



## ANSI / API RP-754

### Process Safety Performance Indicators for the Refining & Petrochemical Industries

#### Part 1: Business Case & Leadership Overview

Bill Ralph  
Chair API RP-754 Drafting Committee

- Welcome and thank you for joining us for the first in a series of four webinars to discuss the content and implementation of the new ANSI/API Recommended Practice 754, Process Safety Performance Indicators for the Refining and Petrochemical Industries.
  - All four webinars are being recorded for future playback on the API website.
  - My name is Bill Ralph and I am a Senior Process Safety Consultant for BP and it was my pleasure to serve as the chairman of the RP-754 drafting committee.
  - Following the presentation, there will be an opportunity for questions and answers.
  - Let's get started.
  - The API RP-754 Drafting Committee worked hard over an 18 month period to produce a standard that we believe will help our industry improve its process safety performance.
  - Implementing the standard will require effort, but that effort has the potential to yield incredible benefit
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## Process Safety Incidents

- Highest potential for multiple injuries/deaths
- Highest potential for significant environmental harm
- Highest potential for significant property damage
- Highest potential for significant business interruption
- Highest potential for damage to reputation

- Unfortunately, we don't have to look very far or very hard to find examples of process safety incidents that have resulted in devastating and tragic loss of life, significant environmental harm, costly property damage and business interruption, and tarnished reputation.
- These types of incidents are the focus of RP-754.
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“You get what you inspect, not what you expect.”

Unknown

- We've all heard some variation of this quote . . . You get what you inspect, not what you expect.
- Intuitively we understand the importance of performance indicators.
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## CSB Recommendation to API & USW

“Work together to develop two new consensus American National Standards Institute (ANSI) standards. In the first standard, create **performance indicators for process safety** in the refinery and petrochemical industries. Ensure that the standard identifies **leading and lagging indicators for nationwide public reporting** as well as indicators for use at individual facilities. Include methods for the development and use of the performance indicators.”

- Although the OSHA process safety standard was issued in 1992, there has been no standardized measure of process safety performance.
- It was this gap that led the Chemical Safety Board to issue a recommendation to API and the USW as part of their investigation into the 2005 BP Texas City incident.
- The task given to the RP-754 Committee was to create a standard for performance indicators for process safety ensuring that the standard identifies leading and lagging indicators for nationwide public reporting.
  
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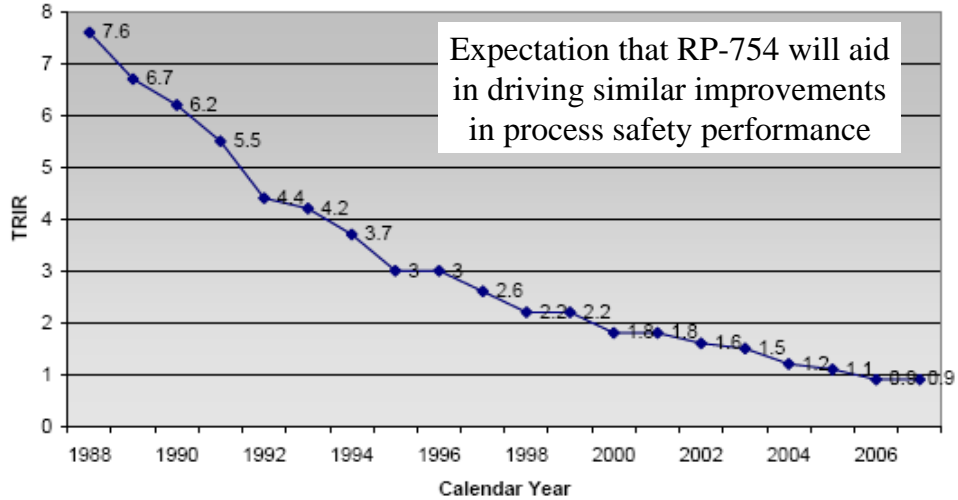
## RP 754 – Drafting Committee Membership

- Academia [1]
- Associations [5]
- Engineering & Construction [1]
- Government [1]
- Labor [3]  
[Withdrew 04-Aug-09]
- Owner / Operators – Refiners [10]
- Owner / Operator – Chemicals [4]

