

Minnesota Department of Labor and Industry

STATEMENT OF NEED AND REASONABLENESS

Proposed Amendment to Rules Governing Attendance at High Pressure Plant, *Minnesota Rules*, part 5225.1180; Revisor's ID Number R-04363

INTRODUCTION

The Boiler Inspection Section of the Department of Labor and Industry ("Department") regulates historical boilers, boilers, pressure vessels and the licensed individuals who operate this equipment in the State of Minnesota. The attendance rule related to these devices has not been amended since 2007 and no significant updates since it was first adopted in 1994. The requirement has not kept up with current technologies or other related statute and rule changes.

In 2014, the Minnesota legislature passed legislation that granted certain sawmills that use steam for drying lumber in sparsely populated counties an exemption from the high pressure boiler attendance requirements.¹ The exemption permits remote monitoring of the high pressure boilers if listed conditions are met.² The listed conditions contain safety requirements not currently required elsewhere in rule or statute.

During the same 2014 legislative session, the legislature provided a one-time appropriation to the Commissioner of Labor and Industry to "update and modernize rules related to high pressure boilers" and to make recommendations to the legislature. To comply with this requirement, the Department created a work group comprised of high pressure boiler facility representatives, licensed boiler engineers, inspectors for insurers of high pressure boilers, and boiler equipment control experts to analyze the boiler attendance rule part, 5225.1180, and provide recommendations to the Department. A copy of the Department's report to the legislature is attached to this document as Attachment A.

The advancements in equipment and technologies, many of which are currently in general use, have provided the boiler industry with many safety devices that enable boilers to operate safely with reduced in-person attendance needs. That is, modern equipment requires fewer licensed boiler engineers and less physical attendance than the boilers in use when this rule part was adopted in 1994.³ Under certain circumstances, the advancements enable the licensed boiler engineer to monitor the boiler from a remote location safely.

The proposed rule amendments are intended to reflect the advancement in high pressure boiler technology by modernizing and providing safe, reasonable boiler attendance requirements.

¹ See Chapter 305, sec. 27 at <https://www.revisor.mn.gov/laws/?year=2014&type=0&doctype=Chapter&id=305>. The final statute language is in Minn. Stat. § 326B.988(e) (2016) at <https://www.revisor.mn.gov/statutes/?id=326B.988>.

² The exemption originally expired on August 1, 2016. However, 2016 legislation extended the exemption until August 1, 2018, or upon the effective date of a rule regulating high pressure boiler attendance requirements adopted after the effective date of the 2016 legislation. See Chapter 189, Article 7, sec. 38 at <https://www.revisor.mn.gov/laws/?id=189&year=2016&type=0>

³ See 18 S.R. 2350 at https://www.revisor.leg.state.mn.us/state_register/?vol=18&num=44 to see the proposed 1994 rule.

ALTERNATIVE FORMAT

Upon request, this information can be made available in an alternative format, such as large print, braille, or audio. To make a request, contact Colleen Clayton at the Department of Labor and Industry, 443 Lafayette Road North, St. Paul, Minnesota 55155, phone 651-284-5867, colleen.clayton@state.mn.us, and fax 651-284-5749.

STATUTORY AUTHORITY

The Department’s statutory authority to adopt the rules is stated in Minnesota Statutes sections 175.171, item (2), and 326B.02, subdivision 5.

Minnesota Statutes, section 175.171, item (2) grants the Department the power “to adopt reasonable and proper rules relative to the exercise of its powers and duties.”

Minnesota Statutes, section 326B.02, subdivision 5 provides:

“The commissioner may, under the rulemaking provisions of chapter 14 and as otherwise provided by this chapter, adopt, amend, suspend, and repeal rules relating to the commissioner's responsibilities under this chapter, except for rules for which the rulemaking authority is expressly transferred to the Plumbing Board, the Board of Electricity, or the Board of High Pressure Piping Systems.”

Rulemaking authority for boilers has not been transferred to any board. The proposed rules relate to the commissioner’s responsibilities under chapter 326B.⁴

The proposed rules amend an existing rule for which the Department has rulemaking authority; therefore, the 18-month time limit in Minn. Stat. § 14.125 (2016) does not apply.

Under these statutes, the Department has the necessary statutory authority to adopt the proposed rules.

REGULATORY ANALYSIS

Minnesota Statutes, section 14.131, sets out eight factors for a regulatory analysis that must be included in the Statement of Need and Reasonableness (“SONAR”). Paragraphs (1) through (8) below quote these factors and then give the agency’s response.

“(1) a description of the classes of persons who probably will be affected by the proposed rule, including classes that will bear the costs of the proposed rule and classes that will benefit from the proposed rule”

The classes of persons who probably will be affected by the proposed rule include all licensed boiler engineers who possess any of the following licenses:

- Special Engineer

⁴ See [Minn. Stat. §§ 326B.952 – 326B.998 \(2016\)](#).

