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**KJ Mining  
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# **FINANCIAL EVALUATION OF LAIVA GOLD MINE - FINLAND**

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# **Financial Evaluation of Laiva Gold Mine - Finland**

## **INTRODUCTION**

KJ Mining Consulting Ltd (KJMC) has prepared a scoping level technical economic model (TEM) for the Laiva Gold Mine, Finland incorporating the use of ore sorting technology at the request of Nordic Mines AB (Nordic or the Client) the operator of Laiva Gold Mine. KJMC has based the TEM on production, operating cost and capital cost data provided by the Client and SRK Consulting (UK) Limited (SRK) a technical advisor to the Client.

It is noted the technical viability of ore sorting is outside the expertise of KJMC and therefore no assurance is provided by KJMC that the ore sorting is technically feasible. KJMC has based and places reliance on the ore sorting performance on technical parameters provided by the Client.

The TEM has been based on the 7 year Life of Mine (LoM) production schedule as prepared by SRK. The LoM mining plan reflects 24.2Mt of ore being extracted as feed to the ore sorter at 0.95 g/t Au containing 741 koz gold. Ore sorting results in a reduction of feed to the CIP processing plant to an overall 13.3Mt however upgraded to 1.42 g/t Au containing 608 koz gold. Overall final gold production after processing amounts to 529 koz over the LoM.

KJMC notes that this study is preliminary in nature and that it includes Inferred Resources in the mining schedule. Inferred Resources are generally considered too speculative geologically to have economic considerations applied to them that would enable them to be categorised as Mineral Reserves, and there is no certainty that they will be realised. This assessment is undertaken to reflect the potential viability of the Mineral Resources using ore sorting technology. This assessment does not support the reporting of Ore Reserves.

KJMC has prepared a base case TEM based on the SRK mine plan including Indicated and Inferred Resources. A second case has been assessed excluding the Inferred Resources, and treating these resources as waste in the mine plan.

## **KEY ASSUMPTIONS**

The following general assumptions have been applied to the evaluation:

- All costs and revenues are January 2016 real terms;
- An exchange rate of 0.884 Euro/US Dollar;
- A range of discount rates has been presented for the determination of NPV;
- A long term gold price of USD1,250/oz gold;
- Restart capital is expensed in 2016;
- Production commences in 2017.

## *Production*

The base case 7 year LoM plan prepared by SRK includes Indicated Resources (18.8Mt @ 0.95 g/t) and Inferred Resources (5.4Mt @ 0.94 g/t). The LoM plan targets 3.64Mtpa for 6 years and 0.2.3Mt in year 7. KJMC has assessed the impact of the Inferred Resources in a second where these resources are considered as waste.

Figure 1 Mined Ore Tonnage



### Capital Cost

KJMC has based the capital costs on estimates provided by the Client. Total sustaining capital amounts to EUR30.1M with total restart capital amounting to EUR22.7M. KJMC has applied a standard scoping level contingency of 35% to the capital estimates.

Table 1 Capital Costs

Capital Costs		
<b>Total Sustaining Capital</b>	<b>(EURM)</b>	<b>30.1</b>
Earth Removal	(EURM)	4.9
High Grade Ponds	(EURM)	3.2
Paste Area Expansion	(EURM)	1.4
Sulphide Waste Bottom Construction	(EURM)	4.2
Miscellaneous	(EURM)	7.0
Replace Water Pipeline	(EURM)	0.6
Archaeology	(EURM)	0.9
Contingency	(EURM)	7.8
<b>Total Restart Capital</b>	<b>(EURM)</b>	<b>22.7</b>
Ore Sorting Facility	(EURM)	14.0
Pre Stripping	(EURM)	1.3
Mill Refurbishment	(EURM)	1.2
Paste Area	(EURM)	0.2
Laboratory and Grade Control	(EURM)	0.2
Contingency	(EURM)	5.9

### Operating Costs

Operating costs are based on the costs used by SRK in undertaking the mining optimisation study.

