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RULEMAKING ESTABLISHING ELECTRIC WEATHERIZATION STANDARDS	§ § § §	**PUBLIC UTILITY COMMISSION OF TEXAS**

THERMON INC. COMMENTS ON THE DISCUSSION DRAFT RULE AND STAFF QUESTIONS ON ELECTRIC WEATHER EMERGENCY PREPAREDNESS

Thermon was founded in Texas in 1954 and is an industry leader providing safe, reliable and mission critical winterization heating solutions. Thermon specializes in providing complete flow assurance, process heating, temperature maintenance, freeze protection and environmental monitoring solutions. We are a global company with offices in 15 countries. We keep power, natural gas, and renewable systems warm and operational in harsh climates such as Alaska, Canada, and Scandinavia. Thermon is headquartered in Austin, Texas and our largest manufacturing plant is in San Marcos, Texas. We are publicly traded (NYSE:THR).

Thermon works with many of the power and natural gas producers and their facilities in Texas. In discussions with these customers, we hear about the urgent need and support for the developing rulings from the PUC, Railroad Commission, and ERCOT. Many of these customers are making plans for winterization improvements before the cold season; however, they are also waiting to fully act until the rulings from the PUC are finalized and expectations are known. For this reason, we emphasize the importance of this ruling and its expedited release. Thermon is ready to support the PUC in this important work.

Executive Summary

- NOAA and ASHRAE are available and reliable sources of climate data.
- Consider defining weather scenarios with both minimum temperature and wind speeds.
- Establish thresholds for each scenario using an "annual probability of exceedance" of 1%, 2% and 5% as a more precise definition as opposed to defining 95th, 98th, and 99th percentile probability.
- Weather limits should be defined based on data for each specific power generation site instead of for weather zones.
- Supervisory monitoring systems are a best practice and an improvement over periodic inspections.
- Examples of project costs for heat trace winterization system on Texas power plant projects are less than 1% of the total facility cost for a new construction project.
- Incremental cost for lowering the temperature limit is relatively low

Response to Staff Question 1

The National Oceanic and Atmospheric Administration (NOAA) already offers an available and reliable source of weather data. Historical data and statistical summaries are readily available for nearby weather stations of existing and any newly proposed power generation sites in Texas.

The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) is another ready and common source for climate data for industrial construction sites.

Thermon starts every project with a "freeze protection design temperature" specification for the project site. This data is typically provided by the facility owner and is commonly derived from NOAA and ASHRAE data sources.

Comments on Subsection (c) Weather Study

Subsection (c) of the draft rule requires ERCOT, in consultation with the Office of the Texas State Climatologist, to prepare a weather study defining the 95th, 98th, and 99th percentile probabilities for a range of weather scenarios. We offer the following comments on this study and the resulting scenarios:

1) Weather risks are largely based on temperature and wind speed. Therefore, we recommend that ERCOT establish scenarios that clearly define both the minimum temperature and wind speed used for winterization design. These parameters are necessary to properly design effective winterization protection systems. These parameters are also necessary to audit the readiness of a power producer to withstand a cold weather emergency.
2) We recommend that the rule establish clearly defined terms for percentile probabilities in terms of the "annual probability of exceedance". Rather than use the term "9Xth percentile probability," we recommend the rule should use a more exact term. For example, we recommend the rule use the term "annual probability of exceedance of 0.01 (or 10^{-2})" instead of the "99th percentile probability." For a cold temperature limit, this means that the chance of the annual low temperature exceeding the defined limit is 0.01 or 1%. This approach has precedence in Canadian law referenced here: https://laws-lois.justice.gc.ca/eng/regulations/sor-96-118/page-4.html . This approach is similar to the 100-year floodplain concept well known to many Texas officials and residents.

3) Although duration at temperature is a factor, the vast majority of heat trace winterization design is performed for a steady state and continuous temperature condition. For example, instead of making special calculations and tradeoffs for a design temperature of 10°F for only 3 days duration, the design would be made for continuous operation at 10°F. This is standard industry practice, results in a slightly more conservative system, and does not significantly increase the cost for the facility *(see comments below on incremental cost of lower temperature design limits)*.
4) Subsection (c) of the draft rule mentions ERCOT established weather zones. Instead of geographically defined weather zones, we recommend that ERCOT define weather scenarios and limits based upon historical data derived from the NOAA weather station closest to each power facility. This ensures that each site is not over or under designed for that site's specific location.

Importance of Audits and Recommendation of Supervisory Monitoring

Subsection (g) of the draft rule requires inspections of a generation facility at least every three years. This is especially important in Texas, an area of warmer climate, which does not experience regular deep-freezing events. In colder climates, regular deep-freezing events regularly exercise winterization systems and thus unveil any weakness. In Texas, inspections must ensure winterization systems work in order to achieve reliability. The inspections must include two key elements: (i) an assessment of the proper installation and operation of the systems in place and (ii) a review of the winterization system design in relation to the limits established by the weather scenario including any system changes due to maintenance and expansion operations.

Thermon also recommends requiring continuous supervisory electronic monitoring of winterization systems. Supervisory monitoring systems are an additional measure for detecting issues when they happen and are commonly used in northern climates. Modern technology includes wirelessly connected solutions for a facility to monitor and test winterization system from a central control room. It is even possible to monitor and test winterization systems for many facilities from a centralized location. Using monitoring and control systems, a facility operator can see alarms and react accordingly when they happen without delay. This helps ensure that systems are always working and avoids relying on occasional inspections to discover an issue.

Discussion and Examples of Winterization Costs

With more than 60 years of experience, Thermon provides turnkey services delivering heat tracing winterization solutions including design, material supply, electrical power distribution, controls, and insulation of piping for Texas power producers and power plants. The following are data from three power plant projects built in Texas. We offer this as an illustration of the costs for heat trace winterization of a new power plant.

Plant Type	Total Heat Trace System (Design, Material, Install, Insulation) Cost Per Unit	No. of Units	MW Per Unit	Total Estimated Cap Ex for Entire Facility	Heat Trace Winterization % of Total Project
Project A - Coal Plant	$ 2,668,875	2	600	$ 1,500,000,000	0.36%
Project B - Combined Cycle	$ 1,497,625	3	300	$ 1,100,000,000	0.41%
Project C - Simple Cycle	$ 380,312	7	66	$ 390,000,000	0.68%

Additionally, our analysis shows that for a combined cycle power plant with ~50,000 feet of electric heat trace, the incremental cost for every additional 10-degree F drop in freeze protection design temperature, the additional cost for a new construction project would be between $150,000 and $200,000. The incremental cost of choosing a conservatively low design temperature limit with a high margin of safety is relatively low for new power facility construction projects, especially compared to business, state and societal costs stemming from the weather-related power and fuel supply outages.

We estimate that the cost to enhance or retrofit an existing facility to protect against to a colder temperature than originally designed might be two times the figures shown in the table above. The removal and replacement of existing materials along with the addition of new materials to an existing facility is more costly than winterization system construction of a new facility.

The heat trace winterization system cost can vary significantly depending upon the specific configuration and needs of the facility, but the table above is representative of typical projects. There are also costs associated with winterization that go beyond the heat trace winterization system; however, the heat trace system is often the largest winterization cost.

Closing

Thermon appreciates the opportunity to provide comments on this draft and is ready to provide additional support or information as may be helpful to Commissioners and staff. Thank you all for your leadership and public service to the State of Texas.

Dated July 30, 2021

Respectfully Submitted,

Bruce Thames
Chief Executive Officer
Thermon, Inc.