Nkomati Joint Venture

South Africa’s only Primary Nickel Producer

October 2005
History

1929 Described by Wagner
1939 ETC purchases mineral rights
1970 Coetzee recognizes potential
1972 - 1975 AAC/INCO JV
1975 Preliminary investigation by ETC
1977 AAC purchase mineral rights
1980 INCO bought out
1987 - 1992 Exploration & evaluation
1988 Slaaihoek mineralization proved
1990 Discovered massive sulphides
1993 - 1994 Exploration & evaluation

Joint Venture (ARM 75% / AAC 25%)
1997 Nkomati mine established
1999 Ongoing evaluation & feasibility

2004 ARM acquires 25% from AAC

2005 LionOre acquires 50% from ARM
Geology Regional Geological Setting
Geology The Uitkomst Complex

Schematic cross section

LEGEND

- Diabase
- Norite Unit
- Upper Pyroxenite Unit
- Peridotite Unit
- Massive Chromitite
- Chromititic Peridotite Unit
- Lower Pyroxenite Unit
- Basal Gabbro Unit
- Klapperkop Quartzite
- Timeball Hill Shale
- Rooihooege Formation
- Malmani Subgroup
- Oaktree Formation and Black Reef Formation
- Nelshooge Granite
- Massive Sulphide
- Shear zone

NOT TO SCALE
Geology Overview

• MSB is situated in the Footwall of the Uitkomst ultramafic complex
• Consists of 3 lenses separated by diabase intrusions
• Pyrrhotite, Pentlandite, Chalcopyrite, Pyrite, Cobalt, PGMs, Gold and Silver
• Reserves:
  — Proven MSB: 0.49Mt @ 2.39%Ni
  — Proven MMZ (u/g): 0.33Mt @ 0.59
  — Probable MSB: 0.08Mt @ 1.12%Ni
  — Probable MMZ (u/g): 9.87Mt @ 0.55%Ni
  — Probable MMZ (Open Pit): 0.92Mt @ 0.63%Ni

Without main expansion, remaining life 21 months
• However the Mine is currently planning a 80tpm interim phase to commence as soon as possible.
Geology Massive Sulphide Orebodies

Long section – Nkomati mine

- Oaktree Formation (quartzite)
- Oaktree Formation (dolomite)
- Black Reef Formation
- Nelshoogte Granite
- Shear zone
- Diabase
- Uitkomst Complex (massive sulphide)
- Uitkomst Complex (layered gabbro, pyroxenite, peridotite)
- Basement granite/gneiss
Mining

• Mechanized Mining
• Primary Drift & benching with backfill.
• Total production of 30 000 tpm ROM
• All primary mining in Lens 1 completed
• Benchling between backfill pillars has been done successfully
• Remote loading was introduced where bench mining between backfill pillars of the higher underground stopes is taking place.
• Open Pit Trial Mining at 5000 tpm has commenced.
Mining Method and Sequence

- Primary Drift
- Bench Retreat
- Fill
- Secondary extraction
Ore Reserve

Lens 1 MSB
Metallurgy

- Concentrator plant (crush, mill, float)
- Current Production 30 000tpm
- 4600 - 5800tpm of concentrates
- Contained metals per annum:
  - 5650t Ni, 3650t Cu, 280t Co, 55 000oz PGM’s
  - PGMs metal split: Pd (72%) / Pt (23%)
- Highly automated - Direct labour 4+1/shift
- Toll smelting and refining
- On-going optimization to improve capacity and efficiency
Nkomati Interim Phase and Expansion Project Update

October 2005
Overview

• Phasing in of Expansion Project
• First phase is 80 000tpm project
• Evaluate Chromite potential
• Re-scoping of the full Nkomati Expansion Project
• Tati Activox demonstration plant results
<table>
<thead>
<tr>
<th>Phased Nickel Production</th>
<th>Ni Production (tpa)</th>
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<tbody>
<tr>
<td>Current MSB mine</td>
<td>4 600</td>
</tr>
<tr>
<td>Interim phase (steady state)</td>
<td>4 000</td>
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<tr>
<td>Full Expansion (steady state)</td>
<td>16 500</td>
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</tbody>
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Scope of work for 80 ktpm feasibility study
Scope of 80 ktpm feasibility study

- Open Pit mining
- Underground mining
- Concentrator and associated infrastructure.
- Project program
Open Pit Mining

- Mining from Pits 1 and 2.
- Mining rate of 33 000tpm of ore.
- Total ore tonnage at 0.35% cut off grade is 6.4 million tons at average grade of 0.55%Ni.
- Average stripping ratio of 1 : 3.6.
Underground Mining

• 47kt/pm ore to optimize utilization of existing infrastructure(trackless equipment).
• Cut off grade of 0.5% Nickel.
• Target high grade MMZ zones for initial 3 to 5 years of project.
• Integration of MSB ramp down schedule and MMZ ramp up schedule completed.
Concentrator and infrastructure

• New 80ktpm MMZ Concentrator plant
• Feasibility study with DRA in progress due for completion October 2005.
• Sufficient Eskom power available at Nkomati sub-station.
• Execution program of 12 months.
• Concentrate to be toll smelted and refined
• Low-sulphide tailings dam upstream of Pit 1.
• High-sulphide tailings disposal on existing MSB dam and/or backfilled underground.
Project Program

• Feasibility study complete - mid-November 2005
• 12 months Construction period
• January 2006 project release
• Commissioning to commence January 2007
• Execution program to be finalized by October 2005
Expansion Study Scope of Work
Expansion Study Scope of Work

- Purpose of re-scoping Expansion Project
- Environmental and Legal
- Test work
- Feasibility work
- Other issues
Purpose of re-scoping Expansion Project

• Fully incorporate contributions from both Joint Venture Partners.
• Take full advantage of significantly higher medium and long term Nickel prices
• Demonstrate Activox leaching and refining as technically and financially viable for Nkomati
• Review and optimize the recovery of PGM’s from the leach residue
Environmental and Legal

• Water Use License Application (WULA) for Expansion Project for signature at Department of Water and Forestry (DWAF) regional office.
• Amendments to Expansion Project Environmental Management Program (EMP) for roaster/acid plant on the mine site in progress.
• Purchase of Uitkomst and portion of Vaalkop farms for open pits and waste rock dumps finalized.
• Registration of pipeline servitude to Onverwacht tailings dam in progress.
• Activox license agreement in place.
Testwork

- Produce concentrate for Activox demonstration
- Demonstration of Activox process
- Roasting testwork on PGM concentrate
- Testwork on PGM calcine from roaster
- Laboratory testwork on other ore types
- Evaluation of Dense Media Separation (DMS)
- Pilot plant testwork on PCMZ ore type
- Test alternative MMZ concentrator circuits
Feasibility Work

- Update ore resource grade model with PGM’s
- Eskom power supply to Nkomati
- Feasibility study on Roaster/Acid plant.
- Feasibility of PGM processing routes.
- Feasibility study on Chromite resources
- Optimization of open pit mining.
- Optimization of underground mining.
- Review/update concentrator and refinery flowsheets.
Tati Activox plant results update

• 750 hour continuous demonstration run
• Activox leaching
  - Nickel recovery on target at 96 to 97%.
  - Cobalt recovery about 3% below target
  - Cu recovery significantly higher (75 - 80%)
• PGM recovery on leach residue gave above target recoveries for Pt and Pd.
• Base metal refining results on target
• Conclusion - Activox leaching and refining technically successful demonstrated
QUESTIONS?