Process Safety Management: Managing the Blind Spots

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Case Study: Runaway Reaction during Start-up

Bayer CropScience manufacturing insecticides, near Charleston, West Virginia.

Root-causes are identified as:
- Premature re-start the unit
- Inadequate training on new control system
- Operator by-passed the safety interlock
- Lack of experience during start-up
- Poor communication with external emergency source

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Blind Spot 1: Audit Action Items

- Audit was conducted in Bayer CorpScience plant against PSM OSHA requirement in 2005.

- An audit action item was overdue and still open until date of incident.
How to Resolve Audit Blind spot

Only conducting audit is not enough, audit action items shall be:

- Prioritized based on the potential risks
- Followed-up seriously (Leadership involvement)
- Closed out meticulously
- Verified closed-out action items as part of PSSR
Blind spot 2: PHA

- Rush PHA and the team’s ineffective application of the PHA process resulted in skipping significant unmitigated scenarios that needed recommendations;

- PHA team failed to validate critical assumptions used in their analyses.
Other PHA Performance Deficiency

- Selecting improper PHA method;
- Loose recommendation and action item;
- Analyzing human – machine interface (specially start-up and emergency shutdown) during PHA.
How to Resolve PHA Blind spot

- Ingredient for a successful PHA is:
  effective method + experienced team + adequate time

- Safety critical element’s function or safety critical tasks to be listed and reviewed at the beginning of PHA for operating facilities;

- Start-up and Emergency shutdown procedures to be reviewed based on the studied scenarios in PHA.

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Blind spot 3: Updating Documents

- Capture key assumptions in PSI, PHA and Procedures;
- Operating Procedure was updated but not approved;
- Essential updated PSI to be stamped by P.Eng.
Complicated Procedures are Confusing

- Many operators did not rely on the SOP: they felt that they understood how to run the unit correctly without instructions;

- The SOP complexity may have also discouraged its use.
Blind spot 4: Pre Startup Safety Review

- Comprehensive PSSR should involve operators and SMEs.
- PSSR team incorrectly identified some items as being completed when they clearly had not been.
Blind spot 5: Human Factors

- **Human-Machine Interface Change**
  - Change in plant, process or control requires training of course, but it needs time for operator to get comfortable with it!

- **Operator’s Fatigue during start-up**
  - Reviewing the required number of operators is very important prior to start-up.
  - Fatigue can decrease level of competencies and alertness required for operating a new control system.
How much did we count on Human during Emergency?

NOW REMEMBER... THIS ONE TURNS ON THE AIR CONDITIONER, AND THIS ONE DESTRYS THE WORLD.

By Mai

Extinguishing Agent “B” (Inactive)

Extinguishing Agent “A”
Blind Spot 6: Learn from Experience

CCPS PSM Pillars

Commit to Process Safety
Understand Hazard and Risk
Manage Risk
Learn from Experience
Learn from Experience

- Use previous lesson learned (from incidents) prior to start-up;
- Share lesson learned openly with industry.
Emergency Response Plan

- It is necessary to establish a list information shall be communicated during incident
- Understand Canadian emergency requirement such as buffer zone, Emergency planning zone
Summary

- PSM blind spots are mostly seen in information transition among PSM elements;

- Written procedures, PHA assumptions, essential PSI shall be reviewed and consistent;

- PSM auditor should be familiar with local requirement and identify gaps between regulatory codes and established PSM procedures.
Thank you

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