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California Energy Commission
Dockets Unit
Docket # 12-AAER-2C
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RE: 2013 Water Appliances Efficiency Rulemaking

Dear Commissioners:

We would like to comment on the information submitted to the Commission, under your Invitation to Participate, regarding water appliances efficiency rulemaking. While water meters are not water appliances, and do not fall under Title 20, we would still like to address concerns that we have with some of the submittals. Our intention is to provide better understanding of several issues, by filling-in some gaps and by correcting what appear to be some misinterpretations. By a separate communication submitted last week, we have commented further on the authority of the Commission to regulate water meters.

A. The NRDC meter standards proposal to AWWA (and now submitted to CEC).

1. The NRDC submittal to AWWA proposes modifications to AWWA meter standards that cover three mechanical metering technologies – C700/C710 that cover positive displacement meters (disc- and piston-types) through 2", C708 that covers multijet meters through 2", and C712 that covers singlejet meters through 6".

   This ignores additional metering technologies covered by other AWWA standards. It also ignores some alternative metering technologies, such as residential ultrasonic meters, already in use in the marketplace but not (yet) covered by AWWA standards.

2. NRDC has asserted that the proposed changes in the AWWA meter standards are supported by the test data reported in the 2011 research report from Utah State ("a majority of the meters …… are of the type, kind and quality ….."). From our evaluation of the raw test data in this report (see item C below), this is not correct.

B. The response on water meters submitted by California IOU.

1. Under point 1.1 Physical Characteristics, other technologies used in residential applications are not mentioned: (a) Turbine meters (see AWWA C701); and (b) additional solid-state metering technologies, such as ultrasonics, that have recently been applied to residential metering applications. Solid-state technologies are discussed in some of the reference materials supplied by California IOU.

2. The same omissions with respect to metering technologies are also seen under point 1.1, Measurement Technology.

In addition, this same section states that solid state (or static) meters "often require a power supply" – this is not the case for solid state meters being used in residential applications, and is becoming less true for larger commercial/industrial solid state meters, as technology progresses.

3. Under point 1.4, Product Lifetime, the useful service life of a water meter is said to be "about fifteen years". Even with the subsequent caveats regarding water quality, maintenance practices, and meter replacement decisions being tied to an assessment of change-out costs versus lost revenues due to meter degradation, this is still an over-simplification. And it may also be overly optimistic, particularly for larger meters used in multi-family residences. In this same paragraph, it is stated that "manufacturers typically warranty initial accuracy levels for only one year." In fact, much longer warranty periods are provided by some of the major manufacturers.

   However, both product lifetime and warranty periods would need to be reassessed, if additional requirements on meter performance were to be imposed for extended low flows.

4. Under point 6.1, Table 3, test data from the 2011 Utah State research report is analyzed by Energy Solutions. From our analysis of the raw data from Utah State (see item C below), we believe the Energy Solutions analysis makes errors in reporting the "worst accuracy" results that were obtained in this study.

5. Under point 6.2, Cal IOU asserts that water meters providing better low flow accuracy may not cost more than other water meters. However, both the Cal IOU point 5.7, and the NRDC submittal to CEC, detail additional product testing, and this would indeed affect costs. There would be added test time for the meters themselves, and it is likely that added test stand investments would also be required, in order to perform these tests. As metrological devices generating billing information, such product testing could not be limited to periodic sampling of small sample groups. And test times at extended 'leak detect' low flows would be quite lengthy. Clearly, the testing needed to assess compliance with performance requirements for metrological devices is quite different from that required for appliances.

   These added costs would be imposed on manufacturers. Similar costs would also be imposed upon the utilities and regulators that also test water meters. Additional costs would also be imposed on manufactures, if such testing were to result in increased rejection rates.

C. Utah State new meter test data being used in support of new provisions for meter standards by NRDC, and referenced in the California IOU response.

