

**AFPM & API  
ADVANCING  
PROCESS SAFETY**

**ANSI API RP-754  
Quarterly Webinar**

**March 22, 2016**

*Process Safety Performance  
Indicators for the Refining and  
Petrochemical Industries*



# Purpose of RP 754 Quarterly Webinars

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- To support broad adoption of RP-754 throughout the Refining and Petrochemical industries
- To ensure consistency in Tier 1 and 2 metrics reporting in order to establish credibility and validity
- To share learning's regarding the effective implementation of Tier 1-4 lagging/leading metrics

# Today's Agenda

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- Introductions – Kelly Keim, ExxonMobil
- Changes from 1<sup>st</sup> to 2<sup>nd</sup> Edition of ANSI API RP-754
- 2016 Webinar Dates

# Background Information

- Process to revise API-754 for Second Edition initiated 2013
- Broad solicitation of comments for Second Edition
- More participation from Chemicals industry and from international Chemicals industry representatives

API-754, Process Safety Performance Indicators for the Refining and Petrochemical Industries, Second Edition

# **SUMMARY OF KEY REVISIONS: SCOPE**

# 1.2 Applicability

- *“This recommended practice applies to the responsible party. At collocated facilities (e.g., industrial park), this recommended practice applies individually to **the responsible parties** and not to the facility as a whole.”*
- **Responsible party** defined as:

*“The party charged with operating the facility in a safe, compliant, and reliable manner is the responsible party. In some countries or jurisdictions, the responsible party may be called the ‘duty holder’ or the party with regulatory reporting responsibility.”*

*“Note: The responsible party is determined prior to any process safety event. The responsible party could be the facility owner or the facility operator depending upon the relationship between the two. Is the owner or the operator responsible for the performance of the facility? Who is responsible for developing and implementing prevention programs? Who is responsible for performing the investigation and identifying and implementing corrective action following a process safety event?).”*

# Responsible Party: Example 1

- Scenario: The facility experienced a Tier 1 PSE. The facility is owned by Company A, but is operated by Company B. Who is the responsible party, who should count the PSE?
- Response: The answer depends on the nature of the contract between the two parties. As the contract operator, does Company B also have responsibility for the performance of the facility (i.e., In this case would they be expected to perform the investigation and identify and implement corrective action?). If 'yes', Company B is the responsible party and they would record the PSE. If 'no' and Company B is simply acting upon the instructions of Company A, then the Company A is the responsible party and they would record the PSE.

# 1.2 b) and c), Transfer Operations

- Clarification added to include within scope of API-754 the act of “connecting and disconnecting” to a process for the purpose of feedstock transfer.
- Clarification added that “active staging” is not considered on-site storage.
  - “Active staging” defined as *“Truck or rail cars waiting to be unloaded where the only delay to unloading is associated with physical limitations with the unloading process (e.g., number of unloading stations) or the reasonable availability of manpower (e.g., unloading on daylight hours only, unloading Monday - Friday only), and not with any limitations in available volume within the process.”*
  - Example: Two chlorine railcars have been delivered to the facility. One is connected to the process and **the other is staged** at the unloading rack **but is not connected** to the process. While at the unloading rack **but not connected** to the loading rack, the second railcar develops a leak and 6 lb is released in less than an hour. This is not a PSE since truck and railcars are expressly excluded unless connected to the process or being used for on-site storage. **Active staging while waiting to unload is not considered storage.**



## 1.2 j), Positively Isolated New Construction

- Added following event as falling outside of the scope of API-754:
  - j) new construction that is **positively isolated** (e.g., blinded or air gapped) from a process prior to commissioning and **prior to the introduction of any process fluids**, and that has **never been part of a process**.

# New Construction: Example

- Scenario: As part of a new construction project, equipment was being hydrotested using potable water when a 2” ball valve suddenly became disconnected. The hose whipped and struck a worker in the head and caused his death. Is this a Tier 1 PSE?
- Response: A hydrotest using potable water for new construction is not considered a “process”; therefore, this tragic event is not a PSE. It is an occupational safety related fatality and an appropriate investigation should be conducted to prevent a recurrence.