- Second Class A and B
- First Class A and B
- Chief A and B

Low pressure licenses are not affected by the proposed rule; they include Second Class C, First Class C, and the Chief Class C.

High pressure boiler plant owners, boiler inspectors, boiler installers, licensed boiler engineers and water treatment companies might be affected by the proposed rule. Boiler plant owners might change staffing decisions based on the proposed rule. If boiler owners exercise the optional provision in subpart 5; boiler inspectors will perform additional inspections; boiler installers might install additional controls and safety devices; and water treatment companies might have to establish and maintain additional water treatment programs.

The high pressure boiler plant owner will bear any additional costs related to subpart 5 of the proposed rule if they choose to exercise that option. Boiler plant owners will benefit from exercising subpart 5 through lower labor costs. The proposed amendments to subparts 1 through 3 will likely reduce costs for the boiler plant owner.⁵ Licensed boiler engineers might experience a change to their work schedules and conditions with the proposed changes to the attendance rule.

The classes of persons that will benefit from the proposed rule include the licensed boiler engineers, high pressure boiler plant owners, and ultimately the general public.

“(2) the probable costs to the agency and to any other agency of the implementation and enforcement of the proposed rule and any anticipated effect on state revenues”

The probable costs to the agency of implementation and enforcement

The only additional costs to the agency for the implementation and enforcement of the proposed rule would be the staff time required to review the remote attendance program application and any subsequent reports submitted to the agency as proof of compliance or continued compliance with the new subpart 5 of the proposed rule. The agency already has enforcement authority and does not anticipate a significant increase in workload so no new staff are anticipated to be necessary to enforce this rule. Any additional work will be absorbed by current staff. Inspections and follow up will be conducted by third-parties already required to be involved in the process or by the Department in the case of uninsured boilers.⁶ If the Department conducts the inspection, statutorily set inspection fees apply so there is no net cost to the Department.⁷

The probable costs to any other agency of implementation and enforcement

⁵ See Attachment B.

⁶ Insured boilers are typically inspected by the insurers on an annual basis, as required in [Minn. Stat. § 326B.958 \(2016\)](#). Some insured boilers might be inspected by department staff. Uninsured boilers are typically inspected by department staff. The annual inspection requirement applies to all boilers.

⁷ Fees for boiler inspections are established in [Minn. Stat. § 326B.986 \(2016\)](#).

There are no costs to any other agency for the implementation and enforcement of the proposed rule because the Department is the only agency that regulates high pressure boilers. Unlike some code enforcement areas, boiler regulation is not delegated to local units of government.

Any anticipated effect on state revenues

The proposed rule will have no effect on state revenues because boiler regulation enforcement is self-funded and does not receive any state general fund money.⁸

“(3) a determination of whether there are less costly methods or less intrusive methods for achieving the purpose of the proposed rule”

The purpose of the proposed rule is to safely modernize high pressure boiler attendance requirements. The proposed rule continues to regulate minimum, safe and reasonable attendance requirements. There are no less costly or intrusive methods for achieving the purpose of the proposed rule because the proposed rule recognizes the licensing statute and advancements in boiler technology already widely in use throughout the state. Adding current technology modernizes the current rule. Subparts 1 through 3 align the horsepower levels with statutory licensing classification levels. This will offer a cost savings to boiler owners and provide consistency between licensing and attendance requirements.⁹

The proposed rule reflects a variety of industry experts’ reasoned determination of safe minimum attendance requirements and minimum added safety features.¹⁰ Furthermore, owners are anticipated to see cost savings with the proposed rule. Although boiler owners might incur initial costs to exercise the new attendance option in subpart 5 of the proposed rule or minimal costs to exercise the reduced attendance option in subpart 2(B), subparts 5 and 2(B) are optional and are anticipated to result in lower labor costs. Owners who wish to exercise the optional attendance option can implement any new equipment requirements gradually over time if they choose. There are no cost requirements imposed on boiler owners unless they choose to utilize the new attendance option or the reduced attendance option in subpart 2(B).

“(4) a description of any alternative methods for achieving the purpose of the proposed rule that were seriously considered by the agency and the reasons why they were rejected in favor of the proposed rule”

The purpose of the proposed rule is to safely modernize high pressure boiler attendance requirements. Modernizing the attendance requirements means once again aligning the attendance requirements with the licensing statute, utilizing current technology, and changing physical attendance requirements to incorporate technology. Alternative methods were seriously considered by the agency when it gathered a work group comprised of high pressure boiler professionals to discuss attendance requirements.¹¹ For example, the work group members discussed a variety of equipment configurations that would allow safe remote monitoring or to continue constant physical attendance requirements. The proposed rule utilizes current technology and reduces the amount of

⁸ See [Minn. Stat. § 326B.04 \(2016\)](#).

