



April 11, 2012

Ms. Brenda Edwards
U.S. Department of Energy
Building Technologies Program
Mailstop EE-2J
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RE: COMMENT ON ICE MAKER RULE MAKING - PUBLIC MEETING FOR AUTOMATIC COMMERCIAL ICE MAKERS - DOCKET EERE-2010-BT-STD-0037 - RIN 1904-AC39

The Alliance for Water Efficiency (Alliance) is pleased to submit the attached response to DOE's request for comments. The preliminary analysis conducted by DOE appears to be absent of adequate water efficiency criteria. The analysis of commercial ice makers contains several omissions and misperceptions that impair the ability to develop proper conclusions from the results, including:

- The DOE analysis dismisses the possibility of improving potable water use efficiency, assuming without evident documentation that all potable water use of ice makers for purging is unavoidable and inconsequential. Any water used beyond 12 gallons per 100 pounds of ice should be scrutinized for its necessity and improved efficiency in the ice making process. The Alliance understands there is a need to flush concentrating minerals from the sump to prevent build-up of scale. No references or other documentation is provided of the minimum amount of water required to prevent damaging levels of scale accumulation. One ice maker is shown needing to purge only 5.8 gallons of water per 100 pounds of ice; this suggests the possibility of unnecessary, inefficient water use in other models using up to 16.2 gallons of water per 100 pounds of ice produced. Given that the water efficiency of ice makers has not been scrutinized until recently, and that no data has been presented on the maximum concentration of minerals allowable to maintain proper equipment function; it is not reasonable to assume the efficiency of potable water use cannot be improved with minimum efficiency standards as evidenced by the variation in performance of models currently on the market.
- The analysis methods use the assumption that embedded energy in water is accurately accounted for in the price of water. In many locations, the price of water and wastewater treatment is regulated without direct itemization of water supply externalities, and price of these services do not directly relate to the embedded energy compared to the price of energy used by the consumer. Water purveyors and wastewater treatment entities are typically on different rate schedules and can pay a significantly lower price per kilowatt than the commercial ice machine customer would pay. An accurate analysis of net energy use requires an accounting of all energy units, especially when comparing air-cooled condensers to water-cooled condensers.

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- DOE inaccurately analyzes the trade-offs of increased water use for energy reductions in water cooled condensers by presuming these are interchangeable commodities. There are multiple and ample sources of energy to generate electricity, and many are renewable; while potable water comes from finite sources. Energy prices are variable based on supply and demand; water costs are regulated based on costs of treatment and delivery. In many locations, even under severe water shortages, water prices remain relatively constant.
- If the analysis is to treat water as a commodity (similar to energy) and assumes water has an unlimited supply where its value is a reflection of its price, the water value should include the marginal cost of the incremental next source of supply to meet growing demand, which is usually much more expensive than existing sources. For example, the cost to treat and deliver desalinated sea water can be more than ten times the typical cost of more traditional fresh water sources. The Alliance proposes the analysis not use a national average cost of existing water supplies, since this appears to not represent future water costs. The accuracy of forecasting the financial impact would benefit from using future water costs, instead of using water costs from relatively lower-cost water sources developed historically.

The attachment contains additional comments and suggestions on the DOE requested guidance issues. We appreciate your consideration of our many concerns and recommendations regarding water efficiency and its relationship to energy efficiency.

The Alliance for Water Efficiency is a nonprofit organization dedicated to the efficient and sustainable use of water. We represent a broad coalition of stakeholders which include water suppliers, business and industry, government agencies, energy and environmental advocates, and academia.

Energy efficiency and water efficiency have a strong nexus, and it is important to recognize this in the analysis. Neither one can be viewed in isolation without impacting the other. Please let us know if you have questions regarding these comments.

Sincerely,



Mary Ann Dickinson
President and CEO

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The Alliance for Water Efficiency provides the following comments in response to DOE's request for comments.

ES.4.2 Potable Water Use Minimum for Batch Ice Makers

Batch ice maker efficiency is affected by potable water use. However, interested parties have pointed out that very low potable water use increases scaling of wet surfaces in the ice maker, leading to increased maintenance costs and potentially higher energy use in the field. To help DOE determine whether practical energy conservation opportunities associated with potable water use reduction exist, DOE requests input on what levels of potable water use can be considered reasonable minimums for consideration in the analysis, whether the minimums depend on equipment class, and, if so, what this relationship is.

Recognizing the minimum of 12 gallons is required to produce 100 pounds of ice; some ice makers use more than 3 times this amount, and much of the use may be unnecessary. DOE's data set includes an ice maker that uses 34 gallons of water to make 100 pounds of ice. DOE's analysis and report needs to include documented technical data to determine the minimum amount of water required to prevent mineral build-up that could harm the equipment, where the user follows manufacturer recommended maintenance and de-liming schedule (every 6 to 12 months). It appears that ice makers might be purging water at excessive rates as a means to overcome poor equipment maintenance practices. The Alliance supports scientific investigation of the minimum amount of water needed to flush minerals to avoid excessive water use to overcome poor equipment maintenance practices and schedules.

