SAFETY BULLETIN
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Effective Winterization Strategies for Ensuring Process Safety

WINTERIZATION

Winterization refers to the steps taken to prepare facilities, equipment and processes for the challenges of colder weather. Effective winterization is critical to preventing incidents, equipment failures and operational disruptions in process safety. This bulletin provides important strategies and considerations for incorporating winterization into process safety management.

Winterization Strategies

A. Equipment Inspections and Maintenance

- **Pre-winter inspections:** Thoroughly inspect all critical equipment, including pumps, valves and pipelines to identify any pre-existing issues that cold temperatures could exacerbate using your organization's inspection process.
- **Preventive maintenance:** Implement a preventive maintenance schedule that includes checking and, if necessary, replacing weather-sensitive components such as insulation, seals and heating elements. Ensure electrical heat tracing is working, and steam traps should be in good working order if steam is used for heat tracing.
- **Lubrication:** Use appropriate lubricants rated for low temperatures to prevent thickening or freezing, which can lead to equipment malfunctions.
- **Dead-leg Inventory:** A dead-leg inventory should be established and maintained. All dead-legs should have positive isolation, preferably blind flanges. If there is the potential for water accumulation in the dead-leg, heat tracing should be installed to prevent freezing. See the CSB winterization video for examples.

B. Insulation and Heating

- **Pipe insulation:** Insulate pipes and tanks to prevent freezing and maintain fluid temperature, especially for high-temperature processes.
- **Heating systems:** Ensure heating systems are operational and capable of maintaining temperatures within safe limits. Install trace heating systems on critical piping and equipment.

C. Process Adjustments

- **Temperature monitoring:** Implement continuous monitoring systems for key process areas to quickly detect and address temperature changes.
- **Flow management:** Modify process flows to handle potential increases in fluid viscosity at lower temperatures. Ensure that pumps and equipment can manage these changes without risking damage, particularly with liquids.

D. Emergency Preparedness

- **Emergency plans:** Develop and review emergency response plans for winter-related incidents caused by freezing or increased heating demands (e.g., equipment failures).
- **Training:** Train personnel on winterization protocols and emergency response procedures for potential winter-related safety challenges.

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Resources

Winterization by US Chemical Safety Board

Winterization Safety Message by USCSB

Winterization Safety Digest by USCSB

Winterization Checklist by Oil Sands Magazine

CCOHS: Climate Change — Impact on Process Safety

PROCESS SAFETY CONSIDERATIONS

A. Risk Assessment

- **Seasonal risk assessment:** Update risk assessments to reflect winter-specific hazards, including the impact of cold temperatures on process safety and equipment reliability.
- **Scenario planning:** Conduct exercises to identify potential winter-related process safety incidents and develop mitigation strategies.

B. Regulatory Compliance

- **Review regulations:** Ensure compliance with local and national regulations regarding process safety and winterization, including standards for equipment maintenance, safety inspections and environmental controls.
- **Documentation:** Maintain thorough documentation of winterization procedures, maintenance activities and safety assessments to demonstrate compliance and support audits.

C. Monitoring and Review

- **Ongoing monitoring:** Continuously monitor the performance of winterization measures and equipment to detect issues early and make necessary adjustments.
- **Post-winter review:** After the winter season, conduct a review to assess the effectiveness of winterization strategies and identify areas for improvement. Utilize the review to update procedures and practices for future winter seasons.

By implementing thorough winterization strategies, emergency preparation and ongoing monitoring, organizations can reduce the risk of winter-related incidents and ensure safe operations. Adhering to safety protocols also ensures effective winterization for maintaining process safety during colder months.