



U.S. Environmental Protection Agency Applicability Determination Index

Control Number: 0500057

Category: NSPS
EPA Office: CAMPD
Date: 04/28/2004
Title: Alternative Monitoring Plan for SO2 Emissions
Recipient: Martin Hestmark
Author: Michael S. Alushin
Comments:

Subparts: Part 60, LLL, Natural Gas Process., SO2 Emissions

References: 60.640
60.641
60.644
60.646

Abstract:

Q1: Are the emissions from the liquid sulfur storage tanks at the Burlington Resources natural gas sweetening and sulfur recovery operation at the Lost Cabin Gas Plant in Lysite, Wyoming, subject to NSPS subpart LLL?

A1: No. Emission from liquid sulfur storage tanks at a natural gas sweetening and sulfur recovery operation are not regulated under NSPS subpart LLL.

Q2: Does performance testing of the tail gas incinerator require the inclusion of the liquid sulfur storage tank vent gas?

A2: No. Liquid sulfur storage tank vent gas does not need to be included in the performance testing of the tail gas incinerator, nor in the sulfur reduction efficiency calculations.

Q3: Does monitoring the tail gas incinerator require inclusion of the sulfur contribution from the liquid sulfur storage tanks? A3: No. Liquid sulfur storage tank vent gas does not need to be included in the monitoring of the tail gas incinerator, nor in the sulfur reduction efficiency calculations.

Q4: Will EPA approve an alternative monitoring method for the combined SO₂ emissions from the Train 1 tail gas unit and the liquid sulfur storage tanks?

A4: No. EPA will not approve the alternative method proposed for the combined SO₂ emissions from the Train 1 tail gas unit and the liquid sulfur storage tanks.

Letter:

MEMORANDUM

SUBJECT: New Source Performance Standard (NSPS) Subpart LLL Applicability
Determination Request and Alternative Monitoring Approval Request for Lost Cabin Gas Plant

FROM: Michael S. Alushin, Director
Compliance Assessment and Media Program Division
Office of Compliance

TO: Martin Hestmark, Director
Technical Enforcement Program
USEPA Region 8

This letter is in response to the September 5, 2003, request from Burlington Resources regarding the applicability of the New Source Performance Standards (NSPS) for Onshore Natural Gas Processing: Sulfur dioxide (SO₂) Emissions (Subpart LLL) and approval of an alternative monitoring method for the Tail Gas Incinerator #1 (H-3302) located at the Lost Cabin Gas Plant in Lysite, WY. Specifically, Burlington Resources requests the Environmental Protection Agency (EPA) to consider: 1) whether emissions from the liquid sulfur storage tanks at the Lost Cabin Gas Plant are subject to NSPS Subpart LLL; 2) whether performance testing of the tail gas incinerator requires the inclusion of the liquid sulfur storage tank vent gas; 3) whether monitoring the tail gas incinerator requires the inclusion of the sulfur contribution from the liquid sulfur storage tanks; and 4) approval of an alternative method for continuous monitoring of the combined SO₂ emissions from the Train 1 tail gas unit and liquid sulfur storage tanks.

Background

Based on information received by EPA, Burlington Resources operates a natural gas sweetening and sulfur recovery operation in three parallel processing trains at the Lost Cabin Gas Plant. The three trains are designed to process 66.5 MMscfd (Train 1), 66.5 MMscfd (Train 2), and 180 MMscfd (Train 3) of sour gas. Each train has an acid gas stream of hydrogen sulfide (H₂S) and carbon dioxide (CO₂) that is sent to a sulfur recovery section consisting of a three-stage Claus Plant followed by a Shell Claus Offgas Treating (SCOT) unit. The Claus Plant converts the H₂S to liquid sulfur. The SCOT unit strips H₂S from the Claus Plant effluent stream. The stripped H₂S is routed back to the Claus Plant. The effluent from the SCOT unit is incinerated.

The sulfur recovery operations at the Lost Cabin Gas Plant are subject to NSPS Subpart LLL.

