WORLD INDUSTRY TRENDS
TITANIUM SPONGE
KAZAKHSTAN, UKRAINE

By Sylvain Gehler
Specialty Metals Company
September, 2005
<table>
<thead>
<tr>
<th>Location</th>
<th>Ilmenite Concentrate Production</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VOLNOGORSK</strong></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>163,200 mt</td>
</tr>
<tr>
<td>2001</td>
<td>171,400 mt</td>
</tr>
<tr>
<td>2002</td>
<td>206,600 mt</td>
</tr>
<tr>
<td>2003</td>
<td>178,400 mt</td>
</tr>
<tr>
<td>2004</td>
<td>220,000 mt</td>
</tr>
<tr>
<td><strong>IRSHANSK</strong></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>272,300 mt</td>
</tr>
<tr>
<td>2001</td>
<td>313,100 mt</td>
</tr>
<tr>
<td>2002</td>
<td>305,800 mt</td>
</tr>
<tr>
<td>2003</td>
<td>242,100 mt</td>
</tr>
<tr>
<td>2004</td>
<td>150,000 mt</td>
</tr>
</tbody>
</table>

C.I.S. Ti Sponge producers’ annual requirement – 150,000 mt
UKRAINE

Titanium Sponge Production

<table>
<thead>
<tr>
<th>YEARS</th>
<th>TPY</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>3,000</td>
</tr>
<tr>
<td>2001</td>
<td>6,000</td>
</tr>
<tr>
<td>2002</td>
<td>9,000</td>
</tr>
<tr>
<td>2003</td>
<td>3,000</td>
</tr>
<tr>
<td>2004</td>
<td>6,000</td>
</tr>
<tr>
<td>2005 (e)</td>
<td>9,000</td>
</tr>
</tbody>
</table>

Legend:
- Total Production
- Deliveries to Domestic Market
KAZAKHSTAN TITANIUM SPONGE PRODUCTION

YEARS

TPY

2003 + 32 %

2004 + 15 %

2005 + 68 %

2006
Kazakhstan Titanium Sponge Share
In World Production and Supply in 2004

World Ti Sponge Production
Excl. sales within integrated producers

- Kazakhstan: 20.2%
- Russia: 51.4%
- Japan:
- USA:
- Ukraine:

Polaris: 51.4%
WORLD TITANIUM SPONGE SUPPLY

YEARS

TPY

RUSSIA
JAPAN
KAZAKHSTAN
NORTH AMERICA
UKRAINE
Titanium Sponge Availability in 2004
From Non-Integrated Producers

- Total after deliveries to steel industry: 37.5%
- Ti sponge available to the market: 32.3%

Shipments within integrated producers

- 100%
- 90%
- 80%
- 70%
- 60%
- 50%
- 40%
- 30%
- 20%
- 10%
- 0%
US IMPORTS OF TITANIUM SPONGE

(e)
US Ti Scrap Exports

![Graph showing US Ti Scrap Exports from 2000 to H1 2005.]

- **2000**: 4,000
- **2001**: 6,000
- **2002**: 5,000
- **2003**: 5,000
- **2004**: 10,000
- **H1 2005**: 14,000
Ti sponge production vs. aircraft deliveries

- Ti sponge production
- # aircraft
- Metal cutting