LION OIL COMPANY
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January 22, 2014

**VIA CERTIFIED MAIL RETURN RECEIPT REQUESTED**

Region VI
Director -- Air, Pesticides, and Toxics Division
U.S. Environmental Protection Agency
1445 Ross Avenue
Dallas, TX 75202

**Re: Lion Oil Company - Alternative Monitoring Procedure Request and Notification for SN-822 and SN-823**

To whom it may concern:

In accordance with 40 C.F.R. § 60.13(i), this letter requests EPA approval of an alternative monitoring procedure (AMP) in lieu of the hydrogen sulfide ($H_2S$) monitoring requirements for the sour gas stream entering its affected flares (SN-822 and SN-823) in New Source Performance Standards (NSPS) Subpart Ja at 40 C.F.R. § 60.107a(a)(2). Alternatives to this requirement are permissible when the owner or operator can demonstrate that monitoring devices at alternative locations will enable accurate and representative measurements. See 40 C.F.R. § 60.13(i)(4).

Lion Oil operates two "affected flares" under NSPS Subpart Ja. Both of these flares were modified after June 24, 2008. See 40 C.F.R. § 60.100a(b). The flares, which themselves are emission control systems, were modified during the installation of the refinery's hydrogen plant and implementation of the MSAT2 compliance plan. The modifications were completed in August 2008 (hydrogen plant) and June 2011 (MSAT2 project), and the refinery's production capacity did not change as a result of the modifications of the flares. See 40 CFR § 60.7(a)(4).

Lion Oil also operates two flare gas recovery systems (FGRS), each supporting a different flare. The flare gas recovery systems can be lined up to function as one system, but normally operate separately. Each FGRS withdraws gas from the flare header upstream of the water seal at the base of the flare and recovers gas that would otherwise be burned in the flare.

This AMP is requested only for the sour gas stream, which is stagnant except when the water seal is broken and a flaring event occurs. It is not feasible for Lion Oil to install a continuous $H_2S$ monitor in the flare stack for the sour gas stream, because of significant safety concerns due to the flares' water seal location at the base of the flare stack. See Attachment 1 for flare system diagram. If the probe/sample line system had to be located in the flare stack, as well as a CEMs building in close proximity, refinery operators and testing personnel would risk thermal radiation exposure during flaring events. Lion Oil does not believe it could install the continuous monitoring equipment and comply with its obligation under ANSI/API Standard 521to ensure that flare system design and plant equipment layout minimize the need for operator exposure when at all possible.

Lion Oil's proposed alternative monitoring method will provide accurate and representative measurements of the $H_2S$ content in the fuel gas. Moreover, EPA already has endorsed the proposed monitoring system as a "good compromise," given the refinery's inability to install continuous monitoring equipment in the flare stack. See Attachment 2, page 3 for EPA Minutes of 2009 Conference Call with Lion Oil.

As described above, both the high pressure flare and low pressure flare at the refinery have flare gas recovery systems with a knockout drum and water seal. The differential pressure is monitored at the water seal, and a pressure exceedances that breaks the water seal is considered a flaring event.

When the water seal is broken, an automatic e-mail is sent to Lab personnel, Operations personnel, and the Environmental department, and a signal is sent to the sample collection system to begin a sampling sequence. There is a short delay in the sample collection in order to make sure the horizontal flare line has been purged, which allows for collection of a representative sample. After completion of the short delay, a solenoid opens allowing the flare gas sample pump to fill the sample canister with a gas sample from the horizontal flare line. The sample is then analyzed using gas chromatography (GC). The GC analysis measures the $H_2S$ content and if required, total sulfur, as well as organic compounds. The lab personnel then provide the results to the Environmental Department for emissions quantification. The Environmental Department records a three hour rolling average based on the sampling results. The sample gathering and analysis take about one hour.

Lion Oil's sampling and analysis also calculates the $SO_2$ emissions associated with the flaring event. Lion Oil calculates flaring event emissions using the monitoring results for pressure, flow rate, and composition of the flare gas ($H_2S$ and total sulfur, if required). The flow rate is monitored by a Panametrics flow meter between the knockout drum and flare.

