TECHNICAL REPORT FOR GUALCAMAYO PROJECT

SAN JUAN - ARGENTINA

Report for NI 43-101

PURSUANT TO NATIONAL INSTRUMENT 43-101 OF THE CANADIAN SECURITIES ADMINISTRATORS

Prepared For

YAMANA GOLD INC.

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## 1. TECHNICAL REPORT FOR GUALCAMAYO PROJECT

## 2. TABLE OF CONTENTS

1. TECHNICAL REPORT FOR GUALCAMAYO PROJECT ................................................................. 2

2. TABLE OF CONTENTS .................................................................................................................. 2

3. SUMMARY ...................................................................................................................................... 9

   3.1 PROPERTY DESCRIPTION AND LOCATION .............................................................................. 9

   3.2 OWNERSHIP ............................................................................................................................... 9

   3.3 GEOLOGY AND MINERALIZATION ........................................................................................... 9

   3.4 EXPLORATION .......................................................................................................................... 10

   3.5 MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES .................................................. 10

   3.6 MINING OPERATIONS .............................................................................................................. 11

   3.6.1 QDD Upper .............................................................................................................................. 11

   3.6.2 Amelia Inés & Magdalena Deposits ....................................................................................... 12

   3.6.3 Quebrada del Diablo Lower West, Underground Mining ....................................................... 12

   3.7 TECTONIC CONDITIONS ......................................................................................................... 13

   3.7.1 Information from Other Authors .......................................................................................... 13

   3.7.2 Overcoring Campaing in QDDLW ....................................................................................... 14

   3.7.3 Relative Magnitude between Primary and Secondary Stresses ........................................... 16

   3.7.4 Absolute magnitude of the principal and secondary stress ................................................ 16

   3.8 IN-SITU STRESSES FOR THE SIMULATION .......................................................................... 16

   3.9 SIMULATION PLAN FOR MINING AT QDDLW ................................................................. 19

   3.10 RESULTS OF THE SIMULATOR .............................................................................................. 20

   3.10.1 Out-Put Nomenclature ......................................................................................................... 20

   3.1 CONCLUSIONS AND RECOMMENDATIONS ......................................................................... 24

   3.1.1 Geo Metallurgic ...................................................................................................................... 24

   3.1.2 Geotechnical .......................................................................................................................... 25

   3.1.3 Rock Quality Values for the Simulation ................................................................................. 26

   3.1.4 ALCODER Simulator ............................................................................................................ 27

   3.1.5 Mine Design .......................................................................................................................... 27

4. INTRODUCTION .......................................................................................................................... 29

5. RELIANCE ON OTHER EXPERTS ............................................................................................. 30

6. PROPERTY DESCRIPTION AND LOCATION ............................................................................ 31

   6.1 MINERAL RIGHTS .................................................................................................................... 32

   6.2 NATURE AND EXTEND OF ISSUER’S TITLE ............................................................................ 34

   6.3 SURFACE RIGHTS ................................................................................................................... 35

   6.4 ENVIRONMENT CONSIDERATIONS, PERMITS & ENVIRONMENTAL LIABILITIES ........... 36

   6.4.1 Environment Considerations ................................................................................................. 36

   6.4.2 Permits .................................................................................................................................. 37

   6.4.3 Environmental Monitoring .................................................................................................... 37

   6.4.4 Closure .................................................................................................................................. 37

7. ACCESSIBILITY, CLIMATE, PHYSIOGRAPHY, SEISMICITY, LOCAL RESOURCES AND INFRASTRUCTURE .................................................................................................................. 39

   7.1 ACCESSIBILITY ......................................................................................................................... 39

   7.2 CLIMATE .................................................................................................................................... 39
16.1 Standards ......................................................................................................................... 71
16.2 Blanks ................................................................................................................................. 74
16.3 Check Assays ...................................................................................................................... 74
16.4 2010 Campaign .................................................................................................................. 75
16.5 2008 Campaign .................................................................................................................. 78
17. Adjacent Properties .............................................................................................................. 80
18. Mineral Processing and Metallurgical Testing ................................................................. 81
18.1 Mineral Processing .............................................................................................................. 81
18.2 Metallurgical Testing ......................................................................................................... 82
18.2.1 QDD Upper Metallurgy ................................................................................................. 82
18.2.2 QDD LW Metallurgy .................................................................................................... 88
18.3 AIM Metallurgy ................................................................................................................ 94
18.3.1 Geometallurgical Model ............................................................................................... 95
18.3.2 Variograms .................................................................................................................. 96
18.3.3 Kriging ....................................................................................................................... 98
18.3.4 Conclusion and Recommendations ............................................................................ 99
19.1 Mineral Resources .......................................................................................................... 100
19.2 Mineral Reserves ........................................................................................................... 100
20. Other Relevant Data and Information ............................................................................... 102
21. Interpretation and Conclusions ......................................................................................... 103
21.1 QDD Upper ..................................................................................................................... 103
21.2 QDD Lower West ............................................................................................................ 103
21.2.1 Geo Metallurgy ............................................................................................................ 103
21.2.2 Geotechnical ............................................................................................................. 103
21.2.3 Mine Design ............................................................................................................... 105
21.2.4 Economic Aspects ...................................................................................................... 105
21.3 AIM ............................................................................................................................... 105
21.3.1 Metallurgy ................................................................................................................ 105
21.3.2 Geometallurgical Model ............................................................................................ 106
22. Recommendations ............................................................................................................ 107
22.1 QDD Upper ..................................................................................................................... 107
22.2 QDD Lower West ........................................................................................................... 107
22.3 AIM ............................................................................................................................... 107
23. References ........................................................................................................................ 108
24. Date and Signature Page .................................................................................................... 109
25. Additional Requirements .................................................................................................. 117
25.1 Mining Operations .......................................................................................................... 117
25.1.1 QDD Upper .............................................................................................................. 117
25.1.2 Amelia Inés & Magdalena Deposits .......................................................................... 118
25.1.3 Quebrada del Diablo Lower West, Underground Mining

25.2 RECOVERABILITY

25.2.1 QDD Upper

25.2.2 AIM

25.2.3 QDD Lower West Results Analysis

25.3 MARKETS

25.4 CONTRACTS

25.5 ENVIRONMENTAL CONSIDERATIONS

25.5.1 Summary of Main Environmental and Social Problems of the Project

25.5.2 Impacts on Water

25.5.3 Impacts on the Atmosphere

25.5.4 Impacts on Ground

25.5.5 Impact on Flora and Fauna

25.5.6 Impact on Socio Cultural Field

25.5.7 Irreversible Impacts from the Activity

25.5.8 Conceptual Closure Plan

25.6 TAXES

25.1 CAPITAL AND OPERATING COST

25.2 ECONOMIC ANALYSIS

25.3 PAYBACK

25.4 MINE LIFE

26. ILLUSTRATIONS
List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gualcamayo Mineral Resources Estimate (exclusive of Reserves)</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Gualcamayo Mineral Reserves</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>Reserve inside the Final Open Pit QDD Upper</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>AIM Reserves</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>QDDLW Estimate Reserves</td>
<td>13</td>
</tr>
<tr>
<td>6</td>
<td>Magnitude of Principal Stresses (MPa)</td>
<td>16</td>
</tr>
<tr>
<td>7</td>
<td>Magnitude of Secondary Stresses (MPa)</td>
<td>16</td>
</tr>
<tr>
<td>8</td>
<td>Rooms with critical (c) or acceptable (e) RMR value</td>
<td>23</td>
</tr>
<tr>
<td>9</td>
<td>Cateos and Mines of Gualcamayo</td>
<td>33</td>
</tr>
<tr>
<td>10</td>
<td>Gualcamayo Stratigraphic Column</td>
<td>46</td>
</tr>
<tr>
<td>11</td>
<td>Skarn Mineral Paragenesis in the Gualcamayo District (modified from Bruno 2005)</td>
<td>50</td>
</tr>
<tr>
<td>12</td>
<td>Gualcamayo Exploration History</td>
<td>58</td>
</tr>
<tr>
<td>13</td>
<td>QDD Drilling Summary Period 1998-2007</td>
<td>60</td>
</tr>
<tr>
<td>14</td>
<td>Detail of Holes Used in the 2010 Resource Update</td>
<td>62</td>
</tr>
<tr>
<td>15</td>
<td>Detail of Total Holes Used in the 2010 Resource Update</td>
<td>63</td>
</tr>
<tr>
<td>16</td>
<td>Detail of Holes and Meters from 2010 Campaign</td>
<td>63</td>
</tr>
<tr>
<td>17</td>
<td>Reference Standard Statistics</td>
<td>71</td>
</tr>
<tr>
<td>18</td>
<td>Comparison of Mean Au Grades Between Standards</td>
<td>73</td>
</tr>
<tr>
<td>19</td>
<td>Drill Holes Used in the Estimation</td>
<td>78</td>
</tr>
<tr>
<td>20</td>
<td>Blank Control</td>
<td>78</td>
</tr>
<tr>
<td>21</td>
<td>Standard Control</td>
<td>78</td>
</tr>
<tr>
<td>22</td>
<td>Overall Average Bottle-Roll Gold Recovery vs Degree of Oxidation (Viceroy Data)</td>
<td>83</td>
</tr>
<tr>
<td>23</td>
<td>Lithological Average Gold Recovery vs. Degree of Oxidation – Viceroy Data (48 Hour Bottle Roll)</td>
<td>83</td>
</tr>
<tr>
<td>24</td>
<td>Summary of Bottle-Roll Test (Viceroy Data)</td>
<td>83</td>
</tr>
<tr>
<td>25</td>
<td>Low Energy Work and Abrasion Indices</td>
<td>87</td>
</tr>
<tr>
<td>26</td>
<td>Results per Bottle Leaching</td>
<td>89</td>
</tr>
<tr>
<td>27</td>
<td>Number of Samples Selected by Hole</td>
<td>89</td>
</tr>
<tr>
<td>28</td>
<td>Column Leach Tests</td>
<td>90</td>
</tr>
<tr>
<td>29</td>
<td>Comparison of Leaching Results of Full Sample vs. Selected and Columns Test</td>
<td>90</td>
</tr>
<tr>
<td>30</td>
<td>Coefficients and Significance Level of Degree</td>
<td>92</td>
</tr>
<tr>
<td>31</td>
<td>Top Cut</td>
<td>96</td>
</tr>
<tr>
<td>32</td>
<td>Gualcamayo Mineral Resources Estimate (exclusive of Reserves)</td>
<td>100</td>
</tr>
<tr>
<td>33</td>
<td>Gualcamayo Mineral Reserves</td>
<td>100</td>
</tr>
<tr>
<td>34</td>
<td>Amelia Ines and Magdalena Reserves Detail by Pit</td>
<td>101</td>
</tr>
<tr>
<td>35</td>
<td>Design Parameters</td>
<td>118</td>
</tr>
<tr>
<td>36</td>
<td>Metallurgical Recovery for QDD Optimization</td>
<td>118</td>
</tr>
<tr>
<td>37</td>
<td>Geomechanical Design Parameters</td>
<td>119</td>
</tr>
<tr>
<td>38</td>
<td>Estimated Blocks</td>
<td>123</td>
</tr>
<tr>
<td>39</td>
<td>Operating Cost</td>
<td>134</td>
</tr>
<tr>
<td>40</td>
<td>Assumptions</td>
<td>135</td>
</tr>
<tr>
<td>41</td>
<td>Gualcamayo Cash Flow</td>
<td>136</td>
</tr>
<tr>
<td>42</td>
<td>NPV</td>
<td>137</td>
</tr>
<tr>
<td>43</td>
<td>Sensibility Analysis</td>
<td>137</td>
</tr>
</tbody>
</table>
List of Figures

FIGURE 1 - GENERAL TECTONIC RELATION (Krstulovic / Chile) ................................................................. 13
FIGURE 2 - ORIENTATION OF PRINCIPAL STRESSES IN PELAMBRES MINE (2 RECORDS, CHILE) ................................................................. 14
FIGURE 3 - LOCATION OF OVERCORING STATION ................................................................................. 15
FIGURE 4 - STEREOGRAPHIC REPRESENTATION OF THE STRESS TENSOR AT OVERCORING STATION ................................................................................. 15
FIGURE 5 - LOCAL VIEW OF THE ALCODER SIMULATOR IN QDD ................................................................................. 17
FIGURE 6 - STEREOGRAPHIC REPRESENTATION OF THE STRESS TENSOR AND THE SIMULATED ALCODER PROFILE ................................................................................. 18
FIGURE 7 - MOHR’S CIRCLE FOR THE PROJECTION OF STRESSES ................................................................. 18
FIGURE 8 - DESIGN FOR ROOM EXCAVATION ......................................................................................... 19
FIGURE 9 - MASS BUST ACCORDING TO METALICA’S DESIGN ................................................................. 20
FIGURE 10 - RESULTS OF ROCK QUALITY (RMR) AFTER STAGE 1 ................................................................. 21
FIGURE 11 - RESULTS OF ROCK QUALITY (RMR) AFTER STAGE 2 ................................................................. 21
FIGURE 12 - LABUSCHER GRAPH AND TABLE WITH ENGINEERING PARAMETERS RELATED TO RMR VALUES ................................................................. 22
FIGURE 13 - ZONING ACCORDING TO RQD / RMR ......................................................................................... 26
FIGURE 14 - EXPERIMENTAL CURVE FOR THE ASSESSMENT OF PARAMETERS K AND N ......................... 27
FIGURE 15 - LOCATION OF THE GUALCAMAYO MINE, SAN JUAN, ARGENTINA ...................................................... 31
FIGURE 16 - GUALCAMAYO DEPOSITS RELATIVE LOCATIONS ...................................................................................... 32
FIGURE 17 - GUALCAMAYO MINE, MINERAL AND SURFACE RIGHTS ................................................................. 35
FIGURE 18 - GEOLOGICAL MAP (FROM TECHNICAL REPORT IN THE PROPERTY GUALCAMAYO, SAN JUAN PROVINCE, ARGENTINA BY WARDROP ENGINEERING INC., 2007) ................................................................................................. 52
FIGURE 19 - GEOLOGICAL LEGEND (EXTRACTED FROM THE TECHNICAL REPORT IN THE PROPERTY GUALCAMAYO, SAN JUAN PROVINCE, ARGENTINA BY WARDROP ENGINEERING INC., 2007) ................................................................................................. 53
FIGURE 20 - IRON OXIDE GRAIN (FROM BONLI, 2005) ......................................................................................... 56
FIGURE 21 - QDD DRILL HOLE PLAN ............................................................................................................. 61
FIGURE 22 - FRONT VIEW OF QDDLW-HOLES FROM LATE 2008, AND 2009 AND 2010 CAMPAIGNS FROM THE THREE UNDERGROUND DRILL STATIONS WHICH APPEAR IN BROAD TRACE ................................................................................................. 62
FIGURE 23 - VIEW OF AIM HOLES, HOLES FROM 2010 CAMPAIGN APPEAR IN BROADER TRACE ................................................................................................. 64
FIGURE 24 - SAMPLE SEQUENCE CHARTS — LOW STANDARDS ...................................................................................... 72
FIGURE 25 - SAMPLE SEQUENCE CHART — HIGH STANDARDS ...................................................................................... 72
FIGURE 26 - SAMPLE SEQUENCE CHART — NEW HIGH STANDARD 261 ...................................................................................... 73
FIGURE 27 - BLANK CONTROL CHART ............................................................................................................. 74
FIGURE 28 - COMPARISON OF THE DATA SETS ................................................................................................. 75
FIGURE 29 - WASTE ............................................................................................................................................. 76
FIGURE 30 - STANDARD B ............................................................................................................................... 76
FIGURE 31 - STANDARD E ............................................................................................................................... 76
FIGURE 32 - PULP CHECK ............................................................................................................................... 77
FIGURE 33 - PULP CHECK ............................................................................................................................... 77
FIGURE 34 - COARSE CHECK .......................................................................................................................... 77
FIGURE 35 - COARSE CHECK .......................................................................................................................... 78
FIGURE 36 - ROCK OXIDE ............................................................................................................................... 79
FIGURE 37 - STANDARD 73 ............................................................................................................................. 79
FIGURE 38 - STANDARD 70 ............................................................................................................................. 80
FIGURE 39 - DUPLICATES ............................................................................................................................... 80
FIGURE 40 - PLAN PROJECTION VIEW — AMELIA INES ...................................................................................... 95
FIGURE 41 - PLAN VIEW — MAGDALENA ......................................................................................................... 96
FIGURE 42 - TOTAL SULFUR VARIOGRAM — RANGE 126 METERS ...................................................................................... 97
FIGURE 43 - SOLUBLE SULFUR VARIOGRAM — RANGE 108 METERS ...................................................................................... 97
FIGURE 44 - GOLD EXTRACTION VARIOGRAM — RANGE 108 METERS ...................................................................................... 98
FIGURE 45 – OXIDATION DEGREE VARIOGRAM – RANGE 120 METERS .......................................................................................................................... 98
FIGURE 46 - GEOMETALLURGICAL MODEL – PLANT VIEW .................................................................................................................................. 99
FIGURE 47 – OPEN PIT AND UNDERGROUND CURRENT DESIGN - GUALCAMAYO MINE .................................................................................................. 117
FIGURE 48 - CROSS SECTION WITH SLS DESIGN AND MASS BLAST .................................................................................................................. 120
FIGURE 49 - COLOUR CODE TO IDENTIFY STOPES.................................................................................................................................. 121
FIGURE 50 - QDD ORE DEPOSIT ........................................................................................................................................................................ 121
FIGURE 51 - HISTOGRAM OF ESTIMATED VALUES.................................................................................................................................. 123
3. SUMMARY

Yamana Gold Inc. ("Yamana"), through its 100% owned subsidiary, Minas Argentinas S.A. ("MASA") is engaged in the exploration and advancement of the Gualcamayo Project in the Jáchal Region of the San Juan province of Western Argentina.

The Gualcamayo Project includes three known deposits, Quebrada Del Diablo ("QDD"), Amelia Inés and Magdalena. The term ("AIM") refers collectively to the latter two deposits. The QDD deposit includes the QDD Upper Zone which is being developed using open pit mining, and the QDD Lower West Zone hereinafter called ("QDDLW") that is at recent approved feasibility stage. Other targets on the property are at an early prospective stage of exploration.

3.1 PROPERTY DESCRIPTION AND LOCATION

The Gualcamayo Project is located in northern San Juan Province, Argentina, approximately 270 km north of the provincial capital, San Juan City. It consists of three main mineral deposits, the main QDD deposit, the AIM satellite deposits and the QDDLW underground zone.

3.2 OWNERSHIP

The main Gualcamayo Project block consists of one Cateo and 57 Minas covering a 7,128 hectare noncontiguous area. Fifty five (55) of the Minas are contiguous and lie wholly within the Cateo. One Mina (Chani) lies partially outside the Cateo and another Mina (Perico) lies wholly outside the Cateo. The Company does not hold an interest in six (6) contiguous Minas, collectively known as the Virgen de Lourdes Property, which cover a 50 hectare area within the main Gualcamayo Project block.

Surface rights in Argentina are not conferred with title to either a mining lease or a claim and must be negotiated with the landowner. In 2004, MASA purchased the surface rights to a contiguous land package totaling 26,218 hectares, which partially covers the Gualcamayo Project and wholly covers access routes to the area of interest from Highway 40, the main access route to the property.

3.3 GEOLOGY AND MINERALIZATION

The property is situated within a complex structural block of Cambrian/Ordovician carbonate sediments characterized by the Andean deformational east-west compression, which formed the Precordillera.

Gold mineralization at Gualcamayo occurs in carbonate sediments within conformable and discordant carbonate breccias and fractured limestone. The gold mineralization is related to a hydrothermal event overprinting the proximal skarns and extending into the surrounding marbles and limestones. The QDD canyon itself lies along a fault/dyke system, which is believed to be a reactivated, Ordovician rift structure that acted as the primary conduit for hydrothermal fluids migrating away from the intrusive contacts.

At AIM, late stage gold-arsenic mineralization overprints skarn zones and extends into the surrounding marbles of the San Juan Formation. Skarn hosted mineralization comprised of chalcopyrite, sphalerite, galena, pyrrhotite and pyrite was deposited as a retrograde event preceding the introduction of the gold-arsenic mineralization. Gold mineralization is intimately associated with fine grained marcasite that lines late fractures and forms the chief component to marble and skarn breccias matrices.
At QDDLW Mineralization, the predominant mineral in the gangue is calcite, followed by quartz, pyrite, iron oxides, feldspars and a small amount of realgar.

### 3.4 EXPLORATION

Since 1983, the Gualcamayo Project has had significant exploration programs conducted by Mincorp Exploration S.A. and MASA. The stage of exploration has advanced through several drill programs sufficient to complete a resource estimate.

Gualcamayo surface sampling results received prior to December 2004 were discussed in reports by Dircksen (2003) and Simpson (2004). Results from programs between 2004 and 2008 were covered in Simpson (2008).

The main assignment for the 2010 update consisted in validating the drill holes data base, adding the information obtained from the 2009 and 2010 campaigns, which served as base for geologic reinterpretation and resources estimation.

The geological reinterpretation of the rock units showed solids corresponding to breccias, marble and porphyry. Total drilling completed in October 2008 was of 6,157 m, including 2,956 m of core holes and 3,201 m of RC holes. A total of 2,708 m of RC drilling were drilled at the Las Vacas Project, and 493 m in Cerro Diablo. The diamond drilling includes 816 m drilled in the Quebrada Perdida regional project, and 2,140 m of near mine exploration drilling at Gualcamayo (1,608 m of underground holes and 532 of surface drilling).

A new resource update of the QDDL Lower West resource was performed during October 2008. The final report was presented early November (Simpson, November 2008).

### 3.5 MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES

The following tables present the mineral resources and reserves for the Gualcamayo Project as of December 31, 2010 consolidated with QDD Upper, QDDL Lower West and Amelia Ignes-Magdalena deposits. The 2006 inferred portion of the QDD Upper zone was updated in 2010 by Yamana as it partially overlapped the QDDLW zone. AIM reserves were estimated by Metálica Consultores S.A. considering a pit optimization of US$1,400, and the reserves for QDD Lower West was estimated by Yamana.

**Table 1 - Gualcamayo mineral resources estimate (exclusive of Reserves)**

<table>
<thead>
<tr>
<th>Deposit</th>
<th>Au Cut-Off</th>
<th>Measured</th>
<th>Indicated</th>
<th>Measures and Indicated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Tonnes t Grade Au g/t oz</td>
<td>Tonnes t Grade Au g/t oz</td>
<td>Tonnes t Grade Au g/t oz</td>
</tr>
<tr>
<td>QDDL Upper</td>
<td>0.15</td>
<td>4,956,395 1.28 203,173</td>
<td>16,457,616 0.78 414,304</td>
<td>21,414,011 0.9 617,478</td>
</tr>
<tr>
<td>QDDL Lower</td>
<td>1</td>
<td>327,545   2.85 30,064</td>
<td>2,378,562 2.61 199,396</td>
<td>2,706,107 2.64 229,460</td>
</tr>
<tr>
<td>AIM</td>
<td>0.18</td>
<td>2,708,500 1.95 3,253</td>
<td>1,447,000 1.76 82,067</td>
<td>1,499,000 1.77 85,320</td>
</tr>
<tr>
<td>Total</td>
<td>5,335,940 1.38 236,490</td>
<td>20,283,178 1.06 695,767</td>
<td>25,619,118 1.13 932,258</td>
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<table>
<thead>
<tr>
<th>Deposit</th>
<th>Au Cut-Off</th>
<th>Inferred</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Tonnes t Grade Au g/t oz</td>
</tr>
<tr>
<td>QDDL Upper</td>
<td>0.15</td>
<td>3,602,390 0.53 60,918</td>
</tr>
<tr>
<td>QDDL Lower</td>
<td>1</td>
<td>380,000 1.45 17,744</td>
</tr>
<tr>
<td>AIM</td>
<td>0.18</td>
<td>398,631 2.79 35,810</td>
</tr>
<tr>
<td>Total</td>
<td>4,380,861 0.82 114,472</td>
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The Table 2 shows the mineral reserves estimated at $900/oz gold price; 1.00 g/t Au cutoff for Underground and 0.15 g/t Au for Open Pit.

### Table 2 - Gualcamayo mineral reserves

<table>
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<tr>
<th>Consolidated reserves</th>
<th>Au Cut-Off g/t</th>
<th>Proven</th>
<th>Probable</th>
<th>Proven&amp;Probable</th>
</tr>
</thead>
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<tr>
<td></td>
<td></td>
<td>Tonnes</td>
<td>Grade Au</td>
<td>Contained Tonnes</td>
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<tr>
<td></td>
<td></td>
<td>t</td>
<td>g/t Oz</td>
<td>t</td>
</tr>
<tr>
<td>QDD Upper</td>
<td>0.15</td>
<td>18,980,520</td>
<td>0.84</td>
<td>513,210</td>
</tr>
<tr>
<td>QDD Lower</td>
<td>1.00</td>
<td>1,214,708</td>
<td>2.63</td>
<td>102,687</td>
</tr>
<tr>
<td>AIM</td>
<td>0.18</td>
<td>418,950</td>
<td>1.84</td>
<td>24,835</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>20,614,178</td>
<td>0.97</td>
<td>640,732</td>
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</tbody>
</table>

### 3.6 MINING OPERATIONS

#### 3.6.1 QDD Upper

The QDD deposit is located in an area of rugged topography. Natural slopes in most of the mining areas are greater than 40°, and in some areas exceed 80°. The highest elevation of the mine is 2,670 m and the lowest elevation 1,940 m.

Because of the rugged terrain, trucking is an expensive choice for transporting the ore to the primary crushing circuit. The rugged topography and the continuous nature of the broad low-grade mineralized zone within a limestone/marble breccia provided the opportunity to investigate alternate mining and transportation methods. The proposed method for ore transportation from the pit is by two ore passes located within the pit.

This system is well proven in the mining industry, mostly within the industrial minerals sector.

The deposit was divided into two major structural domains (West and East) for the purposes of open pit assessment. A series of pit design sectors were defined based on the site geology plans, surface geological mapping, and the oriented geotechnical drilling. Pit slope design criteria for each design sector were formulated to minimize significant structurally controlled failures along continuous bedding based on the results of kinematic analyses.

Low-damage careful blasting practices are being utilized for the current pit wall development. 4.5” diameter pre-split holes are drilled at 65 degrees along the final bench faces with a close spacing of 1.5 to 2.0 m. Small diameter drills (4.5” to 5.5”) were also used for buffer holes and production blastholes with typical spacing of 3.0 to 4.5 m. This blasting practice minimizes wall damage behind design lines and results in less backbreak along the upper benches.

For QDD optimization (whittle) the metallurgical recovery was 80%.

The cutoff grade of 0.18 g/t Au was calculated using a gold price of $480/oz, 80% recovery, and a processing cost of $2.19/t. The process operating cost includes general and administration, power and environmental costs. This grade was used for pit reserve calculations. All blocks with grade less than 0.18 g/t were considered as waste rock.

The final pit was designed and optimized with the software Whittle (optimization) and MineSight (design), the following figures shows the optimization results and the graphic, to apply the optimum pit selection in which the revenue factor is equal to 1.
Table below shows the total diluted proven and probable reserves.

### Table 3 - Reserve inside the final open pit QDD upper

<table>
<thead>
<tr>
<th>Au Cut-Off g/t</th>
<th>Proven</th>
<th></th>
<th></th>
<th>Probable</th>
<th></th>
<th></th>
<th>Proven &amp; Probable</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tonnes</td>
<td>Grade Au</td>
<td>Contained</td>
<td>Tonnes</td>
<td>Grade Au</td>
<td>Contained</td>
<td>Tonnes</td>
<td>Grade Au</td>
</tr>
<tr>
<td>0.15</td>
<td>18,980,520</td>
<td>0.84</td>
<td>513,210</td>
<td>34,473,775</td>
<td>0.78</td>
<td>861,193</td>
<td>53,454,295</td>
<td>0.80</td>
</tr>
</tbody>
</table>

#### 3.6.2 Amelia Inés & Magdalena Deposits

The definition of the Final Pits (optimization and analysis) and the mining sequence for the Amelia Inés and Magdalena bodies was calculated by Metalica Consultores using Whittle Four-X, based on the technical and economical parameters that will be described in the following sections. It is necessary to highlight that, for the determination of the final pit, only the measured and indicated resources have been used to feed the plant, treating the inferred resources as waste.

Table below shows the total diluted proven and probable reserves of AIM deposits.

### Table 4 - AIM reserves

| Pit             | Au Cut-Off g/t | Proven | | | Probable | | | Proven & Probable | |
|-----------------|---------------|--------|---|---|--------|---|---|---|---|---|---|
|                 | Tonnes | Grade Au |Contained | Tonnes | Grade Au |Contained | Tonnes | Grade Au |Contained |
| Amelia Inés     | 0.18 | 200,550 | 2.02 | 13,023 | 1,710,450 | 2.08 | 114,227 | 1,911,000 | 2.07 | 127,251 |
| Magdalena       | 0.18 | 218,400 | 1.68 | 11,812 | 2,734,200 | 1.70 | 148,972 | 2,952,600 | 1.69 | 160,783 |
| Total           | 0.18 | 418,950 | 1.84 | 24,835 | 4,444,650 | 1.84 | 263,199 | 4,863,600 | 1.84 | 288,034 |

A series of assumptions and operational aspects were also considered to generate the mining sequence. These criteria, assumptions and operational restrictions are used in the mine development and preparation.

#### 3.6.3 Quebrada del Diablo Lower West, Underground Mining

The primary mining option for this ore deposit was for underground mining, because the ore area lies at a depth over 430 m, therefore an open pit option was completely ruled out, considering the high ore waste rates which this type of mining would imply.

For design input, Yamana defined that the operation could reach a productive rate of 1.8 million tons per year (5 ktpd), a condition which imposes a high restriction for this definition.

The considerations lead to underground mining through the open stopes method called Sublevel Stoping, which is considered because it complies with two basic conditions, which are overall stability assurance and a required productive rate.

The next table shows the mineral reserves available for the QDD Lower West ore deposit:
Table 5 - QDDLW estimate reserves

<table>
<thead>
<tr>
<th>Au Cut-Off g/t</th>
<th>Proven</th>
<th></th>
<th>Probable</th>
<th></th>
<th>Proven&amp;Probable</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tonnes</td>
<td>Grade Au</td>
<td>Contained</td>
<td>Tonnes</td>
<td>Grade Au</td>
<td>Contained</td>
</tr>
<tr>
<td></td>
<td>t</td>
<td>g/t</td>
<td>oz</td>
<td>t</td>
<td>g/t</td>
<td>oz</td>
</tr>
<tr>
<td>1.00</td>
<td>1,214,708</td>
<td>2.63</td>
<td>102,687</td>
<td>9,542,354</td>
<td>2.12</td>
<td>651,255</td>
</tr>
</tbody>
</table>

3.7 TECTONIC CONDITIONS

For purposes of design of an underground mine in the Andes it is insufficient to assume that the conditions of confinement stress of the rock mass where the excavation will take place arise only from the action of gravity. This simplification could lead to significant errors in the mining design. Consequently to the nature of the project for the QDDLW, a record of tectonic in-situ is required.

The data available for this purpose is presented below.

3.7.1 Information from Other Authors

The source of information about the tectonic condition applied to underground mining comes from the records of stresses obtained in-situ in mining sites in Chile.

Figure 1 reveals a tectonic relation applicable to mining operations in the Andes.

Figure 1 - General tectonic relation (Krstulovic / Chile)

Another typical record near of an open-pit mining operation like Gualcamayo is shown in Figure 2.
3.7.2 Overcoring Campaign in QDDLW

In-situ stresses in QDDLW were measured inside the tunnel called “Rodados” and in a site considered far enough to receive possible influence of the Open Pit Gualcamayo.

Figure 3 shows the approximate location of the station and gives an account of the approximate location of the station regarding the Open Pit. The most relevant conclusions of these results are:

- In-situ stresses orientation.
- The orientation of the principal stress S1 (Major) is nearly EW, with strike of S86°E - N86°W, and is sub horizontal (4° W).
- The orientation of the principal stress S2 (Minor) is almost vertical with strike of S33°W - N33°E with an inclination of 73° E.
- The orientation of the principal stress S3 (Intermediate) is also nearly horizontal with strike N17°E - S17°W and inclination of 16° SW.

1 Anaconda Co Chile – Minera Los Pelambres.
Figure 3 - Location of overcoring station

Figure 4 - Stereographic representation of the stress tensor at overcoring station²

² Anaconda Co Chile – Minera Los Pelambres.
3.7.3 Relative Magnitude between Primary and Secondary Stresses

The relationship between the magnitude of principal stress (S1, S2 and S3) gives the following proportion:

\[ S1 : S2 : S3 = 4.57 : 1.00 : 1.58 \]

3.7.4 Absolute magnitude of the principal and secondary stress

As a result of the overcoring measurements, estimates of typical confinement stresses and in-situ deformation module, the most likely tectonic values in QDD are shown in Table 6 and Table 7.

