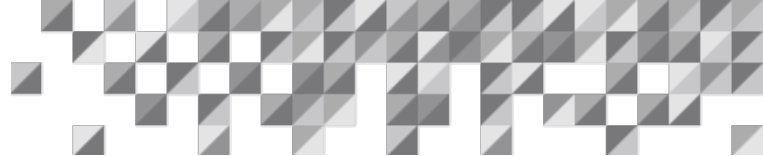# Effectively Manage Process Hazard Analyses using Process Safety Enterprise®

An ioMosaic White Paper

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Overview

Process Safety Enterprise® (PSE), a cloud-based platform, helps ensure compliance with the 14 elements of the Occupational Health and Safety's (OSHA's) Process Safety Management (PSM) standard. This white paper details the key features of PSE, with a focus on Process Hazard Analyses (PHAs), including:

- Document Control System: Easily stores and retrieves documents.
- Intelligent Form Builder: Creates customizable forms.
- Action Tracking System: Manages all tasks related to PHAs.
- Reporting and Dashboard/KPI: Provides real-time insights into activities.
- Process Hazard Analysis Workflow: Guides users through initiating a PHA, assigning team members, approving the work, preparing the data, completing the PHA in the PSMPro™ software, documenting the completed PHA, performing a quality check, approving the final PHA, assigning and completing all recommendations after electronic transfer from PSMPro™, and completing the workflow.
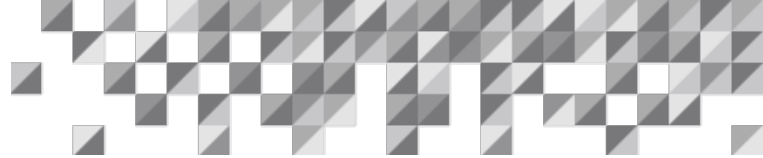
A case study highlights the consequences of not conducting PHAs and understanding the hazards of a process. It emphasizes how the PSE software with the Management of Change (MOC) and PHA workflows could have helped to prevent this disaster.

Introduction

Process Hazard Analysis is crucial to OSHA's PSM 29 CFR 1910.119 standard. PHAs identify viable scenarios and associated process hazards and determine how to mitigate or eliminate them using appropriate layers of protection and safeguards.

Businesses often encounter challenges managing PHAs since they involve large amounts of Process Safety Information (PSI), approvals, the execution of the PHA, quality checks, and the initiation and completion of many action items to address the PHA recommendations Overlooking these responsibilities risks the safety of employees, plant assets, the community, and the environment. Moreover, an accident could lead to production interruptions.

An effective PHA process should include identifying the activities above and tracking them to completion. Training should also be tracked for employee awareness of the PHA process and PHA leaders and participants. The PHA HAZOP Leader course can prepare your qualified people to lead PHAs. For new safety professionals or others who will assist with PHAs, the Basic PHA eLearning course will help them understand the basic structure of typical risk assessments.

[Process Safety Learning®](#) (PSL), powered by ioMosaic, is an eLearning platform for process safety training. For new participants on a PHA team, such as operators and engineers who are not safety professionals, the PSL eLearning course on [Hazard Identification and Process Risk](#) is a great introduction to the essentials of Process Hazard Analysis. The [Refinery Hazards Fundamentals](#) eLearning course is also available.

Effective PHA systems help companies document, plan, execute, and store required risk assessments and the action items they generate. This workflow can help companies comply with the PSM requirements of the 29 CFR 1910.119 standard.

An effective PHA process tied to related PSM elements can help companies document, plan, execute, and store required PHAs while accessing required PSI and other related documentation. The workflows can help companies comply with the PSM requirements of the 29 CFR 1910.119 standard.

For businesses serious about implementing a comprehensive PSM compliance system, ioMosaic offers the Process Safety Enterprise® (PSE) (Figure 1). PSE is a cloud-based platform enabling easy ongoing management of process safety data, helping businesses achieve compliance, manage risk, and remain competitive. Unlike any other system available today, PSE is a centralized web-based application that integrates all PSM elements and workflows, making it THE ultimate solution for managing PHAs effectively. This white paper delves into the key features of the PHA workflow and how it benefits companies seeking to improve and elevate their systems to manage process hazards while complying with PSM.

