



Client: Endomines

**Pampalo Mine
Feasibility Study**

Prepared by:

Wardell Armstrong International Limited

February 2008

Ref: 61-0375


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PAMPALO MINE FEASIBILITY STUDY

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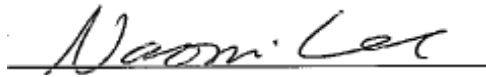
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EXECUTIVE SUMMARY

Introduction

Wardell Armstrong International (WAI) has been commissioned by Endomines AB to provide a Feasibility Study for the Pampalo Gold Deposit located in eastern Finland. The Pampalo deposit is located close to the border with the Russian Federation approximately 430km northeast of Helsinki.

Location and Geology

The Pampalo deposit is situated at 62.9° North and 31.3° East, in the region of North Karelia, far eastern Finland. The deposit is 430km northeast of Helsinki and 100km northeast of the city of Joensuu close to the border with the Russian Federation.

Topography is generally undulating with low hills and lakes; the majority of land in the region is typically forested. Snow covers the ground between November and April, with temperatures ranging from -10°C to +20°C from winter to summer.

The Pampalo deposit is situated in the Hattu Schist Belt, part of the Ilomantsi greenstone belt, which occupies the south western margin of the Karelian craton. The Hattu Schist Belt comprises four formations: Sivakkojoki, Hosko, Tiittalanvaara, and Pampalo. The predominant lithologies of the belt are felsic volcanoclastics, mica schists and greywackes.

Mineralisation at Pampalo was discovered in 1990 by the Geological Survey of Finland. The deposit was then explored further by Outokumpu in 1995, who carried out exploration drilling followed by test mining, both in an open pit and underground between 1996 and 1998, when an underground ramp was completed to 275m below surface. Endomines Oy acquired the project in September 2006.

The Pampalo deposit is a structurally controlled shear hosted gold deposit. The host lithology is a strongly sheared and altered mafic tuff. Footwall lithologies include an iron formation along with mafic tuffs and talc-chlorite ultramafics form the hangingwall. Mineralisation is typically associated with scheelite and disseminated pyrite within the host rock.

Numerous gold occurrences have been identified along the Hattu Schist Belt with seven showing good prospectivity. These include the Rämepuro, Pampalo East, Muurinsuo, Kuittila and Hosko deposits that are currently subject to further drilling programmes by Endomines Oy to better delineate mineralisation.

Resources and Ore Reserves

Geological modelling of the Pampalo mineralisation identified three sub-vertical ore shoots striking northeast-southwest and plunging approximately 40° to the northeast. Zones of mineralisation were defined using a 1g/t Au cut-off grade.

The resulting model estimated 957kt of *Measured* and *Indicated* resources at 5.2g/t Au in accordance with the JORC Code (2004).

A summary of resources defined by WAI is given in the table below:

| WAI Estimate of Pampalo Resources (WAI 2007) in accordance with JORC (2004) | | | | | | | | |
|--|-----------------------------|-----------------------|----------------------|----------------------|---------------------|-----------------------|----------------------|----------------------|
| Lode | Measured | | | | Indicated | | | |
| | Tonnage (kt) | Grade Au (g/t) | Au Metal (kg) | Au Metal (oz) | Tonnage (kt) | Grade Au (g/t) | Au Metal (kg) | Au Metal (oz) |
| South | 83 | 8.5 | 706 | 21,959 | 72 | 8.7 | 626 | 19,471 |
| Central | 150 | 7.1 | 1065 | 33,125 | 193 | 4.0 | 772 | 24,012 |
| North | | | | | 437 | 3.9 | 1,704 | 53,000 |
| Other | | | | | | | | |
| Surface Stockpile | | | | | 22 | 4.0 | 88 | 2,737 |
| Total | 233 | 7.6 | 1771 | 55,084 | 724 | 4.4 | 3,190 | 99,220 |
| Lode | Measured + Indicated | | | | Inferred | | | |
| | Tonnage (kt) | Grade Au (g/t) | Au Metal (kg) | Au Metal (oz) | Tonnage (kt) | Grade Au (g/t) | Au Metal (kg) | Au Metal (oz) |
| South | 155 | 8.6 | 1,332 | 41,430 | 36 | 6.5 | 234 | 7,278 |
| Central | 343 | 5.4 | 1,837 | 57,137 | 86 | 6.8 | 585 | 18,196 |
| North | 437 | 3.9 | 1,704 | 53,000 | 12 | 17.0 | 204 | 6,345 |
| Other | | | | | 26 | 4.1 | 107 | 3,328 |
| Surface Stockpile | 22 | 4.0 | 88 | 2,737 | | | | |
| Total | 957 | 5.2 | 4,961 | 154,304 | 160 | 7.1 | 1,130 | 35,147 |

