PAN AMERICAN SILVER CORP
Form 6-K
January 18, 2011
Table of Contents

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 6-K

Report of Foreign Private Issuer

Pursuant to Rule 13a-16 or 15d-16 of

the Securities Exchange Act of 1934

For the month of, January 2011

Commission File Number 000-13727

Pan American Silver Corp

(Translation of registrant s name into English)

1500-625 Howe Street, Vancouver BC Canada V6C 2T6

(Address of principal executive offices)

Indicate by check mark whether the registrant files or will file annual reports under cover of Form 20-F or Form 40F:

Form 20-F o Form 40-F x

Indicate by check mark if the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(1): o

Indicate by check mark if the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(7): o

Indicate by check mark whether by furnishing the information contained in this Form, the registrant is also thereby furnishing the information to the Commission pursuant to Rule 12g3-2(b) under the Securities Exchange Act of 1934.

Yes o No x

If Yes is marked, indicate below the file number assigned to the registrant in connection with Rule 12g3-2(b): 82-

Table of Contents

DOCUMENTS INCLUDED AS PART OF THIS REPORT

Document

1	Technical Report for Navidad Property

Table of Contents

Document 1

M3-PN100019
January 14, 2011

PAN AMERICAN SILVER CORP.NAVIDAD PROJECT

Chubut Province, Argentina:
Preliminay Assessment

Prepared For:

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

TABLE OF CONTENTS

M3-PN100019
14 January 2011

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

M3-PN100019
14 January 2011

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

LIST OF TABLES

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Table of Contents

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

1 TITLE PAGE

This report is classified as a Preliminary Assessment (PA) and is formatted and prepared in accordance with the Canadian National Instrument 43-101 (NI 43-101) *Standards of Disclosure for Mineral Projects*. The first two items of this 26-item outline are the Title Page and Table of Contents. For ease of cross-referencing during review, the first two subsections of this report (1 and 2) are incorporated into the format for this report.

2 TABLE OF CONTENTS

See discussion in subsection 1.

3 SUMMARY

Pan American Silver Corp. (PAS) acquired the Navidad Project with the purchase of Aquiline Resources Inc. (Aquiline) in December 2009. PAS is headquartered in Vancouver, Canada. Its wholly-owned Argentine subsidiary, Minera Argenta, S.A. (MASA), is headquartered in Buenos Aires, Argentina and controls 100% interest in the Navidad Project. The Navidad properties are located in north central Chubut Province in Argentina. Several deposits of silver, lead, zinc and copper minerals have been identified along three northwest striking parallel mineral trends, known as the Navidad, Esperanza, and Argenta trends, all within a 5 km by 4 km rectangle. Mineral Resource estimates have been completed for eight of these deposits, including Calcite NW, Calcite Hill, Navidad Hill, Connector Zone, Galena Hill, Barite Hill, Loma de La Plata, and Valle Esperanza.

A Preliminary Economic Assessment (PEA) for the Loma de La Plata deposit was completed in 2008 based on resource estimates as at December 2007 (Snowden, 2007). The results of the 2008 PEA have been superseded by additional resource drilling, updated resource estimates as at April 2009 (Snowden, 2009), and the findings presented in this Technical Report. This Technical Report discloses the results of a Preliminary Assessment (PA) based on Mineral Resources at seven adjacent deposits as well as Loma de La Plata and is expanded to encompass the potential development items, as PAS intends to proceed with the preparation of an Environmental Impact Study (EIA) and Feasibility Study.

M3 Engineering & Technology Corporation (M3) led the PA with assistance from PAS, Independent Mining Consultants (IMC), Golder Associates (Golder), and others.

3.1 ABSTRACT OF THE BASE CASE

The daily ore production rate is 15,000 tonnes per day (tpd) and the ore is scheduled to be produced from the eight deposits. The ore will be mined and transported in 150 tonne (t) trucks to the crusher.

The process plant consists of a 54-inch gyratory crusher, a stockpile and a 15,000 tpd semi-autogenous (SAG) mill/ball mill/flotation/filtration facility. The process plant is capable of treating two basic ore types from the Navidad deposits: copper-silver ore and lead-silver ore, using the same circuit on a campaign treatment basis. Two different concentrates will be

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

produced in campaigns of the two basic ore types: copper-silver and lead-silver. The copper-silver concentrates will be bagged and placed in containers and likely trucked 320 km east to Puerto Madryn in the Province of Chubut, on the Atlantic. The lead-silver bulk concentrate will be trucked in enclosed bulk transport or container trailers to ports in Argentina or Chile. The concentrates will be exported for treatment and recovery of contained metal, as adequate smelter and refinery facilities do not exist in Argentina.

Electric power will be provided from existing twin 330 kV power lines presently located 80 km to the south of the Project. SPT SRL Electrical Power Consultants (SPT), an Argentine power line consultant, has produced a preliminary report for the supply of power that has been incorporated into the PA.

Mine dewatering is expected to be the principal source of water makeup for processing. The Project is designed to minimize fresh water make-up by optimizing water recycle and using water conservation technology. A local well field will supply additional water if required.

3.2 BASE CASE DEFINITION

A conventional open cut mining operation, followed by SAG mill grinding and froth flotation are defined in this study. Multiple open cuts have been designed by PAS and the mining consultant IMC of Tucson, Arizona. The average ore production rate is 15,000 tpd and the average life-of-mine strip ratio is 4.8 to 1. Golder (Golder, 2010a and Golder, 2010b) evaluated alternative tailings dam types and locations and the owner determined that a conventional slurry discharge facility using a rockfill dam and engineered systems to protect surface and groundwater resources surrounding the facilities is the preferred approach considering both environmental and economic aspects.

The Montgomery Watson Harza (MWH) Buenos Aires office has been retained by PAS to complete baseline studies and prepare an environmental impact assessment. The same team was responsible for similar work for PAS s Manantial Espejo mine in Santa Cruz Province to the south of Navidad.

Southmark Logistics, S.A. delivered a scoping level concentrate shipping study (Southmark, 2010). Other port and logistics specialists are further developing the details.

A marketing study is in progress and initial estimates for concentrate Treatment Charge/Refining Charge (TC/RC) have been assembled from data collected from interested third party smelters. This preliminary information is incorporated into this PA.

There is currently a law in Chubut Province prohibiting open cut mining and the use of cyanide in mining that, as currently enacted, would severely restrict and likely prohibit the future construction and development of the Navidad Project defined in this PA which employs the use of surface mining methods. PAS has advised that it intends to demonstrate to the Provincial Government, local population and other stakeholders that it can develop the Navidad Project in a socially and environmentally sensitive manner and believes this will stimulate reform to the open-cut mining prohibition allowing the development of the Navidad Project.

Table of Contents

3.3 CAPITAL COST ESTIMATE

Eight (8) open cut mines and a 15,000 tpd plant with a single grinding line were chosen for this study.

A preliminary estimate to an accuracy of -10% to +30% has been calculated. Approximately 50 drawings were completed in support of this PA study.

Budgetary bids were obtained for most major equipment. Other equipment and material costs were taken from the experience of M3, IMC, Golder, or PAS. Piping, electrical and instrumentation are largely factored estimates. Labour rates were obtained from PAS and Argentine contractors.

The initial capital is estimated at US$759.7 million. The sustaining capital is estimated at US$161 million over the life of the operation.

3.4 MINING RESERVES

This is a PA, thus no reserves have been declared. As this work is ongoing, the reserves will be declared for the Feasibility Study.

3.5 MINERAL RESOURCES

Mineral Resources as at April 2009, (Snowden, 2009) and summarized in Table 3-1 were utilized for this PA. PAS updated the April 2009 resource models with estimates of Cu and utilized resources classified as Measured, Indicated, and Inferred Mineral Resources to develop a mine plan. This PA is preliminary in nature because of the inclusion of Inferred Mineral Resources that are considered too geologically speculative to have the economic considerations applied to them that would enable them to be categorized as mineral reserves. No mineral reserves have been estimated and there is no certainty that the PA will be realized. The resource estimate does not include the 2010 drill hole results as the models are not complete.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Table 3-1: Navidad April 2009 Mineral Resources Reported Above a 50 g/t Ag Equivalent (AgEQ) Cut-off Grade

Classification	Tonnes (Mt)	AgEq (g/t)	Ag (g/t)	Pb (%)	Cu%	Contained Ag (Moz)	Contained Pb (Mlb)	Contained Cu (Mlb)
Measured	15.4	177	137	1.44	0.10	67	489	35
Indicated	139.8	147	126	0.79	0.04	565	2,425	127
Measured and Indicated	155.2	150	127	0.85	0.05	632	2,914	162
Inferred	45.9	97	81	0.57	0.02	119	580	22

Notes:

The most likely cut-off grade for Navidad is not known at this time and must be confirmed by the appropriate economic studies.

Silver equivalent grade values are calculated without consideration of variable metal recoveries for silver and lead. A silver price of US$12.52/oz and lead price of US$0.50/lb was used to derive an equivalence formula of AgEQ g/t = Ag g/t + (Pb% × 10,000/365). Silver prices were based on a three-year rolling average and lead prices were based on an approximate ten-year rolling average.

The estimated metal content does not include any consideration of mining, mineral processing, or metallurgical recoveries.

Tonnes, ounces, and pounds have been rounded and this may have resulted in minor discrepancies in the total.

Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. No Mineral Reserves have been estimated.

The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, title, taxation, socio-political, marketing, or other relevant issues.

Estimates of Cu were updated by Pan American Silver Corp. for the purposes of this PA.

IMC has developed a 17 year mine production schedule which will produce:

- 52,874,000 tonnes of copper-silver Ore
- 36,571,000 tonnes of lead-silver Ore
- 418,083,000 tonnes of Non-Mineralised or Non-Economic Material

3.6 METALLURGICAL RECOVERIES FOR ORES

The expected metallurgical performance for the Navidad ores was determined by laboratory bench-scale flotation test methods and a pilot plant test on one ore type. There are two distinct ore types found in the Navidad Mineral Resources that have been defined as copper-silver ores and lead-silver ores. The metal recoveries and the concentrate tonnage (portion of the ore feed that is estimated to be in the concentrate) for both the silver-copper ore and the lead-silver ore vary by the degree of oxidation, lithology, grade and cut. Recovery algorithms have been constructed for each cut and each ore type using a statistical analysis of the laboratory and pilot test results. The algorithms are recorded to each Mineral Resource block to project recoveries by ore type, oxidation state (depth), lithology, grade and cut. The following tables (Table 3-2 and Table 3-3) show average life metal recoveries from the block model life of mine ore tonnes using

Table of Contents

the developed recovery matrix separated by the two distinct ore types, as well as average mine head grades and concentrate grades.

Table 3-2: Average Navidad Recoveries and Grades for Copper-Silver Ore

Cu-Ag Ore	Ag	Cu	Pb
Mine Head Grades	163.5 g/t	0.066%	0.131%
Flotation Recovery	77.76 g/t	51.93%	56.55%
Concentrate Grade	36,696 g/t	10.09%	21.85%

Table 3-3: Average Navidad Recoveries and Grade for Lead-Silver Ore

Pb Ag Ore	Ag	Cu	Pb
Mine Head Grade	150.454 g/t	0.036%	2.255%
Flotation Recovery	33.58 g/t	32.60%	76.57%
Concentrate Grade	1,736 g/t	0.400%	59.43%

3.7 ORE GRADES

IMC constructed optimized cut shells and an annual mine plan using the April 2009 Mineral Resource block models for each of the eight deposits of Navidad updated with the addition of Cu grades estimated by PAS. The anticipated annual mined and milled tonnages and feed grades are shown in Table 3-6, Table 3-7, and Table 3-8 in Section 3.13. The mine schedule and plant production plan are shown in Section 3.13.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

3.8 CAPITAL COST SUMMARY

Pan American Silver Corporation/Minera Argenta SA
15,000 MTPD-Preliminary Economic Assessment Capital Cost Estimate
TOTAL PROJECT COST SUMMARY SHEET
Navidad Project M3 PN 100019 October 27, 2010 Rev P-3

Plant Area	Description	Man-hours	Plant Equipment	Material	Labor	Subcontract	Construction Equipment	Total
	DIRECT COST							
000	Site General	66,532	$ 6,495,830	$ 2,083,717	$ 2,560,155	$ 2,792,400	$ 5,831,104	$ 19,763,206
100	Mine (Equip.& Preproduction In Indirects)	15,461	$ 0	$ 165,274	$ 604,169	$ 1,625,712	$ 17,965	$ 2,413,121
160	Mine Waste Stockpiles	1,981	$ 0	$ 0	$ 75,010	$ 0	$ 375,000	$ 450,010
200	Open Pit Primary Crusher & Storage	607,768	$ 11,191,482	$ 15,368,578	$ 23,332,202	$ 448,128	$ 1,596,674	$ 51,937,064
250	SAG Feed Conveyors)	26,391	$ 1,223,476	$ 470,627	$ 1,149,151	$ 105,730	$ 18,338	$ 2,967,323
300	Grinding, Classification	571,339	$ 28,256,791	$ 19,467,055	$ 22,211,645	$ 2,115,603	$ 1,454,398	$ 73,505,491
400	Flotation & Regrind	250,413	$ 13,606,848	$ 12,793,944	$ 9,655,399	$ 0	$ 1,104,464	$ 37,160,654
500	Concentrate Thickening & Filtering	245,421	$ 5,457,083	$ 9,606,122	$ 9,253,597	$ 0	$ 770,619	$ 25,087,421
600	Tailings System	193,191	$ 5,568,854	$ 7,805,960	$ 7,515,449	$ 275,178	$ 2,595,609	$ 23,761,051
650	Fresh Water	62,981	$ 2,314,245	$ 2,384,130	$ 2,502,331	$ 500,000	$ 160,408	$ 7,861,114
700	Main Substation	28,252	$ 5,033,400	$ 1,538,087	$ 1,130,189	$ 100,000	$ 151,096	$ 7,952,772
750	Utility Substation & Power Lines	27,023	$ 6,649,000	$ 1,595,760	$ 1,097,085	$ 10,000,000	$ 166,225	$ 19,508,070
800	Reagents	17,689	$ 1,350,958	$ 353,396	$ 716,325	$ 0	$ 111,346	$ 2,532,024
900	Ancillary Facilities	42,458	$ 0	$ 4,469,397	$ 1,650,062	$ 16,725,595	$ 679,010	$ 23,524,065
910	Lab	2,082	$ 0	$ 2,274,826	$ 82,293	$ 1,338,235	$ 38,718	$ 3,734,071
940	Owner s Camp Facilities	86,949	$ 0	$ 7,286,601	$ 3,227,686	$ 80,000	$ 1,282,325	$ 11,876,612
950	Construction Camp Facilities	14,481	$ 0	$ 8,604,480	$ 578,800	$ 1,979,258	$ 0	$ 11,162,538
960	Puerta Madryn	4,000	$ 550,000	$ 150,000	$ 151,432	$ 125,000	$ 100,000	$ 1,076,432
970	Bulk Port Facilities	200,000	$ 10,214,000	$ 0	$ 7,571,600	$ 0	$ 199,400	$ 17,985,000
	Freight (8% domestic/materials 15% Import/equipment)		$ 14,686,795	$ 7,713,436				$ 22,400,231
	Import Duties & Custom Fees 1.5%		$ 1,468,680	$ 1,446,269				$ 2,914,949
	Subtotal DIRECT COST	**2,464,412**	**$ 114,067,442**	**$ 105,577,658**	**$ 95,064,580**	**$ 38,210,840**	**$ 16,652,700**	**$ 369,573,220**

M3-PN100019
14 January 2011

6

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

NOTES:

(1) Specific Indirect Field Costs have been added to the direct labor rates listed for each area. Indirects added contractor operating overheads and profit at 15%. Mobilization 0.5% of Total Direct Cost without Mine.

(2) Camp & Busing Costs included in Owner s Cost.

(3) Contractors fee included in labor rates and Subcontract unit cost.

(4) Engineering, Procurement & Construction Management included at 15% of Total Constructed Cost. Does not include Owner s management team.

(5) Mine & Mining Equipment costs provided by owner.

(6) Operating spare parts included at 4.5% of Plant Equipment. Commissioning spares are included at 0.5% of plant equipment. Vender Commissioning at 1.5%. Initial fills and construction power in owner s cost.

(7) Contingency is included at 25% of Total Contracted cost & Commission/spare parts. Contingency is included at 15% of mine equipment, mine cost, tailings dam and owner s costs.

(8) Added Owners Cost - number provided by Owner.

(9) IVA is not included in estimate.

(10) All costs are in end of 3rd quarter 2010 US dollars with no escalation

(11) Total Evaluated Project Cost is projected to be in the range of -10% to +30%.

Note: Construction Man-hours do not include subcontract hours.

Conversion Rates used for the estimate are as follows:

1 US$ Dollar =	4	ARS

TOTAL DIRECT FIELD COST	$	369,573,220
TOTAL INDIRECT FIELD COST (1)	$	1,847,866
CAMP & BUSING COSTS (2)	$	0
FEE - CONTRACTOR (3)	$	0
TOTAL CONSTRUCTED COST	$	371,421,086
EPCM (4)	$	55,713,163
TOTAL CONTRACTED COST	$	427,134,249
MINE EQUIPMENT COST (5)	$	41,353,312
MINE COST (5)	$	21,205,000
TAILINGS DAM	$	46,300,000
COMMISSIONING AND SPARE PARTS (6)	$	7,414,384
Subtotal	$	543,406,945
ADDED OWNER S COST (8)	$	79,383,333
CONTINGENCY (7)	$	136,873,405
TOTAL CONTRACTED & OWNER S COST	$	759,663,682
IVA (9)	$	0
ESCALATION (10)	$	0
TOTAL EVALUATED PROJECT COST (11)	**$**	**759,663,682**

Table of Contents

3.9 OPERATING COST SUMMARY

The average Cash Operating Cost over the life of the mine is estimated to be $27.40 per tonne of ore processed, excluding the cost of the capitalized pre-stripping. Cash Operating Cost includes mine operations, process plant operations, general administrative cost, smelting and refining charges and shipping charges. Table 3-4 below shows the estimated operating cost by category per tonne of ore processed.

Table 3-4: Cash Operating Cost Over the Life of Navidad Operations

Operating Cost		**$/ore tonne**
Mine(1)	$	8.08
Process Plant	$	9.86
General Administration	$	2.00
Smelting/Refining Treatment	$	7.46
Total Operating Cost	$	27.40

(1) Based on a mining cost of $1.52 per tonne of material mined.

3.10 SCHEDULE

The overall development schedule for the Navidad Project as of this report is shown in Figure 3-1. The schedule assumes Project approvals to proceed in the second quarter of year 2, and approval of the Project EIA in the fourth quarter of year 2. At present, a 30-month construction schedule is assumed, followed by a three-month commissioning and start-up period.

Table of Contents

Figure 3-1: Overall Development Schedule Summary

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

3.11 FINANCIAL MODEL

A summary of the financial model is shown in Table 3-5.

Table 3-5: Financial Model Economic Summary

	Base Case	Upside Case
Silver Price ($/oz)	$ 18.00	$ 25.00
Lead Price ($/tonne)	$ 1,950	$ 2,150
Copper Price ($/tonne)	$ 6,500	$ 8,150
After-tax NPV 0% ($ million)	$ 1,089	$ 2,019
After-tax NPV 5% ($ million)	$ 524	$ 1,157
After-tax IRR (%)	14.2%	23.6%
Payback (years)	5.5	3.7
Years 1-5 average Ag production (Moz)	19.8	19.8
Years 1-5 average cash cost ($/oz)	$ 6.03	$ 7.00
Years 1-5 average annual cash flow ($ million)	$ 142	$ 202

Approximately US$705 million of Argentine corporate taxes are projected to be paid over the life of the Project in the base case.

3.12 SENSITIVITIES

The Project is most sensitive to the silver price as shown in Table 3-5. To a lesser extent the Project is sensitive to the estimation of silver grade and silver recovery as well as operating costs and capital costs.

3.13 PROJECT OPERATIONS AND PRODUCTION

IMC developed the PA mine production plan based on the April 2009 resource estimates (Snowden, 2009) updated by PAS to include estimates of Cu. The mine plan is summarized in Table 3-6 through Table 3-8, inclusive.

Mill feed in these tables was taken from the financial model and not the IMC mine production schedule. The tonnage and silver grades match the mine schedule. Lead and copper grades are lower in the financial model than the mine schedule. Thus, the values below are more conservative than the values in the mine schedule.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Table 3-6: Mine Production Plan (Years -1 to 5)

	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5
Mining						
Ore, kt	651	3,893	5,474	5,474	5,475	5,475
Low Grade to Stockpile, kt	0	0	0	0	2,248	1,301
Non-Economic Material, kt	6,349	11,107	14,526	24,526	32,277	33,224
Total Mining, kt	7,000	15,000	20,000	30,000	40,000	40,000
From Low Grade Stockpile, kt	0	0	0	0	0	0
Mill Feed						
kt		**4,544**	**5,475**	**5,474**	**5,474**	**5,474**
Ag, ppm		**226**	**208**	**167**	**189**	**204**
Pb,%		**0.441**	**1.016**	**0.737**	**1.431**	**1.308**
Cu,%		**0.026**	**0.019**	**0.038**	**0.053**	**0.105**
Percentage of Mill Feed						
Copper - Silver Ore		79%	55%	66%	48%	50%
Lead - Silver Ore		21%	45%	34%	52%	50%

Table 3-7: Mine Production Plan (Years 6 to 11)

	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Mining						
Ore, kt	5,475	5,475	5,475	5,475	5,476	5,475
Low Grade to Stockpile, kt	1,261	2,500	2,117	2,437	405	295
Non-Economic Material, kt	33,264	32,025	32,408	32,088	34,119	34,230
Total Mining, kt	40,000	40,000	40,000	40,000	40,000	40,000
From Low Grade Stockpile, kt	0	0	0	0	0	0
Mill Feed						
kt	**5,474**	**5,474**	**5,475**	**5,475**	**5,475**	**5,475**
Ag, ppm	**174**	**152**	**156**	**170**	**141**	**125**
Pb,%	**1.248**	**0.802**	**0.790**	**0.550**	**1.468**	**1.830**
Cu,%	**0.034**	**0.032**	**0.034**	**0.054**	**0.016**	**0.012**
Percentage of Mill Feed						
Copper - Silver Ore	54%	65%	71%	80%	45%	31%
Lead - Silver Ore	46%	35%	29%	20%	55%	69%

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Table 3-8: Mine Production Plan (Years 12 to 17)

	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Total
Mining							
Ore, kt	5,474	2,136	4,879	5,099	0	0	76,881
Low Grade to Stockpile, kt	0	0	0	0	0	0	12,564
Non-Economic Material, kt	34,526	37,864	22,393	3,157	0	0	418,083
Total Mining, kt	40,000	40,000	27,272	8,256	0	0	507,528
From Low Grade Stockpile, kt	0	3,338	595	375	5,476	2,780	12,564
Mill Feed							
kt	**5,474**	**5,474**	**5,473**	**5,475**	**5,477**	**2,780**	**89,442**
Ag, ppm	**106**	**123**	**186**	**186**	**75**	**73**	**158**
Pb,%	**2.151**	**0.463**	**0.116**	**0.072**	**0.481**	**0.467**	**0.922**
Cu,%	**0.005**	**0.036**	**0.046**	**0.068**	**0.045**	**0.046**	**0.039**
Percentage of Mill Feed							
Copper - Silver Ore	9%	66%	86%	90%	57%	57%	59%
Lead - Silver Ore	91%	34%	14%	10%	43%	43%	41%

Over the 17-year life of the Navidad operations, the following quantities of metals (in concentrates) are projected to be produced:

Silver	275.5 million ounces
Lead	631.5 thousand tonnes
Copper	18.2 thousand tonnes

A more detailed annual summary of this metal production is included in Section 20.5 of this report.

3.14 PROJECT DESCRIPTION AND LOCATION

The Project is located in the central plateau of northern Chubut province, 1,250 km southwest of Buenos Aires, Argentina. The mine site is approximately 360 km west of Puerto Madryn and is served by graded Provincial Highway #4. The site elevation is approximately 1,200 metres (m).

The area is semi-arid, windy and relatively cold. Sparse sheep ranching occurs in the area. A regional location map for the Project is shown in Figure 3-2 and a local map is shown in Figure 3-3.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Figure 3-2: Map of Argentina

M3-PN100019
14 January 2011

Table of Contents

Figure 3-3: Project Location Map

3.15 PROJECT DEVELOPMENT PLAN

An environmental impact assessment is scheduled to be submitted as soon as provincial laws are changed or modified to permit development of open cut mining in the Navidad Meseta area of Chubut. Once all permits are received, the Project will proceed immediately into construction. Commercial production could start in 2014.

An Engineering, Procurement and Construction Management (EPCM) company will be contracted to manage the Project. Argentine contractors will be used for the construction of the facilities. Based on PAS s recent construction experience at Manantial Espejo, a knowledge base of the existing Argentine contractors and suppliers is readily available, and will be advantageous in advancing the Project in an expedient manner.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

3.16 RESOURCE TABULATION

Table 3-9 shows the April 2009 Navidad Mineral Resource estimates (Snowden, 2009) on a deposit basis above a 50 g/t AgEQ cut-off grade.