The standards in NSPS Subpart LLL require affected facilities to reduce SO₂ emissions by recovering sulfur. Under 40 CFR Section 60.644, owners and/or operators of facilities subject to NSPS Subpart LLL must determine the minimum sulfur reduction efficiencies using the prescribed methods. Based on information provided by Burlington Resources, their required reduction efficiency is 99.8 percent.

Liquid sulfur recovered at the Lost Cabin Gas Plant is sent to four on-site storage tanks. Emissions generated from their liquid sulfur tanks, primarily H₂S, are piped to Tail Gas Incinerator #1 (H-3302) on Train 1, the closest tail gas incinerator, to convert the liquid sulfur storage tank emissions to SO₂. According to Burlington Resources, as a result of the increased sulfur load from the liquid sulfur storage tanks emissions, the Train 1 tail gas incinerator has difficulty meeting the NSPS Subpart LLL required sulfur emission reduction efficiency, specifically during the warmer summer months when the overall plant efficiency is affected by the higher ambient temperature. At most other times, Burlington Resources has indicated that there is enough excess design capacity built into Train 1 that the incinerator can handle the additional liquid sulfur storage tank emissions while continuing to meet the reduction efficiency requirements.

1. Are the emissions contributed from the liquid sulfur storage tanks subject to NSPS Subpart LLL?

EPA Response:

NSPS Subpart LLL applies to the following affected facilities that process natural gas: each sweetening unit, and each sweetening unit followed by a sulfur recovery unit. 40 CFR Section 60.640(a). Furthermore, a sulfur recovery unit is defined as ". . . a process device that recovers element sulfur from acid gas." 40 CFR Section 60.641. In the background information documents to NSPS Subpart LLL, a "sulfur plant" includes the liquid sulfur storage tanks, but the "sulfur recovery unit" is shown separately from the liquid sulfur storage tanks. One commenter in the Background Information for Promulgated Standards (EPA-450/3-82-023b) asked for clarification of whether auxiliary or adjacent equipment is included in the term "sulfur recovery unit". EPA's response was that, "[A]ll equipment that is essential to the gas sweetening or sulfur recovery process is part of the affected facility under these standards." Storage tanks are essential to contain the recovered liquid sulfur, therefore they are included as part of the NSPS Subpart LLL affected facilities. In addition, the original economic analysis to measure the impact of this regulation considered the sale of the recovered liquid sulfur. Also, the sulfur removal efficiency calculations in the regulations require a measure of the liquid sulfur produced. Thus, EPA finds that liquid sulfur storage tanks are part of the affected facilities subject to NSPS Subpart LLL.

Although EPA finds that the liquid sulfur storage tanks are part of the affected facilities, emissions from the storage tanks are not regulated under the standard. However, the State of Wyoming requires that Burlington Resources capture emissions from the liquid sulfur storage tanks. As previously discussed, Burlington Resources satisfies the state requirement by routing the liquid sulfur storage tanks emissions to the Train 1 tail gas incinerator. Therefore, the Train 1 tail gas incinerator is combusting a commingled stream of an NSPS Subpart LLL regulated gas stream (the effluent from the Train 1 SCOT unit) and a state-only regulated gas stream (the emissions from the liquid sulfur storage tanks).

2. Does performance testing of the tail gas incinerator require the inclusion of the liquid sulfur storage tank vent gas?

EPA Response:

As indicated above, emissions from the liquid sulfur storage tanks are not regulated under the standard. Therefore, liquid sulfur storage tank vent gas does not need to be included in the performance testing of the tail gas incinerator including the sulfur reduction efficiency calculations.

3. Does monitoring the tail gas incinerator require the inclusion of the sulfur contribution from the liquid sulfur storage tanks?

EPA Response:

As indicated above, emissions from the liquid sulfur storage tanks are not regulated under the standard. Therefore, liquid sulfur storage tank vent gas does not need to be included in the monitoring of the tail gas incinerator including the sulfur reduction efficiency calculations.