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# **SUMMARY OF KEY REVISIONS: TERMS AND DEFINITIONS**

# 3.1, Definition of Process and Active Warehouses

- Definition of “process” revised to include “active warehouse” as follows:

*“Production, distribution, storage, utilities, or pilot plant facilities used in the manufacture of petrochemical and petroleum refining products. This includes process equipment (e.g. reactors, vessels, piping, furnaces, boilers, pumps, compressors, exchangers, cooling towers, refrigeration systems, etc.), storage tanks, **active warehouses**, ancillary support areas (e.g. boiler houses and waste water treatment plants), on-site remediation facilities, and distribution piping under control of the Company.”*

- Definition of “active warehouse”:

*“An on-site warehouse that stores raw materials, intermediates, or finished products used or produced by a refinery or petrochemical manufacturing process.”*

*“From a process perspective, an active warehouse is equivalent to a bulk storage tank. Rather than being stored in a single large container, the raw materials, intermediates, or finished products are stored in smaller containers (e.g., totes, barrels, pails, etc.)”*

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# **SUMMARY OF KEY REVISIONS: TIER 1 PERFORMANCE INDICATOR**

## 5.2, Indicator Definition and Consequences: Fire or Explosion Damage

- Fire or explosion direct cost criteria raised from \$25,000 to \$100,000 for triggering Tier 1 PSE.
  - *Note: PSE Tier 2 criteria (\$2,500) did not change, therefore \$25,000 to \$99,999.99 direct cost events will still fall within Tier 1/Tier 2 tracking and reporting.*
  - *Direct cost definition modified for consistency in application.*

## 5.2, Tier 1 Indicator Definition and Consequences: Upset emissions from permitted or regulated source

Upset emissions from a permitted or regulated source, of a quantity greater than or equal to the threshold quantities in Table 1 in any one-hour period, that results in one or more of the following four consequences:

- rainout;
- discharge to a potentially unsafe location;
- an on-site shelter-in-place or on-site evacuation, excluding precautionary on-site shelter-in-place or on-site evacuation;
- public protective measures (e.g., road closure) including precautionary public protective measures.

## 5.2, Tier 1 Indicator Definition and Consequences: Precautionary Community Response

- Officially declared community evacuation or community shelter in place:
  - Clarified this consequence includes “precautionary evacuation or shelter-in-place” and would be a Tier 1 PSE.
- Precautionary defined as:

*“A measure taken from an abundance of caution.”*

*“For example, a company may require all workers to shelter-in-place in response to an LOPC independent of or prior to any assessment (e.g., wind direction, distance from the LOPC, etc.) of the potential hazard to those worker.”*

*“For example, a recognized community official (e.g., fire, police, civil defense, emergency management) may order a community shelter-in-place, evacuation, or public protective measure (e.g., road closure) in the absence of information from a company experiencing a process safety event, or ‘just in case’ the wind direction changes, or due to the sensitive nature of the potentially affected population (e.g., school children, the elderly).”*



## 5.2, Indicator Definition and Consequences: Fire or Explosion Damage Direct Cost

- Direct cost defined as:

*“Cost of repairs or replacement, cleanup, material disposal, and **acute environmental cost** associated with a fire or explosion. Direct cost does not include indirect costs, such as business opportunity, business interruption and feedstock/product losses, loss of profits due to equipment outages, costs of obtaining or operating temporary facilities, or costs of obtaining replacement products to meet customer demand. Direct cost does not include the cost of repairing or replacing the failed component leading to LOPC if the component is not further damaged by the fire or explosion. Direct cost does include the cost of repairing or replacing the failed component leading to LOPC if the component failed due to internal or external explosion or overpressure.”*

- Acute environmental cost replaced “environmental remediation”.

- Acute environmental cost defined as:

*“Cost of **short-term cleanup** and **material disposal**, associated with an LOPC with **off-site environmental impact**.”*

- Cost of emergency response removed from direct cost definition given variation and inconsistency.

