BURNING PYRITES COMPARED TO SULPHUR

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SNC-Lavalin Fenco

Introduction
- Sulphur
- Pyrite

Plant Design

Cost
- Capital
- Operating

Summary
Multidisciplinary teams offer a complete range of professional services to all our clients, wherever located. In-house resources include:

> Engineering
> Procurement
> Construction
> Project Services
> Start-up, training and troubleshooting

Fenco is further a long standing licensee of MECS, the recognized world leader in the sulphuric acid field. Their technology has been utilized in the design of more than 850 plants in 56 countries.
Highly integrated and customizable e-Learning solutions in order to transform traditional training into a tailor-made learning experience.
Customized simulations to create a virtual training environment based on study cases

- Emulation of the DCS.
- Equipment modelled to match the behaviour of the process.
- Control strategies and interlocks included.
- Virtual control camera
- Alarms included
- Communications simulated
- Keyboard emulated
ETI MADEH
BANDIRMA, TURKEY

- **Production:** 750 MTPD H₂SO₄ (from pyrite with 42% sulphur content) and 11 MW of power
- **Products:** 93 - 98.5% H₂SO₄
- **Scope of Services:** Basic and detailed engineering, procurement, construction, commissioning and start-up, turnkey basis
- **Conversion Efficiency:** 99.7%
- **Scope of Plant:** Double absorption with MECS HRS, sea water cooling system, turbo-generator
- **Completion:** 2004
SULPHUR BURNING

- **Production:** 2,000 MTPD $\text{H}_2\text{SO}_4$
- **Products:** 98.5% $\text{H}_2\text{SO}_4$
- **Scope of Services:** Basic and detailed engineering, procurement, construction, commissioning and start-up, turnkey basis
- **Conversion Efficiency:** 99.7%
- **Scope of Plant:** Sulphur burning sulphuric acid plant with sulphur melting
- **Completion:** 2010
PRAYON SA
ENGIS, BELGIUM

Production: 1,000 MTPD H₂SO₄ and 15 MW of power
Products: 98.5% H₂SO₄
Scope of Services: Basic and detailed engineering
Conversion Efficiency: 99.85%
Scope of Plant: Sulphur burning sulphuric acid plant with 15 MW turbo-generator and MECS HRS
Completion: 2009
FEED CHARACTERISTICS

> Sulphur
  • - “Concentrated”
  • - High purity
  • - Pricing transparency

> Pyrite
  • - 30 – 50% sulphur
  • - Contaminants
  • - Pricing is site specific
PLANT DESIGN

System Differences
- Feed systems
- Burner
- Heat recovery
- Acid plant
### SIMPLE PRODUCTION COSTS FOR PYRITE AND SULPHUR BURNING ACID PLANTS

<table>
<thead>
<tr>
<th>FEED TYPE</th>
<th>PYRITES</th>
<th>SULPHUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Investment</td>
<td>$150,000,000</td>
<td>$90,000,000</td>
</tr>
<tr>
<td>Direct Production Cost ($/Tonne Acid)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feedstock</td>
<td>$14.50</td>
<td>$16.70</td>
</tr>
<tr>
<td>Power</td>
<td>-$10.80</td>
<td>-$12.90</td>
</tr>
<tr>
<td>Utilities</td>
<td>$7.00</td>
<td>$3.90</td>
</tr>
<tr>
<td>Labour</td>
<td>$4.50</td>
<td>$2.70</td>
</tr>
<tr>
<td>Maintenance</td>
<td>$6.40</td>
<td>$3.90</td>
</tr>
<tr>
<td><strong>Total Direct Production Cost</strong></td>
<td><strong>$21.60</strong></td>
<td><strong>$14.30</strong></td>
</tr>
</tbody>
</table>

1 - Basis: 2000 t/d $H_2SO_4$, U.S.A. site
Figure 1: Sensitivity Analysis - NPV (10%)