MARCELLUS SHALE COALITION®

RECOMMENDED PRACTICES: Winterization

MSC RP 2024-1 December ___, 2024

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1.1 Purpose
The following recommended practices address relevant considerations and guidelines for the winterization of natural gas facilities, which support the Marcellus Shale Coalition (MSC) guiding principles.

1.2 Nomenclature
The term "winterization" broadly encompasses a variety of measures undertaken by operators of natural gas facilities to prevent freezing and minimize the risk of damage to facilities and employees due to extreme cold temperatures. The term "natural gas facilities" refers to upstream facilities where natural gas is produced and midstream facilities where natural gas is gathered, processed and transported.

2. 1. Planning
Advance planning for extreme cold temperatures is fundamental to ensuring the safety of all personnel on site as well as the continuous and proper operation of the upstream and midstream facilities. These facilities provide crucial natural gas resources to the marketplace – critical to heating and electricity generation – which are relied upon by fellow citizens to help them successfully navigate through extreme cold temperatures.

Separate plans and accompanying checklists should be developed for:

- The onset of the winter season comprised of regular preparatory steps for the duration of the winter season.
- The onset of a forecasted extreme cold temperature event.

Plans should be revisited on at least an annual basis to provide for any necessary updates or revisions. Plans should include monitoring of short-term and long-term weather forecasts so that operators can take appropriate steps prior to the onset of a specific cold temperature event.

Plans should take into account prior experiences at the upstream or midstream facility, gauging the likelihood of difficulties posed by extreme cold temperatures at various different temperatures.

Plans should include after-action reviews, both at the conclusion of the winter season and conclusion of specific extreme cold temperature events. Such after-action reviews provide for an opportunity to review what worked well, potential deficiencies, and identification of opportunities to improve plans moving forward.

3.1 General Health and Safety Considerations
Planning for challenges posed by extreme cold temperatures should be a component of any operator's general health and safety plan. Such a plan is intended to safeguard the safety and well-being of any employee, contractor, regulator or other visitor to the site at all times. Several specific considerations relative to extreme cold temperatures include:

- Providing cold weather training to individuals that may work outdoors, to include review of health and safety hazards associated with working in cold temperatures and cold-related illnesses.
- Access to and wearing of adequate clothing to mitigate cold weather risks to people, including coats, hats, gloves and boots. Note that wearing such clothing and accessories must still conform to any flame-resistant clothing policies applicable to any personnel on site.
- If an employee or contractor must be outdoors exposed to extreme cold temperatures for an extended period, identify accessible locations on site, including vehicles, that may be utilized to warm up as necessary. Many dangers posed by extreme cold temperatures are exacerbated by prolonged, uninterrupted exposures.
- All walkways, stairs or other areas traversed by personnel on site should be kept clear and de-iced as necessary to minimize the potential for slips, trips and falls, particularly on icy surfaces. When utilizing stairways, always adhere to the three points of contact rules, with both hands in contact to provide balance and leverage. Gloves should be worn at all times, particularly when coming into contact with metal surfaces.
- Personnel should never run or move briskly. Slow down, move deliberately and take note of your surroundings and pathways for potential hazards.
- Vehicle operators should drive at reduced speeds and take extra precautions when in proximity to personnel or equipment and facilities.

3.1.2 Cold Weather Preparation
Plans should include several key elements to protect personnel from hazards such as frostbite, hypothermia, slips, falls or other potential injuries. Key elements include:

- Proper cold weather clothing.
  - Ensure all personnel have access to appropriate cold-weather gear, including coats, hats, pants, gloves and boots suited for freezing conditions.
  - Clothing must also comply with any flame-resistant clothing policies that may be required of personnel on site.
  - Ice cleats that fit over footwear.
- Warming stations.
  - Identify accessible locations, such as heated vehicles or indoor areas, where personnel can warm up during extended periods of outdoor work.
  - Intermittent warming breaks should be encouraged if not mandated, as continuous exposure to extreme cold increases risks to personnel on site.
- Clear and safe pathways.
  - Ensure that all walkways, stairs and work areas are kept clear of snow and ice to prevent slips, trips and falls.
  - Regular de-icing procedures should be in place, especially in high-traffic areas.
  - Always adhere to the three points of contact rule when using stairways. Both hands and at least one foot should always maintain contact with the stairway to ensure stability.
- Controlled movements.
  - To avoid accidents in icy conditions, personnel should avoid running or moving quickly.
  - Encourage deliberate, caution movement while being mindful of potential hazards in the surrounding environment.

3.1.3 Emergency Kit for Rural Areas
While emergency kits are recommended for all locations at all times, facilities located in rural, remote areas can pose particular challenges and are often more inaccessible during an extreme weather event compared to other locations. The following are recommended for emergency kits to be used in rural or remote areas:

- Safety triangles and flares to increase visibility in low light environments.
- Cell phone and computer chargers or battery packs.
- Water and food for at least two days, including non-perishable items like energy bars.
- Flashlights.
- First aid kit.
- Emergency alert radio to track weather forecasts or emergency broadcasts.
- Salt or sand for roadway traction.
- Snow shovels.
- Tools for basic repairs.
- Ice cleats for walking on ice.
- Blankets and additional insulated clothing.

3.1.4 Driving Safety Tips
The following key elements should be considered by all personnel engaged in driving or operating equipment on site or to and from a site:

- Communicate with appropriate colleagues regarding your planned travel, driving route and anticipated arrival time.