## 5.2, Indicator Definition and Consequences: Relief Discharges

- For clarification, added safety instrumented system and other engineered depressuring devices to this consequence for Tier 1 PSE consideration as follows:

*“a pressure relief device (PRD), safety instrumented system (SIS), or other engineered depressuring device discharge, of a quantity greater than or equal to the threshold quantities in Table 1, to atmosphere whether directly or via a downstream destructive device that results in one or more of the following four consequences:”*

## 5.2, Indicator Definition and Consequences: Relief Discharges

- For discharges resulting in shelter-in-place, evacuation and public protective measures, clarified treatment of “precautionary”.
- The following consequences would be considered Tier 1 PSEs:
  - “an on-site shelter-in-place *or* evacuation, excluding precautionary shelter-in-place or evacuation;”
  - “public protective measures (e.g. road closure) including precautionary public protective measures.”

## 5.2, Indicator Definition and Consequences: Lab Analysis and Safety Data Sheets (SDSs)

- Clarification Added for Use of Lab Analysis and/or SDSs:

*“Note: In determining the Threshold Release Category, a Company may choose to use either the properties of the released material based upon laboratory analysis at the time of release, or the properties documented in a safety data sheet. Companies **should be consistent** in their approach for all LOPC’s.”*

# 5.2 Table 1, Tier 1 Material Release Threshold Quantities (TQs)

Key Changes in TQ Table and Criteria:

1. Indoor release quantities reduced.
2. “Initial” changed to “Normal”.
3. Removed word “strong”.
4. Removed word “moderate”.
5. Added reference to definitions.
6. Added UNDG Class 2, Division 2.2 (non-flammable, non-toxic gases) excluding air, recognizing potential for asphyxiation.

Threshold Release Category	Material Hazard Classification <sup>a,c,d,e</sup>	Threshold Quantity (outdoor release)	Threshold Quantity (indoor <sup>f</sup> release)
T1-1	TIH Zone A Materials	≥ 5 kg (11 lb)	≥ 0.5 kg (1.1 lb)
T1-2	TIH Zone B Materials	≥ 25 kg (55 lb)	≥ 2.5 kg (5.5 lb)
T1-3	TIH Zone C Materials	≥ 100 kg (220 lb)	≥ 10 kg (22 lb)
T1-4	TIH Zone D Materials	≥ 200 kg (440 lb)	≥ 20 kg (44 lb)
T1-5	Flammable Gases or Liquids with Normal Boiling Point ≤ 35 °C (95 °F) and Flash Point < 23 °C (73 °F) or Other Packing Group I Material (excluding acids/bases)	≥ 500 kg (1100 lb)	≥ 50 kg (110 lb)
T1-6	Liquids with Normal Boiling Point > 35 °C (95 °F) and Flash Point < 23 °C (73 °F) or Other Packing Group II Material (excluding acids/bases)	≥ 1000 kg (2200 lb) or ≥ 7 bbl	≥ 100 kg (220 lb) or ≥ 0.7 bbl
T1-7	Liquids with Flash Point ≥ 23 °C (73 °F) and ≤ 60 °C (140 °F) or Liquids with Flash Point > 60 °C (140 °F) released at a temperature at or above Flash Point or strong acids/bases (see definition 3.1.1 and 3.1.2) or Other Packing Group III Materials or UNDG Class 2, Division 2.2 (non-flammable, non-toxic gases) excluding air	≥ 2000 kg (4400 lb) or ≥ 14 bbl	≥ 200 kg (440 lb) or ≥ 1.4 bbl

## 5.2 Table 1, Tier 1 Material Release Threshold Quantities (TQs) Notes: Use of Packing Groups

- Closes a potential “loophole” by clarifying the Packing Group is used when other hazards are not otherwise expressed/known:

