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**Process Safety Management &  
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January 30, 2013

Randall L. Sawyer  
Hazardous Materials Program Director  
Contra Costa Health Services Department  
4333 Pacheco Boulevard  
Martinez, CA 94553-2229

RE: Fourth Update to the 30-Day Report for the CWS Level 3 Event of August 6, 2012, *amended with minor typographical corrections.*

Dear Mr. Sawyer,

In accordance with the December 14, 2004 Contra Costa Health Services (CCHS) Department Hazardous Materials Incident Notification Policy, Chevron U.S.A. Inc. ("CUSA") is providing an update to the 30-Day Report for the Community Warning System Level 3 event that occurred at the Richmond Refinery on August 6, 2012.

The attached "Update to the 30-Day Follow-Up Notification Report Form" includes some minor textual clarifications and updates Sections VIII and XI as follows:

**VIII. COMMUNITY IMPACT**

CUSA's had previously stated that it intended to compensate community members with valid claims. This update provides that, as of January 21, 2013, approximately 23,900 claims have been initiated, and that CUSA provided approximately \$10 million in compensation to area hospitals, affected community members with valid claims, and local government agencies in Richmond and West Contra Costa County.

**XI. SUMMARIZE PREVENTABLE MEASURES TO BE TAKEN TO PREVENT RECURRENCE INCLUDING MILESTONE AND COMPLETION DATES FOR IMPLEMENTATION.**

CUSA had previously stated that, since its investigation was ongoing, we were unable to identify or summarize all measures to prevent recurrence. This update provides that, while the investigation is still not complete, the refinery has begun to develop and implement the following corrective actions based on preliminary observations from the investigation team. We have met with governmental agencies,

including the CSB, Cal/OSHA, and the County to discuss these efforts. Additional actions may be identified upon completion of the investigation, but the following efforts are already underway:

#### Low Silicon Carbon Steel and Piping Component Inspections

- As stated in the Industry Alert we issued in September 2012, carbon steel piping with low-silicon content is susceptible to accelerated corrosion when exposed to high-temperature sulfidation (HTS) conditions. Based on preliminary information from the test laboratory, the pipe component that ruptured had low-silicon content and general thinning. This thinning was not readily detected by existing corrosion monitoring locations. To address this issue, the company is inspecting all components potentially susceptible to accelerated HTS corrosion and will complete inspection of all such components in the No. 4 Crude Unit before restarting the unit. If we do locate any components that are not suitable for service they will be replaced.

#### Mechanical Integrity Program

- The refinery is implementing a process to review, prioritize, and act upon mechanical integrity-related recommendations from internal and external technical experts, including industry standards and alerts.
- The refinery is enhancing its mechanical integrity program to ensure that the proper identification and monitoring of piping circuits for all potential damage mechanisms, not just HTS corrosion. Our goal is to enhance and standardize our inspection method and documentation system.

#### Assessment, Decision-Making, and Oversight

- The refinery is implementing a process for additional oversight of mechanical integrity-related recommendations and inspection plans. We also are taking steps to make certain that relevant technical studies and inspection data are considered for equipment reliability plans and other processes used to ensure process safety.
- The refinery is reviewing and strengthening its procedures for analyzing process hazards to ensure that work teams consider known failure threats/mechanisms. We also are considering a project to evaluate the purpose and methods of various process safety-related reviews to determine if these activities can be combined or better sequenced to improve risk understanding and promote better process safety outcomes.
- The refinery is reviewing and improving its requirements for training and competency for leaders, inspectors, and engineers. We also are making certain that we have the appropriate technical resources to assist in any evaluation of the fitness of equipment for service.

#### Leak Response

- The refinery is revising internal policies and checklists to ensure appropriate information—including process safety information and inspection history and data—is considered when evaluating leaks and addressing whether to shut down or continue operation of equipment. We intend to share the resulting leak response protocol with other Bay Area refineries.
- We are looking at the industry's experience with major losses of containment to determine if we should change our standards for fire protection or loss prevention.