Table 3-9: Navidad 2009 Mineral Resources Reported Above a Cut-Off Grade of 50 g/t AgEQ

Deposit	Classification	Tonnes (Mt)	AgEQ g/t	Ag g/t	Pb%	Cu%	Contained Ag (Moz)	Contained Pb (Mlb)	Contained Cu (Mlb)
Calcite Hill NW	Measured								
	Indicated	14.8	94	78	0.59	0.03	37	194	9
	Meas. + Ind.	**14.8**	**94**	**78**	**0.59**	**0.03**	**37**	**194**	**9**
	Inferred	14.6	74	52	0.82	0.02	24	265	6
Calcite Hill	Measured								
	Indicated	17.5	115	100	0.55	0.06	56	212	24
	Meas. + Ind.	**17.5**	**115**	**100**	**0.55**	**0.06**	**56**	**212**	**24**
	Inferred	4.9	106	96	0.36	0.03	15	39	3
Navidad Hill	Measured	8.4	122	109	0.46	0.16	29	85	29
	Indicated	5.6	96	90	0.24	0.11	16	29	14
	Meas. + Ind.	**14**	**112**	**101**	**0.37**	**0.14**	**45**	**114**	**42**
	Inferred	1.8	81	70	0.41	0.08	4	16	3
Connector Zone	Measured								
	Indicated	8.2	102	91	0.41	0.04	24	74	7
	Meas. + Ind.	**8.2**	**102**	**91**	**0.41**	**0.04**	**24**	**74**	**7**
	Inferred	9.9	88	74	0.49	0.03	24	107	13
Galena Hill	Measured	7	242	170	2.62	0.04	38	404	6
	Indicated	44.7	166	117	1.78	0.03	168	1,754	26
	Meas. + Ind.	**51.7**	**176**	**124**	**1.89**	**0.03**	**206**	**2,158**	**33**

15

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Deposit	Classification	Tonnes (Mt)	AgEQ g/t	Ag g/t	Pb%	Cu%	Contained Ag (Moz)	Contained Pb (Mlb)	Contained Cu (Mlb)
	Inferred	1.7	116	80	1.35	0.01	4	50	1
Barite Hill	Measured								
	Indicated	7.7	161	153	0.28	0.07	38	48	12
	Meas. + Ind.	**7.7**	**161**	**153**	**0.28**	**0.07**	**38**	**48**	**12**
	Inferred	0.9	100	81	0.69	0.01	2	13	0
Loma de La Plata	Measured								
	Indicated	29.1	172	169	0.09	0.04	158	58	26
	Meas. + Ind.	**29.1**	**172**	**169**	**0.09**	**0.04**	**158**	**58**	**26**
	Inferred	1.3	82	76	0.21	0.02	3	6	0
Valle Esperanza	Measured								
	Indicated	12.2	178	172	0.21	0.03	68	56	9
	Meas. + Ind.	**12.2**	**178**	**172**	**0.21**	**0.03**	**68**	**56**	**9**
	Inferred	10.8	133	123	0.35	0.02	43	84	4
Total	Measured	15.4	177	137	1.44	0.10	67	489	35
	Indicated	139.8	147	126	0.79	0.04	565	2,425	127
	Meas. + Ind.	**155.2**	**150**	**127**	**0.85**	**0.05**	**632**	**2,914**	**162**
	Inferred	45.9	97	81	0.57	0.02	119	580	22

Table of Contents

Notes:

The most likely cut-off grade for these deposits is not known at this time and must be confirmed by the appropriate economic studies.

Silver equivalent grade values are calculated without consideration of variable metal recoveries for silver and lead. A silver price of US$12.52/oz and lead price of US$0.50/lb was used to derive an equivalence formula of AgEQ = Ag + (Pb × 10,000 / 365). Silver prices are based on a three-year rolling average and lead prices are based on an approximate ten-year rolling average.

The estimated metal content does not include any consideration of mining, mineral processing, or metallurgical recoveries.

Tonnes, ounces, and pounds have been rounded and this may have resulted in minor discrepancies in the totals.

Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. No Mineral Reserves have been estimated.

The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, title, taxation, socio-political, marketing, or other relevant issues.

Estimates of Cu were updated by Pan American Silver Corp. for the purposes of this PA.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

3.17 RESERVE TABULATION

No Reserves have been declared for this study. Measured, Indicated, and to a lesser extent, Inferred Resources for all eight deposits have been utilized to develop a preliminary mine production plan.

This PA is preliminary in nature because of the inclusion of Inferred Mineral Resources that are considered too geologically speculative to have the economic considerations applied to them that would enable them to be categorized as mineral reserves. No mineral reserves have been estimated and there is no certainty that the preliminary assessment will be realized.

3.18 FACILITIES

Normal open cut mine type facilities have been selected for the Project. These include:

- Maintenance Facilities (Truck Shop)
- Warehouse
- Process Plant
- Concentrate Filtering, Storage & Loadout
- Metallurgical and Environmental Laboratory
- Medical Facilities/Clinic
- Operator s Camp
- Contractor s Camp
- Administration Building
- Concentrate transport containers
- Open cut facility upgrades

3.19 INFRASTRUCTURE

Although a camp will be constructed to house the employees and contractors at the site that do not live in the immediate area, the surrounding small towns and ranching areas will most likely develop numerous small support businesses that will profit from the mine construction and operation. The graded highway route Provincial Highway #4 connects the mine site to the medium sized coastal cities of Puerto Madryn, Rawson and Trelew and will likely provide the main supply route for the mine construction and operation.

Regularly scheduled commercial airline flights are available from Buenos Aires and service Trelew and Puerto Madryn.

Puerto Madryn has container shipping service. Other ports in Argentina and Chile have bulk concentrate handling facilities. A final decision on which bulk handling facility will ultimately be used has yet to be finalized.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

3.20 METALLURGICAL TEST PROGRAM

An extensive bench scale and pilot plant program is underway at G&T Metallurgical (G&T) in Kamloops, B.C., Canada. This is the same lab that was used by the previous owner of the Navidad Project (Aquiline) and provides consistency to the test results used for this PA metallurgical performance estimation.

The available G&T test results were used for developing the metallurgical projections used in this study.

3.21 REFINERIES

There are no suitable smelters or refineries in Argentina for treatment of Navidad concentrates. While a study has been done of foreign smelters and their terms, a formal study will be performed as part of the Feasibility Study. There is no assurance at this time that the concentrate revenue calculated in this study will be attained. No smelter contracts have yet been negotiated. The commercial terms and ocean freight cost assumptions used in this PA are based on an in-house assessment by experienced PAS personnel, who are currently engaged in marketing similar PAS products elsewhere in the Company s businesses, with additional assistance from an external concentrate logistics consulting firm.

3.22 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this PA, it is the opinion of the authors that the Project should advance to a Feasibility Study stage.

The following recommendations have been made as a result of the findings disclosed in this PA and in support of the recommendations to advance to a Feasibility Study:

1. Continue the discussions with interested smelters.

2. Continue to support efforts for open cut mining to be legally recognised as a valid and sustainable form of economic development in the central plateau of Chubut Province.

3. Complete EIA permit applications that can be submitted when mining becomes permissible.

4. Further refine the geological interpretation to incorporate all available geological information, including surface mapping (including the position of outcropping mineralisation), geophysical information, structural information, and core logging detail in digital, three dimensional format.

5. Continue the modelling of fault interpretations for use in future resource estimations.

6. Continue with the work currently underway to update the April 2009 Mineral Resource estimate to include the results of the 2010 drilling and the interpretations described above, and revise the mine production plan.

Table of Contents

7. Continued exploration in the company s land package in the Navidad district.

8. Continue the metallurgical testing program to improve in particular silver recoveries in all ore types. Local concentrate treatment is also being investigated.

9. Finalize engineering work for development of water and utility networks.

The following budget is approved and recommended by PAS for advancing the Project to a feasibility study level (not including Value Added Tax VAT):

Table 3-10: Recommended Feasibility Study Budget

Capital Spending	US$ 1.6 Million
Human Resources	US$ 2.9 Million
Admin and Support	US$ 4.7 Million
Feasibility Study	US$ 5.0 Million
Geology and Exploration Drilling	US$ 6.1 Million (including 3.0 Million for diamond drilling)
Project Management and Technical Services	US$ 2.3 Million
Environmental Work	US$ 1.1 Million
Safety	US$ 1.3 Million
TOTAL	US$ 25.0 Million

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

4 INTRODUCTION

4.1 PURPOSE AND BACKGROUND

Pan American Silver Corp. (PAS) intends to develop its 100% owned Navidad Silver Project. It is located in north central Chubut Province, 1,250 km southwest of Buenos Aires, Argentina.

PAS engaged M3 in early 2010 to produce a revised Preliminary Assessment (PA) to update the previous PA performed for Aquiline Resources Inc. (Aquiline) on the Project, followed by a Feasibility Study. The previous PA in 2008 (Snowden, 2008) evaluated only Loma de La Plata and was based on resource estimates as at December 2007 (Snowden, 2007). The results of the 2008 PA have been superseded by additional resource drilling, updated resource estimates as at April 2009 (Snowden, 2009), and the findings presented in this Technical Report. Snowden has also prepared numerous NI 43-101 reports for the Navidad resource including the most recent report issued by PAS in February 2010 disclosing the transaction between Aquiline and PAS. The current Mineral Resource estimate carried out in April 2009 and updated by PAS with estimates of Cu, formed the basis of Mineral Resources for this PA.

Concurrent to M3 activities, PAS engaged other sub-consultants for geological modelling and updates to the current resource estimates, mining, permitting, geotechnical, power and logistics. Also, major drilling and metallurgical testing programs are nearing completion.

The Montgomery Watson Harza (MWH) Buenos Aires office is in the process of preparing an Environmental Impact Study (EIA).

A provincial law that prohibits open cut mining must be modified before the EIA can be submitted. In the meantime, all preparatory work is being done in order to position the Project to proceed immediately following a change to the provincial law.

4.2 SOURCES OF INFORMATION

Snowden completed a PEA in 2008 for the Loma de La Plata deposit (Snowden, 2008) based on resource estimates as at November 2007 (Snowden, 2007) Updated resource estimates as at April 2009 (Snowden, 2009) and later updated by PAS to include estimates of Cu, form the basis of this PA. The April 2009 estimates were also disclosed in a Technical Report dated February 2010 (Snowden, 2010) disclosing the details of the acquisition of the Project by PAS. Independent Mining Consultants (IMC) used the April 2009 resource estimates to develop optimized cut designs and to construct the annual mine production plan for this report.

G&T Metallurgical Services (G&T) has been performing metallurgical testing in Kamloops, British Columbia on this Project since 2005. G&T has completed variability testing on samples collected from the 2010 core. This was mostly bench scale testing, but a pilot plant test was also run on a Loma de La Plata ore composite. Planning for confirmation testing and optimization in 2011 is currently underway. Rheology, settling and filtering tests for copper-silver (at Loma de La Plata) ore have been performed by other consultants.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Golder Associates (Golder) has performed field geotechnical testing and three studies to support the EIA and this PA. The Golder studies cover cut slope stability, the tailings storage facility, and the process plant facility foundations. Further work is underway to support the upcoming Feasibility Study.

Determining the optimum method for concentrate transport commenced with a scoping study by Southmark Logistics, S.A. (Southmark) of Buenos Aires, supported by their Toronto office. Other sub-consultants are now studying port improvement requirements and other transport logistics.

4.3 LIST OF QUALIFIED PERSONS

Table 4-1 lists the Qualified Persons and the sections that they are responsible for.

Table 4-1: List of Qualified Persons

Author	Company	Designation	Section Responsibility
Douglas C.J. Austin	M3 Eng	P.E., P. Eng.	3, 4, 20, 21, 22, 26
Martin Wafforn	PAS	P. Eng.	3, 4, 20, 21, 22, 26 (Golder drawings)
Herb Welhener	IMC	M.M.S.A.	3, 20
Michael Steinmann	PAS	P. Geo.	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 17, 21, 22
Thomas L. Drielick	M3 Eng	P.E.	3, 18, 20, 26 (M3 drawings)
Pamela De Mark	PAS	P. Geo.	3, 16, 19

4.4 PERSONAL INSPECTIONS

The following groups have carried out site inspections:

- M3 Douglas Austin visited the site in February and early March 2010.Activities done during this visit by Mr. Austin were:

- Visited the Navidad Project to understand the site location and its surroundings

- Define options for process plant location.
- Visited Gan Gan and Gastre and the client offices in Gastre, Puerto Madryn and Buenos Aires
- Visited Puerto Madryn port facilities to evaluate the feasibility of installations for concentrate shipping.
- PAS Martin Wafforn made a visit to the site in December of 2008 and carried out the following activities:
- Observed the geology and mineralisation.

Table of Contents

- Verified that the diamond drilling and drill core logging was in progress.

- Confirmed that no apparent fatal flaws exist for a development concept that was being formed within PAS.

- Michael Steinmann visited the Navidad site in January 13-15, April 21-23, May 3-4, and October 21-23, all in 2010. Activities carried out by Mr. Steinmann include:

- Reviewed the mining claim holdings.

- Reviewed geological plans and cross sections.

- Reviewed diamond drill core logging, cutting, and sampling procedures.

- Reviewed the on-site sample preparation lab and lab procedures.

- Inspected operating diamond drilling rigs during the April and May site visits.

- Pamela De Mark visited site on 10 September to 13 September 2007 and from 28 April to 30 April 2009, which is considered current for the purposes of the mineral resource estimates. Activities carried out by Ms. De Mark include:

- Reviewed geological plans and cross sections.

- Reviewed selected diamond drillhole logs and diamond drill core intersections.

- Reviewed diamond drill core logging, cutting, and sampling procedures.

- Selected mineralized intersections for independent analyses.

- Confirmed the coordinates of selected diamond drilling rigs during the 2007 site visit. No diamond drill rigs were in operation at the time of the 2009 visit.

- Reviewed the diamond drilling database validation undertaken by site geologists.

- Reviewed diamond drill core sample QAQC results.

- Reviewed the digital geological interpretation and modelling of lithological and mineralisation domains.

4.5 UNITS

The units of measurement in this report are metric, unless otherwise noted. All costs are in 4th Quarter 2010 US Dollars.

Table of Contents

Table 4-2: Project Term Abbreviations and Descriptions

Abbreviation	Description
°	degrees
°C	degrees Celsius
Alex Stewart	Alex Stewart (Assayers) Argentina S.A.
Ag	silver
AgEQ	silver equivalent
BLEG	bulk leach extractable gold
CIM	Canadian Institute of Mining, Metallurgy and Petroleum
cm	centimetre
COPRAM	Provincial Environment Committee
Cu	copper
CSAMT	controlled source audio-frequency magnetotellurics
DC	direct costs
DGPS	Differential Global Positioning System
dollar ($)	U.S. dollars
E	east
EPCM	Engineering, Procurement and Construction Management
EIA	Informe de Impacto Ambiental, or Environmental Impact Study
Fe	iron
gpm	US gallons per minute
GPS	Global Positioning System
g/t	grams per tonne
g/dmt	gram per dry metric tonne
g/t	gram per metric tonne
G&T	G&T Metallurgical Services
Golder	Golder Associates
h	hour
ha	hectares
IC	indirect costs
IMA	IMA Exploration Inc. and Inversiones Mineras Argentinas, S.A. They are part of the same group, with Inversiones Mineras Argentinas, S.A. being the subsidiary.

Table of Contents

Abbreviation	Description
IMC	Independent Mining Consultants
INPRES	Instituto Nacional de Prevención Sísmica
IP	induced polarization
IRA	interramp slope angle
IRR	internal rate of return
k	thousand
kg	kilogram
kg/t	kilograms per metric tonne
km	kilometre
KNA	Kriging Neighborhood Analysis
kt	kilotonnes
kV	kilovolt
l	litres
l/s	Litres per second
lb	pound
LG	Lerch Grossman algorithm
LOM	life of mine
m	metre
m2	square metre
m3	cubic metres
MASA	Minera Argenta, S.A.
METSIM	name of a computer-based process simulation tool.
Minera Normandy	Minera Normandy Argentina S.A.
MIK	Multiple Indicator Kriging
mm	millimetre
M3	M3 Engineering & Technology Corporation
MD	Manifestación de Descubrimiento
MLARD	metal leaching and acid rock drainage
Mlb	million pounds
Moz	million ounces
t	metric tonne
Mt	million metric tonnes
tpd	tonnes per day
tpy	tonnes per year

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Abbreviation	Description
MIBC	methylisobutyl carbinol
MW	megawatts
MWh	megawatt hours
MWH	Montgomery Watson Harza Consultants
N	north
Newmont	Newmont Mining
NN	nearest neighbour
Normandy	Normandy Argentina
NPV	net present value
NSR	net smelter return
Pb	lead
OK	Ordinary Kriging
OSA	overall slope angles
oz	ounce
P80	80 percent of material passing through a screen
PA	preliminary assessment
PAS	Pan American Silver Corp.
PEA	preliminary economical assessment
pH	a measurement on a scale from 0 to 14 of the acidity or alkalinity of a solution
PM10	Particulate matter with aerodynamic diameter less than 10 microns.
PM2.5	Particulate matter with aerodynamic diameter less than 2.5 microns.
POSGAR	Posiciones Geodésicas Argentinas (Argentinean Geodesic Positions)
PP	pilot plant
ppm	parts per million
QA/QC	quality assurance/quality control
QP	qualified person
Quantec	Quantec Geoscience Argentina S.A.
RC	reverse circulation (drill holes)
ROM	run of mine
s	second(s)
S	south

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Abbreviation	Description
SAG mill	semi-autogenous grinding mill
SEDAR	System for Electronic Document Analysis and Retrieval (electronic site holding documents and information filed by public companies for the Canadian Securities Administrators and where many feasibility studies are filed)
Selmar	Selmar International Services Ltda
Silver Wheaton	Silver Wheaton Corp.
Smee	Smee and Associates Consulting Ltd.
Snowden	Snowden Mining Industry Consultants
Southmark	Southmark Logistics, S.A.
SP	self-potential test
SPT	SPT SRL Electrical Power Consultants
SWS	Schlumberger Water Services
t	metric tonne
TEM	transient electromagnetic survey
TC/RC	treatment charges and refining charges
TSF	tailings storage facility
TSP	total suspended particulates
µm	micron, one millionth of a metre
US	United States
US$	United States dollars
USEPA	US Environmental Protection Agency
V	volts
VMS	volcanogenic massive sulphide
W	west
w/w	weight to weight
WGS	World Geodetic System
Wt	wet tonne
Xstrata	Xstrata Process Support Laboratory
y	year
Zn	zinc

Table of Contents

5 RELIANCE ON OTHER EXPERTS

M3 has not inspected the legal documents concerning PAS s incorporation, mineral leases, land holdings, caveats, if any, Argentine federal regulations, and the Province of Chubut or any local regulations. M3 has no reason to believe that any of the information contained in this report is incorrect. Mining is a business with inherent risks, despite the efforts of the qualified persons who have prepared this and supporting reports. As this is a preliminary report, its results should not be used for budgetary purposes or commitments.

6 PROPERTY DESCRIPTION & LOCATION

6.1 LOCATION

The Navidad Project is located in the central plateau of northern Chubut province, 1,580 km southwest of Buenos Aires, Argentina. The mine site is served by the gravel graded road called Provincial Route #4 . The Project site is situated approximately 360 km west of Puerto Madryn. The nearest communities are Gan Gan 47 km to the east with a population of approximately 900 and Gastre 35 km to the west with a population of approximately 800. There is also the smaller community of Blancuntre located 25 km southwest of the Project with a population of 80. The area is semi-arid, windy, and relatively cold. Sparse sheep ranching occurs in the region. Figure 6-1 shows the approximate Project location in the region, and Figure 6-2 shows the Project with relation to some of the nearby communities.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Figure 6-1: Project Regional Map

Table of Contents

Figure 6-2: Navidad Project Location Map

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

6.2 PROPERTY DESCRIPTION

Information in this section has been updated from Snowden (2010).

The Navidad Project is located within the Gastre Department in the Province of Chubut, southern Argentina, at approximately 42°24'54"S and 68°49'12"W.

6.3 MINERAL TENURE

In Argentina, exploration concessions are not physically surveyed or staked in the field, but are electronically filed using the Gauss Kruger coordinate system, zone (faja) 2, relative to the World Geodetic System (WGS) 84 datum. There are three levels of mineral rights (which do not include surface rights):

- ***Cateo*** an exploration permit granting any mineral discoveries on the cateo to the applicant. In the Province of Chubut, cateos are measured in units of 500 hectares (ha), with a minimum of one unit (500 ha) and a maximum of 20 units (10,000 ha) granted to any holder. Cateo units must be reduced over time relative to the number of units held. The maximum duration for any granted cateo is three years. The holder may conduct prospecting, mapping, sampling, and geophysical surveys, and drilling and trenching after notifying the mining office of the exploration plan and obtaining environmental permits.

- ***Manifestación de Descubrimiento*** (MD) once mineralisation is discovered on a cateo, the cateo lease expires and the permit is upgraded to an MD. The maximum area of an MD is 7,000 ha. A basic environmental impact assessment, a physical survey, and boundary markers are required at this stage.

- ***Pertenencia*** a lease allowing mining. A physical survey and boundary markers are required.

The main Navidad Property block, containing all of the current resources, consists of four MDs (Navidad Oeste, Navidad Este, Navidad Oeste 1, and Navidad Este 1, with MD registration numbers 14340/04, 14341/04, 14902/06, and 14903/06 respectively), each of which is 2,500 ha in area. Minera Argenta (MASA) holds the rights to an additional 20 MD s in the Province of Chubut and has applied for a number of others. Nine of the MD s currently held (Pampa 1, Puente 1, Puente 2, Colonia Este, Sierra 1, Sierra Sur 1, Sierra, Sierra Oeste, and Sierra Cacique III) are located either adjacent to or in the vicinity of the main Navidad claim block, along strike of the mineralised trends. The remaining 11 MD s that MASA currently holds (Trucha A, Trucha B, Mara A, Mara B, Mara C, Condor C, Condor D, Alamo A, Alamo B, Nina 3 and Carlota 3) are located in three different areas approximately 50 km to 150 km to the south. All 24 MD properties together cover an area of 67,327 ha and are in good standing with the mining authorities of the Chubut Province.

Figure 6-3 shows the mining concession map in the vicinity of the Project.

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Figure 6-3: Mining Concession Map in the Vicinity of the Navidad Project

Table of Contents

6.4 OPTION AGREEMENTS

There are no option agreements for the mine site.

6.5 AGREEMENTS AND ROYALTIES

1. Silver Wheaton Silver Stream

Discussions with Silver Wheaton Corp. (Silver Wheaton) with respect to a silver stream for part of the production from the Loma de La Plata deposit are ongoing. An agreement was entered into by Silverstone Resources Corp. and Aquiline, (those companies being subsequently acquired by Silver Wheaton and PAS, respectively), which included some basic terms for the silver stream. The financial estimates in this PA include an allowance for this silver stream based on the terms set out below. This estimate may change depending on the final terms negotiated with Silver Wheaton.

Silver Wheaton has the right to purchase 12.5% of the payable silver produced from the Loma de La Plata deposit for the life of that deposit, such right including the right to purchase a minimum of one million ounces of payable silver per year from Loma de La Plata, or if unavailable, from other production on the Navidad Project, for a minimum of a 12.5 year period.

Silver Wheaton purchased this right for the sum of: (a) an upfront payment of $50 million (the Upfront Payment); and (b) the lesser of $4.00 per ounce of payable silver and the prevailing market price per ounce of payable silver on the London Metals Exchange.

The Upfront Payment shall be made by Silver Wheaton as follows: (a) $17.6 million which has already been paid; (b) $14.9 million on the date a decision is made to proceed with the construction of a mine at Loma de La Plata; and (c) $17.5 million to be paid in four equal instalments, payable as follows:

(i) three months after commencement of construction $4.375 million;

(ii) six months after commencement of construction $4.375 million;

(iii) nine months after commencement of construction $4.375 million; and

(iv) 12 months after commencement of construction $4.375 million.

2. Export Royalty

This PA includes application of the 10% federal export tariff to the gross value of concentrates shipped off-shore for third party treatment and refining.

Table of Contents

3. Provincial (Chubut) Royalty

This PA includes application of the Chubut Provincial royalty of 3% of the Operating Income . Operating income is defined as revenue minus production cost (not including mining costs), treatment and transportation charges.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

7 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

Information in this section has been sourced from Snowden (Snowden, 2010) with some updates from current developments.

7.1 ACCESSIBILITY

The communities nearest to the Property are Gastre, with a population of approximately 800 inhabitants, 35 km to the northwest, and Gan Gan, with a population of approximately 900 inhabitants, about 47 km to the east. Both communities are located on Provincial Highway #4, a gravel highway that passes just north of the Property. The Property is accessible year round.

Daily flights are available from Buenos Aires to Trelew, located about 370 km by road from the site to the southeast near the Atlantic coast. The nearest airport, which also has regularly scheduled flights, is located in Esquel, about four hours drive to the southwest by gravel road. The provincial capital of Rawson is located 20 km east of Trelew. PAS currently has offices in Buenos Aires, Trelew, Gan Gan and Gastre to service the Navidad Project.

7.2 CLIMATE

The climate is semi-arid with average monthly temperatures ranging from 1°C to 20°C. High winds frequently occur from October through December, but may also occur at other times throughout the year. Monthly average precipitation ranges between 7 mm and 29 mm, with the highest precipitation during the winter months from May to August that may occur as either rain or snow. Field activities run throughout the year and are typically not curtailed by weather conditions.

7.3 INFRASTRUCTURE AND LOCAL RESOURCES

The PAS base of operation for the Navidad Project is in Gastre and Gan Gan. Facilities include offices, modular living facilities, and core-storage warehouses. Communications are provided by land-line telephone service and satellite internet. The Gastre modular living facilities provide lodging and meals for up to 20 people. The Gastre warehouses include three drill core storage sheds, a logging and sampling shed, metal shop, vehicle workshop, and a regional exploration office.

In Gan Gan the company has built two core storage facilities as well as an office on land purchased on the western edge of town in 2007. The office serves as a base of operation for its social and community relations personnel, while the warehouses contain older drill core from the Navidad Property.

