

18-01-04-01



**CHEMTRADE**

**RECEIVED**

**FEB 28 2018**

Contra Costa Health  
Hazardous Materials

February 28, 2018

Attn: Randall L. Sawyer  
Chief Environmental Health and Hazardous Materials Officer  
Contra Costa County Hazardous Materials Programs  
4585 Pacheco Boulevard, Suite 100  
Martinez, CA 94553

**Re: Chemtrade West US LLC – Richmond Facility 30 Day Follow-Up Report**

Mr. Sawyer,

Please find enclosed the 30-day follow up report for the incident that occurred at the Chemtrade West US, LLC facility on January 4<sup>th</sup>, 2018.

If you should have any questions, please contact me at (510) 232-7193 X226.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'Mike Shepherd'.

Mike Shepherd  
Plant Manager  
Chemtrade West US LLC – Richmond

**ATTACHMENT C  
30-DAY FOLLOW-UP NOTIFICATION REPORT FORM  
CONTRA COSTA HEALTH SERVICES**

<b>For CCHS Use Only:</b>  Received By: _____ Date Received: _____ Incident Number: _____ Copied To: _____ Event Classification Level: _____
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**INSTRUCTIONS:** A hardcopy and an electronic copy of this report is to be submitted for all Level 2 and 3 incidents or when requested by CCHS. See Attachment C-1 for suggestions regarding the type of information to be included in the report. Attach additional sheets as necessary. This form is to be used for update reports after the initial 30-day report has been submitted. Forward the completed form to:

ATTENTION: Randall L. Sawyer  
Chief Environmental Health and Hazardous Materials Officer  
Contra Costa Hazardous Materials Programs  
4585 Pacheco Boulevard, Suite 100  
Martinez, CA 94553

INCIDENT DATE: January 4, 2018  
INCIDENT TIME: 09:00 a.m.  
FACILITY: Chemtrade West US, LLC.

**PERSON TO CONTACT FOR ADDITIONAL INFORMATION**

Michael Shepherd Phone number (510) 232-7193 X226

**PROVIDE ANY ADDITIONAL INFORMATION THAT WAS NOT INCLUDED IN THE 72-HOUR REPORT WHEN THE 72-HOUR REPORT WAS SUBMITTED, INCLUDING MATERIAL RELEASED AND ESTIMATED OR KNOWN QUANTITIES, COMMUNITY IMPACT, INJURIES, ETC.:**

**I. INCIDENT INVESTIGATION RESULTS**

Is the investigation of the incident complete at this time? X Yes        No  
If the answer is no, when do you expect completion of the investigation?

        
If the answer is yes, complete the following:

**SUMMARIZE INVESTIGATION RESULTS BELOW OR ATTACH COPY OF REPORT:**

Please see attached report

**SUMMARIZE PREVENTATIVE MEASURES TO BE TAKEN TO PREVENT RECURRENCE INCLUDING MILESTONE AND COMPLETION DATES FOR IMPLEMENTATION:**

Please see attached report

**30-DAY REPORT, PAGE 2**

**INCIDENT DATE:** January 4, 2018

**FACILITY:** Chemtrade West US, LLC.

**STATE AND DESCRIBE THE ROOT-CAUSE(S) OF THE INCIDENT:**

Please see attached report



Incident Report #: IR-2018-RICH-01  
Initiated By: Hornbeck, Andrew

Incident Type: Environmental  
Status: Initial

**Section I: Preliminary Information**

<b>Title:</b>	Oleum Spill and SO3 Release	<b>Date Of Incident:</b>	1/4/2018
		<b>Time Of Incident:</b>	9:00 AM
		<b>Date Reported:</b>	1/4/2018
<b>Classification:</b>	Reportable Release	<b>Dept. where incident occurred:</b>	Ultra Pure Sulfuric Acid