Safety Focus

- We are reemphasizing our expectations around process safety to clarify our responsibility for process safety performance and the importance of incorporating process safety into decision-making.

Chevron U.S.A. Inc. will continue to provide written documentation of current status and updates to the 30-Day Report until the final investigation results and recommendations have been shared.

If you have any questions or comments, please feel free to contact Karen Draper of my staff at (510) 242-1547 or me.



Steve Wildman

*Attachment: Update to the 30-Day Follow-Up Notification Report Form with amendments to typographical errors.*

*Attachment: Update to the 30-Day Follow-Up Notification Report containing typographical errors – for record keeping purposes.*

**ATTACHMENT C**

**Update to the 30 DAY FOLLOW-UP NOTIFICATION REPORT FORM  
CONTRA COSTA HEALTH SERVICES**

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For CCHS Use Only:  Received By: _____  Date Received: _____  Incident Number: _____  Copied To: _____  Event Classification Level: _____
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**ATTENTION:** Randall L. Sawyer  
Hazardous Materials Program Director  
Contra Costa Health Services Department  
4333 Pacheco Boulevard  
Martinez, CA 94553

**INCIDENT DATE:** August 6, 2012  
**INCIDENT TIME:** 6:30 PM  
**FACILITY:** Chevron U.S.A. Inc. Richmond Refinery

**PERSON TO CONTACT FOR ADDITIONAL INFORMATION:** Karen Draper  
**Phone Number:** (510) 242-1547

**PROVIDE ANY ADDITIONAL INFORMATION THAT WAS NOT INCLUDED IN THE 30-DAY REPORT WHEN THE 30-DAY REPORT WAS SUBMITTED, INCLUDING MATERIAL RELEASED AND ESTIMATED OR KNOWN QUANTITIES, COMMUNITY IMPACT, INJURIES, ETC.:**

**I. SUMMARY OF EVENT**

On August 6, 2012, a piping rupture occurred in the #4 Crude Unit at the Chevron U.S.A. Inc. refinery in Richmond, CA, and subsequently a fire ignited in the area of the rupture. The rupture involved an 8" carbon-steel atmospheric gas-oil pipe line from the atmospheric distillation tower.

The primary location of the fire was near P-1149 (C-1100 Atmospheric Column No. 4 Sidecut pump). At the time of the fire, Operations personnel were in the process of evaluating a reported leak with the assistance of Chevron Fire Department personnel.

The #4 Crude Unit distills crude oil into various fractions of different boiling ranges, each of which is then processed further in the other refinery processing units. The #4 Crude Unit at Richmond Refinery has both an Atmospheric Distillation column and a Vacuum Distillation column. This incident involved equipment associated with the Atmospheric Distillation column.

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The company's investigation into this incident is on-going. Some of the information in this report is preliminary.

## II. AGENCIES NOTIFIED, INCLUDING TIME OF NOTIFICATION

**Primary:** Community Warning System (CWS):

- Level 3 CWS (shelter in place) activated at approximately 6:35 PM (which served as the initial notification to most of the agencies below)
- The shelter in place was lifted by Contra Costa County Hazardous Materials Programs (CCHMP) at 11:30 PM

**Secondary:** Subsequent notifications via telephone to the agencies below:

State of Emergency Services	Bob McRae	800-852-7550 or 916-845-8911	6:53 PM
National Response Center (NRC)	Garther	800-424-8802	6:59 PM
Contra Costa Hazardous Materials Program (CCHMP)	Melissa Hagen	925-335-3200	7:28 PM
Bay Area Air Quality Management District (BAAQMD)	Mr. Scott	415-749-4979	7:33 PM
Richmond Fire/ Police Central Dispatch	Dispatch	510-620-6933	7:40 PM
California Division of Occupational Safety and Health (Cal/OSHA)	Clyde Trombettas	925-602-6517	10:09 PM

