

MAINTAINING LOW SO₂ EMISSIONS DURING START UP AND SHUTDOWN

Sulfur burning sulfuric acid plants generate sulfur dioxide gas by burning sulfur in air. Proper burner operation controls the combustion reaction to maintain the ratio of sulfur to air within acceptable limits. This is to maintain the temperature within the sulfur burner and maintain proper conversion of sulfur dioxide to sulfur trioxide in the downstream catalyst beds. This ratio is unchanged during normal operation, but may be reduced during start up until the catalyst beds fully reach their operating temperature. Failure to maintain the proper ratio for the conditions of the catalyst may result in an unexpected release of sulfur dioxide gas. Gross loss of control may result in sublimation of elemental sulfur and damage to downstream equipment in addition to the high SO₂ emissions.

Recent plant emission episodes were reported during transient conditions due the imbalance of this ratio. These imbalances were caused by significantly higher than design sulfur to air ratios due to excessive charging of sulfur to the burner or the reaction of residual sulfur left on the burner floor. The following are suggested general procedures that are recommended during operation, shut down and start up.

- Maintain sulfur guns and sulfur feed temperature controls so that liquid sulfur is properly atomized and does not pool on the floor of the sulfur burner.
- If liquid sulfur is pooled on the burner floor when the plant is shut down, continue to operate the blower until the pool is removed. If the pool is small, normal purging rates should be adequate. If the size of the sulfur pool is significant, increased airflow rates for purging will be required.
- If the sulfur pool cannot be removed prior to shutdown of the blower, restart the blower as soon as possible and purge the sulfur burner with excessive air.
- During start up, obtain proper bed temperatures, 420° C minimum, throughout the first and last pass of interpass plants and preferably throughout all of the catalyst passes.
- Familiarize the operating staff with proper relationships between airflow and sulfur valve position or flow meter readings. If venting of the sulfur feed line is required, this should be done with particular care in order to reestablish the normal sulfur valve position as quickly as possible.

Please contact your MECS representative should you require assistance with your specific installation. Consultation will be provided at nominal and standard industrial rates.