

September 25, 2015 (via email)

Ms. Abigail Daken
ENERGY STAR Product Development Team
US Environmental Protection Agency
1200 Pennsylvania Avenue NW (Postal Code 6202J)
Washington DC 20460

Re: Version 1.0, Final Draft Product Specification for Commercial Boilers

Dear Ms. Daken,

Burnham Holdings, Inc. is providing comments in response to the above-referenced draft specification issued by EPA on August 28th, 2015. Burnham Holdings, Inc. ("BHI") is a holding company owning several, separate subsidiaries each of which do business in the commercial boiler industry and which could be materially affected by this specification should it be adopted. Accordingly, BHI hereby provides comments for and on behalf of itself, and its wholly owned subsidiaries, U.S. Boiler Company, Inc. (a Pennsylvania Corporation headquartered in Lancaster, PA); Burnham LLC (a Pennsylvania Company Located in Lancaster PA); Thermal Solutions (a Delaware Company located in Lancaster, PA); Bryan Steam (a Delaware Company located in Peru, Indiana); Crown Boiler Co. (a Pennsylvania Company located in Philadelphia, PA); New Yorker Boiler Company, Inc., (a Pennsylvania Company located in Hatfield, PA); and Castings Solutions, LLC, (a Delaware Company located in Zanesville, OH). With the exception of New Yorker Boiler and Casting Solutions, all of these companies manufacture and/or sell both non-condensing boilers and condensing commercial boilers, with many of the latter meeting the proposed specification. Castings Solutions supplies the cast iron heat exchangers used by several of the above subsidiaries in their non-condensing boilers. Collectively, the parties listed above shall be referred to as BHI, unless otherwise indicated.

Collectively, BHI employs over 650 people including 203 manufacturing personnel. Over 170 of its manufacturing jobs are union represented manufacturing jobs.

BHI is opposed to the creation of this specification. EPA has not publicly demonstrated that this specification will result in any significant energy savings or predictably provide a positive, let alone significant, payback for the consumer. Compliance of this proposed specification to the first three of EPA's own "Guiding Principles for Establishing New or Revised ENERGY STAR Specifications" (copy attached) is debatable at best. In fact, the system-dependent nature of commercial boiler efficiency means that it is probably impossible to create any commercial boiler ENERGY STAR specification meeting the first of these principles that relies on steady state thermal efficiency (this is discussed further below).

EPA's decision to create this program means that EPA believes such a program will have a significant impact on the commercial boiler marketplace, resulting in more sales of boilers meeting the proposed specification. Any such change must therefore result in "winners" and "losers" among all manufacturers, *even though participation in an ENERGY STAR program is voluntary*. This program's potential impact on individual manufacturers therefore imposes a moral, if not legal, obligation on EPA to publicly demonstrate

that **any new specifications provide a tangible benefit that outweighs the associated costs. In this case, the proposed specification potentially distorts the marketplace in favor of condensing boilers manufactured overseas and the cost could include the loss of U.S. manufacturing jobs.**

In light of this, the process by which EPA is establishing these specifications is particularly troubling. While claiming “transparency” and “clarity” as important elements in its process¹, EPA has failed to make public all of the calculations, data, and assumptions used to support the proposed specification at the outset of the review and comment period. During its stakeholder webinar on September 9th, EPA did offer to answer questions about its analysis on a one-on-one basis following the meeting and also promised to provide a link to a DOE technical support document (TSD) from which originated some of the data used. While we appreciate this gesture, **the promised link was still missing from the specification docket as of September 23rd (two days before the comment deadline).** Attempting to reconstruct EPA’s analysis through discussions with EPA is both unduly time consuming and completely unnecessary. EPA claims that this analysis supports the proposed specification and it should therefore have been made publicly available at the beginning of the comment period for all stakeholders to review. This is especially true in light of the unreasonably short comment period (less than a month) EPA has allowed for this process.

Our reasons for questioning EPA’s adherence to the first three of its six “guiding principles” are as follows:

Principle 1: Significant energy savings can be achieved on a national basis – As previously noted, we have not seen the data, assumptions, and calculations DOE used to conclude that such savings exist. We do know that commercial boilers are a perfect example of the type of system-dependent product EPA says it prefers to avoid creating specifications for when it makes the following statement in its explanation of Principle 1:

In general ENERGY STAR specifications are created only for those product categories where it is clear that the energy savings potential of a product will translate into tangible energy savings when the product is placed in a home or building. That is, installation or system integration issues have little or no impact on the ability to realize the product’s energy efficiency. This is essential to ensuring ENERGY STAR qualified products deliver promised savings and to maintain trust in the label. As a result, the Agency is very cautious about labeling products that are components of larger building or industrial system².

The effect of water temperature on boiler efficiency (particularly condensing boiler efficiency) has been acknowledged by EPA. Other factors determining realized efficiency savings include, but are not limited to:

- **How the boiler is used** – A “back-up” boiler used only during the coldest few months of the year will accrue far less energy reduction if its nominal efficiency is raised than a boiler used for the entire heating season. The size and demand patterns of auxiliary loads, such as domestic hot water and snow melt systems, also vary dramatically from one installation to another, making the energy savings associated with a given thermal efficiency rating highly system dependent.

