Purpose of **Industry Learning & Outreach**

Quarterly Webinars

- To update participants on recent learnings stemming from the AFPM/API Advancing Process Safety Programs
  - Industry Learnings & Outreach (API RP 754 and Event Sharing)
  - Hazard Identification & Practice Sharing
  - Site Assessments
  - Regional Networks
  - Human Reliability: Permit to Work and Fired Heaters
  - Mechanical Integrity

- To ensure consistency in Tier 1 and 2 metrics reporting in order to establish credibility and validity

- To share learnings regarding the effective implementation of Tier 1-4 lagging/leading metrics
Today’s Agenda

1. Trend Charts for PSE 1s & 2s for Refining and Petrochemical Facilities
2. Highlight on Hazard ID and Practice Sharing documents
3. 2017 Annual Learnings Report
4. Process Safety Queries
5. Outreach and involvement opportunities
6. Q & A
Trend Charts for PSE 1s & 2s

REFINING AND PETROCHEMICAL PROCESS SAFETY EVENT RATES

- Refining T1 Rate
- Refining T2 Rate
- Petrochemical T1 Rate
- Petrochemical T2 Rate

2012: 0.10, 0.24; 2013: 0.09, 0.25; 2014: 0.09, 0.27; 2015: 0.10, 0.20; 2016: 0.14, 0.17
Refining PSE Trend by Site Size

2012-2016 Tier 1 PSE Rate

- Small
- Medium
- Large
Petrochemical PSE Trend by Site Size

Petrochemical Tier 1 2012-2016

- Small
- Medium
- Large
Purpose and Use

• Hazard Identification documents are meant to share process safety hazards for a particular equipment or practice
  • They can be used to create awareness, to use as a checklist when reviewing current practices, or to use when creating new practices

• Practice Sharing documents are meant to share a site specific practice that has worked at one company or site
  • These documents may be used when a site is updating their practices or is looking to develop a new practice.
Practice Sharing Development Process

Identification of Practice
- API Site Assessment
- Regional Network Meeting
- Human Reliability Subgroup/Other Conference/Workshop

Document Development
- Site/Company grants permission/approval to put practices through the process
- Typically, documents are developed by an AFPM Contractors, but a site/company can develop as well
- Company/site provides final approval and legal review prior to sending to AFPM for Subgroup reviews

Document Review
- Each document is reviewed by the Hazard Identification/Practices Sharing Subgroup or the Subgroup of origin, for example, Human Reliability Subgroup.
- A Site/Company can then “Approve” or “Reject” comments
- The Process Safety Workgroup provides on last review before final legal reviews.

Legal Review
- Prior to publication, each document is reviewed by the company legal, Chair of the Legal Subgroup, and AFPM legal

Publication
- Practice is Published to AFPM Safety Portal
Recent PS Documents

- **Integrity Operating Window (IOWs) Alarm Management (Site Assessment)**
  - Document is an example of a way to manage and communicate IOWs such that they are consistently followed.

- **Higher Risk Procedure (Regional Network Presentation)**
  - Provides process and checklists to ensure safe methods are used for tasks that have been identified as representing ‘Higher Risk’

- **HAZOP Vulnerabilities List (Site Assessment)**
  - Provides a process to improve a site’s HAZOP revalidation by identifying potential damage mechanisms and vulnerabilities

- **First Line Break Labeling (Walk the Line Workshop)**
  - Provides an example of an administrative barrier in human error in identifying and communicating the intended points of first breaks or cut lines – can supplement LOTO procedure

- **Open Valve Labeling and Management (Walk the Line Workshop)**
  - Provides an example of a way to label and manage bleeder/drain/vent valves that are left open to the atmosphere while unattended.

- **Flange Bolting and Gasketing (Site Assessment)**
  - Practice is meant to help assure correct design and installation of flange bolting and gasketing
Recent Hazard Identification Documents

- **Atmospheric Storage Tank Operation**
  - Hazards associated with in-service atmospheric tanks, including fixed roofs, external floating roofs, and internal floating roofs.

