

# **CHEMISTRY OF LIME KILN WET SCRUBBERS**

Kevin Taylor, B.Sc., M.Sc. (Chemistry), P.Chem.

**Taylor Industrial Research, Inc.**

Tel: 250-418-5705 Fax: 250-361-0099

Email: [kevin.taylor@industrialresearch.ca](mailto:kevin.taylor@industrialresearch.ca) Website: [www.industrialresearch.ca](http://www.industrialresearch.ca)

---

## **Improve Operation and Reduce Scaling Problems**

Wet scrubbers are used at some Kraft mills to reduce particulate emissions from the lime kiln. Some of these mills experience serious scaling problems in the scrubber system. In some cases, this scaling has caused mill shutdowns from kiln shutdown and insufficient lime production.

The chemistry of lime kiln wet scrubbers is very similar to that of flue gas desulphurization (FGD) scrubbers used in power generation. A large amount of literature is available on FGD chemistry, while very little is published on lime kiln wet scrubbers. This course is based on a review of the technical literature and on work carried out on kiln scrubbers in Canada and the U.S.

The following items are covered:

- Survey of lime kiln scrubber operation at other mills (case studies and literature).
- Types of scale and formation mechanisms
  - Calcium carbonate (3 types), calcium sulfite (2 types), calcium sulfate, calcium hydroxide.
- Scale characterization
  - Simple mill testing
  - Detailed analytical testing
- Slurry characterization
  - Composition of solid and liquid phases
- Factors that affect kiln scrubber operation
  - Slurry pH
  - Slurry solids content
  - Fuel sulfur content
  - Clarifier operation (residence time, temperature control, recycle)
  - Magnesium concentration in slurry
  - Dust load to scrubber
- Options to improve scrubber operation and reduce scaling