¹ September 9th 2015 stakeholder webinar, slide 14.

² *ENERGY STAR Products Program Strategic Vision and Guiding Principles* May 2012, pg. 3 (downloaded from ENERGY STAR website 9/23/15).

- How the boiler is controlled – A variety of control strategies are used to determine the water temperature set-point of commercial systems, as well as to determine how multiple boilers are staged. The choice of strategy can therefore have a significant effect on system efficiency.
- How the boiler is piped – Some multiple boiler systems allow water to flow through units that are in standby mode. Such systems will have greater losses than ones where this is not permitted.
- Auxiliary electrical loads – Unlike some non-condensing boilers, all condensing boilers include a blower to move air/flue products through the boiler and vent system. In many cases, condensing boiler systems also require a pump to move condensate to a location where it can be disposed. Finally, the condensing boilers tend to require larger pumps than non-condensing boilers due to their generally higher water-side pressure drops. This auxiliary energy consumption is not captured by the proposed thermal efficiency metric, nor can it be, because as the presence and size of some of these pumps is determined by system conditions.

Principle 2: Product performance can be maintained or enhanced with increased energy efficiency – EPA cites lifetime as a factor impacting product performance³. In its revision to the version 3.0 residential boiler specification, EPA elected to assume that condensing and non-condensing boilers have the same life expectancy. We believe that there is objective evidence to suggest that the life expectancy of condensing boilers is significantly shorter and that this applies to both residential and commercial condensing boilers. Numerous sources, including the ASHRAE HVAC Applications Handbook⁴ cite life expectancies for cast iron (non-condensing) boilers in excess of 23 years. By contrast, references exist specifically applying to condensing boilers that show a life expectancy of 15 years or less⁵.

Principle 3: Purchasers will recover their investment in increased energy efficiency within a reasonable period of time – Again, EPA has provided none of the data, assumptions, or calculations which led them to conclude that this principle would be met for the proposed specification. As EPA is well aware, some of the costs which determine payback include:

- Cost of the boiler itself – EPA’s assumed costs for the baseline and 94.0% baseline are unknown.
- Installed cost – In addition to the cost of the boiler itself, the costs of labor and materials associated with changes to venting, additional pump(s), piping, and controls must be considered. In some cases, the costs of these additional items may approach that of the boiler itself. One of the principle drivers of this added cost is often the change from Category I (“chimney”) venting to Category IV venting that would accompany the change from a baseline to an ENERGY STAR model. In cases where a suitable outside wall is unavailable for terminations, and where there is no practical way for a Category IV vent systems to be routed to the roof, the option of using an ENERGY STAR commercial boiler may be unavailable to the consumer.

³ *ENERGY STAR Products Program Strategic Vision and Guiding Principles* May 2012, pg. 3 (downloaded from ENERGY STAR website 9/23/15).

⁴ *2015 ASHRAE Handbook-HVAC Applications*, Chapter 37, Table 4 (also see TRP-1237 online database)

⁵ PM Engineer, October 2012, Page 10; Keman, R., M. v. Elburg, W. Li, and R. v. Holsteijn, *Preparatory Study on Eco-design of Boilers, Task 2 (Final) Market Analysis*, September 30, 2007, page 67.

These venting issues were mentioned by other stakeholders on the September 9th webinar and were also described in comments we made during past revisions to residential boiler ENERGY STAR specifications. If anything, the issues raised then are more acute on commercial boiler applications, where vent systems are physically larger and the use of multiple boiler systems more common.

- Cost of fuel
- System efficiency
- Maintenance costs (arguably higher for condensing boilers)
- Life expectancy

Obviously all of these costs vary dramatically over the range of this specification (i.e. from 300 MBH to 2500 MBH) and likely do so in a non-linear way. It follows that the difference in payback period between the baseline case, and the proposed 94.0% thermal efficiency case, may also vary widely across the range. We do not know what size boiler(s) EPA used in this analysis, but it would be appropriate to look at the 300MBH and 2500MBH endpoints, at the very least.

ASHRAE SPC155 is currently developing a standard designed to measure boiler system efficiency. This standard is designed to predict system efficiency as a function of water temperature, turndown ratio, actual heating load, the number boilers installed and, of course, the design of the boiler itself. This project is intended to provide an HVAC engineer with the data and software needed to predict the system efficiency that will result from the installation of a given boiler (or boilers) in a particular system. A draft of the SPC155 test procedure is expected to be released for public comment by July of 2016 and a "beta" version of the above software is already in existence. This standard is being developed in response to a widespread feeling among engineers, regulators, and energy advocates that the current steady state thermal efficiency metric, generated by the 10CFR Part 431.86 test method, fails to accurately predict energy consumption across different systems.

If EPA is serious about creating a "commercial boiler" specification that will result in predicable energy savings, it needs to develop the specification around *system*, rather than *boiler*, efficiency. As it stands, the current draft specification may well result in no significant energy savings and come at a cost in US manufacturing jobs, as well as damage to the credibility of the ENERGY STAR brand.

For the reasons set out above, and others, BHI opposes the adoption of the Product Specification for Commercial Boilers.

Respectfully submitted,

BHI



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Burnham Holdings, Inc.