

<b>Customer</b>	Primary Metals
<b>Service</b>	Environmental Technology Selection/Design



Strategic Solutions  
SSI Associates, Inc.

## Technology Innovation and Process Design for SO<sub>2</sub> Emissions Control

**Selection, design and startup support for an SO<sub>2</sub> emissions control system for a new smelting facility**



### Challenge

A US strategic metals mining and processing company embarked on a project to triple smelter capacity through complete replacement of an existing facility. Dilute mode lime dual alkali (LDA) technology was selected for meeting the stringent control requirements for both SO<sub>2</sub> and SO<sub>3</sub> emissions. This same technology had been used in the existing plant and had demonstrated the capability for meeting similar, difficult challenges of high peak levels of SO<sub>2</sub> and SO<sub>3</sub> with wide, rapid fluctuations in gas flow and concentrations. Constraints on waste management were also established – no wastewater discharge and production of a solid material that could be disposed directly or marketed as a byproduct.

### Approach

Unlike the dilute mode LDA system in the existing facility, a streamlined dilute mode LDA concept was envisioned for the new facility that would greatly simplify the design and at the same time significantly reduce both capital investment and operating costs without sacrificing environmental performance. A joint effort of the Owner, Strategic Solutions and the engineering/design firm resulted in the successful implementation of this new adaptation of dilute mode LDA technology.

- **Technology Validation** – Strategic Solutions staff developed innovative concepts for streamlining standard dilute mode dual alkali technology. In concert with the Owner, these concepts were pre-tested in the existing plant, which provided the basis for the design of the new facility.
- **Design** - Expedited process engineering was then undertaken to support a fast-track schedule to complete the entire project in less than two years. This required close coordination of the process engineering with detailed design and early start construction.
- **Startup** – Our staff provided onsite support to startup including pre-commissioning walk-downs and follow-on post-commissioning troubleshooting.

### Value/Result

- Met the required plant startup date.
- Attained continuous operation within three months of initial startup.
- Achieved SO<sub>2</sub> emissions limits from the beginning of hot operations.
- Demonstrated plant capacity 25% above “nameplate” due to the flexibility in the system design.
- Produces a gypsum byproduct that is marketed locally.
- Produces no wastewater discharge.

Performance Parameter	Permit Limit	Year 1	Year 2
SO <sub>2</sub> Emissions: 1-Hr Limit (lbs)	235	35	42
SO <sub>2</sub> Emissions: Annual Limit (lbs)	74	4.6	2.1
Overall SO <sub>2</sub> Removal - Design	99.5%	99.83%	99.84%
Overall SO <sub>3</sub> Removal - Design	90.0%	>90%	>90%
Particulate Emissions (mg/DNm <sup>3</sup> )	50	<10	<10