## III. AGENCIES RESPONDING, INCLUDING CONTACT NAMES AND PHONE NUMBERS:

The list below does not include all representatives from the respective agencies

Cal/OSHA	Clyde Trombettas	925-602-2665
CCHMP	Trisha Asuncion	925-335-3200
BAAQMD	Jackie Huynh	415-749-4979
OSPR– Dept. Fish & Game	Bob Chedsey	707-864-4975
U.S. EPA	Scott Adair	415-947-4549
Richmond Police Department	Responding Officers	510-233-1214
U. S. Chemical Safety and Hazard Investigation Board (CSB)	Dan Tillema	303-236-8703

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#### IV. EMERGENCY RESPONSE ACTION:

At or around 3:48 PM on August 6, 2012, an operator noticed a small leak from insulated piping on the C-1100 Atmospheric Distillation Column of the 4 Crude Unit. The operator immediately notified the Head Operator and Supervisor for the unit and initiated a dialogue regarding next steps and how to isolate the leak.

The standard practice of the Chevron Fire Department (CFD) is to respond to leaks, spills, and releases. In this instance, the CFD was notified at 4:02 PM that a leak had been discovered at the 4 Crude Unit. The CFD was asked to deploy a crew to the location as a precaution. The CFD arrived at the location between 4:07 PM and 4:09 PM and initiated air monitoring and assessment.

From 4:09 PM to 4:19 PM the rate of feed to the unit was reduced. Then, from 4:20 PM to 6:24 PM, Operations personnel, in conjunction with the CFD, investigated and assessed options. While the leak was being assessed, the CFD set up an engine and had two hose teams in place, one directed at the potential source of the leak and one directed at the personnel assessing the leak. At approximately 6:22PM, a small flash fire occurred on the insulated piping going to P-1149/A. The CFD and Plant Operators activated water spray and extinguished the small flash fire. At some point shortly before 6:25 PM, the size of the release abruptly increased. Between 6:25 PM and 6:28 PM, the order was given to shut down the unit. Around this time a white cloud was visible. At or around 6:32 PM, the fire that is the subject of this report and ongoing investigation ignited.

At 6:38 PM, a Community Warning System Level 3 alert was initiated by Chevron U.S.A. Inc. and the CWS alarm sounded. At or around this timeframe, both Petro-Chem Mutual Aid and Municipal Mutual Aid were called in for support. This included: Richmond Fire, El Cerrito Fire, Berkeley Fire, Contra Costa County Fire, Moraga/Orinda Fire, Hercules/Rodeo Fire, Phillips 66, Valero, Shell, Tesoro and Dow Fire. Also at or around this timeframe, a shelter-in-place order was issued for Richmond, San Pablo, and North Richmond. The shelter-in-place order advised residents to remain indoors until the fire was controlled. At 11:12 PM, the shelter-in-place order was lifted by CCHMP.

#### V. IDENTITY OF MATERIAL RELEASED AND ESTIMATED OR KNOWN QUANTITIES:

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Emergency Planning and Community Right-To-Know Act (EPCRA) require reporting when a facility releases more than a "reportable quantity" of a hazardous substance. The reportable release thresholds are based upon EPCRA & CERCLA reporting requirements. There was a reportable quantity of sulfur dioxide released from the fire and the flaring associated with the fire.

As a result of our continuing investigation, emission calculations from flaring associated with the event have been refined and summarized below.

Flare emissions (8/6 – 8/10)*	
Material Release	Quantity Released
Vent Gas Volume	8,021,389 SCF
Sulfur Dioxide (SO <sub>2</sub> )	8,772 pounds
Methane	1,713 pounds
Non-Methane Hydrocarbon	3,794 pounds
Hydrogen Sulfide (H <sub>2</sub> S)	46 pounds
Nitric Oxides (NO <sub>x</sub> )	937 pounds

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\* Flare emission data includes emissions from the initial release and from depressuring the unit through August 10, 2012

As a result of our continuing investigation, emissions calculations from the fire that were in excess of a reportable quantity have been refined and summarized below:

Fire Emissions		
Material Released	Quantity Released	Reportable Release Thresholds
Sulfur Dioxide (SO <sub>2</sub> )	2,017 pounds	500 pounds

Emission estimates herein are based on currently available data and are subject to change based on further investigation and analysis.