<b>Company:</b>	Chemtrade West US LLC	<b>Onsite Area:</b>	Ultra Pure Sulfuric Acid
<b>Location:</b>	Richmond, CA	<b>Offsite Location:</b>	No
<b>State/Province &amp; Country:</b>	Richmond, CA	<b>Offsite Location:</b>	

**Initial Incident Description: (be sure to address who, what, where and when)**

On January 4th, an oleum leak on a heat exchanger resulted in a vapor cloud release of sulfur trioxide (SO3). The site contacted 911 to shut down the adjacent highway as a precaution to prevent any potential off-site impacts from the vapor cloud. The initial estimate of the release was 106 pounds, which was later recalculated at 38 pounds. The Reportable Quantity (RQ) for SO3 is 100 pounds. A potential RQ exceedance was reported to the National Response Center, California Office of Emergency Services, the local County Hazardous Materials division, and the Bay Area Air Quality District.

**Follow-up Investigation Details: (address the why and how)**

The root cause was identified as management systems. The inlet head had been installed improperly. An impingement plate was installed on the discharge side head, rather than the inlet side head as the design specified. This resulted in accelerated corrosion rates. Corrective actions include updating the drawings and increased oversight of third party repairs. Preventative action is the elimination of this heat exchanger from the process. Until then, steps to ensure correct manufacturing or repair, inspection and assembly are being implemented. A permit amendment application will be submitted by May 28, 2018 to the Bay Area Air Quality Management District requesting removal of the heat exchanger from the process.

On Thursday, January 4th, sunrise was at 7:25 AM. The temperature was approximately 54 F, with low levels of fog moving to the south east, supporting winds of approximately 10-15 mph. Visibility was somewhat limited. Traffic along the adjacent roadway, Castro Street, was considered light (normally moderate traffic at this time of the day). January 4th was normal business day, and adjacent businesses were all operating as usual. The release occurred around 9:00 am.

This event was investigated on-site by David Bissot, Senior Reliability Engineer, and Tony Gutenberg, Regional EHS Manager, on January 8, 2018. The investigation team utilized TapRoot methodology for root cause analysis. Taproot is a systematic process based on human factors and equipment reliability factors. The primary goal of the technique is to determine the root cause of a defect or problem. The root cause, using the TapRoot methodology was identified as management systems.

The inlet head on the heat exchanger had been installed improperly, without an impingement plate. Oleum returning to the heat exchanger from the strippers cascades, by gravity, into the heat exchanger. With this cascading, SO3 vapor is also carried into the vessel. When these vapor bubbles get into the head (and early tube sections) they get re-absorbed into the oleum causing a bubble collapse similar to cavitation. When this happens, protective iron sulfate layers on the metal surfaces are removed causing accelerated localized corrosion. Without the impingement plate, the bubble has a greater propensity to collapse at the very bottom of the inlet head due to the slightly greater pressure there, increasing the corrosion rate in that area. Since the tubes have little or no corrosion allowance, they usually fail first. Without a definitive method of complete vapor removal, it is expected that similar tube failures will continue approximately every 18 months.

The Contra Costa Inherently Safer Systems Check sheet was reviewed during the course of this investigation. The recommendation resulting from that review is to remove the heat exchanger from the process. The heat exchanger, installed for energy and steam conservation, is of questionable value for either energy conservation or cost benefit.

The investigation identified the plant implemented its emergency response procedures effectively. The plant manager, immediately investigated the concern, and without delay, activated the plant-wide emergency siren. Non-essential employees (those not responding to the Oleum release) moved to shelter in place and everyone was quickly accounted for. In addition, the plant manager effectively engaged a precautionary process to close the adjacent Castro roadway and directed police to position themselves at a safe distance. Based on the combination of fog, steam from the plant itself and the white mist of SO3, it was difficult to identify the exact volume of the release, so the decision to close the road, based on wind direction was correct.

