

Legislative Report

High Pressure Boiler Attendance Rule

October 1, 2015



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Executive summary

In 2014, the Minnesota legislature made a one-time appropriation to the Department of Labor and Industry to “update and modernize rules related to high pressure boilers.”¹ That same year, the legislature also passed a law that granted remotely-located sawmills that use steam for drying lumber an exception to high pressure boiler attendance requirements until July 31, 2016.²

In response to the directive, the Department assembled a workgroup composed of representatives of high pressure boiler facilities, licensed boiler engineers, inspectors for insurers of high pressure boilers, and boiler equipment controls experts. The workgroup met three times.³ The workgroup came to consensus on suggested updates to the current boiler attendance rule.

¹ Minnesota Session Laws 2014; Chapter 305, Sec. 29 (<https://www.revisor.mn.gov/laws/?year=2014&type=0&doctype=Chapter&id=305>)

² Minnesota Session Laws 2014; Chapter 305, Sec. 27 (<https://www.revisor.mn.gov/laws/?year=2014&type=0&doctype=Chapter&id=305>). See also Minn. Stat. Sec. 326B.988 (<https://www.revisor.mn.gov/statutes/?id=326B.988>).

³ Workgroup meeting dates: April 2, 2015; May 4, 2015; and June 1, 2015.

Introduction and background

During the 2014 legislative session, the legislature made an appropriation to the Department of Labor and Industry (“Department”):

\$100,000 in fiscal year 2015 is appropriated from the general fund to the commissioner of labor and industry to update and modernize rules related to high pressure boilers. The commissioner must make recommendations by October 1, 2015, to the committees of the house of representatives and senate with jurisdiction over construction codes and licensing on changes related to boilers that operate at levels of 15 PSI or higher. This is a onetime appropriation.⁴

That same year, the legislature passed legislation that exempts remotely located sawmills in Minnesota from the boiler attendance requirements through July 31, 2016. Minnesota Statutes 326B.988, Exceptions, was amended to include:

(e) Sawmills, located in a county with a population of less than 8,000 according to the last federal census and that utilize steam for the drying of lumber, are not required to meet the high pressure boiler attendance requirements set forth in Minnesota Rules, part 5225.1180, only if all of the following conditions are met:

(1) the owner complies with the inspection requirements under section 326B.958, and the licensing requirements under section 326B.972; and

(2) the boiler:

(i) is equipped with electronic control systems that are remotely operated but which require on-site manual reset of system faults;

(ii) is remotely monitored for log water levels, boiler pressure, and steam flow;

(iii) has automatic safety mechanisms built into the remote monitoring systems that send an alarm upon detection of a fault condition, and an on-site alarm that will sound upon detection of a fault condition and which may be heard at a distance of 500 feet;

(iv) has a water treatment program that is supervised by a third party water treatment company; and

(v) is attended on site by a licensed boiler operator at least two times in a 24-hour period. If the boiler is not attended more than twice in a 24-hour period, the period between checks must not be less than eight hours.

⁴ Minnesota Session Laws 2014; Chapter 305, Sec. 29
(<https://www.revisor.mn.gov/laws/?year=2014&type=0&doctype=Chapter&id=305>)

This paragraph expires August 1, 2016.

In light of both pieces of legislation, the Department assembled a workgroup to consider updates and modernization of the high pressure boiler rules with a focus on the high pressure boiler attendance rule in Minnesota Rules, part 5225.1180.

Minnesota Rules, part 5225.1180

Minnesota Rules, part 5225.1180, provides the attendance requirements for high pressure boiler plants based on the combined horsepower (HP) of one or more boilers in operation at the plant. There are three classes of boiler engineer licenses (Chief, First and Second).⁵ Each license class has grades within it. The class and grade of the boiler engineer license determines what size boiler(s) for which a licensed engineer may be responsible.

Briefly, the attendance requirements for different plant sizes are:

- Boiler plants of up to 30 HP may operate with only single daily checks by a licensed engineer
- Boiler plants of 31 to 200 HP allow for the licensed engineer to leave the boiler(s) unattended for up to 2 hours; there is an exception that permits these high pressure boilers to be reduced to low pressure if they have operating and safety controls to run at low pressure (under 15 PSI), thereby subject to daily checks instead of the 2 hour limit.
- In plants over 200 HP, qualified engineers may only leave the boiler room for up to 30 minutes and must stay within 500 feet of the boiler room.

