

## Compliance Assurance Monitoring Submittal

Breitburn Operating, L.P. (Breitburn)

St. Regis Treating Facility

Jay, Florida

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### Sulfur Recovery Units

#### I. Background

##### A. Emissions Unit

Description: Sulfur Recovery Units Nos. 2 and 3  
Identification: EU 034  
Facility: St. Regis Treating Facility  
Jay, Florida  
FDEP Facility ID: 1130005

##### B. Applicable Regulation, Emission Limit, and Monitoring Requirements

Regulation No.: [Rule 62-296.409(1), F.A.C.]  
Pollutant: SO<sub>2</sub>  
Limit: SO<sub>2</sub> emissions shall not exceed 12.01 (requested limit) tons per calendar day per unit at the maximum allowable operating rate of 8.8 MMscf/day combined acid gas feed for two units (requested allowable) and an assumed maximum acid gas H<sub>2</sub>S mole fraction of 0.81. At all lesser operating rates and acid gas mole fractions, the SO<sub>2</sub> emissions shall not exceed 0.08 pound of SO<sub>2</sub> per pound of sulfur input. The allowable SO<sub>2</sub> emissions shall not exceed the value obtained from the following equation.

$$\text{Allowable SO}_2 \text{ (tons/day)} = \frac{(\text{QAG})(\text{CAG})(32.06)(0.08)}{(380.68)(2000)}$$

Where,

QAG = Acid gas flow rate, scf/d

CAG = Mole fraction of H<sub>2</sub>S in acid gas based on most recent stack test (normally 0.77 - 0.81)

32.06 = Molecular weight of sulfur

0.08 = Allowable emission fraction of sulfur × ratio of molecular weight of SO<sub>2</sub> to sulfur

380.68 = scf per pound-mole of any gas

2000 = pounds per ton

Monitoring Requirements: Acid gas composition, , acid gas feed rate, and the sulfur plant's thermal oxidizer tail gas ratio ( $\text{H}_2\text{S}$  to  $\text{SO}_2$ ).

Note that the monitoring requirements in the current operating permit shall be replaced with the proposed CAM approach.

### C. Control Technology

The sulfur recovery units control sulfur emissions from the production and treating of sour crude oil and gas from the Jay Oil Field. Acid gas containing  $\text{H}_2\text{S}$  from oil and gas production is oxidized and reacted to form elemental sulfur by a three-stage Claus process.

## II. Monitoring Approach

The monitoring approach will consist of a flow monitor and a  $\text{H}_2\text{S}$  and  $\text{SO}_2$  Parametric Monitoring System to monitor the exhaust gas from the thermal oxidizer from each of the two sulfur recovery units. The key elements of the monitoring approach, including the indicators to be monitored, indicator ranges, and performance criteria are presented in Table 1. Using Indicators No.1 and No. 2, it will be possible to calculate allowable (by the equation in Section I.B above)  $\text{SO}_2$  emissions in tons per day. By taking into consideration the sulfur recovery rate established by the most recent stack test for each of the sulfur recovery units, Indicators No.1 and No. 2 can also be used to calculate the actual  $\text{SO}_2$  emissions in tons per day. These calculations will be used to verify that the actual  $\text{SO}_2$  emissions are less than or equal to the allowable  $\text{SO}_2$  emissions on a daily basis (12:00 midnight to 12:00 midnight).

The parametric monitoring system will be computer-based, providing indication at 15-minute or shorter intervals of the  $\text{H}_2\text{S}/\text{SO}_2$  ratio from the tail gas of the thermal oxidizers.

### **Monitoring Approach Justification**

#### I. Background

The St. Regis Treating Facility is a natural gas production facility. Two operational sulfur recovery units (SRUs) control sulfur emissions from the gas plant. A permit limit on  $\text{SO}_2$  emissions from the SRUs is expressed as a function of acid gas flow rate and the  $\text{H}_2\text{S}$  mole fraction in the acid gas. The SRUs have the potential to emit over 100 tons per year.

#### II. Rationale for Selection of Performance Indicators

The chosen indicators are directly related to the permit limit placed on  $\text{SO}_2$  emissions from the SRUs. By measuring acid gas flow rate and  $\text{H}_2\text{S}$  concentration in the acid gas, the allowable  $\text{SO}_2$  emissions can be directly calculated using the equation provided in the permit, and the actual emissions can be compared to this calculated level (12.01 tons per day per plant).

