

## Sludge Treatment

### Using Lime to Stabilize Biosolids and Sludges

Lime has been effectively utilized for the management of sewage biosolids and industrial sludges for over a century.

### Sewage Biosolids

The stabilization of biosolids using lime is a cost-effective, environmentally safe treatment that also promotes the beneficial re-use of this waste product. When lime is applied to sewage biosolids, the conditions that support the growth of pathogens are controlled, and the solids are converted into a usable agricultural product. The addition of lime to sewage biosolids is sanctioned by the U.S. Environmental Protection Agency's regulations, and complies with their requirements for pathogen management.

### Industrial Sludges

Lime can be used for the treatment of industrial sludges. Lime will adjust the pH of the sludge for acid neutralization. Lime will also immobilize contaminants in the sludge to prevent subsequent leaching of metals into ground and surface waters.

Lime can also be used to dewater and stabilize oily waste deposits, such as old waste oil ponds.

### Summary of Benefits:

- Lime treatment offers lower capital costs compared to alternative technologies
- Effective treatment of Class A and B biosolids (EPA Part 503 Requirements)
- Biosolids treated with lime can be re-used
- Prevention and control of odors
- Prevents leaching of toxic contaminants
- Dewatering capabilities make lime treated solids easy to handle and transport

## Carmeuse Lime Plant Locations -- Eastern and Central NA and Canada

**For more information about a Carmeuse Lime plant near you call:**

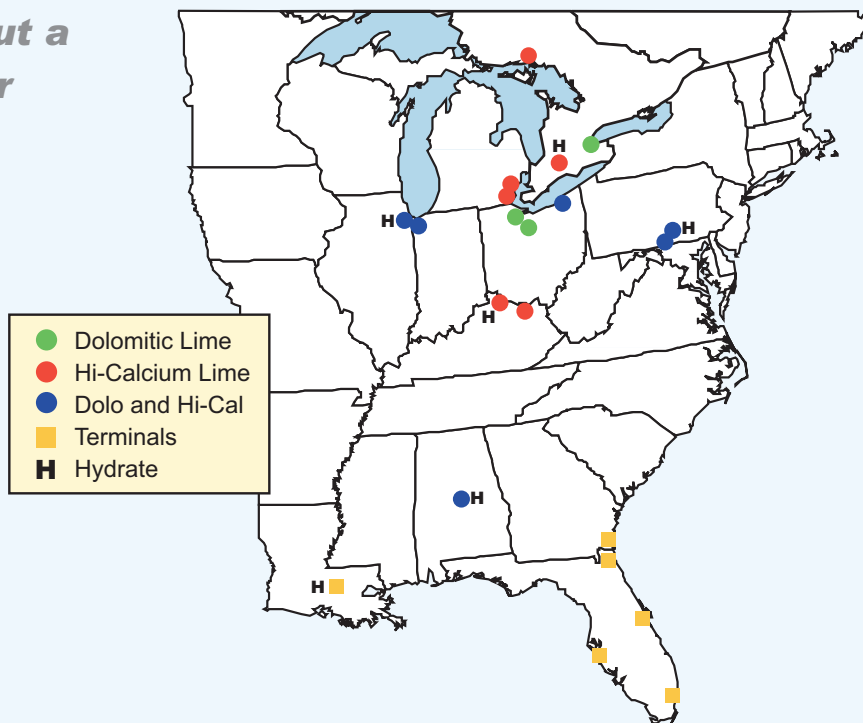
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**866-780-0974**

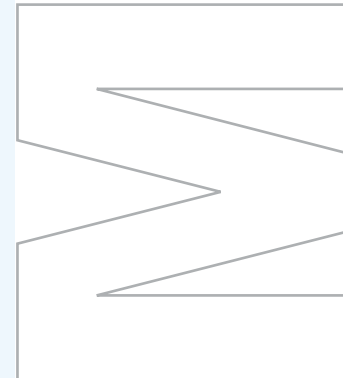


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# Lime The Proven Solution for Environmental Challenges