*“In determining the Threshold Release Category for a material, one should first use the toxic (TIH Zone) or flammability (Flash Point and Boiling Point) or corrosiveness (Strong Acid or Base vs. Moderate Acid or Base) characteristics. **Only** when the hazard of the material **is not expressed** by those simple characteristics (e.g. reacts violently with water) is the UN DGL Packing Group used.”*

# 5.4, Optional Tier 1 PSE Severity Weighting

- Used CCPS Severity Weighting as starting point.
- Modified weighting and included in Annex D.
- Severity consequence categories:
  - Safety/Human Health
  - Direct Cost from Fire/Explosion
  - Material Release Within Any 1-Hr Period
  - Community Impact
  - Off-Site Environmental Impact
- Useful in communicating actual loss impact of a PSE Tier 1 internally within the Company

# 5.4, Optional Tier 1 PSE

## Severity Weighting: Annex D Table 4

Table 4 -- Tier 1 Process Safety Event Severity Weighting

Severity Points	Consequence Categories				
	Safety/Human Health <sup>a</sup>	Direct Cost from Fire or Explosion	Material Release Within Any 1-Hr Period <sup>b</sup>	Community Impact	Off-Site Environmental Impact <sup>a, c</sup>
1 point	<ul style="list-style-type: none"> <li>Injury requiring treatment beyond first aid to an employee, contractor, or subcontractor. (Meets the definition of a US OSHA recordable injury.)</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in \$100,000 ≤ Direct Cost Damage &lt; \$1,000,000.</li> </ul>	<ul style="list-style-type: none"> <li>Release volume 1x ≤ Tier 1 TQ &lt; 3x outside of secondary containment.</li> </ul>	<ul style="list-style-type: none"> <li>Officially declared shelter-in-place or public protective measures (e.g., road closure) for &lt; 3 hours, or</li> <li>Officially declared evacuation &lt; 3 hours.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in \$100,000 ≤ Acute Environmental Cost &lt; \$1,000,000.</li> </ul>
3 points	<ul style="list-style-type: none"> <li>Days Away From Work injury to an employee, contractor, or subcontractor, or</li> <li>Injury requiring treatment beyond first aid to a third party.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in \$1,000,000 ≤ Direct Cost Damage &lt; \$10,000,000.</li> </ul>	<ul style="list-style-type: none"> <li>Release volume 3x ≤ Tier 1 TQ &lt; 9x outside of secondary containment.</li> </ul>	<ul style="list-style-type: none"> <li>Officially declared shelter-in-place or public protective measures (e.g., road closure) for &gt; 3 hours, or</li> <li>Officially declared evacuation &gt; 3 hours &lt; 24 hours.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in \$1,000,000 ≤ Acute Environmental Cost &lt; \$10,000,000, or</li> <li>Small-scale injury or death of aquatic or land-based wildlife.</li> </ul>
9 points	<ul style="list-style-type: none"> <li>A fatality of an employee, contractor, or subcontractor, or</li> <li>A hospital admission of a third party.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in \$10,000,000 ≤ Direct Cost Damage &lt; \$100,000,000.</li> </ul>	<ul style="list-style-type: none"> <li>Release volume 9x ≤ Tier 1 TQ &lt; 27x outside of secondary containment.</li> </ul>	<ul style="list-style-type: none"> <li>Officially declared evacuation &gt; 24 hours &lt; 48 hours.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in \$10,000,000 ≤ Acute Environmental Cost &lt; \$100,000,000, or</li> <li>Medium-scale injury or death of aquatic or land-based wildlife.</li> </ul>
27 points	<ul style="list-style-type: none"> <li>Multiple fatalities of employees, contractors, or subcontractors, or</li> <li>Multiple hospital admission of third parties, or</li> <li>A fatality of a third party.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in ≥ \$100,000,000 of direct cost damages.</li> </ul>	<ul style="list-style-type: none"> <li>Release volume ≥ 27x Tier 1 TQ outside of secondary containment.</li> </ul>	<ul style="list-style-type: none"> <li>Officially declared evacuation &gt; 48 hours.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in ≥ \$100,000,000 of Acute Environmental Costs, or</li> <li>Large-scale injury or death of aquatic or land-based wildlife</li> </ul>





