R.I.S.K.

PROJECT CASE STUDY

Risk Integrity Safety Knowledge, Inc.

Procedural PHAs

The Challenge

"Procedures are subject to a form of corrosion more rapid and thorough than that which affects the steelwork." Trevor Kletz

Leading agribusiness, food, oil and chemical firms needed to have a more in-depth review of operations such as loading/unloading than they were achieving with standard PHA approaches. Some also needed to review procedures for non-standard operations related to start-up, shutdown, purging and other maintenance related tasks. Standard PHA approaches did not provide sufficient insight into hazards and teams struggled to apply appropriate risk ranking using those methods.

Client Description
Company Multiple global
Project Location Multiple sites
Industries Chemical, Food, Agribusiness, Oil
Annual Revenues $20+ Billion
Employees 10,001+ employees
RISK, Inc. Solution Facilitate Procedural PHAs

Procedure heavy processes often lack clarity, by nature. For example, "Open ##-Valve slowly" - What does slowly mean? What happens if it is opened too quickly?

Additionally, some procedures require certain safeguards to be in bypass mode. Therefore, it is imperative for the site to understand if there are sufficient safeguards still in place during the operation in question.

The Solution:

RISK, Inc. used Procedural PHAs to assist clients with a more in-depth look at what could go wrong. Procedural PHAs are an excellent tool for non-standard operations. For one client, they were starting up a new chemical plant and needed to review over 25 operating procedures. The SOPs from a sister plant were used as the basis for the 25 procedures and were modified to reflect operations at the new plant. A Procedural PHA was used to review the procedures as a verification of the efficacy of the updates. RISK's facilitator worked with the site to group the procedures according to process and procedure type then completed the review of all in only 3.5 days of team time.

Examples of Procedural PHAs RISK has recently completed include:

- Unmanned Oil Truck Loading Station
- Hydrogen Unloading for Hydrogenation Plant
- Extraction Steam Purge Procedures used for plant maintenance
- Closed Steam Purge Procedure used for plant maintenance
- Water Flooding Procedure for Hydro Regen Reactors
- Start-up Procedure for Reformer unit

Both Loading/Unloading processes and maintenance processes are procedure heavy operations. A standard HAZOP or SWIFT may miss possible hazards or releases that could occur during the performing the procedure.

In a Procedural PHA the procedure steps become the nodes or system/sub-systems and the design intent is the content of the step to be performed. As in a standard PHA, deviations (for HAZOP) or questions (What-If) are applied to each node to help a team identify possible failures that could result in possible hazards or releases. These deviations and/or questions include such things as missing a step, performing a step out of sequence, or inadvertently performing step inaccurately. Systematically using the deviations and/or questions can also be used to help identify procedural deficiencies or incompleteness.

Common deviations/questions may include:

- Missed Step,
- Performing Step Incorrectly
- Performing steps out of order
- Ramping up too quickly or too slowly
- How, Why, When, Where, Who, Check and Order

The Result:

The application of Procedural PHAs for these clients provided a better insight into the possible hazards or releases. Using this right-sized approach reduced team time compared to a standard equipment based PHA. In one case, the site had tried to apply a standard SWIFT approach and the sessions required weeks of team time. RISK facilitated a procedural PHA for a sister site and completed the sessions in less than a week and uncovered several scenarios that had been missed using the standard approach.

Procedural PHAs are valuable in examining procedures when writing or updating to verify if sufficient safeguards are in place during the operation in question. Historically 70% of major accidents occurred during non-routine operations. Over the past ten years over 40% of the incidents reviewed by the Chemical Safety Board (CSB) occurred during non-routine operations. Using a Procedural PHA to review those operations can help identify hazards and missing safeguards, thus preventing or lessening incidents.