Table 2 Operating Costs

<b>Unit Operating Costs</b>		
Mining Cost	(EUR/t Mined)	2.56
Crusher Feed	(EUR/t RoM)	0.70
Crushing	(EUR/t RoM)	1.50
Ore Sorting	(EUR/t Sorted)	0.52
Rehandle Reject	(EUR/t Reject)	0.30
CIP Processing	(EUR/t CIP Feed)	12.04
G&A	(EUR/t RoM)	0.71
Selling Cost	(EUR/t RoM)	0.14
<b>Total Operating Costs</b>	<b>(EUR/t RoM)</b>	<b>17.21</b>

### *General*

Reclamation costs have been included and have been based on the reclamation costs in the “Nordic Mines Updated Financial Model to Lenders 20150123”. These amount to EUR11.7M with the majority of expenditure occurring following mine closure.

Tax has been included based on the tax rate in the “Nordic Mines Updated Financial Model to Lenders 20150123” of 24.5%. An opening tax loss of EUR95.7M has been assumed as per the “Nordic Mines Updated Financial Model to Lenders 20150123” however as this was a 2015 estimate it is likely that this may now be higher. The TEM reflects small levels of tax being paid in year 7 of the LoM plan. Any increase in the opening tax loss will reduce tax payable.

Tax depreciation for mining capital has been determined based on 10% per annum on the reducing balance of mining capital. Tax depreciation for processing/general has been determined based on units of production. This is in line with the approach used in the “Nordic Mines Updated Financial Model to Lenders 20150123”.

Reclamation costs have been treated as capital however it is assumed these are directly depreciated in the year of expenditure for tax purposes.

### **CASH FLOW MODEL**

The base case TEM and cash flow is presented in the following table.