Near the Navidad Property a small camp facility has been installed at an acquired farmhouse with electrical power provided by several small generators. Drilling contractors and consultants are also located in the temporary camp. Alex Stewart Assayers Argentina S.A. (Alex Stewart) operates a sample preparation lab at the campsite. Communication is provided by a satellite

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

internet uplink. Other infrastructure on site includes storage areas for drill supplies and contractors. There are several water supply bore holes authorized by the Chubut Provincial Water Institute to pump water for camp use and diamond drilling. PAS has rented a portable package sewage treatment plant for the camp.

7.4 LAND ACCESS

Access to land for drilling and other exploration activities is allowed through outright surface ownership as well as through a series of easement contracts with the remaining surface owners. Aquiline initiated land acquisition to facilitate unimpeded land access to the Navidad Project.

PAS reports the current status of its land acquisition process as follows:

- Santana Horacio Property (property of 2,988 ha): Direct purchase of land completed on May 13, 2008.
- Santana Sarmiento Property (property of 4,280 ha): Land swap completed on February 26, 2008.
- Montenegro Succession: Direct purchase of the 4,109 ha property named La Rosada was completed on August 6, 2009. The purchase agreement for a 325 ha property is signed and title transfer is in progress.
- Raileff Succession (property of 2,962 ha): Land swap agreements have been signed for a property acquired by Minera Argenta in Telsen (outside the Project), and the titles are in the process of being transferred. Mr. Raileff is in a new property and waiting for local authority inspection to complete transfer.
- Llanquetru Eleuterio Property (property of 1,784 ha): With easement agreement in force. The original easement agreement was executed on June 16, 2006. A new easement agreement was executed on January 23, 2008 modifying the landowner´s compensation. This agreement expires automatically when Minera Argenta (or its successors) ceases with the exploitation of its mining rights located in Llanquetru´s land.

7.5 PHYSIOGRAPHY

The Property is located in the Patagonian Plateau region with steppe vegetation characterized by low and compact bushes of grass and by stocky shrubs of less than a metre high. Elevation ranges from 1,060 m to 1,460 m with gentle topographic relief interrupted by local structurally controlled ridges.

8 HISTORY

Information in this section has been updated from Snowden (2010).

The first known exploration program that included the Navidad Project area consisted of a preliminary regional geochemical sampling program conducted by Normandy Argentina

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

(Normandy) in mid-2000 to locate additional deposits to supplement those known at its Calcatreu Property, a gold and silver deposit located approximately 80 km from Navidad. The program consisted of 1,200 bulk leach extractable gold (BLEG) stream sediment samples taken from drainage systems overlying Jurassic volcanic rocks in Chubut Province in the general vicinity of Calcatreu, Mina Angela, Gastre, Lagunita Salada, Gan Gan, and other areas. This program took place on what was then considered open exploration ground, and resulted in the identification by Normandy of various anomalies, including the Flamingo Prospect and Sacanana, which is today known as Navidad.

In January and February 2002, Newmont Mining (Newmont) purchased Normandy s worldwide mining interests, and in March 2002, Newmont decided to sell all of its interests in Argentina. In September 2002, IMA Exploration Inc. (IMA) signed a confidentiality agreement in order to obtain a copy of the Information Brochure and technical data related to Newmont s Argentinean interests, which included the Calcatreu Project. In December 2002, IMA applied for exploration concessions (cateos) over the area formerly known as Sacanana and now known as Navidad, utilizing and relying upon the Normandy BLEG data (known as BLEG A), and began undertaking a regional exploration program over the Navidad area, including regional mapping and sampling. From December 2002 to July 2006, IMA conducted diamond drilling, geochemical sampling, geophysical exploration, and Mineral Resource estimates at Navidad.

In January 2003 Aquiline entered into an agreement with Newmont, which was completed in July 2003, to purchase all of the shares of Normandy and Newmont s 100% interest in Calcatreu, and acquired all of Newmont s assets including the BLEG A data. In May 2003 Aquiline reviewed the BLEG A data and found that the ground covered by the BLEG A data had already been claimed by IMA. After failure to receive a credible response from IMA as to how they could otherwise have made a legitimate discovery at Navidad without having breached the terms of the Confidentiality Agreement, Aquiline went on to file suit in the Supreme Court of British Columbia in March 2004.

The Supreme Court of British Columbia awarded ownership of the Navidad Project to Aquiline on 14 July 2006 following a court case with IMA where IMA was found to have breached the Confidentiality Agreement. IMA subsequently appealed to the Court of Appeal for British Columbia, but lost the appeal by unanimous decision in June 2007. An Application for Leave to Appeal to the Supreme Court of Canada was filed by IMA in September 2007. Sole ownership rights were granted to Aquiline by the Supreme Court of Canada on 20 December 2007, subject to Aquiline making payment to IMA which would reimburse the latter for its accrued exploration expenditures up to the July 2006 court decision. Aquiline s final payment to IMA was made on 8 February 2008, giving Aquiline full ownership of the Project.

Since October 2006, Aquiline undertook diamond drilling, geophysical and geochemical exploration, metallurgical test work, resource estimates (Snowden, 2007), including the 2009 Mineral Resource estimate, and a PA for Loma de La Plata (Snowden, 2008).

On 14 October 2009, PAS announced a friendly offer to acquire all of the issued and outstanding securities of Aquiline. On 7 December 2009, PAS acquired approximately 85% of the issued and outstanding shares of Aquiline and extended its bid to 22 December 2009, and on that later date,

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

PAS took up approximately an additional 7% of the issued and outstanding shares in the capital of Aquiline. Since the offer to acquire the Aquiline shares was accepted by holders of more than 90% of the Aquiline shares, on 23 December 2009, PAS provided notice to the remaining shareholders of its intention to exercise its right to acquire the remaining issued and outstanding Aquiline shares pursuant to the compulsory acquisition provisions of the Business Corporation Act (Ontario). Pursuant to the compulsory acquisition, PAS has been deemed to have acquired the balance of the Aquiline shares not already owned by it on or about 22 January 2010.

Early in 2010, PAS took possession of the Property. PAS continued with a rigorous drilling campaign, metallurgical testing, hydrologic analysis, environmental studies, and several other works on the Project site. Mineral Resource estimates based on the results of the 2010 drilling and updated geological models are currently under way. Metallurgical testing of both older and new drill core continued at G&T in Kamloops, British Columbia. Crushing and grinding testwork was completed at the SGS laboratories in Santiago, Chile.

9 GEOLOGICAL SETTING

9.1 REGIONAL GEOLOGY

Information in this section has been sourced from Snowden (2010).

The Navidad Project is located on the southwest edge of the Northern Patagonia Massif in southern Argentina. This boundary of the massif is coincident with the Gastre Fault System , a mega-structural feature believed to be the result of continental-scale northeast to southwest extension that produced through down-faulting a series of northwest to southeast trending half grabens and tectonic basins (von Gosen et. al. 2004). Granitoid rocks of the basement in northern Chubut Province belong to the Palaeozoic age Mail Choique and Lipetren formations. Locally these rocks are exposed at surface in windows through the overlying Mesozoic age volcanic and sedimentary rocks. At Navidad the Mesozoic sequence consists of the Lonco Trapial Formation and overlying Cañadón Asfalto Formation. The latter of these formations hosts the Navidad mineralisation.

9.2 LOCAL GEOLOGY

The oldest rocks are Palaeozoic (Mamil Choique Formation) and crop out along the west side of the area. They comprise red and grey granitoids, cut by aplite dykes and quartz-rich pegmatites. These crystalline basement rocks are overlain by a Jurassic sequence of volcanic (Lonco Trapial Formation), and sedimentary (Cañadón Asfalto Formation), rocks. These are the host for silver mineralisation at Navidad. The contact between the Mamil Choique and Lonco Trapial formations lies about 6.5 km southwest of Navidad.

The older rocks are overlain unconformably by the Cerro Barcino Formation (Chubut Group, Cretaceous), comprising continental sandstones, conglomerates and tuffs. The youngest rocks are plateau basalts of the Pire Mahuida Volcanic Complex (Miocene).

Table of Contents

9.3 PROPERTY GEOLOGY

The oldest rocks at the Navidad Project comprise the Mamil Choique Formation. This is overlain by acid pyroclastics (ignimbrites), volcanic agglomerates, and lavas of the Lonco Trapial Formation. These rocks crop out on the southwest side of a complex, faulted sedimentary basin filled by sandstones, mudstones and limestones of the Cañadón Asfalto Formation. Lonco Trapial ignimbrites also occur on the northeast side of the basin. The basin includes, and is defined by, three northwest-striking major fault zones, generally referred to as trends . These comprise the Argenta, Esperanza, and Navidad trends. The Navidad Trend, which includes the bulk of the silver mineralisation, occurs in the immediate hanging wall of a major northeast-striking fault (Sauzal Fault). Most of the economic mineralisation is hosted by the upper of two trachytic andesite lava flows (referred to as latite in the literature). The latites overlie an extensive andesite flow.

10 DEPOSIT TYPES

Information in this section has been sourced from Snowden (Snowden, 2010), which incorporated contributions from Sillitoe (Sillitoe, 2007).

Navidad mineralisation is epithermal, as demonstrated by widespread open space-filling crustiform and cockade textures in the gangue minerals (carbonate, barite) and sulphide assemblages. The abundance of base metals, combined with carbonate-rich gangue, suggests that the deposit is intermediate, rather than low, sulphidation in style. Typical high sulphidation sulphides and gangue minerals are absent, but there is rare late stage kaolinite and minor hydrothermal alunite that implies late ingress of a hypogene acid fluid.

The Navidad silver mineralisation occurred very soon after deposition of the host sandstones, mudstones and limestones (Cañadón Asfalto Formation). It was localized at the contact between oxidized volcanic rocks and overlying organic-rich sedimentary rocks. Mineralisation was strongly controlled by existing permeability, with common open space-filling textures. Most is hosted by a single trachytic andesite (latite) lava flow. Calcite fluid inclusion studies (Lang, 2003) suggest a depth of formation of about 400-500 m below the original surface. The hydrothermal fluid was vapour-dominated, with an homogenisation temperature below 200°C. Despite forming near the surface, there is no concrete evidence of exhalative mineralisation. The semi-massive sulphides at Galena Hill, the most sulphide-rich of all the Navidad deposits, are clearly replacement in origin. Finely laminated carbonates postulated as exhalative products are in fact stromatolitic limestone of the Cañadón Asfalto Formation. Navidad is therefore not analogous to shallow water volcanogenic massive sulphide (VMS) deposits, such as Eskay Creek in British Columbia. This had been suggested by previous investigators.

The Sillitoe (Sillitoe, 2007) model for Navidad envisages mineralisation controlled by a district-wide redox interface. It is similar to red bed Cu and Ag deposits, where brines ascending through thick oxidized sequences leach Cu and/or Ag and deposit them in overlying reduced rocks. Like Navidad, red bed silver deposits, such as Nacimiento in New Mexico in the United States, are characterized by sulphur-poor minerals, such as native Ag and acanthite. The principal difference

Table of Contents

is that at Navidad the mineralizing fluid is thought to be epithermal in origin, rather than basinal brine.

The broadly strataform nature of the Navidad mineralisation is uncommon for an intermediate sulphidation epithermal silver deposit, most of which tend to be of vein type (e.g. Fresnillo in Mexico, Arcata in Peru, Martha in Santa Cruz province, Argentina). Potential analogous deposits include the Jardin Cu-Ag deposit of northern Chile. At Jardin, strata-bound copper sulphide mineralisation occurs in the upper brecciated, and non-welded, part of a pyroclastic flow deposit, overlain by organic-rich tuffaceous lacustrine sedimentary rocks (Lortie, 1987). San Cristóbal in Bolivia is another example of a broadly strataform silver deposit. Although the feeders for the San Cristóbal deposit are largely confined to a dacite dome complex, the bulk of the silver-zinc-lead mineralisation is hosted by lacustrine sedimentary rocks rather than lava, as at Navidad.

11 MINERALISATION

Information in this section has been sourced from Snowden (2010).

In all of the Navidad deposits the gangue minerals are principally calcite with minor barite. Silica is less important and occurs mostly as chalcedony and late amethyst. Ore minerals recognizable with a hand lens include: native silver, clots of black sulphide comprising argentite/acanthite, discrete grains of sphalerite, galena, chalcopyrite, cuprite, bornite, native copper and copper carbonates (malachite, azurite). Similar styles of mineralisation and a similar paragenesis occur in most of the deposits. However, the proportion of sulphides varies considerably. Loma de La Plata is silver-rich, but is sulphide-poor and contains very low levels of lead, zinc and copper. Various pulses of mineralisation are observed, principally at Galena Hill.

The principal metal association is Ag-Pb. Other associations include Ag-Pb-Cu and Cu-Ag and, more rarely, Ag-Zn. Occasionally there is Ag only, or Cu-Pb-Zn or simply isolated occurrences of these base metals. This suggests that deposition occurred through successive pulses of mineralisation. Gold appears to be totally absent from the system.

Mineralisation is mostly hosted in the upper latite, but important mineralisation occurs in the lower latite at Galena Hill. In a few places the underlying andesite also hosts high grade mineralisation. Deposits with mostly latite-hosted mineralisation include: Loma de La Plata, Valle Esperanza, Calcite Hill, and Galena Hill. Sedimentary rocks and volcaniclastics that overlie or are laterally equivalent to the upper latite also host significant mineralisation. Deposits where the mineralisation is dominantly hosted by these rock types include Calcite NW, Navidad Hill, Barite Hill, and Connector Zone.

High grade mineralisation mostly occurs in permeable host rocks. Examples of primary porosity include coarse volcaniclastic rocks and autobrecciated lava flows. Secondary porosity occurs as crackle brecciation of the brittle lava flows, hydrothermal eruption breccias, and tectonic breccias. At both Valle Esperanza and Loma de La Plata, the autobrecciated upper latite acted as an aquifer, sealed by overlying organic-rich sedimentary rocks (mudstones, limestones). The sediments were unconsolidated and are commonly slumped. Mixing of reduced water, derived

Table of Contents

from the organic-rich sediments, and rising metal-laden hydrothermal fluid probably triggered sulphide precipitation.

To date, the Navidad Project comprises eight individual mineral deposits in three separate mineralized trends (Navidad, Esperanza and Argenta trends). The six deposits of the Navidad Trend occur along strike over a distance of about 5.8 km and are essentially continuous. They comprise, from northwest to southeast: Calcite NW, Calcite Hill, Navidad Hill, Connector Zone, Galena Hill, and Barite Hill. The Valle Esperanza deposit occurs on the east flank of the Esperanza Trend and is found approximately 400 m south-southwest of Galena Hill. The Loma de La Plata deposit occurs in the north part of the Argenta Trend, approximately 2.2 km southwest from Calcite Hill. Summary descriptions are listed in the remainder of Section 11.

11.1 CALCITE NW

Mineralisation at Calcite NW takes the form of three long and tabular to slightly synformal bodies. The main body lies from the surface to a depth of 130 m below surface and has an average overburden thickness of approximately 60 m. It has a strike length of 1,825 m towards the northwest, a width between 350 m to 500 m, and a thickness between 10 m and 80 m. The mineralised body plunges gently to the northeast with a dip between 1° to 5°. The base of the main body is normally identified by the Galena Marker.

Towards the south-eastern end of the deposit, a smaller lens lies close to the surface parallel to the main body and about 80 m above it. It has a regular shape 275 m long, up to 250 m wide and between 20 m and 40 m thick.

Another elongated lens of mineralisation lies between 15 m to 50 m below and parallel to the northern end of the main body. The body is 1,000 m long, between 200 m and 350 m wide, and ranges between 10 m and 30 m in thickness.

11.2 CALCITE HILL

Mineralisation at Calcite Hill forms an irregular body with a narrow upper portion outcropping towards the western end of Calcite Hill, which merges with a larger mineralised lens. Mineralisation outcrops and extends to a depth of around 250 m below surface. It forms a relatively flat surface 600 m long, ranging from 270 m to 600 m in width. The lower portion of the body has an irregular shape resulting from two nearly separate lenses that merge into one lens having a variable thickness between 150 m to 20 m. The body plunges to the southwest with a -5° dip.

11.3 NAVIDAD HILL

Mineralisation at Navidad Hill trends for 520 m towards the northwest and forms an irregular globular shape ranging from 270 m to 470 m wide and 10 m to 175 m thick. The mineralised zone has a shallow dip to the southwest and lies at the subsurface along the ridge crest to around 50 m depth along the southern flank.

Table of Contents

11.4 CONNECTOR ZONE

The mineralisation at Connector forms two intersecting, but distinct bodies, which combined, are 670 m in strike length, and between 240 m and 590 m wide. The mineralisation lies from the surface to a depth of 330 m.

11.5 GALENA HILL

The extent of mineralisation is long and wide with a strike length of roughly 900 m and a width of between 250 m and 700 m. In section views orientated at 030° to 210°, the mineralised body as defined by values approaching 50 g/t AgEQ forms a roughly strataform body with a slight dip to the southwest. This body resembles an inverted shield with a flat top and a thicker central portion that thins to the margins. On nearly every section the mineralisation is affected by post-mineralisation movement on the northwest to southeast trending block faults resulting is displacements of roughly 10 m to 50 m. Those portions of the mineralisation located above the horst are partly eroded whilst those portions to either side are preserved in their entirety. The mineralised zone ranges from a few metres thick at the extreme margins to over 200 m thick in the central portions of the deposit.

11.6 BARITE HILL

Mineralisation at Barite Hill forms three lenses. The northern lens is about 230 m long along strike, between 170 m and 430 m wide in the dip direction and between 5 m and 30 m thick. The southwest dip varies between 3° where the body outcrops in the north to 25° in the southwest where the body lies approximately 120 m below surface. The second lens is found towards the southern end of Barite Hill. Its dimensions are approximately 300 m long by 350 m wide with thicknesses ranging from 4 m to 32 m. It occurs at the subsurface on the crest of the ridge and plunges to the southwest.

The third mineralised body, characterised by high Ag values, forms an irregularly shaped mass around 350 m long, between 100 m and 400 m wide, and between 7 m to 100 m thick. It lies between 50 m and 200 m below the second lens in southern Barite Hill and has a dip of 30° to the west-southwest.

11.7 LOMA DE LA PLATA

Two distinct mineralised bodies are present at Loma de La Plata. The main deposit is 850 m long with a north-south strike, between 600 m to 1,200 m wide and 40 m to 50 m thick. It covers a surface area of 74 ha. The second body is considerably lower in grade and is located approximately 60 m beneath the main deposit. It has approximately the same surface area as the upper main body but with an average thickness of only 5 m.

The area with the highest grade mineralisation is located in the central and western side of the upper Loma de La Plata deposit; overburden thickness varies from 0 m to 50 m. The dimensions of the high grade zone are 500 m north-south by 170 m east-west.

Table of Contents

11.8 VALLE ESPERANZA

Drillhole intersections have traced the two mineralised zones from surface to approximately 400 m below surface. The upper body is about 1,100 m long and between 130 m and 700 m wide. The lower body lies approximately 50 m below the upper deposit, and is 800 m long and between 140 m and 500 m wide. Both bodies range in thickness between 5 m to 30 m.

The mineralised horizon strikes approximately to 290° with a variable northeast dip between -70° to -10°. The dip appears to flatten towards the northeast.

12 EXPLORATION

Information in this section has been sourced from Snowden (2010). Some details of the PAS drilling campaign in 2010 have been added.

12.1 EXPLORATION BY NORMANDY MINING

The first exploration on the Navidad Project area consisted of a preliminary regional geochemical sampling program conducted by Normandy in mid-2000. The program consisted of 1,200 BLEG stream sediment samples taken from drainage systems overlying Jurassic age volcanic rocks in Chubut Province in the general vicinity of Calcatreu, Mina Angela, Gastre, Lagunita Salada, Gan Gan, and other areas. This program resulted in the identification of various anomalies, including the Flamingo Prospect and Sacanana, which is today known as Navidad.

12.2 EXPLORATION BY IMA

12.2.1 Geological Mapping and topographical Surveys

IMA commenced the initial detailed outcrop mapping of the Navidad Project along the Navidad Trend in 2003 at both 1:500 and 1:5,000 map scales. During 2004 this mapping was expanded to cover a wider portion of the mineral tenement at 1:5,000 and 1:10,000 map scales.

In 2003 IMA produced a 2 m contour map over the central portion of the Navidad Project using a differential GPS. The coverage of this topography is 2.5 km by 4.5 km. Outside this core zone, 10 m contour lines were produced from satellite radar data. In 2004 IMA commissioned high resolution air photo coverage of the Navidad Project area. These photos were used to produce an orthophoto of the Project area and to create 2 m contour lines covering an area of 14.4 km by 5.5 km.

12.2.2 Geophysical Exploration

In 2003 IMA contracted Proingeo S.A. to conduct a limited ground gravimetric survey over Galena Hill, Connector Zone and the southeast part of Navidad Hill. The survey consisted of ten lines of roughly 2 km each at 200 m line spacing.

In 2005 IMA commissioned Quantec Geoscience Argentina S.A. (Quantec) to conduct pole-dipole and gradient array IP and ground magnetometer surveys over the Navidad Trend. These

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

surveys covered roughly an area of 6.9 km by 4.6 km. A large open spaced survey of IP covered strike extensions of the main trend for a total coverage of 14.4 km by 5.5 km. The data from these surveys was reprocessed in 2007 by Aquiline. The results of these surveys were variable, probably in great part due to the distinct physical characteristics of the various deposits and their varying degree of oxidation.

12.2.3 Geochemical Exploration

Commencing in 2002 and continuing through 2006, IMA collected soil, rock chip and stream silt samples over the Navidad Project. A total of 1,852 rock, 6,411 soil and 63 stream sediment geochemical samples are listed in the IMA database spatially related to the Project area. This work led to the identification of nearly all mineralised bedrock exposures known on the Property. The best example of soil geochemistry leading to the identification of a mineralised zone is that of Loma de La Plata. Collectively the anomalous rock chip samples clearly delineate the Navidad, Esperanza and Argenta trends, as does the soil geochemistry.

12.2.4 Diamond Drilling

A list of the drillholes drilled by Boart Longyear for IMA between November 2003 and July 2006 is shown in Table 12-1.

Table 12-1: Diamond Drillholes Completed by IMA from 2003 to 2006

Deposit	Number of drillholes	Metres drilled
Calcite NW	45	7,788
Calcite Hill	71	13,949
Navidad Hill	96	11,289
Connector Zone	37	4,712
Galena Hill	66	12,862
Barite Hill	8	1,315
Loma de La Plata	12	1,615
Exploration drillholes elsewhere on the Property	32	7,391
Total	367	60,921

12.2.5 Other Work

IMA also collected metallurgical samples during IMA s second field season running from November 2003 to March 2004. The results of this test work are summarized in Section 18.1 of this Report.

In 2005, IMA contracted Peter Lewis, a consulting structural geologist, to study the Project area including the Esperanza and Navidad trends. He concluded the Esperanza Fault formed part of the larger Gastre Fault system and was active at the time of mineralisation. He postulated that there could be a splay to this fault that was as yet unrecognized coincident with the Navidad Trend and that mineralisation was related to dilatational zones formed by dextral strike-slip

Table of Contents

movement on these northwest-southeast structures. He further concluded that post mineral tectonic activity resulted in deformation of the host rock units. This manifested in the formation of folds and southwest dipping thrust faulting.

12.2.6 Mineral Resource Estimates

In February 2006 and updated in May 2006, Snowden prepared Mineral Resource estimates for IMA on the Navidad Project deposits including Calcite NW, Calcite Hill, Navidad Hill, Connector Zone, and Galena Hill (Snowden, 2006a). In September 2006, Snowden prepared an updated Mineral Resource estimate and drill spacing study at Galena Hill for IMA (Snowden, 2006b).

12.3 EXPLORATION BY AQUILINE FROM OCTOBER 2006 TO JUNE 2009

Aquiline focused exploration efforts on identifying new exploration targets with diamond drilling, with delineation and infill drilling at the Loma de La Plata deposit, and with minor infill drilling of the other previously identified mineralised zones. Exploration for additional deposits through the use of fence drilling across prospective covered areas was considered feasible, since as is so far known, the occurrence of the latite unit hosting mineralisation is generally of relatively large areal extent that can be measured in units of tens of hectares. Mineralisation is frequently stratiform with relatively shallow dips, and most of the known deposits occur as large roughly tabular bodies.

Geophysical and geochemical methods have proved useful in mapping the distribution of the latite unit and potassic-style alteration, in detecting Galena Hill style sulphide-rich mineralisation, and in interpreting the Project-scale structural regime. The characteristics of the host rock and wall rock units are favourable for diamond drilling, and extensive areas can be rapidly explored by drilling at relatively low cost. As was demonstrated during the 2007 diamond drilling program, additional Mineral Resources could be delineated by extension drilling laterally away from known deposit areas.

12.3.1 Geophysical Exploration

Gravity Surveys

Between March and May 2007, Aquiline contracted/commissioned Quantec to conduct a gravimetric survey over an area measuring approximately 10 km by 8.5 km in the area referred to as the core Navidad Project area. Measurements were recorded at 150 m stations along 82 parallel lines trending 030º located at 200 m intervals. A total of 2,998 grid stations were read in the survey area. Station locations were surveyed with a differential global positioning system (DGPS), ensuring accuracies of ±5 cm. The objective of the survey was to map out density variations that potentially coincide with mineralisation and to provide data for structural interpretation.

Raw data for this survey has been interpreted by geophysical consultant Robert Ellis who has produced a residual Bouguer gravity model over the tested area. In this model, the 2003 Proingeo

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

data demonstrates a gravity high in the area of Galena Hill. Other gravity anomalies within the survey area remain to be tested by drilling.

Ground TEM Survey

Between January and February 2007, Aquiline contracted Quantec to run a transient electromagnetic (TEM) survey on three test lines. The tests were performed to determine if a recognizable TEM response could be observed across areas of known mineralisation and in particular across massive sulphide mineralisation beneath Galena Hill. Each line was surveyed with transmitter 200 m by 200 m loops advanced at 50 m intervals, and then repeated with 100 m by 100 m loops advanced at 25 m intervals. The reading instrument was a Zonge GDP-16 receiver. Results were flat and no meaningful TEM response was detected.