During the incident, the plant effectively exercised its Incident Command System structure, with the plant manager assuming the role of Incident Commander (IC), while the plant's Environmental, Health & Safety Supervisor assumed the communication role to liaise with the numerous first responders. Particularly effective was the plant's ability to keep First Responders (i.e. Police) from entering the plant, thus keeping them safely away from potential exposure to SO3. Plant employees responded effectively to the release, moving to the area quickly, but only after donning the correct PPE- including acid suits and self-contained breathing apparatus. As noted, there were no reports of any exposure to SO3, and no injuries sustained from this event.

**Type Of Incident:**

Near Miss       RMP Event      NAICS #:

Fatality	
Contractor Fatality	
Recordable Case	
Contractor Recordable	
First-Aid Case	

Process Safety	
Industrial Hygiene	
Regulatory Type Inspection	
Derailment	
Vehicular Accident	

Contractor First-Aid Case	
Fire/Explosion	
Enforcement Action (NOV, NOE, etc.)	
Permit Excursion	
RQ Release	
Compliance Issue	
Reportable Release	X
Spill/Release	X
Mechanical Integrity	

Property damage	
TSCA Allegation	
Complaint	
Security	
Near Miss	
Contractor Near Miss	
Hazard	
Other	

**Photos/Attachments/Supporting Documentation**

Description	Attachment	Comment
	Contra Costa 30 Day Follow-Up Report.pdf	
	Contra costa ISS checklist Jan 2018 R1.xlsx	
	IR-2018-RICH-01 Level I Investigation Report.pdf	
	Richmond oleum release 20180104 Calculation.xlsx	
	BAAQMD 30-Day Follow Up Report.pdf	
	72 Hour Contra Costa Incident Notification.pdf	
	CalOES 30-Day Follow-Up Report.pdf	

Did this incident involve?  
(choose from adjacent list)

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Bomb Threat                           | <input checked="" type="checkbox"/> Business Interruption | <input type="checkbox"/> Community Evacuation              |
| <input type="checkbox"/> Off-Site Impact                       | <input checked="" type="checkbox"/> Site Evacuation       | <input type="checkbox"/> Workplace Violence                |
| <input checked="" type="checkbox"/> Off-Site ER Plan Activated | <input type="checkbox"/> Evacuation of Bldg/Area          | <input checked="" type="checkbox"/> Site ER Plan Activated |
- Did this incident cause a shutdown?  YES      Type:

**Contact Information:**

Main ESHA Contact(s):	
Authoritles Notified? Yes	City of Richmond Fire Dept, NRC, BAAQMD, and Contra Costa County
Media Coverage? No	
Evacuation of Persons? No	
Corporate CHEMTRADE Notified? Yes	1/8/2018 10:56:28 AM
Site Contact(s) Notified? Yes	1/8/2018 10:56:28 AM
ESHA Contact Notified? No	
Transport Contact Notified? No	

**Weather Information:**

Weather Description:	Calm		
Wind Direction:	ESE	Humidity (%):	85
Wind Speed:	10.00	Barometric Pressure:	
Temperature:	55		

**Witness Information:**

Individual's Name	Company	Job Title	Phone (if needed)
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**Injury/Illness Information:**

Involved Name	Employer	Job Title	Phone	Lost Days	Restricted Days
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**Section II: Property**

<b>Site Equipment</b>			
Equipment	Description	Damage Involved	Loss Incurred

<b>Transportation Equipment</b>			
Carrier	Vehicle Number(s)	Driver	Loss Incurred

**Section III: Chemical Release**

Chemical	Agency Reportable?	Above Reportable Qty?	Release Type	Release Media	Qty Involved	Qty Contained	Qty Released	Duration
Sulfur Trioxide	N	N	Point Source	Air	38.00 lbs	38.00 lbs	38.00 lbs	2340 sec
<b>Basis of calculations:</b>	Engineering calculations							

Permit Type	Permit #	Parameter	Media Impacted	Permit Limit	Quantity
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**Section IV: Investigation**