# 5.4, Optional Tier 1 PSE

## Severity Weighting: Annex D Table 4

Table 4 -- Tier 1 Process Safety Event Severity Weighting

Consequence Categories

Based on \$100k

Five categories (v. CCPS four categories)

Does not include media coverage

Severity Points	Consequence Categories				
	Safety/Human Health <sup>a</sup>	Direct Cost from Fire or Explosion	Material Release Within Any 1-Hr Period <sup>b</sup>	Community Impact	Off-Site Environmental Impact <sup>a, c</sup>
1 point	<ul style="list-style-type: none"> <li>Injury requiring treatment beyond first aid to an employee, contractor, or subcontractor. (Meets the definition of a US OSHA recordable injury.)</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in \$100,000 ≤ Direct Cost Damage &lt; \$1,000,000.</li> </ul>	<ul style="list-style-type: none"> <li>Release volume 1x ≤ Tier 1 TQ &lt; 3x outside of secondary containment.</li> </ul>	<ul style="list-style-type: none"> <li>Officially declared shelter-in-place or public protective measures (e.g., road closure) for &lt; 3 hours, or</li> <li>Officially declared evacuation &lt; 3 hours.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in \$100,000 ≤ Acute Environmental Cost &lt; \$1,000,000</li> </ul>
3 points	<ul style="list-style-type: none"> <li>Days Away From Work injury to an employee, contractor, or subcontractor, or</li> <li>Injury requiring treatment beyond first aid to a third party.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in \$1,000,000 ≤ Direct Cost Damage &lt; \$10,000,000.</li> </ul>	<ul style="list-style-type: none"> <li>Release volume 3x ≤ Tier 1 TQ &lt; 9x outside of secondary containment.</li> </ul>	<ul style="list-style-type: none"> <li>Officially declared shelter-in-place or public protective measures (e.g., road closure) for &gt; 3 hours, or</li> <li>Officially declared evacuation &gt; 3 hours &lt; 24 hours.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in \$1,000,000 ≤ Acute Environmental Cost &lt; \$10,000,000, or</li> <li>Small-scale injury or death of aquatic or land-based wildlife.</li> </ul>
9 points	<ul style="list-style-type: none"> <li>A fatality of an employee, contractor, or subcontractor, or</li> <li>A hospital admission of a third party.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in \$10,000,000 ≤ Direct Cost Damage &lt; \$100,000,000.</li> </ul>	<ul style="list-style-type: none"> <li>Release volume 9x ≤ Tier 1 TQ &lt; 27x outside of secondary containment.</li> </ul>	<ul style="list-style-type: none"> <li>Officially declared evacuation &gt; 24 hours &lt; 48 hours.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in \$10,000,000 ≤ Acute Environmental Cost &lt; \$100,000,000, or</li> <li>Medium-scale injury or death of aquatic or land-based wildlife.</li> </ul>
27 points	<ul style="list-style-type: none"> <li>Multiple fatalities of employees, contractors, or subcontractors, or</li> <li>Multiple hospital admission of third parties, or</li> <li>A fatality of a third party.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in ≥ \$100,000,000 of direct cost damages.</li> </ul>	<ul style="list-style-type: none"> <li>Release volume ≥ 27x Tier 1 TQ outside of secondary containment.</li> </ul>	<ul style="list-style-type: none"> <li>Officially declared evacuation &gt; 48 hours.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in ≥ \$100,000,000 of Acute Environmental Costs, or</li> <li>Large-scale injury or death of aquatic or land-based wildlife</li> </ul>

Out of secondary containment

Based on "acute" environmental cost

Increasing Severity

# PSE Tier 1 Severity: Example 1

- During startup following a maintenance outage, a distillation column was overfilled resulting in a release of 1,200 bbls of flammable liquid in six minutes from an atmospheric relief device. The liquid release formed a flammable cloud which exploded killing 8 people, injured 47 people, and caused \$200 M in damage. A shelter-in-place order was issued for the nearby community for 2 hours.