<table>
<thead>
<tr>
<th>Station</th>
<th>Principal stresses (MPa)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S1</td>
<td>S2</td>
</tr>
<tr>
<td>Overcoring QDD</td>
<td>49</td>
<td>11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Station</th>
<th>Compressive stresses (MPa)</th>
<th>Shear Stresses (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sx (EW)</td>
<td>Sy (NS)</td>
</tr>
<tr>
<td>Overcoring QDD</td>
<td>45</td>
<td>19</td>
</tr>
</tbody>
</table>

3.8 IN-SITU STRESSES FOR THE SIMULATION

The image from ALCODER simulator shown in Figure 5 presents a typical profile with an orientation E-W that does not match the orientation of the in-situ principal stresses.
The three-dimensional orientation of the principal in-situ stresses at section N671325 in Gualcamayo and also, the section profile simulated in ALCODER can be visualized by using the stereographic projection shown in Figure 6.
Figure 6 - Stereographic representation of the stress tensor and the simulated ALCODER profile

The projection of the principal stresses (Table 6) in the orientation of the typical profile for QDD was calculated by using the Mohr’s circle as illustrated in Figure 7.

Figure 7 - Mohr’s circle for the projection of stresses
(J.C. Jaeger, M.G. Cook. Fundamentals of Rock Mechanics)
3.9 SIMULATION PLAN FOR MINING AT QDDLW

Since the QDDLW ore deposit has not yet been excavated, the calibration process cannot be performed at this early stage.

Given this limitation, this Report suggests the implementation of the ALCODER only on the most relevant proposals of METALICA’s design. The proposals to be checked are the following:

- To check the stability of rooms and pillars during the mining sequence with a room in advance at the upper level. This sequence is shown with a color scheme in Figure 10. The proposed sequence involves the simultaneous excavation of a room at the top and bottom level but out of phase in the vertical direction.
- To confirm the overall stability of all Sub Level Stoping (SLS) rooms.
- To verify the properties of the in-situ rock in order to begin with the Mass Blast from the west end of the exhausted ore deposit, as proposed by METALICA.

According to the above, the local model of the ALCODER simulator, shown in Figure 5, will model a process of excavation including the following stages:

**Stage 1.** It corresponds to the mining of all ore reserves contained in the rooms so the “structure” QDDLW is supported by the pillars, according to the design proposed by METALICA shown in Figure 8.

**Stage 2.** It corresponds to the state described in Stage 1, having also mined the pillars between two rooms according to METALICA’s Mass Blast design (Figure 9).
The aforementioned designs are applied to the ALCODER simulator of Figure 5 in such a way that the conditions of the rocks resulting from Stage 1 are pre-conditions for the Mass Blast in Stage 2.

### 3.10 RESULTS OF THE SIMULATOR

#### 3.10.1 Out-Put Nomenclature

Under the guidelines outlined in chapter 1.3, the ALCODER simulator provides results of the condition of the in-situ rock after the SLS excavation. The results are expressed as Rock Mass Ratting (RMR) values, same index used as an input for the simulator. The rocks, for which the quality has been previously established with the quality zone model (Figure 13), suffer damage during the excavation process and modify their initial RMR values.

Consequently, for each simulated stage of excavation, ALCODER provides a modified image of the RMR values of the in-situ rocks. For simplicity, the image shows only the rocks that have experienced a decrease of their RMR value.

In Metallica’s case, the color scheme adopted is the same as in Figure 14, remarking that the red color means that the in-situ rock has fallen to a RMR value of 0-20 while yellow color indicates values of 20-40.

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3 Source Geomechanics for Excavations Designed in Rock, September 2010, Geomecánica Ltda. from FS QDD Lower West.
Figure 10 and Figure 11 present the results of Stages 1 and 2 respectively.

**Figure 10 - Results of rock quality (RMR) after stage 1**

For obvious reasons these results should be interpreted in accordance with usual practice in such cases. These practices are related to verify the stability of the roof using Laubscher’s relationship RMR / HR shown in Figure 12. (GEOMECANICA report, July 2010).
From the hydraulic radius (HR) of each room the critical (minimum) RMR value can be determined for which the roof will be stable.

A direct example of this approach was applied to all rooms of the design proposed by METALICA. Acceptable and critical RMR values are shown in Table 8 (GEOMECANICA report, July 2010).

The direct application of these (critical) values on the results of the ALCODER simulation, shown in Figure 10 and Figure 11, concludes:

- Rocks with a RMR value between 0-20 (red) meet the necessary condition for collapse since their value is below the required minimum, which is shown in Table 8.
- All the rocks fulfilling this condition also satisfy the sufficient condition to limit with the excavation (roof or wall) are considered rocks prone to collapse.
In other words, only the rocks marked red have the ability to collapse.

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>VT1-S</th>
<th>VT2-S</th>
<th>VT3-S</th>
<th>VT4-S</th>
<th>VT5-S</th>
<th>VT6-S</th>
<th>VT7-S</th>
<th>VT8-S</th>
<th>VT9-S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area n2</td>
<td>1750</td>
<td>2500</td>
<td>3750</td>
<td>4125</td>
<td>2125</td>
<td>3375</td>
<td>3500</td>
<td>3750</td>
<td>2875</td>
</tr>
<tr>
<td>Perimeter</td>
<td>190</td>
<td>220</td>
<td>350</td>
<td>380</td>
<td>220</td>
<td>320</td>
<td>350</td>
<td>350</td>
<td>280</td>
</tr>
<tr>
<td>HR</td>
<td>9.2</td>
<td>8.8</td>
<td>8.1</td>
<td>8.7</td>
<td>7.7</td>
<td>7.7</td>
<td>7.7</td>
<td>7.7</td>
<td>7.7</td>
</tr>
<tr>
<td>MRM (c)</td>
<td>40.1</td>
<td>40.0</td>
<td>40.1</td>
<td>40.7</td>
<td>39.5</td>
<td>40.5</td>
<td>40.6</td>
<td>40.7</td>
<td>40.2</td>
</tr>
<tr>
<td>MRM (c)</td>
<td>19.6</td>
<td>19.0</td>
<td>20.8</td>
<td>20.8</td>
<td>19.0</td>
<td>20.8</td>
<td>20.8</td>
<td>20.8</td>
<td>20.8</td>
</tr>
<tr>
<td>RMR (c)</td>
<td>44.6</td>
<td>44.4</td>
<td>45.2</td>
<td>45.2</td>
<td>45.9</td>
<td>45.9</td>
<td>45.9</td>
<td>45.9</td>
<td>44.7</td>
</tr>
<tr>
<td>RMR (c)</td>
<td>21.1</td>
<td>21.1</td>
<td>22.9</td>
<td>22.9</td>
<td>21.1</td>
<td>22.9</td>
<td>22.9</td>
<td>22.9</td>
<td>22.9</td>
</tr>
</tbody>
</table>

| Area n2 | 1750 | 2500 | 3750 | 4125 | 2125 | 3375 | 3500 | 3750 | 2875 |
| Perimeter | 190 | 220 | 350 | 380 | 220 | 320 | 350 | 350 | 280 |
| HR | 9.2 | 8.8 | 8.1 | 8.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 |
| MRM (c) | 40.1 | 40.0 | 40.1 | 40.7 | 39.5 | 40.5 | 40.6 | 40.7 | 40.2 |
| MRM (c) | 19.6 | 19.0 | 20.8 | 20.8 | 19.0 | 20.8 | 20.8 | 20.8 | 20.8 |
| RMR (c) | 44.6 | 44.4 | 45.2 | 45.2 | 45.9 | 45.9 | 45.9 | 45.9 | 44.7 |
| RMR (c) | 21.1 | 21.1 | 22.9 | 22.9 | 21.1 | 22.9 | 22.9 | 22.9 | 22.9 |

| Area n2 | 1750 | 2500 | 3750 | 4125 | 2125 | 3375 | 3500 | 3750 | 2875 |
| Perimeter | 190 | 220 | 350 | 380 | 220 | 320 | 350 | 350 | 280 |
| HR | 9.2 | 8.8 | 8.1 | 8.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 |
| MRM (c) | 40.1 | 40.0 | 40.1 | 40.7 | 39.5 | 40.5 | 40.6 | 40.7 | 40.2 |
| MRM (c) | 19.6 | 19.0 | 20.8 | 20.8 | 19.0 | 20.8 | 20.8 | 20.8 | 20.8 |
| RMR (c) | 44.6 | 44.4 | 45.2 | 45.2 | 45.9 | 45.9 | 45.9 | 45.9 | 44.7 |
| RMR (c) | 21.1 | 21.1 | 22.9 | 22.9 | 21.1 | 22.9 | 22.9 | 22.9 | 22.9 |

| Area n2 | 1750 | 2500 | 3750 | 4125 | 2125 | 3375 | 3500 | 3750 | 2875 |
| Perimeter | 190 | 220 | 350 | 380 | 220 | 320 | 350 | 350 | 280 |
| HR | 9.2 | 8.8 | 8.1 | 8.7 | 7.7 | 7.7 | 7.7 | 7.7 | 7.7 |
| MRM (c) | 40.1 | 40.0 | 40.1 | 40.7 | 39.5 | 40.5 | 40.6 | 40.7 | 40.2 |
| MRM (c) | 19.6 | 19.0 | 20.8 | 20.8 | 19.0 | 20.8 | 20.8 | 20.8 | 20.8 |
| RMR (c) | 44.6 | 44.4 | 45.2 | 45.2 | 45.9 | 45.9 | 45.9 | 45.9 | 44.7 |
| RMR (c) | 21.1 | 21.1 | 22.9 | 22.9 | 21.1 | 22.9 | 22.9 | 22.9 | 22.9 |
The HR of the Mass Blast cavity resulting by the removal of two remaining pillars, causes rocks marked red and yellow in Figure 10 to spontaneously collapse according to Laubscher’s criterion (Figure 12). If so required, the ALCODER simulator could monitor the process of collapse, but it is not justified at this time.

3.1 CONCLUSIONS AND RECOMMENDATIONS

3.1.1 Geo Metallurgic

The reviewed information generates the following conclusions and recommendations:

It was found that in general, there is a correlation between gold grade and the presence of sulphur in relation with gold recovery; the presence of sulphur has a strong negative impact in the recovery, and in lesser degree, in the gold content.

It is recommend that Yamana performs an electronic microscopic study in the deeper areas in order to analyze the way in which gold is associated with the sulphides, the type of association, the liberation size of the gold particles, etc. in order to study the most profitable process design for the future in case the sulphur presence makes it worthwhile.
Also, in exceptional cases there were in which, despite their low sulphur content, the gold recovery obtained was very poor. This could indicate that there may be areas with carbon presence, which retains gold and prevents its extraction.

The predictive models have a good Pearson coefficient and significance degree, originating a good correlation between the independent variables and the gold recovery in most holes, with the exception of holes QD 402, QD 592 and QD 594, where the correlation is very low and the significance degree is bad.

The most influencing and dominating factor is the sulphur grade, which shows a strong correlation and significance degree, not so with the gold grade, which is low and its correlation is erratic.

Given the strong, negative effect of the sulphur content associated to the presence of sulphides, it is highly recommend that Yamana perform the metallurgic study for the lower areas in the QDDLW sector, in order to know their behaviour and evaluate their most profitable processing design.

### 3.1.2 Geotechnical

Two stages were considered for the mining of the QDDLW reserves in Gualcamayo. The first stage refers to the mining of stopes 25 m wide and separated by 15 m pillars. All the former located in two levels separated by a sill pillar 10 m thick.

In our case, after having developed a statistic relation between the hard RQD fact and the RMR available in Metálica’s rock quality files, the author has identified the minimum RMR quality demanded for collapse, observing that the rocks identified for backs and walls of these stopes adequately comply with these requirements, and definitely no stopes from the project are unstable.

Complementing the former and using the hard RMR fact obtained from 21 in fill drill holes, Metálica has experimented with a new review, now using the Laubscher empirical relation directly with the RMR from the 21 in fill drill holes. For obvious reasons, this review is restricted to sectors near to the 21 available drill holes. The results obtained confirm that the stopes evaluated thus are equally stable according to the applied analysis methodology.

The second stage refers to the Mass Blast sequence in discreet events in order to rescue the remaining reserves (pillars between stopes, seal pillar, etc.). Metálica thinks that the available information only allows suggesting the following:

According to the depth of the QDDLW ore deposit in relation with the upper topography and the Pit advance work, it is unlikely that the Mass Blast collapse in events interferes with the surface. The former in the understanding that the column collapsed and swelled to 40% would not allow the outcrop of the crater. Independently from the former, it is reasonable estimating a subsidence angle for minor fractures due to the deformation of the back rocks of only 70º.

The rock quality information in terms of the fractures / meter, average index is FF 5 (fract./m), which suggests a regular spontaneous collapse of fine material. This issue must be reviewed in order to adequately program the Mass Blast events with minimum dilution.

Conceptually, the alternative for an underground mining in Gualcamayo aims to incorporate reserves to the ore deposit, but also to improve the gold grades which currently are in decline in the Open Pit.

Specifically, the first challenge from the suggested SLS method (with the Mass Blast extension) aims to rescue the reserves from the stopes, while the second challenge poses that the extension of the Mass Blast aims to rescue the remaining in situ reserves, thus minimizing the ore dilution.
In the first case, the mine operation has the advantage of being flexible in the compliance of goals, the alternative of reducing (according to the stopes length) the RH index, and with that, make the minimum rock quality (RMR) less demanding in order to support the stopes without dilution. This operational flexibility refers to leaving cross pillars to the longitudinal axis of the stopes (example: 10 m wide pillars), which can solve the support incapacity of the in situ rock. In this case, the operational cost of reopening a face from the cross auxiliary pillar is very low, while the cost of the reserves contained in the auxiliary pillar cannot be considered lost, because the reserves taken in stage 1 (stope) are only transferred to stage 2 (Mass Blast).

It must be concluded that the Geotechnics from QDDLW must have, in the Advanced Basic engineering stage, a sufficient amount and quality of rock information in order to serve as input for the state of the arts tools to tackle those problems.

At the effective date of this Report, the initiatives for obtaining those antecedents are about to materialize, but their results are still not available. The referred antecedents are:

The proximity of the Andean Mountain Range and the references from other nearby mining field works suggest the occurrence of a tectonic sub horizontal stress with E-W Orientation with unknown magnitude, which alters the stress / deformation mechanic of the SLS cavities considered in this project. In order to solve this issue, the study in process includes the measurement of such tectonic vector through the “Overcoring” technique, using the sensor developed by the U.S. Bureau of Mines.

The laws of science which control the rock deterioration via alteration of the Deformation Module are necessarily obtained by lab testing i.e., triaxial tests with Modules records under confined states. Tests such as these have been commissioned to specialized laboratories, and their results are being awaited.

### 3.1.3 Rock Quality Values for the Simulation

For purposes of the ALCODER simulator, the rock mass in section N6713250 is discretized according to its characteristic RQD value (representation of the RQD Block Model proposed by METALICA). Figure 13 shows the zoning according to RQD values, this zoning is extended to RMR value as explained in Chapter 2.3

![Figure 13 - Zoning according to RQD / RMR](image)

The values of parameters K and n which define the deformation modulus by the effect of confinement stress are obtained from the experimental curve in Figure 14. This is done assuming a vertical gravitational confinement stress of 7 MPa on rock with an average RMR value of 42.
3.1.4 ALCODER Simulator

The most relevant conclusions of this first study with the ALCODER simulator are:

- As shown in Figure 10, rooms that are fully mined in the first stage of the mining operation are quite stable with the configuration of pillars that support them. On the edges of the roof of these rooms the rock is damaged and prone to collapse. This condition is an inconvenient for the stability of the sill pillar that separates rooms of the upper and lower level (Figure 9). **A solution to this problem is obtained making an efficient blast on the roof of the mining module shown in Figure 8. In this way, the excavation from the central tunnel (undercut) should be made in such a way that it produces a self-supporting concave roof which, due to its shape, will prevent the occurrence of damaged rock as shown in Figure 10.**

- After the first pillar between rooms of a mining module is blasted (Figure 11), the following can be checked:
  1. When removing the pillar, the global stability of the QDD SLS is not affected. A "domino effect" that could spontaneously break down the other pillars between rooms **will not occur.**
  2. The collapse of the roof of rooms, from which their pillars have been removed, shows a **delayed effect** that will take time to progress in height, thereby preventing contamination of high grade ore from the removed pillars.

3.1.5 Mine Design

For the desired production rate for the project (5,000t/d or 1.8Mtpa), the only method seen as potentially applicable is SLS; any other method (Ruling out the massive ones), would mean a significantly lower production scenario. The information available today indicates the technical viability of its application between elevations 1,800 and 1,900 masl.
The greatest risk identified for this method, and consequently for a large scale production, is the application of mass blasting. This event is a relevant factor. The production plan indicates that the last three years of the ore deposit mining will be 100% from Mass Blast.

Metálica’s experience in mass blast events applied in the Chilean mining, specifically in the case of the El Soldado Mine, and Santos Mine, anticipates the success of that event, one of the most relevant projects undertaken by Yamana regarding the challenge of recovering the reserves.

In case of not receiving a favorable answer from the project (technology failure), the reserves to be recovered could be significantly reduced, therefore the option of using filling in the mined stopes is suggested, which would considerably increase the mine costs.

The QDDLW ore body mining is approximately 150 m below the corresponding last bench which will be mined in the open pit operations; the possibility exists that, at its ending, the underground mining could generate a subsidence crater which could compromise part of the pit infrastructure within its projection.
4. INTRODUCTION

This Report has been compiled by Yamana and Metálica Consultores S.A. in accordance with the requirements of NI 43-101 and Form 43-101F1. The authors state that they are qualified persons and appropriate “certificates of qualified person” are attached.

This Report has been prepared to support the update of mineral reserves for the Gualcamayo Project and to provide regulators and investors with up-to-date information on the Gualcamayo Project that incorporates the results of the most recent work program completed by Yamana as of August 2010 (Feasibility Study Amelia-Ines and Magdalena Basic Engineering and Basic Engineering Project Gualcamayo Mine QDD Lower).

The document summarizes the professional opinion of the authors and includes conclusions and estimates that have been based on professional judgment and reasonable care.

The metallurgical testwork was performed by the Mining Research Institute of Universidad Nacional de San Juan in Argentina.

Said conclusions and estimates are consistent with the level of detail of this study and based on the information available at the time this report was completed. All conclusions and estimates presented are based on the assumptions and conditions outlined in this report.

All currency amounts are stated in United States dollars (US$). Quantities are generally stated in SI units, the Canadian and international practice, including metric tonnes (t), kilograms (kg) and grams (g) for weight; kilometres (km) or metres (m) for distance; hectares (ha) for area and grams per metric tonne (g/t) for gold grades (g/t Au). Precious metal grades may be expressed in parts per billion (ppb) or parts per million (ppm) and also in troy ounces (oz), a common practice in the industry.

This Report is to be issued and read in its entirety. Written or verbal excerpts from this report may not be used without the express written consent of the authors or officers of Yamana.
5. RELIANCE ON OTHER EXPERTS

In the preparation of this report, Metálica has based itself on information provided by Minas Argentinas S.A., including topography plans, economic, geologic and metallurgic data, and reports from engineering studies carried out in the feasibility stage of the project.

Whenever possible, Metálica has confirmed this information by comparing it with other data sources. When checks and confirmations were not available, Metálica understands that due to the fact that Gualcamayo is a field work currently in operation, all the information provided is complete and reliable within normally accepted deviation limits for the Feasibility Engineering study level.

Metálica has not specifically audited Gualcamayo mining property. However, Gualcamayo has presented background of public disclosure that indicates that everything is in order. Due to the former, Metálica is confident that the mining properties rights and surface rights for performing mining activities are adequately settled.

According to the information check and due to the fact that it is published by Gualcamayo, Metálica considers - for this reserves declaration – that the company has all the necessary permits in order to legally perform mining activities. However, Metálica has not carried out an auditing to ensure compliance of all the permits conditions.

Metálica also participated in test work analysis and spatial estimation of the metallurgic recovery from QDDLW and AIM ore body, and details its main conclusions and recommendations in this document.
6. PROPERTY DESCRIPTION AND LOCATION


Figure 15 - Location of the Gualcamayo Mine, San Juan, Argentina
The Gualcamayo Project is located in northern San Juan Province, Argentina approximately 270 kilometres north of the capital city, San Juan, see Figure 15. The property lays approximately 29.72 decimal degrees south latitude and 68.65 decimal degrees west longitude. Coordinates for legal land tenure in Argentina are normally expressed in the Posgar Datum WGS 84; however, in San Juan the older Campo Inchauspe datum is still used. The Gualcamayo Project is found within Campo Inchauspe Zone 2 and all figures in this report are presented in this datum.

The Gualcamayo Project includes three main deposits, respectively known as Quebrada del Diablo (QDD), Amelia Inés and Magdalena (AIM) and Quebrada del Diablo Lower West (QDDLW), an underground portion in the West Lower Zone of QDD. The QDD deposit is located in an area of abrupt topography. The natural slopes in nearly all the mining areas exceed the 100% with 40º angles and in some places with angles over 80º. The highest altitude in the mine is 2,670 masl and the lowest 1,940 masl.

The QDD mineralized area is characterized by collapse-solution breccias cemented by iron oxides (limonite's) with gold.

A lateral extension towards the WNW zone of the abovementioned breccias, but placed at deeper depth, consequently non-outcrop, constitutes the deposit known as QDDLW.

The QDDLW deposit is located at least 500 m below QDD, more precisely towards the west. Core drilling has defined a continuous zone of +1 g/t Au mineralization that extends at least 535 m along its longest dimension in an east-west direction and up to 150 m N-S. The vertical thickness of the zone ranges up to 120 m.

6.1 MINERAL RIGHTS

The main Gualcamayo block consists of one Cateo and 57 Mines covering a noncontiguous 7,317.7 hectare area as listed in Table 9. Fifty five (55) of the Mines are contiguous and lie wholly within the Cateo. One Mine (Chani) lies partially outside the Cateo and another Mine (Perico) lies entirely outside the Cateo. The Company is not interested
in six (6) contiguous Mines, collectively known as Virgen de Lourdes Property), which cover a 50 hectare area within the main Gualcamayo Project block.

Table 9 - Cateos and Mines of Gualcamayo

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<th>Type</th>
<th>Size (ha) *</th>
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<td><strong>Total Hectare</strong></td>
<td></td>
<td></td>
<td><strong>7,317,7</strong></td>
</tr>
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</table>

Note: *() indicates overlapping between Cateos and Mines.

Mines and Cateos in Argentina are applied for by paper staking in the Argentina Gauss Kruger coordinate projection. Cateos are not surveyed but when application has been made for a mine then the boundaries are confirmed through a legal survey prior to final granting of the lease. A Cateo can overlap a Mine such that a single piece of ground can be part of both a Mine and a Cateo, as is the case in the Gualcamayo Project. The rights of the Mine supercede those of the Cateo.

In Argentina, a Mine is a real property interest, which allows the holder the right to explore and exploit manifestations of discovery (Manifestaciones de Descubrimiento) on a permanent basis after completion of an official survey for as long as the right is diligently utilized and property taxes are made to the San Juan Mining Secretariat (Departamento de Minería de San Juan).

A Cateo is an exploration concession which allows the holder the exclusive right to explore the area subject to certain rights of owners of pre-existing mines within the Cateo area. Once an application for a Cateo is submitted all rights to any mineral discovery on the Cateo belong to the applicant. Through exploration, the holder of a Cateo may make and file manifestations of discovery and formally request the Mining Secretariat for the granting of a mining lease. Properties in Argentina are held in good standing by the payment of property taxes (Canons) and perfecting the mining title from cateo through to mine. As such, no expiry date exists, nor can be given for Cateos and Mines in Argentina.

### 6.2 Nature and Extend of Issuer’s Title

The Gualcamayo Project is owned 100% by MASA, a wholly-owned subsidiary of Yamana which acquired through its purchases of Viceroy in October of 2006. Royalties on the property are as follows: (i) a 1% Net Smelter Return Royalty ("NSR") on production from the Gualcamayo Project is payable on certain concessions to Inversiones Mineras Argentinas Inc. ("IMA"), who assigned their rights and obligations to Golden Arrow Resource Corporation by assignment agreement dated July 4, 2004; (ii) a 1% NSR, capped at US$200,000 on production from the Patrimonio, Patrimonio III, Patrimonio IV and Leticia mining leases is payable to the Lirio Family; (iii) a 1.5% NSR, capped US$500,000, is payable to the Lirio Family on production from the Rio Piojos Cateo; (iv) a 3% provincial royalty is payable on mine production after deduction of direct mining and associated G&A costs and (v) an export tax of 5% of the value of doré exported. An additional 1.5% of contributions to infrastructure fiduciary funds is calculated upon the gross sales and is payable to the San Juan government. This contribution is included in the Mine site overhead line of the cash flow, along with the debit and credit tax (1.2% upon the total transactions in the Argentinean Banking system).
6.3 SURFACE RIGHTS

Surface rights in Argentina are not conferred with title to either a mining lease or a claim and must be negotiated with the landowner. In 2004, MASA purchased the surface rights to a contiguous land package totaling 26,218 hectare, which partially covers the Gualcamayo Project and wholly covers access to the area of interest from Highway 40, the main access route to the property. The surveyed western boundary of the land package is shown in Figure 17.

Figure 17 - Gualcamayo Mine, mineral and surface rights

Note: there are not mine workings, waste deposits, and important natural features and improvements, related to the outside property boundaries.
6.4 ENVIRONMENT CONSIDERATIONS, PERMITS & ENVIRONMENTAL LIABILITIES

6.4.1 Environment Considerations

The Gualcamayo Project is a Mine that entered into commercial production stage on July 1st, 2009, and its main resource is gold ore. The exploration program conducted by MASA, has covered three mineralized zones known as: Quebrada del Diablo (QDD), Amelia Inés and Magdalena (AIM). Later, Quebrada del Diablo Inferior (QDDLW) Ore Deposit, the subject of this report, was discovered and explored.

In November 1997, the Environmental Impact Report - Exploration Stage according to File N° 520-1051-M-97 was submitted, and approved in June 1998 according to Resolution N° 285-HCM-98, covering three mineralized zones: Quebrada del Diablo (QDD), Amelia Inés (AI) and Magdalena (MG).

Later, a mineralized body located in the subsoil called QDD Lower West was discovered as stated in the Exploration Environmental Impact Report, Fourth Update, from "Gualcamayo Project".

In December 2006, the corresponding Environmental Impact Report prepared for the Gualcamayo Project Operational Stage File N° 1100-0273-M-06, was submitted to the San Juan Province Mining Secretariat authorities. The report developed by Knight Piésold was submitted in order to comply with the environmental legal framework for mining activities ratified in Law N° 24.585 of Environmental Protection for the Mining Activity, incorporated in the Mining Code as Title Thirteen, Section II, and statutory and additional Regulations.

The Gualcamayo Project that was submitted for environmental evaluation through the report refers to the mining operation of a gold mine in QDD area with traditional methods: open pit, primary and secondary crushing, a valley leaching system, and treatment of the leaching solutions in an Adsorption – Desorption – Refining plant (ADR). Through electrolysis, the enriched solution produces a cathodic precipitate that is subjected to casting, yielding Metal Doré bars as final product.

The Environmental Impact Report (EIR/IAA) has been developed in accordance with the requirements from the national, provincial and municipal regulations from Argentine, San Juan and Jáchal, respectively.

The EIR/IAA includes the environmental base line characterization, a Project description, impact description and evaluation, environmental management plan, actions against environmental contingencies, methodology, and consulted regulations. As part of the EIR/IAA studies, a civic participation program, which is described in the EIR/IAA, was carried out.

MASA received the Environmental Impact Declaration (EID) in August 2007 according to resolution 104-SEM-07. The approval of this report allowed developing the mine for its mining, subject to obtaining the corresponding area permits for installing and executing specific projects.

In August 2009, the First EIR/IAA update of the Gualcamayo Project mining works was submitted, covering the three mineralized zones, QDD, AI and MG. This report includes updated environmental data during construction and production start up, a description of the mine upon preparing this report, a description and evaluation of environmental impacts, results from the environmental protection actions carried out, environmental management plan, and actions against environmental contingencies.

The 5th Update of the Environmental Assessment Report – Exploration Phase has been submitted and it includes information referring to the future construction of the Access Ramp to the West Zone Lower QDD deposit. The referred information is included under item 4 sub-item 4.4 of said report.
6.4.2 Permits

Exploration drilling on the property is subject to the application and acceptance of a water use permit from the "Departamento de Hidráulica de San Juan" which MASA has received.

At the completion of each phase of exploration an environmental impact study is required to be submitted to the Environmental Provincial Management Unit ("EPMU"; Unidad de Gestion Ambiental Provincial) of the San Juan Department of Mines. Two reports (Expediente Nº 520-1051-M-97) cover the Gualcamayo Project for the years 2005 and 2006 (Hernandez, 2005 and 2006).

An application to develop the project, an environmental assessment, or Informe de Impacto Ambiental ("IIA"), for the production phase was submitted to the San Juan authorities in December 2006. Yamana received formal approval of the application in August of 2007.

Approval of this assessment permits mining development to proceed, subject to obtaining sectoral permits for specific project facilities. Sectoral permits have now been obtained for most of the QDD project facilities, and continue to progress well.

Planning for the sectoral permitting for the leach pad facility was initiated in December 2006, continuing through 2007 and 2008, with key focus on the longer lead permit processes such as the water use concession, and approvals of design and for construction of the leach pad embankments. The active permitting phase is expected to continue throughout 2009.

6.4.3 Environmental Monitoring

During development of the Gualcamayo environmental impact assessment, site-specific studies and monitoring to define existing conditions were carried out in a broad range of disciplines including hydrology and hydrogeology, archaeology, traffic, noise and vibrations, geomorphology and geologic risk, seismology, terrestrial and aquatic life, socio-economic aspects, palaeontology, soil, water quality, air quality, meteorology, landscape values.

In order to determine the presence of aquifers in the mineable area of QDDLW deposit, a drillhole of 300m with 5 1/2" diameter was carried out according to the following coordinates: (X2.535.124; Y6.713.365; Z2.065). The result of this drilling was negative, no trace of aquifers was found in the nearby areas.

Several hydrological and geophysical studies have been carried out in Gualcamayo Project on 2008, they have been conducted by Hidroar S.A. These studies will be updated in the Environmental Assessment Report, 2009.

Monitoring will be continued during construction, operation, and closure phases of the project. Monitoring proposed in the environmental assessment includes ongoing monitoring of surface and groundwater sites, sewage-treatment plant effluent, airborne particulate, and meteorological conditions. Periodic monitoring is proposed for noise, vibration, flora, fauna, and archaeological sites.

6.4.4 Closure

A conceptual closure plan was developed for the Gualcamayo project, and was submitted as part of the environmental impact assessment document. This plan considers both temporary (for example, in the case of depressed gold prices), and definitive closure scenarios.

Once operations cease, closure activities, including demolition and dismantling, remediation, and leach pad chemical and physical stabilization are expected to be completed within two years. Environmental and geotechnical monitoring would continue on a reduced schedule for an additional four years until final closure.
In the environmental impact assessment, the company has committed to refining and updating the closure plan throughout the project life, and to submitting a final closure plan to the mining authority two years prior to the anticipated definitive closure date.
7. ACCESSIBILITY, CLIMATE, PHYSIOGRAPHY, SEISMICITY, LOCAL RESOURCES AND INFRASTRUCTURE

7.1 ACCESSIBILITY

The Gualcamayo Project is easily accessible from the city of San Juan by driving 3 hours north on paved Highway 40 and then via a 20 km gravel access road to the camp. The site is accessible from the nearby towns of Guadacol, Huaco, and Jachal, with driving times respectively of approximately 40 minutes, 1 hour and 1.5 hours.

The main site access road starts in Highway 40 and it goes along the embankment, the foot of the mountain and the Gualcamayo river valley. The distance between the road and Gualcamayo river is approximately 15 km. A 3 km road has been built along one of the river banks into the main campsite area. The road has been built with adequate elevation, drainage and culvert systems so as to prevent damage during the rainy season.

The main access road to the Gualcamayo Project was completed in 2006 and it is adequate for the operational phase. In addition to the main access road, a large network of tracks has been built within the Gualcamayo Project site to access the camps, the resource area and the future facilities, including the leach pads and the mine access roads. The main access road to the QDD East mining area can already be used.

