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Chevron Richmond Refinery
Causal Analysis Report - December 18, 2014 Reportable Flaring Event

To Whom It May Concern:

Please find attached the causal analysis report for the reportable flaring event that occurred on December 18, 2014 at Chevron's Richmond Refinery. This report is submitted pursuant to Regulation 12, Rule 12, Section 12-12-406. The report is due within 60 days following the end of the month in which a reportable flaring event occurs.

If you have any questions regarding this report, please contact Steven Yang at (510) 242-9030.

Sincerely,

David Feiglstok

Attachments

Attachment I

Causal Analysis Report

Chevron Richmond Refinery
Reportable Flaring Event

Event Date: December 18, 2014
SDA Level Instrument

1. Date on which the report was drafted: February 26, 2015

2. The refinery name and site number:

Refinery: Chevron Richmond Refinery
Refinery Site Number: A0010

3. The assigned refinery contact name and phone number:

Contact Name: Steven Yang
Contact Phone Number: (510) 242-9030

Is this a rescission/modification of a previous report: No

Date of initial report: N/A

Reason for rescission/modification: N/A

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4. Identification of flare(s) at which the reportable event occurred by reviewing water seal monitoring data to determine which seals were breached during the event

Flare	**Reportable Event (SO_2 or Vent Gas Volume)**
SISO Flare (S-6012)	SO2 and Vent Gas Volume
NISO Flare (S-(6013)	None
FCC Flare (S-6016)	None
ALKY-POLY Flare (S-6019)	None
RLOP Flare (S-6039)	None

5. The flaring event duration for each affected flare

Flare (Source Number): SISO Flare (S-6012)
The Date(s) of the event: December 18, 2014
The start time of the event: 18:37
The end time of the event: 21:36
The net duration of event (in hours and minutes): 3 Hours, 0 Minutes

Flare (Source Number): NISO Flare (S-6013)
The Date(s) of the event: December 18, 2014
The start time of the event: 18:36
The end time of the event: 19:08
The net duration of event (in hours and minutes): 0 Hours, 33 Minutes

Flare (Source Number): FCC Flare (S-6016)
The Date(s) of the event: December 18, 2014
The start time of the event: 18:34
The end time of the event: 21:12
The net duration of event (in hours and minutes): 0 Hours, 52 Minutes (intermittently)

Flare (Source Number): ALKY-POLY Flare (S-6019)
The Date(s) of the event: December 18, 2014
The start time of the event: 18:41
The end time of the event: 19:07
The net duration of event (in hours and minutes): 0 Hours, 27 Minutes

Flare (Source Number): RLOP Flare (S-6039)
The Date(s) of the event: December 18, 2014
The start time of the event: 18:34
The end time of the event: 19:14
The net duration of event (in hours and minutes): 0 Hours, 41 Minutes

6. A brief description of the flaring event

On December 18, 2014 at approximately 16:30, the float mechanism on a level instrument in the Solvent Deasphalting (SDA) unit in the Hydroprocessing Area Business Unit malfunctioned. The loss of level control resulted in the flow of liquid asphalt and solvent to downstream equipment. The asphalt and solvent decreased the cooling capacity of the downstream equipment in the solvent recovery system. At approximately 18:23, consequential pressure buildup lifted a pressure safety valve as designed thus sending process gases to the flare gas recovery system.

Flaring occurred at the SISO (S-6012), NISO (S-6013), FCC (S-6016), Alky-Poly (S-6019), and RLOP (S-6039) flares when the flare gas recovery system capacity was exceeded. The sulfur dioxide (SO2) emissions from the South Isomax (SISO) flare exceeded 500 pounds (lbs) within a calendar day. The vent gas volume from the SISO flare exceeded 500,000 SCF within a calendar day. Flaring continued until 21:36 while the plant was being safely shut down.

Operators took actions to reduce high pressure in downstream equipment and executed a shutdown of the SDA unit.

7. A process flow diagram showing the equipment and process units that were the primary cause of the event.

See Attachment Ia.

8. The total volume of vent gas flared (MMSCF) throughout the event

Flare	Vent Gas Volume (MMSCF)
SISO	1.100334
NISO	0.032478
FCC	0.057521
ALKY-POLY	0.003063
RLOP	0.007202

9. The emissions associated with the flaring event per calendar day

Flare	Calendar Day	CH4 (lbs.)	NMHC (lbs.)	SO_2 (lbs.)

