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Air/Toxics & Inspection
Coordination Branch
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November 15, 2011

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on consent u

Re: October 10, 2011 Acid Gas Flaring Incident Investigation
United States of America, and the State of Louisiana v. Chalmette Refining, L.L.C.
Civil Action Case Number 05-4662
DOJ Case Number 90-5-2-1-07030/2

Dear Sir or Madam:

Pursuant to Paragraph 63 of the Consent Decree (CD) entered on April 26, 2006 between the United States and Chalmette Refining, L.L.C., attached is an Acid Gas Flaring Incident Investigation Report for the October 10, 2011 Incident. For ease of review, the report is structured to follow the elements required under the decree.

If you have any questions, or need any additional information, please contact J. Derek Reese at (225) 977-0609.

Very truly yours,

J Reese

J. Derek Reese
Air Permitting and Compliance Section Supervisor

cc:

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Attachment

October 10, 2011 Acid Gas Flaring
Chalmette Refining, L.L.C.

Facility Name	Chalmette Refining, L.L.C. (CRLLC)
Location(s) of Release	Number 1 Flare
Type of Incident	Acid Gas Flaring

Incident Summary:

On October 10, 2011, Sulfur Recovery Unit Train 1 (SRU1) was processing all the refinery acid gas inO2-mode, while Sulfur Recovery Unit Train 2 was down for a turnaround and unavailable. During this same time, Air Products had shut down their air separation unit(ASU) in the morning for repairs which required CRLLC to utilize Air Products' secondary O2 supply from its vaporizer. Air Products completed the maintenance activities and notified CRLLC of its intent to restart its ASU. At 19:59 CRLLC unexpectedly began to lose oxygen pressure and the SRU1 tripped. CRLLC immediately initiated a re-start of SRU1 on natural gas and reduced feed to minimize flaring. The first stage reaction furnace was relit at 21:55 in air mode. Acid gas was then re-introduced to SRU1. The acid gas feed rate was increased and SRU1 was then switched to oxygen mode so it could process all the refinery acid gas. Intermittent flaring at the No. 1 Flare began at 20:21hours and lastedforapproximately167minutes, during which time 82.45tons of SO2 were released from the Number 1 Flare.

The root cause of this event was the loss of Air Products' O2 supply, causing SRU1 to shut down on low O2 flow. The following actions were taken in accordance with the SRU PMO plan to mitigate this event:

- Upstream acid gas producing units were immediately cut back. Please note cutting rate on acid gas producing units will not immediately stop acid gas production. At any given time, the acid gas that the amine regenerators are sending to the sulfur plant comes from the rich amine solution, which has already picked up H2S/CO2 from the sour gas that the upstream units previously produced. Even though the upstream units were cutting rate as fast as possible, there was a certain inventory of acid gas that was still being released from the amine regenerators.
- Operations promptly restarted SRU1 on air-mode operation, and then switched to O2-mode as per procedure. This mitigated the duration and severity of the event.

63.i. The date and time that the Acid Gas Flaring Incident started and ended.

Date and Time Acid Gas Flaring Incident Started	10/10/11 20:21 HOURS
Date and Time Acid Gas Flaring Incident Ended	10/11/1100:14HOURS

63.ii. An estimate of the quantity of sulfur dioxide that was emitted during acid gas flaring and the calculations that were used to determine that quantity;

Date	Estimated Quantity of SO2 (tons) Acid Gas
10/10/1120:21 to 10/11/1100:14	82.45Tons from the Number 1 Flare

CRLLC used the following calculation to estimate the quantity of Sulfur Dioxide released:

From the Acid Gas Flaring Incident:

Tons of SO2 = [FR][TD][ConcH2S][8.44×10^{-5}].

Where: FR = Average Flow Rate to Flaring Device(s) during Flaring Incident in standard cubic feet per hour: 428,025scf/hr

TD = Total Duration of Flaring Incident: 2.78hrs(167min)

ConcH2S = Average Concentration of Hydrogen Sulfide in gas during Flaring Incident (or immediately prior to Flaring Incident if all gas is being flared) expressed as a volume fraction: 0.82scf H2S/scf gas

8.44×10^{-5}= [lb mole H2S/379 scf H2S][64 lbs SO2/lb mole H2S][Ton/2000 lbs]

Tons of SO2 = 82.45 tons
Pounds of SO2 = 164,891.98lbs

63.iii. The steps, if any, that CRLLC took to limit the duration and/or quantity of sulfur dioxide emissions associated with the Acid Gas Flaring;

CRLLC took the following steps to limit the duration and/or quantity of sulfur dioxide emissions:

1) Unit rates throughout the Refinery were cut back to reduce acid gas production.
2) Operations immediately re-started SRU1 on air-mode and switched to O2-mode as soon as the unit was stable per startup procedures.

63.iv. A detailed analysis that sets forth the Root Cause and all significant contributing causes of that SO_2 emissions Incident, to the extent determinable;

The root cause of this event was the sudden and unexpected loss of O2 supply from Air Products. This caused SRU1 to immediately shut down on low O2 flow. SRU2 was unavailable due to a planned turnaround. There was an immediate response to re-start SRU1 and minimize the duration of the acid gas flaring incident and avoid a tail gas incident.

