

**Pasadena Citizen's Advisory Council**  
**Plant Input on Winter Storm Uri**  
From April 27, 2021 Meeting

The input below is from presentations, breakout room discussions, and other notes plants submitted. The information has been compiled by topic without plant name so that the CAC may share it to help plants learn from each other.

**PRECAUTIONS TAKEN BEFORE THE FREEZE**

- Monitored weather/storm forecast.
- As weather forecasts materialized, our site's severe weather committee began holding virtual meetings.
- We also had a participant on joint calls held by city, county, and state emergency management agencies. The agency calls provided valuable information about road and bridge closure plans.
- Participated in Harris County OEM industrial updates.
  
- Implemented freeze protection plan (mentioned multiple times).
- Identified some additional weatherization measures based on forecast (mentioned multiple times).
- Review of all heat tracing was completed to ensure it was operable.
- Ran drains for freeze protection.
- The site chose to stay up through the cold weather so equipment would stay hot and hopefully not freeze. (The site was not successful as freezing conditions resulted in a complete plant shutdown.)
- Heat load from machinery would keep process water from freezing.

**PERSONNEL**

- Identified "ride out" crew before freeze.
- Released personnel not performing rideout crew duties from reporting to plant.
  
- Utilize ride out crews - similar to hurricanes (mentioned multiple times).
- We did not initially identify a ride out crew. But did declare a weather emergency for two days and did implement the ride out crew at that time.
- We did not require the ride out crew to stay on-site as long as they could ensure they would be able to return to work the following shift and road conditions would not prevent them from making it into work. We did provide lodging that was close to the plant if they could not travel on the roads.

- We made arrangements for people to stay at the plant, purchasing food and putting cots in offices to keep the ride out crew as comfortable as possible.
- Rideout crew schedule: Two groups. One works/runs plant while other group rests/sleeps. Each group works 12-hour shifts. Eat and sleep at plant in cots in offices/conference rooms.
- Provided housing in nearby hotel for first responder crew.
- The company provided food and lodging for ride out crew members as well as several employees and their families that lost electricity during the freeze event.
- Brought in portable toilets when potable water was lost.
- We expected the ride out crew to stay at the plant until Tuesday but extended it to Thursday due to continued adverse travel conditions.
- Also, like many other plants in the area, our workforce outside the facility was greatly impacted by the power outages and left unable to mobilize to the facility or support remotely due to power outages.
- Our ride out crew completed the work without sustaining any injuries.

## **IMPACTS FROM THE FREEZE**

- ERCOT (via the governor) did ask us to reduce power usage.
- We are not identified as a high priority customer by CenterPoint.
- Loss of nitrogen from supplier – biggest impact.
- Curtailment of natural gas from supplier.
- Erosion/Loss of potable water pressure as storm continued (mentioned multiple times).
- Cooling water and process water was delayed from supplier due to damage.
- Some of the needed products in high demand included power, natural gas, nitrogen, chemicals and catalyst, even potable water.
- Loading into the plant (food for the “bugs”) decreased significantly as discharger facilities were impacted. Continued for extended period as discharger facilities remained down.
- The site chose to stay up through the cold weather so equipment would stay hot and hopefully not freeze. The site was not successful as freezing conditions resulted in a complete plant shutdown. Ultimately, all production units and site utilities (except electricity) were shut down or became unavailable from external suppliers.
- While it is generally better to keep the facility running in cold weather (versus shutting down and starting up), specific conditions required that we shut down. For example, several key suppliers could not provide products and services we needed to run, a key factor in the decision to shut down.
- Boil water notice for site.
- Freezing of some smaller diameter lines. Some associated valve/pump damage.

- Level indication and process bleeds froze due to extreme cold temps – ultimately took down facility.
- Examples of impacts: Cracked valve bodies, piping separated at couplings, damaged transmitters, split piping, icicles, cooling tower icicles.