- **Maintenance/ Operations Turnover and Verification After Maintenance**
  - Hazards associated with equipment turnovers between Operations and Maintenance for the performance of routine maintenance work in a live unit

- **Temporary Repairs of Piping and Piping Components**
  - Temporary repairs of piping and piping components typically call in the categories of clamping, wrapping, or welding

- **Atmospheric Tank Preparation for Out of Services Maintenance**
  - Five year review
  - Original published 2012, updated in 2017
What’s Coming Next

Practices:

• **Temporary Leak Repair Checklist and Form**

  This practice provides a checklist that serves as a template for the review of potential hazards of temporary repairs that can include installation of clamps, enclosures, overlays, wraps and “Tell-Tale” (T-T) pins, including the re-tightening and reinjection of sealant in temporary repair enclosures to help prevent loss of containment events.

• **Control of Defeat**

  The purpose of the Control of Defeat work practice is to ensure that the necessary analysis, authorization, communications and recordkeeping is performed when disabling or impairment of SHE (Safety, Health, Environment) Critical Devices occurs.

• **Radio Communications Protocol**

  Defined radio communication protocol in an operation that requires close coordination between field and console operators is important to effective performance and avoidance of unintended consequences.

• **Human Reliability Subgroups: Fired Heaters and Permit to Work** will publish several documents soon around Fired Heater Management, Joint Jobsite Visits, LOTO University, Electrical Distribution Permitting
Current Practice Sharing Documents

- Refinery Tank Farm & Terminal Product Transfer
- Tracking WTL Incidents
- Checklist SOP
- Maintenance/Operations Turnover Verification after Maintenance
- MOC Tagging
- Piping & Instrumentation Diagram walk-down
- Pre-startup Safety Review (PSSR)
- Soap Testing for Equipment Commissioning
- Use of Infra-red Camera to Detect Leaks During Start-up
- Bolting & Gasketing Management
- Line Labeling
- Shift Handover Process Safety Field Audit
- Operator Evaluation Rounds
- Informal Unit Walk-Through
- Operating Instructions
- Operator Shift Notes
- Shift Change Communications
- Shift Change Meeting
- Threaded Lanyard Plug
- Critical Bleeder Valves
- Spring Loaded Valves
- Cap & Plug Program
- Safe Operating Limits & Alarm Management
- Energy Isolation

Find more Practice Sharing documents as they are update on the Safety Portal at: https://safetyportal.afpm.org/HazardIdentification-access.aspx
Current Hazard ID Documents

- Atmospheric Storage Tank Operation
- Maintenance/Operations Turnover and Verification After Maintenance
- Temporary Repair of Piping and Piping Components
- Injection Point and Process Mixing Point Hazards
- Deadlegs
- Operator Line-up
- Winterization
- Hose Hazards
- Equipment Small Bore Piping
- Opening Flare System While in Service
- Fired Heaters
- Critical Crane Lifts
- Hot Taps
- Liquid Petroleum Gas
- Flare Operations
- Process Sampling for QA/QC
- Shift Handover
- Atmospheric Tank Preparation for Out of Service Maintenance
- Vacuum Trucks

Find more Hazard ID documents as they are update on the Safety Portal at: https://safetyportal.afpm.org/HazardIdentification-access.aspx
AFPM Annual Learnings Report

Published November 2017

Update on Lessons from Advancing Process Safety Data

2016 API 754 Event Data

- 4% Pressure vessels
- 12% Atmospheric tanks
- 4% Fired heaters
- 43% Piping systems
- 7% Pumps
- 4% Heat exchangers
- 16% Miscellaneous

AFPM Annual Learnings Report

Update on Lessons from Advancing Process Safety Data

Opportunities to Improve Process Safety Performance

A summary of discoveries from the review of Advanced Process Safety data sources included the following:

- 10% of the Tier 1 & 2 events submitted in 2016 during "Normal Mode of Operation" had a single cause (equipment failure)
- 42% of these events resulted in at least one Cause of Failed equipment
- 5% inoperability, Insulation, Insulation Loss less than adequate, No Insulation, or Gas/Water Line with Adequate
- The results of the API Process Safety Code Assessments show that the highest scoring subassemblies are from Mechanical Integrity, Process Hazards, and Critical Check Valves