The Gualcamayo river intersects the main access road. It divides the operations process area to the East from the mining operations, and crushing and camp facilities located West of the river. The staff and visitors will normally cross the river. The river has usually very little or no flow and it is easily passed by light vehicles. However, occasional flash floods occur during the rainy season and can make the river impassable generally for less than six hours, and in extreme cases for up to twelve hours.

A conveyor belt developed partly in an underground gallery and partly in the open will cross the Gualcamayo river over an elevated structure supported by rock-filled gabions. A catwalk will be built all the way along the conveyor belt and it will allow the crossing on foot when the river flash floods prevent light vehicles from passing.

Vehicles will cross the river through an adjacent place to the conveyor belt, a gravel road which will require repairing after the floods so as to clear debris.

7.2 CLIMATE

The climate is semi-arid with average annual precipitation of 190 mm. The rainy season commences in December and ends in late March.

Temperature at the site averages 15°C over the year. Extreme temperatures range from -9°C in the winter to 40°C in the summer. Winter daytime temperatures average 15°C with sub-zero temperatures occasionally reached, especially at night. July and August can experience snow accumulations to 15 cm above 2000 m. The snow typically melts within one or two days.

Apart from occasional flash flooding in the rainy season (December and January), no disruption of operation can be expected. Vegetation consists of thorny bushes and cactus. Wildlife is sparse and there is no agriculture aside from limited grazing in the nearby upstream areas of the project.

The primary wind direction at the site is from the east, and secondarily from the west. The region can experience high winds, particularly in the winter period, when a warm dry wind, referred to as Zonda, descends from the Andes.
7.3 PHYSIOGRAPHY

The Gualcamayo Project is located in the Pre-Mountain Range Mendoza, San Juan and La Rioja, in Argentina, in a rugged topography area. Elevation ranges from 1,600 to nearly 3,000 m. The most prominent geographical feature is the Quebrada Del Diablo, a northwest trending structurally controlled 750 m long canyon with up to 400 m of near vertical relief.

The Gualcamayo river valley intersects the project site to the east of the mining area. The river has a trickle flow during most of the year and is easily travelable by light vehicles. During the rainy season, flash floods occasionally occur that can make the river impenetrable, generally for less than six hours, and in extreme cases for up to 12 hours.

7.4 SEISMICITY

The Gualcamayo Project is located in a seismically active region. In August 2006, Golder Associated Inc. (Golder) completed a specific seismic design for the site: likely soil accelerations were considered and applied to the design basis of the leach pads, resulting with soil accelerations of 0.29 g and 0.40 g for recurrence periods of 475 and 1,000 years respectively.

7.5 SERVICES AND INFRASTRUCTURE

The area of general services and infrastructure are good. Heavy machinery dealer, spare parts and repair shops are available in both San Juan (260 km) and Mendoza (430 km). Local labour is readily available, staff engineers, geologists and research institutions are available through the Universidad de San Juan, as well as from consulting companies based in the region.

7.5.1 Electrical Power Line

The National electric power system is located approximately 129 km from the project site, currently Gualcamayo relies on a 132 kV HTOL (high tension overhead line) that connects Jáchal – Huaco – Gualcamayo.

7.5.2 Fuel Storage and Distribution

Fuel storage deposits are located in the Campamento Gualcamayo area, total storage capacity of fuel is approximately 60,000 litres. Propane tanks are also located at the camp, total storage capacity of propane is 49,640 litres.

The distribution in the mine are carried out by specially down-the-mine fuel equipment that will provide lube and grease maintenance services, thus offering lubrication and fuel supply services at the same time.

7.5.3 Water Supply

A water distribution system pumped water to the camp and up to the key operational points at the mine, including exploration drilling key locations. The water is potable and a chlorination and filtration system has been installed at both camps. Pump tests and draw down tests have been completed at the water source and there is more than enough water to meet future operations requirements. Updated pump tests have confirmed that the water source can sustain a constant pumping flow of up to 70 litres per second.

Additional drilling has been planned to provide fresh water to the operations. Potable water will be obtained through water filtration treatment and a small chlorination plant located at each facility.
7.5.4 Site Facilities

At present, an on-site camp called ‘Campamento Gualcamayo’ is installed near the Gualcamayo River. The new camp called Campamento Minero (Mining Camp) consists of six modules of 144 rooms each with a total capacity of more than 350 beds, a kitchen dining room with capacity for 200 persons, a multiple purpose conference room, a TV lounge and a laundry facilities. A sports centre, a basketball court and fields for football and other open door sports are also considered.

There are six room modules and each one has 24 rooms in two paired-up lines, 12 rooms in each. Each room is approximately 3.9 m x 3.6 m x 2.9 m high. Each room has a private bathroom and is equipped with the following furniture: closet, beds, chairs or desk as well as satellite television service.

The kitchen dining room is 32 m x 25 m, plus a 9 m x 5 m covered entrance hall. The areas for kitchen and dining room are well-delimited. It is equipped with cold/hot water distribution system.

The water supply service for the camp bathrooms is provided from a 20,000 litres reserve water tank that maintains a constant pressure of 25 m high and which receives water from water wells located on the Gualcamayo river banks. Hot water is supplied continuously operating boilers. It is also equipped with separate split air conditioning equipment (cold / warm).

All facilities (room modules, the kitchen dining-room and the multiple purpose conference room) are equipped with a fire-control system authorized by the Fire Department.

The Campamento Gualcamayo has a sewage treatment plant with unique characteristics in Jáchal District and is one of the few advanced plants in San Juan Province.

7.5.5 Explosive Handling

Power Magazines are located 1 km from the camp in accordance with Law and Safety Standards. Permits for the approval to handle the power magazine are on going.

The authorized power magazines will be used as general explosives warehouse for the underground mine. Inside the mine, smaller power magazines will be built to storage a minimum quantity of explosives to ensure daily operations. These power magazines will be rock excavated and pursuant to all safety standards ruled by RENAR, a national body.

7.5.6 Site Roads

As planned for the Gualcamayo Project phase IV, part of the road leading through the primary ramp access to the underground deposit will be covered with waste from QDD Upper deposit mining operations. For this reason a new road has been studied to access the QDDLW mine entrance, which will be throught Quebrada Rodado.

7.5.7 Communications

Site external communications are provided by a 256 KB/sec satellite link that provides voice and data communications to Campamento Gualcamayo using a Voice over IP system.

Portable radios are used for communication within the project site. A VHF repeater is located on Cerro Condor south of the QDD resource, providing good radio communication coverage within the project site. Installation of a microwave communication link between the site and the town of Jáchal is currently in progress and expected to be
completed in 2007. This link will have up to 500 Mb/s of voice and data transfer capacity between the site and Jáchal.

Communications down the mine will be through a radio-link connection between the project site and Jáchal city, which is expected to be completed by year 2009.

Leaky Feeder system will be used for communications down the mine, which will cover all points in the mining developments and production area and shall provide interconnection with open pit mining operations and offices.

In addition, telephone services shall be provided down the mine with connection to the entire communications network.

7.5.8 Human Resources

MASA, the operator of the Gualcamayo Project, will soon begin mining an underground mine called QDD Lower, (QDDL), whose mining will be simultaneous with the current open pit operation.

This new operation will require personnel with new mining abilities, and a significant resource which will integrate itself in the current organization.

The shortage of labour with experience in underground mining will force to develop a selection, coaching and training stage for the new staff, and probably some foreign staff, experienced in underground mining, will be integrated.

The work scope is based on the basic engineering studies of the QDD Lower Project, which defined the staff resources by specialties, working days, and shifts system.

The recruiting and selection of staff with the required profiles will be in charge of the HR Area from MASA, which will follow the established procedures to fill the requested vacancies.

An additional team will be required, owned or with consultants, of at least four persons with support and guidance from MASA’s HR team, whose objective will be elaborating the profiles and job descriptions, and organize the staff recruiting and selection process.

The process involves personal interviews, technical line interviews, field tests or development of technical evaluations, application of psychometric tools and pre occupational medical studies.

This is suggested as a continuous process, during an 8 month period, due to the number of people that have to be hired. A maximum of 50 persons per month has been defined, considering the capacity of the market and of the internal processing, during the period defined in the enclosed schedule.

The hired operative personnel will be regulated by the Working Collective Bargain Agreement Nr 988-08 “E “ and its expansions for underground mines, in the understanding that the working shifts, wage scale applied, leaves, absenteeism regulations, production awards, etc. will be established in accordance to the regulations stipulated by it. Regarding the administration of hierarchical personnel, professionals and administratives, they will be ruled by the current work legislation, policies and regulations from HR determined by MASA.

In order to prepare the staff for the operation, a training program will be established (theoretical-practical), whose aim will be teach, spread and encourage basic mining knowledge, working procedures, safety regulations, health and environment, specific practices in underground mining, Work Manual from Yamana, and all the subject matter required for the operation.
8. HISTORY

The general area of the Gualcamayo Project has been sporadically prospected by local miners for at least the last 60 years. These exploration activities were directed towards surface occurrences of skarn lead hosting, zinc, copper, gold and silver mineralization. There is also evidence of minor magnetite production from the skarns.


At the Amelia Inés deposit, Mincorp carried out 3,414 m of surface diamond drilling, 1,405 m of underground development on three levels, and 4,047 m of underground drilling from 79 holes. They also conducted an Induced Polarization ("I.P.") survey and 750 m of surface trenching, sampling and mapping. Based on this work, Mincorp identified three zones of gold mineralization referred to as Betsy, Ana and Diana.

A 92 m tunnel referred to as "tunnel D" was also developed southeast of Amelia Inés. Although this was designed to provide underground drill stations to explore the Amelia Inés deposit it was never utilized.

At the Magdalena prospect, Mincorp carried out an I.P. survey, 980 m of surface diamond drilling, 335 m of underground development on two levels (4 adits), and 795 m of underground drilling. Mincorp concluded from their exploration program that the mineralized zones were small and irregular. However, later interpretation suggests that the adits and drill holes may have been oriented parallel to the strike of the mineralization, providing little useful information about the size or grade of the zone.

At the General Belgrano prospect, a 350 m crosscut was driven at the 1,850 level (1,965 masl.) and cut five veins. An additional 195 m of drifting was performed along these veins. One was a sub concordant structure containing pyrite, chalcopyrite, tetrahedrite and sphalerite. Grades reportedly averaged 10.8 g/t Au and 1,002 g/t Ag over a thickness of 0.3 m for a length of 55.6 m. Mincorp concluded that the Belgrano veins are generally narrow and dislocated by faulting which made exploration difficult and work was suspended.

MASA formed a joint venture in 1997 with Mincorp to earn a 60% in the Gualcamayo Project. The objective of the exploration program initiated by MASA was to explore and evaluate the potential for epithermal sediment hosted gold mineralization peripheral to the skarn hosted mineralization explored by Mincorp.

In late 1997 and 1998, regional prospecting and rock geochemical sampling by Bill Rowell revealed the presence of gold bearing carbonate breccias in QDD, approximately 1.2 km southeast of Amelia Inés. The mineralized zone as defined by surface sampling extended 400 m along the quebrada and up to 800 m to the east along steep cliff exposures. The original discovery was confirmed by a saw-cut channel sampling and a follow-up program of continuous rock chip sampling along a newly constructed road into the Quebrada.

Throughout December 1997 and December 2000, MASA completed four drill programs for a total of 11,230 m in 58 drill holes. The drilling included 6,043 m of diamond drilling and 5,187 m of reverse circulation ("RC") drilling that focused primarily on the QDD area.

Geological mapping and surface sampling during 1999 and 2000 helped in further defining the trend of gold mineralization which currently extends for more than 2.5 km from QDD through the Amelia Inés and Magdalena areas.

In 2004 MASA completed further definition and fill-in drilling at QDD totaling 7,167.5 m in 26 RC holes. RC Drilling was also conducted at Amelia Inés (947 m in 5 holes), Magdalena (1,844 m in 8 holes) and three other peripheral target areas (1,964 m in 8 holes).

In late 2004, Major Drilling brought in a skid-mounted UG JKS Boyles B20 core rig capable of drilling angle holes from -90° to +45° in order to test previously inaccessible portions of the QDD and AIM deposits as well as other exploration targets. Four core holes were completed before the end of 2004 amounting 712 m.

In January 2005, AMEC Americas Limited (“AMEC”) completed a Preliminary Economic Assessment (“PEA”) of the QDD deposit in accordance with NI 43-101. The study used a gold price of US$400 per ounce and concluded that the QDD project had the potential to be economically viable and should proceed to the next phases of feasibility study. Core and RC drilling was continued throughout 2005 and 2006 on both QDD and surrounding targets. Between January 2005 and August 2006, results were received from 114 core holes and 69 RC holes representing an additional 38,452 m.

GeoSim Services Inc. (“GeoSim”) completed an updated mineral resource estimate in September 2006.

Exploration drilling continued through the remainder of 2006 and during 2007 concentrating mainly on the outlying satellite deposits, Amelia Ines and Magdalena (collectively referred to as AIM). However, exploration continued to explore the deep western extension of the QDD deposit, and in mid 2007, an exploration decline had started to provide better access.

In August, 2007 Wardrop Engineering completed a feasibility study on the QDD deposit (Wardrop, 2007). The study involved developing feasibility level design of all aspects of the project, including mine design, mineral processing, heap leach facilities, gold recovery, and economic evaluation. The financial evaluation concluded that the Gualcamayo Project is a positive project at current gold prices prices and with the current NI 43-101 resource.

In the same report, an updated resource estimate was reported for the AIM deposits and used as the basis for a separate scoping study. The scoping study on the AIM deposits was completed to a ±30% level of accuracy and concluded that the addition of the AIM deposits to the QDD deposit would significantly improve the overall economics project.

In September, 2007 an interim resource update for the AIM deposits was carried out using assay data received as of July 12, 2007. This included an additional 25 core and 6 RC drill holes.

A positive construction decision for the QDD deposit was announced by Yamana in August 2007 following the results of the positive feasibility study and on the formal approval for its Gualcamayo Environmental Impact Report. Mining is ongoing at the QDD deposit with commercial production projected by mid-year 2009.

Total drilling on the QDD Upper and Lower deposits as to the end of 2007 included 190 core holes and 134 RC holes totaling 79,784 m.

In March, 2008, GeoSim completed a new database update with three deposits QDD upper, AIM and underground deposit QDD Lower West.

In January, 2009, Yamana announced the results an updated Pre-Feasibility study relating to the QDDLW deposit in which two alternative approaches to mining were considered. In February, 2009 Yamana Technical Services for Yamana Gold Inc. and Yamana Desenvolvimento Mineral S.A. completed The Technical Report Update Gualcamayo Project in accordance with the requirements of NI 43-101 and Form 43-101F1.

In July, 2010 Yamana completed an update with resources estimation of QDD Lower Deposits.
9. GEOLOGICAL SETTING

9.1 REGIONAL GEOLOGY

The Gualcamayo Project is located along the eastern margin of the Precordillera of west central Argentina, immediately to the east of the Cordillera de Los Andes. The Precordillera is a narrow N-S trending belt of tectonically deformed clastic and carbonate rocks of lower to mid Paleozoic age, overlain by Carboniferous and Permian marine and continental sediments, Triassic volcanics and continental redbeds and Tertiary continental redbeds (Rowell 1997).

Permo-Triassic granodiorite and diorite stocks intrude the sedimentary section and are considered to be related to at least two, Paleozoic orogenic events. During the Miocene, the Precordillera was affected by subduction related deformation (Andean Orogeny) that telescoped stratigraphy eastward into a high level fold and thrust belt with crustal shortening of 60 to 90% (Jordan et al 1993). Major, N-S trending thrust faults horizontally displaced stratigraphy more than 100 km to the east and superimposed lower Paleozoic rocks over Tertiary, continental redbeds.

Tertiary magmatism in the project area, ranging in age from 16 to 5.6 MA (Simon, 1986, Simon et al, 1997), was focused on the intersection of NNW trending regional structures with more localized cross-cutting faults. Tertiary intrusives are generally smaller than the older granodiorite and diorite stocks but produced more extensive hydrothermal alteration (Rowell, 1998).

9.2 LOCAL AND PROPERTY GEOLOGY

The Gualcamayo Project is located primarily within a package of lower Paleozoic stratigraphy characterized by thick carbonate sequences of upper-Cambrian Los Sapitos and Ordovician San Juan Formations, which are overlain by marine clastics of Upper Ordovician Trapiche Formation. The entire stratigraphic section exceeds 1,000 m in thickness. The immediate project area is intruded by a quartz diorite stock, dated at 16-5.6 MA, (Simon et al, 1997 and Simon 1986) that produced relatively thin skarn halos and a metasomatic areole that extends 100’s of metres outboard into the surrounding carbonates.

The property’s deformation history is complex, exhibiting two phases of folding followed by reactivation of pre-existing structures. The first event (D1), characterized by NW to NNW trending folds and related structures, is compatible with the formation of the Andean thrust belt and an E-W compressional stress regime. Refolded NNW folds along an ENE axis and the presence of bedding parallel ENE and E-W brittle faults indicate a later deformation event (D2), characterized by N-S compression (Marquis 2000). Re-establishment of the E-W compressional regime created north directed extension along D2 faults and oblique slip movement along D1 structures.

Structural controls to gold mineralization, intrusive emplacement and the geometry of the metasomatic areole at Gualcamayo are believed to be closely related to small and regional scale fold structures, developed from both D1 and D2 events.

9.2.1 Stratigraphy

The stratigraphy of the Gualcamayo Project area is summarized in Table 10. The following sections describe the lithologies in more detail.
9.2.1.1 Los Sapitos, Cambrian

The Upper Cambrian Los Sapitos Formation is well exposed in the lower portions of Quebrada Varela and along Rio Gualcamayo. The upper part of the Los Sapitos contains distinctive cycles of dark gray burrowed lagoonal lime-wackestone and packstone, alternating with tan or light brown weathering dolomitized supratidal packstones and grainstones. Skeletal and algal-cemented grains are concentrated at strand lines and in tidal channels as packstones, grainstones, and micro-breccias. Gas bubbles from decaying organic material produce distinctive fenestral fabrics when the bubble voids were later filled with sparry calcite (Thorson, 2006).

Each lagoon-supratidal cycle is a low energy shallowing upward event, beginning with a small sea level rise creating a lagoon that is gradually filled up to supratidal levels. The many repeated cycles in the upper part of the Los Sapitos indicate a depositional environment on a stable carbonate platform (Thorson, 2006).

9.2.1.2 San Juan Formation, Ordovician

The Ordovician San Juan Formation consists of a northwest-trending, 300 metre thick succession and has been divided into four separate members by Thorson (2006) as follows:

- Platy Algal Limestone;
- Cliffsy Bioturbated Grainstone;
- Triplets Member;
- White Recessive Limestone.

These members make identifiable mapping units for the project as they are distinctive in lithology and topographic expression.

<table>
<thead>
<tr>
<th>Table 10 - Gualcamayo stratigraphic column</th>
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<tr>
<td><strong>Tertiary</strong></td>
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<td>Miocene</td>
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<td>Ordovician</td>
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<tr>
<td>San Juan</td>
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<td>Cambrian</td>
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</tbody>
</table>
The White Recessive Limestone is a unit of somewhat friable crystalline limestone that forms the bottom member of the San Juan Formation. The recrystallization imparted a light color and resulted in a recessive topographic expression. It appears to have been a limegrainstone, probably originating as a grainstone shoal. Beneath the Gualcamayo resource area, the unit has textures indicative of karst dissolution, collapse, and internal cave sediment. Early karst collapse of this unit may have created permeability channels that guided later collapse and mineralization events (Thorson, 2006).

The Triplets unit is a distinctive series of upward shallowing cycles of dark lagoonal limestone and light colored supratidal dolomite that make up the second member of the San Juan Formation. Initially, three cycles were described with distinctive light colored dolomite horizons, thus triplets, but examination of the unit on Filo Condor Este indicates that locally there may be as many as six cycles. The lagoonal - supratidal cycles are very similar to those described, above, from the upper part of the Los Sapitos. Bryozoa and flat-coiled gastropods that appeared in the Ordovician should help distinguish the Triplets cycles from the upper Los Sapitos (Thorson, 2006).

The Cliffy Bioturbated Grainstone is a burrowed grainstone shoal with some oolites that has a distinctive topographic expression above the Triplets (Thorson, 2006).

The Platy Algal Limestone is a unit of thin to medium bedded dark gray lime-wackestones. The unit is heavily burrowed producing bedding plane surfaces with distinctive, highly irregular, mottled and hummocky, textures (Thorson, 2006).

9.2.1.3 Trapiche Group, Upper Ordovician

The relatively recessive, clastic rocks of the Late Ordovician Trapiche Group are confined to Quebradas Rodado and Montosa. Rock types for the lowest member include red and dark red pebble conglomerates and fine to coarse arkosic sandstones (Las Vacas). This member is overlain by dark red siltstone and silty shale interbedded with thin gray limestone beds. The upper member of the Trapiche Group is composed of dark red, fine grained, sandstone and siltstone units interbedded with light gray to white coarse grained sandstone beds with occasional white pebble conglomerates.

In the upper parts of Quebrada Rodado, the clastics are wrapped around the intrusive and are metamorphosed to hornfels. Sedimentary textures are only preserved in the conglomerates (Marquis 2000). Along Quebrada Montosa, Trapiche sediments form a broad, gentle west dipping syncline that is bounded to the west by the steep, west dipping, Montosa Thrust.

Although Trapiche clastics are heavily sheared and altered in places they do not host significant gold mineralization. In his 2006 report, Thorson states that the coarser grained Trapiche Fm. lithologies may make potential host rock for Au mineralization and that bleached and sulfidized Trapiche sandstones or conglomerates should be sampled carefully as possible gold-hosts, or as possible leakage indicators above gold mineralization in the underlying San Juan Fm.

9.2.1.4 Intrusive Rocks

The lower elevations of the property in Quebradas Varela and Rodado are dominated by a multi phase dacite to quartz diorite porphyry stock (Varela Stock) that is reduced to thin dikes and pods intruding pre-existing fractures, faults and fold hinges within the higher, thin bedded, San Juan Formation to the west. Age dates of these porphyritic intrusives range from 16 to 5 MY (Simon et al, 1997). The younger quartz diorite phase consists primarily of 60% calcic plagioclase and 30% quartz phenocrysts within a fine groundmass of 30-65% adularia, 15-25% quartz and minor mica, chlorite and iron oxides (Hodder 1999). The more dominant and felsic dacite phase is strongly weathered and argillically altered producing locally recessive zones and a bleached white colour in outcrop.
Extensive mapping by MASA and Marquis conducted in 2000, recognized subtle differences in composition and structural emplacement between the larger stock and dikes to the west and indicates that they may represent distinct phases that are tied to the two deformation events (D1 and D2).

- **Phase 1 (Stock);** Strong to intense argillic alteration, heavily fractured and deformed, contains en echelon centimeter scale quartz veinlets, produced contact skarn deposits and metasomatic areole. Emplacement and geometry of metasomatic areole controlled by gentle, NW plunging F1 folds. One sample at the Amelia Inés Skarn Deposit produced a K-Ar date of 5.6 +/- 0.2 MA (Simon et al, 1997).

- **Phase 2 (Dikes);** fresh, less argillically altered, large (1cm) quartz phenocrysts, 1-5% biotite and hornblende. Emplacement controlled by steep north dipping WNW, ENE and E-W faults and gentle, SW plunging F2 folds.

### 9.2.2 Structure

Regionally, the Central range of the Pre-Cordillera is dominated by west dipping thrust faults that juxtaposed Cambrian Los Sapitos Carbonates against Tertiary sediments east of the Gualcamayo Project during the Miocene, Andean Orogeny. However the dominant structure underlying the Gualcamayo Project is a shallow east dipping detachment structure, which juxtaposes the upper part of the San Juan Formation against the Trapiche clastics along the southwestern flank of Filo Montosa. This structure is interpreted to be a back thrust of similar age to the Andean west dipping thrusts. Northwest-trending, west vergent folds are common within the hanging wall to this detachment structure forming a unique structural domain compared to the lesser deformed west dipping carbonates in the footwall.

A major sinistral wrench fault (tear fault) is recognized at Ptz. Tamberias, 2 km southeast of Gualcamayo Project, which offsets a north-striking principal thrust as much as two kilometres. This fault transects the Gualcamayo area as a series of similar striking en echelon structures. Tertiary porphyry intrusives are common along this structural corridor extending another 15 kilometres along strike to the WNW. Minor shallow east dipping detachment structures with chaotic folding in the hangingwall are common in the thin bedded upper San Juan Fm along the western margin of the Varela stock. These flat lying detachment faults and associated folding are interpreted as flower structures that were produced by the accommodation of stress of the Ptz. Tamberias wrench system around the Varela Stock.

E-W trending folds and related brittle faults are also recognized superimposed on northwesttrending folds and faults. Origin of these later folds are interpreted to be the result of dextral rebound along pre-existing NW trending sinistral faults that extends as much as 300 meters outboard into thin bedded limestones of the Upper San Juan Fm. This second order folding produces a dome and basin geometry of carbonate beds along the southwest margin of the Varela Stock.

The youngest deformation recognized consists of normal movement along pre-existing E-W structures and continued sinistral and reverse movement along pre-existing NW striking faults all compatible with continued E-W compression. Relative displacements are in the order of 10 to 100 metres.

The most striking geomorphological feature in the project area is a northwest-trending canyon with as much as 400 metres of sub-vertical relief on its eastern wall known as Quebrada Del Diablo (QDD). This structure is believed to be a deep seated Ordovician rift structure that was reactivated as a sinistral wrench fault during Andean Compression, forming the central feeder structure to gold mineralization in the Upper San Juan Fm.

### Brecciation

In the QDD area and Amelia Inés and Magdalena satellite deposits, MASA has mapped five types of breccias as the principal host of gold mineralization. These are primarily collapse breccias primarily derived by hydrothermal dolomitization of the diagenetic dolomite Triplet unit causing collapse of the overlying kartsed algal mat limestone.
The criteria for classification is based on type and percentage of clasts and/or matrix, i.e. > 90% marble clasts (Bx1), > 90% limestone clasts (Bx2), > 10% marble and > 10% limestone clasts (Bx3), intrusive porphyry matrix (Bx4), skarn clasts (Bx5).

9.2.3 Alteration

9.3 DOLOMITE

Two types of dolomite have been recognized at the Gualcamayo Project, stratigraphic early diagenetic dolomite and hydrothermal alteration dolomite. Both are the result of alteration of limestones. The early diagenetic dolomite partially replaced limestone, or carbonate sediment, shortly after deposition. This dolomite appears as distinctive tan weathering beds at the tops of shallowing-upward sedimentary cycles in the upper Los Sapitos and Triplets member of the San Juan Formation. Dolomitization of these beds was the result of concentration of Mg-rich brine by evaporation in ephemeral ponds on the supratidal surface (Thorson, 2006).

Hydrothermal alteration dolomite is widespread in the project area. It occurs several different ways and shows varying characteristics dependant upon its location at Gualcamayo. In some occurrences alteration dolomite has coarser crystal size, and occurs as zones that cross-cut stratigraphy; in others, dolomite that is suspected of being an alteration product is fine-grained and massive.

Alteration of limestone to dolomite has created a collapse breccia of dark colored fragments that has been largely filled with white dolomite and calcite. In a few examples of cavities that were not completely filled with calcite, the white dolomite can be seen to have the distinctive curved crystal faces of “saddle dolomite”. Saddle dolomite is encountered as a hydrothermal dolomite gangue or alteration product in many low to moderate temperature carbonate hosted hydrothermal ore deposits (Thorson, 2006).

9.3.1.1 Skarn

Garnet bearing endoskarn and exoskarn forms patchy, NW-trending rims of conspicuous, reddish brown gossan along intrusive/marble contacts. Widths range from a few metres along Quebrada Varela to 10’s of metres at Amelia Inés and Magdalena where thicker skarn halos were developed in anticlinal fold hinges within the dolomitized triplet member of the San Juan Formation Limestone. At Amelia Inés and Magdalena, intrusive textures are commonly destroyed near the contact exhibiting a massive, gossanous texture that progressively grades into massive brown (andradite) and green (grossularite) garnet exoskarn. Semi-massive pyrite veins and magnetite veins up to 20-30 cm wide with minor retrograde veinlets of sphalerite, chalcopyrite and galena are also recognized. Retrograde molybdenite/quartz veinlets 1-3 cm wide are common along skarn /intrusive margins, localized along E-W striking tensional structures. The interpreted skarn paragenesis for district is summarized in Table 11 with Stage V representing the late stage gold-arsenic mineralizing event.
9.3.1.2 Ankerite

Hydrothermal ankerite alteration of carbonates is widespread in the area and post-dates dolomitization. An early stage of ankerite alteration is seen replacing dolomite rhombs in partially dolomitized beds. A second stage occurs as veins and veinlets cross-cutting the earlier stage ankerite. Ankerite alteration is strong in area of the gold deposit, but its distribution has not been fully understood (Thorson, 2006).

9.3.1.3 Carbonatization and Absence of Silicification

Secondary silicification is notably absent within all hydrothermally altered rock types, excluding one outcrop of quartz diorite at Ptz. Belgrano containing sheeted quartz veinlets and a silicified intrusive sill that forms a structural unconformity between the San Juan limestone and overlying Trapiche conglomerate. A mechanism for transporting and depositing gold with no silicification can be explained by descending bicarbonate fluids (ground water in a karst environment) being heated by an upwelling magmatic fluid. This interaction would create:

1. Increase in temperature of groundwater promoting carbonate deposition (i.e. calcite veins);
2. Possible boiling of bicarbonate groundwaters would drive off CO2, increase pH and as result inhibit deposition of quartz;
3. Magmatic waters would be oxygenated by circulating ground water.

The last item is one of the best mechanisms for depositing gold in epithermal systems. In addition, free silicon may have been taken up in skarn development rather than quartz.
9.3.1.4 Iron Oxides

The matrix of breccias and fractures in limestones, marbles, intrusives and associated breccias are moderate to weakly, stained by Fe oxides. However, in some breccia outcrops Fe oxides are rare to absent. Thin section analyses (Rowell 1998) of breccia samples reveal that hematite and limonite occur along fractures interstitial to carbonate grains and in breccia cement with smaller patches derived from the oxidation of pyrite containing micron size gold particles.

Due to the very low sulphide content in the outer edges of the hydrothermal system it is difficult to account for all the hematite and limonite within the breccias as solely from the oxidation of pyrite. Rowell (1998) suggests that much of the hematite may be hypogene as several other non-auriferous, hematitic breccias occur within the district that contains no precursor to pyrite. Hodder (1999) suggests that the hematite may be derived from the oxidation of limestone (siderite?) and would explain the weak gold values associated with the hematitic rich, limestone breccia at Ptz. Condor. The oxidation of siderite to hematite is very common in regionally metamorphosed carbonate rocks.

9.3.1.5 Late Fine Grained Marcasite

Fine grained marcasite is very common at the Amelia Inés and Magdalena deposits lining late fractures and forming the chief matrix component to marble and skarn breccias.

Previous work by Mincorp in the late 1980’s commonly referred to this sulphide as “sulfuros negros” due to its black, sooty texture. The higher gold grades are directly related to higher concentrations of this fine grained marcasite that overprints early dolomitization and metasomatism. Although the majority of the fine marcasite occurs as sub metre wide zones along late fractures and tensional structures it does occur as semi massive zones greater than 10 m wide with internal clasts of intensely dolomitized marble. This combination of strong dolomitization proximal to metre scale semi massive sulphide zones suggests that late sulphide rich magmatic fluids may have filled in pre-existing karst voids within the “Cliffy Bioturbated Grainstone” and dolomitized “Triplets” members of the San Juan Formation.

Hydrothermal dolomitization may have also been strong enough to collapse and brecciate the overlying section.

A geologic plan and legend of the Gualcamayo Project are shown in Figure 18 and Figure 19.
Figure 18 - Geological map (from technical report in the property Gualcamayo, San Juan province, Argentina by Wardrop Engineering Inc., 2007)
Figure 19 - Geological legend (extracted from the technical report in the property Gualcamayo, San Juan province, Argentina by Wardrop Engineering Inc., 2007)
10. DEPOSIT TYPE

Four distinct mineralization types occur in the Gualcamayo Project and three of these are of present economic interest. They are:

1. Sediment-hosted distal-disseminated gold (QDD);
2. Sulphide-bearing skarn deposits containing copper, zinc and molybdenum with late stage gold-arsenic mineralization (AIM); and
3. Porphyry style molybdenum mineralization.

Sillitoe, (2004) compares the former type to gold-arsenic mineralization in the Bingham Canyon district of Utah and the Eureka districts of Nevada where gold mineralization occurs distally with respect to porphyry stocks. Other analogies are the Bau district in Sarawak, East Malaysia and the Sepon deposit in Laos.

