



# U. S. Chemical Safety and Hazard Investigation Board

## RECOMMENDATIONS STATUS CHANGE

### SUMMARY

<b>Report:</b>	Chevron Refinery Fire
<b>Recommendation Number(s):</b>	2012-3-I-CA-R10
<b>Date Issued:</b>	April 19, 2013
<b>Recipient:</b>	California State Legislature, Governor of California
<b>New Status:</b>	Closed – Acceptable Alternative Action
<b>Date of Status Change:</b>	May 30, 2018

#### Recommendation Text(s):

*For all California oil refineries, identify and require the reporting of leading and lagging process safety indicators, such as the action item completion status of recommendations from damage mechanism hazard reviews, to state and local regulatory agencies that have chemical release prevention authority. These indicators shall be used to ensure that requirements described in 2012-03-I-CA-R9 are effective at improving mechanical integrity and process hazard analysis performance at all California oil refineries and preventing major chemical incidents.*

#### Board Status Change Decision:

##### A. Rationale for Recommendation

On August 6, 2012, the Chevron Refinery in Richmond, California, experienced a catastrophic pipe failure in a crude unit causing the release of a flammable hydrocarbon process fluid which partially vaporized into a large cloud. Nineteen Chevron employees engulfed by the vapor cloud narrowly escaped avoiding serious injury. The ignition and subsequent continued burning of the hydrocarbon process fluid resulted in a large plume of unknown particulates and vapor. Approximately 15,000 people from the surrounding area sought medical treatment in the weeks following the incident.

The U. S. Chemical Safety and Hazard Investigation Board's (CSB) investigation found that the pipe failure was caused by sulfidation corrosion, a damage mechanism that causes piping walls to thin over time. The CSB also found that the California Process Safety Management (PSM) regulation did not require the conducting of formal damage mechanism hazard reviews, and that the Process Hazards Analysis (PHA) team for the crude unit at the Richmond refinery did not identify the damage mechanism sulfidation corrosion as a potential cause of a leak or rupture in the piping. Additionally, the CSB found that the California PSM regulation did not require the use of a recognized methodology for making an objective determination of the effectiveness of safeguards in place to prevent a hazardous consequence from occurring. A more detailed safeguard analysis, which requires sufficient consideration of the principles of inherently safer technology and to driving risks As Low As Reasonably Practicable (ALARP), could have identified the need to upgrade the metallurgy of the piping to a material less susceptible to sulfidation corrosion.

The CSB concluded that the systematic and documented consideration of inherently safer systems and the hierarchy of controls to the greatest extent feasible by Chevron and other process plants during PHAs, Management of Change (MOC) analyses, prior to new construction, rebuilds, and repairs, and in the development of corrective actions from incident investigation recommendations, would provide a more adequate degree of protection from incidents like the one that occurred on August 6, 2012.

Finally, the CSB concluded that the reporting of leading and lagging process safety indicators to the relevant regulators would be an important driver for continual improvement of refinery operations in the state of California. The reporting of indicators and additional information related to activities such as damage mechanism hazard reviews and maintenance-related shutdowns promotes greater transparency and facilitates increased collaboration between regulators and industry in chemical accident prevention.

Based on these findings, the CSB issued six recommendations to the California State Legislature and the Governor. This recommendation pertains only to the reporting of leading and lagging indicators.

## B. Response to the Recommendation

On October 1, 2017, the newly adopted California Occupational Safety and Health Process Safety Management (PSM) for Petroleum Refineries regulation became effective. This new standard (Section 5189.1), which applies to all California petroleum refineries, including Chevron Richmond, added the following new subsections, which requires employers to develop, implement, and maintain an effective program to track and document process safety performance indicators:

### **(v) Process Safety Management Program.**

*(4) The employer shall develop, implement and maintain and effective program to track and document process safety performance indicators.*

### **(w) Division Access to Documents and Information.**

*(1) The employer shall provide all documents and information developed or collected pursuant to this Section to the Division upon request.*

On November 16, 2017, CSB Recommendations staff spoke with the California Division of Occupational Safety and Health, or Cal OSHA, to better understand this requirement. Cal/OSHA will be periodically conducting Program Quality Verification (PQV) inspections at refineries under the new California PSM for Petroleum Refineries regulation, where a team of five staff members will visit each refinery in the state and audit the facility based on their compliance with each section of the new regulation, including indicators. For the first time ever the team will examine each facility's indicator data during this inspection. Cal/OSHA credited the CSB for its work on both the Chevron Richmond and Tesoro Martinez investigations for this development.

In addition to indicator data being made available to Cal/OSHA when requested, the newly adopted California Accidental Release Prevention Program (CalARP) Regulations will require all California petroleum refineries to annually report indicator data beginning in 2019 to the California Governor's Office of Emergency Services (Cal OES) and the local Unified Program Agency (UPA), or the local agency responsible for implementing the CalARP Program. Cal OES will make these public by posting them on their website. The indicators listed as required are: 1) past due inspections for piping and pressure vessels; 2) past due PHA corrective actions and seismic corrective actions; 3) past due incident investigation corrective actions for major incidents; 4) the number of major incidents that have occurred since the updated regulations were passed; 5) the number of temporary piping and equipment repairs installed on hydrocarbon and high energy utility systems that are past their date of replacement with a permanent repair and the total number of temporary piping and equipment repairs installed on hydrocarbon and high energy utility systems; and 6) site-specific indicators, consisting of activities and other events that are measured in order to evaluate the performance of process safety systems for the purpose of continuous improvement.<sup>1</sup>

#### C. Board Analysis and Decision

As the intent of this recommendation has been met, the Board voted to change the status of Recommendation No. 2012-30I-CA-R10 to "**Closed-Acceptable Alternative Action.**"

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<sup>1</sup> See Section 2762.16 (h) of the CalARP Program Regulations at <http://www.caloes.ca.gov/FireRescueSite/Documents/CalARP%20Regs%20Title%2019%20Division%202%20Chapter%204.5.pdf> (accessed March 30, 2018).