Process Safety Performance Indicators for the Refining and Petrochemical Industries

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Introduction

The purpose of this recommended practice 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 indicator program provides useful information for driving improvement and, when acted upon, contributes to reducing the risks of major hazards (e.g., by identifying trends and underlying causes and taking action to prevent recurrence). This recommended practice may augment a Company's existing practices and procedures.

This recommended practice 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 the Occupational Safety and Health Administration (OSHA) standards themselves or any other legal or regulatory requirement concerning process safety. The use of the term or concept of "process safety" in this document is independent of and may in fact be broader than the term or concept of "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 recommended practice and any OSHA or other legal requirements, the OSHA or other legal requirements should be fully implemented.

Notes to the Fourth Edition

As part of the revision process, the drafting committee gathered input from operating companies, trade associations, and community members that had adopted, interacted with, or had a material interest in this recommended practice. The committee sought comments about 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 recommended practice was originally written for the US refining and petrochemical industries, it has been widely adopted around the globe and by additional industry segments and trade associations. The revision committee benefited from broad participation by parties with a direct and material interest from academia, trade associations, engineering and construction companies, regulators, community members, and owner/operators both domestic and international.

The purpose of this recommended practice 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 indicator program provides useful information for driving improvement and, when acted upon, contributes to reducing the risks of major hazards (e.g., by identifying trends and underlying causes and taking action to correct barrier weaknesses or operating discipline and management system concerns).

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 live or work nearby.

A number of issues, including definitions, material release thresholds, data capture, statistical validity, and public reporting, were again considered, this time with the benefit of 15 years of implementation experience. One of the most significant revisions was the inflation adjustment of the Tier 1 and Tier 2 direct cost thresholds. These thresholds had been held constant since their adoption in 2016 and 2010, respectively, resulting in a gradual erosion of the threshold value. The other significant revision was the reassignment of several TRC 1 through TRC 4 toxic inhalation hazards (TIHs) within Table 1 to reflect their relative hazard when compared with other Table 1 materials. These reassignments reflect the distinction between TIH materials that are gases or liquids at standard conditions and TIH categories that are mildly toxic versus acutely toxic. These changes also improve alignment between the Table 1 material hazard classification Option 1 (UNDG) and Option 2 (GHS).

Other significant continuous improvement changes include the following:

— clarified definitions;

— expanded data collection including the adoption of additional causal factors, mode of operation, process types, and other conditions of the event;

— improved resolution relative to general chemical process types.

Process Safety Performance Indicators for the Refining and Petrochemical Industries

1 Scope

1.1 General

This recommended practice 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

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

This recommended practice 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. Applicability is not limited to those facilities covered by the Occupational Safety and Health Administration (OSHA) Process Safety Management Regulation, 29 *CFR* 1910.119 [22], or similar national and international regulations.

To enable consistent application of these 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 recommended practice: Annex A—Application to Petroleum Pipeline and Terminal Operations, Annex B—Application to Retail Service Stations, and Annex C—Oil and Gas Drilling and Production Operations.

This recommended practice applies to the responsible party. At co-located facilities (e.g., industrial park), this recommended practice 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 recommended practice 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.

   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).

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

   Active staging is not part of connecting or disconnecting to the process; active staging is not considered on-site storage; for the purpose of this recommended practice, active staging is part of transportation.

   The boundary between tank 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).