SERLEPC Guidance

On

Facility Freeze Preparations

The following information presented in this document is based on best practices and can be referred to as a guide when preparing for freezing conditions.

As a suggestion, a company should define freeze levels with a baseline for determining what actions to take when creating a plan. Listed below is an example.

* **Freeze Level I -** A Level I Freeze condition exists when ambient temperature drops to below 32 degrees F and returns to above 32 degrees within a 24-hour period.
* **Freeze Level 2 -** A Level II Freeze condition exists when temperature drops to a low of 20 degrees F and the temperature is predicted to not rise above 32 degrees for the next 24 hours.
* **Freeze Level 3 -** A Level III Freeze condition exists when the temperature is predicted to drop to below 20 degrees F and is predicted to not rise above 32 degrees for at least 48 hours.

**Objective**

* Maintain safe plant operations with no exposure to the environment and community and limit production/economic loss due to freezing weather.

**Leadership Activity**

* The site leadership team (SLT) should have meeting to discuss levels with regular updates at chosen freeze levels (defined in the plan) is possible
* SLT should consider activating their EOC (Emergency Operations Center), based on their plan. Level III may be a good time for activation.

**Plant Status**

* Plants should decide on their operating systems and freeze preparation on what levels they should continue to operate. Some plants in chose to operate during a Level I or II freeze.
* Plants should operate or shutdown based on all of the information presented and agreed on.

**General Safety Considerations**

* Non-essential employees for operations and maintenance may be released before the arrival of any freezing conditions that could result in unsafe driving conditions.
* Employees must evaluate their normal route to work for any icy conditions and/or closures
	+ If unsafe, employees must report to their supervision any delay or inability to safely arrive at work.
* Similar to hurricane supplies, plants should identify needed supplies and inventory them. Including but not limited to:
	+ Ice melting pellets and necessary equipment to distribute
	+ Pipe fittings, tubing, insulation etc.
	+ Spare parts for equipment
	+ Contracts with vendors and equipment rental companies to aid in recovery efforts

**Pre-Season Prep**

* Plans shall identify equipment preparations and responsible individuals
* Freeze plans shall be audited along with equipment preparations in October
	+ Audit reports: forwarded to the EOC before Nov 15th
* Plans should include around-the-clock coverage as needed. Functions considered:
	+ Maintenance
	+ I&E techs
	+ Operations
	+ Supervision
	+ Any other support personnel needed
	+ Subcontractors

**Shutdown and Restart**

* Sequence of shutdowns provided to Supply Chain Process/Planning
* Site operations should coordinate, monitor and document process
* Time required to shut down in advance of Freeze levels should be determined and communicated to respective Production Planners and EOC
* Restart sequence should be coordinated through Production Planners and EOC

**Responsibilities**

* Health and Safety – promptly notify the site when freeze prediction is received
	+ Indicate expected freeze level
	+ Managers should advise personnel to implement freeze procedures
* Site Operations – monitor and coordinate material flows as well as shutdown and restart procedures in the event of the freeze level
* Plants/Units – prepare following systems to operate/provide adequate alternate systems to operate plant during the defined freeze levels:
	+ Fire Protection and fire water
	+ Safety shower/eye wash
	+ Potable Water
	+ Service water
	+ Waste water & Sewer
	+ Compressed air
	+ Steam & condensate
	+ Utility block and bleed
	+ Fuel gas, diesel
	+ Standby generators
	+ In-plant driving & walking surfaces
	+ Process lines and interplant transfer lines subject to freezing