⁹ See Attachment B.

¹⁰ See Attachment A.

¹¹ See Attachment A.

physical attendance necessary to attend boilers of various sizes due to the incorporation of technology. The work group, despite having come to the table with a wide variety of concerns, agreed that the proposed rule modernizes the attendance rule while maintaining boiler safety. The work group did not discuss other adjustments to subparts 1 through 3 other than the horsepower changes which align with the statutory licensing requirements for consistency. The changes to subpart 2(B) are not substantive changes but rather clarify the existing requirement.

The proposed rule is in response to some 2014 legislation that created an exception for certain boiler plants from the attendance requirements in this rule part, subject to some additional safety requirements. However, the legislation did not specifically address all safety aspects involved with remote monitoring of high pressure boilers. The proposed rule provides the missing safety requirements necessary for safe remote monitoring and allows other plant owners to utilize the same remote monitoring process that was granted to the high pressure boiler plant in the legislative exemption. The proposed rule also provides inspection requirements that were not addressed in the legislative exemption.

“(5) the probable costs of complying with the proposed rule, including the portion of the total costs that will be borne by identifiable categories of affected parties, such as separate classes of governmental units, businesses, or individuals”

The probable costs of complying with the proposed rule

The amendments proposed in subparts 1 through 3 are anticipated to provide a cost-savings to boiler owners by potentially reducing their labor costs.¹² A boiler owner will incur costs of complying with the proposed rule only if the boiler owner chooses to exercise the new attendance option in subpart 5 or the reduced attendance option in subpart 2(B). Subpart 5 allows remote monitoring of certain high pressure boilers but requires additional controls and safety devices that may or may not already be installed on the boiler. If an owner must install any or all of the safety equipment necessary to exercise the new attendance option, there will be initial capital costs.¹³ Subpart 5 requires two annual inspections: one internal inspection and one external inspection. The internal inspection is currently required in Minn. Stat. § 326B.958, subd. 1 (2016). The external inspection is a new requirement if owners choose to exercise the option offered in subpart 5. The owner is responsible for the cost of the external inspection. If inspected by the Department, each boiler inspection is estimated to cost \$55-\$240, depending on size.¹⁴ If a boiler owner chooses to exercise the reduced attendance option in subpart 2(B), a drain valve must be installed if there is not one installed already. A drain valve and installation is estimated to cost \$50-\$100.¹⁵

However, owners are anticipated to see cost savings overall as a result of salary savings paid to engineers who monitor and operate the boilers. That is, it is likely that the engineer providing the remote monitoring will be paid differently than an engineer monitoring the boiler on-site. Also, the plant owner might be able to employ fewer licensed boiler engineers overall. Lastly, boiler owners

¹² See Attachment B.

¹³ Initial costs will vary from situation to situation depending on what equipment already exists and the number of boilers that will need the additional equipment, which will be at least one. See Attachment B.

¹⁴ Pursuant to Minn. Stat. § 326B.986 (2016), boilers less than 200 hp cost \$55 for an external inspection while boilers greater than 200 hp are estimated to cost around \$240 (based on the \$80 hourly rate, inspection of a boiler larger than 200 hp is estimated to take around 3 hours, totaling \$240).

¹⁵ See Attachment B.

who currently shift the boilers from high pressure to low pressure during down times (e.g., weekends) in order to reduce attendance requirements might be able to maintain high pressure boiler production with remote monitoring.

The portion of costs to be borne by identifiable categories of affected parties

The boiler owner will bear the costs of any additional controls and safety devices required by subparts 5 and 2(B), if they choose to exercise either of those options, but will likely see a cost-savings overall. Insurers of high pressure boilers might incur an additional cost if they currently conduct only one inspection trip per year because the proposed subpart 5 requires an external operating inspection while the boiler is running. Currently, insurers conduct inspections only when the boiler is not running. In order to conduct an external operating inspection while the boiler is running, the inspector will likely have to make a second trip to the plant. This cost may be absorbed by insurance premiums or passed onto the boiler owner. If the Department performs the inspection, statutory inspection fees apply and the boiler owner is responsible for the fee.

“(6) the probable costs or consequences of not adopting the proposed rule, including those costs or consequences borne by identifiable categories of affected parties, such as separate classes of government units, businesses, or individuals”

The probable costs or consequences of not adopting the proposed rules

The probable costs of not adopting the proposed rules eliminates the cost savings it creates for boilers up to 500 horsepower (“hp”) and the possibility for cost savings to plants over 500 hp that choose to exercise the new remote attendance option in subpart 5.