A stockpile at the deposit, left from previous mining activity is estimated to be approximately 22kt at 4g/t Au. This stockpile at present could only be classified as *Indicated* resources due to the lack of any measured bulk density figure for the ore.

The mineralisation defined during geological modelling is considered by WAI to be open down plunge, and it is conceivable that mineralisation continues along the same trend. This, however, is unconstrained and further drilling is required to delineate any continuation of the mineralisation down plunge.

A total conceptual resource of 2.0Mt (although not in accordance with JORC (2004)), has been modelled, based on deep drill hole intersections which indicate that the mineralisation continues at depth. At present insufficient information exists to classify this resource. There

are also additional resources in nearby satellite deposits, which although are prospective targets, have not been used in this calculation.

The Life of Mine calculations include an allowance of €1.05M for additional exploration expenditure to test the *Inferred* resource and Exploration Targets in order that additional *Indicated* or better resources can be delineated, so that they can be included in future financial analysis. These have not been included as part of the financial analysis within this report.

The WAI new model was based on the previous resource model which utilised a 2g/t Au cut-off grade produced by Resource Evaluations Pty Ltd for Polar Mining Oy in 2004. The new WAI model used a lower 1g/t cut-off grade to define mineralised envelopes. The remodelling exercise used the previous model wireframes as a guide; these were then adjusted and redefined according to the 1g/t cut-off.

| Summary of Top Cut Values applied to each Lode | | |
|---|----------------------------|---------------------------|
| Lode | Top Cut Value (g/t) | No. of Samples Cut |
| 1 | 80 | 14 |
| 2 | 60 | 29 |
| 3 | 21 | 9 |
| 0 | 40 | 0 |

Specific gravity used in this resource model is 2.7t/m³ the same as that used by Resource Evaluations Pty Ltd. WAI has assumed this is reasonable, however no checks have been made on this value and would recommend that future determinations are undertaken on drill core in order to validate its value.

Mining

The geometry of the orebody, the weak nature of the hangingwall contact, along with the grade of the deposit dictated the selection of the mining method. A modified Avoca mining method has been adopted to minimise the extent of the hangingwall exposure during mining operations. The grade of the deposit prevents the use of higher cost cut-and-fill mining methods, which require cemented fill.

The modified Avoca method allows simultaneous mining and filling of the stopes to minimise the span of the hangingwall exposed, reducing the potential for hangingwall instability and dilution. The Avoca method lends itself to trackless mechanised mining, with in-stope development, production drilling, mucking and backfill of stopes all being isolated mining activities.

Based on the WAI Mineral Resource, Mining Reserves have been estimated in accordance with JORC Code (2004). The mining reserves are the ore tonnes available for mining, once mining width dilution and ore recovery factors have been taken into consideration. The WAI estimates for Pampalo Mineral Reserves (by ore body) are given in the table below.

The combined total of *Proven* and *Probable* reserves is 723,818t at a grade of 4.65g/t Au containing 3,363kg (108,115oz) of gold. Of the total ore reserves 64.5% are *probable* and 35.5% are *proven*.