Ground SP Survey

A self-potential (SP) test was carried out by Quantec during the same period as the TEM survey. The purpose of the SP test was to map naturally occurring voltage patterns produced by the oxidation of sulphides. Three 4,200 m test lines were selected to transverse known mineralised areas. Three averaged measurements were taken at 25 m intervals along the test lines. Results were considered to be too ambiguous to justify continuing with this method as a geophysical prospecting technique at Navidad.

Ground Radiometric Surveys

Ground radiometric testing was done by Quantec with an Exploranium Gamma Ray Spectrometer GR 256 during the same period as the TEM survey and across the same three lines used for the SP test. The purpose was to determine if alteration related to mineral occurrence, particularly the introduction of potassium in the form of adularia, gives a coherent radiometric signature. Thirty-second measurements were taken at 25 m intervals on the test lines. Results for potassium were considered to be sufficiently correlative with areas of known mineralisation to justify radiometric measurements in the fixed-wing geophysical survey conducted in 2008.

Fixed-Wing Magnetometer and Radiometric Surveys

In 2008 a 9,700 line-km fixed-wing geophysical survey collected magnetic and radiometric data over 1,935 km^2 of selected Aquiline controlled mineral tenements in Chubut province. The survey was flown using 200 m line spacing and 2 km tie-lines spacing. The survey consisted of a northern and southern block. The northern block covered 1,670 km^2 and was designed to include all of the Cañadón Asfalto Formation on strike with the Navidad Project. The southern survey block covered 265 km^2 including a basin containing Cañadón Asfalto Formation sediments. These surveys are helping build ongoing regional exploration activities.

High Resolution Ground Magnetometer Surveys

During the last quarter of 2008 a 2,153 line-km high definition ground magnetometer survey was conducted over the entire Navidad Project area. The survey covered a surface area of 10,750 ha. Five roving magnetometers on 50 m line spacing were used to collect readings at one second intervals. Line orientation of the main survey was 030°. Two smaller surveys using 300° line orientations were conducted over the Navidad Trend and Loma de La Plata. Combined, these surveys greatly aided in the definition of boundaries of magnetic rock units and identifying structures that juxtapose rocks of different magnetic susceptibilities.

Ground 200 m Dipole and CSAMT Surveys

During 2008 seven test lines for a total of 53 line-km of deep looking IP and CSAMT were conducted by Quantec over the Navidad Project area. The objective of these surveys was to provide information from depth for both the extension of mineralisation and to better understand the structural architecture of the geology.

12.3.2 Geochemical Exploration

A series of orientation geochemical surveys were conducted by Aquiline over known mineralised zones on the Navidad Project in early 2007. These included soil, stream silt and biogeochemical surveys. As a result new sampling protocols were established that markedly improved the geochemical response in both ore and path finder elements. The biogeochemical study provided distinct and complementary information to that of the soil geochemistry. This has led to the protocol of collecting twin biogeochemistry and soil geochemistry samples. The greater sensitivity of the new sampling protocols has allowed the initial phase of sampling to utilize a wider spacing on grids while maintaining good line-to-line correlation.

From the end of 2007 and into 2008 a large combined soil and biogeochemical survey was conducted by Aquiline over the Navidad Project area and the projected on-strike extensions of the zone under Quaternary cover. A total of 3,316 soil and 4,297 biogeochemical samples were collected. Results of the surveys have identified new zones of precious and path finder base metals that are being followed up by reconnaissance drill programs. The geochemical data is also being incorporated into the environmental base line studies.

12.3.3 Geological Mapping

Beginning at the end of 2007 Aquiline geologists have conducted a program of remapping and expanding the coverage of geologic mapping of the Navidad district.

Currently 240 km2 are mapped covering the entire Navidad Project and surrounding area. The main objective of this work is to improve the geological understanding of the geology and controls to mineralisation. This is being done by refining the Project stratigraphy and establishing the location, relative sense of movement and timing of the complex structural elements. This work has led to an updated deposit model as discussed in detail under Section 8 of this report.

12.3.4 Mineral Resource Estimates

In November 2007, Snowden prepared an updated Mineral Resource estimate for Aquiline for the Barite Hill, Galena Hill, Connector Zone, Navidad Hill, Calcite Hill, Calcite NW, and Loma de La Plata deposits. These resource estimates were updated with additional drillhole

Table of Contents

information and new estimates were prepared for Valle Esperanza in April 2009 (Snowden, 2009). The April 2009 estimates are the current resource estimates for the property.

12.4 EXPLORATION BY PAS IN 2010

PAS continued exploration drilling on several open or new targets along the mineralised trends during 2010. Also, infill drilling was done for Loma de La Plata, Valle Esperanza, Barite Hill, Calcite Hill, Calcite NW, the Connector Zone, and Galena Hill during 2010. These infill drillholes also provided new samples for metallurgical analysis. In addition, condemnation and geotechnical drilling was conducted in the various planned facility areas during 2010. Updates to the resource estimates based on the 2010 drilling results and updated geological interpretations are currently underway. A summary of the 2010 drillhole programme by hole type is shown in Table 12-2. The summary of drilling performed on the Navidad Project is shown in Table 12-3. The 2010 drillholes are shown in Figure 12-1.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Table 12-2: Diamond Drillholes Completed by Pan American Silver in 2010

	Infill / Extension		Metallurgy		Grinding		Geotechnical		Exploration / Condemnation		Hydrology		Total	
Deposit	**Metres**	**Holes**	**Metres**	**Holes**	**Metres**	**Holes**	**Metres**	**Holes**	**Metres**	**Holes**	**Metres**	**Holes**	**Metres**	**Holes**
Loma de La Plata	7,313.00	54			531.00	5	239.00	1	2,405.00	7			10,488.00	67
Barite Hill	4,821.70	26			180.60	1	769.50	3					5,771.80	30
Galena Hill	10,324.85	75	1,530.65	11	679.20	4	300.00	2			151.50	1	12,986.20	93
Connector Zone	3,009.30	35	802.60	11	523.10	4	231.50	2					4,566.50	52
Navidad Hill	7,147.60	73	1,322.00	16	468.50	7	100.50	1	537.00	3	112.00	1	9,687.60	101
Calcite Hill	12,670.70	95	1,187.60	7	326.90	2	638.50	3	91.00	1			14,914.70	108
Calcite NW	1,247.00	9	936.00	12	340.50	4							2,523.50	25
Valle Esperanza	11,214.20	53					1,696.50	6	1,994.20	4	181.00	1	15,085.90	64
Valle Yanquetru							364.60	6	1,847.80	5			2,212.40	11
Sector Z									753.00	3			753.00	3
Zona 9									4,045.40	13			4,045.40	13
Marcasite Hill									4,429.50	11			4,429.50	11
Valle de La Plata									655.00	2			655.00	2
Alto Valle Esperanza							253.00	6	3,991.00	12			4,244.00	18
Total	**57,748.35**	**420**	**5,778.85**	**57**	**3,049.80**	**27**	**4,593.10**	**30**	**20,748.90**	**61**	**444.50**	**3**	**92,363.50**	**598**

Table 12-3: Summary of Drilling Performed on the Navidad Project

Drilling	**Metres Drilled**	**Drillholes**
Drilling Prior to 2010	188,881	950
Drilling Performed in 2010	92,364	598
Total	**281,245**	**1,548**

M3-PN100019
14 January 2011

Figure 12-1: Plan of Drillholes Completed at the Navidad Project in 2010

M3-PN100019

14 January 2011

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

13 DRILLING

Information in this section has been sourced from Snowden (2010). This section has not been updated for the 2010 PAS drilling program as the analysis is not complete.

13.1 DIAMOND DRILLING METHODS

All diamond drilling on the Navidad Project undertaken by all operators since the first drillhole in November 2003 has been completed by Boart Longyear Connors Argentina S.A. of Mendoza, Argentina (subsequently taken over by Boart Longyear in 2007). Nearly all holes have been drilled at HQ3 diameter (61 mm) with 3 m long rods, except for rare instances where the drillhole was collared at HQ size diameter and subsequently reduced to NQ diameter down the drillhole and where larger diameter PQ holes were drilled in 2010 to collect metallurgical samples. Also, a number of geotechnical holes were drilled in the open cut areas to obtain data necessary for the design of the open cut walls. Drilling conditions were typically good with drilling rates of approximately 120 m per day per machine.

13.2 DRILLHOLE COLLAR SURVEYS

Staff geologists set up drill collars in the field by locating the planned collar coordinates with a GPS unit or occasionally by tape measure from a nearby drillhole. The geologist aligns the azimuth of the rig by setting out a row of stakes oriented on the desired azimuth, frequently 030°, with a Brunton compass. The edge of the drill rig, such as the Nodwell track or the outer wall of the mounted housing unit, is aligned with the stakes. Drillhole inclination is set by placing the inclinometer of the Brunton compass directly on the drill rod.

After drilling the hole, collar coordinates are periodically surveyed by a professional contract surveyor using total station methods or more recently with a differential GPS. The survey point of reference is a federal government geocentric reference frame (POSGAR) point. Coordinates are expressed in the Gauss Kruger Zone II system, relative to the Campo Inchauspe datum. Drillhole azimuths at the Navidad Project have historically used a magnetic declination correction of 08°E, but beginning in 2009 drillholes from number NV-949 onwards will use an updated correction of 06.5°E.

13.3 DOWNHOLE SURVEYS

A number of different instruments have been employed at the Project to define the drillhole trace down the hole (Table 13-1). Aquiline previously used a system of taking downhole surveys either halfway downhole, or every third of the hole, or every quarter of the hole, depending on hole length. In October 2008, Aquiline implemented a system of standardising downhole surveys every 50 m, and beginning in 2009, in deposits where Mineral Resources have previously been estimated, downhole readings are now taken at 30 m intervals. Currently no downhole survey of the bearing and dip is taken at the collar, but the first measurement is now taken not lower than 10 m below the drill collar. No surveys are taken of vertical holes.

Table of Contents

The average distance between downhole surveys is 84 m, with a maximum distance of 232 m. Beginning with drillhole 616, survey measurements have averaged 52 m between readings. No serious drillhole deviation problems have been encountered in the drilling to date. Azimuth swing between downhole surveys ranges between 0° and 10°, with lifts of between 0° and 3°.

Table 13-1: Downhole Survey Methods at the Navidad Project

Date	Drillhole numbers	Method
November 2003 to June 2004	1 to 72	Tropari
July 2004 to April 2007	73 to 445	Sperry Sun
April 2007 to present	446 onwards	Reflex EZ-shot

13.4 DRILL INTERCEPTS

The following drill intercepts are given for prospects at the Navidad Project which were not included as part of the April 2009 Mineral Resource estimates. Drillholes are planned to intersect mineralisation as close to perpendicular as possible, but they will not always be exact. Therefore downhole intersection thicknesses described below will have a slightly shorter true thickness.

13.4.1 Southern Argenta Trend (Yanquetru)

Several holes were drilled in the Yanquetru area to test at depth the Pb mineralisation observed in soil anomalies. Drillhole NV07-409 intersected a zone within the sediments from 106.3 m to 166.3 m that averaged 0.5% Zn over 57 m. From 187.3 m to 193.3 m, the drillhole intercepted 6 m averaging 21 g/t Ag and 0.2% Pb in the rhythmically bedded turbidite-like greywacke below a 7 m thick horizon of latite. This mineralisation is interpreted to represent a lower grade, relatively zinc-rich distal zone of mineralisation lateral to the higher grade core deposits.

13.4.2 Marcasite Hill

Marcasite Hill is located at the southeast end of the Navidad Trend as it is presently known, approximately 1 km to the southeast of Barite Hill. It initially attracted attention due to a sharp IP response, and outcrop examination revealed veinlets and breccia with calcite, galena, and marcasite mineralisation, hosted in the upper latite unit. To date Marcasite Hill has been tested by 14 drill holes, NV07-435 through NV07-600, which are located in an irregular area of approximately 850 m by 450 m though the majority of the holes have been drilled in an area measuring 300 m by 200 m. Beneath the latite, sedimentary units are encountered comprised principally of mudstone and lesser sandstones and sandy conglomerates that are similarly mineralised by calcite, galena, and marcasite/pyrite occurring in breccia and veinlets. The most noteworthy hole drilled in this sequence is NV07-596 with an intercept of 104 m at 0.42% Pb, 0.55% Zn, and low grade anomalies in Ag to 12 g/t with an average of 3 g/t Ag.

13.4.3 Bajo del Plomo and Filo del Plomo

To date 20 holes have been drilled in the Bajo del Plomo and Filo del Plomo prospects along the Argenta Trend for a strike length of 1,400 m and down dip from the crest for approximately 400 m. It is believed that the total down-dip extension could be on the order of 600 m or more based

Table of Contents

on the continuation of this mineralisation towards Bajo del Plomo Inferior. The mineralisation is hosted in the upper latite, with an attitude of azimuth 315º dipping 20° northeast, and along the contact with the overlying sedimentary units where these are preserved. The mineralisation in the latite unit is found as irregular breccia fillings or in veinlets and typically consists of calcite, galena, and lesser barite. In general analytical results report high lead values with low silver. The most significant intercepts are found in hole NV07-486 for 13.15 m at 97 g/t Ag and 7.10% Pb, hole NV07-494 for 12.5 m at 72 g/t Ag and 1.30% Pb, and in hole NV07- 644 for 13.4 m at 40 g/t Ag and 2.53% Pb.

13.4.4 Bajo del Plomo Inferior

In this area 26 holes were completed to evaluate the area proposed in the 2008 PA for Loma de La Plata as a site for a future tailings dam, hence this was in large measure a condemnation drilling program. The holes were typically drilled to a depth of 300 m. They frequently terminated in mudstone, but several holes managed to intercept the upper latite unit which in several cases reported mineralisation of the style encountered at Filo del Plomo.

Condemnation drilling was also performed in the future plant site and non-economic material storage sites, with some mineralisation being intersected in some zones, but nothing that indicated any significant zones of economic material. Some further condemnation drilling may be warranted in some of these areas to complete the condemnation program.

13.4.5 Sector Z and Valle La Plata

Sector Z is a hilly and structurally complex area at the northwest extreme of the Argenta Trend; to date it has been tested with 11 drill holes in two sub-areas. At Valle La Plata, between the Loma de La Plata deposit and Sector Z, seven holes have been drilled with generally wide spacing of 200 m to 300 m between collars. To date neither zone has demonstrated continuous significant mineralisation though several individual intercepts have been noteworthy. The most significant intercepts in Sector Z include hole NV08- 670 for 14.70 m at 73 g/t Ag and 0.34% Pb, hole NV08-742 for 10.97 m at 47 g/t Ag and 0.24% Pb.

The majority of the holes drilled in the Valle La Plata zone have cut short intervals with anomalous to moderately significant Ag mineralisation in the upper latite unit. The most noteworthy intercepts include hole NV08-751 for 6.82 m at 105 g/t Ag and 0% Pb and hole NV08-760 for 4.0 m at 80 g/t Ag and 0% Pb.

14 SAMPLING METHOD AND APPROACH

The sampling method at the Navidad Project has followed similar protocols for the life of the Project. This section has been sourced from Snowden (2009) and updated for the PAS 2010 drilling program.

Table of Contents

14.1 CORE LOGGING

PAS has followed the existing sampling methodology for diamond drill core sampling at Navidad since acquiring the Project, with a few refinements. Approximately five staff geologists are responsible for logging drill core, which takes place at the core logging facilities in Gastre.

Drill core is stored and well-maintained in wooden core boxes with a nominal capacity of approximately 3 m. The drillhole number, box number, and downhole interval are marked in felt tip marker on the side of the box. Wooden downhole core depth markers are placed in the core box by the driller indicating the drillhole number and end of run depth.

Staff geologists log the drill core in detail using standardized logging sheets on handheld computers for: lithology; alteration type, style, and intensity; mineralisation type, style, and intensity; and structural information. The entire drillhole is photographed prior to cutting. Geotechnical information including drill core recovery, RQD, weathering, texture, fracture frequency, type, roughness, infill, shape and angle, hardness, and other notes are recorded on a drill-run basis.

14.2 SAMPLING

The drill core is transported from the drill rig to the Gastre facilities by Minera Argenta employees in core boxes. Each sample interval is indicated by marking the sample interval on the core box with a yellow paint marker and by stapling a waterproof sample number tag on the core box. Samples are taken continuously downhole and supervised by a Minera Argenta (MASA) geologist.

After describing the geology, the geologist is in charge of defining what was sampled and the length of every core sample. In general, the entire drill core is cut in half with a diamond-bladed core saw, using recycled water decanted from a settling tank. Then, one half is sent for geochemical analysis and the other half remains in the core boxes for future reference.

Samples are collected by staff, placed into a previously numbered plastic bag along with a two-ticket sample number tag indicating the sample depth interval, with the sample number corresponding to the tag stapled to the core box. A third ticket is placed in the core box. A fourth ticket remains in the sample ticket book (heel) with a record of the hole number, date, geologist, metres from and metres up to of every sample. Every ticket has printed on it the sample number and the MASA logo.

The plastic sample bag and tag are then sealed with two warranty seal ties embossed with the sample number. The first is an ordinary warranty seal to seal the bag and the second is a warranty seal embossed with the seal number and MASA s name.

The ties are placed across the neck of the bag and are numbered in accordance with the number of samples in such a way that it is possible to ensure that the bag was not opened and that the sample was not altered in the distance between the core shed and the laboratory. The laboratory controls the numbered bindings and how they correspond to the samples. They will report if the

Table of Contents

warranty seal is broken, or if a sample is lacking the warranty seal, etc. so that the chain of custody can be assured.

Several sample bags are then placed into larger poly-woven plastic bags and weighed. The samples are recorded in duplicate. One record is sent to the laboratory and the copy is kept in Gastre s offices for future reference and to support chain of custody verification at any time.

Alex Stewart processes the samples in a preparation room installed at the Project site to obtain 250 g envelopes of pulverized sample. As soon as the samples are processed, they are sent to Alex Stewart in Mendoza for geochemical analysis. If necessary and if instructed by Minera Argenta, Alex Stewart would send core samples without processing to Mendoza.

Alex Stewart is responsible for the custody of the samples from after receiving them from PAS.

The remaining drill core is stored under cover at the PAS core storage facilities in Gastre and Gan Gan. Since March 2010, the remaining drill core is stored at the PAS core storage facilities in La Rosada.

14.3 DENSITY DETERMINATIONS

Density determinations are made on a box by box basis for the entire drillhole. Technicians record the downhole interval marked on the box and the length of the sample contained within the box to obtain the recovery percentage. The volume of the sample is calculated by multiplying the core diameter (6.1 cm) by the recovered core length. The density is then calculated by weighing the core box, subtracting the weight of the wooden core box (previously set at 3,580 g, but now set at the average weight of each new shipment of boxes), and dividing by the volume of the recovered sample.

Boxes with more than 15% core loss are excluded from the database. There are a number of potential sources of error when determining density values using this method, including the accuracy of the scale in use, the accuracy of the drill core recovery estimation, using a set weight for a wooden core box, and the crossing of lithological and/or mineralisation boundaries within the core box. Snowden (2007, 2009 and 2010) made recommendations for more reliable methods for determining density values.

Since October 2008 drillholes numbered NV08-876 and above have had their density determined using the water displacement method, in addition to the box method. Older drillholes under examination have also had density determinations made using the water displacement method. An approximately 20 cm long piece of competent core is selected, quartered with a saw, washed, and dried on a hot plate for between five and ten minutes. The weight of the dry sample is recorded, and the sample is suspended on a length of string and completely submerged into a 1,000 ml capacity cylinder containing 600 ml of water. The displaced water volume is recorded, and the density is calculated by dividing the volume of the displaced water by the weight of the dry sample.

Since September 2010, drillholes numbered NV10-1499 and above have had their density determined using the weight differential method.

The sample protocol is defined as a maximum of one sample every 15 m in unmineralised rock and one sample every 5 m in the mineralised zones. These intervals can be modified based on rock quality, lithology and the width of the intersection.

An approximately 15-20 cm long piece of core is selected (representative of the entire sample), quartered with a saw, washed, and dried in an electrical oven for between five and ten minutes and then the sample is sealed with plastic cling film. The weight of the dry sample is recorded, and the sample is suspended on a length of string and completely submerged into a 1,000 ml capacity cylinder containing 600 ml of water. The weight of the sample suspended is recorded, and the density is calculated by dividing the weight of the dry sample by the volume calculated by the difference between weight dry and weight of the sample suspended divided by water density.

Density = mass (weight in the air) / volume

Volume = (weight dry weight of the simple suspended) / water density

14.4 QP STATEMENT ON SAMPLING METHODS

PAS are of the opinion that drillhole logging and sampling procedures at the Project are reliable and that samples are representative. There is no indication that the sampling protocol could result in sample grade biases. Improvements to sampling methods could be made by determining the density of drill core prior to splitting with the diamond saw to eliminate precision errors associated with small sample weights. Further, to prevent the risk of cross-contamination, the practice of using recycled water during core cutting should be discontinued, and cut samples should be rinsed prior to placing in the sample bag.

15 SAMPLE PREPARATION, ANALYSIS AND SECURITY

Information in this section has been sourced from Snowden (2010).

15.1 SAMPLE PREPARATION, ANALYSES, AND SECURITY

15.1.1 Laboratory

All diamond drill core samples at the Navidad Project have been analyzed by Alex Stewart in Mendoza. Alex Stewart is ISO 9001:2000 accredited for the preparation and chemical analysis of mining exploration samples. On two separate occasions in 2003 and 2007, Smee and Associates Consulting Ltd. (Smee) conducted a laboratory inspection and considered the laboratory to conform to industry best practice methods for analysis (Smee, 2003 and Smee, 2007).

15.1.2 Sample Preparation

Upon receipt of the sample submission, each sample bag is weighed and the entire sample is removed from the bag and placed in a drying pan. Samples are dried at 70°C for up to 40 hours.

Table of Contents

After drying, the entire sample is removed from the drying pan and jaw crushed to #10 mesh to reduce its fragment size so that 95% of the sample is less than 2 mm in size (which is monitored by subsequent screen tests). The entire sample is passed through a riffle splitter several times before a final split of 1.2 kg is collected.

At this point a 1.2 kg duplicate of the coarse reject is collected randomly from each analytical batch. This coarse reject duplicate is subsequently re-numbered as the original sample number with the suffix DC and then treated as a normal sample. The residual coarse reject is stored.

The sample is then pulverized ensuring that at least 80% of the material is less than 75 µm in size (80% passing through #200 mesh, also monitored by screen tests). A representative 250 g split of the sample pulp is taken as the sample and pulp duplicates are routinely collected by the laboratory and assayed as part of their analytical quality control measures. The remaining pulp reject (approximately 950 g) is stored for future reference.

The crusher and pulverizer are cleaned with barren quartz between each sample.

Results of this have shown no major issues.

15.1.3 QP Statement of Navidad Quality Control Samples

Snowden (2010) and PAS consider the results of the standard, blank, and field duplicate samples submitted for the Navidad Project and used in the April 2009 Mineral Resource estimates to be of industry standard and do not indicate any significant source of bias, cross contamination, or inaccuracy.

16 DATA VERIFICATION

Information in this section has been updated from Snowden (Snowden, 2010).

16.1 FIELD AND LABORATORY QUALITY CONTROL DATA REVIEWS

In June 2003, Smee and Associates Consulting Ltd. (Smee) was engaged to audit the laboratories of Alex Stewart in Mendoza and ALS Chemex laboratories of Coquimbo and Santiago, Chile, and to make recommendations as to the suitability of the methods used by these laboratories for the high grade samples expected to be submitted from the Navidad Project (Smee, 2003). The work involved a formal audit of the Alex Stewart laboratory in Mendoza, a visit to the ALS Chemex laboratory in Santiago, and a formal audit of the ALS Chemex laboratory at Coquimbo. Smee concluded that both laboratories were capable of meeting the required standards, but there would be some operational and turn around differences between the two options.

In April 2005, Smee conducted a review of the 2004 Navidad QA/QC data and an audit of the procedures used at the Alex Stewart laboratory in Mendoza, Argentina (Smee, 2005a). No site visit was undertaken. Smee considered the laboratory facilities in Mendoza to comply with industry best practice methods for analysis, and that the QA/QC Project data as at April 2005 was accurate, precise, free from contamination, and suitable for inclusion in Mineral Resource estimates. Smee recommended improvements in: managing QA/QC data; capturing and analyzing the Alex Stewart internal QA/QC data; initiating a plan of action for identifying QA/QC failures and the corrective action required; improvements to diamond drill core cutting (orienting core and marking a cutting line); and taking half core samples for duplicates rather than quarter core samples.

In December 2005, Smee conducted a review of the 2004 and 2005 QC data and made recommendations as to the suitability of the analytical data to be included in Mineral Resources estimations (Smee, 2005b). No site visit was undertaken. Smee considered the laboratory facilities in Mendoza were performing the analyses using industry accepted procedures and quality control protocols, and that the QA/QC Project data as at December 2005 was accurate, precise, free from contamination, and suitable for use in resource estimations. Smee recommended the purchase of a commercial software database to assist the capture of the analytical and quality control data.

In February 2008, Smee visited the Project and conducted a review of the Navidad QA/QC data and procedures (Smee, 2008). Smee recommended improvements for the data compilation and in managing the QA/QC data: to build a table of failures to document the course of action taken to correct or accept the failures; to document and describe the nature of the inserted blank and to determine the background values of the blank samples in order to establish a more precise warning limit. Smee calculated the sampling precision for some of the Project deposits that showed that most areas have an overall sampling precision of nearly ±20%, which is expected for this style of mineralisation. Smee indicated that Calcite Hill mineralisation has a precision of ±30% which is considered to be high for this style of mineralisation and recommended investigating the source of this variation. It was recommended that the corresponding lithology symbol be attached to the duplicate samples to determine which lithology has the poorest precision. These recommendations were subsequently implemented by Aquiline.

