PHA AS A TOOL FOR INCIDENT INVESTIGATIONS AND MANAGEMENT OF CHANGE

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PHA as a Tool

- Process Hazard Analyses (PHAs)
  - An integral part of a PSM system

- Regulations require:
  - PHAs must address previous incidents
  - PHAs must be revalidated every 5 years
  - Management of Change must address the technical and safety aspects of the change (PHA is not required)
PHA as a Tool

- Typical PHA Revalidations
  - Incorporate a review of incidents for regulatory requirements.
  - Incorporate a review of MOCs to ensure the PHA is consistent with the current process.

- The review of incidents and changes as part of the PHA process may not take place for up to five years based on the revalidation schedule.
PHA as a Tool

- Why Wait?
  - Utilizing the existing PHA as a tool for selected incident investigations and changes, as they occur, provides one option for an integrated approach to these process safety programs.
Incident Investigation Techniques

- Incident Investigations (IIIs) help identify deficiencies in the PSM management systems.
  - Process Safety Information (design)
  - Management of Change
  - Mechanical Integrity
  - Operating Procedures
  - Training, and
  - PHAs
Incident Investigation Techniques

- A review of the PHA as part of the investigation process can identify:
  - Errors in the previous analysis
  - Poor technique in applying the PHA methodology
Incident Investigation Techniques

- As part of the Investigation, review the applicable PHA Section that was involved in the incident while the facts and information are still fresh in everyone’s mind.
Incident Investigation Techniques

- Did the incident involve a process deviation not used in the PHA?
  - If not, add the deviation and fully explore the causes, consequences and safeguards, by considering the circumstance of the incident.
  - Evaluate if this omitted deviation applies to other Sections within the analysis.
Incident Investigation Techniques

- If the deviation was previously reviewed in the analysis:
  - Review any circumstances of the incident with regards to the causes, consequences and safeguards for the deviation.
Incident Investigation Techniques

- Review of existing Deviation
  - Was the consequence of the incident previously identified?
    - If yes, update any new information learned from the incident on the severity.
    - If not, add the new consequence.
Incident Investigation Techniques

- Review of existing Deviation (cont)
  - Were the causes of the Incident previously identified as a cause for the process deviation?
    - If yes, update any new information learned from the incident on the initiating event and the likelihood.
    - If not, add the new cause.
Incident Investigation Techniques

- Review of existing Deviation (cont.)
  - Did the safeguards perform adequately, or as expected to prevent/mitigate the incident?
    - If not, conduct a root cause analysis of the safeguard failure or evaluate the quality of the previously listed safeguard(s)
Incident Investigation Techniques

- Review of existing Deviation (cont.)
  - Evaluate if the proposed actions resulting from the investigation qualify as new safeguards, and evaluate the quality of those safeguards as adequate risk reduction.
  - The recommended action could later be listed as safeguard, once implemented.
Incident Investigation Techniques

- Update the PHA, if desired, or maintain the review notes to be incorporated into the PHA at the next revalidation.
  - Red-line a copy of the applicable PHA table to indicate any changes to the causes, consequences, safeguards, and recommended actions.
  - Mark-up the PHA P&ID.

- Example

II_PHA_P&ID1.pdf   II_PHA_TBL1.pdf
MOC Techniques

- Management of Change can be viewed as the ongoing maintenance of the programs, procedures, and information that have already been implemented for process safety of covered processes.
- Proper implementation of MOC ensures that the change does not negatively impact the process safety measures that have been taken previously.
MOC Techniques

- Regulations do not require a PHA for a change
  - Formal MOC review is usually included in the PHA revalidation to keep the PHA consistent with the current process.

- Why wait?
  - Reviewing the affected PHA section can be used to improve the technical and safety evaluation of the change and will support the technical evaluation.
MOC Techniques

- The PHA review of an MOC that revises an existing section does not have to be as laborious as the typical PHA meeting.
  - A facilitator, project engineer, and an operator should be sufficient.
MOC Techniques

- PHA Review for Revised Sections
  - Mark up (highlight) the proposed P&ID to show the original PHA section.
  - Highlight the additions with a different color on the Project P&ID.
  - Cross out any equipment that will be removed.
MOC Techniques

- Review each of the previous deviations to determine how they may be impacted by the change:
  - Are new consequences possible?
  - Are new causes created for initiating events?
    - New opportunities for mis-directed flow, high pressure, contamination, etc.
  - Are existing safeguards removed or affected by the change?
  - Are additional safeguards or recommendations needed for any new causes and consequences?
MOC Techniques

- Document the Review
  - Mark-up the PHA worksheet with the applicable changes.
  - Include copies with the MOC to help document the safety and technical evaluation for the MOC and support the next PHA revalidation (if not updated immediately).

- Example

  - MOC_P&ID1.pdf
  - MOC_PHA_Tbl1.pdf
MOC Techniques

- PHA Review for Revised Sections (cont.)
  - If no changes are required, have the team document a review statement such as:
    - A review of existing PHA section “X” was made on xx/xx/xx to determine if there was any impact from the proposed MOC-###. No changes to the deviations were identified as a result of this proposed change.
MOC Techniques

- PHA Review for an MOC that Creates New Sections
  - The complexity of the new section will determine the resources needed for the PHA review.
Implementation

- To implement a PHA review process:
  - PHA reports should be “user friendly”
    - PHA report readily accessible
    - PHA P&IDs clearly marked with numbered sections
  - Start small with less complicated incidents or MOCs selected by the PSM Coordinator or PHA Owner to establish some successful reviews.
  - After a learning curve – establish a criteria for selecting Incidents and MOCs to be reviewed.
PHA as a Tool for II and MOC

- What are the potential benefits?
  - Improved reviews of Incident Investigations and MOCs.
  - Improved quality of PHA re-validations with reduced effort.
  - Integration of PSM programs for PHAs, Incident Investigations and MOC.
  - Improved understanding of the PHA analysis by increased usage.
PHA as a Tool for II and MOC

- In Conclusion
  - For facilities that are looking for new ways to improve their PSM programs, a review of the PHA as part of the incident investigation and MOC processes is one approach to going “Beyond Regulatory Compliance”