The late stage gold-arsenic overprinting of the skarn zones at Amelia Inés and Magdalena is believed to be part of the same mineralizing event but of a more proximal nature to the intrusions.

Molibdenum potential is being reassessed bearing into account recent drilling results indicating highly anomalous to potentially economic grades around peripheral quartz stock. It is not well understood if this deposit should be classified as skarn or porphyry style.

Auriferous quartz-chalcopyrite-tetrahedrite veins were also explored in the past (Mina Belgrano).
11. MINERALIZATION

Gold mineralization at QDD occurs in carbonate sediments within conformable and discordant carbonate breccias and fractured limestone. The gold mineralization is related to a hydrothermal event overprinting the proximal skarns and extending into the surrounding marbles and limestones. The QDD canyon itself lies along a fault/dyke system, which is believed to be a reactivated, Ordovician rift structure that acted as the primary conduit for hydrothermal fluids migrating away from the intrusive contacts.

The mineralizing fluids were dispersed into a semi conformable, receptive limestone aquifers travelling up dip following the hydraulic gradient, more than 600 m away from the QDD feeder structure. The permeability was provided by several deformation and alteration factors forming large conformable collapse breccias and includes:

- Early meteoric karsting of the Upper San Juan Formation and in particular the clifffy, bioturbated limestone member;
- Hydrothermal dolomitization of the pre-existing diagenetic dolomite member of the upper San Juan Formation that initiated collapse and breccia development of the over lying karsted limestone;
- E-W faulting, tectonic brecciation along fold hinges, stylolite formation during the ongoing contractional, and transpressive deformation during the Andean orogeny.

These three factors produced a very permeable stratigraphic window (conformable breccia) within the Upper San Juan Formation that later focused mineralizing sulphurous fluids through the earlier hydrothermal collapse breccias.

During gold deposition, hydrothermal karsting and breccia development was also superimposed on the earlier collapse breccias dissolving carbonate and flushing it up gradient where it was deposited as network of calcite stock work veins, lining fractures and voids, overlying the collapse breccias. Descending, supergene fluids were also focused along the developing hydrothermal karst system forming karst sediment supported breccias and graded karst sediment up to a metre thick along the bottom of caverns.

Alteration of the host rocks is minimal and sulphide content is low. Gold, sulphides (arsenopyrite), realgar, orpiment, pyrite, and calcite are deposited along fractures and as matrix fillings. Higher gold values are spatially related to the intrusive breccia (Bx4). The mineralized structures are strongly oxidized throughout the depth of drilling, except for minor unoxidized intervals in which the primary mineralization is preserved.

Higher-grade zones in the QDD deposit (> 2 g/t Au) are common and related to fold hinges, sediment infilled karst cavities, and brecciated intrusive contacts with limestone and marble. Mineralized breccia thicknesses range from 30 m to 150 m thick and extend more than 500 m outboard to the east and NW of the QDD feeder structure. Due to the complex folding along NNW and E-W axes and strong lithological control, the mineralized collapse breccias form an undulatory ore deposit (dome and basin geometry) underlain by the hydrothermally altered dolomite member of the upper San Juan Formation.

Although more confined, gold mineralization remains open down dip along the QDD fault zone cutting the white recessive limestone unit (white marble) of the lower San Juan Formation.

The QDD deposit is silica poor, high-level gold-arsenic system with fine marcasite and trace amounts of realgar and orpiment forming the main sulphide minerals. Silver values generally less than 0.1 ppm. Barium is also elevated (200 ppm to 400 ppm) with higher concentrations localized along brecciated E-W striking dike margins.

Mercury and Antimony are weakly anomalous. Strong clay alteration along brecciated intrusive margins consisting of supergene kaolinite and alunite is also common suggesting a fairly acidic hydrothermal system. Gold occurs mainly as 1 µm to 5 µm inclusions within marcasite that was deposited with calcite along fractures and breccia matrices. Electron Microprobe Figure of Sample from Hole QD05-111 Showing Gold within.
The mineralized structures and breccias are strongly oxidized throughout the depth of drilling, except for minor unoxidized intervals near intrusive breccias and contacts where sulphides are preserved. It is estimated that sulphide mineralization makes up less than 5% of the total resource.

At Amelia Inés and Magdalena, late stage gold-arsenic mineralization overprints skarn zones and extends into the surrounding marbles of the San Juan Formation. Skarn hosted mineralization comprised of chalcopyrite, sphalerite, galena, pyrrhotite and pyrite was deposited as a retrograde event preceding the introduction of the gold-arsenic mineralization.

Gold mineralization is intimately associated with fine grained marcasite that lines late fractures and forms the chief component to marble and skarn breccias matrices. Brecciation and higher grade gold mineralization are localized along the W to NW trending marble–skarn contact and cross cutting E-W tensional structures. The rheological contrast between the brittle skarn and ductile marble is believed to have accommodated much of the movement during later wrench fault tectonics, forming localized E-W trending, tensional zones (i.e breccia zones) that extend 10’s of metres outboard into the marble and skarn from the contact.

In addition to tectonic brecciation, gold mineralization was also enhanced by the presence of pre-existing karst cavities within the Cliffo Bioturbated member of the San Juan Formation and collapse generated by early hydrothermal dolomitization of the underlying Triplets member. These collapsed karst voids that have undergone late tectonic brecciation were later filled with semi massive, fine grained marcasite with dolomitized marble clasts over thicknesses greater than 10 m. This style of mineralization forms the highest grade mineralized zones returning up to 30 gpt Au over 12 m.

Silver is anomalous but very sporadic returning greater than 30 gpt within the higher grade >5 gpt Au zones. Silver is localized within retrograde tetrahedrite veinlets and possibly electrum during deposition of the later stage fine grained marcasite.

ICP analysis of the marcasite (sulfuros negros) shows elevated levels of lead, zinc and molybdenum but depleted levels of silver.
Negligible gold mineralization extends into the intrusive stock to the north. Narrow 1-3 cm wide sheeted quartz-molybdenite veinlets are generally confined within the skarn at both Magdalena and Amelia Inés and extend outboard into the intrusive stock, localized along EW tension structures.

Areas of high molybdenum content commonly lie peripheral to the gold enriched zones and overlap the intrusive contacts. Molybdenum mineralization is often associated with high manganese levels and occurs mainly in skarn with lesser amounts hosted by marble and intrusive rocks. Drill holes at Magdalena commonly encounter intervals of +1000 ppm Mo over several metres. Core hole 06QD-369 intersected an average Mo grade of 422 ppm over 152.4 metres. Hole 07QD-412 intersected 113.8 m averaging 556 ppm Mo including an interval grading 1014 ppm. RC holes drilled into the intrusive stock more than 50 metres away from the contact intersected anomalous Mo mineralization but the levels were much lower with the best interval averaging 162 ppm over 56 m in hole 06QDR-350.

### 11.1 OXIDATION

Thin section analyses (Rowell 1998) of breccia samples reveal that hematite and limonite occur along fractures interstitial to carbonate grains and in breccia cement with smaller patches derived from the oxidation of pyrite containing micron size gold particles.

The oxidation degree of minerals in the skarn body of AIM, was classified by visual observations of the exploratory probing, assigned oxidation percentage ranging from zero when the material does not present any degree of oxidation to a hundred when the material was completely oxidized.
12. EXPLORATION

12.1 GUALCAMAYO EXPLORATION

Since 1983, the Gualcamayo Project has had significant exploration programs conducted by Mincorp and MASA. The stage of exploration has advanced through several drill programs sufficient to complete a resource estimate. Past exploration programs have been assessed in previous Technical Reports by P. Dircksen (2003) and R. Simpson (2004 & 2008). The following table summarizes the exploration carried out to date on the Gualcamayo Project.

Table 12 - Gualcamayo exploration history

<table>
<thead>
<tr>
<th>YEAR</th>
<th>COMPANY</th>
<th>EXPLORATION PROGRAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre 1983</td>
<td>Small Miners</td>
<td>• High grade shear-hosted mineralization.</td>
</tr>
<tr>
<td>1983 – 1988</td>
<td>Mincorp</td>
<td>• Map &amp; sample AIM / Belgrano areas. • Undergound sample program at AIM / Belgrano. • Surface &amp; underground drill program of AIM / Belgrano areas.</td>
</tr>
<tr>
<td>1996 - 1997</td>
<td>MASA</td>
<td>• Mapped &amp; reconn-sampled Gualcamayo. • Discovery of breccia/sediment hosted gold mineralization at QDD.</td>
</tr>
<tr>
<td>1998</td>
<td>MASA</td>
<td>• Cut channel samples at previous site rock-chip panel. Results consistent and higher. • Detailed sample/map QDD 130 continuous rock-chip channel samples @1.7 g/t Au. Contractor review of regional aeromagnetics. • Diamond drill QDD area.</td>
</tr>
<tr>
<td>1999</td>
<td>MASA</td>
<td>• Petrographic studies. • Geologic mapping/sampling 1:500 scale. • Diamond drill and reverse circulation drilling QDD. • Metallurgical test work on core and cuttings.</td>
</tr>
<tr>
<td>2000</td>
<td>MASA</td>
<td>• Structural mapping (1:250 scale) coincident with geochem program • Reverse circulation drill program.</td>
</tr>
<tr>
<td>2003</td>
<td>MASA</td>
<td>• Rock geochem sampling • Re-sampling of Anglo drill core.</td>
</tr>
<tr>
<td>2004</td>
<td>MASA</td>
<td>• Reverse circulation drill program • Rock geochem sampling/Channel sampling • Re-tapping of drill core.</td>
</tr>
<tr>
<td>2005/2007</td>
<td>MASA</td>
<td>• Core drilling • Reverse circulation drilling • Rock geochem sampling Geologic mapping. Airborne geophysics Petrographic study • Electron microprobe study.</td>
</tr>
<tr>
<td>2008</td>
<td>MASA</td>
<td>• Core drilling • Reverse circulation drilling • Rock geochem sampling Petrographic study • Electron microprobe study.</td>
</tr>
</tbody>
</table>

Total drilling on the QDD deposit to the end of 2007 included 190 core holes and 134 RC holes totalling 79,905 m.

Gualcamayo Project surface sampling results received prior to December 2004 were discussed in reports by Dircksen (2003) and Simpson (2004). Results from programs between 2004 and 2008 were covered in Simpson (2008).

An aggressive regional exploration program is also underway assessing the numerous gold anomalies that extend a further 12 km west and 8 km north of Gualcamayo. Anomalies are associated with similar transtensional wrench structures, Tertiary age intrusives and Lower Paleozoic carbonates recognized at Gualcamayo.

Total drilling completed in October 2008 was of 6,157 m, including 2,956 m of core holes and 3,201 m of RC holes. A total of 2,708 m of RC drilling were drilled at the Las Vacas Project; and 493 m in Cerro Diablo. The diamond drilling includes 816 m drilled in the Quebrada Perdida regional project, and 2,140 m of near mine exploration drilling at Gualcamayo (1,608 m of underground holes and 532 of surface drilling).
A resource update of the QDDLW resource was performed during October 2008. The final report was presented early November (Simpson, November 2008). It considered data from the finished infill drilling aimed to carry about 240 K of inferred resources to the Measured and Indicated categories.

Preliminary results from this new resource update show a global ounces increase amount of 294 K oz over a total of 905 K oz at 2.86 gpt Au. The added Measured and Indicated resource was of 392 K oz, over a total of 769 K oz at 2.9 gpt Au.

The infill drilling confirmed and expanded the initial resource estimation (Jan ’08) by introducing higher grade and volume data from QDDLW. At the same time, partial exploration data allowed to confirm the westward expansion of the resource.

12.2 QDD LOWER WEST ZONE EXPLORATION

The QDD Lower West Zone was discovered by exploration drilling in June of 2006. Surface drilling continued to explore the zone but only a few locations provided access and the drillings directions were not ideal. In 2007 an exploration decline was begun to explore the zone and provide underground drill stations. The decline and a crosscut were completed in late 2007 and two drill stations constructed. The entire length of the underground development was mapped and channel sampled using a diamond saw.

In 2006 an aerial magnetic survey was completed over the project area by New Sense Geophysical Limited using a helicopter survey system.

Since the initial discovery of the QDDLW Zone in June of 2006, MASA has completed a total of 79 core holes totalling 26,881 metres. In 2010 was perforated another 35 core holes.

12.3 AIM EXPLORATION

The information provided by MASA is based in collecting data from different exploration campaigns carried out in the project between 1988 and 2010. 256 drillings were completed in AIM area being studied until February 2009, 52 of them are drillings of reverse circulation and 204 of diamantine, with a total of 28,826 m drilled.

Since the end of February until May 2010, an exploration-infill drilling campaign was carried out in the Amelia Ines-Magdalena targets, in order to redefine resources for 2010.
13. DRILLING

13.1 PREVIOUS DRILLING PROGRAMS

Mincorp carried out core drilling at the AIM deposits between 1983 and 1988. They drilled a total of 127 holes totalling 1,475 metres from surface and underground workings. All subsequent drilling on the deposits has been carried out by MASA between 2000 and 2007. This included both core and reverse circulation drilling.

Since November, 2004, Major Perforaciones S.A. has been contracted to carry out exploration diamond drilling utilizing a skid-mounted UG JKS Boyles B-20 core rig capable of drilling angle holes –90° to +45°. Drilling on the deposits by MASA between 2000 and mid-2006 has been described in detail in previous technical reports (Simpson, 2004 & 2006).

The following table summarizes the drilling programs on the QDD deposit until 2007.

<table>
<thead>
<tr>
<th>Year</th>
<th>Core Drilling</th>
<th>RC Drilling</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Holes</td>
<td>Total m</td>
<td>Holes</td>
</tr>
<tr>
<td>1998</td>
<td>14</td>
<td>2,706.3</td>
<td>14</td>
</tr>
<tr>
<td>1999</td>
<td>19</td>
<td>3,336.7</td>
<td>9</td>
</tr>
<tr>
<td>2000</td>
<td>13</td>
<td>3,422.3</td>
<td>13</td>
</tr>
<tr>
<td>2004</td>
<td>26</td>
<td>7,167.5</td>
<td>26</td>
</tr>
<tr>
<td>Subtotal</td>
<td>33</td>
<td>6,043.0</td>
<td>48</td>
</tr>
</tbody>
</table>

2004 Resource estimate

<table>
<thead>
<tr>
<th>Year</th>
<th>Core Drilling</th>
<th>RC Drilling</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Holes</td>
<td>Total m</td>
<td>Holes</td>
</tr>
<tr>
<td>2004</td>
<td>4</td>
<td>712.6</td>
<td>4</td>
</tr>
<tr>
<td>2005</td>
<td>73</td>
<td>14,753.6</td>
<td>26</td>
</tr>
<tr>
<td>2006</td>
<td>38</td>
<td>9,916.9</td>
<td>43</td>
</tr>
<tr>
<td>Subtotal</td>
<td>115</td>
<td>25,383.1</td>
<td>69</td>
</tr>
</tbody>
</table>

2006 Resource estimate (2007 feasibility study)

<table>
<thead>
<tr>
<th>Year</th>
<th>Core Drilling</th>
<th>RC Drilling</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Holes</td>
<td>Total m</td>
<td>Holes</td>
</tr>
<tr>
<td>2006</td>
<td>16</td>
<td>5,949.3</td>
<td>4</td>
</tr>
<tr>
<td>2007</td>
<td>26</td>
<td>9,240.7</td>
<td>13</td>
</tr>
<tr>
<td>Subtotal</td>
<td>42</td>
<td>15,190.0</td>
<td>17</td>
</tr>
</tbody>
</table>

2007 Resource estimate

<table>
<thead>
<tr>
<th>Year</th>
<th>Core Drilling</th>
<th>RC Drilling</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Holes</td>
<td>Total m</td>
<td>Holes</td>
</tr>
<tr>
<td>Total</td>
<td>190</td>
<td>46,616.1</td>
<td>134</td>
</tr>
</tbody>
</table>

EcoMinera Drilling of San Juan was used as the principal RC drill contractor using a truck mounted Schramm drill rig. Down hole equipment consisted of a center sampling hammer, with a nominal 5 ¼ inch bit diameter and nominal 4 ½ inch drill rods.

Seventeen RC holes (7,397 m) were completed on the QDD deposit during this period. An additional 24 RC holes (2,760 m) were drilled at AIM. Thirteen RC holes (5,450 m) were completed on other targets.

Prior to May 2007, the exploration drilling programs were conducted under the direct supervision of Consulting Senior Geologists, Rick Diment of Whitehorse, Yukon and Consulting Geologist Jeff Dean of Reno, Nevada. On May 1, 2007, Walter Søechting was appointed MASA Exploration Manager and took over supervision of the ongoing programs. During the RC drilling a MASA rig geologist was on-site at all times while the drill was operating. The rig geologist was responsible for contractor supervision and hole logging.
Both geological and geotechnical drill logs were completed for each hole. The geotechnical logs included drilling performance, drilling and sampling problems and rod changes that may affect sample quality. Changes in sample return rate, rate of depth penetration, loss of air pressure, etc. were also recorded to assist in defining major structures, voids, etc. The geologic logs followed standard MASA procedures established in earlier programs and included complete descriptions of geology, lithology, alteration and mineralization. This information was recorded in digital format and was incorporated into the digital drill database.

The drilling programs at QDD were successful in further delineating the extent and grade of gold mineralization in the QDDLW Zone (Figure 21). The mineralized widths shown are not true thicknesses but simply the length of the interval. The mineralized zones are highly irregular in shape and true thickness was not used as a factor in resource estimation.

13.2 QDDLW

Drilling on the zone by MASA between 2006 and the end of 2007 has been described in detail in the previous technical report (Simpson, 2008).

The main assignment for the 2010 update consisted in validating the drill holes data base, adding the information obtained from the 2009 and 2010 campaigns, which served as base for geologic reinterpretation and resources estimation.

The geological reinterpretation of the rock units showed solids corresponding to breccias, marble and porphyry.
The drill holes data base was compiled in Access and imported to the Vulcan software, where the samples were treated for the different calculations performed. The data base was closed with the information obtained up to June 11th 2010.

The modeling and resources calculations considered all the information from holes used in the November 2008 estimation, plus the data from the end of the 2008 campaign, and the complete 2009 and 2010 campaigns. The Table 14 shows the amount of holes used.

The holes detailed represent 22,097 samples, 3,688 of which are involved within the mineralized area. (See the Figure 22). In general, the holes used have a radial arrangement with an approximate grid distance of 25 to 30 metres. All the holes added to the ones from the previous estimation were underground, drilled from the three chambers of the main and by-pass tunnels.

<table>
<thead>
<tr>
<th>Year</th>
<th>Hole Number</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1</td>
<td>RC</td>
</tr>
<tr>
<td>2005</td>
<td>10</td>
<td>DH</td>
</tr>
<tr>
<td>2006</td>
<td>14</td>
<td>DH</td>
</tr>
<tr>
<td>2007</td>
<td>18</td>
<td>DH</td>
</tr>
<tr>
<td>2008</td>
<td>62</td>
<td>DH-TRENCHES</td>
</tr>
<tr>
<td>2009</td>
<td>11</td>
<td>DH</td>
</tr>
<tr>
<td>2010</td>
<td>35</td>
<td>DH</td>
</tr>
<tr>
<td>Total</td>
<td>151</td>
<td></td>
</tr>
</tbody>
</table>

Figure 22 - Front view of QDDLW-holes from late 2008, and 2009 and 2010 campaigns from the three underground drill stations which appear in broad trace
13.3 AMELIA INES-MAGDALENA

Since the end of February until May 2010, an exploration-infill drilling campaign was carried out in the Amelia Ines-Magdalena targets, in order to redefine resources for 2010.

A total of 1,733.35 m with diamantine from 2010, and 928 m with reverse air from 2009, distributed among both targets, were considered for this update. The data base was closed in June 11th 2010, since the subsequent holes would present analysis results belated to the information delivery date.

The detail of total holes used, and the ones from the 2010 campaign are summarized in the Table 15 and Table 16, and can be observed in the Figure 23.

<table>
<thead>
<tr>
<th>Year</th>
<th>Type</th>
<th>Amelia-Ines</th>
<th>Magdalena</th>
<th>Total Holes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988</td>
<td>QD</td>
<td>105</td>
<td>22</td>
<td>127</td>
</tr>
<tr>
<td>2000</td>
<td>QDR</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>2004</td>
<td>QDR</td>
<td>5</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>2005</td>
<td>QDR-QD</td>
<td>3</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>2006</td>
<td>QD</td>
<td>2</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>2007</td>
<td>QDR-QD</td>
<td>21</td>
<td>45</td>
<td>66</td>
</tr>
<tr>
<td>2008</td>
<td>QD</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2009</td>
<td>QDR</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>2010</td>
<td>QD</td>
<td>1</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>139</td>
<td>117</td>
<td>256</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hole ID</th>
<th>Objetive</th>
<th>Ubicacion</th>
<th>m</th>
</tr>
</thead>
<tbody>
<tr>
<td>10QD-598</td>
<td>Infill/Explor</td>
<td>Magdalena</td>
<td>209.8</td>
</tr>
<tr>
<td>10QD-599</td>
<td>Infill/Explor</td>
<td>Magdalena</td>
<td>272.2</td>
</tr>
<tr>
<td>10QD-601</td>
<td>Infill/Explor</td>
<td>Magdalena</td>
<td>183.15</td>
</tr>
<tr>
<td>10QD-604</td>
<td>Infill/Explor</td>
<td>Magdalena</td>
<td>209.2</td>
</tr>
<tr>
<td>10QD-610</td>
<td>Infill</td>
<td>Magdalena</td>
<td>161</td>
</tr>
<tr>
<td>10QD-613</td>
<td>Infill</td>
<td>Magdalena</td>
<td>134.9</td>
</tr>
<tr>
<td>10QD-617</td>
<td>Infill/Explor</td>
<td>Magdalena</td>
<td>134.9</td>
</tr>
<tr>
<td>10QD-621</td>
<td>Infill/Explor</td>
<td>Magdalena</td>
<td>215.3</td>
</tr>
<tr>
<td>10QD-628</td>
<td>Infill/Explor</td>
<td>Qda.Amelia Inés</td>
<td>212.9</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>1,733.35</td>
</tr>
</tbody>
</table>
Figure 23 - View of AIM holes, holes from 2010 campaign appear in broader trace
14. SAMPLING METHODS AND APPROACH

Sampling method and approach used in exploration programs completed prior to 2008 were assessed in the previous technical reports by P. Dircksen (2003) and R. Simpson (2004, 2006 & 2008).

14.1 REVERSE CIRCULATION DRILLING

The RC holes were drilled with a 5 ¼” bit and the drill material was collected on 2 metre intervals using a dry cyclone system. 100% of the sample from the cyclone was collected using pre-labeled plastic bags. The total sample was weighed, then two 50% splits were collected using a Gilson splitter with a large hopper to allow the total sample to be split at the same time. One of the two 50% splits was split in half again to produce two 25% splits (12-15kg). The two 25% split samples were bagged in heavy duty plastic bags with one split labeled by hole number and interval and the other labeled the same but with the addition of an “R” following the sample number. The “Original” split was sent to the primary lab and the other “Reject” split was stored on site. All samples were sealed with tamper-resistant plastic ties. Small (washed and unwashed) representative samples were taken from the 50% duplicate split samples and placed in plastic chip trays for detailed logging purposes.

In 2007, the 25% split was split in half again to obtain two, 12.5% splits (7-10 kg). One split was delivered to the lab and the other labeled with an “R” was stored at site.

Sample recoveries were calculated by weighing the cuttings from the entire sampled interval. The recoveries for the 2 metre intervals averaged 63 kg with an interquartile range from 58 to 70 kg. Chip trays were filled at the drill site and preserved for logging using the same protocol as previous drill programs.

Two rig duplicates were prepared for every 20th sample. One was submitted blind to the primary lab and the second to the check lab. A duplicate coarse lab reject was also prepared for every 20th sample and sent to the check lab. In addition, one blank was submitted per hole after a suspected mineralized interval.

In 2005 the introduction of blind standards was started. The standards were derived from RC rig duplicate material from previously drilled holes at Gualcamayo which were prepared by Alex Stewart (Assayers) Argentina S.A. in Mendoza and subjected to a “round robin” analysis by several labs to derive the statistics. The standards were submitted as blind pulps in the sample stream to the primary lab every 20th sample. Three standard values were used: low (620 & 500 ppb Au), medium (1280 & 1110 ppb Au), & high (2260 & 2760 ppb Au). A second batch of standards was developed in 2006 when all of the first set had been consumed. The primary lab used was Alex Stewart (Assayers), Argentina S.A. and the check lab, ALS-Chemex in La Serena, Chile.

Between 2000 and 2004 down hole surveys in RC holes were taken at 3 metre intervals using a Maxibor instrument. Results showed considerable variation in azimuth from -17 in hole QDR-87 to +12 degrees in QDR-91. Five of the holes flattened by as much as 7 degrees and 3 holes steepened by as much as 15 degrees over 250 metres.

Since 2005, down hole surveys were taken periodically using a single-shot instrument at approximately 50 metre intervals. Results for the 2005 drilling program revealed a slight tendency to increase in azimuth with distance down hole with a maximum change of about 10 degrees. Hole inclinations were fairly consistent and only varied up to 2 degrees over 200 metres.

14.2 CORE DRILLING

Between January and September 2008, 49 diamond drill holes were completed on the QDDLW Zone totaling 14,768 metres. HQ core size was used in order to achieve the best recovery and sample size. Some holes were reduced to NQ to achieve target depths. Core recovery was generally good averaging over 84% (median=88%).
The core samples were placed in standard wooden core boxes and transported to camp for logging and sampling. Most core holes were sampled at two meter intervals or at a change in geology. All core samples were photographed prior to logging and sampling. Geological and geotechnical logs were prepared for all holes. Upon completion of logging, the sample intervals were split on site with a conventional hydraulic splitter. Samples for assay were enclosed in plastic sample bags with a tamper-resistant seal.

In December 2004, the introduction of blind standards was started. The first set of site standards were derived from RC rig duplicate material from previously drilled holes at Gualcamayo which were prepared by Alex Stewart (Assayers) Argentina S.A. in Mendoza and subjected to a “round robin” analysis by several labs to derive the statistics. The standards were submitted as blind pulps in the sample stream to the primary lab every 20th sample. Three standard values were used: low (620 & 500 ppb Au), medium (1280 & 1110 ppb Au), & high (2260 & 2760 ppb Au). A second batch of standards was developed in 2006 when all of the first set had been consumed. In 2008 a set of 5 standards was purchased from Rocklabs Ltd.

The primary lab used up to January 2008 was Alex Stewart (Assayers), Argentina S.A. and the check lab, ALS Chemex in La Serena, Chile. In January 2008 the primary lab was changed to ACME Analytical Laboratories in Santiago, Chile. The check lab was changed to ALS Chemex (Santiago).

Down hole surveys were taken using a single-shot instrument at 10m below surface and at approximately 50 metre thereafter. Changes in azimuth and inclination were less than 5 degrees per 100 metres. Inclinations showed a marked tendency to steepen, particularly those drilled at flat or positive angles. The average rate was around -1° per 100 metres. Azimuths showed no particular bias to the right or left.

During the 2009 campaign, the results from the controls performed concluded the following:

- That all the wastes analyzed were within the tolerance limits.
- That in all cases the standard material was within the tolerance limits.
- For the rechecks of samples over one gram, the secondary lab measures under; and in the smaller samples, it measures over.

### 14.3 CHANNEL SAMPLING

Several lines of continuous channel samples were collected between 2004 and 2007 in order to provide data for the resource estimation in areas of rugged topography. The sampling was specifically designed to supplement the drill data in these areas. Samples were cut by diamond saw in areas of competent bedrock. In less competent areas, hammers and chisels were used to cut a regular 9 cm channel similar to the HQ core diameter used for recent core drilling. Tarps were laid out along the channel line to ensure all material, including fines, were collected. All samples were bagged and sealed with tamper-resistant seals for shipping.

In 2007, continuous horizontal channel samples were also cut along the length of the exploration decline. Sample widths ranged from 1.15 to 2 m.

Continuous saw-cut channel samples were collected along the underground exploration decline and crosscut in late 2007 and early 2008. Sample widths ranged from 1.1 to 3.1 m and averaged just under 2 m. Tarps were laid out along the channel line to ensure all material, including fines, were collected. All samples were bagged and sealed with tamper-resistant seals for shipping.

Channel samples were collected into the exploration tunnel, which is implanted into the mineralized zone, so there are not any factors that could materially impact the accuracy and reliability of the results, or sample quality.
15. SAMPLE PREPARATION, ANALYSES AND SECURITY

The methods of sample collection and preparation prior to dispatch of samples to the analytical lab and the security measures taken were discussed in the preceding section.

RC drill samples were transported from the drill sites to camp via a rented 5 t. truck and were stored at camp site in an enclosed, secure warehouse. These tasks were performed and controlled by Yamana employees. They were then shipped directly to the Alex Stewart laboratory facility in Mendoza via a commercial truck arranged through the lab. Samples were packaged in large, durable woven plastic sacks with tamperresistant plastic ties. A list of samples and sacks were prepared for each shipment and a copy of submittal sent for filing in San Juan.

Core samples were transported from the drill sites to camp via MASA pickup trucks and stored at the camp site in an enclosed, secure warehouse before being logged and split. All these tasks were performed and controlled by Yamana employees. Samples were packaged in large, durable woven plastic sacks with tamperresistant plastic ties and numbered seals and shipped directly to the Alex Stewart Laboratory in Mendoza or the ACME Analytical Laboratory in Santiago. A list of samples and sacks were prepared for each shipment and verified at the laboratory as part of the chain of custody.

Both labs are certified by the Norm ISO 9001.

All samples were prepared and analyzed for Au and 39 element ICP suite using standard fire assay/AA finish sample prep and assay procedures. Lab sample preparation procedures included:

1) Dry samples;
2) Coarse crush- 70% passing 2 mm;
3) Split 500 gm for pulp, and
4) Fine pulverize split to 85% passing 75 microns.

Gold was initially analyzed at Alex Stewart by Fire Assay on a 50 gm split and lab checks were performed on every 10th sample. Starting in July, 2005 the split size was reduced to 30 gm in order to eliminate periodic over boiling problems in the crucibles caused by the high carbonate content. Alex Stewart believed that reducing the split size would not be detrimental to the validity of the assay due to the fine grained nature of the gold (1-10 microns). To verify this, fire assays were carried out on two drill holes previously analyzed using the 50 gm split. No significant differences were observed between the original assays using a 50 gm split and the 30 gm pulp re-checks.

Samples with gold assays exceeding 10 g/t were routinely re-checked using a gravimetric finish. A 37 element ICP suite including silver was scanned using aqua regia digestion.

All pulps are returned and maintained in long term secure storage in the company warehouse. Select reject samples are organized in labeled rice bags and stored in a secure area at Camp Gualcamayo. Bags are systematically organized to facilitate easy retrieval in the future for other analytical, metallurgical or environmental test work.

In January 2008 the primary lab was changed to ACME Analytical Laboratories in Santiago, Chile.

All preliminary analytical data is e-mailed from the laboratory to the MASA San Juan office. Final assays certificates are e-mailed in pdf forma to MASA office in San Juan and filed in binders. Final assay results are e-mailed to corporate headquarters in Vancouver. The summary digital logs are incorporated into a database for map plotting and deposit modeling.
The author concluded that the sample preparation, security and analytical procedures implemented by Yamana have been effective.

15.1 QDD LOWER SAMPLING

Between January and September 2008, 49 diamond drill holes were completed on the QDD-LW totalling 14,768 metres. HQ core size was used in order to achieve the best recovery and sample size. Some holes were reduced to NQ to achieve target depths. Core recovery was generally good averaging over 84% (median=88%).

The core was placed in standard wooden core boxes and transported to camp for logging and sampling. Most core holes were sampled at two meter intervals or at a change in geology. All cores were photographed prior to logging and sampling. Geological and geotechnical logs were prepared for all holes. Upon completion of logging, the sample intervals were split on site with a conventional hydraulic splitter. Samples for assay were enclosed in plastic sample bags with a tamper-resistant seal. In December 2004 the introduction of blind standards was started. The first set of site standards were derived from RC rig duplicate material from previously drilled holes at Gualcamayo which were prepared by Alex Stewart (Assayers) Argentina S.A. in Mendoza and subjected to a “round robin” analysis by several labs to derive the statistics.

The standards were submitted as blind pulps in the sample stream to the primary lab every 20th sample. Three standard values were used: low (620 & 500 ppb Au), medium (1,280 & 1,110 ppb Au), & high (2,260 & 2,760 ppb Au). A second batch of standards was developed in 2006 when all of the first set had been consumed. In 2008 a set of 5 standards was purchased from Rocklabs Ltd.