Table 3 Laiva Gold Mine Base Case Cash Flow Model

	Total	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
<b>Mining</b>											
Ore Tonnes (kt)	24,166	0	3,640	3,640	3,640	3,640	3,640	3,640	2,326	0	0
Waste Tonnes (kt)	41,827	0	4,952	2,796	7,880	3,112	14,572	6,535	1,980	0	0
Total Tonnes Moved (kt)	65,993	0	8,592	6,436	11,520	6,752	18,212	10,175	4,307	0	0
Stripping Ratio (tw :to)	1.73	0.00	1.36	0.77	2.16	0.85	4.00	1.80	0.85	0.00	0.00
Ore Grade (g/t)	0.95	0.00	1.04	1.00	0.78	1.06	0.64	0.84	1.52	0.00	0.00
<b>Processing CIP</b>											
Fines <25mm (kt)	3,142	0	473	473	473	473	473	473	302	0	0
Coarse >150mm (Grinding Media) (kt)	1,329	0	200	200	200	200	200	200	128	0	0
Sorted Ore (kt)	8,792	0	1,324	1,324	1,324	1,324	1,324	1,324	846	0	0
Total Mill Feed (kt)	13,263	0	1,998	1,998	1,998	1,998	1,998	1,998	1,277	0	0
Fines Grade (g/t)	1.05	0.00	1.14	1.10	0.86	1.17	0.70	0.93	1.67	0.00	0.00
Coarse Grade (g/t)	0.95	0.00	1.04	1.00	0.78	1.06	0.64	0.84	1.52	0.00	0.00
Sorted Ore Grade (g/t)	1.63	0.00	1.77	1.71	1.34	1.81	1.09	1.44	2.60	0.00	0.00
Mill Feed Grade (g/t)	1.42	0.00	1.55	1.49	1.17	1.59	0.95	1.26	2.27	0.00	0.00
Mill Feed Content (koz)	608	0.0	99.3	96.0	75.2	101.8	61.2	80.8	93.3	0.0	0.0
CIP Recovery (%)	87%	0%	87%	87%	87%	87%	87%	87%	87%	87%	87%
Gold Produced (koz)	529	0.0	86.4	83.5	65.4	88.6	53.2	70.3	81.2	0.0	0.0
<b>Revenue</b>											
Gold Price (EUR/oz)	1,105	1,105	1,105	1,105	1,105	1,105	1,105	1,105	1,105	1,105	1,105
<b>Gold Revenue (EURM)</b>	<b>584.3</b>	<b>0.0</b>	<b>95.5</b>	<b>92.3</b>	<b>72.3</b>	<b>97.9</b>	<b>58.8</b>	<b>77.7</b>	<b>89.8</b>	<b>0.0</b>	<b>0.0</b>
<b>Operating Costs</b>											
Mining Cost (EURM)	169.1	0.0	22.0	16.5	29.5	17.3	46.7	26.1	11.0	0.0	0.0
Crusher Feed (EURM)	16.9	0.0	2.5	2.5	2.5	2.5	2.5	2.5	1.6	0.0	0.0
Crushing (EURM)	36.2	0.0	5.5	5.5	5.5	5.5	5.5	5.5	3.5	0.0	0.0
Ore Sorting (EURM)	10.2	0.0	1.5	1.5	1.5	1.5	1.5	1.5	1.0	0.0	0.0
Rehandle Reject (EURM)	3.3	0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.0	0.0
CIP Processing (EURM)	159.7	0.0	24.1	24.1	24.1	24.1	24.1	24.1	15.4	0.0	0.0
G&A (EURM)	17.1	0.0	2.4	2.4	2.4	2.4	2.4	2.4	2.4	0.0	0.0
Selling Cost (EURM)	3.5	0.0	0.6	0.6	0.4	0.6	0.4	0.5	0.5	0.0	0.0
<b>Total Operating Costs (EURM)</b>	<b>416.0</b>	<b>0.0</b>	<b>59.1</b>	<b>53.6</b>	<b>66.5</b>	<b>54.4</b>	<b>83.5</b>	<b>63.1</b>	<b>35.8</b>	<b>0.0</b>	<b>0.0</b>
<b>Sustaining Capital Costs</b>											
<b>Total Sustaining Capital (EURM)</b>	<b>30.1</b>	<b>0.0</b>	<b>5.6</b>	<b>5.1</b>	<b>5.6</b>	<b>3.5</b>	<b>3.5</b>	<b>3.5</b>	<b>3.5</b>	<b>0.0</b>	<b>0.0</b>
<b>Restart Capital Costs</b>											
<b>Total Restart Capital (EURM)</b>	<b>22.7</b>	<b>22.7</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>Reclamation Costs</b>											
<b>Reclamation costs (EURM)</b>	<b>11.7</b>	<b>0.0</b>	<b>0.0</b>	<b>0.5</b>	<b>0.7</b>	<b>0.6</b>	<b>0.6</b>	<b>0.6</b>	<b>4.7</b>	<b>2.2</b>	<b>1.7</b>
<b>CashFlow</b>											
Revenue (EURM)	584.3	0.0	95.5	92.3	72.3	97.9	58.8	77.7	89.8	0.0	0.0
Operating Costs (EURM)	416.0	0.0	59.1	53.6	66.5	54.4	83.5	63.1	35.8	0.0	0.0
EBITDA (EURM)	168.3	0.0	36.4	38.7	5.8	43.5	-24.7	14.6	54.0	0.0	0.0
Tax Payable (EURM)	4.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.1	0.0	0.0
Capital (EURM)	52.8	22.7	5.6	5.1	5.6	3.5	3.5	3.5	3.5	0.0	0.0
Working Capital (EURM)	0.0	0.0	4.4	-0.2	-0.8	1.0	-1.5	0.7	0.3	-4.0	0.0
Reclamation Costs (EURM)	11.7	0.0	0.0	0.5	0.7	0.6	0.6	0.6	4.7	2.2	1.7
<b>Net Free Cash Flow (EURM)</b>	<b>99.7</b>	<b>-22.7</b>	<b>26.4</b>	<b>33.3</b>	<b>0.3</b>	<b>38.4</b>	<b>-27.3</b>	<b>9.9</b>	<b>41.4</b>	<b>1.9</b>	<b>-1.7</b>

## RESULTS AND SENSITIVITIES

### *Summary of Cash Flow*

The following table summarises the base case LoM cash flow, production and cost per ounce for the Laiva Gold Mine.

