

## Lepore, Theresa (DPS)

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**From:** Linehan, Kathleen on behalf of DPSinfo (DPS)  
**Sent:** Friday, September 11, 2015 1:59 PM  
**To:** Lepore, Theresa (DPS)  
**Subject:** FW: EO562  
**Attachments:** E.O.562FeedbackSuggestedChangestoM.G.L.Chapter146.pdf

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**From:** Michael Gerhart [mailto:mgerhart@state.ma.us]  
**Sent:** Tuesday, September 08, 2015 10:40 AM  
**To:** DPSinfo (DPS)  
**Subject:** EO562

To Whom It May Concern,

As the Department of Public Safety engages in a review process IAW Executive Order 562, I would ask that consideration be given to making changes to the regulations surrounding the operation of high pressure steam boilers contained in M.G.L. Chapter 146.

Please see below, and/or attached:

**Feedback & Suggestions to the Massachusetts Department of Public Safety IAW Executive Order 562 - Suggested Changes to M.G.L. Chapter 146, Operator and Licensing Regulations for High Pressure Steam Boilers**

Current M.G.L. Chapter 146 high pressure steam boiler regulations create a significant competitive disadvantage to Massachusetts businesses, practically limiting, by way of labor and licensing costs, the expansion of, and ultimately, the production capacity of, high pressure steam plants. Especially for steam plants with a need for installed capacity of more than 500 Hp, the requirement for continuous attendance during all times of operation, is such a competitive disadvantage, relative to other jurisdictions, that companies either avoid expansion beyond that capacity, or close their existing plants operating above this onerous limit. These regulatory hurdles not only block the path to market-driven expansion of decent paying, industrial manufacturing jobs for working people, but also contribute to corporate decisions to close plants in Massachusetts, leading to layoffs of often hundreds of highly productive workers.

Boiler operators who must be in continuous attendance, are by regulation, of little, to no, productive benefit to the plants compelled to employ them, as they can serve little purpose, other than monitoring what, in the majority of installations, amounts to a highly automated boiler plant. This situation offers these boiler operators few opportunities for advancement within these companies, often forcing them to relocate, in order to better their situation. When a plant is forced to close, because it cannot compete, not only do hundreds of productive plant workers lose their jobs, but so too, do the boiler operators.

The loss of industrial plants is a loss for everyone, for working people, the communities the workers live in, the suppliers who do business with the plant, the utilities that serve it, and the governments who reaped associated tax revenues. If Massachusetts is to not only preserve what remains of, but grow and modernize their manufacturing base, which provides decent paying jobs, and a path to upward mobility for working people, obsolete boiler regulations like those contained within M.G.L. Chapter 146 must be revisited, and revised for this new century.

**Since the main concern for public safety with regard to boiler systems is the potential for catastrophic failure of the pressure vessel, that is, explosion, perhaps the law could be altered to reflect, more accurately, this potential. The greatest amount of potentially explosive energy in the pressure vessel of a high pressure steam boiler, and therefore the greatest public safety risk unique to high pressure steam boilers, requiring their specific regulation, is the pressurized water that is contained therein.**

The water contained within a pressure vessel, at saturation pressure equal to boiler operating steam pressure, contains a great deal of potential energy. It remains only in the liquid state, due to the pressure being exerted upon it, flashing into steam in a controlled way, as enough energy is added from combustion to complete the phase change. However, in the case of a pressure vessel rupture suddenly exposing that pressurized water to significantly lower atmospheric pressure, the immediate flashing of that water to steam could be catastrophic, since steam occupies roughly 2,000 times the volume of water. This is how boilers explode, which has led to the regulations on the manufacturing and operation of boilers in existence today. *It could be correctly stated then, that the danger to public*

*safety that a high pressure steam boiler poses, is closely correlated to the volume of water contained within the boiler's pressure vessel during steaming operation at rated capacity.*

Many advances have been made in high pressure steam boiler marketplace since M.G.L. Chapter 146 was last revised. Among those advances has been the introduction of, and marketplace demand for, much safer boiler designs incorporating a massive reduction in operational water content. For example, while Chapter 146 currently only requires a licensed operator for high pressure steam boilers of 9 hp capacity and greater, there are a number of boiler manufacturers producing boilers with capacities of 100 Hp, which have less pressurized water in them than many of the popular 8.9 Hp and lower capacity boilers which would fall outside of Chapter 146 regulations. *Currently these higher capacity boilers still must still comply with Chapter 146 regulations, even though they are potentially, and historically, safer to operate due to ultra low operating water content, than boilers of even 1/10th their capacity.*

Not only does the reduced water content of these modern boilers contribute to an unparalleled safety record, but the designs also minimize some of the greatest operational energy losses historically associated with steam boilers, thereby significantly increasing the operational efficiencies of these modern plants, along with a related reduction in carbon emissions. In fact, so efficient are these ultra low operating water content boilers, that their customers have collected hundreds of thousands of dollars in energy efficiency incentives from utilities and government entities in Massachusetts alone, for their installation. *Unfortunately, even these substantial incentives do little to offset the costs associated with regulations dictating licensed attendance to their operation.*

In fact, modern ultra low operating water content boilers can be operated on demand. Rather than lengthy, fuel wasting start up periods, these designs can very safely, and repeatedly achieve full rated output steam pressure and flow capacity in just several minutes from cold steel, without risking thermal shock to the pressure vessel. This allows multiple, smaller capacity boilers to be operated as a single modular system, in a much safer arrangement than a single, or small number of high capacity, high operating water content, industrial firetube or watertube boilers. In this way, even though multiple ultra low operating water content boilers are operating as a single system, in close proximity, the explosion risk is no greater than if a single ultra low water content boiler were operating individually as a standalone. Due to the ability to operate as a modular system, ultra low water content boiler installations may range in aggregate capacity from a couple hundred horsepower to several thousand horsepower per plant, supplying a significant swath of the available steam boiler marketplace.

As a point of reference, a modern, ultra low water content, on demand, 300 Hp boiler has less operating water content than in what would be considered a relatively low water content 30 Hp vertical tubeless steam boiler commonly found in commercial laundry applications, and subject by current Chapter 146 regulation, to only periodic attendance.

Therefore, if revisions to Chapter 146 regulations were to acknowledge the intrinsic safety of ultra low water content, high pressure steam boilers, and grant these more advanced designs certain exemptions from current regulations intended for safe operation of high operating water content, high pressure steam boiler designs, market forces would most likely drive steam plant owners to establish a much safer, more environmentally friendly, high pressure steam boiler installed base in the state than exists today.

One way to acknowledge this shift in available technology would be **to revise high pressure steam boiler operator attendance and licensing requirements to be established on the basis of operational water content, rather than on, or solely on, horsepower capacity**, as currently written. The difference in operational water content between the most advanced ultra low water content steam boiler designs, and that of the most modern, yet traditional high water content steam boiler designs of similar horsepower capacity, is so vast, that selection of a reasonable boundary between them offers no opportunity for overlap, or controversy of interpretation. Such a revision would also present a more scientific basis for the need of boiler attendance and licensing, tying such regulations directly to the potential public safety risk present, that is, the volume of pressurized water present during full capacity steaming conditions, rather than seemingly arbitrary high pressure steam output capacities, which are more of a function of combustion system capacity, the products of which are exhausted to atmosphere, posing little explosion risk.

**Michael Gerhart**  
Regional/Branch Manager

The logo for Miura, featuring the word "MIURA" in a bold, black, sans-serif font. The letter "I" is replaced by a vertical line with a solid black circle at the top and a solid black circle at the bottom, resembling a stylized vertical bar or a pair of eyes.

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