Regolith Enrichment of the Wonmunna Marra Mamba Iron Ore Deposits of the Hamersley Region, Western Australia

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Iron Ore

Mount Whaleback

Mount Tom Price
Aim
to describe the nature of the iron mineralisation at Wonmunna and determine the processes responsible for Fe-enrichment
<table>
<thead>
<tr>
<th></th>
<th>Fe cut-off</th>
<th>Million Tonnes</th>
<th>Fe %</th>
<th>SiO 2 %</th>
<th>Al 2 O 3 %</th>
<th>P %</th>
<th>LOI %</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMM Resource</td>
<td>50%</td>
<td>47.2</td>
<td>55.9</td>
<td>6.9</td>
<td>3.7</td>
<td>0.07</td>
<td>8.9</td>
</tr>
<tr>
<td>NMM DSO Resource</td>
<td>60%</td>
<td>6.2</td>
<td>61.4</td>
<td>3.0</td>
<td>1.8</td>
<td>0.07</td>
<td>7.2</td>
</tr>
<tr>
<td>CMM Resource</td>
<td>50%</td>
<td>15.2</td>
<td>56.8</td>
<td>5.7</td>
<td>3.3</td>
<td>0.10</td>
<td>9.5</td>
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<tr>
<td>CMM DSO Resource</td>
<td>60%</td>
<td>2.4</td>
<td>61.2</td>
<td>3.3</td>
<td>1.7</td>
<td>0.10</td>
<td>7.4</td>
</tr>
<tr>
<td>SMM Resource</td>
<td>50%</td>
<td>15.9</td>
<td>55.3</td>
<td>6.7</td>
<td>3.8</td>
<td>0.07</td>
<td>9.7</td>
</tr>
<tr>
<td>SMM DSO Resource</td>
<td>60%</td>
<td>1.4</td>
<td>61.2</td>
<td>2.9</td>
<td>1.6</td>
<td>0.06</td>
<td>7.6</td>
</tr>
<tr>
<td>Total Resources</td>
<td>50%</td>
<td>78.3</td>
<td>56.0</td>
<td>6.6</td>
<td>3.6</td>
<td>0.08</td>
<td>9.2</td>
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<tr>
<td>Total DSO Resources</td>
<td>60%</td>
<td>10.0</td>
<td>61.3</td>
<td>3.1</td>
<td>1.7</td>
<td>0.08</td>
<td>7.3</td>
</tr>
</tbody>
</table>

**Wonmunnna**

Map Location

Legend:
- RC Collars
- sealed road
- unfomed track
- uniformed track
- Wonmunnna Project
- Iron Ore Resource (>+50% Fe)
- High Grade DSO Iron Ore Resource (>+60% Fe)
Banded Iron Formation (BIF)
Ore Types

Martite-goethite ore

Microplaty-hematite ore
Enrichment Processes

Hypogene Model
1. warm, reduced fluids leach silica
2. Oxidisation (hot meteoric oxidising fluids)
3. Microplaty hematite formed in carbonate matrix
4. Late stage supergene leaching

→ Taylor et al., (2001)

Supergene – Metamorphic Model
1. Supergene processes for martite-goethite ore
2. Burial metamorphism upgrades this to microplaty-hematite ore

→ Morris (1985)

Regolith Processes

→ Ramanaidou (2009)
Field work and mapping
Petrography

10 x, plane polarized light

10 x, crossed polarized light
Distribution of minerals downhole, NMM deposit Hole 150

Mineralogy
XRD
Conclusion

• Relationship with the current surface and regolith development.

• Microplaty hematite in the Marra Mamba Iron Formation at Wonmunna

• Regolith enrichment model for Wonmunna: oxidation, leaching, goethitisisation → dehydration of goethite → mpl-H

• Implications for exploration models