4. Will EPA approve an alternative monitoring method for the combined SO₂ emissions from the Train 1 tail gas unit and the liquid sulfur storage tanks?

EPA Response:

Burlington Resources currently uses one continuous emissions monitoring system (CEMS) to monitor the combined SO₂ emissions from the Train 1 tail gas unit and the liquid sulfur storage tanks, which in turn are used in their calculations for sulfur reduction efficiency. In their alternative monitoring plan, Burlington Resources proposes to utilize a procedure to correct the monitor readings from the Train 1 incinerator to subtract the unregulated emissions contributed by the liquid sulfur storage tanks. NSPS Subpart LLL regulated emissions of SO₂ for Train 1 would be calculated by subtracting the quantity of equivalent SO₂ that results from the emissions contributed from the liquid sulfur storage tanks from the combined sulfur emissions from the Train 1 stack. Burlington Resources claims the corrected CEMS value would then provide only SO₂ emissions from Train 1, the affected facility.

To determine the quantity of equivalent SO₂ from the liquid sulfur storage tanks, Burlington Resources proposes to re-route the emissions from the liquid sulfur storage tanks directly to the atmosphere twice per day (about 12 hours apart) for approximately five minutes. During these 5-minute periods, the liquid sulfur storage tanks would be vented to the atmosphere and the Distributed Control System (DCS) would save in memory the difference between the CEMS readings before and during each 5-minute period (i.e., the difference in SO₂ readings with and without the tanks vented to the atmosphere). This difference would establish the quantity of SO₂ associated with the liquid sulfur storage tank emissions. The DCS would then use this measured difference for the next 12 hours for correcting the CEMS reading for SO₂ in the Train 1 incinerator stack.

To determine the variability in the contribution of SO₂ from the liquid sulfur storage tanks, Burlington Resources conducted the following test approximately once per hour over 48 hours.

They noted the start date and time and recorded the SO₂ lbs/hr on the emissions from the stack of the Train 1 incinerator with all tank emissions flowing to the incinerator. Then they pushed the 'STOP' buttons on each of the four tank eductors. After the SO₂ reading stabilized (approximately 30 to 60 seconds), they recorded the SO₂ lbs/hr again. Then they pushed the 'START' buttons on each tank and reestablished eductor flow. According to Burlington Resources, the contribution of SO₂ from the liquid sulfur storage tanks ranged from 36 to 48 lbs/hr with an average of 40.7lbs/hr of SO₂.

NSPS Subpart LLL requires the installation, calibration, maintenance, and operation of a continuous emission monitoring system for total reduced sulfur compounds to determine continuous compliance with the sulfur reduction efficiency requirement. 40 CFR Section 60.646(b)(3). However, the NSPS general provisions allow owners and/or operators of affected sources to submit alternative monitoring requests for consideration by EPA. 40 CFR Section 60.13(i). Based on an evaluation of the information provided by Burlington Resources in their September 5, 2003, alternative monitoring request, EPA does not believe that the proposed alternative monitoring provides a continuous method for adequately accounting for the impact of the sulfur contributions from the liquid sulfur storage tanks on the Train 1 SO₂ emissions. H₂S formation in the head space of a liquid sulfur storage tank can vary greatly due to changes in temperature, as well as other factors such as agitation of the liquid sulfur, which may impact the SO₂ emissions from Train 1. Therefore, EPA will not approve the subtractive method proposed by Burlington Resources.

In the September 5, 2003, request, Burlington Resources referred to a previously issued determination in which EPA suggested a method for conducting an initial performance test for a combined emission stream at a portland cement facility. In that determination, a portland cement facility was routing kiln emissions through a raw mill dryer to a common stack. For this specific arrangement, EPA suggested that the facility shut-off the raw mill dryer during the initial performance test of the kiln. This determination, however, is not on point since it deals with an initial performance test and does not discuss how compliance will be determined on an ongoing basis, which is the focus of Burlington Resource's request.

If you have any questions concerning this determination, please contact Gregory Fried at (202) 564-7016.

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