The primary lab used up to January 2008 was Alex Stewart (Assayers), Argentina S.A. and the check lab, ALSChemex in La Serena, Chile. In January 2008 the primary lab was changed to ACME Analytical Laboratories in Santiago, Chile. Down hole surveys were taken using a single-shot instrument at 10m below surface and at approximately 50 metres thereafter. Changes in azimuth and dip were less than 5 degrees per 100 metres. Dips showed a marked tendency to steepen, particularly those drilled at flat or positive angles. The average rate was around -1° per 100 m. Azimuths showed no particular bias to the right or left.

During the 2009 campaign, the results from the controls performed concluded the following:

- That all the wastes analyzed were within the tolerance limits.
- That in all cases the standard material was within the tolerance limits.
- For the rechecks of samples over one gram, the secondary lab measures under; and in the smaller samples, it measures over.

15.2 AIM SAMPLING

15.2.1 Reverse Circulation Drilling

The RC holes were drilled with a 5⅛” bit and the drill material was collected at 2 meter intervals using a dry cyclone system. 100% of the samples from the cyclone were collected using pre-labeled plastic bags. The total samples were weighed, then two 50% splits were collected using a Gilson splitter with a large hopper to allow the total sample to be split at the same time. One of the two 50% splits was split in two halves again to produce two 25% splits (12-15 kg). The two 25% split samples were bagged in heavy duty plastic bags with one split labeled by hole and interval number, and the other labeled the same but adding an “R” after the sample number. The “Original” split was sent to the primary lab and the other “Rejected” split was stored on site. All samples were sealed with tamper-resistant plastic ties. Small (washed and unwashed) representative samples were taken from the 50% duplicate split samples and placed in plastic chip trays for detailed logging purposes.
In 2007, the 25% split was split in half again to obtain two, 12.5% splits (7-10 kg). One split was delivered to the lab and the other labeled with an “R” was stored at site.

Sample recoveries were calculated by weighing the cuttings from the entire sampled interval. The recoveries for the 2 meter intervals averaged 63 kg with an interquartile range between 58 and 70 kg. Chip trays were filled at the drill site and preserved for logging using the same protocol as previous drill programs.

Two rig duplicates were prepared for every 20th sample. One was submitted blind to the primary lab and the second to the check lab. A duplicate coarse lab reject was also prepared for every 20th sample and sent to the check lab. In addition, one blank was submitted per hole after a suspected mineralized interval.

In 2005 the introduction of blind standards was started. The standards were derived from RC rig duplicate material from previously drilled holes at Gualcamayo which were prepared by Alex Stewart (Assayers) Argentina S.A. in Mendoza and subjected to a “round robin” analysis by several labs to derive the statistics. The standards were submitted as blind pulps in the sample stream to the primary lab every 20th sample. Three standard values were used: low (620 & 500 ppb Au), medium (1,280 & 1,110 ppb Au), & high (2,260 & 2,760 ppb Au). A second batch of standards was developed in 2006 when all of the first set had been consumed. The primary lab used was Alex Stewart (Assayers), Argentina S.A. and the check lab, ALS-Chemex in La Serena, Chile.

Between 2000 and 2004 down hole surveys in RC holes were taken at 3 meter intervals using a Maxibor instrument. Results showed considerable variation in azimuth from -17 in hole QDR-87 to +12 degrees in QDR-91. Five of the holes flattened by as much as 7 degrees and 3 holes steepened by as much as 15 degrees over 250 meters.

Since 2005, down hole surveys were taken periodically using a single-shot instrument at approximately 50 meter intervals. Results for the 2005 drilling program revealed a slight tendency to increase in azimuth with distance down hole with a maximum change of about 10 degrees. Holes dips were fairly consistent and only varied up to 2 degrees over 200 meters.

15.2.2 Core Drilling

HQ core size was used in order to achieve the best recovery and sample size. Some holes were reduced to NQ to achieve target depths. Core recovery was generally good averaging over 80% in marble and skarn and 69% in quartz diorite porphyry.

The core was placed in standard wooden core boxes and transported to camp for logging and sampling. Most core holes were sampled at two meter intervals or at a change in geology. All cores were photographed prior to logging and sampling. Geological and geotechnical logs were prepared for all holes. Upon completion of logging, the sample intervals were split on site with a conventional hydraulic splitter. Samples for assay were enclosed in plastic sample bags with a tamper-resistant seal.

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The primary lab used up to January 2008 was Alex Stewart (Assayers), Argentina S.A. and the check lab, ALSChemex in La Serena, Chile. In January 2008 the primary lab was changed to ACME Analytical Laboratories in Santiago, Chile. The check lab was changed to ALS Chemex (Santiago).
Down hole surveys were taken using a single-shot instrument at 10 m below surface and at approximately 50 m thereafter. Changes in azimuth and dip were less than 5 degrees per 100 meters. Dips showed a marked tendency to steepen, particularly those drilled at flat or positive angles. The average rate was around -1° per 100 meters. Azimuths showed no particular bias to the right or left.

15.2.3 Channel Sampling

Several lines of continuous channel samples were collected between 2004 and 2007 in order to provide data for the resource estimation in areas of rugged topography. The sampling was specifically designed to supplement the drill data in these areas. Samples were cut by diamond saw in areas of competent bedrock. In less competent areas, hammers and chisels were used to cut a regular 9 cm channel similar to the HQ core diameter used for recent core drilling. Tarps were laid out along the channel line to ensure all material, including fines, were collected. All samples were bagged and sealed with tamper-resistant seals for shipping.

In 2007, continuous horizontal channel samples were also cut along the length of the exploration decline. Sample widths ranged from 1.15 to 2 meters.

Continuous saw-cut channel samples were collected along the underground exploration decline and crosscut in late 2007 and early 2008. Sample widths ranged from 1.1 to 3.1 meters and averaged just below 2 meters. Tarps were laid out along the channel line to ensure all material, including fines, were collected. All samples were bagged and sealed with tamper-resistant seals for shipping.

Channel samples were collected into the exploration tunnel, which is emplaced into the mineralized zone, so there are no factors that could materially impact the accuracy and reliability of the results, or sample quality.
16. DATA VERIFICATION

Following database compilation of the drill results, an assay report of all Y2006-2008 holes was manually checked against the original hard copy assay certificate by MASA personnel in the San Juan office. Comparison of check assays against originals and blank monitoring occurs immediately after assays are received from the commercial labs. Industry standard confidence levels for check vs. original and blank assay variability are secured before resource/reserve estimates or news releases containing drill holes assay data are released to the public.

Additional validation checks were performed when the data was imported to Surpac software for modeling. This included detection of overlapping intervals and any inconsistencies connecting survey and sample depths. Visual checks were also used to check for errors in down hole surveys.

16.1 STANDARDS

Site specific standards have been used since December 2004 to monitor laboratory performance. A set of three standards was prepared from RC Drill duplicate material by Alex Stewart Laboratory and then subject to a round robin analysis to derive the statistics used for monitoring. The standards were submitted as blind pulps in the sample stream to the primary lab every 20th sample. The reference values were 620, 1280 and 2260 ppb gold.

These were derived from the median based on testing at three labs. A second set of standards was prepared in mid 2006 as the initial set was depleted. The mean and standard deviation values from the round robin testing at five labs are shown in the Table 17.

<table>
<thead>
<tr>
<th>2004/06 Standards</th>
<th>Mean (ppb Au)</th>
<th>Std. Dev</th>
<th>2006/07 Standards</th>
<th>Mean (ppb Au)</th>
<th>Std. Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>Std 167</td>
<td>504</td>
<td>24</td>
<td>Std 367</td>
<td>457</td>
<td>11</td>
</tr>
<tr>
<td>Std 213</td>
<td>1,110</td>
<td>33</td>
<td>Std 360</td>
<td>1,064</td>
<td>17</td>
</tr>
<tr>
<td>Std 196</td>
<td>2,756</td>
<td>79</td>
<td>Std 245</td>
<td>2,380</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Std 261</td>
<td>3,361</td>
<td>59</td>
</tr>
</tbody>
</table>

Sample sequence charts for the initial set of site standards (Sep 2006-June 2007) show acceptable performance with virtually all samples within 2 standard deviations of the mean. The newer set of standards, exhibit a slight high bias for all standards. Figure 24 to Figure 26 show the older set of standards on the left and the closest comparable new standards on the right.
Figure 24 - Sample sequence charts – low standards

Figure 25 - Sample sequence chart – high standard
Although the same 5 laboratories were used for the round robin standard testing, the newer group of standards tended to have smaller standard deviation values (Table 18). This means that although the spread of data points remained similar, the thresholds were reduced and more samples fell outside of the 2 standard deviation boundary.

In the round robin tests for the new standards both Alex Stewart (ASA) and OMAC (part of the ALS group) tended to have lower average analyses for most standards. In hindsight, this is unusual in that the final ASA standard results show a consistent high bias. If only the results from the three independent Canadian laboratories (ACME, ALS and ASSAYERS) are used as a reference then the mean value is closer to that of Alex Stewart results but still averages slightly lower. Table 18 compares the standard means and standard deviations calculated by:

1. Initial round robin results from ASA & OMAC;
2. Initial round robin results from ACME, ALS & ASSAYERS;
3. Mean of standard assays from 2006/07 drill program (ASA).

<table>
<thead>
<tr>
<th>2006/07 Standards</th>
<th>ASA Group Results (ASA/OMAC)</th>
<th>Independent Labs (ACME/ALS/ASSAYERS)</th>
<th>Standard Results from 2006/07 Drilling (ASA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (ppb Au)</td>
<td>Std. Dev</td>
<td>Mean (ppb Au)</td>
</tr>
<tr>
<td>Std 367</td>
<td>449</td>
<td>9</td>
<td>465</td>
</tr>
<tr>
<td>Std 360</td>
<td>1,054</td>
<td>20</td>
<td>1,067</td>
</tr>
<tr>
<td>Std 245</td>
<td>2,340</td>
<td>57</td>
<td>2,417</td>
</tr>
<tr>
<td>Std 261</td>
<td>3,334</td>
<td>49</td>
<td>3,380</td>
</tr>
</tbody>
</table>
16.2 BLANKS

As a check to monitor possible contamination, blank samples were inserted immediately after a suspected mineralized drill hole intercept as determined by the core logger.

The blank material used since 2004 was derived from crushed dolomite/limestone from TEA Mining Company, a commercial quarry near San Juan. It has a high Mg content which gives a unique ICP signature.

The control chart of blank results is shown in Figure 27. The detection limit reported by ACME is <5 ppb gold (compared to <10 for Alex Stewart) but the blank results indicate that analyses in the 5-10 ppb range are probably not reliable. If the tolerance level is lowered from 40 to 20 ppb (4 times the detection limit) then almost 12% of the ACME blanks were failures compared with around 1% for Alex Stewart.

Wherever blank assays were above tolerance limit the lab was requested to re-analyze the 10 samples before and after the blank sample insertion order. Due to concerns over blank and standard performance, a visit was made by Yamana personnel to ACME’s preparation lab in June, 2008. Although the lab was seen to comply with cleanliness procedures it was recommended that ACME pay closer attention to this aspect. Unfortunately, results since June continue to be inconsistent and problematic. In view of this it is the author’s opinion that the use of ACME (Santiago) as the primary laboratory should be re-considered.

![Figure 27 - Blank control chart](image)

16.3 CHECK ASSAYS

For every 20th sample of each hole, duplicate rejects and pulps were sent to the check lab (ALS-Chemex). During routine sample preparation procedures, Acme was directed to prepare a second 500 gram coarse reject split and ship these splits directly to ALS-Chemex where new pulps were prepared and analyzed for gold. For pulp checks, ACME prepared a duplicate pulp and submitted it to ALS-Chemex. Duplicate reject and pulp checks were staggered to prevent re-duplication of check intervals.

Comparison of the data sets shows good correlation with no significant bias (Figure 28). Follow-up on 5 outliers revealed that sample labeling mix-ups between the primary and check labs were the main cause. One sample was due to a pulp mix-up at the check lab.
16.4 2010 CAMPAIGN

The controls results concluded that:

1. The waste analysis showed anomalies in one sample, corresponding to hole 10QD-598, which was found inserted beyond the mineralized area. This originated a requirement for greater cleanliness at the lab during the pulverizing process.

2. In all cases, the standard material was found within the expected tolerance limits, with a slight positive bias.

3. The rechecks of pulps and coarse material also resulted within the expected values. No tendencies were observed.

The results obtained allowed concluding that the analyses were precise and exact.

Some results can be observed in the following figures:
Figure 29 - Waste

Figure 30 - Standard B

Figure 31 - Standard E
Figure 32 - Pulp check

Figure 33 - Pulp check

Figure 34 - Coarse check
16.5 2008 CAMPAIGN

This section includes the quality controls from 2008 and from the reverse air campaign performed in Magdalena in 2009 by Mine Geology, since the holes were used in the estimation process.

Year 2008

Table 19 - Drill holes used in the estimation

<table>
<thead>
<tr>
<th>Hole</th>
<th>Sample</th>
<th>Au ppm original</th>
<th>Au ppm re-check</th>
</tr>
</thead>
<tbody>
<tr>
<td>08QD-513</td>
<td>115,094</td>
<td>0.27</td>
<td>0.227</td>
</tr>
<tr>
<td>08QD-514</td>
<td>115,074</td>
<td>0.06</td>
<td>0.05</td>
</tr>
<tr>
<td>08QD-515</td>
<td>115,054</td>
<td>0.01</td>
<td>0.018</td>
</tr>
<tr>
<td>08QD-516</td>
<td>115,114</td>
<td>0.32</td>
<td>0.086</td>
</tr>
</tbody>
</table>

Table 20 - Blank control

<table>
<thead>
<tr>
<th>Hole</th>
<th>Sample</th>
<th>Control Type</th>
<th>Au in ppb</th>
</tr>
</thead>
<tbody>
<tr>
<td>08QD-513</td>
<td>115,076</td>
<td>Blank</td>
<td>-10</td>
</tr>
<tr>
<td>08QD-514</td>
<td>115,129</td>
<td>Blank</td>
<td>-10</td>
</tr>
</tbody>
</table>

Table 21 - Standard control

<table>
<thead>
<tr>
<th>Hole</th>
<th>Sample</th>
<th>Control Type</th>
<th>Au ppm</th>
<th>Mean</th>
<th>Std Mean+2</th>
<th>Std Mean+3</th>
<th>Std Mean-2</th>
<th>Std Mean-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>08QD-513</td>
<td>115,069</td>
<td>Standard 367</td>
<td>490</td>
<td>457</td>
<td>479.6</td>
<td>490.9</td>
<td>434.4</td>
<td>423.1</td>
</tr>
<tr>
<td>08QD-513</td>
<td>115,108</td>
<td>Standard 245</td>
<td>2,500</td>
<td>2,380</td>
<td>2,498</td>
<td>2,557</td>
<td>2,262</td>
<td>2,203</td>
</tr>
</tbody>
</table>

Year 2009
In the 2009 reverse air campaign, the precision, accuracy and pollution of the samples were analyzed, and it was concluded that the data presented an appropriate quality in order to be used in the model update.

Figure 36 - Rock oxide

Figure 37 - Standard 73
17. ADJACENT PROPERTIES

No adjacent properties affect the Gualcamayo Project.
18. MINERAL PROCESSING AND METALLURGICAL TESTING

18.1 MINERAL PROCESSING

The main MASA deposits are currently QDD and AIM, which can be mined out at an annual rate of 7,600,000 t (1,100 tph) and 1,040,000 t (150 tph) respectively in a plant designed to treat a nominal amount of 24,000 tpd, including a primary, secondary and tertiary crushing circuit which allows achieving 100% of the crushed product under 25 mm. This granulometry is an optimum size for gold recovery using heap leaching and activated carbon in an ADR plant. Recovery is close to 80%.

Yamana aims at incorporating a future underground mine, with a production capacity of 250 tph. The deposit QDDLW would provide an increase of 20% throughput.

Due to the changes required to increase production by 20%, the increase in electrical requirements is 3.4% more than the original project. This new requirement can be handled by the power supply system, which was designed with an over capacity of 20% during the detailed engineering stage.

The Crushing Capacity study for the increase in production reveals that small changes are needed to incorporate the ore from QDDLW into the process at Gualcamayo. The total investment costs are estimated as US$570,070 with an initial investment of US$520,000 and a deferred investment of US$50,000 subject to the height of the leaching pads.

The following summarizes the individual circuits included in the Gualcamayo process facility:

ROM ore is provided to the underground crusher from two sources: An ore pass fed from within the pit perimeter and an ore chute located outside the pit perimeter. A stationary grizzly with 650 mm openings to limit the feed size entering the ore pass and crushing circuit screen the ROM ore from the ore pass and ore chute. The ore pass and ore chute discharge material onto an underground conveyor system by Ross chain feeder and apron feeder respectively. Only one of these feed systems will be operated at a time. The conveyor discharges ore onto a vibrating grizzly with 150 mm spacing’s with the oversize material discharging into a jaw crusher set at a 150 mm closed side setting. The jaw crusher product and the vibrating grizzly undersize materials are conveyed to an intermediate ore stockpile using an overland conveyor. The ore from the intermediate stockpile is screened at 25 mm, resulting in a 100% -25 mm product, with the oversize material feeding a secondary cone crusher. The secondary cone crusher closed-side-setting is 40 mm, and is operated in open-circuit.

The secondary crusher discharge is conveyed to the tertiary vibrating screen, also with 25 mm apertures, with the oversize sent to a tertiary crusher with a calculated closed-side setting of 24 mm. The tertiary crusher discharge combines with the secondary crusher discharge and is returned to the tertiary screen. The secondary and tertiary screen underflows are conveyed to the leach pad, where it is stacked in 10-m lifts. Barren solution is distributed on the surface of the stacked ore using a drip system and percolates through the ore to dissolve the gold over a leach cycle of 30 days. The pregnant solution is pumped to a set of five carbón columns that contain activated carbon to recover the gold. The barren solution discharging from the columns is returned to the leach pad after adding fresh cyanide to a concentration of 500 mg/l.

The loaded carbon is advanced through an acid-wash circuit then to the gold desorption and stripping circuit where the gold is removed from the carbon with a high-pressure, high temperature caustic and cyanide solution. The stripped carbon is returned to a regeneration circuit for re-activation before returning to the carbon columns. The gold in the high-grade solution from desorption/stripping circuit is recovered by electrowinning. The electrowinning tailings solution is recycled to the desorption/stripping circuit. The electrowinning cell cathodes are cleaned and the sludge containing the gold is dewatered with a high-pressure filter and dried in an oven. The dried product is mixed with fluxes and smelted in a furnace to produce gold bullion.
18.2 METALLURGICAL TESTING

18.2.1 QDD Upper Metallurgy

The QDD deposit is reported to be a sediment-hosted distal disseminated gold deposit (AMEC, 2005). The sulphide content was low, with gold, sulphides (arsenopyrite), realgar, orpiment, pyrite, and calcite deposited along fractures and as matrix fillers.

Based on the mineralogical evaluation on the QDD deposit, the gold particles are approximately 5 microns in size, or smaller, regardless of the grade of the samples. The largest particle noted was 10 microns, and with no gold grains visible in samples that were reported having assays of up to 19.7 g/t Au.

Testwork has indicated the ore is primarily highly oxidized, as classified by visual observation of the visible sulphide minerals. However, the general comparison of % of oxidation agrees with the % gold extraction using cyanide leaching.

The following briefly summarises all the testwork programs conducted by Viceroy Exploration Ltd. since 1998.

- December 1998, 16 bottle-roll leach tests conducted by Resource Development Inc. (“RDi”), Colorado. The results obtained indicated that the samples were amenable to cyanidation.
- February 1999, 13 bottle-roll leach tests conducted by RDi, Colorado. The results obtained confirmed the previous test results and established the basis for the relationship between recovery and degree of oxidation.
- May 1999, 140 bottle-roll leach tests conducted at the Brewery Creek laboratory, Yukon Territory. The results were used for the compilation of the database to establish relationships between recovery and lithology, degree of oxidation, head grade, and depth of origin of the sample as well as detailing the reagent consumption values.
- May 1999, 20 bottle-roll leach tests conducted by RDi, Colorado. The results were used to establish recovery versus particle size fraction relationship.
- June 2000, 90 bottle-roll leach tests conducted at the Castle Mountain Mine laboratory, California. The test results were used to augment the overall database.
- September 2000, two column leach tests and eight bottle-roll leach tests conducted at the Castle Mountain Mine laboratory, California. The results were used to establish column leach test data to be used for design purposes.

Generally, the tests were conducted utilizing conventional bottle-roll cyanidation leaching procedure, which utilized 1 kg samples. The particle size varied from between 100% passing 25 mm and 80% passing 74 μm (P80 = 74 μm); a slurry density of 40% solids was used, the leaching time varied between 24 and 96 hours, a pH value was maintained between 10.5 and 11.0 using lime, and a cyanide concentration which was generally maintained at 0.25 g/l NaCN throughout the duration of the test. Some of the tests were performed with cyanide concentrations of 1.0 g/l NaCN. Head samples were assayed for gold, as were solution samples taken from the leach during the leaching process (kinetic samples) or from the filtrate taken at the end of the leaching period. The solid residue was washed and then dried with a sample submitted to analyse for the gold content. In addition to the calculated extraction values obtained, each test also recorded the cyanide and lime consumption.
Table 22 to Table 24 shows the bottle roll test results.

**Table 22 - Overall average Bottle-Roll gold recovery vs degree of oxidation (Viceroy Data)**

<table>
<thead>
<tr>
<th>Group name</th>
<th>Degree of Oxidation</th>
<th>Gold Recovery (%)</th>
<th>Reagent Consumption NaCN (Kg/t)</th>
<th>Lime (Kg/t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulphide</td>
<td>0 to 40 (%)</td>
<td>46.6</td>
<td>0.49</td>
<td>1.03</td>
</tr>
<tr>
<td>Mid-Oxide</td>
<td>40 to 70 (%)</td>
<td>68.2</td>
<td>0.38</td>
<td>0.55</td>
</tr>
<tr>
<td>Oxide</td>
<td>70 to 100 (%)</td>
<td>81.4</td>
<td>0.33</td>
<td>0.46</td>
</tr>
</tbody>
</table>

Lithology also indicated an impact on the recovery rate and is shown below:

**Table 23 - Lithological average gold recovery vs. degree of oxidation – Viceroy Data (48 hour bottle roll)**

<table>
<thead>
<tr>
<th>Lithology</th>
<th>Degree of Oxidation (%)</th>
<th>Sulphide, 0% to 40%</th>
<th>Mid-Oxide, 40% to 70%</th>
<th>Oxide, 70% to 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limestone</td>
<td>46.6</td>
<td>65</td>
<td>82.9</td>
<td></td>
</tr>
<tr>
<td>Porphyry</td>
<td>31.7</td>
<td>82</td>
<td>85.3</td>
<td></td>
</tr>
<tr>
<td>Marble</td>
<td>73.7</td>
<td>57.7</td>
<td>85</td>
<td></td>
</tr>
<tr>
<td>Breccia</td>
<td>43.7</td>
<td>71.3</td>
<td>82.5</td>
<td></td>
</tr>
</tbody>
</table>

**Table 24 - Summary of Bottle-Roll test (Viceroy Data)**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Oxidation Category</th>
<th>N° of Test</th>
<th>Head Grade (g/t Au)</th>
<th>% Average Extraction</th>
<th>NaCN Used (Kg/t)</th>
<th>% Average Oxidation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limestone: Rock Type - 10 series</td>
<td>&lt; 50%</td>
<td>6</td>
<td>1.9</td>
<td>60</td>
<td>0.48</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>&gt;50%</td>
<td>34</td>
<td>1.47</td>
<td>82</td>
<td>0.29</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>0% to 100%</td>
<td>40</td>
<td>1.535</td>
<td>78.7</td>
<td>0.319</td>
<td>85.3</td>
</tr>
<tr>
<td>Porphyry: Rock Type - 30 series</td>
<td>&lt; 50%</td>
<td>8</td>
<td>1.62</td>
<td>43</td>
<td>0.35</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>&gt;50%</td>
<td>4</td>
<td>1.47</td>
<td>84.4</td>
<td>0.47</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>0% to 100%</td>
<td>12</td>
<td>1.57</td>
<td>56.7</td>
<td>0.39</td>
<td>42.7</td>
</tr>
<tr>
<td>Marble: Rock Type - 40 series</td>
<td>&lt; 50%</td>
<td>8</td>
<td>1.07</td>
<td>55</td>
<td>0.25</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>&gt;50%</td>
<td>42</td>
<td>1.18</td>
<td>86</td>
<td>0.24</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>0% to 100%</td>
<td>50</td>
<td>1.162</td>
<td>81</td>
<td>0.242</td>
<td>86.2</td>
</tr>
<tr>
<td>Breccia: Rock Type - 50 series</td>
<td>&lt; 50%</td>
<td>51</td>
<td>1.68</td>
<td>42</td>
<td>0.38</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>&gt;50%</td>
<td>166</td>
<td>1.6</td>
<td>83</td>
<td>0.23</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td>0% to 100%</td>
<td>217</td>
<td>1.688</td>
<td>73.4</td>
<td>0.265</td>
<td>79.2</td>
</tr>
<tr>
<td>High Grade Breccia: Rock Type 57</td>
<td>&lt; 50%</td>
<td>7</td>
<td>6.93</td>
<td>76</td>
<td>0.68</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>&gt;50%</td>
<td>7</td>
<td>6.93</td>
<td>76</td>
<td>0.68</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>0% to 100%</td>
<td>73</td>
<td>1.625</td>
<td>45</td>
<td>0.371</td>
<td>16.4</td>
</tr>
<tr>
<td>Average: All Rock Types</td>
<td>&lt; 50%</td>
<td>253</td>
<td>1.717</td>
<td>83.2</td>
<td>0.256</td>
<td>97.9</td>
</tr>
<tr>
<td></td>
<td>&gt;50%</td>
<td>326</td>
<td>1.697</td>
<td>74.6</td>
<td>0.282</td>
<td>79.6</td>
</tr>
</tbody>
</table>

An analysis of the Viceroy database results indicate that an overall gold extraction of between 81% and 83% could be anticipated for samples oxidized to > 50% oxidation, and leached under the conditions as previously described.
2000 Viceroy Column Test Program

Following is a summary of testwork performed:

- November 2005, six bucket-types leach tests conducted by RDi, Colorado. The results of these tests were used to simulate column test conditions using a lithologically composited sample. (The bucket test is a very simple test carried out on small samples, about 10 kg each, and leached with a solution at 1.0 g/l NaCN and pH 11.0 at about 70% solids for short periods of time, ± 20 days; the contents of the bucket are stirred periodically and a sample taken to determine recovery and kinetics. This test is a simple simulation of a column test).
- November 2005, four bucket-type leach tests conducted by RDi, Colorado. The results of these tests were also used to simulate column test conditions using hand-picked rock samples from the QDD deposit.
- January 2006, eight bottle-roll leach and CIP tests conducted by RDi, Colorado. The tests were conducted to investigate possible preg-robbing characteristics, (subsequently not found).
- February 2006, 46 in-situ density and moisture content determinations performed by RDi, Colorado.
- March 2006, two low energy Bond Impact and Abrasion tests performed by Phillips Enterprises LLC, Colorado on behalf of RDi, Colorado. The tests were conducted to determine the crushing power requirements and the abrasion index of the samples.
- March 2006, 12 bottle-roll leach and CIP tests conducted by RDi, Colorado. The tests were performed to further investigate the apparent preg-robbing characteristics observed in previous testwork. Preg-robbing was not observed.
- March 2006, ten column tests and corresponding bottle-roll tests conducted by the Universidad Nacional de San Juan (“UNSJ”), Argentina, under the supervision of RDi. The tests were conducted to obtain heap leach data for design and feasibility study purposes.
- March 2006, six apparent specific gravity (in situ bulk density) determinations conducted by Process Research Associates, Vancouver, BC. These tests were conducted to confirm the results obtained by RDi for the previous bulk density determinations.
- July 2006, summarized the results of the 10 column tests conducted by UNSJ RDi under the supervision of RDi and reported in March 2006 together with the results of a confirmatory column test conducted at the RDi facilities in Colorado.
- October 2006, four column tests and related bottle-roll leach tests conducted by UNSJ, Argentina, under the supervision of Viceroy Exploration Ltda. The tests were conducted to obtain additional heap leach data for differing crush sizes.
- October 2006, 31 bottle-roll leach and CIP tests conducted by RDi, Colorado.
- End 2006 and early 2007, additional cyanide leach bottle-roll tests conducted at UNSJ.

Column Leach Tests

Three sets of column leach tests have been conducted on QDD samples. Viceroy Resource Corporation conducted the first test program in 2000 and two samples were tested at two different crush sizes (and were reported in the historic testwork above). The second very detailed test program involving ten column leach tests was conducted during March 2006 at the UNSJ in Argentina. In this test program, five different samples were tested and this included varying the crush size, solution flow rate and cyanide concentration. A duplicate sample was also tested to assess the reproducibility of the test results while a further confirmatory test was also conducted at RDi in Colorado. This confirmatory test duplicated the two baseline control tests done by UNSJ in Argentina. The third column leach
test program was conducted as an additional set of four column leach tests, which were also performed at the UNSJ facilities in Argentina. This test program was performed during June 2006. The second column test program, performed by UNSJ, was conducted under the direct supervision of RDi personnel, while the third test program was conducted by UNSJ under the direct supervision of Viceroy. The results of these three test programs are described below.

1 March 2006 UNSJ/RDi Test Program

The second detailed column leach test program consisting of ten column tests, including related bottle-roll leach check tests, was conducted at UNSJ during February and March 2006 (UNSJ, 2006), and included one additional check test conducted concomitantly at the RDi facilities. The samples used for the column leach testwork all originated from the QDD deposit. Composite samples were prepared from various drill holes and depths of the drill holes. Sample location and preparation information was included in the feasibility study.

The column leach test conditions included using a solution pH of between 9.0 and 11.0 with a leaching period of 21 days. This was followed by a six-day rest period and a further 16-day leaching and rinsing cycle for a total leaching period of 43 days. The cyanide concentration was generally maintained at 0.50 g/l NaCN except for one column where the cyanide concentration was maintained at 0.25 g/l NaCN. The solution flow rate was maintained at 0.2 l/min/m² of surface area, except for one test using Composite A material, which had a flow rate of 0.1 l/min/m² of surface area.

A size fraction and gold assay analysis was conducted on each of the composite samples to determine the P80 of the sample and the mass and gold distributions. This was subsequently repeated at the end of the test to determine the extraction of each of the size fractions.

An evaluation of the results of the UNSJ detailed column test program (the second set of tests) and that of the corresponding bottle-roll tests conducted during March 2006, has led to the following conclusions:

- The column leach tests indicated that the leaching rate was very rapid with almost the maximum gold extraction attained after 20 days of leaching, or less.

- The three baseline column leach tests, two tests from UNSJ and one from RDi, gave very good confirmatory results with respect to gold extraction values and reagent consumptions. The solution flow rate was found to be a sensitive parameter and the lower flow rate probably resulted in dry areas of the coarse particles in the column with extraction being reduced and a slightly lower reagent usage being recorded.

- The reduced cyanide concentration gave a lower overall gold extraction for the same period of time. It also gave lower extractions only in the coarsest particle size fractions. A corresponding reduction in cyanide consumption was noted.

- The difference in overall extraction with crushing sizes of -25 mm and -13 mm is about 2% to 3%. There was no discernable difference in reagent consumption.

- Extraction increases with decreasing particle size for all the samples. The test results illustrated this effect particularly with the very coarse crush sizes used, namely -100 mm (80.3% extraction) and -25 mm (87.2% extraction).

- The grade of each size fraction for each sample was found to generally increase with decreasing particle size. This is a common observation among crushed and sized ores.

- The bottle-roll tests for the coarse samples (-25 mm +18 mm) indicated that leaching was still in progress after 48 hours but that the finest fraction (-1.68 mm) was completely leached within 48 hours.

- The cyanide consumption for the column leach tests was lower than for the bottle-roll leach tests.
The estimated consumption of cyanide is about 0.20 kg/t NaCN for oxidized ore. The estimated lime consumption is 1.5 kg/t.

Very little additional lime is required for pH control once the required solution pH value of 10 to 11 has been reached.

Preg-robbing effects were not observed to occur in the column tests. Pre-robbing was also not observed in the bottle-roll leach tests, even for the finest particle size fraction tested.

Assay variations were observed between the two size fraction analysis tests, as well as between the head assays of these tests and the re-calculated head values. These differences are probably the result of sampling errors for the coarse size fractions caused by the larger sized particles.

The second program of column leach test results has confirmed that an overall gold recovery of 80% is attainable from oxidized ores at a crush size of -25 mm.

