ARIES MAGNESIUM HYDROXIDE SLURRY FOR BIOLOGICAL TREATMENT

Municipal and industrial wastewater treatment systems have utilized aerobic processes for the removal of biochemical oxygen demand (BOD), organic compounds, ammonia and phosphorus from wastewater. In an aerobic wastewater treatment process microorganisms decompose organic matter into water and carbon dioxide in the presence of oxygen as seen in the following reaction:

Organic compounds + O2 + Nutrients ---- > CO2 + H2O + new cells + Other end products

A stable environment throughout a biological system is critical for an aerobic wastewater treatment system's efficient operation. The system's microorganisms need an environment with a stable pH, adequate nutrients and alkalinity to support the biological conversion of organic waste. In general the optimum pH range for bacteria growth is 6.5 to 7.5. Biological ammonia removal requires substantial alkalinity to aid the nitrification process. Municipal wastewaters typically contain adequate amounts of nutrients and alkalinity to support the biological conversion of organic waste. Industrial wastewaters, on the other hand, may not have sufficient nutrients or alkalinity to sustain optimum bacterial growth. In these cases, nutrients and alkali addition may be necessary in order for the bacteria to function properly. By utilizing Aries Magnesium Hydroxide slurry for aerobic biological treatment, a nutrient supply in the form of magnesium is readily available to bacteria while magnesium hydroxide's buffering ability provides superior pH control.

Magnesium Hydroxide has been observed, when used to replace caustic soda or soda ash in a biological system to improve secondary solids settling and dewatering, Higgins, M.J. and J.T. Novak. (68^{th} Annual WEF Conference, Miami Florida). Magnesium Hydroxide's divalent cationic species (Mg^{++}) improves the settling and dewatering properties, due to improved biofloc formation, when it replaces the monovalent cationic (Na^{+}) speicies. Up to a 15 % improvement in SVI was observed, while polymer usage reductions of 25% have been observed for sludge dewatering.

Aries Magnesium Hydroxide slurry offers the following advantages over caustic soda and lime for aerobic processes.

■ PO Box 519 ■ Beaver Falls, NY 13305 ■ Tel: 315-346-1489 ■ Fax: 315-346-1658 ■
■ E-mail: aries@arieschem.com ■

Benefits of Aries Magnesium Hydroxide

- **Buffers to a controlled pH.** Magnesium hydroxide is a buffered alkalinity source, so it has less chance of spiking system pH due to over addition. Even with over addition the maximum pH that can be attained with magnesium hydroxide is 9.0. Moreover this buffering ability eliminates pH excursions that are harmful to bacterial growth.

- **Provides alkalinity and nutrients.** Magnesium hydroxide is a good source of nutrients and alkalinity by providing magnesium and hydroxyl ions to support bacterial growth.

- **Improved settling and dewatering**. Magnesium hydroxide can improve secondary solids settling and dewatering due to improved biofloc formation.

- **Contains more neutralization value per pound.** Magnesium hydroxide has a higher neutralizing value per dry pound when compared to caustic soda and lime. Less magnesium hydroxide is needed to neutralize the same acidic waste stream.

- **Safer and easier to handle.** Unlike caustic soda and lime, magnesium hydroxide is non-toxic and non-corrosive which makes handling safer and easier.

- **Does not cause scaling.** Unlike lime, magnesium hydroxide does not cause scaling in equipment that necessitates frequent cleaning and maintenance.

Aries Magnesium Hydroxide slurries can be effectively utilized in aerobic processes where sufficient agitation and retention time are provided. Possible applications are the activated-sludge process, aerated lagoons, aerobic digestion, suspended-growth nitrification and phosphorus removal.

TP130506

■ PO Box 519 ■ Beaver Falls, NY 13305 ■ Tel: 315-346-1489 ■ Fax: 315-346-1658 ■
■ E-mail: aries@arieschem.com ■