The probable consequences of not adopting the proposed rule include inconsistent attendance rules because the current legislation carves out an exception that applies to a very limited number of high pressure boiler plants. Other high pressure boiler plants might seek similar treatment statutorily. The proposed subpart 5 addresses the exception but opens it up to all boilers that qualify. Given the legislative directive to modernize this rule, it is clear that the legislature values the expert, detailed considerations that rulemaking offers as well as statewide, equal application of rules.

The portion of those costs or consequences borne by identifiable categories of affected parties.

The portion of costs associated with any capital investment required to exercise the attendance options in subparts 5 and 2(B) of the proposed rule would be borne by boiler owners.¹⁶ No significant capital investment is anticipated for any other part of the rule.

It is anticipated that boiler owners will see cost savings or improved plant productivity because the proposed rule amendments permit more boilers to have reduced attendance requirements at higher horsepower levels.

¹⁶ Subpart 2(B)(1) newly requires a drain valve but most applicable boilers already have one. If boiler owners need to add a drain valve, the cost is minimal. *See* Attachment B.

“(7) an assessment of any differences between the proposed rule and existing federal regulations and a specific analysis of the need for and reasonableness of each difference”

There are no existing federal regulations pertaining to the subject matter of the proposed rules.

“(8) an assessment of the cumulative effect of the rule with other federal and state regulations related to the specific purpose of the rule. . . . ‘[C]umulative effect’ means the impact that results from incremental impact of the proposed rule in addition to other rules, regardless of what state or federal agency has adopted the other rules. Cumulative effects can result from individually minor but collectively significant rules adopted over a period of time.”

There are no cumulative effects of the proposed rule as there are no other state or federal boiler attendance rules. Further, the proposed rule safely reduces the current attendance requirements and allows more boilers to have lower physical attendance requirements.

PERFORMANCE-BASED RULES

Minnesota Statutes, section 14.002, states that “whenever feasible, state agencies must develop rules and regulatory programs that emphasize superior achievement in meeting the agency’s regulatory objectives and maximum flexibility for the regulated party and the agency in meeting those goals.” The proposed rule amendments satisfy this requirement because the proposed amendments align the rule with current technology by providing more flexibility than the current rule. That is, the proposed rule lessens the attendance restrictions for many boilers, thereby allowing more flexibility in how boiler owners choose to satisfy the attendance requirement.

ADDITIONAL NOTICE

This Additional Notice Plan was reviewed by the Office of Administrative Hearings and approved in an Order on Review of Dual Notice and Additional Notice Plan dated January 19, 2017, by Administrative Law Judge Lipman.

Our Notice Plan includes giving notice required by statute. The Department will mail or email the proposed rule amendments and Notice of Intent to Adopt Rules to everyone who has registered to be on the Department’s rulemaking mailing lists under Minnesota Statutes, section 14.14, subdivision 1a. We will also give notice to the Legislature per Minnesota Statutes, section 14.116. Pursuant to the approved Additional Notice Plan, the Department will mail or email the proposed rule amendments and Notice of Intent to Adopt Rules to the following groups or associations. The list contains groups and associations of which some of their members likely own, use or operate high pressure boilers.

1. Chief Engineers Guild – Chief Engineers and Physical Plant Directors from all state facilities
2. Local operators Unions: International Union of Operating Engineers (IUOE) Local 70 and Local 49, and Service Employees International Union (SEIU)
3. American Insurance Association – An organization consisting of many of the 12 large insurance carriers that write boiler and machinery insurance

4. National Board of Boiler and Pressure Vessel Inspectors – An organization consisting of the 64 Chief Boiler Inspectors from the United States and Canada (the Minnesota Representative is the DLI Chief Boiler Inspector)
5. Renewable Fuels Association – The leading trade association for the ethanol industry
6. American Association of Meat Processors – The leading association for the meat processing industry
7. Minnesota Milk Producers Association – Association for Minnesota’s Dairy Industry
8. Minnesota Chamber of Commerce – Network of businesses
9. National Association of Manufacturers – Largest manufacturing association in the U.S.
10. Pharmaceutical Research and Manufacturers of America – An association of Pharmaceutical Manufacturers
11. American Public Power Association – A service organization for community-owned electric utilities
12. Minnesota Hospital Association – An association for health care facilities
13. International Brotherhood of Electrical Workers (IBEW) – IBEW MN State Council
14. Minnesota Dry Cleaners Association (MCA)

The Notice Plan does not include notifying the Commissioner of Agriculture because the rules do not affect farming operations.¹⁷ See Minn. Stat. § 14.111 (2016).