   1. The Utah State testing had some significant limitations in scope. As such, it cannot, by itself, support the creation of new provisions for water meter standards.

      For example, the meters chosen represent a single 'snapshot in time', for each of the manufacturers whose meters were studied. As such, the testing does provide insight into product manufacturing variation that may be seen over time.

      In addition, sample quantities for any single make/model/size were quite small. The largest sample quantity used was only six, as seen for the smallest meters tested. Much smaller sample quantities were used for some of the larger meters, culminating in a total of only 16 meters tested (covering five different metering technologies) for the 2" line size.

No meters were tested for line sizes larger than 2".

2. The new meter test results do not appear to support the NRDC assertion that positive displacement, multijet and singlejet meters would all meet new extended low flow test requirements of 80% minimum accuracy at flows equal to 25% of the current AWWA minimum flow test points. Examples from the 5/8" test data to illustrate this point, taken from the Utah State Table A.1:

    - of 48 oscillating piston meters tested, 15 would pass (note that AWWA C700 and C710 combine disc meters and piston meters under a single 'displacement-type' meter standard)
    - of 30 nutating disc meters tested, 28 would pass
    - of 43 multijet meters tested, 6 would pass
    - of 24 singlejet meters tested, 5 would pass

3. The California IOU response includes an analysis of Utah State results, for 1" meters. This does not agree with our own analysis of the data. First, the IOU analysis provides accuracy figures for a flow rate of 0.09 gpm. The Utah State data actually show that most meters have 0% accuracy in tests below 0.19 gpm. Our assumption is that the 0.09 gpm figure in the IOU analysis is a typographical error, and that their intention was to actually report results at 0.19 gpm (a flow equal to 25% of the current AWWA minimum flow test rate). From our analysis of the data in Utah State Table A.11, for a 0.19 gpm flow rate:

    - for 18 disc meters, best accuracy is 95%, worst accuracy is 76% (Cal IOU has 95% and 89%)
    - for 30 piston meters, best accuracy is 97%, worst accuracy is 0% (Cal IOU has 96% and 65%)
    - for 33 multijets, best accuracy is 99%, worst accuracy is 0% (Cal IOU has 99% and 54%)
    - for six singlejets, best accuracy is 95%, worst accuracy is 71% (Cal IOU has 95% and 85%)

D. The 2011 Aquacraft study of residential water use in California, referenced in the California IOU response.

The Aquacraft data logging of single-family homes in California included a total of 780 residences. We believe most involved ½" (a.k.a., 5/8") or ¾" service lines. From the list of utilities that participated, a significant portion (perhaps half?) of the sites may have been metered with nutating disc technology from the two largest manufactures of such meters. The designs for these meters have remained basically unchanged for the past two decades.

If the Utah State results were actually representative of meter performance in the field, then one could assume that much of the Aquacraft information was generated from meters already capable of "leak-detection" per the NRDC proposed criteria.

Aquacraft reports that 7% of all homes in their study had leak-type events with metered flow rates of 0.07 gpm or higher, and that those homes accounted for 44% of all indicated leak volume. From Figure 51 in the Aquacraft report, it also appears that 30% of all leak volume occurred at indicated flows of 0.12 gpm or higher.

From this, we conclude that increases in water bills associated with metering of significant leak flows are not a strong motivation for the consumer to correct leaks – these larger, on-going leaks were not being addressed by the homeowners, even though the homeowners were being billed for the leak volumes.

From an energy-efficiency standpoint, being billed for water lost through leaks does not have a direct correlation to correcting the leaks. It may not even be a clear indication to the homeowner that a leak is present. For an alternative approach to the issue of leaks, the information submitted to the Commission by Badger Meter, under your Invitation to Participate, noted developments in automated meter reading systems (AMR/AMI). These systems can provide timely water usage information and leak detection, providing visibility to water consumption patterns and thereby aiding in the conservation and efficient use of water.

Sincerely,

BADGER METER

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