

**Texas Commission on Environmental Quality  
Air Permits Division**

**New Source Review (NSR) Emission Calculations**

This information is maintained by the Chemical NSR Section and is subject to change. Last update was made **October 2006**. These emission calculations represent current NSR guidelines and are provided for informational purposes only. The emission calculations are subject to change based on TCEQ case by case evaluation. Please contact the appropriate Chemical NSR Section management if there are questions related to the emission calculations.

**Sample Sulfur Recovery Unit Calculations**

For acid flaring, see the flare standardization package. Emission estimates from the thermal oxidizer should be based on the expected sulfur inlet rates reduced by the expected recovery values:

*Example 1:*

H<sub>2</sub>S feed: 600 lb mole/hr  
Expected efficiency: 99.8%

$$\frac{600 \text{ lbmol}}{\text{hour}} \cdot \frac{(100 - 99.8)}{100} = 1.20 \text{ lb mole H}_2\text{S/hr}$$

H<sub>2</sub>S feed to the thermal oxidizer = 1.20 lb mole H<sub>2</sub>S/hr

Since 1 mole of H<sub>2</sub>S would convert to 1 mole of SO<sub>2</sub>, assuming that 99.9% of the H<sub>2</sub>S converts to SO<sub>2</sub> yields an hourly emission rate as follows:

Based on 99.9% conversion of H<sub>2</sub>S to SO<sub>2</sub>

$$\frac{1.20 \text{ lbmol H}_2\text{S}}{\text{hour}} \cdot \frac{1 \text{ lbmol SO}_2}{1 \text{ lbmol H}_2\text{S}} \cdot \frac{64 \text{ lb SO}_2}{1 \text{ lbmol SO}_2} \cdot \frac{99.9}{100} = 7.61 \text{ pph SO}_2$$

$$\frac{1.20 \text{ lbmol H}_2\text{S}}{\text{hour}} \cdot \frac{32 \text{ lb H}_2\text{S}}{1 \text{ lbmol H}_2\text{S}} \cdot \frac{(100 - 99.9)}{100} = 0.04 \text{ pph H}_2\text{S}$$

In some cases the hourly rate is more restrictive if calculated based on the maximum concentration permitted by NSPS Subpart J, 250 ppm. In those cases, the hourly rate would be based on the calculation using this value as follows:

*Example 2:*

Stack effluent flow rate: 40,000 scf per minute (standard conditions taken at 60°F, 14.7 psia)  
Sulfur concentration: 250 ppm

$$\frac{40,000 \text{ scf}}{\text{min}} \cdot \frac{60 \text{ min}}{\text{hour}} \cdot \frac{250}{10^6} \cdot \frac{1 \text{ mol } SO_2}{379.4 \text{ scf}} \cdot \frac{64 \text{ lb } SO_2}{1 \text{ mole } SO_2} = 101.2 \text{ pph } SO_2$$

The final maximum allowable emission rate in the permit will be the more restrictive of the two limitations as calculated above.