CONSULTATION WITH MMB ON LOCAL GOVERNMENT IMPACT

As required by Minnesota Statutes, section 14.131, the Department consulted with Minnesota Management and Budget (MMB). We did this by sending MMB copies of the documents that we sent to the Governor’s Office for review and approval on the same day we sent them to the Governor’s office. We did this before publishing the Notice of Intent to Adopt Rules. The documents included: the Governor’s Office Proposed Rule and Proposed SONAR Form; the proposed rules (October 25, 2016 draft); and the near-final SONAR. MMB Executive Budget Officer Marianne Conboy responded, in part, as follows in a letter dated December 19, 2016: “Accordingly, based on the current information provided to me, the proposed rule amendments will not impose any significant cost on local governments.”

DETERMINATION ABOUT RULES REQUIRING LOCAL IMPLEMENTATION

Pursuant to Minn. Stat. § 14.128 (2016), the Department has determined that a local government will not be required to adopt or amend an ordinance or other regulation to comply with these proposed rules. If a city wishes that its ordinances accurately reflect legal requirements in a situation in which the rule supersedes the ordinances, then the city can choose to amend or update its ordinances but it is not required. However, it is unlikely any local government has an ordinance related to this rule.

COST OF COMPLYING FOR SMALL BUSINESS OR CITY

Agency Determination of Cost

¹⁷ Per Minn. Stat. § 326B.988(a)(9) (2016), boiler or pressure vessels located on farms used solely for agricultural or horticultural purposes are exempt from the Minnesota boiler statutes.

As required by Minnesota Statutes, section 14.127, the Department has considered whether the cost of complying with the proposed rules in the first year after the rules take effect will exceed \$25,000 for any small business or small city.¹⁸ The Department has determined that the cost of complying with the proposed rules in the first year after the rules take effect will not exceed \$25,000 for any small business or small city.¹⁹

The proposed amendments in subparts 1 through 3, which are mandated,²⁰ are anticipated to lower operating costs for boiler owners. Costs are anticipated to be lower because the proposed rule permits licensed boiler engineers with lower classifications to operate larger boilers. Licensed boiler engineers with lower boiler classifications are typically paid less than higher classifications.²¹ The proposed amendment in subpart 5 is an attendance option that boiler owners can choose to or not to exercise. Although some initial costs in updating boiler controls might be required by some boiler owners to exercise subpart 5, the expectation is that boiler owners will see those expenses offset by reduced labor expenses.²² That is, operating costs for boiler owners will be reduced by allowing licensed boiler engineers to monitor the boilers remotely and not paying the engineer a higher rate to be physically at the plant. Some of the capital investment needed to comply with the optional subpart 5, such as equipment or appurtenances, is typically already installed and in use at the plants likely to exercise this option, which makes this a viable option financially.²³ Boiler owners who choose not to use this option will continue to comply with the requirements in subpart 3. They will not incur any new capital costs as a result of this proposed rule. That is, worst case scenario, operating costs will remain the same in regard to rule compliance.

LIST OF WITNESSES

If these rules go to a public hearing, the Department anticipates having the following witnesses testify in support of the need for and reasonableness of the rules:

1. Mr. Joel Amato, State Chief Boiler Inspector, Department of Labor and Industry, will testify about any technical aspects of boilers, the industry and the proposed rule.
2. Mr. Todd Green, Manager of Inspection Programs, Construction Codes and Licensing Division, Department of Labor and Industry, will testify about the workgroup and rulemaking process used for the proposed rule.

RULE-BY-RULE ANALYSIS

¹⁸ A small business is defined as “any one business that has less than 50 full-time employees; a small city is defined as “any one statutory or home rule charter city that has less than ten full-time employees.” *Minn. Stat.* § 14.127 (2016).

¹⁹ The Department does not believe any small city or small business is likely to exercise the option in subpart 5 or incur expenses \$25,000 or more in the first year after the rules take effect. However, if any small city or small business were to incur expenses \$25,000 or more, then any small city or small business may file a written statement with the agency claiming a temporary exemption from the rules pursuant to *Minn. Stat.* § 14.127, subd. 3 (2016).

²⁰ Subpart 2(B) is not mandated. Subpart 2(B) provides an attendance alternative to the requirement in Subpart 2(A) if the boiler plant is transitioned to operate at low pressure instead of high pressure.

²¹ See Attachment B.

²² See Attachment B.

²³ See Attachment B.

5225.1180 ATTENDANCE AT HIGH PRESSURE PLANT.

GENERAL.