Part 5225.1180 was adopted over twenty years ago in 1994. In the past twenty years, boiler technology and operation has changed significantly.

The attendance requirement before part 5225.1180 was adopted in 1994 was:

“A shift engineer in a high pressure boiler plant of 150 boiler horsepower or more in operation shall not leave said plant for more than 15 minutes at any one time or be more than 200 feet away therefrom without leaving on duty an engineer with a licensee not lower than one grade below that required for the shift engineer.”

Over time, boiler operation and monitoring technology has evolved and regulation of boiler monitoring has changed too. That is, before 1994, most boiler systems required constant attendance. The change in 1994 reduced the attendance time requirement as technology at the time allowed. It is time to again update regulation of boiler monitoring to reflect more current technology.

Department of Labor and Industry

The Department is responsible for the examination of boiler operating engineers, issuing boiler operating engineer licenses and performing annual boiler inspections where the facility does

⁵ See Minn. Stat. § 326B.978.

not have their boilers insured and inspected by insurance company boiler inspectors. The Department inspects approximately 465 of the nearly 2,320 high pressure boilers in the state. Department inspectors also conduct initial safety inspections on all new boilers and relocated boilers prior to their initial operation.

Boiler Attendance Workgroup

The workgroup’s purpose was 1) to share information about the current state of the boiler industry and technology changes that have occurred in recent years that may affect boiler attendance requirements; 2) to discuss concerns and recommendations about boiler attendance requirements; and 3) to achieve consensus on possible changes to the current boiler attendance requirements in part 5225.1180. Discussions addressed historic boiler system concerns and dangers as well as safety concerns of current high pressure boiler systems.

Specifically, the workgroup explored whether current boiler safety and operation technology allows for safe remote monitoring by licensed boiler operators. That is, the workgroup considered whether Minnesota’s boiler attendance rule should be modified to allow less frequent and less constant attendance by licensed operators, such as what the 2014 legislation permits in the exemption granted to certain sawmill operators.

Workgroup members

High Pressure Boiler Facilities ⁶	Boiler Operating Engineers ⁷	Boiler Insurance Industry ⁸	Boiler Controls ⁹	Labor and Industry
John Husnik	Reed Sprung	Paul Bearden	Joel Carberry	Scott McLellan
Dirk Cedergren	Dave Monsour	Greg Goosens		Todd Green
Stacy Cook	Gary Sycks			Joel Amato
Jake Gundry	Tom Deboer			Suzanne Todnem
Howard Hedstrom				Bill Bierman

The workgroup met three times.¹⁰ Workgroup sessions included information sharing and discussions and were supplemented with group email exchanges to confirm final consensus.

⁶ Facilities of various horsepower and pressure (psi) were represented.

⁷ Both union and nonunion operators were represented within this group.

⁸ Insurance companies provide annual safety inspections on approximately 1,855 of the high pressure boilers in the state.

⁹ In addition to the two presentations by boiler monitoring equipment companies at the first workgroup meeting, a boiler control company representative was a workgroup member.

¹⁰ Workgroup meeting dates: April 2, 2015; May 4, 2015; and June 1, 2015. See *Attachment 1* for the meeting Agendas.

The workgroup considered:

- Both pieces of the 2014 legislation above that granted a boiler attendance rule exemption to certain sawmills and an appropriation to the Department¹¹;
- Current high pressure boiler attendance rules;
- Presentations and demonstrations by two equipment companies about current technology available for remote boiler monitoring; and
- Possible rule recommendations, based on prior workgroup meetings, regarding remote high pressure boiler monitoring.

Workgroup Findings

Present-day boiler operation is much less hands-on than it was in 1994. Significant changes in fuel types are one main factor. For example, older boilers relied on solid fuels such as coal or wood whereas most boilers today rely on fuels such as natural gas. This shift to natural gas means it is easier to control fuel utilization because unlike solid fuels that have residual burn times, natural gas can be stopped instantly to terminate the boiler.