Table 4 Laiva Gold Mine Base Case Summary

<b>Cash Flow</b>		
Revenue	(EURM)	584.3
Operating Costs	(EURM)	416.0
<b>EBITDA</b>	<b>(EURM)</b>	<b>168.3</b>
Tax Payable	(EURM)	4.1
Capital	(EURM)	52.8
Working Capital	(EURM)	0.0
Reclamation Costs	(EURM)	11.7
<b>Net Free Cash Flow</b>	<b>(EURM)</b>	<b>99.7</b>
<b>Production</b>		
Mined Ore Tonnes	(kt)	24,166
Mined Ore Grade	(g/t)	0.95
Waste Tonnes	(kt)	41,827
Total Mill Feed After Sorting	(kt)	13,263
Mill Feed Grade	(g/t)	1.42
Gold Produced	(koz)	529
<b>Operating Profit per Ounce Au</b>		
Revenue	(EUR/oz)	1,105
Mining & Processing Operating Costs	(EUR/oz)	748
G&A and Sales Costs	(EUR/oz)	39
<b>Operating Profit</b>	<b>(EUR/oz)</b>	<b>318</b>
Revenue	(USD/oz)	1,250
Mining & Processing Operating Costs	(USD/oz)	846
G&A and Sales Costs	(USD/oz)	44
<b>Operating Profit</b>	<b>(USD/oz)</b>	<b>360</b>

### *Net Present Value*

The following table shows the NPV determined over a range of discount rates for the base case TEM.

Table 5 Base Case NPV over a Range of Discount Rates

Discounted Cash Flow Analysis		
	Discount Rate	NPV (EURM)
	0.0%	99.7
	4.0%	83.5
	6.0%	76.7
	8.0%	70.6
	10.0%	65.2
	12.0%	60.4
	15.0%	53.9
IRR	105%	0.0

### NPV Sensitivity

The following chart and table presents the sensitivity of the NPV at a 6% discount rate to changes in revenue/gold price, operating costs and capital costs. The Laiva Gold Mine Project is most sensitive to changes in revenue/gold price with a 16% reduction resulting in breakeven. The project is also sensitive to changes in operating costs with a 23% increase resulting in breakeven. The mine is least sensitive to changes in capital.