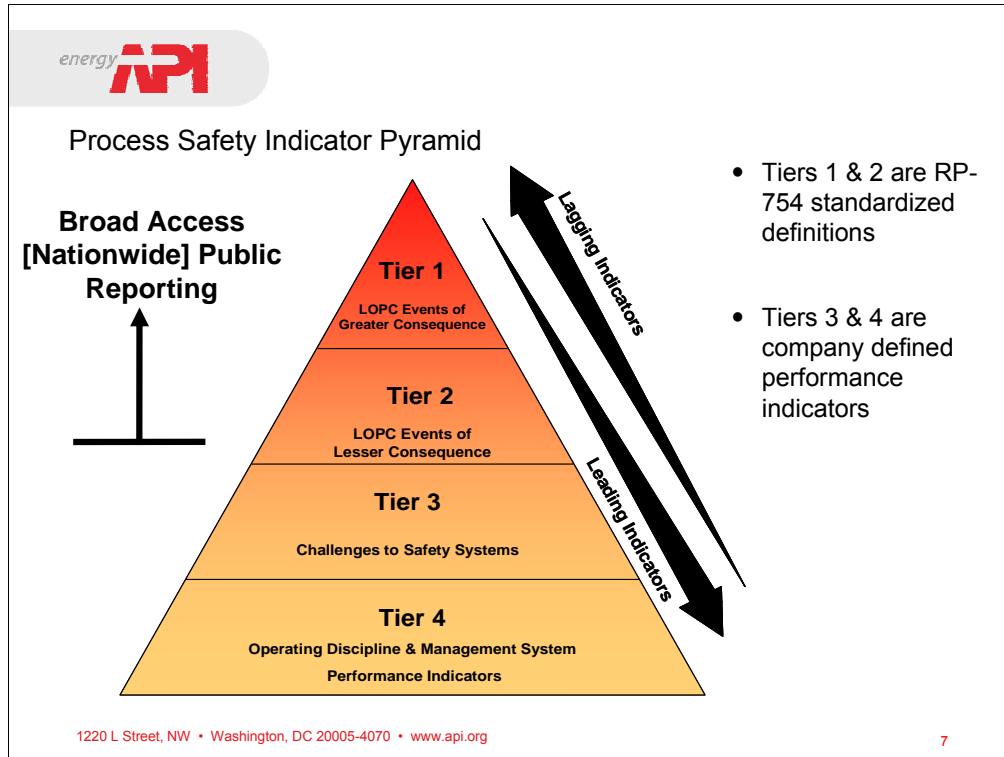
- As required by the ASNI process, there was a broad base of participation to achieve both openness and balance.
- A variety of groups and individual each with unique perspectives blending into a positive whole.
- As you can see, we had participants from Academia, Trade & Professional Associations, Engineering & Construction firms, Government, Labor, and Owner Operators.

- Academia [1]
  - MKO Process Safety Center
- Associations [5]
  - ACC, CCPS, NPRA, UK Petroleum Industry Association, **ORC [observer] [ORC Worldwide – Occupation Safety & Health Group]**
- Engineering & Construction [1]
  - UOP
- Government [1]
  - CSB [observer]**
- Labor [3] [Withdrew 04-Aug-09]
  - USW, ICWUC [International Chemical Workers Union], Teamsters
- Owner/Operators – Refiners [10]
  - BP, Chevron, CHS Inc., Koch Ind., Pasadena Ref, Exxon Mobil, Conoco Phillips, Shell, Marathon, Valero,
- Owner/Operator – Chemicals [4]

### Total Recordable Incident Rate vs. Calendar Year – U.S. Refineries



- Why is the Committee confident that implementing RP-754 will result in process safety performance improvement? We're confident, because there are clear examples where a standardized indicator has enabled improvement . . . One of which is the OSHA Recordable Incident Rate.
- While none of us can be satisfied as long as anyone is getting hurt in our facilities, we can be proud of the tremendous success in reducing the occupational injury incident rate over time.
- We expect that by implementing a similar measure for process safety and acting upon the data, we will see similar success over time.
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- RP-754 is predicated on a process safety event pyramid.
  - The pyramid itself reflects the 1931 Heinrich model which embodies two key concepts:
    - First, events can be placed on a scale of increasing consequence, and
    - Second, precursor or predictive events occur at a lower consequence for each event with a higher consequence
- In terms of the CSB recommendation
  - Tier 1 serves as a lagging indicator
  - Tier 2 serves as a leading indicator in that it is predictive of Tier 1 events
  - Tiers 3 & 4 serve as indicators for use at individual facilities
- Leading and lagging labels are often debated, but the classification is not important.
  - The important point is to capture information that can be acted upon to correct a situation.
  - Indicators at the top of the pyramid tend to be more lagging, while indicators at the bottom tend to be more leading.
- While Tiers 1 & 2 measure outcomes of greater and lesser consequence, Tiers 3 & 4 measure challenges to our safety systems and gaps in our operating discipline and management systems.
- Acting upon the data provided by Tier 3 & 4 provides the opportunity to improve the performance measured by Tiers 1 & 2.

