PRELIMINARY ANALYSIS LETTER ITEM #4:
Uncontrolled Sulfuric Acid Emissions from the Pre-Leach and Leach Systems

Copyright 2009 Kleinfelder

This page intentionally left blank

Rational for PTE basis for sulfuric acid emissions.

It is recognized that "potential to emit" (PTE) calculations are based on uncontrolled emissions unless the controls are federally enforced. Per discussion with Colorado Department of Public Health and Environment (CDPHE), it was acknowledged that the PTE of sulfuric acid from the pre-leach and leach systems may take credit for an emission control device if that device is necessary to comply with a federal standard. Further, the PTE can not take credit for emission reductions that are less than the limits of the applicable federal standard. The facility will be required to meet the Mine Safety and Health Administration (MSHA) Safety and Health Standards for protection of workers within the facility. Because the pre-leach and leach systems could result in unsafe concentrations of sulfuric acid within the workroom air where workers could be exposed, a wet scrubber system would be built into the design to manage concentrations to levels needed to comply with the MSHA standards. To further ensure compliance with the MSHA Safety and Health Standards, the scrubber system is designed as an integral part of the system with built in interlocks so that the leach system shuts down if the scrubbers malfunction.

The MSHA Safety and Health Standards for Air Quality include the following:

30 CFR Part 56–Safety and Health Standards – Surface Metal and Nonmetal Mines
Subpart D - Air Quality and Physical Agents

§56.5001 Exposure limits for airborne contaminants

Except as permitted by §56.5005-

(a) **Except as provided in paragraph (b) of this section, the exposure to airborne contaminants shall not exceed, on the basis of a time weighted average, the threshold limit values adopted by the American Conference of Governmental Industrial Hygienists, as set forth and explained in the 1973 edition of the Conference's publication, entitled "TLV's Threshold Limit Values for Chemical Substances in Workroom Air** Adopted by ACGIH for 1973," pages 1 through 54, which are hereby incorporated by reference and made a part hereof. This publication may be obtained from the American Conference of Governmental industrial Hygienists by writing to 1330 Kemper Meadow Drive, Attn: Customer Service, Cincinnati, OH 45240; ***http://www.acgih.org"***, or may be examined in any Metal and Nonmetal Mine Safety and Health District Office of the Mine Safety and Health Administration. Excursions above the listed thresholds shall not be of a greater magnitude than is characterized as permissible by the Conference.

§56.5005 Control of exposure to airborne contaminants

Control of employee exposure to harmful airborne contaminants shall be, insofar as feasible, by prevention of contamination, removal by exhaust ventilation, or by dilution with uncontaminated air. However, where accepted, engineering control measures have not been developed or when necessary by the nature of work involved (for example, while establishing controls or occasional entry into hazardous atmospheres to perform maintenance or investigation), employees may work for reasonable periods of time in concentrations of airborne contaminants exceeding permissible levels if they are protected by appropriate respiratory protective equipment.

Copyright 2009 Kleinfelder

The 1973 American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) for sulfuric acid is 1.0 mg/m^3. This TLV is a time weighted average value over an average 8 hour workday. Using this value and the system exhaust flow rate, this equates to an emission rate of 0.009 pounds per hour calculated as follows:

Multiply sulfuric acid TLV by the exhaust flow rate of the leach system scrubber to get an emission rate in lb/hour:

$$1.0\frac{mg}{m^3}\times 2500scfm = 0.009\frac{lb}{hr}.$$

The potential to emit of uncontrolled sulfuric acid from the two pre-leach and the eight leach tanks was calculated in the APEN to be 177 pounds per hour (lb/hr). The allowable limit for worker safety of 0.009 lb/hr is less than the uncontrolled calculated potential to emit. Therefore, the scrubber is needed to reduce sulfuric acid emissions to room concentrations that are manageable for meeting the MSHA mandated level for purposes of worker safety.

The PTE of controlled sulfuric acid from the two pre-leach and the eight leach tanks was calculated in the APEN to be 1.77 pounds per hour (lb/hr). This is also greater than the worker safety limit of 0.009 pounds per hour. Therefore, no additional credit beyond the worker safety limit was applied to the PTE estimate for sulfuric acid emissions. It should be noted that although the PTE estimated is greater than the worker safety limit, it does not mean the facility would be in non-compliance as this is the concentration at the scrubber outlet. Other management practices would be employed should the actual concentrations be greater than the worker limits (i.e. limited exposure durations, increased ventilation, etc.). However, due to the high concentration potential, it is necessary to reduce the emissions with the scrubber such that other management options can be effective, if needed.

In conclusion, because the scrubber is needed to reduce sulfuric acid emissions to manageable levels necessary to comply with the MSHA health and safety program, the scrubber is considered integral to the pre-leach and leach system for purposes of emission calculations for the permit application.

Copyright 2009 Kleinfelder