Process Safety Performance Indicators for the Refining and Petrochemical Industries

ANSI/API RECOMMENDED PRACTICE 754
THIRD EDITION, AUGUST 2021

American
Petroleum
Institute

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Introduction

The purpose of this recommended practice (RP) is to identify leading and lagging indicators for the refining and petrochemical industries, suitable for nationwide public reporting, as well as performance indicators for use at individual facilities including methods for their development and use. A comprehensive leading and lagging indicators program provides useful information for driving improvement and when acted upon contributes to reducing risks of major hazards (e.g. by identifying trends and underlying causes and taking action to prevent recurrence). This RP may augment a Company's existing practices and procedures.

This RP cannot and does not preempt any federal, state, or local laws regulating process safety. Therefore, nothing contained in this document is intended to alter or determine a Company's compliance responsibilities set forth in the Occupational Safety and Health Act of 1970 and/or the OSHA standards themselves or any other legal or regulatory requirement concerning process safety. The use of the term or concept "process safety" in this document is independent of and may in fact be broader than the term or concept "process safety" contained in OSHA regulatory requirements or as the term may be used in other legal or regulatory contexts. In the event of conflict between this RP and any OSHA or other legal requirements, the OSHA or other legal requirements should be fully implemented.

Notes to the Third Edition

As part of the revision process, the drafting committee gathered input from companies that had adopted this RP. The committee sought comments regarding the utility and usefulness of the Tier 1 and Tier 2 indicators to drive performance improvement, as well as any comments regarding suggested improvements. The result of the input gathering exercise was a desire for continuous improvement rather than any need for fundamental change.

Although the RP was written for the U.S. Refining and Petrochemical industries, it has been widely adopted around the globe and by additional industry segments. The revision committee benefited from broad participation by parties with a direct and material interest from academia, trade associations, engineering and construction, regulators, and owner/operators both domestic and international.

The purpose of this RP is to identify leading and lagging process safety performance indicators for the refining and petrochemical industries, suitable for nationwide public reporting, as well as indicators for use at individual facilities including methods for their development and use. A comprehensive leading and lagging indicators program provides useful information for driving improvement and when acted upon, contributes to reducing risks of major hazards (e.g. by identifying trends and underlying causes and taking action to prevent recurrence).

In revising this document, the drafting committee maintained a focus on indicators of process safety performance vs indicators of health, personal safety, or environmental performance. Each is important and each should have its own performance indicators as part of a comprehensive and robust Health, Safety, and Environmental Program. Process safety hazards can result in major accidents involving the release of potentially dangerous materials. Process safety incidents can have catastrophic effects such as multiple injuries and fatalities, as well as substantial economic, property, and environmental damage, and can affect workers inside the facility and members of the public who reside or work nearby.

Numerous issues including process safety indicator definitions, chemical release thresholds, data capture, statistical validity, and public reporting were again considered, this time with the benefit of 10 years of implementation experience. One of the most significant revision proposals was the adoption of the *Globally Harmonized System for Classification and Labeling of Chemicals* (GHS) for threshold release categorization. The drafting committee chose to include the equivalent GHS classifications in parallel to the U.S. DOT version of the United Nations Dangerous Goods (UNDG) hazard classifications. The GHS system offers analogous categories to nearly all toxic, flammable, and corrosive characteristics identified by the U.S. DOT version of UNDG hazard classification. In addition, a variety of GHS categories were aligned to specific packing group material classifications. Another significant change was regarding how corrosives are viewed in relation to process safety events. Given the localized effects of corrosive loss of primary containments (LOPC) compared to flammables and toxics, the committee chose to reduce the material hazard classification for corrosive agents to better align with the other hazard classes.

Other significant continuous improvement changes include:

— clarifications to the definitions of primary and secondary containment, direct cost, indoor release, and unsafe location;

— making process safety event (PSE) severity weighting reporting mandatory;

— expanding the resolution and usefulness of causal data collected by adding an additional layer of causes under each primary cause;

— expanded the data collection capability to include non-petroleum-based chemical facilities.

Process Safety Performance Indicators for the Refining and Petrochemical Industries

1 Scope

1.1 General

This recommended practice (RP) identifies leading and lagging process safety indicators useful for driving performance improvement. As a framework for measuring activity, status, or performance, this document classifies process safety indicators into four tiers of leading and lagging indicators. Tiers 1 and 2 are suitable for nationwide public reporting and Tiers 3 and 4 are intended for internal use at individual facilities. Guidance on methods for development and use of performance indicators is also provided.

1.2 Applicability

NOTE At joint venture sites and tolling operations, the Company should encourage the joint venture or tolling operation to consider applying this RP.

This RP was developed for the refining and petrochemical industries but may also be applicable to other industries with operating systems and processes where loss of containment has the potential to cause harm (see Note). Applicability is not limited to those facilities covered by the OSHA Process Safety Management Standard, 29 *CFR* 1910.119, or similar national and international regulations.

NOTE To enable consistent application of this RP to other refining and petrochemical industry subsegments, informative annexes have been created to define the Applicability and Process definition for those subsegments. The user would substitute the content of those annexes for the referenced sections of this RP: Annex A—Petroleum Pipeline and Terminal Operation, Annex B—Retail Service Stations, Annex C—Oil and Gas Drilling and Production Operations.

This RP applies to the responsible party. At co-located facilities (e.g. industrial park), this RP applies individually to the responsible parties and not to the facility as a whole.

Events associated with the following activities fall outside the scope of this RP and shall not be included in data collection or reporting efforts:

a) releases from transportation pipeline operations outside the control of the responsible party;

b) marine transport operations, except when the vessel is connected or in the process of connecting or disconnecting to the process;

   NOTE The boundary between marine transport operations and in the process of connecting to or disconnecting from the process is the first/last step in loading/unloading procedure (e.g. first line ashore, last line removed, etc.).

c) truck or rail transport operations, except when the truck or rail car is connected or in the process of connecting or disconnecting to the process, or when the truck or rail car is being used for on-site storage;

   NOTE 1 Active staging is not part of connecting or disconnecting to the process; active staging is not considered on-site storage; active staging is part of transportation.

   NOTE 2 The boundary between truck or rail transport operations and in the process of connecting to or disconnecting from the process is the first/last step in loading/unloading procedure (e.g. wheel chocks, set air brakes, disconnect master switch, etc.).

d) vacuum truck operations, except on-site truck loading or discharging operations, or use of the vacuum truck transfer pump;