Four additional column leach tests were conducted by UNSJ during June 2006. This constituted the third program of column leach testwork. The sample material tested was a blend of material excavated from two locations within the QDD ore zone. Sixty percent of the sample constituted material excavated from the surface in the area where drill holes 05-QD-113 to 05-QD-118 are located. This material had a reported average grade of 1.4 g/t Au. The lithological classification of this sample was oxidized limestone and breccia.

The balance of the sample material was oxidized marble and breccia excavated from the surface of the area where drill holes 05-QD-124, 05-QD-125, and 06-QD-276 are located. This material was reported to have an average grade of 0.45 g/t Au.

The objective of these four column leach tests was to investigate the extraction of gold from typical material using a very coarse particle crush size ranging from a top size of -125 mm (two tests), one test with -75 mm material and one test with a -50 mm crush size.

The column leach test conditions were generally the same as those used with the March 2006 column tests.

The duration of the leach test varied between 81 and 98 days. There was a rest period of 6 days after about 28 days of leaching for all four tests. There was another 6 days rest period after 53 days of leaching, and a further two-day rest period after 80 days of leaching for the coarsest columns.

The following conclusions can be drawn from the UNSJ June 2006 column-leach test program (the third set of column tests):

- The leaching of very coarse QDD material of 100% -125 mm after 96 days resulted in gold extraction values of 75%.
- Finer crush sizes will increase the overall gold extraction up to 81% for a crush size of 100% -50 mm after 81 days. However, the head assay for these UNSJ June 2006 samples are significantly higher than the average ore grade.
- Leach kinetics are very rapid even for the coarse crush sizes. Very little additional extraction was gained after extending the leaching period from about 30 days to 80 or 90 days.
- The solution flow rate of 0.20 l/min/m² and cyanide concentration of 0.5 g/l NaCN resulted in good operational extraction values.
- The cyanide and lime consumption values measured at between 0.13 kg/t NaCN and 0.26 kg/t NaCN and between 0.28 kg/t and 0.57 kg/t lime are similar to the plant design consumption values.
Other Testwork

The following testwork result summaries are attached below:

- The low-energy crusher work index values are about industry-average for the limestone sample, high (compared with the industry standard database values) for the marble sample, and very low (compared with the industry standard database values) for the skarn sample. Values for the work and abrasion indices can be found in Table 25.

- The abrasion index values are very low (compared with industry-wide database values) for the limestone and marble samples, and about average for the skarn sample. The SG value for the ore averages 2.8.

- Bucket tests generally show similar results to column and bottle roll tests with regards to extraction rates increasing with finer screen fractions.

Table 25 - Low energy work and abrasion indices

<table>
<thead>
<tr>
<th>Sample</th>
<th>SG</th>
<th>Low-Energy/Work Index (kwh/t)</th>
<th>Abrasion Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limestone</td>
<td>2.81</td>
<td>6.4</td>
<td>0.0017</td>
</tr>
<tr>
<td>Marble</td>
<td>2.76</td>
<td>8.02</td>
<td>0.0023</td>
</tr>
<tr>
<td>Skarn</td>
<td>3.01</td>
<td>2.55</td>
<td>0.1613</td>
</tr>
</tbody>
</table>

Conclusions

The main conclusions reached from the mineralogical evaluation and the metallurgical testwork results for QDDLW, were the following:

- The gold observed during mineralogical studies in the samples submitted for analysis was all very fine-grained particles. The maximum grain size observed was about 10 μm with the majority of grains being less than approximately 2 μm.

- A gold-bearing variety of cinnabar, together with cinnabar, was reported to be present in some of the samples from QDD deposit. Since its occurrence appears to be extremely rare, the associated mercury is not considered a problem in the cyanidation or subsequent ADR (adsorption-desorption-recovery) processes. Cinnabar can be dissolved by cyanide, and, if required, a mercury retort system can be installed in the refinery to recover the mercury for safety and health requirements.

- The associated sulphide minerals have been identified from the samples studied. Gold is associated with the sulphide minerals, but the quantity of sulphide minerals is less than 5% of the total reserve so that the gold extraction is not expected to be a problem apart from consuming some of the available cyanide.

- An unidentified bituminous-graphitic carbonaceous material is of widespread occurrence throughout the area sampled for the mineralogical investigation. Whether this material is of a preg-robbing nature will require confirmatory testwork, although the high gold extractions reported in many of the tests appear to indicate that this effect could be of minor significance.

- The degree of oxidation of the ore material in the samples taken from the deposit was the primary factor that influenced the dissolution of gold. The gold extraction is invariably the highest for the samples with the greatest degree of oxidation.

- The initial column test gold extraction results generally exceeded the bottle-roll test results indicating that the fineness of grind (over the size range of 25 μm to 75 μm) is not a critical variable. However, particle size analysis evaluations conducted on subsequent column tests did not replicate these findings. These tests indicated that a finer crush to about 13 mm of the oxidized sample would result in a higher gold recovery of about 3% being obtained when compared with the recovery obtained for a 25 mm crush size. This effect was confirmed with the
extraction increasing with decreasing particle size for all the samples. Subsequent column tests using very coarse crush sizes confirmed this effect of extraction increasing with decreasing particle size.

- The cyanide and lime consumption for oxidized material is lower than for less oxidized ore samples, or unoxidized material.
- Reagent consumption values from the tests show a relatively low cyanide usage of between 0.6 kg/t and 0.8 kg/t for the oxidized material, and about 1.1 kg/t for the less oxidized material. The lime usage was between 1.1 and 1.8 kg/t.
- For plant design purposes, the cyanide and lime consumption values are estimated to be 0.2 kg/t and 1.5 kg/t respectively.
- There does not appear to be a correlation between the gold recovery and the origin of the sample concerning vertical depth from the surface probably because of the steep topography of the deposit.
- There does not appear to be a correlation between the gold recovery and the head grade of the samples tested.
- Column leach testwork results indicated that the gold is rapidly leached and that the leaching time for – 25 mm material could be about 60 days. The column tests indicated that the bulk of the leaching had been completed by about 25 days.
- The duplicated column test gave very good confirmatory results with respect to extractions and reagent consumptions.
- The solution flow rate was found to be a sensitive parameter with regards to the extraction of gold.
- The reduced cyanide concentration gave lower extractions only in the coarsest sizes with a corresponding reduction in cyanide usage.
- There was no evidence of preg-robbing occurring despite the widespread presence of graphitic carbonaceous material.
- An overall gold extraction of 80% of the gold for a crushing size of -25 mm is attainable for the ore proportions as given in the September 2006 mining plan.
- An analysis of the QDSDLW core drills, which includes all the Viceroy Exploration Ltd. data.

18.2.2 QDSDLW Metallurgy

This Report is issued as part of this study; in the report is analyzed metallurgic characterization, for the gold recovery associated to each hole from the QDSDLW sector, through a predictive model, which is used as input in the development of Geometallurgic model.

This predictive model was developed, considering a total of 216 bottle leaching test and 6 columns tests, corresponding to 12 Hole or drill QDSDLW sector available and using statistical analysis software called IBM multivariate regression SPSS Regression.

In addition, an escalation factor is determined by analysis of the results obtained in tests on columns and expert criteria, in order to estimate the projected gold recovery in the plant.

18.2.2.1 Methodology

The methodology used considered the following subjects:

- Analysis of bottle leaching metallurgic testing.
• Chemical characterization analysis of the samples from each Hole or drill hole.
• Column testing analysis.
• Correlation Matrix determination.
• Descriptive statistic analysis.
• Correlation analysis of independent variables.
• Correlation analysis of dependent variable.
• Model estimation for each drill hole.
• Statistic analysis of model validation.

18.2.2.2 Test Analysis

A) Bottle Leaching Testing

The samples subjected to leaching into bottles (Laboratory Test) were 314, corresponding to 15 drill holes. Of these, 216 tests were used, for testing 12 holes, where the information was complete for analysis.

The average results for bottle leaching, collected from each hole, the number of samples constituting each of these, and its gold grade and recovery are shown in Table 26.

<table>
<thead>
<tr>
<th>Hole</th>
<th>N° of Samples</th>
<th>Au Grade g/t</th>
<th>Au recovery %</th>
</tr>
</thead>
<tbody>
<tr>
<td>06 QD 302</td>
<td>9</td>
<td>2.9</td>
<td>83</td>
</tr>
<tr>
<td>06 QD 309</td>
<td>11</td>
<td>3.23</td>
<td>85</td>
</tr>
<tr>
<td>06 QD 343</td>
<td>10</td>
<td>1.7</td>
<td>49</td>
</tr>
<tr>
<td>07 QD 385</td>
<td>30</td>
<td>3.07</td>
<td>81</td>
</tr>
<tr>
<td>07 QD 396</td>
<td>10</td>
<td>2.78</td>
<td>71</td>
</tr>
<tr>
<td>07 QD 402</td>
<td>12</td>
<td>0.62</td>
<td>88</td>
</tr>
</tbody>
</table>

In parallel, a sample number from each hole was selected for testing in columns. In total 6 holes were selected for conducting such tests.

Table 27 shows the number of samples selected from each hole, for columns testing. Next to each hole, the grade feed and average gold recovery obtained in the bottle leaching for each composite is shown.

<table>
<thead>
<tr>
<th>Hole</th>
<th>N° of Samples</th>
<th>Au Grade g/t</th>
<th>Au Recovery %</th>
</tr>
</thead>
<tbody>
<tr>
<td>06 QD 302</td>
<td>7</td>
<td>4.47</td>
<td>87</td>
</tr>
<tr>
<td>06 QD 309</td>
<td>11</td>
<td>3.48</td>
<td>80</td>
</tr>
<tr>
<td>06 QD 343</td>
<td>9</td>
<td>2.32</td>
<td>59</td>
</tr>
<tr>
<td>07 QD 385</td>
<td>30</td>
<td>3.54</td>
<td>82</td>
</tr>
<tr>
<td>07 QD 396</td>
<td>10</td>
<td>3.42</td>
<td>72</td>
</tr>
<tr>
<td>07 QD 402</td>
<td>12</td>
<td>0.58</td>
<td>90</td>
</tr>
</tbody>
</table>
Table 26 to Table 28 show that the number of selected samples, by each hole for column testing, corresponding to 45 to 50% of total samples constituting each hole, with the exception of wells QD 302 and QD 402, whose selection corresponds to 78 and 100% respectively.

The gold grade average in the feed for these selected samples are generally higher than the average of each hole complete, likewise gold recoveries varies, ranging from 2.8 to 17.8%, to those obtained in hole complete, with the exception of the sample QD 402.

All this suggests the possible existence of a bias that can be negative or positive, probably due to the use of a smaller number of samples, corresponding to each hole, except, as said hole QD 402.

B) Column Leach Tests

The results of the columns tests are shown in Table 28.

<table>
<thead>
<tr>
<th>Hole</th>
<th>N° of Samples</th>
<th>Au Grade g/t</th>
<th>Au Recovery %</th>
</tr>
</thead>
<tbody>
<tr>
<td>06 QD 302</td>
<td>9</td>
<td>2.9</td>
<td>83</td>
</tr>
<tr>
<td>06 QD 309</td>
<td>11</td>
<td>3.23</td>
<td>85</td>
</tr>
<tr>
<td>06 QD 343</td>
<td>10</td>
<td>1.7</td>
<td>49</td>
</tr>
<tr>
<td>07 QD 385</td>
<td>30</td>
<td>3.07</td>
<td>81</td>
</tr>
<tr>
<td>07 QD 396</td>
<td>10</td>
<td>2.78</td>
<td>71</td>
</tr>
<tr>
<td>07 QD 402</td>
<td>12</td>
<td>0.62</td>
<td>88</td>
</tr>
</tbody>
</table>

Table 29 compares the results of bottle leaching test for the samples from each hole, the results obtained with selected samples from each hole and finally the test in columns.

<table>
<thead>
<tr>
<th>Hole</th>
<th>Leaching full samples</th>
<th>Leaching Selected Samples</th>
<th>Columns Leaching</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Au Grade g/t</td>
<td>Au Recovery %</td>
<td>Au Grade g/t</td>
</tr>
<tr>
<td>06 QD 302</td>
<td>3.71</td>
<td>83.09</td>
<td>4.47</td>
</tr>
<tr>
<td>06 QD 309</td>
<td>2.61</td>
<td>75.62</td>
<td>3.48</td>
</tr>
<tr>
<td>06 QD 343</td>
<td>2.18</td>
<td>71.16</td>
<td>2.32</td>
</tr>
<tr>
<td>07 QD 385</td>
<td>2.86</td>
<td>79.87</td>
<td>3.54</td>
</tr>
<tr>
<td>07 QD 396</td>
<td>2.05</td>
<td>82.47</td>
<td>3.42</td>
</tr>
<tr>
<td>07 QD 402</td>
<td>0.58</td>
<td>90.36</td>
<td>0.58</td>
</tr>
</tbody>
</table>

As indicated in the table above, the calculated head grade in the columns test differs between 7 to 36% with respect to the average gold grade of the complete hole, except for samples from Hole QD 402, which are very similar law in both tests as those samples selected columns and corresponding to the hole. These results suggest that the column test may be unrepresentative of the entire Hole.

Moreover, the recovery obtained in the hole 06 QD 309, the result of recovery is better in the leaching column than in the bottle. If one considers the nature of the leaching tests in the bottle and the conditions in which they are made, it is unlikely that this is realistic.
18.2.2.3 Scaling factor

According to the above, it is considered reasonable to dispense with the retrieval result obtained in the column 06 QD 309, and to use the average gold recovery of the remaining tests of columns as a scaling factor from bottle leaching to column. The average estimate is 95.0%. Finally it is considered an expert criterion, used as a scaling factor to move from columns to expected results on the plant, a value of 90%, bringing the overall scaling factor from leaching tests in bottle to the plant would be 85.0%.

18.2.2.4 Modeling

The predictive model determination used the results and characterization of those samples in which total and soluble sulfur analysis were made.

The methodology used to determine the predictive Model considered using statistic tools corresponding to multivariate correlations and their corresponding analysis in order to validate assumptions from the model and ensure its validity.

The steps used in the model development were the following:

- Correlation Matrix. In order to analyze the dependent variable correlation, which in this case is gold Recovery, with the independent variables, verify their independence and the existence of possible co linearity, a Correlation Matrix for each hole considered in the evaluation was developed. This Matrix is shown in the chapter corresponding to the estimation model development

- Descriptive Statistic Analysis. Next, we present graphs with the variability of the predictive parameters and means, and standard deviation of the dependent and independent variables.

- Correlation Analysis. The next step corresponds to analyzing the correlation Matrix between the dependent variable (gold recovery) and the independent variables selected after the co-linearity and independence analysis.

In this stage, the Pearson correlation coefficient and the significance test for the considered variables is analyzed.

Predictive Model Estimation

Once the previous steps for validating the Model assumptions were made, the consultant proceeded to estimate the predictor model by calculating the Pearson correlation coefficient (R2), the Anova analysis, and finally the Model coefficient determination and its correspondent significance test.

Model Analysis

In general there is a correlation between gold grade and sulfur with the recovery of gold, having a higher weight, the impact of sulfur in the recovery of gold compared with the effect of the grade of golden.

Exceptionally, it was found that the sulfur content does not explain the behavior of gold recovery, which could be due to the different ways that can find gold and sulphides associated. On the other hand it was found in exceptional cases that a low sulfur content caused a poor gold recovery in the latter case is likely to have the presence of coal, which retains the gold and prevent its extraction.
Importantly, the results show that with increasing sulfur content, reduced gold recovery and cyanide consumption increases, this negative impact on recovery caused by the sulfur content could be due to the presence of sulfides in which matrix would be fine disseminated gold. Metalica suggests to Yamana conduct an electronic microscopic study to analyze how the gold is in association, liberation size of gold particles etc. in order to make the process more profitable.

The presence of sulfur is also related to the consumption of cyanide, which was expected. In our testing we observed a higher cyanide consumption when increased presence of sulfur and in the same way a higher consumption of lime.

In general all drilling are following the same pattern of correlation discussed, with the exception of wells QD 402, 592 and 594.

**Predictor Model**

A summary of the coefficients obtained in estimating the predictor model for each hole and the degree of significance of these are shown below:

<table>
<thead>
<tr>
<th>Hole</th>
<th>R-Squared</th>
<th>Constant</th>
<th>Coefficient grade Au</th>
<th>Coefficient grade Sulfur</th>
<th>Number of Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>06 QD 302</td>
<td>0.79</td>
<td>84.46</td>
<td>1.60</td>
<td>-57.2</td>
<td>7.00</td>
</tr>
<tr>
<td>sig.</td>
<td>0.04</td>
<td>0</td>
<td>0.25</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>06 QD 309</td>
<td>0.83</td>
<td>82.47</td>
<td>3.72</td>
<td>-352.9</td>
<td>11.00</td>
</tr>
<tr>
<td>sig.</td>
<td>0.00</td>
<td>0</td>
<td>0.11</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>06 QD 343</td>
<td>0.76</td>
<td>70.06</td>
<td>3.08</td>
<td>-53.1</td>
<td>9.00</td>
</tr>
<tr>
<td>sig.</td>
<td>0.01</td>
<td>0.001</td>
<td>0.39</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>07 QD 385</td>
<td>0.74</td>
<td>96.76</td>
<td>0.40</td>
<td>-290.7</td>
<td>30.00</td>
</tr>
<tr>
<td>sig.</td>
<td>0.00</td>
<td>0</td>
<td>0.49</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>07 QD 396</td>
<td>0.87</td>
<td>87.61</td>
<td>1.19</td>
<td>-146.5</td>
<td>10.00</td>
</tr>
<tr>
<td>sig.</td>
<td>0.00</td>
<td>0</td>
<td>0.57</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>07 QD 402</td>
<td>0.12</td>
<td>89.58</td>
<td>-0.19</td>
<td>88.4</td>
<td>11.00</td>
</tr>
<tr>
<td>sig.</td>
<td>0.61</td>
<td>0</td>
<td>0.96</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>10 QD 589</td>
<td>0.83</td>
<td>99.43</td>
<td>-3.81</td>
<td>-114.9</td>
<td>23.00</td>
</tr>
<tr>
<td>sig.</td>
<td>0.00</td>
<td>0</td>
<td>0.02</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>10 QD 590</td>
<td>0.42</td>
<td>85.96</td>
<td>-3.62</td>
<td>32.0</td>
<td>26.00</td>
</tr>
<tr>
<td>sig.</td>
<td>0.00</td>
<td>0</td>
<td>0.26</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>10 QD 591</td>
<td>0.46</td>
<td>95.55</td>
<td>-2.32</td>
<td>-26.9</td>
<td>24.00</td>
</tr>
<tr>
<td>sig.</td>
<td>0.00</td>
<td>0</td>
<td>0.27</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>10 QD 592</td>
<td>0.50</td>
<td>-195.48</td>
<td>-315.42</td>
<td>382.7</td>
<td>6.00</td>
</tr>
<tr>
<td>sig.</td>
<td>0.35</td>
<td>0.21</td>
<td>0.46</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>10 QD 594</td>
<td>0.22</td>
<td>102.34</td>
<td>-1.66</td>
<td>-10.4</td>
<td>22.00</td>
</tr>
<tr>
<td>sig.</td>
<td>0.10</td>
<td>0</td>
<td>0.06</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>10 QD 596</td>
<td>0.43</td>
<td>99.28</td>
<td>1.80</td>
<td>-318.8</td>
<td>37.00</td>
</tr>
<tr>
<td>sig.</td>
<td>0.00</td>
<td>0</td>
<td>0.05</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>

In Table 30 it can be seen, according to Pearson and level of significance, a good correlation between the independent variables with the recovery of gold in most of the hole except holes QD 402, QD 592 and QD 594, already mentioned, that correlation is low and the degree of significance is bad.
The most influential factor is the law of sulfur, where you can see a strong correlation and degree of significance with the exception of the above.

In hole QD 402, QD 592 and 594, the correlation is poor and does not follow the general pattern observed in the other hole, where the sulfur content is an important factor in the gold recovery efficiency, this could be to a different mineralogy, in which the type of existent association between sulfides and gold, liberation degree and the presence of other elements which affect differently the recovery of gold, which may be confirmed by performing special electronic microscope study.

The degree of significance of the coefficients of the models is acceptable with the exception of the aforementioned hole. This significance grade is very strong in the case of sulfur and thus the variable of greatest negative impact on recovery as it increases.

As shown also in Table 30, the weight coefficient of the gold grade is lower and relative significance, which is explained by the greater effect of sulfur. To equal gold grade, the degree of extraction is given by the amount of sulphides present in the ore.

18.2.2.5 Conclusions and Recommendations

The analysis carried out by the authors was: chemical characterization of the hole available of the sector QDDL, laboratory test and columns and metallurgical behavior estimated by predictive model which allows us to establish the following conclusions and recommendations:

Grade feed gold average for these selected samples are generally higher than the average obtained of each hole, likewise the gold recoveries obtained in leaching test, differ in some cases quite, to those obtained in the complete hole. The above-mentioned suggests the probably existence of a bias in the selection of the samples that can be negative or positive in the test of columns.

The feed gold grade average for these selected samples are generally higher than the average of each hole, likewise the gold recoveries obtained in leaching test, differ in some cases quite, to those obtained in the complete hole. The above-mentioned suggests the probably existence of a bias in the selection of the samples that can be negative or positive in the test of columns.

Generally there is a correlation between the gold grade and the presence of sulfur on the recovery of gold, having a strong negative impact on recovery, the presence of sulfur and a smaller effect on the gold content.

Predictive models has a coefficient of Pearson and a good degree of significance, giving rise to a good correlation between the independent variables with the recovery of gold in most of the hole except the holes QD 402, QD 592 and QD 594, where the correlation is low and the degree of significance is bad.

The most influential and dominant factor is the grade of sulfur, where you can see a strong correlation and important level significance, not with the gold grade, which is low and erratic correlation.

According to the above, this negative impact on recovery caused by the presence of sulfur is due to the presence of sulfides in whose matrix, would be found possibly gold fine disseminated.

The presence of sulfur is observed in general with more abundance in the lower areas of the exploration. This indicates that to more depth one has a bigger presence of sulfur and consequently a smaller extraction of gold.

Given the strong negative effect of sulfur associated with the presence of sulphides; is highly recommended to perform the metallurgical study in the lower areas of the QDDLW sector, in order to understand its behavior and evaluate the design of more cost-effective processing.
The presence of sulfur is also related to the consumption of cyanide, which is expected. In our testing we observed a higher consumption in front of increased presence of sulfur and greater consumption of lime.

Also, detected in some cases the content of sulfur doesn't explain the behavior of the recovery of gold, that which would be due to the different forms in that it can be associated with the gold and the sulfides.

Also unusually, we found cases where, despite its low content of sulfur, gold recovery obtained was very poor. This could indicate that there would be areas with presence of carbon, which retains the gold and prevent its extraction.

It is recommended to carry out a microscopic electronic study in the deepest areas, in manner of analyzing the association form in that meets the gold with the sulfides, association type, size of liberation the particles of gold etc., with the purpose of studying the design from the process more profitable in case that the presence of sulphur.

18.3 AIM METALLURGY

The gold-bearing mineralized zones for the AIM deposit is primarily sulphide-bearing skarn, breccia and marble deposits containing minor copper, zinc and molybdenum with late stage gold-arsenic mineralization.

The skarn contains minor chalcopyrite, sphalerite, galena, pyrrhotite, and pyrite that preceded the introduction of the gold-arsenic mineralization (AMEC, 2005). The gold mineralization extends beyond the skarn into the surrounding marbles.


To support the Metallurgical Test of AIM, Yamana has requested an external consultant the compilation of all metallurgical studies conducted so far, the result of which is described below:

Summary and Conclusions on AIM Metallurgy Among studies evaluated, it was pointed out that gold distribution in ore is:

- 12% free gold;
- 84% associated with sulphides; and
- 4% occluded in waste rock.

As far as oxidized and sulfides mass, there are few references in the various studies completed, once being mentioned the value of a chance of 22.9% sulfur in the form of pyrite (SGS, Report No. 1, 24-09-08).

Regarding gold size, Hatch reported in its Final Report for the QDDLW sizes from 5 to 10 microns (see report), with no visible grains of gold, most of the studies reported below 11 microns, having been reported on one occasion the presence of gold in 30 microns.

The inclusion in sulphide such as arsenopyrite, pyrite and pyrrhotite is of vital importance in many gold refractory systems.

Gold could appear as ultra thin (invisible) in solid solutions among the grains of suluretted ore.

Occluded gold between sulphide grains can be measured as follows: Arsenopyrite <0.2 to 15,200 g/t; Pyrite <0.2 to 132 g/t; tetrahedral <0.2 to 72 g/t; Chalcopyrite <0 2 to 7.7 g/t (Marsen and House, page 41.SME 2006).

Bear in mind: this is important because if the ore contains a 3% pyrite weight and the ore gold grade (breccias texture) is 3 g/t, all gold could be present in solid solution (as invisible gold) in pyrite. In this case the pyrite ore grade could have a gold content of approximately 100 g/t.
Different tests done show the link of gold with pyrite and marcasite and gold content is related to the presence of the above mentioned.

Conclusions

- The complex mineralogy and fine particle grain size of the gold will adversely affect the cyanidation extraction of the gold from this material.
- For calculating purposes sulfides should take a recovery of 45% and 1.5 kg of CN/t 8 kg lime/t consumption.
- In the case of Mixed plus oxidized ore it should be worked with a gold recovery of 65%, CN consumption of 750 g/t and 2 kg/t of lime.
- Only for the oxidized ore, gold recovery of 80% and CN consumption of 500 g/t of lime 1.5 kg/t should be taken.

18.3.1 Geometallurgical Model

In July 2010, Engineer Marco Alfaro carried out a metallurgic analysis in order to build the best geometallurgic model for the Amelia Inés and Magdalena ore deposits considering the available information, which is a sub group of the data base which was used to build the gold resources model.

The 5 m x 5 m x 5 m Block Model built by Yamana Explorations in June 2010 was used for this analysis. The 20 meter long composites were analyzed in the San Juan Mining Investigations Institute by Gold Feed Grade (g/t), Extractable Gold (g/t), Oxidation Degree (%), Gold Extraction (%), Total Sulfur (%), and Soluble Sulfur (%).

One limitation of Yamana Exploration’s model is that it only has internal data to the bodies, without a boundaries study.

Figure 40 - Plan projection view – Amelia Inés
Note: Not all the drill holes from the project were sampled for geometallurgics.

The statistics from the different variables show the presence of anomalous values, which have to be filtered (Table 31).

### Table 31 – Top Cut

<table>
<thead>
<tr>
<th>Variable</th>
<th>Top Cut</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soluble Sulfur (%)</td>
<td>1.5</td>
</tr>
<tr>
<td>Total Sulfur(%)</td>
<td>22</td>
</tr>
<tr>
<td>Gold Feed Grade (g/t)</td>
<td>12</td>
</tr>
<tr>
<td>Gold Extraction (%)</td>
<td>Non applicable</td>
</tr>
<tr>
<td>Extractable Gold (g/t)</td>
<td>9</td>
</tr>
<tr>
<td>Oxidation Degree (%)</td>
<td>Non applicable</td>
</tr>
</tbody>
</table>

#### 18.3.2 Variograms

Since the data amount is small, only omni directional variograms were used, which are fairly acceptable. Only one variogram was calculated for Amelia Inés and Magdalena, using the data base from both sectors. The figure below presents some results.

Experimental Variograms adjusted to a spherical model.
Figure 42 – Total Sulfur Variogram – Range 126 meters

\[ \gamma(h) \]

Azufre Total. C0 = 11.0, C = 17.5, a = 126

Figure 43 – Soluble Sulfur Variogram – Range 108 meters

\[ \gamma(h) \]

Azufre soluble. C0 = 0.0168, C = 0.0264, a = 108
18.3.3 Kriging

The common kriging method was used over:

- 5mx5m5m blocks generated by Explorations were used.
- Variograms for each variable were used.
- Search radii equal to the scopes were used.
- 2 samples minimum and 32 samples maximum to krigate a block.
- High values restriction (over Top Cut) in a 2.5 meter radius.
- The krigated variables were: Soluble Sulfur, Total Sulfur, Gold Extraction, Gold Feed Grade, extractable Gold, and Oxidation Degree.
The figure below shows an example:

**Figure 46 - Geometallurgical model – plant view**

18.3.4 Conclusion and Recommendations

With the available information (960 composites analyzed with geometallurgic variables from a total of 3,586 composites), the best possible geometallurgic model has been built.

Regarding the gold grades, this model is less reliable than the Explorations model. However, in overall terms, it is more reliable because it uses external data to the block model.
19. MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES

19.1 MINERAL RESOURCES

The following tables present the mineral resources informed by Yamana and reserves for the Gualcamayo Project as of December 2010, consolidated with QDD Upper, QDD Lower West and Amelia Ines-Magdalena deposits. AIM reserves were estimated by Metálica Consultores S.A. considering a pit optimization of US$1,400. Also QDDLW was estimated by Metálica, however QDD Upper was informed by Yamana.

Table 32 - Gualcamayo mineral resources estimate (exclusive of reserves)

| Deposit  | Au Cut-Off | Measured |  |  |  |  |  |  |  |
|----------|------------|----------|----------|----------|----------|----------|----------|----------|
|          |            | Tonnes   | Grade Au | Contained | Tonnes   | Grade Au | Contained | Tonnes   | Grade Au | Contained |
|          | g/t | t | g/t | oz | t | g/t | oz | t | g/t | oz |
| QDD Upper | 0.15 | 4,956,395 | 1.28 | 203,173 | 16,457,616 | 0.78 | 414,304 | 21,414,011 | 0.9 | 617,478 |
| QDD Lower | 1 | 327,545 | 2.85 | 30,064 | 2,378,562 | 2.61 | 199,396 | 2,706,107 | 2.64 | 229,460 |
| AIM       | 0.18 | 52,000 | 1.95 | 3,253 | 1,447,000 | 1.76 | 82,067 | 1,499,000 | 1.77 | 85,320 |
| Total     |      | 5,335,940 | 1.38 | 236,490 | 20,283,178 | 1.06 | 695,767 | 25,619,118 | 1.13 | 932,258 |

Table 33 - Gualcamayo mineral reserves

<table>
<thead>
<tr>
<th>Consolidated reserves</th>
<th>Au Cut-Off g/t</th>
<th>Proven</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Tonnes</td>
<td>Grade Au</td>
<td>Contained</td>
<td>Tonnes</td>
<td>Grade Au</td>
<td>Contained</td>
<td>Tonnes</td>
<td>Grade Au</td>
<td>Contained</td>
<td></td>
</tr>
<tr>
<td></td>
<td>g/t</td>
<td>t</td>
<td>g/t</td>
<td>Oz</td>
<td>t</td>
<td>g/t</td>
<td>Oz</td>
<td>t</td>
<td>g/t</td>
<td>Oz</td>
<td></td>
</tr>
<tr>
<td>QDD Upper</td>
<td>0.15</td>
<td>18,980,520</td>
<td>0.84</td>
<td>513,210</td>
<td>34,473,775</td>
<td>0.78</td>
<td>861,193</td>
<td>53,454,295</td>
<td>0.80</td>
<td>1,374,403</td>
<td></td>
</tr>
<tr>
<td>QDD Lower</td>
<td>1.00</td>
<td>1,214,708</td>
<td>2.63</td>
<td>102,687</td>
<td>9,542,354</td>
<td>2.12</td>
<td>651,255</td>
<td>10,757,062</td>
<td>2.18</td>
<td>753,948</td>
<td></td>
</tr>
<tr>
<td>AIM</td>
<td>0.18</td>
<td>418,950</td>
<td>1.84</td>
<td>24,835</td>
<td>4,444,650</td>
<td>1.84</td>
<td>263,199</td>
<td>4,863,600</td>
<td>1.84</td>
<td>288,034</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>20,614,178</td>
<td>0.97</td>
<td>640,732</td>
<td>48,460,779</td>
<td>1.14</td>
<td>1,775,647</td>
<td>69,074,957</td>
<td>1.09</td>
<td>2,615,385</td>
<td></td>
</tr>
</tbody>
</table>

19.2 MINERAL RESERVES

The following table shows the Mineral Reserves estimated for the Gualcamayo Project.
The following table shows the mineral reserves, according to the final Pit designs of Amelia Inés and Magdalena, created in July 2010, considering a Price per gold ounce of US$ 900.