Leading Causes of Incidents Involved

- Failed Equipment: mechanical integrity – internal and external corrosion, stress, cracking, inspection less than adequate
- Equipment Reliability: premature failure, maintenance repair less than adequate
- Human Factors: varies, not open, open-ended lines, shutdown/starting, tank filling
- Design - instrumentation, spec not adequate
- 68% of design causes related to engineering less than adequate, focused by gaps in specifications and construction
- Revising existing operating procedures, gaps, 25% of all procedures available but not implemented, 15% with situation not covered, 15% with no procedure available, and 15% with procedure not accurate

Additional Resources (afpm.org/safetyresources):

- Process Safety Bulletin:
  - Understanding Process Safety
  - Understanding Human Error
  - Understanding Human Error
  - Understanding Human Error
  - Understanding Human Error

- Risk Sharing & Hazard ID

- Prevention and Repairs

- Maintenance: Operations, Turnover, and Verification

- Energy Isolation

- Maintenance: Operations, Turnover, and Verification

- Energy Isolation

- Prevention and Repairs

- Change Management

- Equipment Performance

- Human Error

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety

- Process Safety
Process Safety Queries

- We continue to receive queries on potential Process Safety Tier 1 and Tier 2 Events.
- Scenarios are reviewed by the members of the Industry Learning & Outreach Sub-Team.
- Consensus is achieved through sharing and discussion.
- Detailed documented responses are provided to the requestor and saved for possible use in the 3rd Edition of API-754.
- Please continue to send your requests to AFPM (Lara Swett), API (Heidi Keller), or ACC (Karen Haase).
Binder

- 8 Safety Bulletins
  - 1 in development

- 19 Hazard ID Documents
  - 1 in development

- 29 Practice Sharing Documents
  - 22 in development

- 688 Events in the Event Sharing database

- Statistic Reports and Benchmarking opportunities
Member Outreach

Planned Outreach

- AFPM Committees
  - Executive, Board of Directors, Maintenance, Safety, etc.
- Company outreach will be customized per company
  - AFPM Board of Directors will direct AFPM on how they want binders rolled out at their company
- Regional Network Participants
  - Operating Practices Symposium
    - Operating Practices Advisory Group
Ways to Get Involved

- Regional Networks
  - Sharing data analysis and tool
  - Getting APS into the sites
  - Opportunity identification
  - Practice Sharing Documents

- Quarterly Webinars
  - Data analysis and tools
  - Sharing observations for data collection improvements
  - Range of 100-200 individuals in attendance

- Annual Walk the Line Workshops
  - 200 individuals

- Email Distribution Lists
  - ~1650 individuals
  - Every 1-2 months sharing new tools

- Industry Conference Presentations
  - ~5 a year

- Safety Portal
  - Weekly digests
    - Anyone who logs in automatically receives digests
    - ~2000 individuals

To be added to lists, contact Lara Swett, lswett@afpm.org at AFPM
2017 Webinar Dates

• February 28 – 10:00 am Eastern (Complete)
• June 6 – 11:00 am Eastern (Complete)
• September 19 – 11:00 am Eastern (Complete)
• December 5 – 11:00 am Eastern
• February 27 – 11:00 am Eastern
Questions? / Discussion!
How to Access the Safety Portal?

All AFPM Members have access to the AFPM Safety Portal

To see if you are a member:
https://www.afpm.org/membership-directory/

Safety Portal Link:
www.afpm.org/safetyportal/

You will need your AFPM Username and Password to access the Portal. If you have forgotten it or need to set one up, follow the instructions on the login page.

Note: For Access to Process Safety Metrics, Injury & Illness Metrics, and Event Sharing database, you will need to get permission from your company’s database administrator. Those individuals are listed in the bottom right hand corner of the Portal Homepage.

For all questions and information, contact:
Lara Swett
Senior Director, Safety Programs
AFPM
202-552-8476
lswett@afpm.org