16.2 QP SITE VISITS

Ms. De Mark conducted a site inspection of the Navidad Property from 10 September to 13 September 2007 and from 28 April to 30 April 2009. Ms. De Mark was involved in discussions with key Aquiline personnel and undertook the following activities:

- Reviewed geological plans and cross sections.
- Reviewed selected diamond drillhole logs and diamond drill core intersections.
- Reviewed diamond drill core logging, cutting, and sampling procedures.
- Selected mineralised intersections for independent analyses.

- Confirmed the coordinates of selected diamond drillhole collars by GPS.

- Inspected Aquiline s two operating diamond drilling rigs during the 2007 site visit. No diamond drill rigs were in operation at the time of Ms. De Mark s 2009 visit.

Table of Contents

Mr. Steinmann visited the Navidad Project site in January 13 15, April 21 23, May 3 -4, and October 21 23, all in 2010. During these four visits, Mr. Steinmann undertook the following activities:

- Reviewed mining claim holdings.
- Reviewed geological plans and cross sections.
- Reviewed diamond drill core logging, cutting, and sampling procedures.
- Reviewed the on-site sample preparation laboratory and laboratory procedures.

16.2.1 QP Review and Sampling of Mineralized Intersections

Ms. De Mark examined mineralised intersections in 49 drillholes from the Barite Hill, Galena Hill, Connector Zone, Navidad Hill, Calcite Hill, Calcite NW, Loma de La Plata and Valle Esperanza deposits in 2007 and 2009. A number of the mineralised intersections selected by Ms. De Mark for review in 2009 were no longer available, as the drill core had been used for metallurgical testing. No discrepancies were noted.

In 2007, Ms. De Mark confirmed the presence of diamond drill core for the Project, which is stored under cover at the Aquiline drill core storage facilities in Gastre. Further, she collected 30 quarter core duplicate samples from 25 drillholes, and confirmed the presence of visible Ag mineralisation in drillhole NV07-442 (which returned assays of 22,818 g/t Ag from 223.55 m to 224.05 m downhole).

Ms. De Mark is of the opinion that the results of the independent samples selected in 2007 and 2009 are acceptable for duplicate samples of the style of mineralisation concerned.

16.2.2 QP Review of Drillhole Collar Locations

Ms. De Mark visited 30 drillhole collars in 2007 and 2009, and measured the drillhole collar coordinates with a handheld GPS unit. No discrepancies were noted in the coordinates beyond the accuracy of the hand held GPS.

16.2.3 QP Review of Original Assay Certificates

In 2007 and 2009, Ms. De Mark obtained original assay certificates for comparison against the database. Original assay certificates were emailed directly to Ms. De Mark from the Alex Stewart Mendoza laboratory. 89 certificates for 4,827 assays were reviewed and no discrepancies were noted.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

17 ADJACENT PROPERTIES

There are no relevant adjacent property issues that require description.

18 MINERAL PROCESSING AND METALLURGICAL TESTING

18.1 INTRODUCTION

Information disclosed in this section comprises testwork undertaken by PAS in 2010 and builds upon the information gained from testwork which has been conducted on the Navidad Project since 2005 and disclosed in previous Technical Reports (Snowden, 2010).

As most of the metallurgical testing has been done at G&T lab in Kamloops, British Columbia, Canada, PAS elected to continue testing at G&T (G&T 2010a to 2010g). Metallurgical flotation testwork has recently been completed for Calcite Hill, Navidad Hill, Connector Zone, Galena Hill, Barite Hill, and Loma de Lla Plata. Testwork at Calcite NW and Valle Esperanza was completed in 2009 and disclosed in Snowden (2010), and has been considered for the summaries and conclusions presented in this Technical Report.

Bench scale testing was done during 2010 on six Barite Hill samples, 34 Galena Hill samples, five Calcite Hill, 28 Navidad Hill samples, 17 Connector Zone samples, and three Loma de La Plata samples (including a pilot run) generated from new metallurgical drill holes in all of the deposits. Settling, filtering and rheology testing were performed on the Loma de La Plata pilot plant residues. In addition, one master composite (nine core intervals) from the high pyrite zone in the Galena Hill cut was tested and concentrate and tailings residues recovered and sent for geochemical characterization.

The samples tested both as deposit composites and individual variability samples and are considered to fairly represent the deposits. Details of the individual samples used to make up composites are described in the individual test reports. Drill hole collar locations for metallurgical test samples are shown in Figure 18-1 to Figure 18-8.

Mineralogical studies were undertaken by Amtel (Amtel, 2010) on three ore samples from Loma de La Plata, Navidad Hill, and Galena Hill.

Grinding testwork was completed by SGS (SGS, 2010) on seven composites for a full suite of comminution tests as well as on 26 individual samples for some selected tests.

Variability testwork was completed at Calcite Hill, Navidad Hill, Connector Zone, Galena Hill, Barite Hill, and Loma de La Plata by G&T (G&T 2010a to 2010g).

Testwork completed to date has confirmed that the material tested responds well to flotation with acceptable recoveries and concentrate grades. A simple crushing, grinding and single product flotation concentrator is planned. The plant is being designed to handle two basic ore types: copper-silver and lead-silver. The ore will be campaigned individually through the plant.

Table of Contents

Figure 18-1: Calcite Hill Metallurgical Test Sample Locations

Table of Contents

Figure 18-2: Navidad Hill Metallurgical Test Sample Locations

Figure 18-3: Barite Hill Metallurgical Test Sample Locations

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Figure 18-4: Galena Hill Metallurgical Test Sample Locations

Table of Contents

Figure 18-5: Connector Zone Metallurgical Test Sample Locations

Table of Contents

Figure 18-6: Calcite NW Metallurgical Test Sample Locations

Figure 18-7: Valle Esperanza Metallurgical Test Sample Locations

Table of Contents

Figure 18-8: Loma de La Plata Metallurgical Test Sample Locations

Table of Contents

18.2 MINERALOGY

Amtel (2010) undertook a study to determine the silver development in the Navidad ore types based on three ore composites from Loma de La Plata, Navidad Hill, and Galena Hill. Silver was found in the form of native silver, silver minerals, and solid solution silver in pyrite, galena, and chalcocite. This section contains Amtel s conclusions. The principal mineral is acanthite followed by native silver, silver sulphosalts and silver halites. The occurrence of silver was determined on a qualitative basis in three Navidad ore composite samples. Each of the three deposits have distinct silver mineralogies:

- Loma de La Plata (Deep)

The principal silver mineral is acanthite. Silver recovery by flotation is estimated at 72% compared to 83% by cyanide leaching. Silver extraction is limited by locking (15%) and refractoriness (2%).

- Navidad Hill

Silver minerals account for 73% of the silver assay. The principal silver mineral is acanthite (50% of the silver assay). Silver mineral inclusions liberate from composite particles at two grinds, 90 µ and 30 µ. Silver recovery by flotation is estimated at 45% primarily due to liberation. Silver extraction is limited to 60% by the significant amount of submicron silver (27%) and locking of coarser silver inclusions (13%).

- Galena Hill

The deportment of silver in this composite is very distinct in that no discrete silver minerals were observed. The sole form of silver in this sample is solid solution silver hosted primarily in pyrite.

The Loma de La Plata and Navidad Hill composite are more alike, with the difference between them being primarily the silver sulphide grind size, hence liberation and secondarily the silver mineral oxidation.

The Galena Hill (high pyrite) composite is distinct in that all the silver is submicroscopic, but contained almost exclusively in pyrite which liberates at a reasonable grind fineness (P_{80}=120 µ).

Based on the silver deportment data alone, it appears that the ores represented by the Loma de La Plata and Navidad Hill composites would be better suited for cyanide leaching. The ore represented by the high pyrite/high galena composite is better suited for bulk sulphide flotation at a relatively coarse grind followed by ultra-fine grinding intensive cyanidation. However, no cyanide leaching has been planned for the processing of ore at the Navidad Project.

Table of Contents

18.3 FLOTATION AND RECOVERY TESTWORK

In general, the recoveries vary by deposit and also within each deposit. Table 18-1 and Table 18-2) indicate the averages from the block model mined ore tonnes using the developed recovery matrix.

Table 18-1: Average Navidad Recoveries and Grades for Copper-Silver

Ag-Cu Ore	Ag	Cu	Pb
Mine Head Grades	163.5 g/t	0.066%	0.131%
Flotation Recovery	77.76%	51.93%	56.55%
Concentrate Grade	36,696 g/t	10.09%	21.85%

Table 18-2: Average Navidad Recoveries and Grades for Lead-Silver

Ag-Pb Ore	Ag	Cu	Pb
Mine Head Grade	150.454 g/t	0.036%	2.255%
Flotation Recovery	33.58%	32.60%	76.57%
Concentrate Grade	1,736 g/t	0.400%	59.43%

The flotation testwork completed at the Navidad Property has followed a typical development route. For each sample (or composite) a series of batch kinetic rougher tests and usually a few batch cleaner tests were completed. For the larger composites an additional locked cycle test was also completed. The batch kinetic tests examined the usual effects of grind size, and flotation chemistry. From the selected batch test grind and chemistry performance, a batch cleaning test was completed to yield a cleaner concentrate. Often the effect of rougher concentrate regrinding size was examined. The number of batch cleaning stages varied, usually limited by the available rougher concentrate mass. The final test in many series was the locked cycle test, using the process variables identified in the preceding batch rougher and cleaning testwork. Typically one locked cycle test was completed for each major composite.

Information from this ongoing and past testwork was used by M3 process engineers to develop process flowsheets, material balance, process design criteria and an equipment list.

Additional testing is planned for some of the deposits in the next phase of the Project. Tests to optimize the grind size, regrind size, number of cleaner stages, and reagent suite and consumption are planned. In addition, concentrate, settling, and filtration tests for the lead ore are planned. Tests for alternate treatment of concentrate are also being considered.

18.4 GRINDING TESTWORK

Grinding testwork was completed by SGS (SGS, 2010). Seven composites were tested for a full battery of comminution tests while 26 individual drill samples were selected from some tests. Table 18-3 shows the results of the SGS testwork.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Table 18-3: SGS Grinding Testwork Results

Indicator	Range of Values		Average Value
Abrasion Index	0.0021	0.3333	0.09719
Crushing Work Index	6.0	22.6	12.2
Rod Mill Work Index	11.5	20.3	15.2
Ball Mill Work Index	7.0	20.5	14.3
JK Factors			
A	46.30	72.7	54.8
b	0.40	3.21	1.23
A x b	29.1	150.2	64.4
ta	0.37	1.47	0.84
SMC Factors			
DWi	2.02	7.77	4.78
A	49.6	74.3	63.3
b	0.45	2.2	0.95
A x b	32.4	145.6	59.4
SG	2.17	2.67	2.42
ta	0.33	1.50	0.64

18.5 VARIABILITY TESTWORK AND RESULTS

Much of the testwork has been completed by deposit to demonstrate global metallurgical performance.

In a general sense there exist three styles of metallurgical performance:

1) Ores with low lead content that produce a high grade silver concentrate (an example is Loma de La Plata);

2) Ores with higher lead content that produce a lead concentrate with lower silver grades (an example is Calcite Hill); and

3) The unique high pyrite zone centered in Galena Hill that produces a lead concentrate, but with low silver recovery (silver remains contained in non-recovered pyrite).

A metallurgical program in 2010 conducted by G&T (G&T 2010a to 2010g) was specifically designed to assess metallurgical response variability of either single drill holes or limited composite samples. Laboratory test conditions were identical using the planned plant flowsheet (including grind size, flotation conditions, etc.). Samples by deposit (Calcite Hill, Navidad Hill, Connector Zone, Galena Hill, Barite Hill, and Loma de La Plata) and by ore type were tested and are considered to reasonably represent the deposits.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Standard open circuit rougher kinetic and batch cleaner flowsheets and test conditions were established (based on prior G&T testwork) for the variability test work. Results of the variability testing are as follows:

Table 18-4: Summary of 2010 Test Data

	Head Grade		% Recovery (open circuit cleaner)		Concentrate Grade	
Deposit	**g/t Ag**	**% Pb**	**% Ag**	**% Pb**	**g/t Ag**	**% Pb**
Loma Pilot Plant	351	0.18	80	59	46185	17.8
Barite Hill	20-225	0.12-2.0	30-70	50-80	100-20,000	15-80
Galena Hill low grade	20-60	1.0-2.0	10	80-85	100 300	70
Galena Hill Pyrite comp	204	5.95	25	80	570	59
Calcite Hill variability	100 332	0.13-5.0	80-95	35-88	30,000-60,000	10-75
Navidad Hill variability	10-6,000	0.1-14.0	15-83	0-85	1000-200,000	1-70
Galena Hill variability	56-1682	0.08-6.10	23-87	2-92	700-53,000	2-58
Connector Zone variability	11-806	0.06-1.47	12-87	1-77	500-69,000	0.5-58

18.5.1 Loma de La Plata Variability Testwork and Results

The G&T KM2592 bench scale and pilot plant testing was performed on three samples from the Loma de La Plata deposit. Samples tested were the Shallow, Deep, and Pilot Plant (PP) composite 1.

The main objective of the bench scale test program was to optimize the primary grind size and determine the benefit of including a gravity recovery step ahead of flotation in the flowsheet. In addition, a pilot plant was run to confirm design parameters on a larger scale with recirculation of tailings streams. Concentrate and tailing samples produced in the pilot run would be used to determine solids-liquid (filtration/thickening) for equipment sizing.

The bench scale flotation program consisted of open circuit rougher kinetic, batch open circuit cleaner, and locked cycle testing. Open circuit tests were used to establish primary grind size and to establish the cleaner circuit grade recovery curve. A single locked cycle test was carried out on the PP composite 1.

Silver recoveries to the cumulative rougher concentrate were 80 to 90% with 3 to 4 % mass pull. Silver recoveries were relatively insensitive to the grind sizes tested. Lead recovery for the shallow composite was 30% and 80% for the Deep composite. Copper and lead grades in the rougher concentrate were 1% for the shallow composite and 2-3% for the Deep composite. Silver concentrate grade from a single open circuit cleaner test on each composite was 50,000 g/t Ag, with 70% to 80% of the feed silver recovered. Tests evaluating gravity concentration ahead of open circuit flotation were inconclusive. Results from the bench scale tests were used to confirm parameters for the pilot plant run.

During the pilot plant run, on average, 85% of the feed silver was recovered into the flotation and gravity concentrates. Silver metallurgical performance in the pilot plant approached the metallurgical performance in the single locked cycle test. The average grade of silver in the pilot plant flotation concentrate was 47,000 g/t Ag.

Filtration tests on the concentrate indicated the potential for final concentrate moisture of about 10%. The transportable moisture limit was reported at 13.8%.

Solids-liquid separation tests on both the concentrate and tailings sample produced good underflow densities but the tailing required very high flocculant doses.

Minor element determinations were performed on the final bulk concentrates produced. Cadmium and cobalt were elevated in the final concentrate sample.

The metallurgical test work conducted on the samples from the Loma de La Plata cut confirmed that high silver recoveries can be achieved to a high grade concentrate that will be commercially valuable for its silver and copper content. The detailed results were used to develop algorithms that have been used to calculate the estimated metal production and hence the predicted value of the Loma de La Plata deposit.

18.5.2 Barite Hill and Galena Hill Variability Testwork and Results

The G&T KM2593 variability testwork was carried out on new geo-metallurgical composites that were made up from half-core composites from the Barite Hill and Galena Hill deposit. The composite selection process included calculated silver equivalents, modeled cut-off grade, and the need for multiple hole intervals. Typically each composite was from six drill holes. Six composites were created for Barite Hill, three from the upper lead zone and three from the lower silver-lead zone. Three composites were produced for Galena Hill testing from the low-pyrite zone of the deposit. The samples for this test program were selected on the basis of the silver to lead ratio. The purpose was to fill in metallurgical data along a broader range of silver to lead ratios in the feed, as the ratios were not previously tested.

To determine the primary grind size that provides the most efficient recovery of lead and silver into a bulk concentrate, kinetic rougher flotation tests were performed at three sizes (75, 100, and 150 µm). As the primary grind size was coarsened, recovery of both lead and silver dropped slightly for some samples. Other samples had little sensitivity to grind size.

In the open circuit variability tests lead recovery varied between 50% to 85% into the final concentrate. Lead grades varied between 15 to 80% Pb. Silver recovery varied between 10% to 70% into the final concentrate. Silver grades varied between 100 to greater than 20,000 g/t Ag. Silver recoveries and grades were uniformly low for the Galena Hill composites. Previous testing indicated that silver in the Galena Hill samples is locked with the pyrite and therefore difficult to recover. The 2010 test program confirmed this.

Table of Contents

A single preliminary open circuit test was conducted on a Barite Hill composite to assess the potential for a copper-lead separation from the bulk concentrate produced by flotation. The test was not successful.

Arsenic and antimony concentrations in the feed have the potential to result in high arsenic and antimony concentrations in the final bulk concentrate. Estimates for the arsenic and antimony grades in the concentrate have been made in order to estimate the smelter charges that will apply to process the concentrate. Zinc concentrations in the Barite Hill samples ranged from 0.05 to 0.39% Zn and have the potential to dilute the lead concentrate depending on flotation conditions. Approximately 30% of the feed lead in two of the Barite Hill samples was reported as lead oxide which may impact lead flotation recovery.

Two composites were generated from drill sample rejects (from 2008 drilling) for the general area Bajo de la Plomo-Filo de Plomo-Tailings Dam . These composites were assayed but not tested metallurgically.

The metallurgical test work confirmed that concentrates can be produced from the Barite Hill deposit and the low-pyrite portion of the Galena Hill deposit that will be commercially valuable for their silver and copper or lead and silver contents. The detailed results were used to develop algorithms that have been used to calculate the estimated metal production and hence the predicted value of the Barite Hill deposit and the low-pyrite portion of the Galena Hill deposit.

18.5.3 Galena Hill High Pyrite Zone Variability Testwork and Results

The G&T KM2617 variability testwork was carried out on samples extracted from a high pyrite zone at Galena Hill. The main objective of the test program was to produce concentrate and tailing samples for environmental testing. Nine core intervals were used to create one master composite. Lead assays in the nine intervals ranged from 1.5 to 17.5% Pb, silver grades ranged from 50 to 900 g/t Ag, copper ranged from 0.01 to 0.08% Cu and zinc ranged from 0.3 to 1.5% Zn. Arsenic and antimony concentrations in the composite have the potential to produce high arsenic and antimony concentrations in the final bulk concentrate, depending on product and upgrade ratios for each. Approximately 15% of the feed lead in the composite was reported as lead oxide.

Approximately 80% of the feed lead was recovered into the lead concentrate assaying 59% Pb. The lead concentrate also assayed 7% Zn although no provision was made to recover or depress zinc in this test program. Silver recovery to the lead concentrate was about 25% with a silver grade of 570 g/t Ag. Lead rougher tail was floated to make a pyrite concentrate. Silver recovery to the pyrite concentrate was 60% with a grade of 1,200 g/t Ag.

18.5.4 Galena Hill Variability Testwork and Results

The G&T KM2662 variability testwork was carried out on 31 discrete variability samples made up from composites from outside the main zone of the Galena Hill deposit. Lead, copper, and zinc were present in each sample. Lead content in the feed ore ranged from 0.08 to 6.1% Pb. Copper content in the feed ore ranged from 0.01 to 0.15% Cu. Zinc content in the feed ore

Table of Contents

ranged from 0.05 to 0.6% Zn. The main silver minerals observed were native silver and acanthite/argentite. Lead oxide (cerussite) was observed in some of the samples. The samples had a variable but significant degree of oxidation which appeared to control the metallurgical performance.

In general, lead was poorly recovered to the final bulk concentrate in open circuit cleaner tests averaging only 21%. Lead grades in the final concentrate averaged 19% Pb. Silver recovery to the final bulk concentrate was variable and silver grade averaged 25,000 g/t Ag. On average 34% of the feed copper was recovered in the rougher concentrate. Copper grade in the final concentrate ranged from 1 to 29% Cu.

Minor element determinations were performed on the final bulk concentrates produced. Arsenic, antimony, cadmium, and mercury were elevated in some of the concentrates.

18.5.5 Calcite Hill Testwork and Results

The G&T KM2628 variability testwork was carried out on five composites made up from individual intervals of half core from the Calcite Hill deposit. Zinc content in the feed ore was generally low at approximately 0.03% Zn with one composite at 0.21% Zn. Copper content in the feed ore ranged from 0.06 to 0.2% Cu. The mode of occurrence of silver minerals was variable across the samples. Two of the five samples had between 35 and 45% of the silver present as native silver while the remaining three samples had no native silver observed. Galena was the dominant sulphide mineral in three of the samples while in the other two chalcopyrite was dominant.

For each of the five composites tested, a kinetic rougher test was carried out with and without a gravity pre-concentration step ahead of flotation. Gravity pre-concentration was tested using a Knelson batch concentrator. A comparison of silver assays in the rougher tailing indicates a potential benefit with gravity concentrate for samples with the highest silver feed grades.

Minor element determinations were performed on the final bulk concentrates produced. Arsenic, cadmium, and mercury were elevated in some of the concentrates.

18.5.6 Navidad Hill Variability Testwork and Results

The G&T KM2629 variability testwork was carried out on 28 discrete variability samples made up from composites from the Navidad Hill deposit. Lead, copper, and zinc were present in each sample. Lead content in the feed ore ranged from 0.1 to 14% Pb. Copper content in the feed ore ranged from 0.02 to 2.8% Cu. Zinc content in the feed ore ranged from 0.01 to 0.4% Zn. Zinc was observed as goethite (not sphalerite) in the feed. Native silver was observed in individual samples; however, most of the silver occurred as acanthite/argentite. Lead oxide (cerussite) was observed in some of the samples. The samples had a variable but significant degree of oxidation which appeared to control the metallurgical performance.

In general, lead was poorly recovered to the final bulk concentrate in open circuit cleaner tests averaging only 21% Pb. Lead grades in the final concentrate averaged 19% Pb. Silver recovery to the final bulk concentrate was variable and silver grade averaged 25,000 g/t Ag. On average

Table of Contents

34% of the feed copper was recovered in the rougher concentrate. Copper grade in the final concentrate ranged from 1 to 29% Cu.

Minor element determinations were performed on the final bulk concentrates produced. Arsenic, antimony, cadmium, and mercury were elevated in some of the concentrates.

18.5.7 Connector Zone Variability Testwork and Results

The G&T KM2664 variability testwork was carried out on 17 variability samples made up from half drill core from the Connector Zone deposit. Lead, copper, and zinc were present in each sample. Lead content in the feed ore ranged from 0.06 to 1.5% Pb. Copper content in the feed ore ranged from 0.01 to 0.56% Cu. Zinc content in the feed ore ranged from 0.03 to 0.84% Zn. The main silver minerals observed were native silver and acanthite/argentite. Lead and copper oxide are present in the samples. The samples had a variable but significant degree of oxidation, which appeared to control the metallurgical performance.

Silver recovery in the open circuit cleaner tests was highly variable. Silver recovery to the final bulk concentrate averaged 42%, with an average grade of 12,000 g/t Ag. Lead recovery ranged from 1 to 77% at lead grades ranging from 0.5 to 58.4% Pb. On average 44% of the feed copper was recovered in the rougher concentrate. Copper grade in the final concentrate ranged from 0.1 to 15% Cu.

Similar to samples from Navidad and Galena Hill, there was a relationship between acid soluble copper content in the feed and copper recovery. A relationship between copper and silver recovery was established. It may be possible to use acid soluble copper content as a rough predictor of silver recovery.

Minor element determinations were performed on the final bulk concentrates produced. Arsenic, antimony, cadmium, and mercury were elevated in some of the concentrates.

18.5.8 Summary of Testwork Results and Conclusions

Based on a review of testwork completed to date the basic mineralogy has been interpreted as copper-silver, lead-silver, and lead-pyrite ore. The latter two will be combined into one ore type and as such the concentrator will treat two ore streams (on a campaign basis), those being copper-silver and lead-silver.

Optimized open cut designs were constructed using assumptions of the metallurgical matrix, and economics. The following averages of key results from the testwork, shown in Table 18-5, were used to establish the design criteria:

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Table 18-5: Key Metallurgical Results and Design Criteria Inputs

			Recovery			Grades	
Ore Type	**Stage**	**Mass Pull %**	**Ag Recovery %**	**Pb Recovery %**	**Cu Recovery %**	**Ag g/t**	**Pb %**
Copper-Silver Ore	Rougher	6.7%	87.1%	83.6%	87.1%		
	1st Cleaner	21.6%	92.8%	93.3%	94.8%		
	2nd Cleaner		97.8%		98.6%	18,610	
	3rd Cleaner		98.3%		98.9%	21,919	
Lead-Silver Ore	Rougher	10.9%	59.4%	87.3%	72.5%		
	1st Cleaner		94.7%	97.6%	95.9%		35.4
	2nd Cleaner		96.3%	98.4%			42.7
	3rd Cleaner		98.0%	98.8%			45.0
Lead-Pyrite Ore	Rougher	10.5%	55.5%	86.3%	73.3%		
	1st Cleaner		45%	94%	62%		52.2
	2nd Cleaner		79.0%	96.7%			57.0
	3rd Cleaner	0.4%	75.9%	94.5%			62.0

18.6 METALLURGICAL MODEL DEVELOPMENT

During 2010, a large number of composites for metallurgical variability testing were completed, as both batch rougher and batch cleaner tests. The number of batch cleaning stages varied, usually limited by the available rougher concentrate mass.

The final test in many series was the locked cycle test, using the process variables identified in the preceding batch rougher and cleaning testwork. Typically one locked cycle test was completed for each major composite.