**Date Investigation Began:** 1/4/2018  
**Investigation Lead:** Andrew Hornbeck  
**Investigation Team Members:** David Bissot  
 Tony Gutenberg

Incident Causes	
Cause	Comment
Drawings/Prints Needs Improvement	The drawings of the heat exchanger were incomplete, leading to the impingement plate being installed improperly. Additionally, stamps or pins were not in place to indicate vessel position on the plate. Inspection and repair documentation was not complete or available. There were differences between the actual response of operators performing shutdown activities in response to the release from what is documented in the SOP's. SOP's address the entire plant and do not consider the oleum plant as a separate entity. The equipment files are confusing due to the inclusion of multiple copies of the same documents and no segregation of individual vessel records. Heat Exchanger E-5001 is included in the Construction, Maintenance, and Management System (CMMS), but has no preventative maintenance tasks or corrective work orders associated with it.
Inspection Not Required	The inlet head of the exchanger was installed improperly. The maintenance procedure did not require inspection, therefore the improper installation was not discovered.

Action to Prevent Recurrence	Assigned To	Target Date	Corrective Action Taken	Date Completed
Investigate cause of Oleum Leak	Hornbeck, Andrew	1/19/2018	Investigation complete. See Incident Report for details	2/16/2018



Action to Prevent Recurrence	Assigned To	Target Date	Corrective Action Taken	Date Completed
Update heat exchanger drawings to include all modifications that have been made including nozzles, impingement plate and Teflon insert. Include a design data block on the drawing to show minimum thickness and corrosion allowances. The impingement plate and inserts should be mounted by vessel manufacturer or repair facility.	Skinner, Jeffery	5/2/2018		
Stamp the inlet and discharge heads with the national board number and vessel position it belongs to. Other possibilities might include installation of locating pins in the flanges to prevent misassembly.	Fanaii, Farid	5/2/2018		
Develop the use of whatever CMMS is in use to include the preventive and corrective maintenance actions that are performed on this vessel. For the near term this should include frequent thickness checks of the vessel in the areas of welds and near nozzles.	Fanaii, Farid	5/2/2018		
Modify the equipment file to segregate and follow individual vessels. Within the file include an archive for old vessel information and other folders for current vessel drawings and design and repair information.	Fanaii, Farid	7/31/2018		
When sending a heat exchanger or other vessel to a repair facility designate when the vessel is inspected to IAW API or National Board standards. Be at the shop when the major inspection is being conducted to make repair/replace decisions. For these heat exchangers pay particular attention to weld, nozzles and expansion joint pitting.	Fanaii, Farid	5/2/2018		
Review possible elimination of this heat exchanger (E-5001) from the stripper oleum loop and develop a timeline for achievement	Skinner, Jeffery	5/2/2018		

Action to Prevent Recurrence	Assigned To	Target Date	Corrective Action Taken	Date Completed
Review and develop or modify SOP's to reflect the actions actually taken during an emergency, especially around the oleum and ultrapure inclusive systems	Hornbeck, Andrew	7/31/2018		
Plant management to work with existing Community Advisory Panel to better define emergency events and level of response.	Shepherd, Michael	7/31/2018		
Consider developing table top exercises and command post exercises with employees and Community Advisory Panel on a more frequent basis. Consider inclusion of Community Advisory Panel from first responder agencies to also participate.	Shepherd, Michael	5/2/2018		
Submit a permit application to the BAAQMD to remove the heat exchanger from the process.	Hornbeck, Andrew	5/28/2018		

#### Section V: Cost

Equipment:

Raw Matl:

Cleanup:

Medical:

Total:                                \$0.00

REVIEW & SIGNATURES	
Date of Report: <u>1/4/2018</u>	Prepared By: <u>Andrew Hornbeck</u>
<b>REPORT MUST BE APPROVED BY APPROPRIATE MANAGER</b>	
Date Reviewed: <u>2/28/2018</u>	Signature: 