- Ensure clear visibility by removing all ice and snow from vehicle or equipment windows, mirrors and lights.
- Use low gears when driving on hills to maintain control on slippery surfaces.
- Increase following distances during slippery conditions from 4-6 seconds to at least 6-8 seconds. Maintain visual contact with other vehicles you may be traveling with while increasing response time during inclement weather.
- Be cautious of black ice, which is most common on bridges and in shaded areas.
- Be familiar with skid – slide – recovery:
    - Take your foot off the acceleration pedal.
    - Steer gently in the direction of the skid.
    - As traction is regained, gradually apply brake or acceleration.
- Consider instituting a winter driving training program.

4.1 Communication

Communication prior to and during an extreme cold weather event is crucial to safeguarding personnel and facilities. Facility operators are encouraged to develop a communication plan that accounts for the time period leading up to an anticipated cold weather event as well as during the actual event.

4.1.2 Internal Communication

- A command or centralized location of the operator removed from the extreme cold weather event should be aware of the identities of all personnel on site during the extreme cold weather event.
- Periodic check-ins and pre-established intervals should occur between the on-site and off-site locations to provide regular operational updates, account for the safety of all personnel, and relay other critical information as deemed necessary.
- Information regarding circumstances at a facility during a cold weather event which may impact the operational performance of a facility should be transmitted to appropriate company personnel on an as-soon-as-possible basis.

4.1.3 External Communication

- As part of the planning process, a list of external stakeholders and points of contact should be identified and maintained for access during a cold temperature event. Such stakeholders may include but are not limited to:
    - Federal, state and local regulators.
    - Emergency responders, such as fire and ambulance services.
    - Customers dependent upon or anticipating receipt of natural gas or natural gas liquid products from the facility.

5.1 Backup Power and Emergency Generators

Operators should anticipate the loss of power necessary to operate a facility and/or provide power necessary to implement winterization measures and plan accordingly.

Such planning should identify backup sources of power, including the siting and maintenance of emergency generators. Steps for providing backup power for critical facilities and infrastructure, as necessary, should be incorporated into winterization planning. Operators should maintain sufficient fuel on site to operate facilities and equipment during the duration of a cold temperature event.

6.1 Equipment Preparation and Protection

An inventory of equipment and potential risk factors for that equipment should be developed. Specific preparations as outlined in the Upstream Facilities and Midstream Facilities section of this Recommended Practice should be consulted. Such recommended preparations should not be regarded as exhaustive and should be supplemented by the operator based upon the operator's experience, knowledge and expertise.

6.1.2 Upstream Facilities

- Prior to freezing conditions, water should be drained from critical facilities, units or equipment, including:
    - Well cellars (below any operating valves)
    - Sand separator skids
    - Gas processing unit skids
    - Containment tanks
- Check levels of any chemicals that may be needed during cold weather event.
- When necessary, install sentry valves on surface casing to vent to atmosphere instead of venting to tanks where dump line freezing may occur.
- Install fire extinguisher bags, or other covering, to block the wind on all pressure pilots at wellheads and wellhead transmitters, after verifying no leaks exist on equipment.
- Verify that wellhead's shut down valve's open/close indicator slot is facing downward toward ground or otherwise wrap the slot with tape or insulation to protect against moisture.
- Grease:
    - Sand separator's choke and gate valves.
    - Gas processing unit's chose and shut down valve.
    - All locks on location.
- Verify sufficient glycol levels within gas processing units.
- Ensure dump lines have an entry point, ball valve or needle valve.
- Store methanol in metal cans, not plastic.
- Be mindful of different preparatory steps necessary for flowing wells, shut-in wells or wells still under construction.

6.1.3 Midstream Facilities

- Empty containment and condensate tanks to reduce spill potentials that may be caused by freeze events.
- Check methanol levels and test methanol injection pumps to ensure proper operation.
- Start up and check status of dehydration equipment.
- Ensure methanol drip bottles are filled and sufficient supplies maintained on site.
- Pig pipelines if necessary.
- Turn online heaters as needed.
- Drain all applicable drip bottles.
- Be mindful of impact internal fans can have on internal temperatures and turn off or adjust flow as needed.
- Shut off supply of water-to-water spigots susceptible to freezing and pipe bursting.

7.1 Heat Trace and Insulation

Heat trace utilizes electricity to maintain or increase the temperature of pipes, vessels and other equipment to ensure that the equipment and infrastructure is capable of performing its necessary function. Insulation is often included to maximize efficiency of retaining existing or increased temperatures.

Key steps in successful utilization of heat trace and insulation include:

- Ensuring heat trace instrumentation is turned on and working properly. Test and review in advance of need.
- Test battery systems.
- Evaluate any installed installation and make sure it is in good working order. Replace damaged, worn or deteriorated insulation.
- Verify that installed heat trace has been insulated.

Operators should keep a heater/exhaust hose in a vehicle or other warm location for use in thawing equipment should the need arise. Deployment of ground heaters staged in appropriate locations can also be an effective mechanism against freezing.

8.1 Snow & Ice Removal

- Review plans for snow and ice removal, including areas of priority for clearing in a weather event.
- If dependent upon contractors, ensure that all contracts are up-to-date and contractor is ready and available to respond as needed.
- Test snow removal equipment (snowblowers, plows, etc.) and vehicles to make sure it is operational.
    - Coordinate with vendor if snow removal is contracted out.
- Verify equipment stockpile: ice melt, snow shovels, cold weather clothing gear and other equipment as needed.

- Safety – clearly mark key locations and facilities that may become covered by snow.
- Clearly identify pathways for plowing.

This document provides general guidance on recommended practices for the subject(s) addressed. It is offered as a reference aid and is designed to assist industry professionals in improving their effectiveness. It is not intended to establish or impose binding requirements. Nothing herein constitutes, is intended to constitute, or shall be deemed to constitute the setting or determination of legal standards of care in the performance of the subject activities. The foregoing disclaimers apply to this document notwithstanding any expressions or terms in the text that may conflict or appear to conflict with the foregoing.

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