Because Lion Oil operates flare gas recovery systems, it has elected to monitor according to the alternative monitoring requirements, effective November 11, 2015. See 40 C.F.R. §60.107a(g). Therefore, Lion Oil will not be required to continuously monitor sulfur and flow according to the requirements of 40 C.F.R. § 60.107a(e) and (f). If, however, Lion Oil experiences more than 4 "reportable pressure exceedances" in a rolling 365-day period and is

required to comply with 40 C.F.R § 60.107a(e) and (f), it requests approval that the monitoring alternative described above satisfy the sulfur monitoring requirements of 40 C.F.R. § 60.107a(e).

If you have any questions regarding this submittal, please contact Chuck Hammock at 870-864-1289 or George Garten at 870-864-1453.

Sincerely,

Steve Cousins
Vice President and General Manager

Attachments

cc: Ms. Brenda Shine (via electronic mail)
Mr. Mike Norman (via electronic mail)
Mr. W.R. Chuck Hammock (via electronic mail)
Mr. George Garten (via electronic mail)

Arkansas Department of Environmental Quality
Mike Bates, Chief
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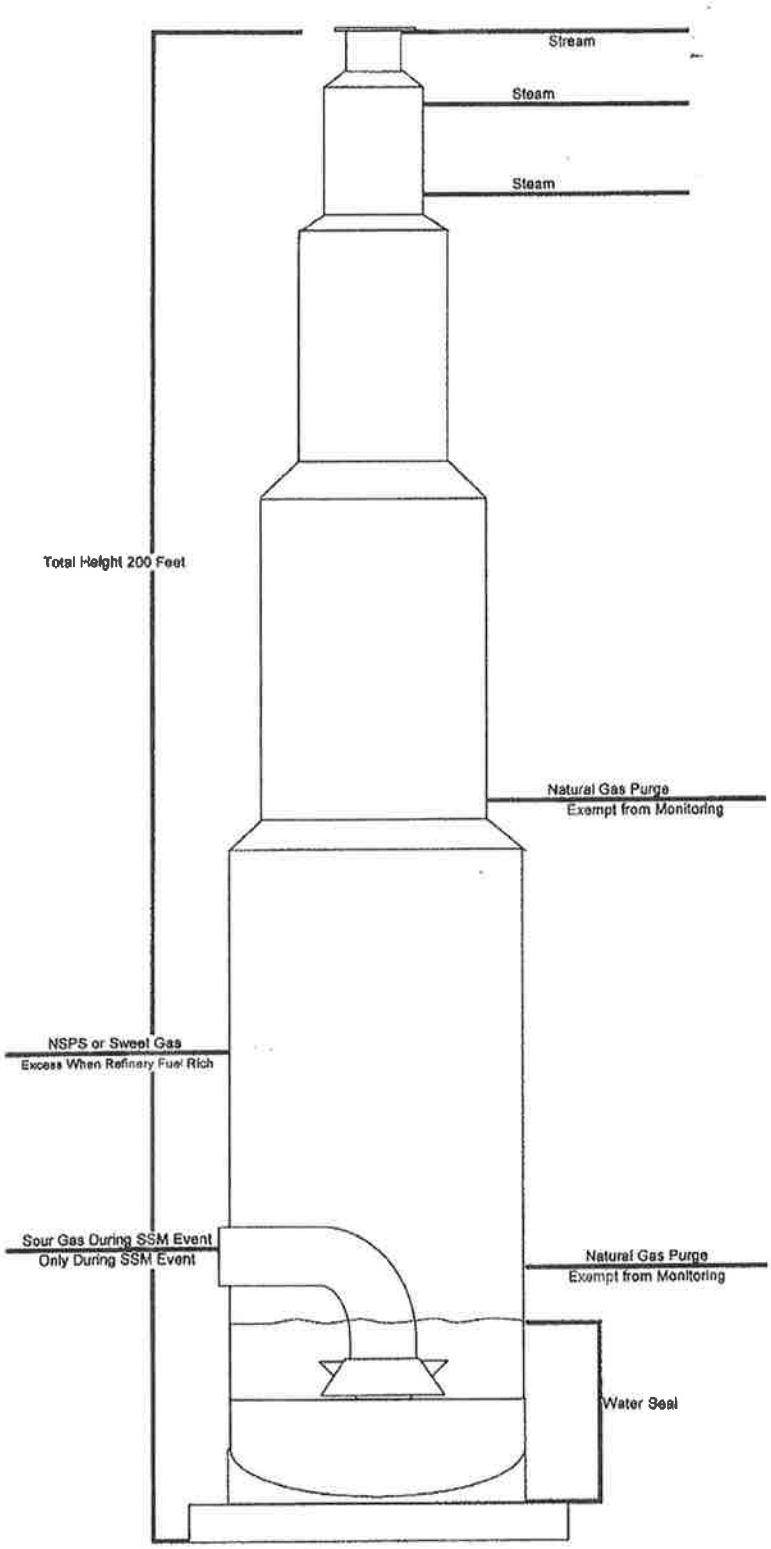