The boiler engineer licensing statute is in Minn. Stat. § 326B.978 (2016).²⁴ The original design of the licensing requirements in Minn. Stat. § 326B.978 created an apprenticeship path for boiler engineers by establishing two tiers of authority within each class. That is, a licensed boiler engineer can be in charge of (a.k.a. chief engineer) boilers and plants of a certain size and shift engineer (working under a chief engineer who is licensed in a higher-class) for boilers and plants of a larger size. For example, Special Engineers can be in charge of boilers or plants up to 50 hp and the shift engineer of plants up to 100 hp. This allows Special Engineers to gain experience operating larger boilers/plants (51-100 hp) under the supervision and guidance of a First Class, Second Class or Chief engineer. Second Class engineers can be in charge of boilers or plants up to 100 hp and the shift engineer of plants up to 500 hp. Thus, after gaining experience as a Special Engineer, he or she will qualify for testing and licensing for a Second Class engineer license. In summary, the four licensing classifications/horsepowers are currently:²⁵

Table 1: Current Licensing Classifications

Classification	Chief (operating) engineer²⁶	Shift engineer²⁷
Special engineer	50 hp	100 hp
Second-class engineer	100 hp	500 hp
First-class engineer	500 hp	Unlimited size/hp
Chief engineer	Unlimited size/hp	Unlimited size/hp

The proposed rule makes several changes to the horsepower ranges permitted for the different attendance requirements. The reason for the changes is, in part, to coordinate the attendance horsepower requirements with the horsepower limits in the boiler license classifications and qualifications statute. Incremental changes to the boiler statutes and administration of licensing have led to the proposed rule.

In 2008, the legislature changed the horsepower limitations for all boiler license classes in Minn. Stat. § 326B.978²⁸ and created a provisional license in Minn. Stat. § 326B.972(d).²⁹ The horsepower limits were amended as follows:

²⁴ Minn. Stat. § 326B.978 (2016) can be viewed at: <https://www.revisor.mn.gov/statutes/?id=326B.978>.

²⁵ There are four classes of boiler engineers, and three grades within each class except Special engineer, which does not have grades. The grades within each classification (except Special engineer) do not affect the hp levels established in each classification.




²⁶ “Chief engineer” is defined in Minn. R. part 5225.0050, subp. 7, as “the properly licensed engineer required to be in charge of and responsible for the safe operation of a boiler plant.” <https://www.revisor.mn.gov/rules/?id=5225.0050>

²⁷ “Shift engineer” is defined in Minn. R. part 5225.0050, subp. 18, as the operating engineer responsible to the chief operating engineer in charge of and responsible for the safe operation of a boiler plant in the absence of the chief engineer.” See <https://www.revisor.mn.gov/rules/?id=5225.0050>

²⁸ See Chapter 309, sec. 3 at <https://www.revisor.mn.gov/laws/?id=309&year=2008&type=0> (Minn. Stat. § 326B.978 (2016) was previously numbered Minn. Stat. § 183.51.)

²⁹ See Chapter 309, sec. 2 at <https://www.revisor.mn.gov/laws/?id=309&year=2008&type=0> and Minn. Stat. § 326B.972 (2016) at <https://www.revisor.mn.gov/statutes/?id=326B.972> (Minn. Stat. § 326B.972 was previously numbered Minn. Stat. § 183.501.)

Table 2: Licensing Horsepower Changes

Classification	Chief (operating) engineer	Shift engineer
Special engineer	From 30 hp  To 50 hp	No change; remains at 100 hp
Second-class engineer	No change; remains at 100 hp	From 300 hp  To 500 hp
First-class engineer	From 300 hp  To 500 hp	No change; remains at unlimited hp

As a result of the 2008 legislative changes to the licensing horsepower limits for boiler engineers, the Department began to test applicants on a broader level. The Department increased the knowledge level required to pass the licensing examinations and performed a complete rewrite of all exams. This included increasing the number of questions on the Special Engineers exam from 33 to 50 and questions that cover a broader scope. The new examinations require applicants to demonstrate that he or she is competent to operate higher horsepower boilers for the license classification. Furthermore, licensing examinations now include technology-based questions about the boiler construction, installation and operation codes as adopted in Minnesota Statutes, §§ 326B.964 and 326B.966 (2016). Knowledge of these operation codes is important for the licensees in the respective license classes to be qualified to operate the higher horsepower boilers. Aligning the attendance requirements with the licensing horsepower requirements provides clarity, consistency and is user-friendly. It is reasonable to once again align the attendance horsepower levels with the licensing horsepower levels.

Subpart 1. Attendance; plant of 0 to 50 horsepower.

This subpart is amended by deleting the 30 hp maximum limit and replacing it with a 50 hp maximum limit. The lowest licensing classification that can be in charge of a plant that is 0-50 hp is a special engineer.³⁰ The anticipated cost savings are, for boilers 30 hp to 50 hp, that the Special engineer in charge of the boiler or the shift engineer must check it only once every 24 hours instead of every two consecutive hours. High pressure boilers of this horsepower range are used for sterilization, laundry, and light industry. Reducing the attendance requirement will allow the licensed boiler engineer to perform other duties within the business. This will reduce costs for business owners and maintain the same level of safety because the owner has an established inspection, maintenance and testing schedule for all safety devices on the boiler, which is required by ASME Controls and Safety Devices for Automatically Fired Boilers (“Code CSD-1”).³¹ Testing safety devices on the boiler ensures the boiler will operate safely while unattended. (Please refer to the “General” statement at the beginning of the Rule-By-Rule Analysis section of this SONAR for additional explanation.)