To help you better understand the requirements of the PSM standard, we recommend a [PSM Essentials eLearning course like the one offered by Process Safety Learning®](#).
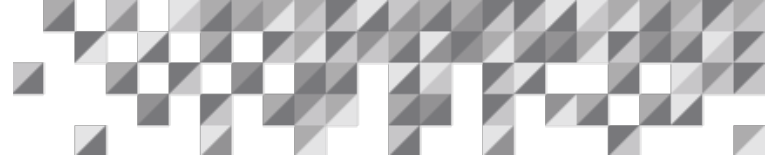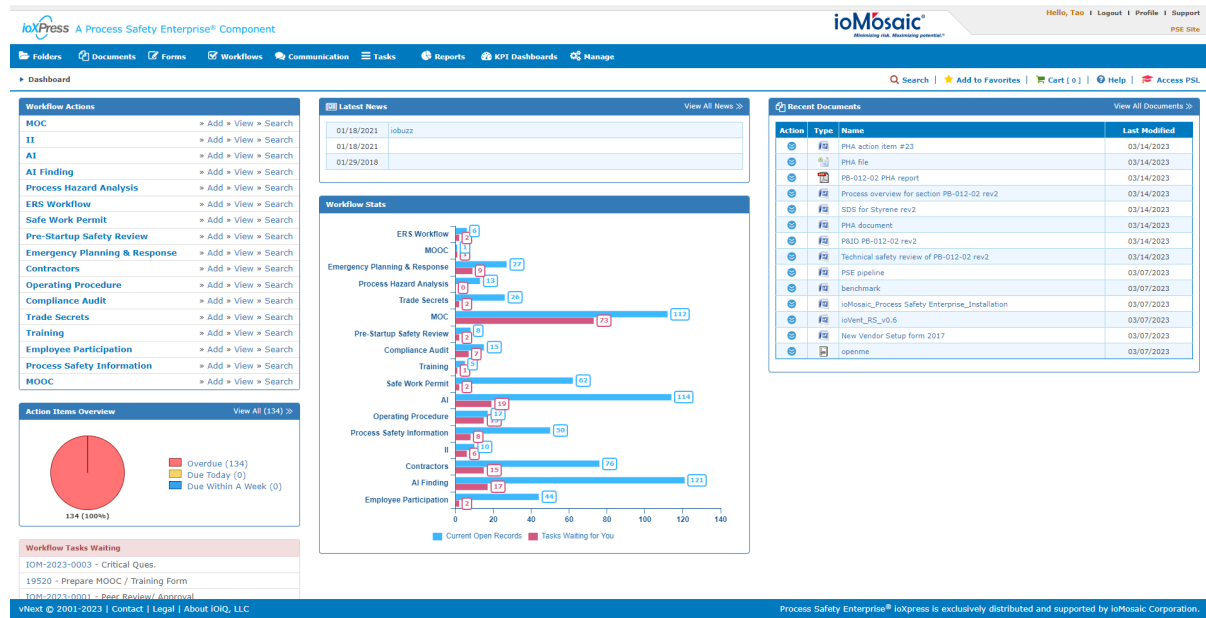
Figure 1. Process Safety Enterprise® (PSE)

Source: ioMosaic Corporation – PSE

Document Control System

The document control system of PSE's platform is a key component for facilitating easy access to all critical process safety data. It allows users to easily access and add documents using a simple drag-and-drop (Figure 2) feature. This action quickly organizes documents into folders for easy retrieval. Its advanced search function indexes all documents with full text, allowing users to find necessary information quickly. An embedded document viewer feature not only enhances accessibility but also bolsters security measures. By granting users view-only permissions, they can view documents as images, preventing unauthorized downloads and eliminating the need to log into their computers for access. This document control component is an effective tool for managing various types of data, including but not limited to completed PHAs, MOCs, incident investigations, Process Safety Information (PSI), procedures, records, pictures, videos, animation, and reports. This component further ensures that all stakeholders have easy access to vital information related to PHAs stored in a centralized location.