Although technology has greatly advanced and high pressure boilers generally use different fuel types (solid versus gas), technology alone is not enough to replace human presence completely. In particular, work group members had concerns about technology malfunctions and failures. Human, in-person monitoring is still necessary and technology is a tool; technology is not a replacement.

Workgroup members' positions

High pressure boiler facilities. These workgroup members had varying opinions on how much time a licensed engineer actually spent “operating” a boiler with today’s computerized systems, but all agreed there must be a limit to the amount of time a licensed engineer may safely be away from a boiler in operation. These members agreed that increasing the horsepower levels in part 5225.1180 would be reasonable and safe. Increasing the horsepower levels allow for less attendance time while a facility is operating for some boilers than the current rule allows. However, these members opined that remote monitoring of boilers should be prohibited when any part of the facility has employees or others present. These members generally agreed that rules allowing for remote boiler monitoring during unoccupied times (weekends, after hours), with strict parameters in place, would be safe and reasonable. They emphasized the importance of the Department or insurance inspectors enforcing compliance. Along with unoccupied facilities, this group recommends that no other businesses or property could be occupied within several hundred feet of the boiler facility during remote monitoring.

Boiler operating engineers. These workgroup members were concerned that reducing boiler attendance requirements could result in unsafe boilers operating in the state. Members provided examples of near-accidents that were prevented only by on-site boiler operators in

¹¹ See Minn. Stat. 326B.988(e) (<https://www.revisor.mn.gov/statutes/?id=326B.988>) and Minnesota Session Laws 2014; Chapter 305, Sec. 29 (<https://www.revisor.mn.gov/laws/?year=2014&type=0&doctype=Chapter&id=305>)

the past, but no recent examples were shared. Reduced on-site attendance requirements might result in less demand for licensed boiler engineers; there was some concern about potential effects on the boiler engineer job market. Some members were of the opinion that boiler rooms are currently not treated as they should be and the situation would worsen if on-site operator time is further reduced or eliminated.¹²

Members recommended adding continuing education requirements to the boiler licensing rule to keep boiler operators up-to-date with the ever-evolving technologies and to increase awareness and safety in the boiler room.

These members agreed that increasing the horsepower levels in part 5225.1180 would be reasonable and safe. Members did not oppose remote monitoring of unoccupied facilities nor assertively support the idea. Without expressing an opinion on whether remote monitoring of unoccupied facilities should be permitted, members supported very strict rules for boilers that were not attended in person. For example, allowing only licensed boiler operators to monitor a high pressure boiler in unoccupied facilities.

Boiler insurance industry. These workgroup members stressed the importance of in-person checks on all boilers. Members agreed that increasing the horsepower levels in part 5225.1180 would be reasonable and safe. Members agreed that any remote monitoring of boilers in unoccupied facilities must be done by properly licensed engineers and that if any such rule was proposed, very strict rules must be met including two semi-annual inspections.

Boiler controls. This workgroup member was concerned that while controls have advanced over the years, the human interface has not been replaced. He expressed the opinion that there is not an electronic replacement for a human operator taking in the “sights and sounds” of the boiler room.

This member agreed with the recommendation to add continuing education requirements to boiler licensing rules.

He agreed that increasing the horsepower levels in part 5225.1180 would be reasonable and safe. He agreed that remote boiler monitoring during unoccupied times, with strict parameters in place, would be safe and reasonable. For example, he stated that critical safety parameters should be monitored and recorded.

Department of Labor and Industry. The Department did not take any positions. The Department’s role was to gather information and assess areas where the workgroup reached consensus.

Suggested rule changes

The workgroup reached consensus on specific changes to the high pressure boiler attendance

¹² For example, some boiler rooms double as storage rooms.

rule in part 5225.1180 and general safety concerns that should be considered as the rule undergoes further development. As reflected in the list of workgroup members above, there was broad representation across the high pressure boiler industry.

Specifically, workgroup members agreed that the horsepower levels in part 5225.1180 can safely be increased. *Attachment 2* to this report shows the suggested horsepower levels the workgroup recommends as safe and reasonable increases. The proposed horsepower increases are considered safe by these industry experts because new technology and current boiler systems have safety features that earlier boiler systems did not have. The safety features are triggered so as to prevent serious malfunctions.