### III. Rationale for Selection of Indicator Ranges

The selected range for the acid gas flow rate is a maximum equivalent to the requested permit limit on the acid gas flow rate (combined maximum flow of 8.8 MMscf/day for two units). Because the inlet H<sub>2</sub>S concentration is used only to calculate the SO<sub>2</sub> emissions, and is not of itself an indicator of performance, there is no specific allowable operating range defined for this parameter. Allowable SO<sub>2</sub> emissions are calculated using the previously noted equation.

**Table 1: Monitoring Approach Parameters**

	<b>Indicator No. 1</b>	<b>Indicator No. 2</b>	<b>Indicator No. 3</b>	<b>Indicator No. 4</b>
<b>Indicator</b>	<b>Acid gas flow</b>	<b>Acid gas H<sub>2</sub>S concentration</b>	<b>Tail gas ratio of H<sub>2</sub>S to SO<sub>2</sub></b>	<b>Thermal Oxidizer exhaust gas SO<sub>2</sub> concentration</b>
Measurement Approach	Acid gas flow is measured with an orifice plate flow meter and differential pressure flow transmitter.	The H <sub>2</sub> S concentration is measured by sampling and 3 <sup>rd</sup> party analysis	The H <sub>2</sub> S and SO <sub>2</sub> concentration is measured by on-line analyzer	The SO <sub>2</sub> concentration is measured by on-line analyzer
Indicator Range	Total maximum flow of 8.8 MMscf/day to two units (requested permit limit).	Not applicable. This indicator is used to compute the daily emission limit.	Not applicable. This indicator is used to directly measure the Thermal Oxidizer's tail gas..	Not applicable. This indicator is used to directly measure SO <sub>2</sub> emissions for RATA testing. Emissions are limited by the permitted equation presented in Section I.B of the CAM submittal.
Data Representativeness	The inlet acid gas flow meter runs are located along a straight and smooth section of pipe, giving a representative indication of total acid gas flow.	The sampler system is installed and will be maintained per manufacturers specifications	The system is installed and will be maintained per manufacturers specifications	The system is installed and will be maintained per manufacturers specifications
Verification of Operational Status	NA – Existing flow meter already in operation.	Completion of manufacturer's written specifications or recommendations for installation and operation of the sampler system.	Completion of manufacturer's written specifications or recommendations for installation, operation, and calibration of the system.	Completion of manufacturer's written specifications or recommendations for installation, operation, and calibration of the system.
QA/QC Practices and Criteria	Orifice plate will be visually inspected during plant shutdowns. Calibration of the transmitter will be done during plant shutdowns.	N/A	Unit is calibrated per manufacturers specifications	Unit is calibrated per manufacturers specifications.
Monitoring Frequency	Continuously.	Weekly or as noted in the permit in Section A.5.	At least one recorded data point every 15 minutes	At least one recorded data point every 15 minutes.
Data Collection Procedures	One data point recorded daily.	Weekly or noted in the permit in Section A.5.	At least one data point recorded electronically every 15 minutes.	At least one data point recorded electronically every 15 minutes.

	<b>Indicator No. 1</b>	<b>Indicator No. 2</b>	<b>Indicator No. 3</b>	<b>Indicator No. 4</b>
<b>Indicator</b>	<b>Acid gas flow</b>	<b>Acid gas H<sub>2</sub>S concentration</b>	<b>Tail gas ratio of H<sub>2</sub>S to SO<sub>2</sub></b>	<b>Thermal Oxidizer exhaust gas SO<sub>2</sub> concentration</b>
Averaging Period*	Total flow per day . No averaging period	Weekly or as noted in the permit in Section A.5.. No averaging period	This indicator is used for operational purposes only. It is not used to demonstrate compliance with the permit conditions.	This indicator is only used for the purpose of conducting a RATA. It is not used to demonstrate compliance with the permit conditions.

\*An excursion is any day in which the actual emission rate exceeds the allowable emission rate. All calculations are based on a 12:00 midnight to 12:00 midnight averaging period.