By directly comparing the batch rougher-cleaning tests to locked cycle tests as pairs on the same composite, with both tests using the same plant design variables; it was determined that the batch rougher-cleaner test results could be used in combination with the locked cycle and pilot plant test results to develop the Metallurgical performance models that are used in this PA.

From the overall Metallurgical database, specific batch cleaning, locked cycle, and the Loma de La Plata pilot tests were extracted. These specific tests were selected to support the Navidad plant design criteria.

The basic plant design criteria include:

Primary grind size: P_{80} of 100 to 120 µm,

Rougher flotation using Cytec 3418A as the collector and MIBC as the frother.

Rougher concentrate regrinding: P_{80} 20 to 30 µm

3 stages of concentrate cleaning.

Table of Contents

Note: few of the completed flotation tests were completed with all three stages of cleaning. In these tests, the final test achieved concentrate grades and recoveries that were used for modelling.

Each deposit was considered as separate model.

For each deposit four basic performance models were generated:

1) Cleaner concentrate mass pull derived from combined copper plus lead head grades;

2) Silver recovery to cleaner concentrate derived from silver head grade;

3) Lead recovery to cleaner concentrate derived from lead head grade;

4) Copper recovery to cleaner concentrate derived from copper head grade.

The three modeled metal recoveries were subsequently reduced based upon one or both of two factors:

a) Depth from surface, or an implied oxidation effect; the amount being deposit specific; and/or

b) Ore lithology; on an overall Navidad Property basis, lithology codes 13 (mudstones) show reduced metal recoveries.

18.6.1 Metallurgical Performance Models

Shown in Figure 18-9 to Figure 18-16 are the cleaner mass and silver, lead, and copper metal recovery graphs for each deposit.

Figure 18-9: Metallurgical Performance Models for Loma de La Plata & Valle Esperanza

Table of Contents

Figure 18-10: Metallurgical Performance Models for Calcite Hill

80

Figure 18-11: Metallurgical Performance Models for Galena Hill, non-pyrite

Table of Contents

Figure 18-12: Metallurgical Performance Models for Galena Hill, pyrite

82

Table of Contents

Figure 18-13: Metallurgical Performance Models for Barite Hill

Table of Contents

Figure 18-14: Metallurgical Performance Models for Navidad Hill

Table of Contents

Figure 18-15: Metallurgical Performance Models for the Connector Zone

85

Table of Contents

Figure 18-16: Metallurgical Performance Models for Calcite North-West

86

Table of Contents

18.6.2 Discussion of Results

The effect of oxidation upon metal recoveries was quantifiable in most deposits. The geology descriptions (oxidation codes 1, 2 & 3) of ore oxidation, and/or sulphide mineral oxidations were tested against metallurgical performance. No consistent relationships exist.

Each tested metallurgical composite was identified by drill hole number and by intercept depths. The relationship of depth to metallurgical performance was generally consistent, by deposit.

The quantity of useful data (i.e. a sample of short interval length) varied with deposit.

The effect of oxidation (depth) was a decrease in flotation recovery, with copper being the most affected, and silver the least affected. Figure 18-17, as an example, displays Loma de La Plata metal recovery by tested sample start depth, the copper recovery curve is the steepest (orange), the silver recovery curve (blue) is the flattest, and the lead (grey) in between.

Figure 18-17: Loma de La Plata, Metal Recovery by Composite Start Depth

The ore grade mineralisation generally occurs in two lithology types. The majority in the latites or geology codes 7 to 7.5, and the minority in the mudstones or geology codes 13 to 13.3.

Source data is somewhat limited, as the tested sample ideally is only one lithology, from the same depth, and same deposit.

Table of Contents

Calcite Hill gave the most consistent trends, with copper and lead recoveries being reduced the most in lithology code 13 versus lithology code 7. Similar to oxidation (depth) silver recoveries were least affected.

As an example, Figure 18-18 and Figure 18-19, display copper and lead recoveries versus head grades for the two lithology units.

Figure 18-18: Calcite Hill, Copper Recovery vs. Head Grade, by Lithology

Table of Contents

Figure 18-19: Calcite Hill, Lead Recovery vs. Head Grade, by Lithology

18.6.3 Metallurgical Recovery Matrix

The metallurgical recovery matrix is shown in Table 18-6. PAS supplied the metallurgical model discussed in the previous section. The metallurgical model has recovery and mass pull functions for each sub-defined mine area. The recoveries are defined by a power law function, with two terms, the multiplier and a power. The mass pull utilizes a linear function with a multiplier and a mantissa value. Below a depth of 50 m the recovery can be altered by a per metre depth multiplier (in this case always reduced or not used). Also for non-latite ore, the recovery is reduced by 10%. Minimums and maximums are applied after power law application and after depth and lithology applications.

Table of Contents

Table 18-6: Recovery and Mass Pull Functions   Navidad PA Base Case

Recovery and Mass Pull Functions - Navidad PEA Base Case

		BH	CH	CNW	CZ	GH	LP	NV	VE	GHp
	MINEC	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**5**
	PROCC	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2**
Recovery										
Ag	**mult**	0.0896	0.8700	0.6500	0.0008	0.2210	0.5585	0.2855	0.5585	0.2087
	power	0.3600	0.0000	0.0000	1.2738	0.1280	0.0753	0.1361	0.0753	0.0000
	min	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	max	0.9000	0.8700	0.6500	0.6500	0.9000	0.9200	0.8500	0.9200	0.2087
	Depth	-0.0025	-0.0025	0.0000	0.0000	0.0000	-0.0025	-0.0025	-0.0025	0.0000
	Litho	0.0000	-0.1000	0.0000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000
Pb	**mult**	4.4641	0.7434	0.4500	0.7000	0.7500	0.8700	0.4161	0.8700	0.7000
	power	1.0440	0.1160	0.0000	0.0000	0.1100	0.1695	0.6969	0.1695	0.0760
	min	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	max	0.6000	0.9000	0.4500	0.7000	0.9000	0.8500	0.9000	0.8500	0.8500
	Depth	0.0000	-0.0025	0.0000	0.0000	-0.0040	-0.0025	-0.0025	-0.0025	0.0000
	Litho	0.0000	-0.1000	0.0000	0.0000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000
Cu	**mult**	1.5957	0.9170	0.4500	4.0000	0.6500	1.0997	0.4000	1.0997	0.2000
	power	0.6040	0.0600	0.0000	0.6100	0.1000	0.2101	0.0000	0.2101	0.0000
	min	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	max	0.8500	0.9000	0.4500	0.7500	0.7000	0.9000	0.4000	0.9000	0.2000
	Depth	-0.0008	-0.0025	0.0000	0.0000	-0.0025	-0.0033	-0.0100	-0.0033	-0.0036
	Litho	0.0000	-0.1000	0.0000	0.0000	-0.1000	-0.1000	-0.1000	-0.1000	-0.1000
Zn	**mult**	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200
	power	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	min	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	max	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200	0.0200
	Depth	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Litho	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mass Pull (Cu+Pb is used as base)										
MP	**mult**	0.0076	0.0122	0.0240	0.0093	0.0126	0.0163	0.0152	0.0163	0.0126
	add	0.0019	0.0000	0.0000	0.0052	0.0000	0.0006	0.0000	0.0006	0.0000
	min	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	max	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
	depth<50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	Litho 13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Approx Pit Heads										
m	**depth**	50	50	50	50	50	50	50	50	50

Ag		370		370	370	370	370	370	370	370	370
Pb		0.4000		0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Cu		0.1000		0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000	0.1000
Estimated Recoveries											
Ag	**Cut**	75.3	%	87.0%	65.0%	65.0%	47.1%	87.2%	63.8%	87.2%	20.9%
Pb	**Cut**	60.0	%	66.8%	45.0%	70.0%	67.8%	74.5%	22.0%	74.5%	65.3%
Cu	**Cut**	39.7	%	79.9%	45.0%	75.0%	51.6%	67.8%	40.0%	67.8%	20.0%
Estimated Concentrate											
MP		0.57	%	0.61%	1.20%	0.99%	0.63%	0.88%	0.76%	0.88%	0.63%
Ag	**gpt**	48751		52628	20042	54731	27622	36864	31165	36864	12237
Pb	**%**	42.0	%	43.7%	15.0%	28.4%	43.0%	34.0%	11.6%	34.0%	41.4%
Cu	**%**	6.9	%	13.1%	3.8%	7.6%	8.2%	7.7%	5.3%	7.7%	3.2%

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

18.7 PROCESS REAGENTS

Reagent consumption rates for the full-scale plant operation have been estimated from the laboratory flotation tests. The grinding media consumption shown in Table 18-7 and Table 18-8 is estimated from test results and other similar operations.

Table 18-7: Reagent Consumptions

Reagent		Copper-Silver Ore	Lead-Silver Ore
3418A	kg/t mill feed	0.110	0.200
PAX	kg/t mill feed		
MIBC	kg/t mill feed	0.050	0.150
Spare frother	kg/t mill feed		
Gangue depressant	kg/t mill feed		
Zinc Depressant	kg/t mill feed		
Flocculant	kg/t mill feed	0.080	0.080
Antiscalant	kg/t mill feed		

Table 18-8: Grinding Media and Wear Parts

		Copper-Silver Ore	Lead-Silver Ore
Primary Crusher Liners	sets/year	0.35	0.65
SAG Mill Liners	sets/year	0.70	1.30
Ball Mill Liners	sets/year	0.25	0.45
Regrind Liners	sets/year	0.35	0.65
SAG Mill Balls	kg/t mill fd	0.700	0.700
Ball Mill Balls	kg/t mill fd	0.800	0.800
Regrind Mill Balls	kg/t mill fd	0.100	0.100

Dry reagents will be stored under cover, then delivered to and mixed in reagent tanks and transferred to distribution tanks for process use. Liquid reagents will be off-loaded to storage tanks and transferred to distribution tanks for process use. The estimates for process reagent, grinding media and wear parts consumption were used as inputs as part of the calculation of the operating cost estimate for the process plant.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

19 MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES

Summary information in this section describing resource estimates as of April 2009 has been sourced and updated from Snowden (2009). None of the drilling results from the PAS 2010 drilling program have been used for the April 2009 resource estimates.

19.1 DISCLOSURE

Mineral Resources as of April 2009 reported in Section 19 were prepared by Ms. P. De Mark, a Senior Consultant of Snowden at that time and a Qualified Person as defined under NI 43-101. Snowden is independent of PAS.

Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. No Mineral Reserves are reported in this Technical Report.

This report uses definitions from and follows the guidelines of the CIM Definition Standards for Mineral Resources and Mineral Reserves (CIM, 2005), CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines (CIM, 2003), and NI 43-101 Form F1. The Project has no mine design or defined economic parameters at this stage.

19.1.1 Known Issues that Materially Affect the Mineral Resources

The Province of Chubut passed a law in 2003 (Law 5001) that prohibits open cut mining and the use of cyanide in mineral processing in the entire province. The law states that, in a period of 120 days, the Provincial Environment Committee (COPRAM) will determine the zoning of the Province for Mineral Resource exploitation with production methods authorized in each case. This determination will also define areas which are to be excluded from the open cut and cyanide prohibition. The law also requires that the proposed COPRAM zoning be passed as law. To date COPRAM has not made a rezoning proposal.

PAS is unaware of any other issues that may materially affect the Mineral Resources in a detrimental sense. These conclusions are based on the following:

- The PAS exploration license has an approved environmental operating license.
- PAS has represented that the material mineral and surface rights have secure title.
- There are no known marketing, political, or taxation issues.
- PAS has represented that the Project has local community support.
- There are no known infrastructure issues.

Table of Contents

19.2 ASSUMPTIONS, METHODS AND PARAMETERS 2009 MINERAL RESOURCE ESTIMATES

Mineral Resource estimates were prepared in the following steps:

- Data validation was undertaken by Aquiline and reviewed by Snowden.
- Data preparation, including importation to various software packages.
- Analysis of the QA/QC data.
- Geological interpretation and modelling of lithological and mineralisation domains was completed by Snowden based on interpretations provided by Aquiline.
- Coding of drillhole data within mineralised grade estimation domains.
- Samples were composited to 3 m lengths. For copper estimates for all deposits later prepared by PAS, samples were composited to 5 m lengths.
- Exploratory data analysis of silver and lead grades based on mineralised domains. PAS undertook data analysis of copper grades for all deposits.
- Indicator variogram analysis and modelling by domain for silver and lead grades, and correlogram analysis and modelling by domain for copper grades.
- Derivation of kriging plan and boundary conditions.

- Creation of block models and application of density values by domain.

- Grade estimation of Ag and Pb into blocks using multiple indicator kriging (MIK) and using ordinary kriging (OK) for estimates of Cu.

- Grade estimation of Ag and Pb into blocks using OK and nearest neighbour (NN) for MIK estimation validation.

- Validation of estimated block grades against input sample composite grades.

- Confidence classification of estimates with respect to CIM guidelines.

- Resource tabulation and Resource reporting.

19.3 DATA PREPARATION AND DATA VALIDATION

19.3.1 Data Preparation

Snowden prepared desurveyed drillholes from collar, survey, lithology, and assay data provided by Aquiline. A location map showing drillholes available for the April 2009 Mineral Resource

Table of Contents

estimate is shown in Figure 19-1. The number of drillholes used in the April 2009 estimate are also shown in Table 19-1.

Figure 19-1: Location Map Drillholes Available in the April 2009 Navidad Database

Table of Contents

Table 19-1: Number of Drillholes Used in the Navidad April 2009 Mineral Resource Estimates

Area	Number of drillholes	Metres of drilling
Calcite NW	111	16,440
Calcite Hill	81	14,973
Navidad Hill	105	12,394
Connector Zone	75	12,394
Galena Hill	92	17,221
Barite Hill	56	12,832
Loma de La Plata	210	45,918
Valle Esperanza	70	23,702
Total	800	155,872

19.3.2 Data Validation

Validation checks in Datamine mining software included searches for overlaps or gaps in sample and geology intervals, inconsistent drillhole identifiers, and missing data. No errors were noted.

Aquiline also provided Snowden with sample assay quality assurance/quality control (QA/QC) data for review. Analysis of QA/QC data is used to assess the reliability of sample assay data and the confidence in the data used for the resource estimation. The results of the QA/QC analyses are discussed in Section 16.1. Snowden and PAS consider the results of the standard, blank, and field duplicate samples submitted for the Navidad Project to be of industry standard and do not indicate any significant source of bias, cross contamination, or error.

19.4 GEOLOGICAL INTERPRETATION, MODELLING, AND DOMAINING

19.4.1 Geological Interpretation and Modelling

Snowden updated the 2007 geological interpretation to include recent drilling information, based on geological wireframes provided by Aquiline. Snowden created new digitised geological interpretations for Valle Esperanza, which had no previous geological interpretation, also based on geological wireframes provided by Aquiline. Three wireframes of north-northwest trending faults were provided by Aquiline, which were used to truncate mineralisation to the west of Galena Hill.

The geological interpretations were digitised on section and wireframed into lithological domains representing mudstone/limestone, conglomerate, latite, and volcaniclastic contacts. Mineralised domains were digitised around continuous areas of mineralisation generally greater than 25 g/t Ag and/or 1% Pb.

Table of Contents

No model of the oxidation surface has yet been prepared, as generally there is no well-developed oxidation zone present in the respective deposits except for a mixed zone comprised mostly of sulphides with oxidation along fractures. Recent metallurgical test work has suggested that oxidation may play a more important role in mineral processing than previously known. Staff geologists will be undertaking a more diligent study of the differences between the oxide and sulphide zones for modelling in future resource estimations.

19.4.2 Definition of Grade Estimation Domains

Grade estimation domains, which are subdivisions of the geological model and represented by subsets of the sample data, ensure that samples used for estimating a block grade are from the same population as the point of estimation. A grade population may be defined by attributes such as spatial location, lithology, mineralisation style, and structural boundaries.

The Navidad Mineral Resources have been estimated and reported individually for each deposit, including Calcite NW, Calcite Hill, Navidad Hill, Connector Zone, Galena Hill, Barite Hill, Loma de La Plata, and Valle Esperanza.

Data for each deposit has been further divided into sub-domains according to lithological unit (mudstone/limestone, latite, conglomerate, and volcaniclastic units) and strength of mineralisation (high or low).

19.5 SAMPLE STATISTICS

19.5.1 Sample Compositing

Sample lengths were composited to ensure that the samples used in statistical analyses and estimations have similar support (i.e., length). Aquiline sampled drillholes at various interval lengths depending on the length of intersected geological features, and in geologically similar units, selected samples at 3 m lengths. Sample lengths were examined for each deposit and composited to 3 m according to the most frequently sampled length interval (3 m). The composited and raw sample data were compared to ensure no sample length loss or metal loss had occurred. For estimates of Cu, PAS composited drillhole sample lengths to 5 m.

19.5.2 Extreme Value Treatment

No top cuts of extreme values were applied to the input samples used in the MIK estimation, as the extreme values in the high grade mineralised domains are well supported by other extreme values, and are not the sole cause of the grade variability in the domain population. Extreme grade values are treated in the estimate using multiple indicator kriging. No top cuts of Cu grade values for the OK estimates were necessary.

19.5.3 Input Sample Statistics

Mineralisation is associated with the mudstone and latite domains although minor occurrences of mineralised conglomerate and volcaniclastic rocks are present. High CV values and examination of the sample histogram suggest mixed populations within most domains. Future definition of

Table of Contents

grade estimation domains may be improved after collection of additional drillhole samples, improvement to the geological interpretation, and analysis of grade distributions.

19.6 VARIOGRAPHY

Variography was undertaken by grade estimation domain for each deposit. To improve variogram quality in the grade estimation domains at the Navidad Trend (Calcite NW, Calcite Hill, Navidad Hill, Connector Zone, Galena Hill, and Barite Hill), sample composites of the grade estimation domain for the deposit under consideration were combined with sample composites from corresponding grade estimation domains from the two deposits lying immediately to the northwest and southeast. For example, sample composites for the high grade latite estimation domain for Galena Hill were combined with high grade latite sample composites from Connector Zone to the northwest and Barite Hill to the southeast.

19.6.1 Continuity Analysis

Continuity analysis refers to the analysis of the spatial correlation of a grade value between sample pairs to determine the major axis of spatial continuity. As the mineralised domain has a long, wide, and relatively flat shape oriented to the northwest, only orientations close to the plane of the domain were considered. Indicator variograms were defined at percentile intervals chosen by grade estimation domain to best represent the grade distribution. Horizontal, across strike, and dip plane continuity directions for each domain were chosen by examining indicator variogram maps and their underlying variograms for Ag and Pb, and Cu at Loma de La Plata, rotated onto the plane of the mineralised domain.

19.6.2 Variogram Modelling

Directional variograms were modeled for the three principal directions for Ag and Pb based on the directions chosen from the variogram fans. Models were applied to omnidirectional correlograms for Cu.

19.7 ESTIMATION PARAMETERS

19.7.1 Kriging Parameters

A kriging neighborhood analysis (KNA) was performed to determine the optimum kriging parameters. KNA is the process of undertaking multiple ordinary kriged estimates using a variety of block sizes and search neighborhood parameters (such as minimum and maximum sample numbers) and comparing the slope of regression, kriging efficiency, and kriging variance values produced from the estimates. Kriging parameters were selected through examination of the results of the estimates in terms of slope of regression, kriging efficiency, kriging variance, and Snowden s experience with similar deposits.

19.7.2 Block Size Selection

Block sizes were selected according to the average drillhole spacing, the results of the KNA and the dimensions of the mineralized envelopes. Snowden created block models with dimensions of

Table of Contents

12.5 m Easting, 12.5 m Northing, and 5 m Elevation, except at Barite Hill, where the block models had blocks with dimensions of 25 m Easting, 25 m Northing, and 5 m Elevation, based on the wider spacing of drillholes at Barite Hill.

19.7.3 Sample Search Parameters

The following search strategy was selected based on the results of the KNA:

- Search range equal to the maximum variogram range.
- A minimum of 10 samples per estimate.
- A maximum of 32 samples per estimate.
- Maximum of three samples per borehole.

Three search ellipses were employed. A second search equal to 1.5 times the maximum variogram range was used wherever the first search did not encounter enough samples to perform an estimate, if enough samples were still not encountered, a third search equal to two times the maximum variogram range was used. If the minimum number of samples required were not encountered in the third search, no estimate was made.

19.7.4 Block Model Set Up

Table 19-2 gives the block model parameters for the Navidad Mineral Resource models.

Table of Contents

Table 19-2: Navidad Block Model Parameters

Deposit	Direction	Minimum	Maximum	Increment (m)
Calcite NW	Easting	2,512,100	2,514,100	12.5
	Northing	5,304,600	5,306,100	12.5
	Elevation	800	1,300	5
Calcite Hill	Easting	2,513,800	2,514,700	12.5
	Northing	5,304,400	5,305,200	12.5
	Elevation	900	1,250	5
Navidad Hill	Easting	2,514,200	2,515,000	12.5
	Northing	5,304,100	5,304,900	12.5
	Elevation	900	1,250	5
Connector Zone	Easting	2,514,600	2,516,000	12.5
	Northing	5,303,900	5,304,525	12.5
	Elevation	700	1,250	5
Galena Hill	Easting	2,515,200	2,516,300	12.5
	Northing	5,303,000	5,304,300	12.5
	Elevation	700	1,200	5
Barite Hill	Easting	2,516,000	2,517,200	25
	Northing	5,302,300	5,303,400	25
	Elevation	700	1,200	5
Loma de La Plata	Easting	2,509,700	2,512,700	12.5
	Northing	5,302,600	5,303,900	12.5
	Elevation	700	1,700	5
Valle Esperanza	Easting	2,513,000	2,516,300	12.5
	Northing	5,302,000	5,304,900	12.5
	Elevation	500	1,300	5

19.7.5 Grade Interpolation and Boundary Conditions

Grade interpolation for Ag and Pb was undertaken in the selected grade percentile bins for each grade estimation domain using MIK. This interpolation method was selected in preference to ordinary kriging to represent the mixed populations in the grade estimation domains and to restrict the effect of extreme grade values, while honouring the extreme grade values present due to the style of mineralisation. Domain boundaries were treated as hard boundaries, so that samples lying in one domain were not used in the estimation of another, to prevent the smearing of grades from one domain to another. Grade interpolation for Cu was by OK.

Ordinary kriged estimates were also performed to assist with optimizing the grade estimation parameters and to assist with resource confidence classification by writing the kriging efficiency, kriging variance, and regression slope to the OK model. A nearest neighbour estimate was also undertaken to assist with estimation validation.

Table of Contents

19.8 SPECIFIC GRAVITY

Specific gravity values were applied by domain to the block model for the estimation of tonnes and contained metal. Table 19-3 gives statistics of the density determinations for each of the domains, and the mean value assigned to the block models.

Table of Contents

Table 19-3: Navidad Block Model Densities

Description	Domain	Count	Min	Max	Mean	CV
Unmineralised conglomerate	115	27	2.18	2.66	2.45	0.07
	215	4	2.43	2.56	2.49	0.03
	315	28	2.21	3.46	2.48	0.09
	615	149	2.03	2.58	2.32	0.04
	715	352	2.13	2.85	2.59	0.04
	815	196	2.22	2.70	2.46	0.04
Unmineralised mudstone/limestone	125	547	1.03	4.02	2.47	0.08
	225	123	2.07	3.18	2.46	0.07
	325	151	2.05	3.32	2.44	0.07
	425	56	1.98	2.65	2.36	0.06
	525	505	1.89	2.78	2.29	0.05
	625	648	1.10	3.59	2.28	0.08
	725	802	2.08	3.00	2.56	0.05
	825	182	1.76	2.96	2.46	0.06
Mineralised mudstone/limestone	126	163	2.04	3.67	2.50	0.08
	226	62	1.94	3.17	2.50	0.10
	326	65	2.12	2.78	2.44	0.05
	426	106	1.95	2.99	2.42	0.07
	526	184	1.87	3.04	2.41	0.07
	626	499	1.56	2.95	2.28	0.06
	726	104	1.87	4.18	2.62	0.09
Unmineralised latite	135	202	1.03	4.02	2.52	0.09
	235	148	2.11	3.19	2.43	0.06
	335	205	1.91	2.76	2.41	0.05
	435	211	2.15	2.93	2.51	0.05
	535	424	2.13	4.25	2.53	0.07
	635	304	2.00	2.88	2.38	0.06
	735	1,564	1.88	4.28	2.61	0.06
	835	777	2.18	3.99	2.55	0.05
Mineralised latite	136	105	2.04	3.45	2.52	0.08
	236	1,587	1.94	3.86	2.53	0.09
	336	352	1.95	3.34	2.39	0.06
	436	769	1.97	3.90	2.59	0.08
	536	1,204	1.88	3.92	2.58	0.06
	636	69	2.23	2.69	2.39	0.04

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Description	Domain	Count	Min	Max	Mean	CV
	736	970	1.79	3.86	2.61	0.06
	836	172	2.32	3.71	2.56	0.06
Unmineralised	145	26	2.36	3.83	2.61	0.11
volcaniclastic	245	44	1.90	2.58	2.38	0.05
	345	19	2.30	2.77	2.48	0.06
	445	41	2.23	3.20	2.46	0.06
	545	137	1.98	2.70	2.43	0.06
	645	23	2.37	2.63	2.48	0.03

19.9 ESTIMATION VALIDATION

Snowden validated the Navidad models using four techniques:

- Comparison of global mean declustered sample statistics with the mean estimated grade by domain.
- Visual inspection of block and sample composite grades in section, plan, and in three dimensions.
- Generation of slice validation plots of declustered sample composite grades with estimated block grades by domain, to compare sample and estimated grade trends.
- Comparison to previous estimates, where possible.

19.9.1 Domain Statistics and Visual Validation

Snowden validated the Navidad models by comparing the estimated grades by domain for each deposit with the declustered input samples. Snowden used a nearest neighbour estimate, which does a basic decluster of the input data into a grid defined by the block model, to make a direct comparison between the estimated mean grade values and the sample input data.