| Ore Reserves for Pampalo by Orebody (WAI 2007) in accordance with JORC Code (2004) | | | | | | | | | | | | |
|--|----------------|-------------|-----------------|-----------------|----------------|-------------|----------------|-----------------|--------|--------|-------|-------|
| OREBODY | PROVEN | | | | | | PROBABLE | | | | | |
| | Tonnes | Au g/t | Au kg | Au oz | Tonnes | Au g/t | Au kg | Au oz | Tonnes | Au g/t | Au kg | Au oz |
| OB1 | 49,676 | 6.55 | 325.5 | 10,464.6 | 40,988 | 7.31 | 229.8 | 9,638.0 | | | | |
| OB2 | 16,487 | 4.24 | 69.8 | 2,245.1 | 0 | 0.00 | 0.0 | 0.0 | | | | |
| OB3 | 52,282 | 8.95 | 468.1 | 15,049.8 | 34,386 | 2.92 | 100.4 | 3,226.8 | | | | |
| OB4 | 0 | 0.00 | 0.0 | 0.0 | 46,762 | 3.44 | 160.8 | 5,170.1 | | | | |
| OB5 | 13,955 | 4.09 | 57.1 | 1,835.8 | 30,833 | 2.78 | 85.6 | 2,752.9 | | | | |
| OB6 | 0 | 0.00 | 0.0 | 0.0 | 45,866 | 3.28 | 150.3 | 4,833.7 | | | | |
| OB7 | 0 | 0.00 | 0.0 | 0.0 | 63,512 | 3.86 | 245.0 | 7,876.6 | | | | |
| OB8 | 0 | 0.00 | 0.0 | 0.0 | 18,787 | 3.59 | 67.4 | 2,168.3 | | | | |
| OB9 | 0 | 0.00 | 0.0 | 0.0 | 33,403 | 4.69 | 156.6 | 5,034.9 | | | | |
| OB10 | 0 | 0.00 | 0.0 | 0.0 | 23,800 | 3.69 | 87.9 | 2,825.0 | | | | |
| OB11 | 0 | 0.00 | 0.0 | 0.0 | 0 | 0.00 | 0.0 | 0.0 | | | | |
| OB12 | 0 | 0.00 | 0.0 | 0.0 | 17,241 | 2.72 | 46.9 | 1,508.9 | | | | |
| OB13 | 0 | 0.00 | 0.0 | 0.0 | 0 | 0.00 | 0.0 | 0.0 | | | | |
| OB14 | 0 | 0.00 | 0.0 | 0.0 | 0 | 0.00 | 0.0 | 0.0 | | | | |
| OB15 | 0 | 0.00 | 0.0 | 0.0 | 0 | 0.00 | 0.0 | 0.0 | | | | |
| OB16 | 0 | 0.00 | 0.0 | 0.0 | 5,674 | 3.37 | 19.1 | 615.1 | | | | |
| OB17 | 0 | 0.00 | 0.0 | 0.0 | 0 | 0.00 | 0.0 | 0.0 | | | | |
| Stripping | 0 | 0.00 | 0.0 | 0.0 | 69,273 | 4.29 | 297.2 | 9,554.5 | | | | |
| Development Ore | 47,907 | 5.73 | 274.5 | 8,825.9 | 112,984 | 3.99 | 450.7 | 14,488.7 | | | | |
| TOTAL | 180,308 | 6.63 | 1,195.00 | 38,421.2 | 543,510 | 3.99 | 2,167.7 | 69,693.6 | | | | |

Process Metallurgy

Laboratory test work on samples with head grades of 8g/t and over have produced recoveries of 92%. Pilot plant runs and plant trials on oxidized ore have failed to match this, achieving recoveries of 80-82%. Plant trials on non oxidized ore have achieved better results; in the plant trial at Vammala in 1998, the average recovery over the period of the trial was 91.9% but in December the recoveries exceeded 94%. With a recovery of 88.2% in the plant trials at Pyhasalmi in 1999, these recovery levels were not repeated, but the cause of the poorer results at Pyhasalmi has been attributed to use of modified flotation and grinding equipment not ideally suited for application.

A pilot plant campaign carried out in 1998 on a 373t parcel of talc-rich ore assaying 38.8g/t only managed to recover 90% using a circuit employing gravity concentration and flotation. This was a very poor result from such a rich sample and gives rise to concern since the recent mine plan developed by WAI will mean that the ore to the plant feed will contain 20% dilution talc rock.

It is not known how the resultant plant feed will compare in terms of talc content with the pilot plant ore referred to above but the presence of talc is likely to decrease recovery. The plant feed will only be 4.65g/t Au (only a little higher than the grade of the “marginal” material stockpiled for use at plant start up) and there is ample evidence that a tailings grade will not be less than 0.5g/t Au, so a likely recovery will be 85-88%.

