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Safety Culture Spotlight

Incomplete Process Safety Analysis—Hazards Analysis

- Failure to consider hazardous materials not covered by a regulation
- Failure to address processes and equipment malfunctions beyond requirements
- Failure to maintain a questioning attitude

BACKGROUND

A specialty chemical facility that produced many products had several product families that involve highly exothermic reactions. The facility had several normal and emergency cooling systems for the reactors that produce these products, including back-up diesel emergency generators.

The feed materials were both toxic and/or flammable and highly volatile. The reactors process chemicals were addressed by regulation, but the final products were not covered, were not highly toxic or flammable and had low vapor pressures. The reactors had multiple Basic Process Control System and Safety Instrumented Systems that monitor and control reactor temperature, pressure, and level, as well as dual relief devices.

WHAT HAPPENED

The facility defined the regulatory boundaries of the facility to include all equipment from raw material storage to just before the first valve downstream of the reactors. They argued that since the products were not regulated, the equipment handling them need not be addressed in the Process Safety Management System (PSMS). Note that the valve is a remotely operated by instrument air and opens and closes automatically based on the temperature in the reactor.

The facility also excluded the cooling systems for the reactors, including the backup power systems from the PSMS, since water and power are not regulated, and in any case, other reactor safeguards protect the reactor in case of thermal runaway. The regulatory manager corporate legal have reviewed and approved the PSMS boundaries.

What could be the impact of excluding utilities, back-up power, and the downstream valve from the PSMS?

SAFETY CULTURE FOCUS

- ✓ Strong leadership supports hazards analyses beyond the minimum requirements to ensure the safety of personnel and processes.
- ✓ Safety must be an integrated part of all activities and not limited to specific areas of operations.
- ✓ The optimum safety culture includes a questioning environment to identify and mitigate potential hazards

****Only 54% of those surveyed indicated risk planning was a strength in their organization.****

IMPROVING HYDROGEN SAFETY CULTURE

LEARNING OPPORTUNITIES FROM OTHER'S EXPERIENCES

"Safety culture is how the organization behaves…
…when no one is watching."

Safety Culture Framework

- Safety is everyone's responsibility
- Strong leadership support
- Integrated into all activities
- Open, timely, effective communications
- Questioning/learning environment
- Mutual trust
- Continuous improvement

What are the benefits?

- ✓ Eliminates common weaknesses identified as contributing factors to catastrophic events.
- ✓ Promotes trust in the hydrogen energy industry's ability to deliver safe, reliable, quality products and services.
- ✓ Supports a sustainable legacy for companies and the hydrogen industry.
- ✓ Fosters efficiency and productivity in the workplace.

Resources

- ✓ For further information and resources on safety culture, see: https://www.aiche.org/ccps/safety-culture-what-stake
- ✓ For further case studies on safety culture, see: https://h2tools.org

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