Attachment 1

RTI INTERNATIONAL | Memorandum

Date: January 11, 2010

To: Docket ID No. EPA-HQ-OAR-2007-0011

From: Kristin Parrish Sroka

Subject: NSPS Subpart J Review: Meeting Minutes for July 16, 2009, Conference Call Between the U.S. EPA and Representatives of Lion Oil

## Introduction

On June 30, 2009, representatives of the U.S. Environmental Protection Agency (EPA) and their contractor (RTI International) participated in a stakeholder conference call with representatives of Lion Oil Company (Lion Oil). The names and affiliations of the participants are included in Attachment 1. Attachment 2 contains the background information provided by the Lion Oil representatives prior to the conference call. Attachment 3 contains more detailed information regarding flare sampling provided by Lion Oil in response to the EPA's request during the call. The purpose of the conference call was to discuss the requirements for monitoring flares in NSPS subpart Ja, particularly for flares with flare gas recovery systems.

## Discussion

The Lion Oil representatives noted that they have safety concerns with testing and Relative Accuracy Test Audit (RATA) requirements that would require operators to be close to a flare. They noted that, for safety reasons, personnel must stay a certain distance from the flare at all times and must wear protective clothing before they can approach any closer. No one is allowed to climb up to the flare tip because flares cannot be isolated and there is no way to be sure that no gas will be flared while a worker is close to the flare. They noted that to comply with safety requirements, a monitor would have to be located at least 125 feet from base of flare, and depending on the height of the flare, that could be 200 feet from the flare tip.

In addition, the Lion Oil representatives noted that the sulfur concentration can range from less than 10 ppmv up to 50,000 ppmv. They stated that it is difficult to span a monitor to accurately measure that range of concentrations. For the above reasons, the Lion Oil representatives asserted that for flares that rarely experience flaring events, there are better ways to quantify emissions than monitoring.

The Lion Oil representatives stated that the flares at their refinery are used mostly as control devices, and they usually collect more than 99 percent of the gas sent to the flare. Although they try to use excess fuel gas in the hydrogen plant as much as possible, the refinery

occasionally has more fuel gas than needed for current operations (*i.e.*, is long on fuel gas) and must flare the excess.

The Lion Oil representatives then described their flare gas recovery system configurations and their emissions estimation procedures. Both the high pressure flare and low pressure flare at the refinery have flare gas recovery systems with a knockout drum and water seal. Each system has staged compressors, one of which is always running. The pressure is monitored so that additional compressors can start up when needed. Regarding the location of the water seal (see diagram in Attachment 2), the Lion Oil representatives noted that their configuration was designed by John Zink Company and they are not sure how many other flare gas recovery systems in the petroleum refining industry might be designed with the water seal in the same location.

The differential pressure is monitored at the water seal, and a pressure exceedance that breaks the water seal is considered a flaring event. Lion Oil calculates flaring event emissions using the monitoring results for pressure, flow rate, and composition of the flare gas. The flow rate is monitored by a Panametrics flow meter between the knockout drum and flare. During a flaring event, a sample of the flare gas is collected and analyzed using gas chromatography (GC). The GC analysis is typically measuring hydrogen sulfide ($H_2S$) and organic compounds; the Lion Oil representatives noted that it may be possible to measure total reduced sulfur if necessary.