**VI. METEOROLOGICAL CONDITIONS AT TIME OF EVENT:**

Wind Speed	11.5 MPH
Wind Direction	134° (SE)
Precipitation	None
Temperature (F)	75°

**VII. DESCRIPTION OF INJURIES:**

The following employee injuries were associated with this incident (all were part of the emergency response):

- 1) Employee received minor burn to small area of the left ear
- 2) Employee received minor burn to left wrist
- 3) Employee suffered abdominal discomfort
- 4) Employee suffered respiratory irritation
- 5) Employee suffered blister to lower leg from boot wear
- 6) Employee suffered bruise to a finger

All employees received first aid onsite by the Chevron Fire Department and/or the onsite clinic. All employees returned to work on the same shift. There were no injuries to contractor personnel associated with this incident.

**VIII. COMMUNITY IMPACT:**

A shelter-in-place order was issued for Richmond, San Pablo, and North Richmond, which advised residents to remain indoors until the fire was controlled. According to the Contra Costa Health Services website, a large number of people sought medical attention at local emergency rooms (three individuals were admitted to the hospital). Most cases have been minor complaints of nose, throat or eye irritation or respiratory issues.

- a) Chevron U.S.A. Inc. established a claims process to compensate community members for medical and property expenses incurred as a result of the incident. As of January 21, 2013, approximately 23,900 claims have been initiated, and Chevron U.S.A. Inc. has spent approximately \$10 million to compensate

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area hospitals, affected community members with valid claims, and local government agencies in Richmond and West Contra Costa County.

b) On August 6, 2012, seventeen (17) direct-reading samples were taken using an Industrial Scientific MX6 iBrid multi-gas monitor. The data from these samples confirms that concentrations for Hydrogen Sulfide (H<sub>2</sub>S), Sulfur Dioxide (SO<sub>2</sub>) and Carbon Monoxide (CO) were below detectable limits (<0.1ppm, <0.1ppm, and <1ppm respectively). Additionally, nineteen (19) grab samples were collected in Tedlar bags in various downwind locations in Richmond, California, El Sobrante, California, and El Cerrito, California. These samples were sent for analysis of sulfur compounds and hydrocarbons to Air Toxics Ltd., a laboratory specializing in the analysis of air using a wide variety of methods. All results from these samples were well below both the California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA) Reference Exposure Levels and California Occupational Safety and Health Administration (Cal/OSHA) Permissible Exposure Limits.

Follow-up community monitoring was conducted by Chevron U.S.A. Inc. at various locations throughout Richmond, California on August 7-8, 2012. Twenty (20) direct-reading air samples were taken during this timeframe using an Industrial Scientific MX6 iBrid multi-gas monitor. The data from these samples also confirms that concentrations of Hydrogen Sulfide (H<sub>2</sub>S), Sulfur Dioxide (SO<sub>2</sub>) and Carbon Monoxide (CO) were below detection limits (<0.1ppm, <0.1ppm, and <1ppm respectively). In addition, six (6) grab samples were collected in Tedlar bags during this timeframe at various locations in Richmond, California and were sent to Air Toxics Ltd Laboratory for analysis of sulfur compounds and hydrocarbons. Consistent with the above-referenced findings, all results from these samples were well below the OEHHA Reference Exposure Levels and Cal/OSHA Permissible Exposure Limits. Please note, however, that the laboratory detection limit for Acrolein is higher than the OEHHA Reference Exposure Limit.

c) Fence-line monitoring: Continuous monitoring data is gathered around the clock from instrumentation located at Chevron's Office Hill, Castro Street and Gertrude Street monitoring stations. A data point, close to or prior to the incident, is employed as a reference. The following maximum readings were recorded between the times the fire ignited and the time all-clear was called by CCHMP (between 6:30 PM and 11:31 PM on August 6, 2012). As reflected in the table below, none of the maximum readings exceeded Cal/OSHA's Permissible Exposure Limits (PELs).