## Tier 1 & 2 -- Process Safety Event

- An unplanned or uncontrolled release of any material, including non-toxic and non-flammable materials from a process that results in one or more of the consequences listed below:
  - Harm to people; or
  - Impact upon the community; or
  - Damage to equipment; or
  - A release of a threshold quantity
- PSE Rate =  $[\text{Total PSE Count} / \text{Total Work Hours}] \times 200,000$

- Let me walk you through a summary of the indicators identified in RP-754
- The definition of Tier 1 & 2 Process Safety Events is straightforward.
- Was there an unplanned or uncontrolled release from primary containment?
  - If no, then it is not a Tier 1 or 2 PSE
  - If yes, did it result in harm to people, impact upon the community, damage to equipment, or a release of a threshold quantity of material?
- The count of process safety events is then used to calculate a rate.
- Calculating a rate creates a statistical basis for comparison over time, between industry segments, or between sites within a company.
  
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### Tier 3 – Challenge to Safety Systems

- Purpose
  - Typically represent challenges to the barrier system that progressed along the path to harm, but were stopped short of a Tier 1 or Tier 2 PSE consequence
- Examples
  - Safe Operating Limit Excursions
  - Primary Containment Inspection or Testing Results Outside Acceptable Limits
  - Demands on Safety Systems
  - Other LOPC Events

•Tier 3 indicators represent challenges to our safety systems that progressed along the path to harm, but were stopped short of a Tier 1 or Tier 2 consequence.

•Examples include Safe Operating Limit Excursions, Inspection or Testing Results Outside of Acceptable Limits, and Demands on Safety Systems.

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## Tier 4 – Operating Discipline & Management System Performance

- Purpose
  - Typically represent the performance of individual components of the barrier system
  - Indicative of process safety system weaknesses that may contribute to future Tier 1, 2 or 3 PSEs
- Examples
  - Process Safety Action Item Closure
  - Training Completed on Schedule
  - Safety Critical Equipment Inspection
  - Completion of Emergency Response Drills

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•Tier 4 indicators represent gaps in our Operating Discipline and Management System Performance.

•The purpose of these indicators is to measure the performance of individual components of the barrier system that may contribute to future Tier 1, 2, or 3 process safety events.

•Examples include Action Item Closure, Training Completion, and Mechanical Integrity Testing & Inspection.

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## Primary Modes of Implementation

- Report everything . . . Database sorts it out
- Train personnel to identify and report Tier 1 & 2 events

•As companies begin the process of implementing RP-754, two primary approaches are emerging.

•One is to have personnel report all Loss of Primary Containment events into a central database and let the database sort out whether a particular event should be classified as Tier 1 or Tier 2.

•The other is to train personnel on the definitions of Tier 1 and Tier 2 and have them classify the events at the time of reporting.

•Both approaches can be effective, and it is a matter of company preference as to which approach to choose.

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## RP-754 Adoption Plans

- API, NPRA, OGP, and CONCAWE have committed to 2010 data collection
- CCPS is revising their guide on Process Safety Leading & Lagging Metrics to align with RP-754
- ACC plans to pilot
- IPIECA is vetting the reporting requirements with their stakeholders
- UK HSE provided positive comments during the ballot period

•Throughout the development process, a number of groups were actively following the progress of the Drafting Committee and making plans for adoption.

•API, NPRA, OGP (Oil & Gas Producers) and CONCAWE (CONservation of Clean Air and Water ) have all committed to 2010 data collection.

•CCPS is revising their guide on Process Safety Leading and Lagging Metrics to align with RP-754.

•ACC is planning to pilot the RP-754 definitions with a number of companies within their association.

•IPIECA (International Petroleum Industry Environmental Conservation Association) is vetting the reporting requirements with their stakeholders.

•In addition, the UK Health & Safety Executive provided positive comments during the ballot period which may indicate regulatory changes or guidance within the UK.