Figure 2 NPV @ 8% Discount Rate - Sensitivity Analysis

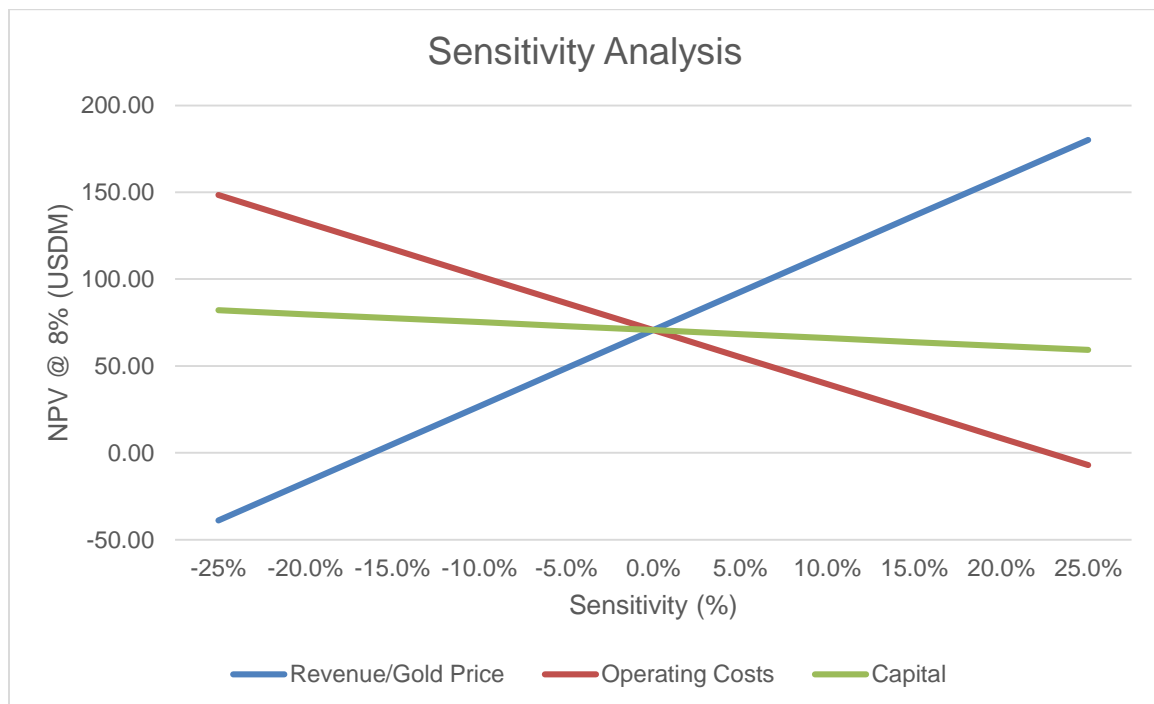


Table 6 Sensitivity of NPV @ 6% Discount Rate

<b>Sensitivity Analysis</b>					
Sensitivity	-20.0%	-10.0%	0.0%	10.0%	20.0%
	NPV@6% (EURM)				
Revenue/Gold Price	-17.1	29.8	76.7	123.6	170.5
Operating Costs	143.3	110.0	76.7	43.4	10.1
Capital	86.1	81.4	76.7	72.0	67.3

### INFERRED MATERIAL

The exclusion of the inferred material (treated as waste) from the TEM still results in positive cash flows. The NPV at a 6% discount rate for this case is EUR25M. The following table summarises the LoM cash flow, production and cost per ounce for the Laiva Gold Mine excluding Inferred Resources.

Table 7 Laiva Gold Mine Summary Excluding Inferred Resources

<b>Cash Flow</b>		
Revenue	(EURM)	455.7
Operating Costs	(EURM)	365.1
<b>EBITDA</b>	<b>(EURM)</b>	<b>90.6</b>
Tax Payable	(EURM)	0.0
Capital	(EURM)	52.8
Working Capital	(EURM)	0.0
Reclamation Costs	(EURM)	11.7
<b>Net Free Cash Flow</b>	<b>(EURM)</b>	<b>26.1</b>
<b>Production</b>		
Mined Ore Tonnes	(kt)	18,809
Mined Ore Grade	(g/t)	0.96
Waste Tonnes	(kt)	47,184
Total Mill Feed After Sorting	(kt)	10,323
Mill Feed Grade	(g/t)	1.43
Gold Produced	(koz)	412
<b>Operating Profit per Ounce Au</b>		
Revenue	(EUR/oz)	1,105
Mining & Processing Operating Costs	(EUR/oz)	838
G&A and Sales Costs	(EUR/oz)	48
<b>Operating Profit</b>	<b>(EUR/oz)</b>	<b>220</b>
Revenue	(USD/oz)	1,250
Mining & Processing Operating Costs	(USD/oz)	947
G&A and Sales Costs	(USD/oz)	54
<b>Operating Profit</b>	<b>(USD/oz)</b>	<b>249</b>



## **CONCLUSIONS AND RECOMMENDATIONS**

Based on the scoping level analysis undertaken KJMC concludes the following:

- The Laiva Gold Mine Project incorporating ore sorting has the potential to generate positive cash flows.
- The indicative NPV at a 6% discount rate for the base case is EUR76.7M. (Including Inferred Resources).
- The Laiva Gold Mine Project is most sensitive to changes in revenue/gold price with a 16% reduction resulting in breakeven. The project is also sensitive to changes in operating costs with a 23% increase resulting in breakeven. The mine is least sensitive to changes in capital.
- The exclusion of the inferred material (treated as waste) from the TEM still results in positive cash flows. The NPV at a 6% discount rate for this case is EUR25M.

KJMC Recommend:

- Nordic continue with their ongoing testwork to corroborate the viability of ore sorting technology.