Table 4 -- Tier 1 Process Safety Event Severity Weighting

Severity Points	Consequence Categories				
	Safety/Human Health <sup>a</sup>	Direct Cost from Fire or Explosion	Material Release Within Any 1-Hr Period <sup>b</sup>	Community Impact	Off-Site Environmental Impact <sup>a, c</sup>
1 point	<ul style="list-style-type: none"> <li>Injury requiring treatment beyond first aid to an employee, contractor, or subcontractor. (Meets the definition of a US OSHA recordable injury.)</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in <math>\\$100,000 \leq</math> Direct Cost Damage <math>&lt; \\$1,000,000</math>.</li> </ul>	<ul style="list-style-type: none"> <li>Release volume <math>1x \leq</math> Tier 1 TQ <math>&lt; 3x</math> outside of secondary containment.</li> </ul>	<ul style="list-style-type: none"> <li>Officially declared shelter-in-place or public protective measures (e.g., road closure) for <math>&lt; 3</math> hours, or</li> <li>Officially declared evacuation <math>&lt; 3</math> hours.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in <math>\\$100,000 \leq</math> Acute Environmental Cost <math>&lt; \\$1,000,000</math>.</li> </ul>
3 points	<ul style="list-style-type: none"> <li>Days Away From Work injury to an employee, contractor, or subcontractor, or</li> <li>Injury requiring treatment beyond first aid to a third party.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in <math>\\$1,000,000 \leq</math> Direct Cost Damage <math>&lt; \\$10,000,000</math>.</li> </ul>	<ul style="list-style-type: none"> <li>Release volume <math>3x \leq</math> Tier 1 TQ <math>&lt; 9x</math> outside of secondary containment.</li> </ul>	<ul style="list-style-type: none"> <li>Officially declared shelter-in-place or public protective measures (e.g., road closure) for <math>&gt; 3</math> hours, or</li> <li>Officially declared evacuation <math>&gt; 3</math> hours <math>&lt; 24</math> hours.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in <math>\\$1,000,000 \leq</math> Acute Environmental Cost <math>&lt; \\$10,000,000</math>, or</li> <li>Small-scale injury or death of aquatic or land-based wildlife.</li> </ul>
9 points	<ul style="list-style-type: none"> <li>A fatality of an employee, contractor, or subcontractor, or</li> <li>A hospital admission of a third party.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in <math>\\$10,000,000 \leq</math> Direct Cost Damage <math>&lt; \\$100,000,000</math>.</li> </ul>	<ul style="list-style-type: none"> <li>Release volume <math>9x \leq</math> Tier 1 TQ <math>&lt; 27x</math> outside of secondary containment.</li> </ul>	<ul style="list-style-type: none"> <li>Officially declared evacuation <math>&gt; 24</math> hours <math>&lt; 48</math> hours.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in <math>\\$10,000,000 \leq</math> Acute Environmental Cost <math>&lt; \\$100,000,000</math>, or</li> <li>Medium-scale injury or death of aquatic or land-based wildlife.</li> </ul>
27 points	<ul style="list-style-type: none"> <li>Multiple fatalities of employees, contractors, or subcontractors, or</li> <li>Multiple hospital admission of third parties, or</li> <li>A fatality of a third party.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in <math>\geq \\$100,000,000</math> of direct cost damages.</li> </ul>	<ul style="list-style-type: none"> <li>Release volume <math>\geq 27x</math> Tier 1 TQ outside of secondary containment.</li> </ul>	<ul style="list-style-type: none"> <li>Officially declared evacuation <math>&gt; 48</math> hours.</li> </ul>	<ul style="list-style-type: none"> <li>Resulting in <math>\geq \\$100,000,000</math> of Acute Environmental Costs, or</li> <li>Large-scale injury or death of aquatic or land-based wildlife</li> </ul>

# PSE Tier 1 Severity: Example 1

- During startup following a maintenance outage, a distillation column was overfilled resulting in a release of 1,200 bbls of flammable liquid in six minutes from an atmospheric relief device. The liquid release formed a flammable cloud which exploded killing 8 people, injured 47 people, and caused \$200 M in damage. A shelter-in-place order was issued for the nearby community for 2 hours.