Generally, workgroup members agreed that with current boiler systems and technology, some remote monitoring is a safe option when certain conditions are present. Longer absences are appropriate for some high pressure boiler systems if additional safety measures and considerations are present. The workgroup compiled a list of safety conditions that should be further considered and vetted through additional processes such as what occurs through the rulemaking process.¹³ Longer absences might result in reduced need for high pressure boiler operators in the number of hours and remote monitoring might garner lower wages. However, the consensus of the group was that qualified boiler operators remain a very important part of the safety equation.

Next Steps

In light of the successful work of the workgroup, and supported by the appropriating legislation, the Department anticipates a rulemaking to amend part 5225.1180. The proposed rule will, at a minimum, reflect the changes discussed and supported by the workgroup. The first step in this process, the request for comments, was published in the State Register on Monday, September 28.

Conclusion

Boiler operational and safety controls have advanced since the last attendance rule change in 1994. In light of the two pieces of 2014 legislation discussed above, the Department recommends adjusting the horsepower levels in part 5225.1180 with further consideration and vetting of additional safety features and conditions during the rulemaking process. With the support of the workgroup members, the Department is confident this recommendation reflects current industry abilities and needs and is reasonable.

¹³ See *Attachment 3*.

High Pressure Boiler Attendance Workgroup Agenda

Thursday, April 2, 2015 @ 9:00 a.m.

Isanti Room / Department of Labor & Industry
443 Lafayette Road North, St Paul

- I. Welcome
- II. Announcements
- III. Introductions
- IV. Overview of workgroup project/why we are here
 - A. Review 2014 statute for attendance exemption
 - B. Review current high pressure attendance rules
- V. Current technology for remote monitoring high pressure boilers
 - A. Demonstration by:
 - 1. Humera Tech
 - 2. Trane
- VI. Monitor vs. Operation
- VII. Group discussion
- VIII. Future meeting
- IX. Adjournment

High Pressure Boiler Attendance Workgroup Agenda

Monday, May 4, 2015 @ 9:00 a.m.

Minnesota Room / Department of Labor & Industry
443 Lafayette Road North, St Paul

- I. Welcome
- II. Announcements
- III. Introductions
- IV. Review meeting minutes from 4/2/2015
- V. Discussion:
 - A. Brief summary discussion of technology presentations
 - B. Discussion regarding benefits and risks of remote monitoring and/or remote operation of high pressure boilers in Minnesota
 - C. Discussion regarding possible recommendations to change boiler operation regulations
- VI. Future meeting
- VII. Adjournment

Some members may participate by telephone. If so, members of the public may also monitor the meeting electronically by telephone. If interested, please contact Lyndy Lutz @ 651-284-5912 or email lyndy.lutz@state.mn.us

High Pressure Boiler Attendance Workgroup Agenda

Monday, June 1, 2015 @ 9:00 a.m.

Minnesota Room / Department of Labor & Industry
443 Lafayette Road North, St Paul

- I. Welcome
- II. Announcements
- III. Introductions
- IV. Review meeting minutes from 5/4/2015
- V. Discussion:
 - A. Brief summary discussion of previously identified risks and benefits of remote monitoring vs remote operation of high pressure boilers.
 - B. Discussion of current MN Rule 5225.1180 regarding boiler attendance and possible changes to horsepower ratings that impacts the attendance requirements.
 - C. Discussion of parameters necessary for consideration of remote monitoring of high pressure boilers.
- VI. Future meeting?
- VII. Adjournment

Some members may participate by telephone. If so, members of the public may also monitor the meeting electronically by telephone. If interested, please contact Lyndy Lutz @ 651-284-5912 or email lyndy.lutz@state.mn.us

Minnesota Rule 5225.1180

5225.1180 ATTENDANCE AT HIGH PRESSURE PLANT.

Subpart 1. **Attendance; plant of 0 to 30 (50) horsepower.** At a minimum, a high pressure boiler plant of 0 to 50 horsepower, when in operation, must be checked daily by an operating engineer.