### Table 34 – Amelia Ines and Magdalena reserves detail by pit

<table>
<thead>
<tr>
<th>Pit</th>
<th>Au Cut-Off g/t</th>
<th>Proven</th>
<th></th>
<th>Probable</th>
<th></th>
<th>Proven&amp;Probable</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pit</td>
<td></td>
<td>Proven</td>
<td></td>
<td>Probable</td>
<td></td>
<td>Proven&amp;Probable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Torres</td>
<td>Grade Au</td>
<td>Contained</td>
<td>Torres</td>
<td>Grade Au</td>
<td>Contained</td>
<td>Torres</td>
</tr>
<tr>
<td></td>
<td>t</td>
<td>g/t</td>
<td>oz</td>
<td>t</td>
<td>g/t</td>
<td>oz</td>
<td>t</td>
</tr>
<tr>
<td>Amelia Inés</td>
<td>0.18</td>
<td>200,550</td>
<td>2.02</td>
<td>13,023</td>
<td>1,710,450</td>
<td>2.08</td>
<td>114,227</td>
</tr>
<tr>
<td>Magdalena</td>
<td>0.18</td>
<td>218,400</td>
<td>1.68</td>
<td>11,812</td>
<td>2,734,200</td>
<td>1.70</td>
<td>148,972</td>
</tr>
<tr>
<td>Total</td>
<td>0.18</td>
<td>418,950</td>
<td>1.84</td>
<td>24,835</td>
<td>4,444,650</td>
<td>1.84</td>
<td>263,199</td>
</tr>
</tbody>
</table>
20. OTHER RELEVANT DATA AND INFORMATION

No additional information or explanation is necessary to make this Report understandable and not misleading.
21. INTERPRETATION AND CONCLUSIONS

21.1 QDD UPPER

The pit is in normal operation. New practices in drilling and blasting are being introduced in order to minimize wall damage behind lines, and results in less back break along the upper benches.

The final pit was designed and optimized with the software Whittle and Minesight for design. For QDD optimization (Whittle), the metallurgical recovery was 80%.

21.2 QDD LOWER WEST

21.2.1 Geo Metallurgic

The reviewed information generates the following interpretations and conclusions:

It was found that in general, there is a correlation between gold grade and the presence of sulphur in relation with gold recovery; the presence of sulphur has a strong negative impact in the recovery, and in lesser degree, in the gold content.

Also, exceptionally there were cases in which, despite their low sulphur content, the gold recovery obtained was very poor. This could indicate that there may be areas with carbon presence, which retains gold and prevents its extraction.

The predictive models have a good Pearson coefficient and significance degree, originating a good correlation between the independent variables and the gold recovery in most holes, with the exception of holes QD 402, QD 592 and QD 594, where the correlation is very low and the significance degree is bad.

The most influencing and dominating factor is the sulphur grade, which shows a strong correlation and significance degree, not so with the gold grade, which is low and its correlation is erratic.

21.2.2 Geotechnical

Two stages for the mining of the QDDLW reserves in Gualcamayo were considered. The first stage refers to the mining of stopes 25 m wide and separated by 15 m pillars. All the former located in two levels separated by a sill pillar 10 m thick.

After having developed a statistic relation between the hard RQD fact and the RMR available in Metálica’s rock quality files, the author has identified the minimum RMR quality demanded for collapse, observing that the rocks identified for backs and walls of these stopes adequately comply with these requirements, and definitely no stopes from the project are unstable.

Complementing the former and using the hard RMR fact obtained from 21 in fill drill holes, Metálica has experimented with a new review, now using the Laubscher empirical relation directly with the RMR from the 21 in fill drill holes. For obvious reasons, this review is restricted to sectors near to the 21 available drill holes. The results obtained confirm that the stopes evaluated thus are equally stable according to the applied analysis methodology.

The second stage refers to the Mass Blast sequence in discreet events in order to rescue the remaining reserves (pillars between stopes, seal pillar, etc.). The author thinks that the available information only allows for the following suggestions:
According to the depth of the QDD ore deposit in relation with the upper topography and the Pit advance work, it is unlikely that the Mass Blast collapse in events interferes with the surface. The former in the understanding that the column collapsed and swelled to 40% would not allow the outcrop of the crater. Independently from the former, it is reasonable estimating a subsidence angle for minor fractures due to the deformation of the back rocks of only 70º.

The rock quality information in terms of the fractures / meter, average index is FF 5 (fract./m), which suggests a regular spontaneous collapse of fine material. This issue must be reviewed in order to adequately program the Mass Blast events with minimum dilution.

The author thinks that the QDDLW SLS presents two challenges to be solved in Mine Operation stages, i.e., Details Engineering.

Conceptually, the alternative for an underground mining in Gualcamayo aims to incorporate reserves to the ore deposit, but also to improve the gold grades which currently are in decline in the Open Pit.

Specifically, the first challenge from the suggested SLS method (with the Mass Blast extension) aims to rescue the reserves from the stopes, while the second challenge poses that the extension of the Mass Blast aims to rescue the remaining in situ reserves, thus minimizing the ore dilution.

In the first case, the mine operation has the advantage of being flexible in the compliance of goals, the alternative of reducing (according to the stopes length) the RH index, and with that, make the minimum rock quality (RMR) less demanding in order to support the stopes without dilution. This operational flexibility refers to leaving cross pillars to the longitudinal axis of the stopes (example: 10 m wide pillars), which can solve the support incapacity of the in situ rock. In this case, the operational cost of reopening a face from the cross auxiliary pillar is very low, while the cost of the reserves contained in the auxiliary pillar cannot be considered lost, because the reserves taken in stage 1 (stope) are only transferred to stage 2 (Mass Blast).

From the former, it must be concluded that the Geotechnics in QDDLW must have, in the Advanced Basic engineering stage, a sufficient amount and quality of rock information in order to serve as input for the state of the arts tools to tackle those problems.

As at the effective date of the Report, the initiatives for obtaining those antecedents are about to materialize, but their results are still not available. The referred antecedents are:

The proximity of the Andean Mountain Range and the references from other nearby mining field works suggest the occurrence of a tectonic sub horizontal stress with E-W Orientation with unknown magnitude, which alters the stress / deformation mechanic of the SLS cavities considered in this project. In order to solve this issue, the study in process includes the measurement of such tectonic vector through the “Overcoring” technique, using the sensor developed by the U.S. Bureau of Mines.

The laws of science which control the rock deterioration via alteration of the Deformation Module are necessarily obtained by lab testing i.e., triaxial tests with Modules records under confined states. Tests such as these have been commissioned to specialized laboratories, and their results are being awaited.

In sum, the Geotechnics for this stage of the QDD project responds to the conceptual demands from the current status.
21.2.3 Mine Design

QDD Lower West

For the desired production rate for the project (5,000 tpd or 1.8 Mtpa), the only method seen as potentially applicable is SLS; any other method (Ruling out the massive ones), would mean a significantly lower production scenario. The information available today indicates the technical viability of its application between elevations 1,800 and 1,900 masl.

The great risk identified for this method, and consequently for a large scale production, is the application of mass blasting. This event is a relevant factor. The production plan indicates that the last three years of the ore deposit mining will be 100% from Mass Blast.

Metálica’s experience in mass blast events applied in the Chilean mining, specifically in the case of the El Soldado Mine, and Santos Mine, anticipates the success of that event, one of the most relevant projects undertaken by Yamana regarding the challenge of recovering the reserves.

In case of not receiving a favorable answer from the project (technology failure), the reserves to be recovered could be significantly reduced, therefore the option of using filling in the mined stopes is suggested, which would considerably increase the mine costs.

21.2.4 Economic Aspects

The QDDL ore body mining is approximately 150 m below the corresponding last bench which will be mined in the open pit operations; the possibility exists that, at its ending, the underground mining could generate a subsidence crater which could compromise part of the pit infrastructure within its projection.

QDD Lower UG Feasibility Study Project was updated considering a Geometallurgic Model, new mine access location, and new geological model considering 2009-2010 infill drilling.

Base case with the current reserve recovers 492,400 ounces of gold in 7.5 years at an average cash cost of $372/oz, generating an NPV at 5% discount rate after tax of US$63.1 million and IRR of 20%.

Among the major economical risks of the project are the quality control of capital expenditures, and the accomplishment of deadlines for implementing the Project.

As more important technical risks, the complexity of the lay out, and mining method, will require a high-level team to manage technically the mine. Decrease of metallurgical recovery in depth may be an important issue for the mine deepening.

21.3 AIM

21.3.1 Metallurgy

The gold-bearing mineralized zones for the AIM deposit is primarily sulphide-bearing skarn, breccia and marble deposits containing minor copper, zinc and molybdenum with late stage gold-arsenic mineralization.

The skarn contains minor chalcopyrite, sphalerite, galena, pyrrhotite, and pyrite that preceded the introduction of the gold-arsenic mineralization (AMEC, 2005). The gold mineralization extends beyond the skarn into the surrounding marbles.

To support the Metallurgical Test of AIM, Yamana has requested an external consultant the compilation of all metallurgical studies conducted so far, the result of which is described below:

Summary and Conclusions on AIM Metallurgy Among studies evaluated, it was pointed out that gold distribution in ore is:

- 12% free gold;
- 84% associated with sulphides; and
- 4% occluded in waste rock.

The complex mineralogy and fine particle grain size of the gold will adversely affect the cyanidation extraction of the gold from this material.

For calculating purposes sulfides should take a recovery of 45% and 1.5 kg of CN/t 8 kg lime/t consumption.

In the case of Mixed plus oxidized ore it should be worked with a gold recovery of 65%, CN consumption of 750 g/t and 2 kg/t of lime.

Only for the oxidized ore, gold recovery of 80% and CN consumption of 500 g/t of lime 1.5 kg/t should be taken.

21.3.2 Geometallurgical Model

With the available information (960 composites analyzed with geometallurgic variables from a total of 3,586 composites), the best possible geometallurgic model has been built.

Regarding the gold grades, this model is less reliable than the Explorations model. However, in overall terms, it is more reliable because it uses external data to the block model.
22. RECOMMENDATIONS

22.1 QDD UPPER

It is recommended reviewing the technical parameters of drilling and blasting in order to improve the best quality of them.

22.2 QDD LOWER WEST

The reviewed information generates the following recommendations:

Geo Metallurgic

It is recommendable to perform an electronic microscopic study in the deeper areas in order to analyze the way in which gold is associated with the sulphides, the type of association, the liberation size of the gold particles, etc. in order to study the most profitable process design for the future in case the sulphur presence makes it worthwhile.

Predictive Model

Given the strong negative effect of the sulphur content associated to the presence of sulphides, it is highly recommended to perform the metallurgic study for the lower areas in the Lower QDD sector, in order to know their behaviour and evaluate their most profitable processing design.

22.3 AIM

In order to perform the Geometallurgical Model, a multivariable analysis should be implemented in short term.
23. REFERENCES

- IIM (Instituto de Investigaciones Mineras) UNSJ (Universidad Nacional de San Juan), 2008, Ensayos Metalúrgicos de Material Oxidado en QDD para el Proyecto Gualcamayo Análisis Mineralógico Informe Final Item 4.
This report titled "National Instrument 43-101 Technical Report for Gualcamayo Project", located in San Juan, Argentina, dated as of March 25, 2011, was prepared and signed by the following authors:

(Signed)

Marcos E. Valencia A.
Regional Resources Estimation Manager, Andes Exploration, Yamana Gold Inc.
Mineral Resources

(Signed)

Emerson Ricardo Re, MSc, MAusIMM
Corporate Manager R&R, Yaman Gold Inc.
QDD Upper Mineral Reserves

(Signed)

Guillermo Bagioli A
Project Manager, Metálica Consultores

Qualified Person
MAusIMM # 302047
(Signed)

Marcelo Trujillo, V
Specialist Engineer, Metálica Consultores
Qualified Person
MAusIMM # 302037

(Signed)

Alvaro Vergara G.
Specialist Engineer, Metálica Consultores
Resources Estimation and Strategic Planning

(Signed)

Renato Petter
MAusIMM, Technical Services Director, Yamana Gold Inc.
I, Marcos Eduardo Valencia Araya, do hereby certify that:

(a). I hold the position of Regional Resources Estimation Manager with Yamana Gold Inc and I am responsible for managing the resources works in Chile, Colombia and Argentina, which include Gualcamayo Project. My current office address is Cerro Colorado, 5240, Piso 9, Oficina A, Santiago, Chile.

(b). I have degree in Bachelor of Science in Geology, 1998, Universidad Católica del Norte, Chile and Master in Business Administration, 2010, Universidad Adolfo Ibáñez, School of Business.

(c). I am practising member of the Chilean Qualifying Commission in Resources and Reserves (#069) recognized by NI43-101.

(d). I have been practising as a professional geologist since 1998 and resources estimation geologist since 2001.

(e). By reason of my education, experience and professional registration I fulfill the requirements of a qualified person as set out in National Instrument 43-101 ("NI43-101").

(f). I have visited the Gualcamayo Property site in person in August 1 - 15, 2010 as Regional Resource Estimation Manager.


(h). As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information required to be disclosed to make the Technical Report not misleading.

(i). By virtue of my employment with Yamana Gold Inc since August 2000, I am not independent of the issuer. I also beneficially own securities in Yamana Gold Inc.

(j). I have read NI 43-101 and Form 43-101F1, and this Technical Report has been prepared in compliance with that instrument and form.

(k). I consent to the filing of this Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated this March 25, 2011.

(Signed)

Marcos Eduardo Valencia A., Qualified Person
Regional Resources Estimation Manager
Yamana Gold Inc.
CERTIFICATE of QUALIFIED PERSON

I, Emerson Ricardo Re, do hereby certify that:

(a). I hold the position of Resource and Reserves Corporative Manager with Yamana Gold Inc and I am responsible for manager the resources and reserves works in Brazil and Argentina, which include Gualcamayo Project. My current office address is Rua Funchal, 411, 4º Andar, São Paulo, SP, Brazil, CEP04551-060.

(b). I have degree in Bachelor of Science in Honours Geology, 1999, University of São Paulo State (UNESP) and Master of Science in Mining Engineering, 2002, Polytechnic School University of Sao Paulo (Poli - USP)

(c). I am practising member of the Australasian Institute of Mining and Metallurgy (#305892)

(d). I have been practising as a professional geologist since 2000 and resource and reserve geologist since 2002.

(e). By reason of my education, experience and professional registration I fulfill the requirements of a qualified person as set out in National Instrument 43-101 ("NI43-101")

(f). I have visited the Gualcamayo Property site in person in December 13 - 15, 2010 as resource and reserve manager.


(h). As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information required to be disclosed to make the Technical Report not misleading.

(i). By virtue of my employment with Yamana Gold Inc since September 2010, I am not independent of the issuer. I also beneficially own securities in Yamana Gold Inc.

(j). I have read NI 43-101 and Form 43-101F1, and this Technical Report has been prepared in compliance with that instrument and form.

(k). I consent to the filing of this Technical Report with any stock exchange and other regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Dated this March 25, 2011.

(Signed)
Emerson Ricardo Re, MSc, MAusIMM
Corporate Manager R&R, Yamana Gold Inc.
CERTIFICATE of QUALIFIED PERSON

I, Guillermo Bagioli A, do hereby certify that:

1. I am employee of, and one of the designated persons to carry out this work by, Metálica Consultores S.A. (Metálica), with commercial address in Evaristo Lillo 78, Las Condes, Santiago, Chile, phone number 56 (02) 290-6969.


3. I am a qualified person for the purposes of National Instrument 43-101. I have the following professional degrees: Civil Mining Engineer, Universidad de Chile, 1976. I am a member of the Mining and Metallurgy Institute (MAusIMM # 302047), an Australian professional association.

4. I have worked continuously in the mineral industry as mining engineer since 1971, a 39 year period.


6. I am responsible for the mining reserve estimate for the QDD Lower ore body, of the Report.

7. I visited Gualcamayo Project in June 2009, for two days, in order to check the conditions and characteristics of the site.

8. I am independent from Yamana Gold Inc. as defined in Section 1.4 of National Instrument 43-101.

9. As of the date of the certificate, to the best of my knowledge, information and belief, the Report contains all scientific and technical information required to be disclosed to make the Report not misleading.

10. I hereby consent to use of the Report and my name in the preparation of Yamana’s annual information form for the fiscal year ended December 31, 2010 and for submission to any provincial regulatory authority.

Dated March 25, 2011

(Signed)

Guillermo Bagioli
MAusIMM # 302047
CERTIFICATE of QUALIFIED PERSON

I, Marcelo Trujillo V. do hereby certify that:

1. I am employee of, and one of the designated persons to carry out this work by, Metálica Consultores S.A. (Metálica), with commercial address in Evaristo Lillo 78, Las Condes, Santiago, Chile, phone number (02) 290-6900.


3. I am a qualified person for the purposes of National Instrument 43-101. I have the following professional degrees: Civil Mining Engineer, Santiago de Chile University, 1996. I am a member of the Mining and Metallurgy Institute (MAusIMM # 302037), an Australian professional association.

4. I have worked continuously in the mineral industry as mining engineer since 1996, a 15 year period.


6. I am responsible for the mining reserve estimate for the Amelia Inés and Magdalena (AIM) ore body, of the Report.

7. I visited Gualcamayo Project in May 2010 for 3 days, in order to check the conditions and characteristics of the site.

8. I am independent from Yamana Gold Inc. as defined in Section 1.4 of National Instrument 43-101.

9. As of the date of the certificate, to the best of my knowledge, information and belief, the Report contains all scientific and technical information required to be disclosed to make the Report not misleading.

10. I hereby consent to use of the Report and my name in the preparation of Yamana’s annual information form for the fiscal year ended December 31, 2010 and for submission to any provincial regulatory authority.

Dated March 25, 2011

(Signed)

Marcelo Trujillo V
MAusIMM # 302037
CERTIFICATE of QUALIFIED PERSON

I, Alvaro Vergara, MAusIMM, do hereby certify that:

1. I hold the position of Project Manager with Metalica Consultores S.A. My current office address is Evaristo Lillo 78, Piso 5, Las Condes, Santiago, Chile.


3. I hold a degree in Industrial Civil Engineering, Universidad de Santiago de Chile, 2000.

4. I am a member of the Mining and Metallurgy Institute (MAusIMM # 991457), an Australian professional association recognized by JORC Code.

5. I have been practising as a Resources Estimation and Strategic Planning Specialist Engineer since 2000.

6. By reason of my education, experience and professional registration, I fulfill the requirements of a qualified person as set out in National Instrument 43-101 (“NI 43-101”)

7. I am responsible for the mining reserves declaration of the QDD Lower ore body, under the assumptions described in the Report.

8. I am independent from Yamana Gold Inc. as defined in section 1.4 of NI 43-101.

9. I have read NI 43-101 and the Report has been prepared in compliance with NI 43-101.

10. As of the date of this certificate, to the best of my knowledge, information and belief, the Report contains all scientific and technical information required to be disclosed to make the Report not misleading.

Dated this 25th day of March, 2011.

(Signed)

Alvaro Vergara, MAusIMM
As a qualified person responsible for preparing or supervising the preparation of the technical report entitled “Technical Report for Gualcamayo Project, San Juan, Argentina, Report for NI43-101 Pursuant to National Instrument 43-101 of the Canadian Securities Administrators” dated March 25, 2011, I hereby certify as follows:

(a) My name is Renato Petter of business address at Funchal 411, São Paulo, Brasil, and I am a Professional Engineer and the Director of Technical Services at Yamana Gold Inc.


(c) I am qualified as a Professional Engineer. I have practiced my profession continuously since graduation. I am a member in good standing of CANADIAN INSTITUTE OF MINING METALLURGY AND PETROLEUM nº 141768, and MAusIMM nº 209012 AUSTRALIAN INSTITUTE OF MINING AND METALLURGY. I am a "qualified person" for the purposes of National Instrument 43-101.

(d) My most recent personal inspection of the Gualcamayo Project was in March, 2011, and the duration of my visit was for 2 days.


(f) I am not independent of Yamana Gold Inc. within the meaning of National Instrument 43-101.

(g) My prior involvement with the Gualcamayo Project includes periodical technical revisions.

(h) By virtue of my employment with Yamana Gold Inc since January 2006, I am not independent of the issuer. I also beneficially own securities in Yamana Gold Inc.

(h) I have read National Instrument 43-101 and the technical report has been prepared in compliance with National Instrument 43-101.

(i) As of the date of this certificate, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to been disclosed to make the technical report not misleading.

Signed as of March 25th, 2011.

(Signed)
Renato Petter, P.Eng.
Director, Technical Services
25. ADDITIONAL REQUIREMENTS

25.1 MINING OPERATIONS

As additional requirements includes the operation and how reserves are calculated in each of the deposits.

25.1.1 QDD Upper

The QDD deposit is located in an area of rugged topography. Natural slopes in most of the mining areas are greater than 40°, and in some areas exceed 80°. The highest elevation of the mine is 2,670 m and the lowest elevation 1,940 m.

Because of the rugged terrain, trucking is an expensive choice for transporting the ore to the primary crushing circuit. The rugged topography and the continuous nature of the broad low-grade mineralized zone within a limestone/marble breccia provided the opportunity to investigate alternate mining and transportation methods. The proposed method for ore transportation from the pit is by two ore passes located within the pit.

This system is well proven in the mining industry, mostly within the industrial minerals sector.

The deposit was divided into two major structural domains (West and East) for the purposes of open pit assessment. A series of pit design sectors were defined based on the site geology plans, surface geological mapping, and the oriented geotechnical drilling. Pit slope design criteria for each design sector were formulated to minimize significant structurally controlled failures along continuous bedding based on the results of kinematic analyses. The pit slope design includes conventional benched slopes and footwall slopes. The benched slopes are typically at an inter-ramp angle of 43 to 49 degrees, and “footwall design” is recommended for design sectors where bedding is believed to dip between 35 and 50 degrees and the dip direction of bedding is within 30 degrees of the dip direction of the pit wall.

Figure 47 – Open Pit and Underground Current Design - Gualcamayo Mine

For the west side of the pit the ore will be dumped into the ore pass at elevation 2,100 m and then transferred to the primary crusher at the bottom of ore pass via conveyor within an adit. Another key aspect to the mining of QDD is the waste removal and storage. The waste is essentially limestone and contains no deleterious elements.
Therefore, the mine plan is based on blasting and pushing or hauling the waste short distances over the edge of the pit into the large deep valleys below.

The final pit designed and optimized with the software Whittle (optimization) and MineSight (design), for the QDD mine gave the following general results:

**Table 35 - Design parameters**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bench Height</td>
<td>10 m</td>
</tr>
<tr>
<td>PreSplit</td>
<td>20 m</td>
</tr>
<tr>
<td>Mined</td>
<td>10 m</td>
</tr>
<tr>
<td>Dilution</td>
<td>7 %</td>
</tr>
<tr>
<td>Ramp Gradient</td>
<td>15 %</td>
</tr>
<tr>
<td>Ramp Width</td>
<td>12 m</td>
</tr>
<tr>
<td>Ramp Length</td>
<td>70 m</td>
</tr>
<tr>
<td>Berm Width</td>
<td>12 m</td>
</tr>
<tr>
<td>Slope Angle</td>
<td>43-49 °</td>
</tr>
<tr>
<td>Face Angle</td>
<td>75 °</td>
</tr>
</tbody>
</table>

Low-damage careful blasting practices are being utilized for the current pit wall development. 4.5” diameter pre-split holes are drilled at 65 degrees along the final bench faces with a close spacing of 1.5 to 2.0 m. Small diameter drills (4.5” to 5.5”) were also used for buffer holes and production blastholes with typical spacing of 3.0 to 4.5 m. This blasting practice minimizes wall damage behind design lines and results in less backbreak along the upper benches.

For QDD optimization (whittle) the metallurgical recovery was 80%.

**Table 36 - Metallurgical recovery for QDD optimization**

<table>
<thead>
<tr>
<th>Recovery % (Au)</th>
<th>Oxidation %</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>0 a 40</td>
</tr>
<tr>
<td>65</td>
<td>41 a 70</td>
</tr>
<tr>
<td>80</td>
<td>71 a 100</td>
</tr>
</tbody>
</table>

The milling cutoff grade of 0.18 g/t Au was calculated using a gold price of $480/oz, 80% recovery, and a processing cost of 2.19 US$/t. The process operating cost includes general and administration, power and environmental costs. This grade was used for pit reserve calculations. All blocks with grade less than 0.18 g/t were considered as waste rock.

The final pit was designed and optimized with the software Whittle (optimization) and MineSight (design), the following figures shows the optimization results and the graphic, to apply the optimum pit selection in which the revenue factor is equal to 1.

**25.1.2 Amelia Inés & Magdalena Deposits**

The definition of the Final Pits (optimization and analysis) and the exploitation sequence for the Amelia Inés and Magdalena bodies was calculated by Metalica Consultores using Whittle Four-X, based on the technical and economical parameters that will be described in the following sections. It is necessary to highlight that, for the determination of the final pit, only the measured and indicated resources have been used to feed the plant, treating the inferred resources as waste.

A series of assumptions and operational aspects were also considered to generate the mining sequence. These criteria, assumptions and operational restrictions are used in the mine development and preparation.
a) **Mining Method Indicated**
   - Open Pit, phase mining sequence in benches with a minimum width of excavation 20 m.

b) **MCF Recovery**
   - Associated to the method: 93%
   - Considered dilution in the plan: 5%

c) **Own Mining**
   - The mineral is transported/moved with own and rental machinery and processed in existing processing plant.
   - The waste will be transported/pushed with own machinery.

d) **Economical and Metallurgical Parameters**

Metallurgical cost and parameters used in the study were:
   - Gold Price: 900US$/oz, for Whittle optimization of AIM.
   - Waste Cost Extraction: 0.87 US$/t
   - Transport Cost: Mineral 0.686 US$/t; Waste 0.069 US$/t
   - Process Cost: Leaching 2.43 US$/t processed (average); G&A 0.98 US$/t
   - Refining and Transport Cost: 3.50 US$/oz
   - Export Duty: 33.32 US$/oz
   - Royalty: 38.5 US$/oz

e) **Design Parameters and Slope Pit Angles**

Next, a summary table of the geomechanical design parameters of the pits is presented:

<table>
<thead>
<tr>
<th>Table 37 - Geomechanical design parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bench height</td>
</tr>
<tr>
<td>Mining Widht</td>
</tr>
<tr>
<td>Ramp Slope</td>
</tr>
<tr>
<td>Ramp Widht</td>
</tr>
<tr>
<td>Ramp Lenght</td>
</tr>
<tr>
<td>Berm Width</td>
</tr>
<tr>
<td>Slope Angle</td>
</tr>
<tr>
<td>Face Angle</td>
</tr>
</tbody>
</table>

The reserves study was presented in the report “Feasibility Study Amelia-Ines and Magdalena Basic Engineering” (M1004600) prepared by Metálica Consultores (August 2010).

25.1.3 **Quebrada del Diablo Lower West, Underground Mining**

The primary mining definition for this ore deposit considers an underground mining, because the ore area lies at a depth over 430 m, therefore an open pit option was completely ruled out, considering the high ore waste rates which this type of mining would imply.

As design input, the client defined that the operation could reach a productive rate of 1.8 million tons per year (5 ktpd), a condition which imposes a high restriction for this definition.
The considerations lead to underground mining through the open stopes method called SLS, which is considered because it complies with two basic conditions, which are overall stability assurance and a required productive rate.

The extraction methodology is shown in the Figure 48. They are stopes with a maximum width of 25 m, separated by pillars of only 15 m. All these cavities are located in two levels with 40 m elevation difference, separated by a sill pillar of only 10 m.

The mining considers Mass Blast of these pillars and the sill pillar for the abandoned stage after exhausting these mining reserves.

**Figure 48 - Cross Section with SLS Design and Mass Blast**

The complete group of SLS stopes according to a longitudinal section of the ore deposit agrees with shown in the next figure. The stopes located in the upper level between elevations 1850 and 1900 mosl add up to a total of 9 cavities denominated VT (s), while the stopes located in the upper level between elevations 1800 and 1850 mosl add up to a total of 12 cavities and are denominated VT (i).
The sequential excavation of stopes will occur as the accesses progress, and consequently, the VT (s) will be mined first until the ramp allows access to lower levels. The Mass Blast events privilege the simultaneous blasting of both levels.

The QDDLW location in relation to the current Open Pit is as shown in the Figure 50. According to the mining business requirements, it is possible that the ore to plant needs could force materializing an anticipated or contemporary Mass Blast process with the underground mine and the Final Pit. In that case, the available antecedents suggest that an anticipated Mass Blast would imply the collapse of the first already mined stopes. If that were the case, in the supposed occurrence of a progressive collapse towards the upper elevations after the Mass Blast, the total column to be filled would be 100 m. The material collapsed in this way would experiment a swelling by irregular rock pieces of up to 40%, generating a natural subsidence estimated here according to a 70º angle.
The planning and the final sequence was made using Enhanced Production Scheduler (EPS) by Metalica Consultores, a tool that complements the information prepared in Mine2-4D (Datamine), and its characteristics allow using and handling information about tasks (drifts), assigning resources to work in the different drifts, and defining construction priorities, among other options, thus becoming an instrument which generates results in agreement with the needed ones in order to generate mining plans at different engineering levels.

The reserves study was presented in the report “Basic Engineering Project Gualcamayo Mine QDD Lower” (M1002000) prepared by Metálica Consultores (August 2010).

### 25.2 RECOVERABILITY

#### 25.2.1 QDD Upper

The process plant for the Gualcamayo Project operates with a recoverability of 80%.

#### 25.2.2 AIM

The Amelia Ines and Magdalena Feasibility Study Project was reviewed considering a geometallurgic model prepared by Marco Alfaro, Phd., P.Eng. from Yamana, based on new metallurgic tests, systematic sulphur assays and an updated geological model considering 2009-2010 infill drilling.

The determination of the geometallurgic model for each year of the production plan is based on the established relationship between gold recovery and Sulfur content, a scaled up factor, and the need to blend AIM ore with QDD ore.

The conclusions in terms of recoverability are:

- According to the model, the expected average recovery in heap leaching is 52.7% for Amelia Ines and 44.2% for Magdalena.
- The blending of the QDD Upper and AIM ore is viable.
- The ore percentage from AIM should not exceed 25%.

#### 25.2.3 QDD Lower West Results Analysis

Metálica prepared an exploratory analysis of the results from the Metallurgic recovery estimation only for the blocks classified as Measured, Indicated or Inferred Ore Resources. It can be observed that the variation coefficient shows that the data are more grouped than the samples, an expected effect due to the flattening achieved in the interpolation processes, this is, the data are grouped around the mean values.

In comparative terms with the data used in the estimation, it is observed that the mean grade moves towards the areas with lower recovery values, and that the minimum and maximum value moves right and left, respectively. All these changes are considered as within the expected from the estimation result. The average recovery decreased its values from 70.38% to 67.01%. According to the consultant’s experience, the average recovery of the plan should lie within the mean value +/- the standard deviation.
Table 38 - Estimated Blocks

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
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<tbody>
<tr>
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<td>%</td>
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</tr>
<tr>
<td>Variation Coefficient</td>
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<td></td>
</tr>
<tr>
<td>N° of blocks</td>
<td>35,825</td>
<td>m</td>
</tr>
</tbody>
</table>

Figure 51 shows a histogram prepared for the estimated values; the comparison between this graph and the one presented for the base samples shows that the distribution tendency remains, moving slightly to the left, which again lies within the behaviour expected by the consultant.

According to the study results, it is commented and concluded that:

- The estimated recovery is not classified because the objective in this stage of the study aims only having a spatial characterization of the plant recovery, thus obtaining spatially arranged values which allow increasing the confidence level of the recovered ore, and avoid applying mean values.
- This methodology allows having a recovered ore profile in the mining sequence, which helps raise the confidence level of the ore commitments and the business evaluation.
- The confidence level of the estimations under level 1850 could be classified as limited due to the scarcity of samples used in the estimation.

25.3 MARKETS

The final product of the Gualcamayo Project is gold Dore in form of Bullion, suitable for direct melting and sampling. Gualcamayo’s bullion will contain approximately 80-90% of gold, the balance being base metals. 100% of the bullion production will be exported from Argentina, shipped by ground transportation and air freight for final refining overseas. The Dore will be shipped in the form of bars weighing 15-30 kilograms from San Juan, thru airfreight departing from Mendoza International Airport.
25.4 CONTRACTS

On October 28, 2008, Minas Argentinas S.A. signed a contract with Johnson Matthey Limited for refining and smelting the 100% of the production of the Gualcamayo mine through October 2010. The exportation of the material from QDD upper will commence in the second quarter 2009. Yamana is studying the settlement options to see convenience of selling the material to the refiner or crediting the outcome of the refining process to a metal account for selling it to third parties (bullion dealers). All contracts and procedures of material movement are accordingly to best practices of security, insurance and in compliance with the Argentinean Customs Regulation.

25.5 ENVIRONMENTAL CONSIDERATIONS

In November 1997, the Environmental Impact Report - Exploration Stage according to File N° 520-1051-M-97 was submitted, and approved in June 1998 according to Resolution N° 285-HCM-98, covering three mineralized zones: Quebrada del Diablo (QDD), Amelia Inés (AI) and Magdalena (MG).

