Brasil

Issued by: Belo Horizonte Office
Doc Ref: 09 02 15_Reserves Audit_CSN.docx

Last Edited: 9 February 2015

Number of copies
CSN: 2

1	Executive Summary.....	4
1.1	Mineral Reserve statement.....	4
1.2	Safety.....	5
1.3	Critical.....	5
1.4	Necessary.....	5
2	Introduction and audit methodology.....	6
2.1	Introduction.....	6
2.2	Audit methodology.....	8
3	Details of audit.....	9
4	Conclusions.....	11
4.1	Safety findings.....	11
4.2	Critical action items.....	11
4.3	Necessary action items.....	11
4.4	Continuous improvement action items.....	12
5	References.....	14

Tables

Table 1.1	Reserve Casa de Pedra.....	4
Table 1.2	Reserve Engenho.....	4
Table 3.1	Risk Likelyhood.....	9
Table 3.2	Consequence or impact.....	10

Figures

Figure 2.1	Casa de Pedra and Engenho’s mine site location.....	6
Figure 3.1	Details of risk matrix and overall risk rating.....	9

Appendices

Appendix A	Detailed comments
Appendix B	DAM’s Letter

1 Executive Summary

Snowden Mining Industry Consultants ("Snowden") has completed a high level process audit of the CSN Casa de Pedra and Engenho sites. As part of the Reserves Audit requested by CSN, Snowden conducted a comprehensive review of ore reserve and methodologies used to define them. Appendix A details the items reviewed by Snowden and provides commentary where necessary.

It is Snowden's opinion that the majority of the processes involved with evaluation and reporting of Ore Reserve at Casa de Pedra and Engenho Mine are from good to industry best practice. However, Snowden identified *necessary* actions relate to the ore reserve estimate. The key points are below:

- Continue the increase the level of confidence of the Dry Stacking studies. According to the DAM's recommendation (Dry staking specialist) to a pre- feasibility level.
- Review the dilution and mine loss assumptions and criteria using reconciliation.
- Peer review by a senior professional engineer.

Appendix A contains a checklist of items grouped by functional area, from the Resource model handover, to the reserve modification parameters, reporting and reconciliation.

Items considered by Snowden to require attention or rectification either urgently or within the next 12 months (necessary) are noted here, with items that might be considered of a Continuous Improvement nature only recorded in the body of the document.

This document is based on the previous audit performed on July / August 2014 ("Reserve Audit_CSN_JUL2014_CDP_ENG.pdf").

1.1 Mineral Reserve statement

Snowden can confirm the reserve statement (Table 1.1, Table 1.2) according to JORC-2012 code for CSN – Casa de Pedra and Engenho.

Table 1.1 Reserve Casa de Pedra

CASA DE PEDRA - RESERVES								
CLASSIFICATION	VOLUME (* 1000 m3)	TONNES (*1000 ton)	FE%	SIO2%	AL2O3%	MN%	P%	PPC%
PROVED	395 923	1 042 760	44.08	31.82	1.20	0.40	0.073	2.10
PROBABLE	619 930	1 661 502	39.83	39.37	1.00	0.27	0.059	1.78
TOTAL	1 015 853	2 704 262	41.36	36.46	1.08	0.32	0.064	1.90

Table 1.2 Reserve Engenho

ENGENHO - RESERVES								
CLASSIFICATION	VOLUME (* 1000 m3)	TONNES (*1000 ton)	FE%	SIO2%	AL2O3%	MN%	P%	PPC%
PROVED	40 101	108 131	40.19	39.68	0.62	0.23	0.033	1.25
PROBABLE	78 660	208 993	39.64	40.18	0.65	0.24	0.036	1.17
TOTAL	118 761	317 124	39.48	40.02	0.64	0.24	0.035	1.20

Notes:

Tonnes in wet basis (6%).

Reserve basis December 2014.