FACT SHEET

Recommended Practice 754

Process Safety Indicators for the Refining and Petrochemical Industries

Background

As a result of the U.S. Chemical Safety and Hazard Investigation Board's (CSB) investigation of the 2005 BP Texas City incident, the CSB issued several recommendations. One of those recommendations called for API and USW to work together to develop an ANSI standard that creates "performance indicators for process safety in the refinery and petrochemical industries." A performance indicators program provides useful information for driving improvement and when acted upon, contributes to reducing risks of major hazards by identifying the underlying causes and taking action to prevent recurrence.

Purpose

This Recommended Practice (RP) identifies leading and lagging process safety indicators that are useful for driving performance improvement. The indicators are divided into four tiers that represent a leading and lagging continuum. Tier 1 is the most lagging and Tier 4 is the most leading. Tiers 1 and 2 are suitable for nationwide public reporting and Tiers 3 and 4 are intended for internal use at individual sites.

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. 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.

Leading and Lagging Performance Indicators

In 1931, H.W. Heinrich introduced the now-familiar accident pyramid that represents two key concepts:

1. Safety accidents can be placed on a scale representing the level of consequence and
2. Many precursor incidents occurred with lesser consequences for each accident that occurred with greater consequences.

It is believed that a similar predictive relationship exists between lower and higher consequence events that relate to process safety. Indicators that are predictive are considered leading indicators and may be used to identify a weakness that can be corrected before a higher consequence event occurs.

Performance indicators identified in this RP are based on the following guiding principles:

- Indicators should drive process safety performance improvement and learning
- Indicators should be relatively easy to implement and easily understood by all stakeholders (e.g., workers and the public)

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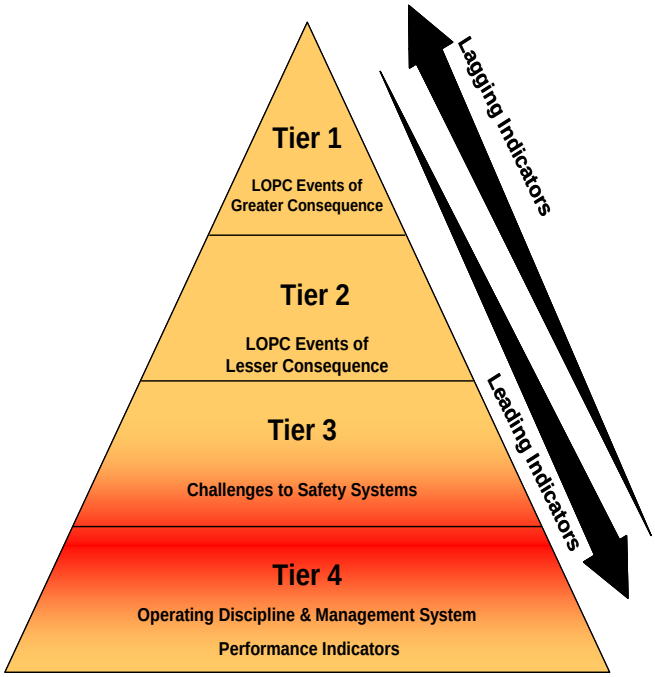
- Indicators should be statistically valid at one or more of the following levels: industry, company, and site
- Indicators should be appropriate for industry, company or site level benchmarking



- The count of **Tier 1** process safety events is the most lagging performance indicator and represents incidents with greater consequence resulting from actual losses of containment.
- The count of **Tier 2** process safety events represents loss of primary containment events with a lesser consequence, but may be predictive of future, more significant incidents.
- **Tier 3** events represent challenges to the safety systems. Indicators at this level provide an opportunity to identify and correct weaknesses within the safety system.
- **Tier 4** indicators represent operating discipline and management system performance.

Any **Tier 1 or Tier 2 Process Safety Event** begins with an **unplanned or uncontrolled** release of any material, including non-toxic and non-flammable materials **from a process** that results in **one or more consequences** described in the RP.

Tier 3 indicators are intended for internal Company use and a Company may use all or some of the example indicators listed in the RP (e.g., safe operating limit excursions; primary containment inspection or testing results outside acceptable limits; demands on safety).

Indicators at the **Tier 4** level need to reflect site-specific performance objectives and are comprised of operating discipline and management system performance. Tier 4 indicators may identify opportunities for both learning and systems improvement.

If you have questions regarding API RP 754, please contact Karen Haase at haasek@api.org or 202-682-8478.

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API Standards Program

API's standards program is accredited by the American National Standards Institute. API follows a formal, comprehensive and rigorous approach to the development of industry standards and recommended practices. These documents are reviewed at a minimum of every five years and may be updated more frequently when new information and data become available. RP 754 is expected to be published by the end of March and can be accessed at: www.api.org/standards

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