Example PSE Severity Weight		
Safety/Human Health	Multiple Fatalities	27 Points
Direct Cost	\$200 M	27 Points
Material Release	≥ 27x Tier 1 TQ	27 Points
Community Impact	Shelter-in-Place < 3 hours	1 Point
Off-Site Environmental Impact	No Environmental Impact	0 Points
<b>Tier 1 PSE Severity Weight Total</b>		<b>82 Points</b>

**PSE Severity Weight = 27 + 27 + 27 + 1 + 0 = 82 Points.**

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# **SUMMARY OF KEY REVISIONS: TIER 2 PERFORMANCE INDICATOR**

# 6.2 Table 2, Tier 2 Material Release Threshold Quantities (TQs)

Key Changes in TQ Table and Criteria:

1. “Initial” changed to “Normal”.
2. Moved Packing Group III to Category T2-7.
3. Removed word “strong”.
4. Created Category 8 and re-aligned T2-6 through T-8.
5. Quantity in bbl modified.
6. UNDG Class 2, Div. 2.2 added.

Threshold Release Category	Material Hazard Classification <sup>a,c,d,e</sup>	Threshold Quantity (outdoor release)	Threshold Quantity (indoor <sup>2</sup> release)
T2-1	TIH Zone A Materials	≥ 0.5 kg (1.1 lb)	≥ 0.25 kg (0.55 lb)
T2-2	TIH Zone B Materials	≥ 2.5 kg (5.5 lb)	≥ 1.2 kg (2.8 lb)
T2-3	TIH Zone C Materials	≥ 10 kg (22 lb)	≥ 5 kg (11 lb)
T2-4	TIH Zone D Materials	≥ 20 kg (44 lb)	≥ 10 kg (22 lb)
T2-5	Flammable Gases <sup>1</sup> or Liquids with Normal Boiling Point ≤ 35 °C (95 °F) and Flash Point < 23 °C (73 °F) <sup>2</sup> or Other Packing Group I Materials (excluding acids/bases) <sup>3</sup>	≥ 50 kg (110 lb)	≥ 25 kg (55 lb)
T2-6	Liquids with Normal Boiling Point > 35 °C (95 °F) and Flash Point < 23 °C (73 °F) <sup>2</sup> or Other Packing Group II Materials (excluding acids/bases)	≥ 100 kg (220 lb) or ≥ 0.7 bbl	≥ 50 kg (110 lb) or ≥ 0.35 bbl
T2-7	Liquids with Flash Point ≥ 23 °C (73 °F) and ≤ 60 °C (140 °F) or Liquids with Flash Point > 60 °C (140 °F) released at a temperature at or above Flash Point or strong acids/bases (see definition 3.1.1 and 3.1.2) or Other Packing Group III Materials	≥ 200 kg (440 lb) or ≥ 1.4 bbl	≥ 100 kg (220 lb) or ≥ 0.7 bbl
T2-8	UNDG Class 2, Division 2.2 (non-flammable, non-toxic gases) excluding air <sup>6</sup> or Liquids with Flash Point > 60 °C (140 °F) and ≤ 93 °C (200 °F) released at a temperature below Flash Point or Moderate acids/bases	≥ 1000 kg (2200 lb) or ≥ 7 bbl	≥ 500 kg (1100 lb) or ≥ 3.5 bbl

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# **SUMMARY OF KEY REVISIONS: REPORTING PERFORMANCE INDICATORS**

# 10.3, Local (Facility) Public Reporting:

## Table 3

- Stakeholder report information revised to include 5-yr rolling average for count and rate.

