

January 4, 2013

US Environmental Protection Agency
ENERGY STAR Program
Ariel Rios Building 6202J
1200 Pennsylvania Avenue, NW
Washington, DC 20460

To whom it may concern:

This letter includes the comments of Southern California Edison (SCE) in response to the Environmental Protection Agency (EPA) ENERGY STAR Program Requirements Product Specification for Residential Refrigerators and Freezer Draft 2 Test Method to Validate Demand Response Rev. Nov-2012.

SCE supports the EPA's effort to introduce demand response and "smart" capabilities in ENERGY STAR appliance specifications; smart products will be a useful tool for utilities and consumers alike to manage their energy use and costs.

From a utility perspective, the financial benefits and peak demand savings of smart, DR capable appliances will depend on a number of variables which can interact in various ways and are not under utility control. It is important to a utility that, despite these variables, DR programs enjoy as much reliability and certainty as possible. When a utility or third party sends a signal for a DR event, the DR-capable product, as authorized by the consumer, will respond according to the signal sent and its own capabilities. While the actual response will depend on a number of factors, it is essential that utility DR programs be able to estimate and depend on a reliable response. These factors motivate our comments in this letter.

Comments regarding the Residential Refrigerators and Freezers Draft 2 Test Method to Validate Demand Response Rev. Nov-2012

1. "Signal" definition

The test method "signal" must be more precisely defined to ensure that laboratory test results will be repeated in response to triggers by utility DR programs.

The Draft 2 Test Method defines "signal" in terms of the action that results from the signal (e.g. "indicate that it should modify its operation"). This definition does not include sufficient detail about the specific packets of information that must be included in the signal sent to the Unit Under Test. In recent testing of DR capable appliances conducted at SCE, it was discovered that different manufacturers trigger their appliance responses based on different components of the DR signal. Thus, a signal broadcast to appliances in a utility's service territory would have to include ALL of the tags (unique bits of information contained in the signal) required to activate ALL manufacturers DR signals. The test method needs to define exactly what signal is sent to test out functionality for both Temporary Appliance Load Reduction and Delay Appliance Load scenarios.



2. AHAM SRF-0.5-2011 references

The referenced document does not appear to be publicly available.

Definitions are reproduced from AHAM SRF-0.5-2011, which does not appear to be available to the public. It is necessary to review the context of these definitions in order to provide well-informed feedback on the propriety of the terms used and their application in the remainder of the document. This document should be made available to those reviewing the Test Method to ensure the definitions are sufficient.

3. Thermal mass

The UUT set up should include thermal mass to more accurately represent power impacts seen in field deployment of smart refrigerators.

The Test Method references the DOE test method, which uses an empty refrigerated cabinet. The addition of thermal mass would more accurately represent DR performance in the field. (The empty cabinet likely gives the most conservative estimate of power reduction.) At the very least, EPA should investigate the differences in operation and DR response between an empty and full refrigerator cabinet.

4. Anti-sweat heater (ASH)

The ASH should be active in both the baseline and DR tests to mimic normal consumer operation.

The goal of the Test Method should be to mimic normal operation that would be seen in consumer homes. Turning the anti-sweat heater off deviates from normal operation and eliminates a significant portion of the load, as well as a significant portion that could be reduced during a DR event. In testing conducted at SCE, refrigerators have performed significantly different when ASHs are turned on compared to when they are off (e.g. multiple degree shift in temperature throttling range and different compressor cycling patterns). The ASH should be active in both the baseline and DR tests.

Turning ASH off will also improperly increase the Percent Delay Load Average Power Reduction (sec 9.3) and the Percent TALR Average Power Consumed (sec 9.5) calculations.

5. Demand Response Definitions

Definitions of Delay Appliance Load (DAL) and Temporary Appliance Load Reduction (TALR) may prove ineffective at achieving their goal of DR load shedding.

Specification uses definitions and response requirements from Joint Petition. Current structure tying responses to event duration will likely be problematic. Duration is not commonly known when an event needs to be called. We cannot foresee a case where an event would be less than 15 minutes in duration (thus nullifying the TALR). Many events will last six hours or more to cover our peak time period of 12 PM to 6 PM. These events would fall outside of the 4 hour maximum defined DAL duration, meaning no response would happen.

6. Response to Multiple DR Signals

A Connected refrigerator should be able to respond to as many DR signals as it is able to and not be limited to one response within a 24-hour period.

The current Draft 3 specification requires that a Connected refrigerator or freezer responding to a DR signal be able to provide *at least one* response (DAL or TALR) within a 24-hour period. However, EPA notes that this means that the unit does not need to respond to additional DR signals if called within a rolling 24-hour period, even if the unit is capable of responding (i.e. within the allowable temperature range). Our concern is that manufacturers may interpret this to mean that their unit does not need to respond to additional DR signals, and could design their units to respond to only one DR signal in a 24-hour period. Nothing in the Test Method currently addresses response to multiple DR events.



We ask the EPA to clarify this requirement, and require that units respond to, *at a minimum*, one DR signal within 24 hours, but shall not limit the ability to respond to more, so long as functionality and safety are not jeopardized. Allowing units to ignore additional signals within a 24-hour period is unnecessary and significantly compromises the value of the DR functionality.

It may be necessary to reasonably call more than one DAL or TALR event in a 24-hour period. For example, it could be reasonable to expect that a DR event could be called at 5:00 PM on one day and at 3:00 PM on the subsequent day. Assuming this language is added to the specification, the Test Method should include a verification that the unit can respond to multiple DR events in less than 24 hours (though it may choose not to respond based on operating conditions).

7. Test Method Development Assistance
Knowledge gained from recent SCE testing of DR capable appliances can provide insight to DOE/EPA test method development efforts.

We recently conducted several tests of DR-capable refrigerators, clothes washers, and dishwashers at SCE's Technology Test Centers. These tests investigated the various appliances' response to DR signals compared to normal operation. We would like to make our findings available to DOE and EPA as well as share insight associated with development of test standards to be followed by manufacturers.

In the near future, we will be installing several connected appliances at customer homes as part of a demonstration project. Data collected will allow much more insight into consumer usage patterns and impacts of DR events on the consumer experience. We will make this data available to DOE and EPA as well.

We thank the EPA and DOE for the opportunity to be involved in this process and encourage the EPA and DOE to carefully consider the recommendations outlined in this letter.

Sincerely,

A handwritten signature in black ink, appearing to be a cursive name, possibly "Michael J. ...".