Later, a mineralized body located in the subsoil called QDD Lower West was discovered as stated in the Exploration Environmental Impact Report, Fourth Update, from “Gualcamayo Project”.

In December 2006, the corresponding Environmental Impact Report prepared for the Gualcamayo Project Operational Stage File N° 1100-0273-M-06, was submitted to the San Juan Province Mining Secretariat authorities. The report developed by Knight Piésold was submitted in order to comply with the environmental legal framework for mining activities ratified in Law N° 24.585 of Environmental Protection for the Mining Activity, incorporated in the Mining Code as Title Thirteen, Section II, and statutory and additional Regulations.

The Project that was submitted for environmental evaluation through the report refers to the mining operation of a gold mine in QDD area with traditional methods: open pit, primary and secondary crushing, a valley leaching system, and treatment of the leaching solutions in an Adsorption – Desorption – Refining plant (ADR). Through electrolysis, the enriched solution produces a cathodic precipitate that is subjected to casting, yielding Metal Doré bars as final product.

The Environmental Impact Report (EIR/IAA) has been developed in accordance with the requirements from the national, provincial and municipal regulations from Argentine, San Juan and Jáchal, respectively.

The EIR/IAA includes the environmental base line characterization, a Project description, impact description and evaluation, environmental management plan, actions against environmental contingencies, methodology, and consulted regulations. As part of the EIR/IAA studies, a civic participation program, which is described in the EIR/IAA, was carried out.

Minas Argentina S.A. (MASA) received the Environmental Impact Declaration (EID) in August 2007 according to resolution 104-SEM-07. The approval of this report allowed developing the mine for its mining, subject to obtaining the corresponding area permits for installing and executing specific projects.

In August 2009, the First EIR/IAA update of the Gualcamayo Mine mining works was submitted, covering the three mineralized zones, QDD, AI and MG. This report includes updated environmental data during construction and production start up, a description of the mine upon preparing this report, a description and evaluation of environmental impacts, results from the environmental protection actions carried out, environmental management plan, and actions against environmental contingencies.

This Chapter presents the Main Environmental Base Line Conclusions, such as Climatology, Water Bodies, Land, Air Quality, Fauna and Flora, Archaeology, and Summary of the Main Environmental Problems that comprise the Gualcamayo Mine influence area since the approval of the Environmental Impact Report, Construction Stage, Commissioning and Operation up to this date, as well as a Conceptual Closure Plan of the Mine. The other
components were described in Section 2 from the Gualcamayo Project Environmental Impact Report, Operational Stage, and in the First EIR/IAA Update.

25.5.1 Summary of Main Environmental and Social Problems of the Project

The description of impacts summarized here addresses each of the potential changes specified in Annex III of Law N° 24,585, Environmental Protection for the Mining Activity.

25.5.1.1 Impacts on Geomorphology

The impacts that the Project will generate on geomorphology are listed below:
- Alteration of the topography by extraction or filling, specially the pit, waste dumps, and leaching valleys;
- Waste dumps;
- Destabilization of slopes, landslides;
- Sinking, collapse and subsidence outside and inside the work area;
- Increase or modification in flooding risk;
- Modification of overall landscape.

25.5.1.2 Modification of Overall Landscape

Based on the previous points, permanent landscape modifications are anticipated in Gualcamayo Project areas after the installation of large field works such as the QDD waste dump, leaching valleys, QDD pit, AIM pit, and in lesser extent, the underground works from QDDLW Project.

In general terms, the area landscape will be altered by the permanent introduction of anthropogenic elements which will affect the original relief of the terrain.

Notwithstanding the former, the landscape that will be intervened by the Project works is fairly recurrent in this area and lies in other sectors of the Pre Mountain Range.

On the other hand, visual access to all the field works that will alter this component is restricted and limited to the visual basins within which they lie.

25.5.2 Impacts on Water

The Project does not consider use or extraction of surface water that affect Gualcamayo River flow. All the water to be used by the Project operation will be extracted from wells. Currently, MASA is authorized to extract a maximum flow of 45 l/s, which will satisfy the requirements of the operation. Hydrogeological studies carried out so far indicate that the aquifer would have a power output of up to 70 l/s.

25.5.2.1 Modification of Surface Water Courses Quality

The only surface water course in the Project area is Gualcamayo River. The quality of this water course could potentially be modified by the extraction of borrow pit material in the areas defined for such purposes; this effect could mean an increase in the total solids content, even when in natural conditions the river carries a significant
amount of suspended solids. Indeed, the results of base line monitoring conducted up to now show that the total solids content in Gualcamayo River is, on average, 2,000 mg/l in the Project area, with peaks of up to 8,000 mg/l.

25.5.2.2 Modification of Groundwater Quality

Although effects on groundwater have not been predicted, this resource will be exposed to events or risk situations that could potentially affect its quality.

Environmental risks on groundwater which could result from the heap leach development will be reduced through engineering controls, which will include a double membrane installation, a collection system, a solution leakage recovery system and surface water diversion channels. No operational consequences from the leaching heap are expected; however, operational monitoring will be implemented to verify that no impacts are produced.

Furthermore, due to its topographic position, the area where the leaching valley and the projected valley are located lies in the unsaturated area, well above water level (possibly more than 150 m), and is composed by very thick and permeable quaternary material. Due to this fact, the sector lies in an area of low groundwater vulnerability.

Environmental risks on groundwater resources due to accidental chemical or fuel spills will be controlled through the spill prevention plan and control.

25.5.2.3 Aquifer Depression

The water extraction from the well field will not significantly impact groundwater from Gualcamayo River Gully because the maximum 45 l/s extraction for the Project needs will not cause a significant depression in the alluvium.

25.5.2.4 Alteration of Runoffs or Drainage Network

The drainage alteration is localized and confined to the surface runoff diversion through channels and defenses that will be executed in order to protect the fieldworks from that effect.

25.5.2.5 Impact on Water Quality in Function of its Current and Potential Use

The Gualcamayo River water leaves the basin with flow rates close to zero, although they can reach significant volumes during floods. This water, when mixed with Los Piojos River low flow, infiltrates itself near the confluence of both rivers.

The Project base line studies have identified a sector in this course, specifically upstream from the facilities, in Gualcamayo River headwaters, in which users extract water for human consumption, agricultural irrigation and livestock drinking, which will not be impacted by the Project operation.

Furthermore, the Project has been conceived under the “closed circuit” concept, without environmental discharges that could affect the current surface water quality.

Therefore, effects on the potential or actual use of water caused by the Project are not expected.

25.5.3 Impacts on the Atmosphere

The impacts generated by the Project over this component are described below, in detail. The description considers the following aspects:
- Pollution with gases and particles in suspension;
- Sonic pollution.

Considering that the most significant environmental aspect of this Project refers to fugitive emissions of particulate matter, which will be generated mainly in the mine area, the description and evaluation is made in terms of that aspect, specifically their inhalable fraction (PM10).

The gas emissions sources generated by the Project activities are not significant, and therefore are not included in this EIR/IIA analysis.

While the particulate matter emissions will directly affect the air quality of the environment where emission sources are located, these could also affect other environmental components. In fact, the sedimentation of particulate matter on the ground, and their presence in air, could affect components such as water, soil, flora, fauna, and landscape.

Results show that the PM10 emissions effects from the Project will be restricted to the operational area. In the camp sector, the nearest receptor, the effect will be lower and it is expected that the expected PM10 contribution will be less than 3 µg/m^3N. Extreme events averaged over 24 hours, which shall not exceed 25 µg/m^3N, are expected.

The noise generated during the Project operation will spread in the atmosphere, generating an increase in NPS. The types of receptors of interest which will be exposed to NPS increases include people from Huaco and Guandacol locations, and fauna individuals that live in habitats near the mining activities and the operation camp.

Notwithstanding the foregoing, MASA has implemented a monitoring program in the main access route to the Project.

### 25.5.4 Impacts on Ground

In the lands that will be altered directly by the Projects, almost all the soils present low to nil development. The soils are represented by the Entisols and Aridisols orders.

The No Soils and Torriortentes unit, with predominance of rocky outcrops, will be affected mainly by the installation of the QDD and AIM pits, the QDD and AIM waste dumps, the Plant Area with the leaching valleys, and in lesser extent, QDDLW Ore Deposit and other installations. The surface to be intervened covers 636 ha, corresponding to approximately 89% of the totality projected to be intervened.

The soil units indicated in the preceding paragraphs are composed by soils that present low to nil development. They are widely represented in the sector, have no organic horizon, and are not suitable for agriculture or forestry. Therefore, their affectation does not require the implementation of special measures and management actions.

#### 25.5.4.1 Pollution form Spills or Discharges

The operation of the Leaching Valleys and process plant from Gualcamayo Project have been conceived under the concept of “closed circuit” towards the environment; therefore, soil pollution during the operation of these units is not expected. Notwithstanding the former, during the construction and operation phases of the Project, and the closure and post – closure, a low probability exists of having events or situations that imply pollution of the land. The events or situations of this nature identified for the Project are the following:

- Hydrocarbon spills;
- Chemical agent’s spills;
- Accidental spills of process solutions.
25.5.5 Impact on Flora and Fauna

25.5.5.1 Affectation Degree on Flora

Of the 717 ha of land to intervened directly by the Project, approximately 8% will be soils with no vegetation; the remaining 92% presents vegetation associations.

In overall terms, the Project will affect five vegetation units, all of which are zonal. The influence area has no “vegas” (fertile lowlands) that could be affected by the Project.

25.5.5.2 Affectation Degree on Fauna

The environmental base line studies identified four types of habitats, some of which will be affected by the field works and activities from the Project operation. The main effects on habitats are mainly related to the intervention of vegetation communities as a result of field works and activities from the Project operation. Indirectly, noise generation, vehicle traffic and human presence may also affect habitats.

Among the field works and activities that could affect habitats, the following stand out:

- Location of major field works, such as leaching pile and waste dumps;
- Generation of noise and vibrations;
- Process solutions and
- Human presence.

Low probability events could also occur, such as hydrocarbon, chemical reagents or process solutions spills, which could cause adverse effects on habitats. In this regard, Project engineering has considered measures that will help prevent and control eventual spills in the operations area.

25.5.6 Impact on Socio Cultural Field

The impact on the socio-cultural field that will be generated has been identified as determined by Law N° 24.585 of Environmental Protection for the Mining Activity, which establishes the socio-cultural break down in:

- Impact on population;
- Impact on health and education of population;
- Impact on road, building and community assets infrastructure;
- Impact on historic, cultural, archaeological and paleontological heritage;
- Impact on local and regional economy.

The evaluation has been developed emphasizing the impact sources and the nature of subsequent positive or negative changes that they generate, as well as dangerous situations that could affect the population.

25.5.7 Irreversible Impacts from the Activity

Irreversible impacts are understood as those that persist indefinitely over time, because it is not feasible to mitigate or restore them until reaching an equal or similar condition to the original one.
The irreversible impacts from the Project will derive from its nature and the location of its remnant works. The Project aims to mine the ore resources in the ore deposit. In the long term, the mining of these ores is an irreversible impact because the ores are not renewable. Indeed, from the analysis presented in this section it was determined that the irreversible impacts from the Project will be related with the intervention of the QDD and AIM pits, the underground drifts from QDDLW Ore Deposit, the waste dump, and the pile with the remnant ore from leaching. These works will affect the topography and modify the local landscape.

The Projects development will also affect lands that have vegetation associations. However, these present a wide representation at a regional scale of the studied area, so its impact is expected to be significantly lower.

Likewise, the location of the works mentioned, as well as the diversion channels to be constructed in order to handle surface water runoffs, will also cause changes in the local drainage network, which will not affect the flows or the quality of Gualcamayo River.

25.5.8 Conceptual Closure Plan

25.5.8.1 Decommissioning

The closing stages at the end of the operation phase are an integral part of Gualcamayo Project. This conceptual Plan has been developed to outline the overall programs at the Project closure, and contains a conceptual description of the design criteria and activities to be carried out upon completion of the useful Project life.

This conceptual Closure Plan will be consolidated and updated during the operations phase. The regular update of the Closure Plan will consider all new information related with environmental, social and legal conditions in the Project influence area. The final Closure Plan will be elaborated and submitted to the mining authorities two years before the anticipated operations cessation year, through the corresponding update of this EIR for evaluation.

Conceptually, the final closure phase will require implementing activities which allow physical and chemical stability of the site, which include rehabilitation measures and land recontouring. This stage also considers removal, dismantling and demolition of minor structures built at ground level, including process facilities.

If practical, the closure activities will be conducted jointly with the mining tasks. Thus, the concurrent rehabilitation will allow completing some tasks during mine operations, thereby reducing costs and closure times at the end of the Projects, and will allow reviewing and improving the Plan during the Projects life. However, most of the tasks or activities will not be able to start closing until the end of the mine operations.

This is a conceptual Plan, and the final one will be prepared and submitted to the mining authority two years before the closure date of the mine.

25.5.8.2 Closure Plan Objective

The main closure objectives of Gualcamayo Project are the following:

- Achieve regulatory requirements and commitments subscribed by MASA for final Project closure.
- Achieve an abandonment condition of the site that protects the environment and public safety.
- Rehabilitate the areas that are not intervened by permanent Projects field works (for example, process plant, internal roads, crushing plant, camp area, etc.) and if possible, integrate the ones that have been permanently intervened by the Projects, to the landscape.
Limit the need to opt for an active scenario at the abandonment time, that is, achieve a state that minimizes ongoing maintenance or operation of some of the Projects technical components after abandonment time.

### 25.5.8.3 Rehabilitation and Closure of Affected Areas

The following is a conceptual approach to the main criteria and closure activities for Gualcamayo Project, which is described in relation with QDD pit, future AIM, future underground drifts in QDDLW area, waste dumps, leaching valleys, process plant, and auxiliary facilities (infrastructure).

#### QDD and AIM Pits

The closure objectives for QDD and AIM pits from the Project are the following:
- Provide long-term stability and safety;
- Ensure protection of surface water resources.

The final pit slopes will be designed with adequate long-term static safety factor, based on failure/risk consequence criteria.

Furthermore, for greater safety and as part of the physical stability program in the post closure, the bench slopes will be monitored during a sufficiently long period that allows knowing their behavior in the long term. In time, it is expected that the pit walls will erode; creating a slope area that will favor integration with the landscape of the area.

The groundwater static level in the Project area lies below the base of the pit height. The absence of water in the pit will significantly reduce the probability of impacts associated with its physical stability, and provide enough evidence to believe that the pit would remain dry after closure.

Barriers will be installed in order to prevent access and/or transit of people. All the equipment and facilities will be removed from the pit. The transference chute will be filled with compacted rock. Signs will be placed at the entrance of the operation and in key access points in order to warn the public of potential risks.

#### Underground Works

As a long-term safety objective, all the auxiliary equipment and facilities will be removed. Furthermore, all openings will be sealed permanently with concrete.

#### Waste Dumps

Closure objectives for the main waste dump and other smaller areas where smaller amounts of waste are located are the following:
- Provide long-term physical and chemical stability, and
- Ensure protection of surface water resources.

In order to achieve the stability objective in the closure operation, the waste dumps have been designed with a long-term static stability based in failure/risk consequence criteria. The final slopes will be based on this long-term static safety factor.

Furthermore, since the material is practically limestone and highly alkaline, no acid drainages are expected.
25.5.8.4 Leaching Pads

The closure objectives of Leach Pads are the following:
- Provide long-term physical and chemical stability;
- Ensure protection of surface water resources.

The overall closure concepts of the Leach Pads (the current one known as LP North and the future one, LP South) are mainly associated with recirculation of the solution. It must be emphasized that the closure plan will be developed and specified as the Project operation advances, and accurate information about local conditions and facilities is acquired, in order to have a closure plan with definitive measures several years before the actual closure of operations.

The closure activities associated with Leach Pads are the following:
- Chemical stabilization of leaching material from the pad; and
- Leveling and contouring of the Leach Pad to remove benches and roads.

The leach pads will be treated in order to reduce WAD cyanide by washing at the end of the Project useful life in order to achieve 0.50 WAD cyanide milligrams per litre (mg/l) or less for the drainage from the SSS. During washing, the pads washing drainage will be recycled to the pad and evaporated using sprinklers until reaching an adequate quality for discharging it into the environment.

25.5.8.5 Plant Facilities

The plant facilities will be closed and dismantled at conclusion of operations.

The plant closure will include clearing, dismantling, removal and reutilization or final disposal of the facilities. The soil conditions and the concrete slab will be visually evaluated and chemically analyzed if necessary in specific areas, in order to determine if there are areas or components with traces of hazardous inputs that require special handling. Concrete and concrete structures (debris) that are exposed on the surface and do not require special handling will be demolished and used as filling for re-leveling or alternatively, dumped in the waste dumps.

25.5.8.6 Fuel Storage Tanks and Related Infrastructure

The tanks and fuel storage infrastructure will be emptied, rinsed, disassembled and removed from the site. Soil conditions and concrete slab will be visually evaluated and chemically analyzed if necessary in specific areas, in order to determine if there are areas or components with traces of fuel that require special handling. The foundations and concrete structures (debris) that are exposed on the surface and do not require special handling will be demolished and used as filling for re-leveling or alternatively, dumped in the waste dumps.

25.5.8.7 Administration Buildings, Maintenance Workshops, Laboratory and Camp

The buildings and infrastructure related with the Project will be dismantled and removed. Soil and concrete slab conditions will be evaluated, if necessary, in specific areas, visually and with chemical analysis in order to determine if there are areas or components with traces of fuel that require special handling. The foundations and concrete structures (debris) that are exposed on the surface and do not require special handling, will be demolished and used as filling for re–leveling or alternatively, dumped in the waste dumps.
25.5.8.8 Domestic and Industrial Residues Deposit

According to the Residues Management Plan, this type of installations will be closed and re-leveled. Surface infrastructure related to them such as fences, will be removed.

The landfill will be leveled in order to allow the flow of surface water, and covered with a 0.5 thick soil layer. If necessary, a layer with these characteristics will be placed in order to maintain harmony with the area landscape. Before performing leveling tasks, the tailings from the foundation structures demolition may also be deposited in this installation in order to improve the deposit stability against erosion. The fences will be removed and recycled or donated.

25.5.8.9 Water Distribution System

Pumps, tanks, piping and related infrastructure will be buried, dismantled or removed from site for its reuse or final disposal, as appropriate. The wells may be sealed and maintained in order to carry out the monitoring plan.

25.5.8.10 Internal and Access Roads

The use of the access road to the property will be restricted during and after closure. A minimum number of internal access roads will be maintained in order to carry out monitoring and inspections of specific areas in the property. These areas will include the pit, lixiviation pad, surface water monitoring sites, and water wells.

The roads that do not need to be used will be closed in order to control erosion and ensure runoff routing, and create conditions so that a possible integration of the road trace with the landscape can be achieved. Closure measures for internal and access roads include constructing open channels for water diversion, runoff routing, as well as placement of bulk material in specific places to minimize erosion, and re-leveling and scarification activities as necessary.

25.5.8.11 Closure Stage Monitoring

In general, the environmental monitoring program to be implemented during the operation stage will continue during the execution of closure activities. The monitoring plan will be updated as the Project nears the closure stage, adding and/or eliminating elements according to the trends of the environmental conditions. The methodologies, sampling frequencies and locations will be defined in terms of the operations monitoring results. It will also focus on the following:

- Areas previously dedicated to handling or storage of supplies or hazardous waste; a visual assessment of soil and concrete conditions in demolition areas will be made in order to determine if there are areas or components with traces of dangerous input that require special handling.
- Inspections to evaluate the effectiveness of the closure works, in order to control erosion and manage runoffs.

25.5.8.12 Post Closure Monitoring

The objectives of the post closure monitoring program will be:

- Guarantee the overall safety of the remaining facilities;
- Confirm the long-term physical and chemical stability of surfaces, pit, banks, and rehabilitated waste dumps;
- Monitor groundwater levels and surface water flows;
• Evaluate drainage of remnant ore from the leach pad;
• Evaluate compliance of water quality objectives;
• Monitor water quality, vegetation and fauna in the Project influence area, as well as in closure activities areas.
• Control programs and abandonment monitoring will be carried out twice a year during a period of four years after completing the closure.

25.5.8.13 Implementation Schedule

It is expected that the closure actions and measures will continue for two years counted from the end of the operation stage. After that, post closure monitoring operations will continue for four years after the final abandonment.

25.5.8.14 Consolidation and Closure Plan Update

The Closure Plan described in this report is conceptual in nature and will be consolidated and updated during the operations phase. The regular update of the Closure Plan will consider the inclusion of any new information related to environmental, social and legal conditions in the Project influence area.

25.6 TAXES

The following taxes have been taken into account in this schedule according to the model employed and presented in the feasibility study:
• -5% Export duty
• -3% Provincial Royalty (Boca Mina)
• -1.5% Contribution to the Trustee Fund for infrastructural Construction works in Jáchal
• -1% Contractual royalties payable to Golden Arrow
• -0.5% Equity tax payments by MASA
• -35% Income tax.
• -16% Effective rate for Value added tax on purchases
• -1.2% Tax on bank charges and debits
• -1.5% Construction tax in the Municipality of Jáchal

MASA has adopted for itself the benefits established according to law 24196 on Mining Investments, which include fiscal stability, tariffs and would change in 30 years and the use of accelerated depreciation of the resources employed. With effect to consideration for the base model, it was done prior to that of taxes. The calculation of taxes on earnings was done in a separate model, not producing payments due until the year 2013.
25.1 CAPITAL AND OPERATING COST

The calculation of the operating costs in consideration was done based on the latest information on costs forecast for the 2011 to 2013 production plan. These costs were calculated from a zero basis (first principles) with a high degree of details area by area, taking into account the enclosed production plan.

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<td>Loading US$/t</td>
<td>0.12</td>
<td>0.13</td>
<td>0.17</td>
<td>0.17</td>
<td>0.27</td>
</tr>
<tr>
<td>Hauling US$/t</td>
<td>0.20</td>
<td>0.49</td>
<td>0.31</td>
<td>0.31</td>
<td>0.49</td>
</tr>
<tr>
<td>Other US$/t</td>
<td>0.30</td>
<td>0.40</td>
<td>0.45</td>
<td>0.45</td>
<td>0.71</td>
</tr>
<tr>
<td><strong>COST (US$/ton feed)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total US$/t</td>
<td>7.26</td>
<td>7.53</td>
<td>8.21</td>
<td>10.69</td>
<td>16.67</td>
</tr>
<tr>
<td>Mine US$/t</td>
<td>5.10</td>
<td>5.65</td>
<td>5.86</td>
<td>6.24</td>
<td>8.38</td>
</tr>
<tr>
<td>Plant US$/t</td>
<td>2.43</td>
<td>2.35</td>
<td>2.47</td>
<td>2.24</td>
<td>2.63</td>
</tr>
<tr>
<td>Crushing US$/t</td>
<td>0.73</td>
<td>0.84</td>
<td>0.89</td>
<td>0.80</td>
<td>0.94</td>
</tr>
<tr>
<td>Refining US$/t</td>
<td>0.05</td>
<td>0.16</td>
<td>0.16</td>
<td>0.15</td>
<td>0.17</td>
</tr>
<tr>
<td>ADR Plant US$/t</td>
<td>0.30</td>
<td>0.24</td>
<td>0.25</td>
<td>0.23</td>
<td>0.27</td>
</tr>
<tr>
<td>Leaching/Cyanidation US$/t</td>
<td>0.71</td>
<td>0.65</td>
<td>0.69</td>
<td>0.62</td>
<td>0.73</td>
</tr>
<tr>
<td>Other US$/t</td>
<td>0.66</td>
<td>0.46</td>
<td>0.48</td>
<td>0.44</td>
<td>0.52</td>
</tr>
<tr>
<td>Other Cash Costs US$/t</td>
<td>0.84</td>
<td>0.74</td>
<td>0.42</td>
<td>0.40</td>
<td>0.47</td>
</tr>
<tr>
<td>Business Unit G&amp;A US$/t</td>
<td>0.59</td>
<td>0.67</td>
<td>0.58</td>
<td>0.60</td>
<td>0.53</td>
</tr>
</tbody>
</table>

The above were based on the following main assumptions:
### Table 40 – Assumptions

<table>
<thead>
<tr>
<th>SUPPLIES - UNITARY COST</th>
<th>USD per unit</th>
<th>LOM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Production Materials</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas Oil/Diesel Oil</td>
<td>$/l</td>
<td>0.85</td>
</tr>
<tr>
<td>Petrol</td>
<td>$/l</td>
<td>1</td>
</tr>
<tr>
<td>Cyanide</td>
<td>$/t/Kg</td>
<td>2.25</td>
</tr>
<tr>
<td>Lime</td>
<td>$/Kg</td>
<td>0.025</td>
</tr>
<tr>
<td>Antiescalant</td>
<td>$/Kg</td>
<td>2.17</td>
</tr>
<tr>
<td>Clorhydric acid</td>
<td>$/Kg</td>
<td>0.023</td>
</tr>
<tr>
<td>Fundente</td>
<td>$/Kg</td>
<td>3.425</td>
</tr>
<tr>
<td>Activated charcoal</td>
<td>$/Kg</td>
<td>2.01</td>
</tr>
<tr>
<td><strong>Drilling materials</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bit (4&quot;)</td>
<td>$/un.</td>
<td>378.58</td>
</tr>
<tr>
<td>Bit (5&quot;)</td>
<td>$/un.</td>
<td>485.74</td>
</tr>
<tr>
<td>Extension bar T-45</td>
<td>$/un.</td>
<td>531.89</td>
</tr>
<tr>
<td>Extension bar Gt-60</td>
<td>$/un.</td>
<td>1039.00</td>
</tr>
<tr>
<td>Starter Bar - Ranger</td>
<td>$/un.</td>
<td>504.64</td>
</tr>
<tr>
<td>Starter Bar - Pantera</td>
<td>$/un.</td>
<td>313.29</td>
</tr>
<tr>
<td>Hastes (Sandvik)</td>
<td>$/un.</td>
<td>7.5</td>
</tr>
<tr>
<td><strong>Explosives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fortan Mex 40/60</td>
<td>$/kg</td>
<td>0.53</td>
</tr>
<tr>
<td>Anfo 25 kg</td>
<td>$/kg</td>
<td>0.83</td>
</tr>
<tr>
<td>Emulsion Matriz</td>
<td>$/kg</td>
<td>0.56</td>
</tr>
<tr>
<td>Booster 225g</td>
<td>$/un.</td>
<td>2.26</td>
</tr>
<tr>
<td>Booster 450g</td>
<td>$/un.</td>
<td>3.65</td>
</tr>
<tr>
<td>Cordon 5/10</td>
<td>$/m</td>
<td>0.21</td>
</tr>
<tr>
<td>Detonator Num 8</td>
<td>$/un.</td>
<td>0.24</td>
</tr>
<tr>
<td>Exel MS</td>
<td>$/un.</td>
<td>2.88</td>
</tr>
<tr>
<td>Exel conector</td>
<td>$/un.</td>
<td>2.66</td>
</tr>
<tr>
<td>Exel TD</td>
<td>$/un.</td>
<td>3.08</td>
</tr>
<tr>
<td>Exel TD Iniciacion 1000m</td>
<td>$/un.</td>
<td>85,109499031</td>
</tr>
<tr>
<td>Exel TD Iniciacion 200m</td>
<td>$/un.</td>
<td>31,91309566</td>
</tr>
<tr>
<td>Exel TD Iniciacion 500m</td>
<td>$/un.</td>
<td>47,86454066</td>
</tr>
<tr>
<td>Fortan Mex 40/60</td>
<td>$/kg</td>
<td>0.5366</td>
</tr>
<tr>
<td>I-KON 30m</td>
<td>$/un.</td>
<td>28,2696754</td>
</tr>
<tr>
<td>Safety detonator</td>
<td>$/m</td>
<td>0.214318839</td>
</tr>
<tr>
<td>Senatel Magnafrac</td>
<td>$/un.</td>
<td>2.28</td>
</tr>
<tr>
<td>Senatel Power Split 40 mm</td>
<td>$/un.</td>
<td>3.22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exchange rate</td>
<td>4</td>
<td>4.5</td>
<td>4.7</td>
</tr>
<tr>
<td>Inflation</td>
<td>25%</td>
<td>15%</td>
<td>15%</td>
</tr>
</tbody>
</table>
The production costs being considered, may be broken down approximately by 40% fixed costs and 60% variable costs, with a 45% share of the costs in the national currency and 55% of the costs exposed in US dollars.

## 25.2 ECONOMIC ANALYSIS

The economic analysis showing the Cash Flow for the Gualcamayo Project is presented below.

### 25.2.1 Table 41 – Gualcamayo Cash Flow

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Management incentive</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Royalties</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Total Net Revenue (Gross Sales)</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
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<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
</tr>
<tr>
<td>Total Net Revenue (Before Royalties)</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
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<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
</tr>
<tr>
<td>Gold Reserve</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Total Gross Margin</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
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<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
</tr>
<tr>
<td>EBITDA</td>
<td>900,048</td>
<td>900,048</td>
<td>900,048</td>
<td>900,048</td>
<td>900,048</td>
<td>900,048</td>
<td>900,048</td>
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<td>900,048</td>
<td>900,048</td>
<td>900,048</td>
</tr>
<tr>
<td>EBITDA</td>
<td>900,048</td>
<td>900,048</td>
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<td>900,048</td>
<td>900,048</td>
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<td>900,048</td>
<td>900,048</td>
<td>900,048</td>
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</tr>
</tbody>
</table>

### 25.2.2 Income Statement

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold Royalty</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Total Gross Margin</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
<td>1,939,301</td>
</tr>
<tr>
<td>EBITDA</td>
<td>900,048</td>
<td>900,048</td>
<td>900,048</td>
<td>900,048</td>
<td>900,048</td>
<td>900,048</td>
<td>900,048</td>
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<td>900,048</td>
<td>900,048</td>
<td>900,048</td>
<td>900,048</td>
<td>900,048</td>
</tr>
</tbody>
</table>

### 25.2.3 Balance Sheet

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold Production koz</td>
<td>1,693</td>
<td>1,892</td>
<td>1,892</td>
<td>1,892</td>
<td>1,892</td>
<td>1,892</td>
<td>1,892</td>
<td>1,892</td>
<td>1,892</td>
<td>1,892</td>
<td>1,892</td>
<td>1,892</td>
<td>1,892</td>
</tr>
</tbody>
</table>
The same shows only marginal investments from the year 2011, leaving the initial investment as a sunk cost and irrelevant for the purpose of calculating the Project economic parameters.

The main expenditures summary in the economic model point to the following numbers.

### Table 42 – NPV

<table>
<thead>
<tr>
<th>NPV@ %</th>
<th>Rate of discount</th>
<th>Net present value</th>
</tr>
</thead>
<tbody>
<tr>
<td>@0%</td>
<td>0,00%</td>
<td>$751.776,20</td>
</tr>
<tr>
<td>@5%</td>
<td>5,00%</td>
<td>$583.453,82</td>
</tr>
<tr>
<td>@7.5%</td>
<td>7,50%</td>
<td>$518.250,01</td>
</tr>
<tr>
<td>@10%</td>
<td>10,00%</td>
<td>$462.677,27</td>
</tr>
<tr>
<td>IRR %</td>
<td>531521%</td>
<td>$0.00</td>
</tr>
</tbody>
</table>

### Table 43 - Sensibility Analysis

<table>
<thead>
<tr>
<th>Price increase 30</th>
<th>NPV @ 10%</th>
<th>Undiscounted cash flow</th>
<th>IRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>$763.905,43</td>
<td>$1.203.537,84</td>
<td>2069434%</td>
<td></td>
</tr>
<tr>
<td>Price increase 15</td>
<td>$602.475,01</td>
<td>$961.903,15</td>
<td>1300413%</td>
</tr>
<tr>
<td>Price at base case</td>
<td>$441.044,58</td>
<td>$720.268,45</td>
<td>531521%</td>
</tr>
<tr>
<td>Price decrease 15</td>
<td>$279.614,16</td>
<td>$478.633,76</td>
<td>458%</td>
</tr>
<tr>
<td>Price decrease 30</td>
<td>$118.183,74</td>
<td>$236.999,06</td>
<td>50%</td>
</tr>
</tbody>
</table>

Analysis of subsceptibility to price variation, operating and capital costs, were done resulting in a model that is more sensitive to prioritizations: price, capital and cost variations.

### 25.3 PAYBACK

By not taking into account the investment sunk costs, the recovery of the capital investment takes an estimated period of 3.5 years, while the same recovery would take up to 5.5 years by taking into account the sunk costs.
25.4 MINE LIFE

The estimated mine life for all mines combined is 10 years.
26. ILLUSTRATIONS

All necessary illustrations were included in the report.