SISO	December 18, 2014	375.7	1492.3	1347.5
NISO	December 18, 2014	6.2	41.6	414.4
FCC	December 18, 2014	42.0	5.3	0.1
ALKY-POLY	December 18, 2014	0.8	4.7	0.0
RLOP	December 18, 2014	1.3	6.4	98.3

Assumptions used to calculate emissions – consistent with the reporting under Reg. 12-11.

10. A statement as to whether or not the gas was scrubbed to eliminate or reduce any entrained compounds and a list of the compounds for which the scrubbing was performed.

The flare gas was not scrubbed to eliminate or reduce any entrained compounds. The scrubbers (C-890 and C-840) are only used in the event acid gas needs to be routed to relief.

11. The primary cause of the flaring event including a detailed description of the cause and all contributing factors. Also identify the upstream process units that contributed vent gas flow to the flare header and provide other flow instrumentation data where available.

Root Cause:

- The float-style level indicator, 67LI122A, stuck at approximately 40%. Due to this false low indication, the level controller, 67LC122, closed the level control valve in an attempt to reach the level setpoint of 45% and caused C-122 to overfill with asphalt. There was an active plan to install an analog nuclear level indication in Jan. 2015, and its installation is now complete.

Contributing Causes:

- One contributing cause was a less-than-adequate response to high level alarm 67LAH122, which had a recent history of numerous spurious alarms. There was an acknowledgement of the alarm, but neither the day shift nor night shift control board operator (CBO) took action to investigate the situation.

- The second contributing cause was related to gaps in the CBO turnover. Had the panel alarm, 67LAH122, been explicitly discussed during turnover, the CBOs would have likely acted sooner to investigate the alarm and correct the high asphalt level in C-122.

12. Describe all immediate corrective actions to stabilize the flaring event, and to reduce or eliminate emissions (flare gas recovered or stored to minimize flaring during the event). If a decision was made not to store or recover flare gas, explain why.

The immediate correction action was operators shutdown the SDA unit.

13. Was the flaring the results of an emergency? If so, was the flaring necessary to prevent an accident, hazard or release to the atmosphere?

The flaring was not due to an Emergency (defined in Regulation 12-12-201) as interpreted by the BAAQMD. However, the root cause of the flaring was the result of a malfunction in the float-style level indicator, 67LI22A.

14. If not the result of an emergency and necessary to prevent an accident, hazard or release to the atmosphere, was the flaring consistent with an approved FMP? If yes, provide a citation to the facility's FMP and any explanation necessary to understand the basis for this determination.

The root cause of the flaring was a malfunction and the flaring was necessary to prevent an accident, hazard, or release to the atmosphere. Nevertheless, the flaring was consistent with Chevron's FMP Section 5.4 Figure 5-1. This event was unplanned. The cause for the flaring was analyzed through an investigation and the main corrective action has been implemented to reduce the likelihood of a recurrence of flaring resulting from the same cause. Other prevention measures have been considered, have been determined to be feasible and have been or will be implemented as described in Section 16.

15. If the flaring was due to a regulatory mandate to vent to flare, why couldn't the gas be recovered, treated, and used as fuel gas?

N/A. Flaring was not due to regulatory mandate.

16. Identify and describe in detail each prevention measure (PM) considered to minimize flaring from the type of reportable flaring event that occurred.
a) State whether the PM is feasible (and will be implemented), or not feasible
b) Explain why the PM is not feasible, if applicable

The following prevention measures have been considered, have been determined to be feasible, and have been or will be implemented.

1. Complete the installation of the analog nuclear level indication device.

   Completed on: 1/10/2015

2. Consider adding low output alarms on asphalt level controllers 67LC102 and 67LC122

   Completed on: 1/6/2015

3. Consider limiting the minimum automatic closure of asphalt level control valves 67LV102 and 67LV122.

   Projected Completion Date: 8/31/2015

4. Conduct a level instrumentation review/analysis of C-102,103,122, & 123. The review should include determining appropriate reliable level indication technologies, understanding operating level ranges within the vessels, and determining the appropriate elevations of level taps and physical locations of instruments on equipment. Develop an appropriate control and alarm strategy to allow sufficient operator response time while providing proper product separation. Ensure appropriate maintenance strategies are in place for level indicators.

   Projected Completion Date: 6/30/2016

5. Improve stewardship of the Process Improvement Team meeting work process to ensure that instruments causing frequent alarms are investigated and that prioritized corrective action plans are developed and tracked to resolution.