Figure 2. Drag and drop feature to add document(s)
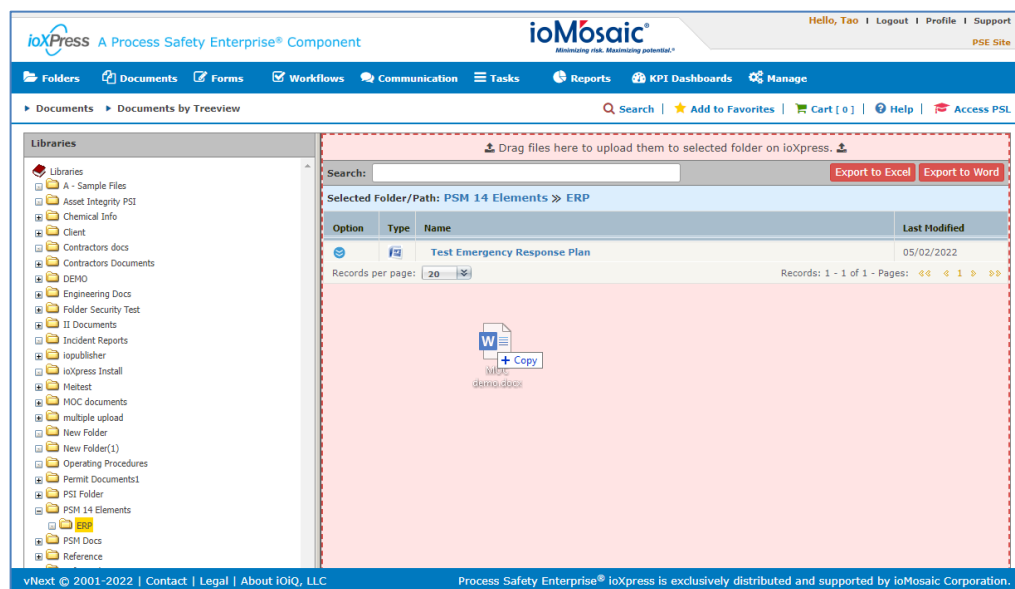
Source: ioMosaic Corporation – PSE

Intelligent Form Builder

PSE also includes an intelligent form builder for efficient data capture and linking to documents in a central digital library. This dynamic form builder enables users to create practical, customizable PHA forms.

The ability to customize forms for unique PHA practices ensures that all necessary data is captured accurately and consistently. Moreover, this feature allows easy data export to an Excel format, making data analysis and sharing even more seamless. Implementing a customizable form builder like the one in PSE streamlines a PHA process by capturing data accurately and efficiently.

Figure 3 shows a portion of one of the PHA workflow forms for gathering the required PSI before the PHA begins.

Figure 3. Example of PHA Form – A portion of the PSI to be gathered

Source: ioMosaic Corporation – PSE

Process Hazard Analysis (PHA) Workflow

PSE is the only process safety platform integrating all of OSHA's Process Safety Management (PSM) elements using visual workflows in a single enterprise system. This workflow includes PSM's 14 elements, action tracking modules, and document control. The Training workflow can be used to require and track training for PHA leaders and participants. The MOC and Incident Investigation workflows provide easy access to previous activities that must be referenced within the PHA. The PSE workflows allow companies to identify and manage process hazards and document the required PSI, related activities, PHA approvals and action items, and the completed PHA report.

The PHA workflow establishes steps for initiating or revalidating a PHA, forming the team, gathering the PSI and other data, approving the work, conducting the PHA, performing quality checks, tracking action items, and saving the approved reports. The workflow can be customized to meet the specific needs of any company.

PSE's Process Hazard Analysis workflow includes checklists to ensure all pertinent PSI is gathered and that the PHA has a thorough quality check after completion. Relevant MOCs and Incident investigations can be attached to the workflow for review and documentation.
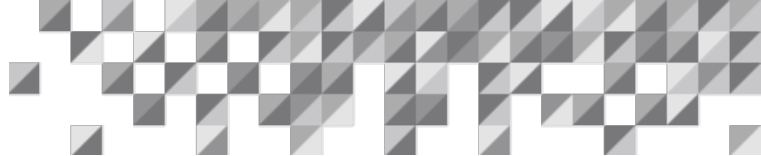
The PHA is executed outside of PSE in ioMosaic's PSMPro™ software or other available PHA software. The PHA report can be linked within the workflow, and the PSMPro™ recommendations can be electronically transferred to PSE to assign and manage them using the Action Tracking System. The PSE workflow automatically emails the assigned people and tracks whether the action items are completed. The final step of the workflow checks that all action items have been completed and approved. The approval step verifies that the PHA recommendations were thoroughly addressed.

Figure 4 illustrates the PHA workflow steps. Completed steps are in blue, Inactive steps in light gray, Not applicable steps in dark gray, and Ready steps are in green. The workflow can only be closed once all required steps are completed.

The Process Hazard Analysis workflow within PSE ensures process hazards are identified and managed per the OSHA standards and guidelines.

