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From:
Jim Smelcer
Engineering Manager
Lochinvar Corporation
300 Maddox-Simpson Parkway
Lebanon, TN 37090

Re: Docket No. 10-BSTD-01; August 17, 2011 Staff Workshop – 2013 Building Energy Efficiency Standards

To Whom It May Concern,

Thank you the opportunity to participate in the subject Webinar of August 17, and to provide comments to the presentation.

Lochinvar Corporation is leading manufacturer of residential and commercial water heating equipment, including a broad variety of water heaters, boilers, and pool heaters. We have been participating in the California market successfully for many years, and would like for the relationship to continue.

To be specific and to the point, whatever studies were done to indicate modifications to a boiler, be it after market or factory redesign by the manufacturer, the assumptions and conclusions presented cannot be applied to an atypical boiler in the marketplace. Here's a more detailed version of my general arguments presented to CEC Staff along with their primary consulting firm during the webinar, whom I might add were very congenial and receptive to hear me out. These comments were intended to be in your possession prior to the Webinar, but unfortunately, that did not happen as we had anticipated due to a communications breakdown between us and AHRI, our industry representative to liaison our collective position.

**Proposal #1 – Mandate flue dampers for new atmospheric commercial process and heating boilers.**

Note: The following comments relative to Proposal #1 are based on the Title 24 proposal and supporting analyses to mandate "flue" dampers. It could be easily inferred based on the assumptions used that the intended goal is to mandate "vent" dampers. If this is the case, the comments below should be received as relative to "flue" dampers, and serve as arguments to support that consideration to mandate flue dampers based on the analysis provided is flawed.

1. The assumption that a flue damper is readily available for most atmospheric boilers is false. A flue damper assembly must be tailored for the flue opening of a boiler. Flue openings vary

both in size and geometry for a given input, and there is no standardization between manufacturers for a common off the shelf purchased flue damper assembly as opposed to, for instance, a vent damper. Flue dampers are usually designed by the boiler manufacturer as an integral part of the boiler.

2. There is no consideration given for additional wiring construction and safety controls for a flue damper assembly. It would have to be interconnected within the boiler system and provisions made to do that. It is not a common practice for wiring harnesses on atmospheric boilers in the market place to have add on connections for a flue damper assembly as an aftermarket option. Also, considering the size of the boiler as a variable requiring varying damper motor torques to function over the range of models, stronger, higher torque motors will be needed, requiring higher VA transformer ampacities with significantly higher costs that are not considered in the analysis as well.

3. Due to the environment associated with where a flue damper shutoff would be applied, provisions must be made to remotely locate and connect a flue damper motor with the external linkage assemblies to allow the motor to be free of exposure to high flue temperatures and corrosive flue gas environments. This also is generally unique to every boiler, and the costs associated with the construction are not mentioned, nor appear to be accounted for.

4. The estimated maintenance costs of $150 over a 10 year period for the flue damper assembly, given the complexity of the design, are most likely underestimated. There are more working parts to a flue damper assembly other than the motor, and $100 for a motor, or for any component, is not taking inflation into account over the 10 year period.

5. The estimated energy costs used to calculate the payback period also do not mention adjustments for inflation. This should also be accounted for.

6. The statement that no additional verification costs or acceptance testing is required is false. Flue damper assemblies installed on a boiler must be examined by the certifying agency with the flue damper in place as required by the boiler test standard. It is uncommon today for a boiler offering to be certified with a flue damper.

7. Given the response in 6, there would be additional production and inventory costs for setting up and maintaining new models for California with these requirements. These costs are not accounted for in the analyses.

8. The energy savings of $1791 for a 700,000 Btu/Hr input boiler over a 15 year period of time for a mandated flue damper is based entirely on an estimated off-cycle savings, and given that the assumptions were flawed, a revised calculated payback would most certainly be extended beyond the maximum 11.9 years payback period permitted under Title 24.

9. There were no specifics related to the analyses for applications of flue dampers for an indoor versus an outdoor installation, although it is assumed that the analyses are based on an indoor application. Off-cycle losses for an outdoor application are not presented, and would be a higher percentage of the total losses (more than 2%), and should be included as part of the analysis given that

outdoor/unheated space boiler applications do exist in California. For these purposes, consideration for flue dampers for outdoor applications only might be in order.

**Proposal #2 – mandated VFD Combustion Air blowers for (powered / mechanical draft induced, multi-rate or modulating gas control equipped) commercial and process boilers.**

1. There were no considerations given to non-VFD multispeed conventional combustion fan motors as a viable alternative. The control strategy, timeframe to implement, and incremental cost adder, and the payback for this option could be attractive, and certainly more favorable, and should be included in the analysis.

2. The report states that motor sizes of 10 HP or greater will be mandated as VFD, but that VFD drives are available as low as 1.5 HP. VFD drives are actually available and used in volume at fractional horsepower sizes today in commercial boilers. Is it assumed that the payback period limitation under Title 24 of 11.9 years is exceeded for motor sizes less than 5 HP? An analysis of a typical ½ or ¾ HP applications would have been good to include in the analyses as verification to see if this fact correlates to the smaller, more predominantly used VFD's today.

2. Similar comments related to the need for additional acceptance testing apply here as well as for mandating flue dampers. See 6 above.

**Proposal #3 – mandated constant excess air ratio controls over the range of modulation for (powered/mechanical draft induced, multi-rate or modulating gas control equipped) commercial and process boilers.**

1. Were NOx emissions tests conducted at more than one firing rate? Recent S CAQMD rulings have dictated that NOx testing will be conducted at full and minimum firing rates, and could include others depending upon what firing condition the boiler is in when arriving to conduct audits. Even though the protocol only requires testing at full firing rate, was this taken into consideration when examining NOx performance at other than full firing rate conditions?

2. It is common knowledge that there are applications limitations for many styles of commonly used high turndown burner head designs because they exhibit resonant burner noise when operating at low burner turndown conditions if excess air is less than 40%. Was this taken into consideration? If this practice is mandated, the result would most lead to a complete burner redesign of major proportions.

3. The application of parallel positioning controls to achieve reduced excess air levels is something that some of us in the industry is not familiar with at all, therefore, the cost analysis comparisons cannot be verified due to lack of knowledge. However, the incremental cost adder of between $8000 and $9000 dollars is substantial to achieve a marginal energy cost savings estimate of $829 annually and hard to justify, especially when the maintenance costs are estimated "conservatively" at $400 per year based on boiler control representatives and not owner/operators. The data is lacking credibility without their input. It is also amusing to note that these calculations using their estimates arrive at exactly the maximum payback period allowed by Title 24. There's no room for error.

Please review these comments, and we'd appreciate the opportunity to discuss our concerns in person or via teleconference. Ultimately, what I pose to the Commission as an alternative – if the goal is to enhance efficiency, it's simpler to manufacturers as a whole to either improve the efficiencies for our own products each in our own way, or simply choose to sell a higher efficiency product that we produce already, such as a condensing boiler. This report assumes all boilers can be modified to improve, when it is highly likely that we can achieve the same objective by selling the higher end products that are already designed.

Thank you again for listening.

Jim Smelcer
Engineering Manager
Lochinvar Corporation
300 Maddox Simpson Parkway
Lebanon, TN 37090
615-889-8901 Ext. 2259
615-882-2962 Fax
jsmelcer@lochinvar.com