Global grade comparisons are within acceptable tolerances for most mineralised domains; for low grade and poorly sampled domains the percentage difference between input samples and estimated grades may be high. Because the nearest neighbour estimate uses a single sample to return a grade value to the block cell, global grade differences between the nearest neighbour and the MIK model, which uses between 10 and 32 samples to estimate block grades, may also be high. The global grade difference may be particularly high if the composite closest to the block cell happens to have an extreme grade value.

Areas with poor comparisons between estimated and input grades were examined again in detail in section and three dimensions. Snowden found that the distribution of estimated grades corresponds to the distribution of grades in the input data, and the grades are continuously

Table of Contents

distributed. The largest differences also appeared to be related to the sample support for the estimates and the declustering and location of the data.

19.9.2 Slice Validation Plots

Validation plots of estimated block grades and input sample data were made for all domains for Ag, Pb and Cu on easting, northing, and elevation. Estimated block grades generally correspond to input sample grades with the expected degree of smoothing from the kriging interpolation.

19.10 MINERAL RESOURCE CLASSIFICATION

Resource confidence classification considers a number of aspects affecting confidence in the Resource estimation, such as:

- Geological continuity (including geological understanding and complexity).
- Data density and orientation.
- Data accuracy and precision.
- Grade continuity (including spatial continuity of mineralisation).
- Estimation quality.

19.10.1 Geological Continuity and Understanding

Staff geologists log drill core in detail including textural, alteration, structural, mineralisation, and lithological properties, and continue to develop a good understanding of the geological controls on mineralisation. Confidence in geological continuity is good in most cases and could be increased by creating a geological interpretation incorporating all available geological information, including surface mapping, geophysical information, and core logging detail in a digital, three-dimensional format.

19.10.2 Data Density and Orientation

Aquiline drilled the Navidad deposits on a pattern roughly 50 m along strike, with closer spaced drilling in the Galena Hill and Navidad Hill areas. Geological confidence and estimation quality are closely related to data density and this is reflected in the classification of Resource confidence categories.

19.10.3 Data Accuracy and Precision

Classification of Mineral Resource confidence categories are also influenced by the accuracy and precision of the available data. The accuracy and the precision of the data may be determined through QA/QC programs and through an analysis of the methods used to measure the data.

Table of Contents

At Navidad, as in most deposits, two important items to consider regarding data accuracy are the quality of the assay values and the specific gravity determinations. Field duplicate results indicate a level of precision that is within a normal range for such a deposit. Potential errors with the specific gravity determination methods in use at the Navidad Project have been discussed in Snowden (2007, 2009, and 2010) and in Section 14.3 of this PA, and are being addressed by PAS. It is Snowden s opinion that the accuracy and precision of the assay and specific gravity data, as defined by the QA/QC and analysis of the methods used to measure the data, is acceptable for use in resource estimation. The confidence in the data is sufficient to support the assigned classifications of the Navidad Mineral Resources.

19.10.4 Spatial Grade Continuity

Spatial grade continuity, as indicated by the variogram, is an important consideration when assigning Resource confidence classification. Variogram characteristics strongly influence estimation quality parameters such as kriging efficiency and regression slope. The nugget effect and short range variance characteristics of the variogram are the most important measures of continuity. At the Navidad deposits the variogram nugget effect for both Ag and Pb is on average a high proportion of the total population variance. In some cases, due to the characteristics of the data, confidence in the model of spatial continuity may be low. In some grade estimation domains, it was not possible to calculate reliable variograms, and variogram models from similar domains were borrowed for these domains. These factors have been considered while assigning Resource confidence classification categories.

19.10.5 Estimation Quality

Estimation quality is influenced by the variogram, the scale of the estimation, and the data configuration. Estimations of small volumes have poorer quality than estimations of large volumes. Measures such as kriging efficiency, kriging variance, and regression slope quantify the quality of local estimations. Snowden used these estimation quality measures to aid in assignment of Resource confidence classifications. The classification strategy has resulted in the expected progression from lower to higher quality estimates when going from Inferred to Indicated.

19.10.6 Classification Process

The Mineral Resource confidence classification of the Navidad Mineral Resource models incorporated the confidence in the drillhole data, the geological interpretation, geological continuity, data density and orientation, spatial grade continuity, and estimation quality. The Resource models were coded for Inferred, Indicated, and Measured categories according to CIM Standards (CIM, 2005). The process for classification is as follows:

- A three dimensional perimeter around three dimensionally continuous blocks containing estimates created during the first search ellipse was created, and the blocks within the perimeter coded as Inferred.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

- A three dimensional perimeter around three dimensionally continuous blocks containing kriging efficiencies greater than 40 were coded as Indicated.

- A three dimensional perimeter around three dimensionally continuous blocks containing kriging efficiencies greater than 60 were coded as Measured. Not all deposits have Measured Mineral Resources.

- A surface representing the base of drilling was created, and all blocks below this base were coded as unclassified.

- A perimeter representing the lateral extent of the drilling was created, and expanded by 25 m and 50 m. Any blocks outside of the 50 m perimeter were coded as unclassified. Any blocks outside of the 25 m perimeter were coded as Inferred. The effect of this process is to restrict the confidence classification in the dip direction, which has a less regular pattern of drilling and often does not define the down dip boundary of mineralisation (in other words, mineralisation remains open, and Mineral Resources may be increased through additional drilling).

19.11 MINERAL RESOURCE REPORTING

Mineral Resource estimates are reported for the Calcite NW, Calcite Hill, Navidad Hill, Connector Zone, Galena Hill, Barite Hill, Loma de La Plata, and Valle Esperanza deposits at the Navidad Property (Table 19-4). Tonnes and grades have been reported above a cut-off grade of 50 g/t silver equivalent. To date, no analysis has been made to determine the economic cut-off grade that will ultimately be applied to the Navidad Project. Silver equivalence was calculated using three year rolling average prices for silver ($12.52 per oz) and an approximate ten year rolling average price for lead ($0.50 per lb). The following formula, which does not include any other factors such as variable metal recoveries, was applied to reach the silver equivalent value:

$$AgEQ\ (g/t) = Ag\ (g/t) + (Pb\ (\%) \times 10{,}000/365)$$

No Mineral Reserves have been estimated at this time. Additional studies will be required to determine technical, economic, legal, environmental, socio-economic, and governmental factors. These modifying factors are normally included in a mining Feasibility Study and are a pre-requisite for conversion of Mineral Resources to, and reporting of, Mineral Reserves. The CIM Standards (CIM, 2005) describe completion of a Preliminary Feasibility Study as the minimum prerequisite for the conversion of Mineral Resources to Mineral Reserves.

Table of Contents

Table 19-4: Navidad April 2009 Mineral Resources Reported Above a Cut-Off Grade of 50 g/t AgEQ

Deposit	Classification	Tonnes (Mt)	AgEQ g/t	Ag g/t	Pb%	Cu%	Contained Ag (Moz)	Contained Pb (Mlb)	Contained Cu (Mlb)
Calcite Hill NW	Measured								
	Indicated	14.8	94	78	0.59	0.03	37	194	9
	Meas. + Ind.	**14.8**	**94**	**78**	**0.59**	**0.03**	**37**	**194**	**9**
	Inferred	14.6	74	52	0.82	0.02	24	265	6
Calcite Hill	Measured								
	Indicated	17.5	115	100	0.55	0.06	56	212	24
	Meas. + Ind.	**17.5**	**115**	**100**	**0.55**	**0.06**	**56**	**212**	**24**
	Inferred	4.9	106	96	0.36	0.03	15	39	3
Navidad Hill	Measured	8.4	122	109	0.46	0.16	29	85	29
	Indicated	5.6	96	90	0.24	0.11	16	29	14
	Meas. + Ind.	**14**	**112**	**101**	**0.37**	**0.14**	**45**	**114**	**42**
	Inferred	1.8	81	70	0.41	0.08	4	16	3
Connector Zone	Measured								
	Indicated	8.2	102	91	0.41	0.04	24	74	7
	Meas. + Ind.	**8.2**	**102**	**91**	**0.41**	**0.04**	**24**	**74**	**7**
	Inferred	9.9	88	74	0.49	0.03	24	107	13
Galena Hill	Measured	7	242	170	2.62	0.04	38	404	6
	Indicated	44.7	166	117	1.78	0.03	168	1,754	26
	Meas. + Ind.	**51.7**	**176**	**124**	**1.89**	**0.03**	**206**	**2,158**	**33**
	Inferred	1.7	116	80	1.35	0.01	4	50	1
Barite Hill	Measured								
	Indicated	7.7	161	153	0.28	0.07	38	48	12
	Meas. + Ind.	**7.7**	**161**	**153**	**0.28**	**0.07**	**38**	**48**	**12**

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Deposit	Classification	Tonnes (Mt)	AgEQ g/t	Ag g/t	Pb%	Cu%	Contained Ag (Moz)	Contained Pb (Mlb)	Contained Cu (Mlb)
	Inferred	0.9	100	81	0.69	0.01	2	13	0
[redacted]									
Valle Esperanza	Measured								
	Indicated	12.2	178	172	0.21	0.03	68	56	9
	Meas. + Ind.	**12.2**	**178**	**172**	**0.21**	**0.03**	**68**	**56**	**9**
	Inferred	10.8	133	123	0.35	0.02	43	84	4
[redacted]									

Notes:

The most likely cut-off grade for these deposits is not known at this time and must be confirmed by the appropriate economic studies.

Silver equivalent grade values are calculated without consideration of variable metal recoveries for silver and lead. A silver price of US$12.52/oz and lead price of US$0.50/lb was used to derive an equivalence formula of AgEQ = Ag + (Pb × 10,000 / 365). Silver prices are based on a three-year rolling average and lead prices are based on an approximate ten-year rolling average.

The estimated metal content does not include any consideration of mining, mineral processing, or metallurgical recoveries.

Tonnes, ounces, and pounds have been rounded and this may have resulted in minor discrepancies in the totals.

Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. No Mineral Reserves have been estimated.

The estimate of Mineral Resources may be materially affected by environmental, permitting, legal, title, taxation, socio-political, marketing, or other relevant issues.

Estimates of Cu were updated by Pan American Silver Corp. for the purposes of this PA.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

20 OTHER RELEVANT DATA AND INFORMATION

20.1 GEOTECHNICAL SITE CONDITIONS AND FOUNDATION DESIGN

Golder has been commissioned to undertake geotechnical investigations for cut slope stability and plant foundation design.

20.2 TAILINGS STORAGE FACILITY (TSF)

20.2.1 Siting Study

A detailed evaluation was conducted of 12 potential TSF sites based on technical, environmental, economic and social factors (Golder 2010a, 2010b). The study identified one site as preferable, with an alternative site also identified should any unexpected flaws be detected during field investigations at the preferred site. The technical and economic factors were evaluated by Golder and included:

- Storage volume/dam volume ratio
- Distance from construction material sources
- Elevation relative to the plant site for pumping cost
- Ability for the storage volume to be expanded for long term capacity
- Surface area of basin for lining cost
- Relative complexity and cost for lining the basin of each site.

Environmental and other factors taken into consideration by PAS included:

- Proximity to sensitive aquifers
- Exposure to winds
- Availability of baseline data
- Presence of sensitive ecosystems
- Archeological/cultural issues
- Potential visual impacts
- Surface land ownership
- Exploration potential

20.2.2 Tailings Storage Facility Pre-Feasibility Study

Golder supervised drilling and undertook a complete field investigation of the proposed TSF Site 7a. Field investigations included detailed geologic mapping, surface structural mapping, supervision of the drilling of ten diamond boreholes with geotechnical logging and hydraulic permeability testing, installation and monitoring of groundwater piezometers; and test pitting. Golder also conducted a full desktop and field investigation into potential seismic hazard. MWH also participated in the design and review of field hydraulic investigations in the TSF area.

Table of Contents

On the basis of field investigation results, Golder proceeded to design a rock fill containment structure and development sequence, a tailings deposition plan, overall TSF water balance, hydraulic performance modelling and containment systems, quantity takeoffs, and a preliminary capital cost estimate for different construction options (+/-25%).

Environmental performance of the preferred TSF option will be evaluated in detail by Golder and MWH. PAS is committed to an environmentally sustainable design that avoids negative impacts to surface and ground waters throughout the entire life cycle of the facility.

20.3 NON-ECONOMICAL MATERIAL STORAGE

Non-economical and subgrade material will be stored in several engineered, geotechnically stable structures located within the mine area. These structures have been designed sympathetic to natural topography in the area and, if they remain sub-economic at plant closure, will be smoothed and fully reclaimed. Detailed geochemical investigations and modelling will ensure that the rock in these structures will not generate negative impacts to surface and ground waters throughout their entire life cycle.

20.4 CUT SLOPES

Golder has provided initial geotechnical recommendations for cut slope design, and is completing further fieldwork and analysis to refine design slope profiles.

20.5 MINE PLAN

A sub-set of the Mineral Resources presented in Section 19 is the basis of the mine plan. This Mineral Resource sub-set is contained within economically optimized open cut designs which were defined based on certain design assumptions, cost and metal recovery information. A mine plan to deliver 15,000 tpd of ore to a primary crusher was developed based on the Resources within the optimized open cut designs. Non-economic material is deposited in storage facilities located close to the open cuts, backfilled into completed cuts or used to build the downstream embankment of the tailings storage facility. The mine equipment fleet requirements were determined to mine and deliver the materials to their appropriate destinations and the mine capital and operating costs were estimated.

The resource tonnage which has been determined to be economic to process based on the metal prices, recoveries and costs used in this PA is referenced as ore in this document versus the uneconomic material. The use of this terminology is a means of separating the material types and it is not intended to imply that the material referenced as ore constitutes a mineral reserve. The economic portion of the resource is summarized in Table 20-1. For this PA, Inferred resource tonnage within the cut limits is included in the overall mine plan. It is tabulated separately on Table 20-3, but is included in the ore tonnage within the production schedule. This PA is preliminary in nature because of the inclusion of Inferred Mineral Resources that are considered too geologically speculative to have the economic considerations applied to them that would enable them to be categorized as mineral reserves. No mineral reserves have been estimated and there is no certainty that the preliminary assessment will be realized.

Table of Contents

The anticipated process flowsheet treats copper-silver ore and lead-silver ore types on a campaign basis. The mine plan tabulates three types of ore: copper-silver ore, lead-silver ore, and lead-pyrite ore (the latter two ore types are to be combined and processed together in the concentrator as the lead-silver ore). The amount of each of these ore types mined in a year is not restricted to a specific percentage of the 15,000 tpd (5,475 kt/yr) delivered to the primary crusher, but is planned to be mined separately and not mixed anywhere in the handling or processing.

Table 20-1: Resource Tonnage and Grade Included in the PA Mine Plan

	kt	Silver, g/t	Lead, %	Copper, %
Measured				
Copper-Silver Ore	2,560	172	0.26	0.27
Lead-Silver Ore	1,321	170	1.88	0.08
Lead-Pyrite Ore	3,968	229	3.41	0.05
Total	7,849	200	2.13	0.13
Indicated				
Copper-Silver Ore	42,226	171	0.12	0.06
Lead-Silver Ore	19,878	102	2.02	0.02
Lead-Pyrite Ore	9,415	227	2.62	0.06
Total	71,519	159	0.98	0.05
Meas & Indicated				
Copper-Silver Ore	44,786	171	0.13	0.07
Lead-Silver Ore	21,199	106	2.01	0.02
Lead-Pyrite Ore	13,383	228	2.86	0.06
Total	79,368	163	1.09	0.06
Inferred				
Copper-Silver Ore	8,086	124	0.17	0.03
Lead-Silver Ore	1,992	105	0.79	0.02
Lead-Pyrite Ore	0			
Total	10,078	120	0.29	0.03

This work was completed by IMC with the initial economic parameters and the cut definition Lerch Grossman algorithm (LG) runs being completed by PAS.

20.5.1 Open Cut Design

The final limits of the open cuts and internal phases for some of the larger cuts are based on the block model, economic assumptions and cut slope recommendations.

Block Model

A single block model comprising the eight deposits of the Navidad Project area and updated for estimates of Cu was developed by PAS for the mining study based on the April 2009 resource estimates discussed in Section 19. The block sizes were regularized to 12.5 by 12.5 m in plan and 5.0 m high. The model covers distances of 4,700 m in the north-south direction (5,301,900N to 5,206,600N), 7,500 m in the east-west direction (2,510,300E to 2,517,800E) and 850 m vertically (from 600 m to 1,450 m in elevation). In the April 2009 estimates, Snowden estimated silver and lead grades for all the deposits and PAS later added estimations for copper, zinc, calcium, sulphur, arsenic and iron for all the deposits. A net value per block was estimated for all blocks in the model based on the following parameters:

- The block model metal values for silver, lead and copper
- The milling recovery matrix of silver, lead, copper and concentrate mass
- The metal prices used
- The smelting and refining recoveries
- The costs at Navidad for mining, milling and G&A (assuming a 15,000 tpd mill project)
- The cost of concentrate transportation, refining and royalties
- Silver Wheaton silver stream sales on the Loma de La Plata ores

The blocks that had a positive value were evaluated as to what type of ore category they would be classified as: copper (a high grade copper-silver concentrate), lead (a lead-silver concentrate) and lead-pyrite ore (lead-silver concentrate that has associated pyrite). Blocks with a negative value were assigned the negative cost of mining, which included a base mining cost plus a haul cost internal to each cut based on the elevation difference between the cut exit and the block being evaluated. The net value per block was divided by the tonnes contained within the block to calculate a net value per tonne for the blocks below topography.

Cut Definition Economics

The economic inputs for the net value calculation per tonne include the metal prices, mill recoveries, smelting and refining recoveries, concentrate transportation and refining costs, royalties and Property operating costs. The metal prices used for the net value per tonne calculations in the mine plan are: $14.00/oz ($0.450/g) silver, $5,600/t ($2.54/lb) copper, $1,700/t ($0.77/lb) lead. The mill metallurgical model matrix for recovery and mass pull for the ore types is presented in Section 18. There are different recoveries for the various cut areas and within the individual cuts depending on oxidation, grade, and lithology considerations. The concentrate transportation and treatment costs, recoveries and payment terms along with the applicable royalties are included in the financial section of this report (Section 20.13).

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

No economic benefit or detrimental value is included for any other elements. The milling cost is $8.86/t plus an incremental additional cost of $0.7576/t times the combined head grade of lead plus copper. The Property G&A cost used is $2.03/t ore and a non-mining sustaining capital cost of $1.04/t ore is included for defining the cut limits.

The mining cost is based on previous internal studies and the haulage portion of the mine cost varies by distance from the primary crusher or non-economic material storage facilities and by depth from potential cut exits. The block model was divided into eight cut areas for the haul cost calculations. An incremental additional cost is included for tonnage above and below the cut exits as a cost per tonne per metre above or below the exit: for ore the incremental cost is $0.001/t/m (above exit) and $0.0018/t/m (below exit, and for non-economic material it is $0.001/t/m (above exit) and $0.0028/t/m (below exit). The non-economic material increment below the cut exit includes an allowance for longer hauls to the storage facilities as material comes from deeper in the cuts. The non-haul portion of the mine cost used for the cut definition routines is shown in Table 20-1. The haul portion of the mine cost (excluding the in-cut incremental cost mentioned above) is shown in Table 20-3.

Table 20-2: Mine Cost Inputs for Cut Definition (excluding hauling)

Mining Cost Center		Ore, $/t	Non-Economic Material, $/t
Drill & Blast		0.492	0.304
Loading		0.181	0.181
Auxiliary		0.145	0.145
Cut Dewatering	Above cut exit	0.000	0.000
Cut Dewatering	Below cut exit	0.063	0.063
Mine G&A		0.370	0.370
Sustaining Capital		0.183	0.183
Total	Non-Haul Cost (above cut exit)	1.371	1.183
Total	Non-Haul Cost (below cut exit)	1.434	1.246

Table 20-3: Haul Portion of the Mine Cost Inputs for Cut Definition

Model Area Code	BH 1	CH 2	CN 3	CZ 4	GH 5	LP 6	NH 7	VE 8
Exit Elevation	1125	1195	1195	1195	1155	1245	1195	1135
Ore Haul, $/t	0.607	0.269	0.269	0.269	0.354	0.373	0.269	0.419
Non-economic Material Haul, $/t	0.215	0.202	0.202	0.202	0.235	0.217	0.202	0.264

BH = Barite Hill   CH = Calcite Hill   CN = Calcite NW   CZ = Connector Zone

GH = Galena Hill LP = Loma de La Plata   NH = Navidad Hill   VE = Valle Esperanza

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Cut Slope Recommendations

The cut slope angles used for the cut definition runs and for the cut design work are based on the results of Golder s geotechnical assessment for open cut mining at the Project (Golder, 2010a, 2010b). The Golder work focused on the slope angles for the Loma de La Plata cut and to a lesser extent for the remaining cut areas. For Loma de La Plata, the design slope angle recommendations are for a maximum inter-ramp slope angle (IRA) of 43° with 38° used in the upper 40 m of pelite. Much of the west wall of Loma de La Plata is defined by the dip of the ore deposit which is less than the 43° IRA. For the remaining cuts, the maximum IRA slope angle of 43° recommended for Loma de La Plata is to be used for this PA study, with the exception of Barite Hill when there is uncertainty with respect to weathering.

Golder recommended IRA plus previous design work were combined to select overall slope angles (OSA) as input to the cut definition LG run PAS. The OSA angles used were 41° for all cuts except Barite Hill where a 35° OSA was used for cut definition runs. The 41° slope assumes one ramp width in the final cut walls for most cuts.

IMC applied the Golder slope recommendations for the PA cut designs as follows:

- Maximum OSA = 41.5° except in Barite Hill where maximum OSA is 35.0°.
- Maximum ISA = 43.0°, except in soft pelite where ISA = 35.0°.
- Bench face angle = 65.0°.

Cut Definition Runs

A series of cut definition runs were completed by PAS and included the base case, variations in metal prices (from -50% to +40% in 10% increments), plus and minus 20% changes in costs, flatter slopes and limiting the cut bottom elevations to reflect potential underground mining. The changes to metal prices had the largest impact on percentage change to the Project cashflow per percentage change of the metal price, with all other changes having lesser impacts. The LG cut shell using metal prices that decreased by 20% appears to be a robust choice in respect to maximization of value at the base case input parameters whilst not exposing the mine development to adverse cost estimation risk. The incremental difference in undiscounted cashflow between the -20% metal price shell and the base case metal price shell is only 4.5%. Table 20-4 summarizes the tonnage contained in the -20% LG shell by cut area. The ore tonnage is the combination of all ore types.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Table 20-4: Cut Definition Leach Grossman Shell Used for Cut Design Guidance

Cut Area	Ore, Millions tonnes	Silver, g/t	Copper,%	Lead, %	Non-Economic Material Millions tonnes	W/O ratio	Profit $/t ore
LP	22.3	180	0.043	0.07	114.1	5.12	38.84
CH-East	5.6	94	0.054	0.20	5.3	0.95	14.94
CH-West	9.6	111	0.056	0.76	24.5	2.56	22.30
CN	2.2	129	0.033	0.41	9.5	4.34	8.50
VE	15.3	156	0.032	0.17	164.0	10.72	17.17
GH	30.1	163	0.033	2.43	16.5	0.55	16.15
CZ	1.1	169	0.062	0.63	2.2	2.1	16.10
NH	7.3	131	0.189	0.37	7.9	1.09	13.35
BH	3.5	193	0.106	0.17	47.5	13.44	11.57
Total	97.0	155	0.053	0.93	391.5	4.04	21.52

BH = Barite Hill   CH = Calcite Hill   CN = Calcite NW   CZ = Connector Zone

GH = Galena Hill LP = Loma de La Plata   NH = Navidad Hill   VE = Valle Esperanza

20.5.2 Open Cut and Phase Design

IMC used the -20% metal price LG shell as a guide to the designs of the various cuts. The Calcite Hill, Navidad Hill, Loma de La Plata and Valle Esperanza cuts were sub-divided into two mining phases each. Phase 2 of Navidad Hill included the Connector Zone. The cut and phase design parameters in addition to the Golder cut slope interramp angles presented earlier are:

- Haul road width = 28 m (including berms and ditches) for two way traffic.
- Haul road width = 20 m (including berms and ditches) for one way traffic.
- Maximum grade on haul ramps = 10%.
- One way traffic ramp width can be used for the bottom benches in a cut.
- Minimum cut base width or length = 25 m.

- Minimum inside bench toe radius = 12.5 m.

The mining phase designs were completed to match as closely as possible the LG shell limits taking into consideration the additional design limitations. Haulage ramps were incorporated into the phase designs with particular attention given to the haul ramp exits from the cuts, the mining width geometries, and good ramp alignments to maximize safety and reduce costs. The non-economic material is a significant portion of the total tonnage mined in many of the mining phases, thus cut exits were designed to provide the shortest non-economic material hauls and if possible also for the ore. For many of the cuts on the east side of the Project, there is an ore haul exit on the west side of the cut and a non-economic material haul exit on the east or south side of the cut.

Table of Contents

The general layout of the open cuts is shown on Figure 20-1 and the Loma de La Plata cut on the west side of the projects is shown in more detail on Figure 20-2. The eastern and southern cuts are shown on Figure 20-3. The mill and infrastructure area is located between the Loma de La Plata cut and the eastern cuts. The primary crusher is located west of the Calcite Hill cut with the truck discharge into the crusher at the 1191 m elevation.

Three ore types are tabulated from the mine plan: copper-silver ore, lead-silver ore and lead-pyrite ore. The lead-silver and lead-pyrite will be blended into one ore type for feed to the concentrator, resulting in only two ore type streams for the concentrator, those being copper-silver and lead-silver. The cuts and mining phases present different aspects requiring different considerations for inclusion within the overall mining plan. For example, some have a mix of the ore types while some areas like Loma de La Plata and Valle Esperanza being very low in lead -silver ore, are primary sources of the copper-silver ore type. Galena Hill has almost no copper-silver ore, but contains all of the pyrite ore. Galena Hill and the Calcite Hill cut have 87% of the lead-silver ore. The non-economic material to ore ratios vary from 0.71 in the Galena Hill cut to 13.22 in the Valle Esperanza cut.