Figure 4: Example of Process Hazard Analysis Workflow
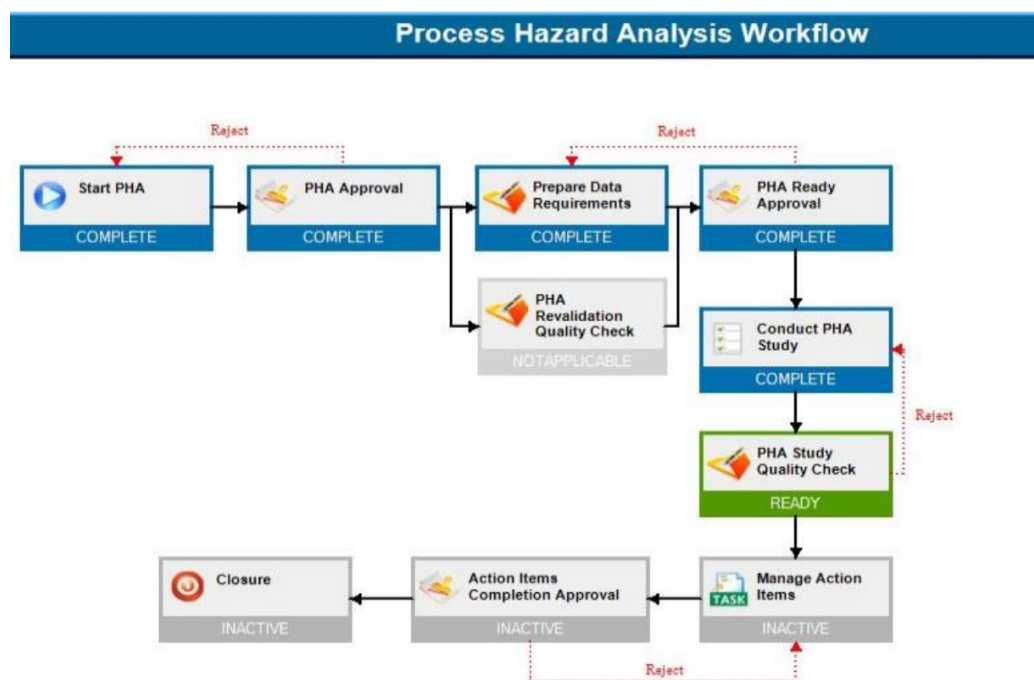
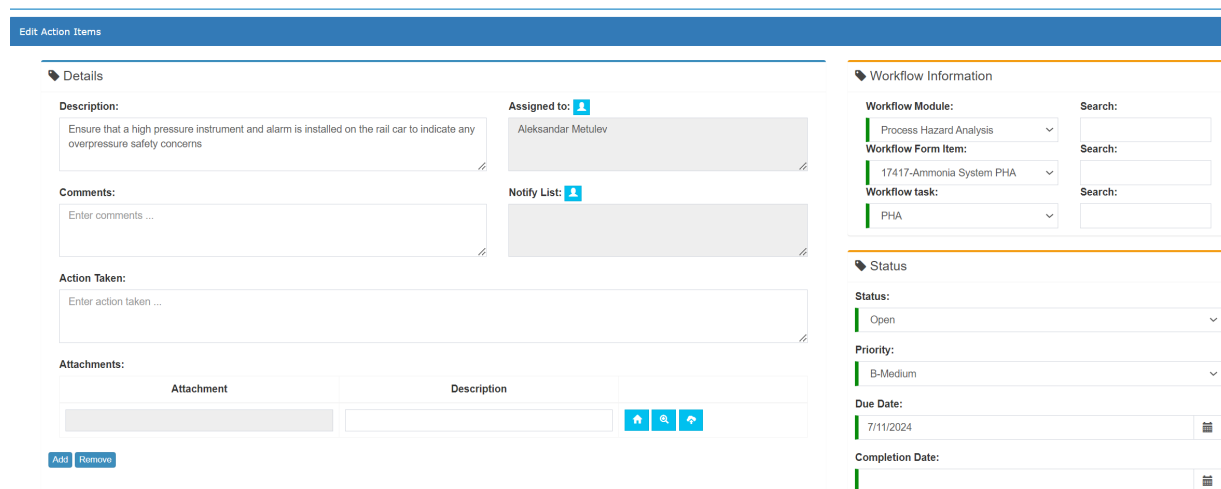Source: ioMosaic Corporation – PSE

Action Tracking System

PSE features a comprehensive action item management system (Figure 5). It tracks all tasks related to each process safety management workflow, such as assigning action items to address

the PHA recommendations. This feature ensures that all action items are managed within the platform, reducing or eliminating the risk of overlooked or forgotten tasks. An additional feature, the 'Automatic Reminders,' enforces all tasks to be completed on time.