## **RECOVERING FROM FREEZE**

- Several hundred work orders were generated related to the freeze. Over 100 valves and transmitters and approximately ½ mile of piping replaced/repaired. Damage was significant and resulted in down time that extended well into March.
- It took approximately 1.5 months to make repairs and get the entire facility back up and operational.
- Raw material availability continues to be an issue into May.

## **FLARING AND OTHER RELEASES**

- An emergency declaration did not remove our responsibility for maintaining equipment in a way that would avoid releases. The emergency declaration only gave relief in the area of deadlines for reporting requirements. Several submission deadlines for standard reports that need to be submitted by the end of February or March were extended by 30 or more days.
- Our plant continued to monitor and report emissions throughout the freeze, regardless of whether regulations applied.
- Flares are safety devices designed to reduce pressure and emissions by burning hydrocarbons when necessary.
- We typically have our unit vents routed to the boiler, but when the boiler went down, we were required to vent to the flare so it does become more visible at that point but it is a permitted route to destruct vent emissions.
- No RQ events throughout the freeze. Natural Gas was shut off by plant due to a leak on a block valve.

## **LESSONS LEARNED/BEST PRACTICES/THINGS TO DO**

- Harris County OEM industrial updates helpful.
- We are planning to modify our severe weather emergency policy to include freeze events and it will include threat levels and actions to take as each threat level is reached.
- Would be helpful to share ideas on how to set threat levels for a freeze like we use Categories 1-5 for hurricane planning.

- Update existing freeze protection plan for an extended freeze.
- We need to review our winterization program and make any appropriate adjustments (mentioned multiple times).
- We will conduct the after-action review and I anticipate we will incorporate elements and updates into our severe weather plans from this experience to be considered as we prepare for severe weather in any season (extended periods where travel and resources are limited and/or restricted or workforce is limited due to impacts from the event).
- The cost to prepare even a small plant to sustain the conditions we went through in February would be cost prohibitive. Plants in our area are not built for cold weather which is one of the draws for building plants in South TX. If a plant did decide to upgrade all freeze protection to be able to endure a storm like we had, I anticipate it would take at least 1 year but likely longer.
- For similar future events, we will plan to shut down in advance of the storm.
- It takes us 2 full days to shut down. Additional time would be required to drain water pipes.
- We need to complete our postponed After-Action Review to identify additional steps our plant should take to prevent or reduce cold weather problems in the future .
- We will complete an Incident Review and Lessons Learned event so we can identify areas that need to be improved for the next time.
- From a maintenance perspective we need to have common valves, instrumentation, and piping materials on hand. We will consider pre-buys for these types of items. An updated criticality assessment of all instrumentation will take this hazard into account.
- Added some additional low point drains based on damage.
- Would keep inventory of portable safety eye wash/safety showers.
- It was most surprising with how fragile the overall utilities infrastructure system is (we lost nitrogen, natural gas and water for a period of time).
- Continue communication of wastewater is critical service to the community.
- The Texas legislature must ensure that improved management of utilities, among other measures, are implemented such that the events of February 2021 never happen again.
- Electricity and natural gas pricing were unexpected. Site will work to ensure all power and gas are contracted to mitigate this risk.
- Many Texans suffered extreme hardship from losing power and water service, as well as property damage during the period of freezing temperatures.
- While we took steps to prepare for the incoming weather, like many others, the severity of the weather and the widespread effects on utilities and partners as well as the general public and our workforce were not anticipated – such as extended impacts to the power grid and roadway conditions.

- We previously have been able to sustain freezes lasting a day with temperatures getting down to 22F.
- Generally, was harder to deal with the freeze than a hurricane, primarily because of the sustained cold weather that kept operations down for such an extended period of time.
- The dedication of our workforce during this event was amazing and humbling. Even while dealing with power and heat loss, personnel stepped up, or stepped in for colleagues who were unable, to take part in response calls and planning efforts to ensure the plant was brought down safely and that the ride-out crews had what they needed to be able to safely monitor the status of the facility.