**Suggested System Preparation Considerations for Freeze**

* Fire Protection Systems
	+ Wet-trip fire protection will not operate when frozen- many consider
		- Draining entire system, block in with freeze protected block-line and block-valve
		- Notify fire department, security, process safety services, block personnel and management of location, open/close procedure when/why
			* Communicate and document
	+ Wet-trip fire protection elected to run: planned out well in advance and approved by Fire department, process safety services and management
		- Otherwise must be heat traced and insulated
	+ Dry systems
		- Exposed piping to trip valve & trip valve should be protected
			* Tracing, insulation etc.
		- Bleed valve added under trip valve – allow ample water to drain to prevent main incoming header freezing
	+ Bleeders
		- Equipped with tail lines – prevent ice build-up
	+ Electrical tracing equipment – verify on and working
	+ Shutdown plans should consider draining freeze-prone systems
		- Provided fire risks are tolerated
* Safety Shower & Eye Wash Systems
	+ Consider means of providing system that can withstand Freeze
	+ If not feasible:
		- Maintain sufficient portable eyewash bottles/stations
		- Block, drain and blow dry system to minimize damage
		- Secure contract with vendor to rent portable safety showers and eye wash
* Potable Water Systems
	+ Bleeds on active systems; bleed to establish minimum flow, keep from freezing
	+ Drain non-flowing systems
	+ Survey lines for low point traps, provide adequate drains
	+ Drain all inactive exchangers
		- Including water-cooled AC condensers
	+ If water to buildings and facilities are not buried or freeze protected:
		- Preventative measures of shutting system in and draining should be strongly considered
	+ Facilities which depend on water for safe operation should freeze-protect all lines
	+ Secure contract with vendor to provide potable water in totes etc.
* Wastewater and Sewer Systems
	+ Facilities which depend on water for safe operation should freeze-protect all lines
* Compressed air systems
	+ Develop and implement Freeze Protection Plan; Include utilities that may be affected by freezing
	+ Check all moisture traps for proper operation
		- Bypass during freezing weather, allow to bleed
		- Drain lines should be insulated
	+ Heat trace and insulate all critical air and water transmitters
	+ Enclose air stations to block freezing winds and retain heat
* Cooling Towers
	+ Shut off fans to prevent ice accumulation
* Utility Block and Bleed Systems
	+ Study installations where isolation valves create dead-legs; must be freeze-protected
* Fuel Gas Systems
	+ 2 Areas of concern:
1. Gas may contain water vapor (can condense and freeze)
2. Condensation of heavy hydrocarbon since cold weather can create liquid distillate build-up
* Process Lines and Inter-Plant Transfer Lines
	+ Insulation and/or heat tracing must be installed

**Availability of Raw Materials and Supplies**

* If a plant decides to run during severe freeze weather, they should
	+ Establish balances for internal demands of raw materials/feedstock
	+ Evaluation should include minimum required inventories
	+ Monitor inventory levels during winter months
	+ Target inventory levels should be at least 5 days
* When Freezing weather is declared a site should
	+ Survey and identify locations of portable units; should be brought in and if possible stored in a secure, enclosed, heated location
* Should also consider icing roadway/delivery problems

**Plant Startup**

When the freeze conditions has passed, plants should be started back up safely and quickly, in keeping with the Plant Startup Sequence

**Additional Factors to Consider:**

**Ride Out Crew:** If a plant decides to have a ride out crew it is the group of people who will be housed in shelters during the event.

* Ride Out Crew will:
* Stay in shelters on property during the event
* Be expected to have a home preparation plan that minimizes the time needed away from work
* Be released to take care of personal preparation prior to the freeze
* Be comprised of the absolute minimum number of people needed to:
* Perform final preparations.
* Complete the initial damage assessment by the site’s process Damage Assessment Process
* Make minor repairs if capable
* Make preparations for start-up

**Early Returnee Crew**: Certain personnel should be designated as “Early Returnees” and will plan to return as designated after the freeze has passed in order to assist in early startup operations. A reliable contingency of these “early returnees” can minimize the need for an extensive Ride out Crew.

* **Early Returnees will:**
	+ Be willing to return for duty before the general public is allowed back into the area. Roads into the local area may be barricaded. Early returnees need to make provisions for this possibility.
	+ All early returnees should routinely monitor designated radio
	+ Report directly to their facility when called back to work
	+ Be notified if needed to return early with a notification system. Employees should not return until authorized to do so.
	+ Be involved in both repair and operational duties where needed
* **Pre-Season Preparation**: Plants should consider a month devoted to preparation for freeze weather where the plan is reviewed, amend and executed
* **Crisis Management:** In the event of plant crisis, it is recommended that there be a Corporate Crisis Management Team (CCMT) made up of team members with specific, written responsibilities. There should be a notification system that folks are trained on and how the recipient needs to respond.
* **Emergency training:** Plant should have a number of personnel undergo regular training in various aspects of emergency response.
* **Transportation emergencies:** Depending on how product is transported there should be a system to support response to a potential transportation emergency involving your products.
* **Business Continuity:** Business Continuity Plans should address how the organization will maintain or re-establish priority business functions in the face of a disruption, and who will be involved in business continuity work. Plants should have an agreement with a facility where Business Continuity operations can occur in the event that the site conditions prohibit operations.
* **Post Storm Critique**: A detailed critique should be performed by senior management to identify opportunities for improvement and an action plan.