The ore tonnage is tabulated using a net value cutoff of $0.10/t. The net value is based on the metal prices ($14.00/oz (0.450/g) silver, $5,600/t ($2.54/lb) copper, $1,700/t ($0.77/lb) lead) plus all recoveries, post Property costs for concentrate and all Property operating costs (processing, G&A and mining cost of the ore). The tonnages and relative percentage of the ore types by mining phase are shown on Table 20-5. The tonnages of ore and non-economic material by mining phase are shown on Table 20-6.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Table 20-5: Ore Tonnage and Relative Percent by Ore Type in Phase Designs

		Ore Type Tonnage (kt)				Percent of Each Ore Type by Phase		
Cut Area	**Phase**	**Copper-Silver**	**Lead-Silver**	**Lead-Pyrite**	**Total**	**Copper-Silver**	**Lead-Silver**	**Lead-Pyrite**
Loma de La Plata	Road Fill	0	0	0	0			
Loma de La Plata	Phase 1	11,519	42	0	11,561	99.64%	0.36%	0.00%
Loma de La Plata	Phase 2	8,700	157	0	8,857	98.32%	1.77%	0.00%
Calcite Hill	Phase 1	1,142	2,178	0	3,320	34.40%	65.60%	0.00%
Calcite Hill	Phase 2	10,433	2,928	0	13,361	78.09%	21.91%	0.00%
Navidad Hill	Phase 1	1,997	702	0	2,699	73.99%	26.01%	0.00%
Navidad Hill	Phase 2	2,827	678	0	3,505	80.66%	19.34%	0.00%
Calcite Northwest	Phase 1	1,304	581	0	1,885	69.18%	30.82%	0.00%
Galena Hill	Phase 1	342	14,978	13,383	28,703	1.19%	52.18%	46.63%
Barite Hill	Phase 1	2,660	271	0	2,931	90.75%	9.25%	0.00%
Valle Esperanza	Phase 1	5,058	459	0	5,517	91.68%	8.32%	0.00%
Valle esperanza	Phase 2	6,890	217	0	7,107	98.23%	3.05%	0.00%
All Cuts		52,872	23,191	13,383	89,446	59.11%	25.93%	14.96%

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Table 20-6: Summary of Phase Tonnage

Location	Description	Phase name	Copper-Silver Ore (>= 0.10/t net value) kt	Ag, ppm	Pb, %	Cu, %	Lead-Silver Ore (>= 0.10/t net value) kt	Ag, ppm	Pb, %	Cu, %	Lead-Pyrite Ores (>= 0.10/t net value) kt	Ag, ppm	Pb, %	Cu, %
Northeast														
Calcite Northwest	one Phase	cn01tr09	1,304	148.2	0.35	0.04	581	96.9	0.58	0.02	0			
Calcite Hill	Phase 1	ch01tr09	1,142	185.3	0.37	0.08	2,178	98.3	1.94	0.05	0			
Navidad Hill	Phase 1	nv01tr09	1,997	166.9	0.31	0.19	702	179.3	1.51	0.14	0			
Calcite Hill	Phase 2	ch02tr09	10,433	100.3	0.13	0.07	2,928	71.8	1.14	0.03	0			
Navidad Hill	Phase 2	nv02tr09	2,827	148.3	0.18	0.23	678	153.9	0.72	0.05	0			
East														
Galena Hill	one phase	gh01tr09	342	260.9	0.48	0.04	14,978	109.4	2.29	0.01	13,383	227.5	2.86	0.06
Barite Hill	one Phase	bh01tr09	2,660	207.8	0.13	0.12	271	106.5	0.54	0.03	0			
South														
Valle Espranza	Phase 1	ve01tr09	5,058	114.9	0.14	0.03	459	92.4	0.47	0.01	0			
Valle Espranza	Phase 2	ve02tr09	6,890	210.6	0.18	0.04	217	92.0	0.41	0.02	0			
West														
Loma del Plata		lp01S1	0				0				0			
Loma del Plata	Phase 1	lp01tr09	11,519	203.2	0.06	0.04	42	68.4	0.31	0.02	0			
Loma del Plata	Phase 2	lp02tr09	8,700	164.0	0.07	0.05	157	85.1	0.43	0.02	0			
Total			52,872	163.5	0.13	0.07	23,191	106.0	1.91	0.02	13,383	227.5	2.86	0.06

Location	Description	Phase name	All Ore Types (>= 0.10/t net value) ktonnes	Ag, ppm	Pb, %	Cu, %	Non-Econ. ktonnes	Total ktonnes	W/O Ratio
Northeast									
Calcite Northwest	one Phase	cn01tr09	1,885	132.4	0.42	0.03	10,096	11,981	5.36
Calcite Hill	Phase 1	ch01tr09	3,320	128.3	1.40	0.06	16,463	19,783	4.96
Navidad Hill	Phase 1	nv01tr09	2,699	170.1	0.62	0.18	6,668	9,367	2.47
Calcite Hill	Phase 2	ch02tr09	13,361	94.0	0.35	0.06	27,704	41,065	2.07
Navidad Hill	Phase 2	nv02tr09	3,505	149.4	0.29	0.20	5,638	9,143	1.61
East									
Galena Hill	one phase	gh01tr09	28,703	166.3	2.53	0.03	20,326	49,029	0.71
Barite Hill	one Phase	bh01tr09	2,931	198.4	0.17	0.12	47,499	50,430	16.21
South									
	Phase 1	ve01tr09	5,517	113.1	0.17	0.03	95,568	101,085	17.32

Valle Espranza									
Valle Espranza	Phase 2	ve02tr09	7,107	207.0	0.19	0.04	71,306	78,413	10.03
West									
Loma del Plata		lp01S1	0				2,175	2,175	
Loma del Plata	Phase 1	lp01tr09	11,561	202.7	0.06	0.04	31,932	43,493	2.76
Loma del Plata	Phase 2	lp02tr09	8,857	162.6	0.08	0.04	82,708	91,565	9.34
Total			89,446	158.2	1.00	0.05	418,083	507,529	4.67

Figure 20-1: Layout of Open Cuts

Table of Contents

Figure 20-2: West Cut, Loma de La Plata

Table of Contents

Figure 20-3: East and South Cuts (Calcite NW, Calcite Hill, Navidad Hill, Galena Hill, Barite Hill, Valle Esperanza)

Table of Contents

20.5.3 Mine Production Schedule

A mine production schedule was developed to provide continuous ore feed to the mill at a rate of 15,000 tpd. For the mine schedule there are three ore types tabulated (copper-silver ore, lead-silver ore and pyrite ore) which will be processed either jointly or on a campaign basis. The lead-silver and pyrite ores are assumed to be processed jointly in this schedule and are referred to as the lead-silver ore. This approach may be modified as the metallurgical test work continues. The copper-silver ore is 59% of the total ore tonnage over the life of the mine and the balance (41%) is a combination of the lead-silver and lead-pyrite ores. Each of the ore types (copper-silver versus lead-silver) will be processed for several days or weeks depending on the availability of that ore type in the mining phases which are actively being mined (plus tonnage in a run of mine stockpile near the primary crusher) and the availability of the other ore type. Galena Hill is the primary source for the pyrite ore whereas Loma de La Plata and Valle Esperanza are predominately copper-silver ore. The other cuts generally have both ore types which are discretely available as the mining develops. While one ore type is being crushed and processed, the other ore type will either be left in the cut or mined and stockpiled near the primary crusher. Stockpiling of the ore above the mill cutoff grade will only be done for ore areas in cuts with a close association of both ore types. It is preferred to minimize the stockpiling of ore which will be processed in the future.

The mine schedule is based on the criteria listed below.

- Maintain the ore to the mill at 15,000 tpd for 365 days per year (5.475 Mt per year) after the year 1 ramp-up period.
- Have both types of ore available in the cuts being actively mined.
- There is no annual restriction of ore percentages, but the ore values and non-economic material to ore tonnage ratios require a blend of ore types be delivered to the primary crusher on an annual basis (but the ore types will be processed on a campaign basis).
- Mine the highest value ore as early as possible in the mine life.
- Maintain a consistent total tonnage mining rate.
- Have a reasonable descent rate within the mining phases (number of benches mined per year).
- Balance the haulage distances from one year to the next as much as possible.

The mine production schedule lasts 14.9 years after a pre-production and construction period with an additional 1.6 years of re-handling ore from a low grade stockpile for plant feed for additional time after the mining is completed. The year 1 mill tonnage is 4,544 kt (combined tonnage mined in pre-production and year 1) which is 83% of a full year s production rate. This production rate reduction is an allowance for mill commissioning and start up. There are 6,349 kt of non-economic material mined during pre-production of which the majority is used to construct the initial embankment for the tailings storage facility. The balance is used to build the base for the stockpile area near the primary crusher and an upper fill ramp in the Loma de La Plata cut.

Table of Contents

A series of trial mine production schedules were completed and compared on a simplistic cashflow basis. Schedules with a flat net value cutoff grade approach and schedules with an elevated cutoff grade (and stockpiling of the lower grade material) were compared. The best net present value (NPV) schedule is one that used an elevated cutoff grade during years 4 through 11 during which 12.56 Mt of lower grade material was stockpiled for processing during years 13 through 17 of the plan.

The total mining tonnage rate reaches its maximum of 40 Mt per year in year 4 and this rate is maintained through year 13 after which the non-economic material stripping tonnage rate drops off. The non-economic material is placed in storage facilities as close as possible to the cut exits. The Galena Hill cut is mined out by the end of year 11 and backfilling of it with non-economic material from Valle Esperanza occurs during year 12 through 15. A summary of the mine production schedule is presented on Table 20-7 and the ore and non-economic material production by phase by year is shown on Table 20-8.

The cut and non-economic material storage facility configurations for selected years of the mine plan are shown on Figure 20-4 (end of year 1), Figure 20-5 (end of year 3), Figure 20-6 (end of year 5), Figure 20-7 (end of year 10), Figure 20-8 (end of year 15, end of cut mining) and Figure 20-9 (end of year 17, completion of low grade stockpile reclaim).

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Table 20-7: PA Mine Production Schedule

Net Value/tonne Cutoff	Year -1 0.10	Year 1 0.10	Year 2 0.10	Year 3 0.10	Year 4 10.00	Year 5 6.00	Year 6 6.00	Year 7 10.00	Year 8 10.00	Year 9 10.00	Year 10 2.00	Year 11 2.00	Year 12 0.10	Year 13 0.10	Year 14 0.10	Year 15 0.10	Year 0.1
DIRECT MILL FEED (PIT TO CRUSHER)																	
Copper-Silver Ore Mined																	
kt	520	3,079	2,995	3,589	2,601	2,755	2,945	3,547	3,882	4,388	2,447	1,677	496	1,759	4,353	4,743	
Ag, ppm	209.3	253.2	238.7	170.3	166.3	192.3	149.3	143.5	155.6	168.3	106.0	110.1	141.2	190.4	209.9	200.1	
Pb,%	0.17	0.08	0.08	0.07	0.19	0.23	0.10	0.15	0.13	0.12	0.14	0.12	0.11	0.12	0.20	0.21	
Cu,%	0.02	0.04	0.03	0.06	0.11	0.21	0.06	0.05	0.05	0.07	0.04	0.04	0.05	0.04	0.05	0.08	
Lead-Silver Ore Mined																	
kt	131	731	1,480	1,216	1,862	1,526	1,337	1,351	1,044	625	1,556	2,155	2,725	294	526	356	
Ag, ppm	71.5	149.0	110.7	87.8	154.7	149.2	133.4	116.4	99.5	122.9	114.7	99.8	88.9	102.5	96.4	100.2	
Pb,%	0.62	2.14	2.24	1.85	2.46	2.33	2.21	1.65	2.13	2.02	2.26	2.36	2.09	1.21	0.56	0.50	
Cu,%	0.00	0.01	0.01	0.04	0.06	0.04	0.02	0.04	0.02	0.02	0.01	0.01	0.02	0.03	0.02	0.02	
Lead - Pyrite Ore Mined																	
kt	0	83	999	669	1,012	1,194	1,193	577	549	462	1,473	1,643	2,253	83	0	0	
Ag, ppm		220.6	258.2	289.5	309.8	301.1	279.4	282.9	261.3	251.8	224.9	173.3	119.0	82.5			
Pb,%		4.32	2.25	2.68	3.22	3.02	3.25	3.74	3.83	3.78	3.07	3.01	2.70	3.10			
Cu,%		0.01	0.07	0.07	0.07	0.07	0.07	0.06	0.06	0.06	0.06	0.04	0.02	0.01			
Total Ore Mined as Mill Feed																	
kt	651	3,893	5,474	5,474	5,475	5,475	5,475	5,475	5,475	5,475	5,476	5,475	5,474	2,136	4,879	5,099	
Ag, ppm	181.6	232.9	207.7	166.5	188.9	204.0	173.8	151.5	155.5	170.2	140.5	125.0	106.0	174.1	197.7	193.1	
Pb,%	0.26	0.56	1.06	0.78	1.52	1.42	1.30	0.90	0.88	0.65	1.53	1.87	2.16	0.39	0.24	0.23	
Cu,%	0.02	0.03	0.03	0.06	0.09	0.13	0.05	0.05	0.05	0.06	0.04	0.03	0.02	0.04	0.05	0.08	
TO LOW GRADE STOCKPILE																	
Copper-Silver Low Grade Mined & Stockpiled																	
kt					986	797	709	1,262	1,136	1,896	239	73					
Ag, ppm					77.8	95.5	70.3	61.3	59.4	53.7	49.2	51.0					
Pb,%					0.12	0.12	0.03	0.08	0.10	0.08	0.07	0.06					
Cu,%					0.07	0.18	0.10	0.04	0.06	0.07	0.03	0.03					
Lead-Silver Low Grade Mined & Stockpiled																	
kt					937	380	447	1,060	786	381	125	158					
Ag, ppm					69.9	71.3	87.0	64.7	59.0	63.5	50.0	48.1					
Pb,%					1.53	1.29	1.04	0.99	1.10	1.14	1.36	1.32					
Cu,%					0.03	0.02	0.02	0.02	0.02	0.02	0.01	0.01					
Lead - Pyrite Low Grade Mined & Stockpiled																	

kt					325	124	105	178	195	160	41	64				
Ag, ppm					248.8	201.9	197.3	215.5	211.7	214.8	166.7	110.0				
Pb,%					1.05	1.31	0.88	1.02	1.07	1.11	0.94	1.32				
Cu,%					0.08	0.06	0.08	0.07	0.08	0.08	0.06	0.04				
Total Low Grade Mined & Stockpiled																
kt	0	0	0	0	2,248	1,301	1,261	2,500	2,117	2,437	405	295	0	0	0	0
Ag, ppm					99.2	98.6	86.8	73.7	73.3	65.8	61.3	62.2				
Pb,%					0.84	0.58	0.46	0.53	0.56	0.31	0.56	1.01				
Cu,%					0.05	0.12	0.07	0.03	0.05	0.06	0.03	0.02				

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Net Value/tonne Cutoff	Year -1 0.10	Year 1 0.10	Year 2 0.10	Year 3 0.10	Year 4 10.00	Year 5 6.00	Year 6 6.00	Year 7 10.00	Year 8 10.00	Year 9 10.00	Year 10 2.00	Year 11 2.00	Year 12 0.10	Year 13 0.10	Year 0.1
LOW GRADE STOCKPILE RECLAIM															
Copper-Silver Low Grade Mill Feed															
ktonnes														1,843	
Ag, ppm														70.4	7
Pb,%														0.10	0
Cu,%														0.06	0
Lead-Silver Low Grade Mill Feed															
ktonnes														1,114	
Ag, ppm														72.0	7
Pb,%														1.34	1
Cu,%														0.02	0
Lead - Pyrite Low Grade Mill Feed															
ktonnes														381	
Ag, ppm														241.0	24
Pb,%														1.14	1
Cu,%														0.08	0
Total Low Grade Mill Feed															
ktonnes	0	0	0	0	0	0	0	0	0	0	0	0	0	3,338	
Ag, ppm														90.5	9
Pb,%														0.63	0
Cu,%														0.05	0
Total Mill Feed (Pit Ore + Low Grade Stockpile Reclaim)															
ktonnes	**651**	**3,893**	**5,474**	**5,474**	**5,475**	**5,475**	**5,475**	**5,475**	**5,475**	**5,475**	**5,476**	**5,475**	**5,474**	**5,474**	**5,**
Ag, ppm	**181.6**	**232.9**	**207.7**	**166.5**	**188.9**	**204.0**	**173.8**	**151.5**	**155.5**	**170.2**	**140.5**	**125.0**	**106.0**	**123.1**	**18**
Pb,%	**0.26**	**0.56**	**1.06**	**0.78**	**1.52**	**1.42**	**1.30**	**0.90**	**0.88**	**0.65**	**1.53**	**1.87**	**2.16**	**0.54**	**0**
Cu,%	**0.02**	**0.03**	**0.03**	**0.06**	**0.09**	**0.13**	**0.05**	**0.05**	**0.05**	**0.06**	**0.04**	**0.03**	**0.02**	**0.05**	**0**
Non-Economic, kt	6,349	11,107	14,526	24,526	32,277	33,224	33,264	32,025	32,408	32,088	34,119	34,230	34,526	37,864	22,
Low Grade to Stkpile, kt					2,248	1,301	1,261	2,500	2,117	2,437	405	295			
Total, kt	7,000	15,000	20,000	30,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	27,
Rehandle Ore from Stockpile to Mill, kt														3,338	
Ore Percentage															
Copper Ore	79.9%	79.1%	54.7%	65.6%	47.5%	50.3%	53.8%	64.8%	70.9%	80.1%	44.7%	30.6%	9.1%	65.8%	8
Lead Ore	20.1%	18.8%	27.0%	22.2%	34.0%	27.9%	24.4%	24.7%	19.1%	11.4%	28.4%	39.4%	49.8%	25.7%	1
Lead-Pyrite Ore	0.0%	2.1%	18.2%	12.2%	18.5%	21.8%	21.8%	10.5%	10.0%	8.4%	26.9%	30.0%	41.2%	8.5%	

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Table 20-8: PA Production Schedule Ore and Non-Economic Material Tonnage by Mining Phase

Location		Year -1 ktonnes	Year 1 ktonnes	Year 2 ktonnes	Year 3 ktonnes	Year 4 ktonnes	Year 5 ktonnes	Year 6 ktonnes	Year 7 ktonnes	Year 8 ktonnes	Year 9 ktonnes	Year 10 ktonnes	Year 11 ktonnes	Year 12 ktonnes	Year 13 ktonnes	Year 14 ktonnes
Northeast																
Calcite Northwest	ore															678
	low grade															
	waste														1,865	8,129
	total														1,865	8,807
Calcite Hill - ph 1	ore	213	0	0	626	990	1,114									
	low grade					338	40									
	waste	4,057	6,167	1,269	4,251	652	66									
	total	4,270	6,167	1,269	4,877	1,980	1,220									
Navidad Hill - ph 1	ore				178	1,386	443									
	low grade					571	119									
	waste				2,254	4,092	324									
	total				2,432	6,049	886									
Calcite Hill - ph 2	ore						23	0	2,206	2,688	3,131	766	240			
	low grade						99	9	1,193	1,174	1,715	101	14			
	waste						570	6,222	11,469	3,351	4,870	1,197	27			
	total						692	6,231	14,868	7,213	9,716	2,064	281			
Navidad Hill - ph 2	ore						1,288	665	242							
	low grade						645	601	61							
	waste						2,091	2,638	912							
	total						4,024	3,904	1,215							
East																
Galena Hill	ore		884	2,633	1,282	1,723	2,170	2,219	1,030	1,000	858	2,993	3,658	4,930	198	
	low grade					831	330	327	432	450	374	165	217			
	waste		2,841	5,672	2,208	3,530	1,902	1,123	513	378	243	382	501	884	148	
	total		3,725	8,305	3,490	6,084	4,402	3,669	1,975	1,828	1,475	3,540	4,376	5,814	346	
Barite Hill	ore														300	1,130
	low grade									6						
	waste								4,089	4,115	0	0	7,808	9,498	13,710	6,570
	total								4,089	4,121	0	0	7,808	9,498	14,010	7,700
South																

Valle de Espranza phase 1	ore								130	323	412	1,716	1,577	544		
	low grade								111	253	249	138	64			
	waste								6,055	20,936	23,344	31,969	11,526	1,738		
	total								6,296	21,512	24,005	33,823	13,167	2,282		
Valle de Espranza phase 2	ore														1,638	3,071
	low grade															
	waste										2,778	573	14,368	22,406	22,141	7,695
	total										2,778	573	14,368	22,406	23,779	10,766
West Loma del Plata road fill	ore															
	low grade															
	waste	2,175														
	total	2,175														
Loma del Plata phase 1	ore	438	3,009	2,842	3,388	1,375										
	low grade					509										
	waste	117	2,099	7,584	15,813	6,319										
	total	555	5,108	10,426	19,201	8,203										
Loma del Plata phase 2	ore						436	2,590	1,866	1,464	1,074					
	low grade						68	323	701	235	99					
	waste					17,684	28,272	23,283	8,990	3,627	853					
	total					17,684	28,776	26,196	11,557	5,326	2,026					
TOTAL	ore	651	3,893	5,475	5,474	5,474	5,474	5,474	5,474	5,475	5,475	5,475	5,475	5,474	2,136	4,879
	low grade	0	0	0	0	2,249	1,301	1,260	2,498	2,118	2,437	404	295	0	0	0
	waste	6,349	11,107	14,525	24,526	32,277	33,225	33,266	32,028	32,407	32,088	34,121	34,230	34,526	37,864	22,394
	Total	7,000	15,000	20,000	30,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	27,273

Table of Contents

Figure 20-4: PA Mine Schedule   End of Year 1

Table of Contents

Figure 20-5: PA Mine Schedule End of Year 3

Figure 20-6: PA Mine Schedule End of Year 5

Table of Contents

Figure 20-7: PA Mine Schedule   End of Year 10

Table of Contents

Figure 20-8: PA Mine Schedule   End of Year 15 (end of cut mining)

Table of Contents

Figure 20-9: PA Mine Schedule End of Year 17 (end of low grade stockpile reclaim)

Table of Contents

20.5.4 Non-Economical Material Storage Facilities

The non-economical material is to be stored on the Property with consideration to a number of criteria. Non-economical material not used for construction material at the tailings storage facility or to construct the base for the run of mine stock pile area is placed in storage facilities close to the cut exits. A limited amount of storage of non-economic material in mined out cuts has been modelled; however, the environmental and economic benefits and the possibility of sterilizing areas of future exploration potential require further review. The design criteria for the facility construction are:

- Avoid the major drainage east of the eastern cuts.
- Minimize the impoundment of runoff if storage facilities are placed in low or valley areas.
- Place external storage facilities as close to the cut exits as possible to minimize land area impact and maintain short hauls.
- Design external storage facilities on 30 m lifts with set-backs between the lifts sufficient that when dozed, the overall slope of the pile will be about 20°.
- The material swell from in-situ in the cut to the settled volume in the storage facility was estimated at 30%.

The non-economical material tonnages mined by year and placed in the various storage areas is shown on Table 20-8 in the previous report section. The non-economical material tonnage by year and mining phase and its destinations are shown on Table 20-9. The location of the non-economical material storage facilities is shown on the maps included at the end of the previous section in this report.

Table of Contents

NAVIDAD PROJECT
PRELIMINARY ASSESSMENT

Table 20-9: Non- Economic Material Tonnage by Year and by Storage Facility Locations

Source Location	Year -1 ktonnes	Year 1 ktonnes	Year 2 ktonnes	Year 3 ktonnes	Year 4 ktonnes	Year 5 ktonnes	Year 6 ktonnes	Year 7 ktonnes	Year 8 ktonnes	Year 9 ktonnes	Year 10 ktonnes	Year 11 ktonnes	Year 12 ktonnes	Year 13 ktonnes	Year 14 ktonnes	Year 1 ktonn
Northeast																
Calcite Northwest														1,865	8,129	10
Calcite Hill - ph 1	4,057	6,167	1,269	4,251	652	66										
Navidad Hill - ph 1				2,254	4,092	324										
Calcite Hill - ph 2						570	6,222	11,469	3,351	4,870	1,197	27				
Navidad Hill - ph 2						2,091	2,638	912								
East																
Galena Hill		2,841	5,672	2,208	3,530	1,902	1,123	513	378	243	382	501	884	148		
Barite Hill								4,089	4,115	0	0	7,808	9,498	13,710	6,570	1,70
South																
Espranza - ph 1								6,055	20,936	23,344	31,969	11,526	1,738			
Espranza - ph 2										2,778	573	14,368	22,406	22,141	7,695	1,34
West																
Loma del Plata -road	2,175															
Loma del Plata - ph1	117	2,099	7,584	15,813	6,319											
Loma del Plata - ph2					17,684	28,272	23,283	8,990	3,627	853						
Total	6,349	11,107	14,525	24,526	32,277	33,225	33,266	32,028	32,407	32,088	34,121	34,230	34,526	37,864	22,394	3,1

Destination Location	Year -1 ktonnes	Year 1 ktonnes	Year 2 ktonnes	Year 3 ktonnes	Year 4 ktonnes	Year 5 ktonnes	Year 6 ktonnes	Year 7 ktonnes	Year 8 ktonnes	Year 9 ktonnes	Year 10 ktonnes	Year 11 ktonnes	Year 12 ktonnes	Year 13 ktonnes	Year 14 ktonnes	Year 1 ktonn
Loma Rd fill																