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## Benefits of Participation

- Consequence analysis
  - No. & % DAFWC / Fatalities
  - No. & % Fires
  - No. & % Explosions
  - No. & % Acute Releases
- Event analysis
  - Type of process
  - Mode of operation
  - Point of release
  - Type of material
- Industry benchmarking

- So, is adoption of RP-754 merely an academic exercise, or does collecting, analyzing, and reporting the data provide real benefits?
- We know that **acting** upon the data is what leads to the benefits, but collecting, analyzing, and reporting the data is the first step; and the greater the participation, the greater the integrity of the data.
- Implementing RP-754 will enable consequence analysis, event analysis, and industry benchmarking. It was this same type of information that contributed to the improvements in occupational safety that I showed earlier.
- In 2009, API collected 2008 process safety event data from U.S. refineries equivalent to the Tier 1 definition
  - 19 companies representing 80 facilities participated in the data collection.
- While that is a good start, it is important for the refining and petrochemical industry to increase participation even further.
  
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## Broad Access [Nationwide] Public Reporting

- Annually, each Company publicly reports Tier 1 and Tier 2 PSE information.
- 2010 – Implementation
- 2011 – Data validation
- 2012 – Industry aggregated result
- 2013 – Industry and Company blinded results
- 2014 – Industry and Company transparent results
- Tier 2 reporting may lag Tier 1 by one year

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- Nationwide public reporting is called for by the CSB recommendation
  - RP-754 requires that Companies publicly report Tier 1 & 2 information annually.
  - Recognizing that this is a new process and that time is needed to implement the standard and to validate the data, public reporting will be phased.
  - 2010 is an implementation year.
  - 2011 is a data validation year.
  - If all goes well in 2010 and 2011, the industry aggregated result will be published in 2012.
  - In 2013, industry and company blinded results will be published.
  - In 2014, industry and company transparent results will be published.
  - Again depending upon the progress of implementation, Tier 2 reporting may lag Tier 1 reporting by one year.
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## Local [Site] Public Reporting

- Each site determines the appropriate methods to communicate PSE information
- Annual report of site-specific Tier 1, 2, 3 and 4 PSE information to employees and employee representatives
- Annually, each Company makes available a summary of site-specific Tier 1 and 2 PSE information and may report site-specific Tier 3 and 4 PSE information to the local community and emergency management officials

- During the RP-754 development process, it became clear that employees and the local community had a strong need to know.
- Therefore, a provision for local public reporting was adopted to satisfy the need for transparency valued by our employees and communities.
- Each site will determine the appropriate methods for communicating Tier 1, 2, 3 and 4 information, but that information will be communicated at least annually.
  
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## Performance Targets

- Process safety performance is dynamic and complex, and must be managed over the entire life cycle of a facility
- Due to the “long wave length,” performance targets should be multi-year
- For example, a 25% reduction in total Tier 1 PSE’s over 5 years is a more appropriate target than a 5% reduction year over year

- One last thought as we draw this presentation to a close.
- Performance targets are not addressed within the standard, but choosing targets is an important part of the performance improvement process.
- Process safety performance is both dynamic and complex, and it must be managed over the entire life cycle of a facility.
- Process safety performance also has a very “long wave length. Meaning that poor operating discipline and management system performance may not manifest itself in process safety incidents for years; likewise, process safety incidents may continue for a period even after the operating discipline and management system performance gaps have been corrected.
- Therefore, performance targets should be multi-year.
- For example, a 25% reduction in total Tier 1 PSE’s over 5 years is a more appropriate target than a 5% reduction year over year.

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## Conclusions

- Process safety incidents result in devastating consequences
- Adopting RP-754 provides a significant opportunity for industry to improve process safety performance
- Similar success has been demonstrated in occupational safety performance

- We know that process safety incidents result in devastating consequences
- We also know that standardized performance indicators enable performance improvement, that is why
- We are confident that adoption of RP-754 will enable process safety performance improvement similar to the success achieved in the area of occupational safety performance.



## Contact Information

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## Electronic Download of RP-754

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As I said at the beginning, all four webinars are being recorded for future playback on the API website.

- If you have any questions or comments beyond today's webinar, Karen Haase is the API Staff member tagged to RP-754. Her contact information is shown on the screen.
- Also, RP-754 is available for free electronic download at the URL shown.
- Okay, let's open it up for questions.
  
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## Questions