The Lion Oil representatives then identified specific issues with the EPA's proposed monitoring provisions for subpart Ja. First, although the compressors in their flare gas recovery system are closely calibrated, the second and third compressor cannot start up instantaneously without burning out the motor. Instead, it takes about 1 to 5 minutes for the additional compressor to be fully operational. Lion Oil is reporting all of these "burps" because the $H_2S$ concentration is above 160 ppmv. The Lion Oil representatives noted that these "burps" are likely exempt from the 160 ppmv $H_2S$ limit because they are process upsets, but they choose to report all of them as emissions exceedances rather than having to prove that each exceedance is caused by an upset. However, the Lion Oil representatives did note that this practice increases the amount of time needed to prepare semiannual reports. In addition, they are worried that this practice, although environmentally conservative, opens them up to accusations of violations.

Going forward, the Lion Oil representatives noted that they would continue to quantify emissions for compressor staging "burps," but they would like to avoid having to do a root cause analysis for each exceedance, particularly because there is not much they can do to prevent the "burps." They requested that the EPA add a provision to subpart Ja that states if the water seal breaks but emissions are below 500 pounds of sulfur dioxide ($SO_2$) per day, a root cause analysis is not needed. They also noted that it would help if the EPA could clarify whether the "burps" are really violations.

Another issue the Lion Oil representatives noted with the subpart Ja standard as it applies to flares with flare gas recovery systems is the format of the concentration limit and how averages are calculated. Even one minute of flare gas with a concentration of 50,000 ppmv (5 percent) $H_2S$ causes the flare to exceed the 3-hour 160 ppmv concentration limit. However, because their recovery system is state-of-the-art and highly efficient, the Lion Oil representatives

feel they would be better able to meet a percent reduction target. The Lion Oil representatives suggested that the EPA should provide an option to consider a flare with a flare gas recovery system to be a control device required to meet a percent reduction emission limit. They also noted that a *de minimis* bright line would help define gray areas. The Lion Oil representatives noted that they would be happy to meet with the EPA again to further discuss their recovery system and their specific requests.

The EPA representatives agreed that it would be ideal for the provisions of subpart Ja to be written such that installation of flare gas recovery systems is encouraged. They noted that the monitoring systems on the flare gas recovery system at the Lion Oil refinery seem to be good for quantifying emissions, and they noted that sampling during a flaring event is a good compromise between continuously monitoring the sulfur content of flare gas and no monitoring at all. Regarding root cause analyses, the EPA representatives noted they would consider allowing facility to explain upfront that "burps" are the result of compressor staging. Regarding the *de minimis* bright line, the EPA representatives noted that it is difficult to draw a bright line because other recovery systems are not as good as the one at Lion Oil, particularly regarding the quantification of $SO_2$ emissions. The EPA representatives requested a description of the monitoring system for the record, including cost estimates for sampling and laboratory labor. (The information provided by Lion Oil following the call is included in Attachment 3.)

Finally, the EPA representatives and Lion Oil representatives discussed the answers to the questions posed in Attachment 2. For Item 1, the EPA representatives noted that if the $H_2S$ concentration of a gas stream is being continuously monitored to ensure compliance with the 160 ppmv concentration limit, the facility could use the $H_2S$-to-sulfur ratio option to determine the total reduced sulfur concentration in that stream. The Lion Oil representatives then noted that they have one fuel gas system providing fuel gas to the flares as well as other combustion devices. They asked, assuming that all the gas being flared is from the fuel gas system, whether they would be permitted to use the information obtained from a boiler's $SO_2$ continuous emissions monitoring system (CEMS) to estimate $SO_2$ emissions from the flare (rather than determining the $H_2S$-to-sulfur ratio). The EPA representatives noted they would consider whether to provide that option.

The EPA representatives agreed with Items 2 and 6. They also agreed with Item 3, with the caveat that their response to Item 1 would have to be taken into account. For Item 5, they agreed that continuous monitoring is meaningless when there is no flow, but they noted they had not yet decided how to handle that issue. According to 40 CFR part 60, a source is required to have valid data for four quadrants of an hour, but they recognize that is not always likely to happen.

**Attachment 1**
**Participants in July 16, 2009, Conference Call**

Industry Representatives
Ray Callahan, Ergon
George Garten, Lion Oil Company
Chuck Hammock, Lion Oil Company

U.S. EPA Representatives
Bob Lucas
Brenda Shine

RTI International (EPA contractor)
Jeff Coburn
Kristin Parrish