U. S. Chemical Safety and Hazard Investigation Board
RECOMMENDATION STATUS CHANGE SUMMARY

Report:	Chevron Richmond Refinery Fire
Recommendation Number:	2012-03-I-CA-R29
Date Issued:	January 28, 2015
Recipient:	American Petroleum Institute (API)
New Status:	Closed – Acceptable Alternative Action
Date of Status Change:	March 16, 2026

Recommendation Text:

Revise API RP 578: Material Verification Program for New and Existing Alloy Piping Systems, to require users to establish and implement a program to identify carbon steel piping circuits that are susceptible to sulfidation corrosion and may contain low-silicon components. These circuits have the potential to contain carbon steel components that were not manufactured to the American Society for Testing and Materials (ASTM) A106 specification and may contain less than 0.10 weight percent silicon content. Refer the reader to the 100 percent component inspection or pipe replacement requirements detailed in API RP 939-C: Guidelines for Avoiding Sulfidation (Sulfidic) Corrosion Failures in Oil Refineries (pursuant to recommendation 2012 03-I-CA-26(b)) and API 570: Piping Inspection Code: In-service Inspection, Rating, Repair, and Alteration of Piping Systems (pursuant to 2012-03-I-CA-28(c)) for carbon steel piping circuits susceptible to sulfidation corrosion that may contain low-silicon components.

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 flammable hydrocarbon process fluid, which partially vaporized into a large cloud. Nineteen Chevron employees engulfed by the vapor cloud escaped, narrowly 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.

As a part of its investigation, the U.S. Chemical Safety and Hazard Investigation Board (CSB) examined the 1) Chevron organization, emergency response, and safety culture; 2) industry leak response standards; and 3) mechanical integrity industry standards.

The CSB identified several contributing causes of the incident relating to various American Petroleum Institute (API) codes, standards, recommended practices, and guidelines, that address piping corrosion, damage mechanisms, inspections, material verification and fire protection. Consequently, the CSB Board issued six recommendations to the API to revise its standards to

address the gaps identified by the CSB. This status change summary addresses CSB Recommendation No. 2012-03-I-CA-R29.

B. Response to the Recommendation

API published the 4th Edition of API Recommended Practice (RP) 578 *Material Verification Program for New and Existing Assets* during February of 2023. This revision addresses the majority of the recommendation's requirements including referencing API RP 939-C: *Guidelines for Avoiding Sulfidation (Sulfidic) Corrosion Failures in Oil Refineries* for carbon steel piping circuits susceptible to sulfidation corrosion that may contain low-silicon components. API RP 939-C was revised as required by CSB Recommendation 2012-03-I-CA-R26, which was acceptably closed in 2021.

API RP 939-C lists API 570: *Piping Inspection Code: In-service Inspection, Rating, Repair, and Alteration of Piping Systems* as a normative reference. API 570 was revised as required by CSB Recommendation 2012-03-I-CA-R28 which was acceptably closed in 2017. Additionally, API RP 939-C and API 570 list the following API products (also revised as a result of CSB Recommendations from the Chevron report) as normative references: (1) API RP 571, *Damage Mechanisms Affecting Fixed Equipment in the Refining Industry* (CSB Recommendation 2012-03-I-CA-R27, acceptably closed in 2022) and (2) API RP 574: *Inspection Practices for Piping System Components* (CSB Recommendation 2012-03-I-CA-R30, acceptably closed in 2022). API RP 939-C also listed ASTM A 106/A 106M, *Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service* as a normative reference.

In October 2025, API published Addendum 1 to the 5th Edition of API 570 which provided additional background information and a warning statement that sulfidation of carbon steel piping materials can lead to uniform internal corrosion, resulting in piping rupture and the sudden release of high-temperature hydrocarbons. It also recommends that owner-operators conduct at least one inspection of every piping component.

C. Board Analysis and Decision

API revised API 578, which details how to establish a material verification program to identify carbon steel piping circuits that are susceptible to sulfidation corrosion and may contain low-silicon components. Sulfidation corrosion risks are explained in detail and API linked all of the applicable, revised API products that address it as normative references. They also included ASTM A106 as a normative reference in addition to adding the new Addendum to API 570. The totality of these actions and the new language satisfied the majority of the objectives envisioned by the Board in issuing this recommendation.

The CSB appreciates the work of the API in making these important updates to API RP 578, API 570 and the other applicable API products. CSB Board Order 022, Recommendations Program, states that when a recipient has successfully completed actions that meet the objectives, or a majority of the objectives, envisioned by the Board a status of "Closed – Acceptable Alternative Action" may be assigned. Based upon the information above, the Board voted to change CSB Recommendation No. 2012-03-I-CA-R29 to: "Closed – Acceptable Alternative Action."