   Projected Completion Date: 12/31/2015

6. Explore options for improved operator troubleshooting tools to help detect inaccurate asphalt level indication. This should include options for dedicated screens for critical process trends.

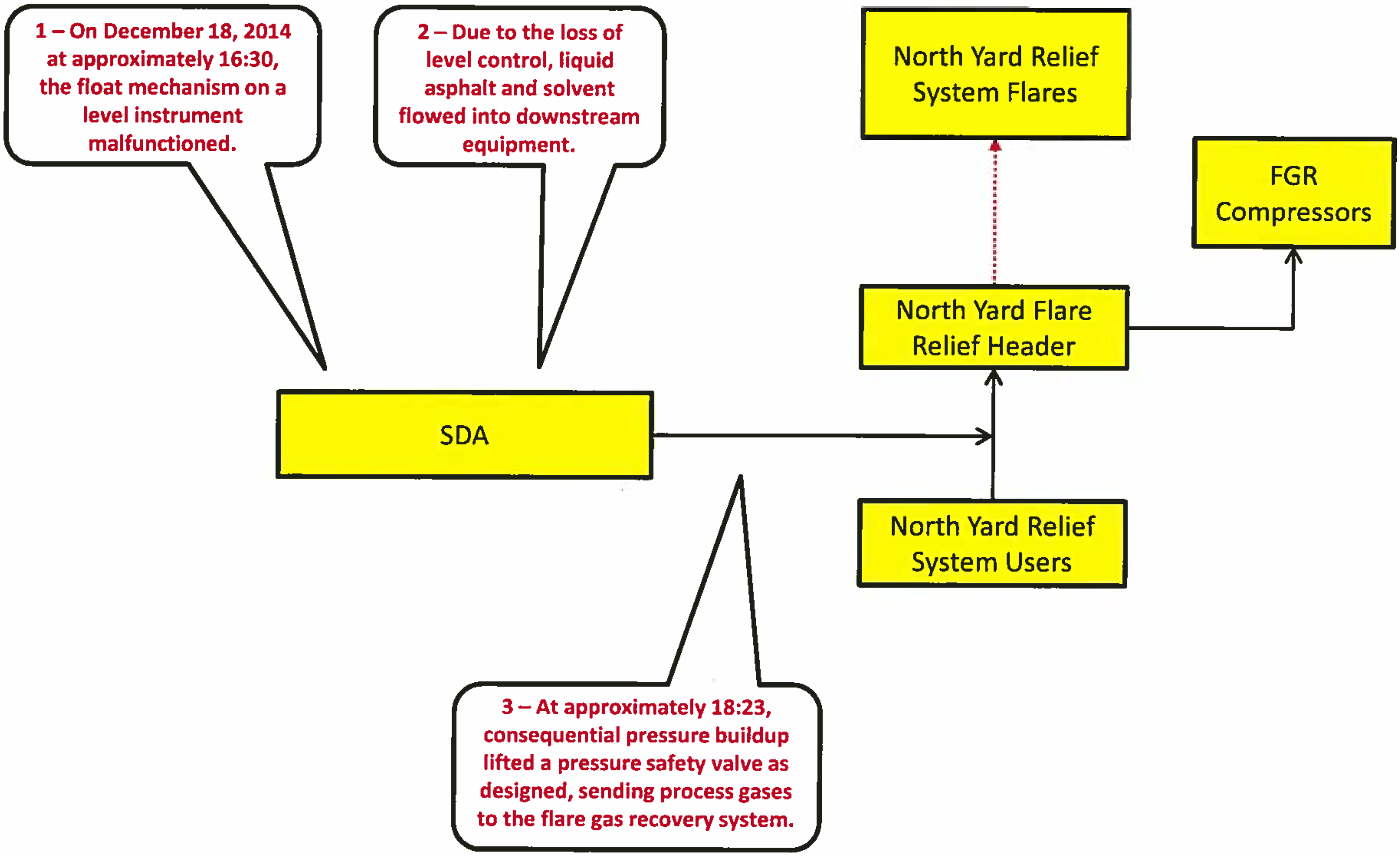
   Projected Completion Date: 8/31/2016

7. Develop and implement a CBO standard shift turnover process which should include a review of critical alarm status.

   Projected Completion Date: 6/30/2016

Attachment Ia

SDA Level Instrument Flaring Incident



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