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CTI Comments on Draft Express Terms

Please find attached the comment letter from the CTI President on the Pre-Rulemaking Draft Express Terms.

Additional submitted attachment is included below.

17 November 2023

To: CEC Staff

Re: **Cooling Technology Institute Comments on the Pre-Rulemaking Express Terms Draft for Docket 22-BSTD-01**

These comments are being submitted by the Cooling Technology Institute in response to the publication and request for comment on the Pre-Rulemaking Express Terms Draft for Docket 22-BSTD-01.

The Cooling Technology Institute (www.CTI.org), based in Houston, Texas, is an independent, not-for-profit organization dedicated to advocating and promoting, for the benefit of the public, the use of all environmentally responsible and energy efficient cooling technologies, such as wet cooling towers, air-cooled condensers, dry coolers, adiabatic coolers and condensers, indirect cooling, and hybrid wet/dry systems by encouraging education, research and development, independent performance verification and certification programs, the exchange of technical information and technology, and dialog with government agencies and organizations. The CTI has a broad based, global membership of individuals and organizations interested in environmentally responsible heat transfer systems, including owner/operators, manufacturers, and suppliers to the industry.

Note that the CTI had previously submitted detailed comments on both the Draft and Final CASE Reports on Cooling Towers. The CTI appreciates the changes to the original proposals based on Stakeholder comments and that are included in the Pre-Rulemaking Express Terms Draft. We continue to generally support the CEC's goals to save energy and reduce water use. We would like to provide the following additional comments to the two sections of the Express Terms under consideration:

Cooling Tower Efficiency

While the CTI appreciated the reduction in the proposed prescriptive minimum efficiency for axial fan open circuit cooling towers as compared to the Draft Case Report, our members continue to believe these levels still remove too high a percentage of viable and efficient cooling tower models from consideration. The CTI believes it is in the best interest of all parties to maintain the current prescriptive minimum of 60 gpm/hp or barring that, further reduce the increases in required minimum efficiency by climate zone.

Please consider the following issues:

- A significant diversity of cooling tower models is necessary on the market to allow building system designers the flexibility to adequately select and position cooling towers

on buildings and building sites. Consideration of the efficiency of the full system, not just a smaller part, is necessary.

- Cooling tower models exist as "step functions" in capacity and energy efficiency. There is no smooth gradual increase in model efficiencies due to the physical constraints of shipping, construction and motor size for cooling towers.
- Removal of an excessive number of models from the market is likely to be legally considered a restraint of trade, especially when the models that are removed are already more thermally efficient than most, if not all, competing technologies. Maintaining the current prescriptive minimum efficiency would eliminate this concern, though any reduction from the levels shown in the Express Terms reduces the restraint of trade concern.
- It is very important to note that evaporative heat rejection uses approximately half of the energy of an air-cooled system. Increasing the cost and size of cooling towers may lead to a shift to less efficient cooling types which increase both energy use and emissions in California, negating much, if not all the expected savings. As the minimum efficiencies of competing classes of equipment (i.e., VRF, rooftops, etc.) have not been increased, this increases risk for market shifts. Maintaining or reducing the current prescriptive minimum avoids potential market shifts as well as restraint of trade concerns noted above.
- Most projects do not have "extra" layout space for either larger cooling tower cells or additional cells, much less for larger and heavier air-cooled equipment. System Designers will be forced to place cooling tower cells closer together. This increases the potential for recirculation of heated exit air back into the same or adjacent tower cells. *Recirculation increases the cold water temperature leaving the tower, eliminating much if not in some cases all of any gain from the increases in minimum efficiency.* As increasing the "box size" of the cooling tower and lowering the fan motor size is the primary means of increasing efficiency, the fan discharge velocity is reduced, further increasing the potential for recirculation. This is why cooling tower manufacturers will only recommend higher efficiency cooling towers when the project site will allow the proper layout spacing to ensure full thermal capacity per manufacturer's guidelines. Cooling tower engineers are generally involved directly in review of such applications for good reason. This is very challenging to accomplish in prescriptive language.
- The CEC should note that the use of the efficiency metric (gpm/hp) is valid only at the thermal condition of 95°F entering water, 85°F leaving water, and 75°F entering air wet bulb. This metric is useful as a comparison point between cooling tower models. The metric cannot be used to set the fan horsepower for a cooling tower at any other thermal condition or be used in Energy Models at other than the stated temperature conditions. The available modelling software does not handle this issue correctly in many cases.
- Lastly, the CTI continues to be aware that by generating an energy model and following a performance-based approach, the minimum efficiency requirements can be overridden. However, this path adds cost, time, and effort when designing a water-cooled system which can be an unfair burden versus competing systems such as rooftop units and VRF.

Blowdown Controls

The CTI continues to be supportive of the new language for cooling tower blowdown requirements as detailed in the Draft Express Terms.

Additional Energy Savings Potential

CTI has contributed toward revisions to ASHRAE Standard 90.1 and respectfully offers the following suggestions for Title 24:

The CTI has recently worked with ASHRAE TC8.6 and SSPC 90.1 on a proposal to include a minimum efficiency and the new CTI test code, ATC-105 Adiabatic (2023), for adiabatic fluid coolers in the heat rejection efficiency table (Table 110.2E in Title 24-2025 and Table 6.8.1-7 in Standard 90.1-2022). While the proposal has not yet completed public review, we encourage the CEC to consider including the requirements from this Addendum in 2025 Title 24 language (see Addendum q attached with this letter), specifically in Table 110.2-E (page 113). Adiabatic fluid coolers offer more efficient heat rejection than air-cooled fluid coolers (aka dry coolers) with lower water usage than conventional cooling towers, which should be of interest to both system designers and the CEC.

Referenced CTI Documents

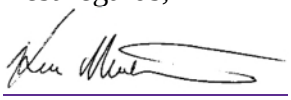
CTI respectfully requests that the dates for the following referenced CTI documents be updated:

CTI ATC-105 2022
CTI ATC-105DS 2018
CTI ATC-105 Adiabatic 2023
CTI STD-201 RS 2021
CTI STD-201 OM 2021

These CTI Codes and Standards are listed in Section 100.1 of the Draft Express Terms (page 65).

The CTI will continue to follow the continuing CEC processes in development of the final rule and will provide additional comments to CEC Staff should the need arise.

Best regards,



Ken Mortensen, President
Cooling Technology Institute

cc: Haile Bucaneg, CEC Senior Mechanical Engineer (Haile.Bucaneg@energy.ca.gov)
CTI Board of Directors
Vicky Manser, CTI Administrator

CTI Strategic Issues Committee, Paul Lindahl, Chair