63.v. An analysis of the measures, if any, that are available to reduce the likelihood of a recurrence of an SO2 emissions incident resulting from the same Root Cause or significant contributing causes in the future. If two or more reasonable alternatives exist to address the Root Cause, the analysis shall discuss the alternatives, if any, that are available, the probable effectiveness and cost of the alternatives, and whether or not an outside consultant should be retained to assist in the analysis. Possible design, operation and maintenance changes shall be evaluated. If CRLLC concludes that corrective action(s) is (are) required under Paragraph 64, the report shall include a description of the action(s) and, if not already completed, a schedule for its (their) implementation, including proposed commencement and completion dates. If CRLLC concludes that corrective action is not required under Paragraph 64, the report shall explain the basis for that conclusion;

The direct cause for acid gas flaring was shutdown of our operating Sulfur Plant #1 due to loss of O2 supply from our 3rd party supplier, Air Products. This occurred while our Sulfur Plant #2 was offline for planned maintenance. Air Products has determined the loss of O2 was due to a failure in the steam supply control system for their liquid O2 vaporizer. The Air Products vaporizer was the sole source of O2 available at the time of the incident, as their Air Separation Unit (ASU) was restarting following a short maintenance outage.

To prevent this from happening again Air Products has committed to CRLLC to implement the following:

- The steam controllers have been repaired and rebuilt. Completed.
- A quarterly PM program has been implemented on the steam controllers. Completed.
- An evaluation of alarm changes to provide more response time. Expected completion 3/31/12.
- An evaluation to determine if additional facilities improvement upgrades are feasible. Expected completion 7/31/12.

In addition, CRLLC and Air Products have now implemented an improved communication protocol to better co-

ordinate maintenance and operating activities between both parties. Completed.

63.vi. A statement that: (a) specifically identifies each of the grounds for stipulated penalties in Paragraphs 66 and 67 of this Decree and describes whether or not the AG Flaring Incident falls under any of those grounds, provided, however, that CRLLC may choose to submit with the Root Cause Failure Analysis a payment of stipulated penalties in the nature of settlement without the need to specifically identify the grounds for the penalty. Such payment of stipulated penalties shall not constitute an admission of liability, nor shall it raise any presumption whatsoever about the nature, existence or strength of CRLLC's potential defenses;

The SO_2 emissions incident does not fall under any grounds for stipulated penalties in Paragraphs 66 and 67 of the Consent Decree.

The following are grounds for stipulated penalties in Paragraphs 66 and 67 of the Decree:

1. Error resulting from careless operation by the personnel charged with the responsibility for the Sulfur Recovery Plant, TGU, or Upstream Process Units
   - This incident was not the result of careless operation of the Sulfur Recovery Plant, TGU, or Upstream Process Units.
2. Failure to follow written procedures
   - This incident was not the result of a failure to follow written procedures.
3. A failure of equipment that is due to a failure by CRLLC to operate and maintain that equipment in a manner consistent with good engineering practice
   - None of the incidents were the result of the failure of equipment due to the failure of CRLLC to operate and maintain equipment in a manner consistent with good engineering practice.
4. Fire eye flame detection system faults or failures
   - Not applicable
5. Problems associated with low air flow shutdown and/or low steam drum levels when transitioning from use of O_2 to use of air in the SRP
   - Not applicable
6. Triple Modular Redundant power supply failures due to grounding problems
   - Not applicable
7. Failures of electrical distribution equipment due to lightning strikes or switchgear equipment failure located at the Chalmette Refinery, and which failures are unrelated to power supply or other equipment problems caused by or attributable to Entergy
   - Not applicable
8. Results in emissions of SO_2 at a rate >20 lbs per hour for 3 consecutive hours or more and CRLLC failed to act in accordance with its PMO Plan and/or take any action during the AG or TG Flaring Incident to limit the duration and/or quantity of SO_2 emissions associated with such incident
   - CRLLC followed its PMO Plan accordingly and took actions quickly to identify and eliminate the source of the flaring
9. Causes the total number of AG flaring incidents in a rolling twelve (12) month period to exceed five (5) for the Chalmette Refinery
   - This was the third Acid Gas Flaring incident in a rolling twelve (12) month period.

(b) if an AG Flaring Incident falls under Paragraph 68 of this Decree, describes which Subparagraph (i.e., 68.a or 68.b) applies and why;

Paragraph 68.a.(1) is applicable to this incident. The primary root cause occurred for the first time, and was not a recurring event that resulted in a previous Acid Gas Flaring Incident that occurred since the Entry Date. The primary root cause of this Acid Gas Flaring Incident was sudden, infrequent, and was not reasonably preventable through the exercise of good engineering practice.

c) if an AG Flaring Incident falls under either Paragraph 67 or Subparagraph 68.b, state whether or not CRLLC asserts a defense to the AG Flaring Incident or Tail Gas Incident, and if so, a description of the defense;

Not Applicable

63.vii. To the extent that investigations of the causes and/or possible corrective actions still are underway on the due date of the report, a statement of the anticipated date by which a follow-up report fully conforming to the requirements of Subparagraphs 63.iv and 63.v shall be submitted;

The initial investigation has been completed based on information available and therefore this single report of the incident conforms to all the requirements of Subparagraphs 63.iv and 63.v and has been submitted within the 45-day time period required. However, to the extent additional relevant information becomes available that information will be provided as part of the report on implementation of corrective actions, discussed in Subparagraph 63.viii within 30 days. Final implementation for long-lead time corrective steps will be submitted upon completion.

63.viii. To the extent that completion of the implementation of corrective action(s), if any, is not finalized at the time of the submission of the report required under this Paragraph, then, by no later than thirty (30) days after completion of the implementation of corrective action(s), CRLLC shall submit a report identifying the corrective action(s) taken and the dates of commencement and completion of implementation.

Although Chalmette is not responsible for any remaining corrective actions in this case, Chalmette will submit a report within 30 days of Air Products' confirmation that is has completed all corrective actions that were identified above.