Subp. 2. Attendance; plant of 51 to 500 horsepower.

A. Item A of subpart 2 is amended by deleting the 31 to 200 horsepower range and replacing it with a 51 to 500 horsepower range. In part, this change is necessary as a result of the change made

³⁰ In relevant part, a licensed special engineer is permitted to “take charge of and be responsible for the safe operation and maintenance of all classes of boilers and their appurtenances of not more than 50 horsepower or to operate as a shift engineer in a plant of not more than 100 horsepower.” Minn. Stat. § 326B.978, subd. 15 (2016).

³¹ See [Minn. Stat. § 326B.964 \(2016\)](#).

to subpart 1. Minn. Stat. § 326B.978 (2016) describes requirements and limits for First-class and Second-class engineers. The proposed amendment aligns horsepower levels with the licensed Second-class shift engineer maximum horsepower levels and the licensed First-class chief engineer maximum horsepower level. *See* Table 1 and Table 2 above. The proposed amendment better utilizes the license qualifications for First-class engineers, who can be in charge of boiler plants up to 500 horsepower while also giving Second-class engineers training opportunities as shift engineers.

The current inconsistent horsepower sizes between the licensing classifications and qualifications and the attendance requirements results in horsepower gaps that unnecessarily require more attendance time of boiler engineers with higher class licenses and disturbs the apprenticeship design of the licensing statute. That is, it makes logical sense to align the licensed boiler engineer classifications with the boiler attendance requirements for financial and training purposes. (Please refer to the “General” statement at the beginning of the Rule-By-Rule Analysis section of this SONAR for additional explanation.)

Item A is further modified by deleting the phrase “when the premises are occupied by employees or the public.” This language is deleted because it is unclear what the attendance requirement is if the premises are not occupied. Regardless of whether the premises are occupied by employees or the public or not, it is reasonable and necessary that the attendance requirement is the same. Therefore, the language is deleted.

Item A is also modified by adding another exception to the requirement with a reference to “or subpart 5.” This addition is necessary because subpart 5 is a proposed addition that offers a new attendance option for boiler owners and licensed boiler engineers.

Lastly, a new sentence is added to the end of item A requiring engineers to visually observe boiler operating conditions and to document the conditions in a logbook that is already required to be maintained.³² The purpose of this addition is to document that the minimum attendance allowed in item A is satisfied. The current rule, in subpart 4, references item A and states that the absences “may not approach nearly continuous absence from the plant.” The proposed rule repeals subpart 4 and clarifies its intent with the proposed sentence here. Rather than reference item A in another subpart, the rule is more user-friendly because the intention is expressed here with a concrete action. The proposed rule language provides clearer requirements to ensure that the operating engineer does not merely enter and then leave the boiler room at least every two hours (“nearly continuous absence”). Requiring observation and the log book entry is reasonable and consistent with safe boiler operation. This provision can be enforced consistently and objectively.

B. Item B is modified by replacing the 31 to 200 horsepower range with the 51-500 horsepower range as in item A and for the same reasons. (Please refer to the “General” statement at the beginning of the Rule-By-Rule Analysis section of this SONAR for additional explanation.)

The proposed rule clarifies the requirements for less-frequent attendance by switching a boiler from high pressure to low pressure. Several of the references to controls and safety devices in the current rule are outdated and vague. It is not clear if all boilers within the plant need to be shifted

³² Minn. R. part 5225.1110, subpart 1 requires a logbook to be maintained in the boiler room by the chief engineer or an operating engineer designated by the chief engineer. *See* <https://www.revisor.mn.gov/rules/?id=5225.1110>.

to low pressure or if only one must be shifted to low pressure. The proposed rule clearly states what needs to be done with each boiler within the plant. The proposed rule also clarifies with specific requirements for the boiler and the licensed boiler engineer when the boiler is shifted to low pressure. This will ensure the licensed boiler engineer has a clear understanding of the requirements for the safe operation of the boiler at low pressure.

Item B: Item B offers 51 to 500 hp boiler plant owners an alternate attendance option from item A if certain action is taken and equipment utilized. The existing language of this item is not clear, particularly in cases involving plants with more than one boiler. All boilers in the plant must be shifted to low pressure or shut down to satisfy the requirements in item B. Therefore, this item was revised to clarify the requirements for boiler plants with more than one boiler.

Item (1): The proposed rule clarifies what type of pressure controls and an isolation valve are required. The only new requirement is a drain valve. The isolation valve ensures that both the high pressure controls and the low pressure controls will not operate at the same time. The drain valve ensures the integrity of the isolation valve with minimal cost and effort.³³ Rewording this item is reasonable to clearly convey the requirement.