		Industry	Company
Tier 1	Current Year PSE Count + 5 Year Rolling Average	X	See Note
	Current Year PSE Rate + 5 Year Rolling Average	X	X
Tier 2	Current Year PSE Count + 5 Year Rolling Average	X	See Note
	Current Year PSE Rate + 5 Year Rolling Average	X	X
Note: Comparisons among companies and industries are only statistically valid on a rate basis; therefore, Company PSE counts are not reported publicly.			

# 10.4, PSE Data Capture

- Multiple revisions to better capture and trend data include:
  - Revisions based on changes made in 5.2 and 6.2
  - Revisions to lists of Refining and Petrochemical processes
  - Addition of sub-categories for “normal” operating mode
  - Addition of Event Description and Causal Factors
  - Other miscellaneous changes



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# **INFORMATIVE ANNEXES**

# Annexes (Informative)

Annex	Title	New/ Revised	Summary of Addition/Revision
Annex A	Application to Petroleum Pipeline & Terminal Operations	New	Annex A through C has been added to suggest API-754 may be useful for application in other industry sectors.
Annex B	Application to Retail Service Stations	New	Annex A through C has been added to suggest API-754 may be useful for application in other industry sectors.
Annex C	Oil & Gas Drilling and Production Operations	New	Annex A through C has been added to suggest API-754 may be useful for application in other industry sectors.
Annex D	Tier 1 PSE Severity Weighting	New	A severity table for PSE Tier 1 has been added in Annex D. This table was based on the CCPS table with several revisions. Several examples are also included in the new Annex D.
Annex E	PSE Examples	Revised (significant)	Annex E revises the original “Examples” included in Edition 1, as well as other publications (e.g., FAQ documents) since issuance of Edition 1. Additionally, Annex E includes various new examples and scenarios based upon revisions discussed and vetted during Edition 2 drafting.
Annex F	Listing of Chemicals Sorted by Threshold Quantity	Revised (minor)	Annex F had no major revisions.
Annex G	Application of Threshold Release Categories to Multicomponent Releases	New	Annex G was added for better clarity and guidance on handling multicomponent release scenarios.
Annex H	PSE Tier 1 Tier 2 Determination Decision Logic Tree	Revised (minor)	Content in Annex H was revised based on other changes in Edition 2 (e.g., increase of Tier 1 PSE direct cost for fire/explosion from \$25K to \$100K).
Annex I	Guidance for Implementation of Tier 3 & Tier 4 Indicators	New	Annexes I and J were added to provide more guidance relative to Tier 3 and Tier 4 indicators.
Annex J	Tier 4 Indicators	New	Annexes I and J were added to provide more guidance relative to Tier 3 and Tier 4 indicators.

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# **IMPLEMENTATION**

# Implementation Timing

Technically, implementation begins when the revision is published, however AFPM and API have agreed to collect CY 2016 data per the 2<sup>nd</sup> edition. That data collection will occur in early 2017.

# QUESTIONS?

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# Webinar Dates

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- May 17 - Presentations at AFPM national Occupational & process Safety Conference on API RP 754, Rev. 2
- June 21 – 11:00am Eastern
- September 13 – 11:00 am Eastern
- December 13 – 11:00 am Eastern

# BACK UP SLIDES

# Resources

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- API
  - API RP 754 Fact Sheet
  - Series of four webinars presented in fall 2010 (available for viewing)
  - Listing of FAQ's that help you properly classify a PSE
  - API Guide to collecting PSE data
  - Read-only access to API RP 754
  - Contact Ron Chittim at [chittim@api.org](mailto:chittim@api.org) for more information
  - Website: <http://www.api.org/environment-health-and-safety/health-safety/process-safety-industry/measuring-safety-improvement.aspx>
- AFPM Safety Portal
  - Process Safety metrics searchable database
  - 2011-2013 annual Process Safety Event reports
  - AFPM Guide to reporting PSE data
  - A “Hypothetical Process Safety Metrics Story”
  - Website: <http://safetyportal.afpm.org/ProcessSafetymetrics-access.aspx>