Figure 5. PHA Action Item

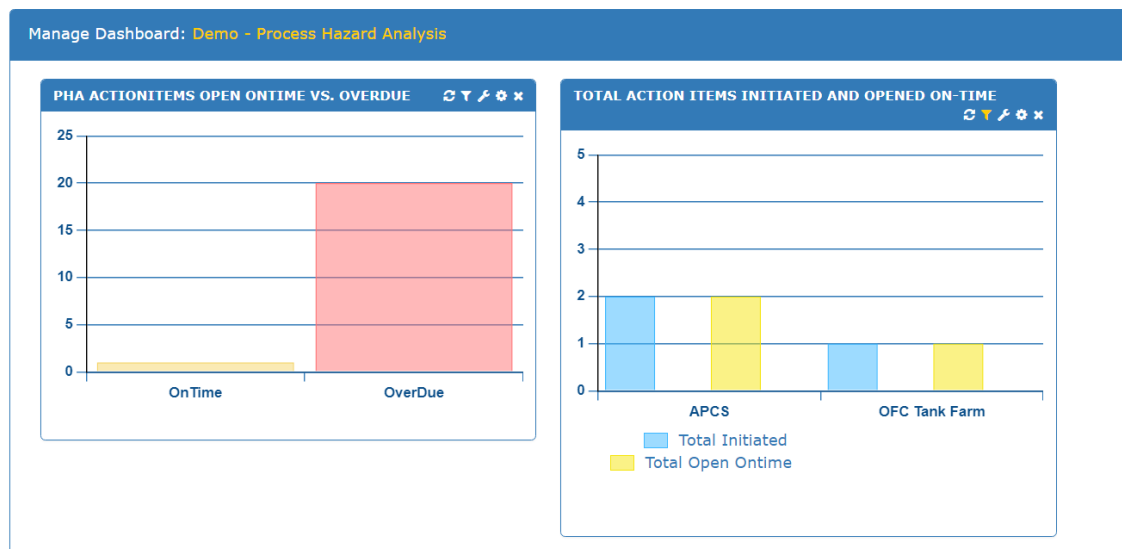
Source: ioMosaic Corporation – PSE

Reporting and Dashboard/KPI

An effective dashboard (Figure 6) is an invaluable 'must-have' asset for any data-driven enterprise solution looking to increase performance and productivity. With well-designed dashboards featuring various widgets such as bar charts, pie charts, line charts, and tables, PSE provides a comprehensive overview of the PSM program from a single source. These dashboards allow business owners to make faster decisions at a glance based on real-time data.

Moreover, the reporting and dashboard capabilities provide real-time visibility into PHA activities, allowing organizations to identify trends and areas of concern quickly. This capability enables the timely resolution of recommendations, reducing the risk of incidents and non-compliance. PSE's robust reporting and dashboard/KPIs are essential tools for optimizing operations and mitigating potential risks.

Figure 6. Dashboard/KPI

Source: ioMosaic Corporation – PSE

Case Study – The Consequences of Not Identifying and Managing Process Hazards

The Challenge

The US Chemical Safety and Hazard Investigation Board (CSB) investigated a fire and explosion from Feb 7, 2003, at the Technic Inc. Plating Chemicals facility in Cranston, Rhode Island. A violent chemical reaction occurred inside the vent collection system, carrying waste gases and particles to a scrubber for pollution control. One worker was critically injured, and 18 others were treated at the hospital. The critically injured worker had permanent eye damage, and chemical burns to the face and body.

The CSB found that the two main causes of this accident were a lack of hazard review and the absence of a Management of Change (MOC) system. When the vent collection system was installed, there was no required MOC process to review the hazards of the new equipment before it was installed. An MOC process would likely have required a hazard review, such as a Process Hazard Analysis. The site conducted a process chemistry compatibility review, but a hazard review of the incompatible chemicals was not completed. The CSB concluded that incompatible chemicals mingled in the vent collection system and caused the violent reaction. They also found that the emergency response was hampered since the hazards and consequences were not understood and, therefore, not communicated to the emergency responders beforehand. The CSB report can be downloaded with this link.