Subp. 2. **Attendance; plant of 31 (51) to 200 (500) horsepower.**

A. A high pressure boiler plant of 31 (51) to 200 (500) horsepower may be left in operation unattended by an operating engineer for no more than two consecutive hours when the premises are occupied by employees or the public, except as permitted by item B.

B. A high pressure boiler plant of 31(51) to 200 (500) horsepower is exempt from the high pressure attendance requirements of item A, but must be checked at least daily, under the following conditions:

(1) the boiler is equipped with dual pressure controls and dual low water fuel cutouts and the boiler does not exceed 15 pounds per square inch operating pressure at any time during the operating engineer's absence;

(2) the boiler is equipped with fail-safe type safety controls or valves regulating pressure, temperature, water level, and control supply lines. Fuel control and safety devices must meet at least the minimum requirements for automatically fired boilers in Sections I and IV of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code;

(3) the valves and controls must be manually switched over by the operating engineer, the dates and time must be entered in the boiler room log, and the entry must be signed by the operating engineer;

(4) the building in which the boiler is located is not occupied by the public or employees except for custodial, maintenance, or security personnel; and

(5) the boiler is for supplying steam directly to a low pressure header with header safety valves set at or below 15 pounds per square inch and is of adequate capacity to prevent a pressure rise above 15 pounds per square inch in the system. The shutoff valve between the high and low pressure systems must be electrically interlocked with the low pressure control system so that the crossover valve is in the open position while operating on low pressure.

Subp. 3. **Attendance; plant over 200 (500) horsepower.**

A. A high pressure boiler plant of more than 200 (500) horsepower, when in operation, requires constant attendance, except as otherwise provided in item B.

B. The shift engineer in a high pressure boiler plant of over 200 (500) horsepower may leave the boiler room for up to 30 minutes **per hour** if all boilers are equipped with dual pressure controls and dual low water fuel cutouts, one of which must be the manual reset type. The shift engineer must stay within 500 feet of the boiler room at all times during the shift.

Subp. 4. **Limitations.** The absences described in subparts 2, item A, and 3, item B, may not approach nearly continuous absence from the plant.

Remote monitoring of high pressure boiler attendance in unoccupied buildings

This could only be used when there are no occupied buildings located either on or off-site within 500 feet of the boiler room.

1. Boilers utilizing remote monitoring must have two inspections per year by a National Board Commissioned inspector, one internal inspection when the boiler is not in operation and one inspection while the boiler is in operation.
2. The boiler must have a water treatment program supervised by a qualified water treatment company.
3. Monitoring must be performed by a properly licensed engineer.
4. Building must be unoccupied except for properly licensed personnel.
5. Boiler must have two feed pumps to supply water to the boiler.
6. Boilers firing with gas must have flammable gas detection system in the boiler room with visual and audible alarm. Visual and audible alarm must be viewable and audible outside boiler room door.
7. Remote boiler shutdown switches shall be located at each boiler room door.
8. Boiler plants utilizing gas or liquid fuels must have a fuel rich condition shutdown procedure.
9. Boiler must be equipped with water level transmitter viewable from a location outside the boiler room.
10. Unattended absence must not exceed **XX** hours.
11. A bound log book must be maintained in the boiler room.
12. A properly licensed Engineer must be within 15 minutes of the boiler room.
13. Boiler must have Emergency and Standard Operating Procedures. The SOP's must include testing of all safety devices on the boiler at scheduled intervals.
14. Remote monitoring must have network failure alarm. Network failure requires engineer to return to the boiler room immediately. The following items must be available to be viewed remotely when the building is not occupied by a licensed engineer:
 - Water level (water pressure and temperature for high temp hot water (HWH))
 - Stack temperature
 - Feedwater flow (make-up water flow for HWH)
 - Steam Flow
 - Fuel flow (at burner)
 - CO2 in boiler room
 - Video camera installed to view boiler front

15. The following alarms will shut down the boiler immediately and give indication to the licensed engineer monitoring the boiler:
- Low water level (high or low pressure and high or low temperature for HWH)
 - High CO₂ in boiler room
 - High fuel flow
 - Low gas pressure
 - High gas pressure
 - Flame failure
 - Flammable gas detection