Permissible Exposure Limits (PELs). Maximum Concentration Readings

	Cal/OSHA PEL	Castro Street	Office Hill	Gertrude Street
H <sub>2</sub> S (ppb) Background at 3:00 PM	10,000 ppb	3.04 ppb	3.99 ppb	2.09 ppb
H <sub>2</sub> S (ppb) Max.	10,000 ppb	3.27 ppb	5.41 ppb	2.51 ppb
SO <sub>2</sub> (ppm) Background at 3:00 PM	2 ppm	0.006 ppm	0.003 ppm	0.002 ppm
SO <sub>2</sub> (ppm) Max.	2 ppm	0.007 ppm	0.006 ppm	0.002 ppm

Note: The Cal/OSHA PEL are concentrations averaged over an 8-hour period.



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### IX. INCIDENT INVESTIGATION RESULTS:

Chevron U.S.A. Inc. promptly initiated an investigation of the incident using the TapRoot® methodology. The investigation team is composed of Subject Matter Experts (SMEs) as well as operations personnel, management personnel and representatives of the United Steel Workers. The investigation Team Leader and the investigation Facilitator are Chevron U.S.A. Inc. personnel external to the Richmond Refinery. The investigation is on-going.

### X. SUMMARIZE INVESTIGATION RESULTS BELOW OR ATTACH COPY OF REPORT:

The investigation is not complete. Chevron U.S.A. Inc. worked with multiple governmental agencies, including the CSB and Cal/OSHA with respect to evidence identification and collection. Protocols for the removal and testing of relevant evidence have been agreed upon and subsequently, a five foot section of the affected piping system was sent for metallurgical analysis on September 10, 2012. Although the test laboratory has issued a preliminary report, the final report is not yet available. The final results of the testing are among the information necessary for the investigation team to complete its work. Chevron U.S.A. Inc. will provide updates to CCHMP as required until the investigation is concluded.

### XI. SUMMARIZE PREVENTABLE MEASURES TO BE TAKEN TO PREVENT RECURRENCE INCLUDING MILESTONE AND COMPLETION DATES FOR IMPLEMENTATION

Since the company's investigation is ongoing, the company is currently unable to identify or summarize all measures to prevent a recurrence. The company has implemented or will implement the following measures.

#### Industry Alert

On September 26, 2012, Chevron U.S.A. Inc. shared some potentially significant preliminary information regarding the incident through issuance of an Industry Alert. The Alert noted that an area-of-interest in Chevron U.S.A. Inc.'s investigation of the incident is whether the pipe failure resulted from general thinning of the five-foot piping component.

#### Corrective Actions

The refinery has begun to develop and implement the following corrective actions based on preliminary observations from the investigation team. We have met with governmental agencies, including the CSB, Cal/OSHA, and the County to discuss these efforts. Additional actions may be identified upon completion of the investigation, but the following efforts are already underway:

#### Low Silicon Carbon Steel and Piping Component Inspections

- As stated in the above-referenced Industry Alert, carbon steel piping with low-silicon content is susceptible to accelerated corrosion when exposed to high-temperature sulfidation (HTS) conditions. Based on preliminary information from the test laboratory, the pipe component that ruptured had low-silicon content and general thinning. This thinning was not readily detected by existing corrosion monitoring locations. To address this issue, the company is inspecting all components potentially susceptible to accelerated HTS corrosion and will complete inspection of all such components in the No.

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4 Crude Unit before restarting the unit. If we do locate any components that are not suitable for service they will be replaced.

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#### Safety Focus

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**XII. ADDITIONAL INFORMATION. DETAILED EVENT TIMELINE, CORRESPONDENCE, RELEVANT HISTORY OF INCIDENTS WITH SIMILAR EQUIPMENT OR PROCEDURES:**

The detailed event timeline is still under development as part of the incident investigation. All required information will be provided upon completion and submittal of the investigation report.