Some degree of purging occurs with all machines currently in the marketplace. However, not all machines purge the same amount for similar capacities of ice, and clearly some machines are more efficient at purging than others. DOE should analyze the data from the more efficient machines and propose limits on purging rates. Water lost from purging also represents energy waste, since utilities would be pumping and treating this excess purge water and wastewater on a national scale.

The Alliance proposes all water using equipment to include water efficiency standards in conjunction to energy efficiency standards, as was successfully implemented by DOE for clothes washers. The embedded energy contained in the water provides DOE with the justification to include water efficiency requirements in this standard. A maximum potable water use requirement should be included, and based on scientific study of water quality and its effect on the equipment. The maximum water requirements should not be based only on a survey of current ice maker designs, and should not be based on mitigating the problems caused by negligent maintenance of the equipment.

ES.4.9 Balance of Condenser Water Use and Energy Use in the Analyses

DOE requests comment on its suggested approach to include consideration of condenser water use increase as a design option in the analysis (see chapter 2 of the preliminary TSD). This approach uses estimates of LCC in the engineering analysis to evaluate the cost effectiveness of design options that affect both energy and water use. DOE also requests comment on its intent to use such an approach to develop condenser water use standards for continuous ice machines.

The consumer now has many viable alternatives to single pass cooling that make such equipment obsolete and an excessive use of water and energy. The Alliance is opposed to all single pass cooling for ice makers, and recommends DOE take more proactive action to disallow all ice makers that can be installed and operated as single-pass cooling. This type of equipment is no longer necessary as technology has advanced to improve the efficiency of air cooled ice makers, remote condenser systems and closed loop water cooling systems that are readily available to the consumer.

The water cooled condensers manufactured today for commercial ice makers can most easily be installed and operated in the single-pass water cooling mode. When water was inexpensive and

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plentiful, the single pass water cooled systems became an option for icemakers placed in confined spaces. The growing demand for water and increased cost of limited water (and energy) resources has rendered single-pass cooling a vestige of the past. The Alliance recommends DOE take actions to eventually eliminate single-pass cooling equipment, which would support the water communities' efforts to ban all single pass cooling equipment. While multi-pass and closed-loop water cooled systems can be both energy and water efficient, single-pass cooling only serves to replace excessive water use for lower electric costs. Where appliances and equipment are built to accommodate single-pass water cooled settings, the equipment will often be installed as single-pass cooling.

The Alliance is opposed to price-based comparisons of trading water use for energy efficiency because of the strong nexus between the two resources and water cannot be properly evaluated on financial factors alone. While there are multiple sources of energy, including renewable sources; the US sources of fresh water are limited while the demands are growing. Energy is a commodity that has price fluctuations based on supply and demand; water is heavily regulated and priced based on the cost of treatment and delivery, and less directly affected by supply and demand. When water demand overcomes our readily available fresh water resources, the alternative water sources require more costly infrastructure and operational changes such as desalination; a very energy intensive process. The Alliance recommends DOE use the marginal cost of alternate water sources in its evaluation, such as desalination to properly analyze and account for all water and energy costs equitably applied to water cooled condensers.

ES.4.14 Condenser Water Usage in Life-Cycle Cost and Payback Period Analyses

DOE requests comment on the modeling of condenser water usage assuming all ice makers are installed in a single-pass configuration.

As aforementioned, the Alliance is opposed to all commercial ice makers accommodating single-pass water cooled condensers because, without restrictions, much of this equipment will likely be used in the single-pass water cooling mode. Single-pass cooling equipment is no longer necessary as technology has advanced to improve the efficiency of air cooled ice makers, remote condenser systems and, closed loop water cooling systems are readily available to the user of larger industrial ice makers. The typical commercial user now has many viable alternatives to single pass cooling that make water cooled equipment obsolete and an unnecessary waste of water.

DOE's analysis appears to not fully account for the factor of the embedded energy of water and wastewater. The Alliance recommends the analysis include the energy expended to pump, treat and deliver the water to the ice maker and the energy used to pump, treat and dispose of the water in the wastewater treatment process. In addition, the analysis should not ignore all water used in the ice making process; DOE should include the embedded energy of the all water used, including the water purged from the water reservoir during the ice making process. The Alliance recommends DOE follow the precedent set when including water efficiency criteria in the clothes washer rule making; this is an opportunity to set water efficiency criteria in this ice maker rule making process.

Trading water use for energy efficiency cannot be properly evaluated solely on financial impact of water and energy prices to the consumer. While there are multiple sources of energy, including renewable sources; our sources of fresh water are limited while the demands are growing. Energy is a commodity that has price fluctuations based on supply and demand; water is heavily regulated and priced based on the cost of treatment and delivery, not as directly affected by supply and demand. For many communities with limited fresh water supplies, the only alternative is desalination; a very energy intensive process. Unless the analysis uses the marginal water and energy costs, such as desalinated water, DOE is not analyzing water costs equitably to the energy costs for water cooled condensers.