Technic Inc. could have prevented this disaster if they had required an MOC to be conducted, which would have identified the potential hazards of the new equipment and triggered a PHA to investigate and manage the incompatibility hazards before startup.

Creating documented MOC and PHA programs that rely on an electronic platform for initiation, approval, execution, and management of action items can improve process safety oversight and employee and contractor safety. An electronic program can also reduce the risk of worker fatalities and injuries using appropriate hazard identification and management workflows.

Our Approach

The Process Safety Enterprise® Process Hazard Analysis Workflow is a cloud-based platform that provides a centralized database accessible and visible to all employees and contains a step-by-step guided workflow. This workflow could have minimized or eliminated the Cranston incident referenced in the case study.

Additionally, PSE can integrate multiple sites and various data into one uniform system (which would have further minimized the incident) by:
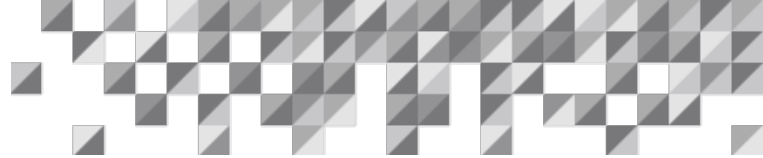
- Developing a unique ID system to differentiate facilities and areas
- Setting up sign-on access for users at all facility sites
- Identifying and developing consistent data definitions and Key Performance Indicators (KPIs)
- Standardizing search queries to ensure data quality
- Devising site-specific and corporate reporting capabilities

Customizable workflows are available within PSE and can assist with creating unique questions or forms.

PSE's built-in features, such as the automatic assignment of approvals, action item tracking, document linking, and email notifications, all contribute to ensuring the documentation and execution of PHAs are properly captured, accessible, and visible to employees.

The Benefits

For companies serious about their process safety compliance and PHA process, PSE is a user-friendly platform with workflows for document control that is scalable and affordable.

The PHA workflow streamlines initiating, approving, checking, completing, and documenting PHAs. Recommendations from the PSMPro™ software are automatically transferred to the PHA workflow as action items that are tracked and completed before the workflow can be closed.

Finally, the PSE workflows have KPIs that track open workflows and the percentage of open or overdue workflows. The KPIs are graphed with interactive data, allowing you to drill down to the specific data. Reports can also be generated to view the status of all workflows.

Conclusion

Managing Process Hazard Analyses effectively and consistently can be challenging; fortunately, Process Safety Enterprise® (PSE) provides an integrated solution that makes the process more efficient and effective. With its dynamic form builder, action tracking feature, and integrated workflow to standardize the process, companies reduce the risk of incidents and non-compliance.

PSE offers additional benefits, including enhanced collaboration, improved data management, and increased compliance with process safety regulations. With the reporting and dashboard capabilities, organizations can easily identify trends and potential areas of concern, gaining real-time visibility into all process safety-related activities. The automatic notification system sends reminders and alerts to stakeholders, ensuring items are addressed in a timely manner.

PSE's customizable PHA workflow module and ioMosaic's PSMPro™ software provide an efficient process for initiating, executing, and completing PHAs while capturing all necessary information in one centrally located platform.

PSE is the only product of its kind in the market today that provides an all-inclusive process safety compliance platform that makes compliance easy.
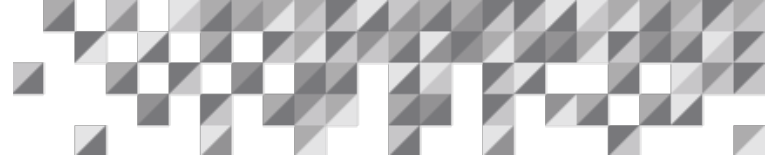
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Useful Links

PSE link to software demo requests

PSE link to PSE overview

CSB report link

PHA HAZOP Leader training course

Basic PHA training course

Hazard Identification and Process Risk training course

Process Safety Learning® link

Refinery Hazards Fundamentals training course

PSMPro™ software

Additional PSE White Papers:

PSM Compliance Made Easy with Process Safety Enterprise® Effectively Manage Mechanical Integrity with PSE

Effectively Manage Processes Chemicals Equipment and Personnel with PSE

Process Safety Enterprise® Asset Integrity Management Service (AIMS) and KPI Dashboard