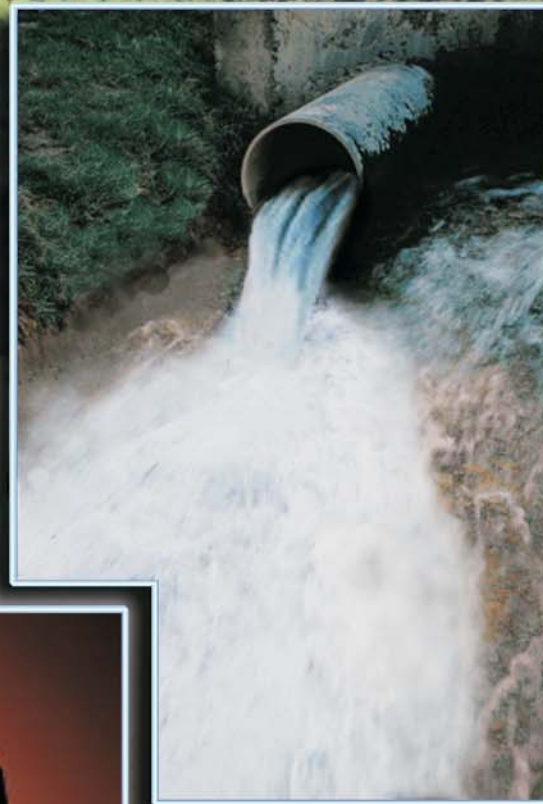


**Flue Gas Treatment**

**Acid Waste Treatment**

**Sludge Treatment**

**Lime.**  
**Proven Industrial**  
**Solutions for the**  
**Environment.**  
**Cleaner Air.**  
**Cleaner Water.**  
**Safer Disposal.**



## Removal of Acid Gases from Flue Gas Streams

### Cleaning Hazardous Air Pollutants

Lime plays a key role in many air pollution control applications. Lime is used as a cost effective means for simultaneous control of mercury, acid gases (HF, HCl, SO<sub>2</sub>, SO<sub>3</sub>), fine particulate, and other hazardous air pollutants in a single vessel. This technology has been demonstrated in power plants and industrial applications since the mid 70's.

The process uses a spray dryer, which is typically shaped like a silo, with a cylindrical top and a cone bottom. Hot flue gas flows into the top. Lime slurry is sprayed through an atomizer (e.g., nozzles) into the cylinder near the top, where it absorbs pollutants. The water in the lime slurry is then evaporated by the hot gas. The reacted dried lime, which now contains the pollutants, falls to the bottom of the cone and is removed. The flue gas then flows to a particulate control device (e.g., a baghouse) which acts to remove any remaining lime reaction products.

Lime spray dryers offer removal efficiencies greater than 90% and minimize waste by-products.

#### Summary of Benefits:

- Proven technology
- Low capital cost to build
- Low operating cost
- Removes multiple pollutants
- Safe to dispose by-products
- No liquid waste stream

## Acid Waste Treatment

### Cleaning Water Industrial Discharge

Lime is a very cost effective way of treating acid waste streams to correct pH, and to remove harmful toxins, such as heavy metals and phosphate and nitrogen compounds. It is also very effective in removing suspended solids, odor, and some bacteria. These multi-benefit actions of lime make it the most time-tested approach to waste stream treatment.

When lime is added as a slurry to acidic waste streams, low pH is quickly neutralized, and heavy metals are precipitated and can be removed by settling and filtration. Lime produced sludges are typically easy to flocculate, settle and filter. In addition the filtered sludge is more physically and chemically stable making it suitable for ultimate disposal.

#### Summary of Benefits:

- Proven solution, widely accepted use
- Cost effective
- Efficiently removes heavy metals
- Controls suspended solids
- Helps eliminate odors and bacteria
- Reduces phosphates and nitrogen compounds
- Excellent sludge characteristics

This table shows the relative effectiveness of commonly used reagents in acid waste treatment:

Reagent	\$/Ton	Neutralizing Power <sup>1</sup> Relative to Lime	Cost to Neutralize One Ton of Sulfuric Acid
CaO	\$72.00	1.00	\$ 72.00
NaOH	\$175.00	1.43	\$ 249.63
Mg(OH) <sub>2</sub>	\$210.00	1.04	\$ 218.39

<sup>1</sup> - Weight for weight of reagent, relative to Lime as 1.0