Plant Design Concepts

The process selected will use single stage crushing followed by a SABC (SAG/Ball/Cone Crusher) milling circuit. Two products will be obtained, a high grade gravity concentrate for sale to a precious metal refinery and a flotation concentrate with a grade of about 140g/t to be sold to a smelter.

Plant Services

The site currently has an existing telephone line, electricity line and raw water available. The existing telephone line and water reservoir is adequate for the demands of the proposed gold plant, however additional electricity will be required. The design comprises upgrading the existing 50km of 20kV overhead line to 30kV.

General Infrastructure

There is an existing building on site which is sufficient for some office space, storage and temporary ablution block if required. However, the long term use of this building has not been utilized in this study.

The main infrastructure comprises a 30m x 60m structural steel building which will house the majority of the plant infrastructure. The building will be insulated and heated by a wood pellet fired furnace located adjacent the workshop. The building includes an office block, laboratory, ablution block, lunch room, workshop, central control room and all associated process equipment.

The primary crusher is located in a shed at the Run-of-Mine Stockpile, approximately 150m south of the main building.

Environmental and Socio-Economic

An extension of the Environmental permit originally granted to Outokumpu Mining Oy has been applied for by Endomines Oy. The granting of the permit is progressing normally and has passed through the public hearing stage and the issuing of the permit by the Eastern Finland Permit Authority is expected soon. Endomines hold the water extraction permit for the Pampalo Mine.

Design for Closure

Mine closure planning started during the environmental permitting stage, with preliminary closure and rehabilitation plans being included in the environmental permit application. The permit defines the rehabilitation process, the removal of equipment, fuel and explosives and hazardous substances, rehabilitation of tailings, rock dumps, the open pit and the removal of structures. A further more detailed submission of the closure plan will be required later in the life of the mine.

Sales of Products

The mining operation would produce two concentration streams, the flotation concentrate (150ppm) and a gravity concentrate. The flotation concentrate will be transported to a copper refinery for treatment and refining.

Capital Costs

The mine capital costs are for site infrastructure such as fans and electrical reticulation for the mine. Development of the access ramp, stope access and drill drives along with

ventilation raises and ore passes have been capitalised as distinct from the stope operating costs. Total mine capital is €8.0M.

Mineral process capital costs include an upgraded high voltage electrical power line; the overall total is €12.22M.

Financial Analysis

The financial analysis was undertaken using the following parameters;

- Gold price per ounce for years 1, 2, 3, 4 of €527, €558, €586 and €613, respectively (Scenario 1);
- Total capital investment is €21.2M;
- Operating costs are €15.97/t mining and €12.88/t processing;
- A discount rate of 10% has been applied; and
- The cost of mine site rehabilitation is estimated at €1.03M inclusive of aftercare and monitoring for a period of five years post closure.

The Base Case projections using the COMEX forward gold price curve, indicates a total Free Cash Flow of €18M over a 4 year production time and EBITDA is €31.1M. The NPV result, with the discount rate of 10%, is €10.6M.

These figures are summarised in the table below:

| Summary of EBITDA Results for Base Case Scenario 1 | | | | | |
|---|----------|----------|----------|----------|----------|
| Project Year | 0 | 1 | 2 | 3 | 4 |
| EBITDA (€ ,000) | -958 | 9,767 | 7,835 | 6,989 | 6,491 |
| EBITDA Margin | | 65% | 61% | 56% | 54% |
| Discounted Cash Flow (€ ,000) | -10,691 | 2,470 | 4,778 | 3,651 | 10,645 |

Economy

The economic situation for the projects looks promising. The grade and the ore reserves give a positive result with the calculated investment. The revenue and EBITDA are showing the positive result of the first four years of operation, which will not be the real outcome, for possible mine life operations, but gives a good picture of the financial capability.

Total conceptual resource of 2.015Mt has been modelled and there are additional resources in nearby satellite deposits, which are confirmed to mineral resources.

Our recommendation is to intensify the preparations for the project as well as continue the drilling to verify the ore resources and to further increase it.