Item (2): The proposed rule reduces and clarifies the required safety controls because the current language inaccurately described the requirements for the controls. There is no “fail-safe type” valve or control supply line. “Temperature” is deleted because in this situation, pressure is measured and regulated, which controls temperature. The proposed rule also adds a reference to the CSD-1, which is a requirement in Minn. Stat. § 326B.964 (2016). The reference is provided here for convenience to the user and to clarify that CSD-1 applies in this situation.

Item (3): The proposed rule clarifies that the low pressure header must have ASME code-stamp safety relief valves, as required in Minn. Stat. § 326B.964 (2016). The proposed rule does not add any new requirements. The requirements are currently in item 5 but are reworded and renumbered here for clarity.

Item (4): The proposed rule clarifies the required functions and purpose of the isolation valve and interlock. Because the requirement is renumbered from item (5) to item (4), it is all underlined as new language but it is not a new requirement.

Item (5): The proposed rule clarifies the current requirement in item (4) regarding who can occupy the building under this paragraph. Because the occupancy provision is renumbered from item (4) to item (5), it is all underlined as new language but it is not a new requirement.

Item (6): The proposed rule renumbers and clarifies the duties of the licensed boiler engineer when switching the boiler between high and low pressure. The proposed rule does not add any new requirements; it clarifies the requirements in the current item (3). Because the requirement is renumbered from item (3) to item (6), it is all underlined as new language.

Item (7): The proposed rule clarifies the existing requirement. The licensed boiler engineer must visually observe the boiler operating conditions as described in subpart 1 and document the conditions in the boiler room logbook at least once every 24 hours as required in Minn. R. part

³³ See Attachment B.

5225.1110, subp. 1. The proposed rule does not add any new requirements; it clarifies the requirements in the current item (3).

Subp. 3. Attendance; plant over 500 horsepower.

A. Item A is amended by replacing the 200 horsepower maximum with a 500 horsepower maximum. (Please refer to the “General” statement at the beginning of the Rule-By-Rule Analysis section of this SONAR for additional explanation.) Paragraph A is further amended by adding a reference to “or subpart 5” to the end of the sentence because the proposed rule amendment offers a new attendance option in subpart 5 that would exempt the licensed boiler engineer from the requirements of subpart 3. The proposed rule is reasonable because it aligns the subpart with the licensing statute and references a new option.

B. Item B is amended by replacing the 200 horsepower threshold with a 500 horsepower threshold. (Please refer to the “General” statement at the beginning of the Rule-By-Rule Analysis section of this SONAR for additional explanation.) Paragraph B is also amended by adding the phrase “per hour” after “30 minutes” to clarify the timeframe in which the licensed boiler engineer can be absent from the boiler room. The proposed rule is reasonable because it aligns the subpart with the licensing statute and clarifies the existing requirement.

Subp. 4. Limitations. (Repeal).

This subpart provided an “add-on” to subpart 2, paragraph A and subpart 3, paragraph B. For clarity, the proposed rule moves the “add-on” to those specific items. The proposed rule also clarifies the intent of subpart 4. That is, subpart 4 states that the absences in the specified items “may not approach nearly continuous.” The proposed rule is reasonable because it provides specific, objective descriptions to clarify what absences are permitted under this rule part. See the analyses above for subpart 2, paragraph A and subpart 3, paragraph B.

Subp. 5. Attendance; unoccupied plant. (proposed new subpart).

The Department was charged with updating and modernizing the high pressure boiler rules. This new proposed subpart provides attendance requirements at unoccupied plants consistent with the attendance exception created in Minn. Stat. § 326B.988(e) (2016). The proposed rule gives owners and licensed boiler engineers a safe remote attendance option similar to the exception created in Minn. Stat. § 326B.988(e) (2016).

First, the proposed rule clearly states the scope of the new subpart. This subpart applies to plants 51 or more horsepower with individual boilers that are 51 to 500 hp, located in an unoccupied plant, and that satisfy all the safety requirements.³⁴ Approximately 465 boilers are 51 to 500 horsepower in Minnesota.³⁵ Boilers over 500 hp are not eligible for this option because they require constant attendance. Boilers over 500 hp are typically utility boilers, which require constant attendance 365 days a year because of their size and complex operating systems. The remote monitoring concept is a proposed alternative for the boiler operating industry. Current technology

³⁴ Subparts 1, 2 and 3 regulate attendance based on plant size whereas subpart 5 offers a remote attendance option for plants of any size as long as the individual boilers are 51 to 500 hp.

³⁵ See Attachment B.

allows an engineer to remotely view, record, and hear boilers in operation. With the addition of boiler safety controls to shut down the boiler in an emergency situation, for unoccupied plants, remote monitoring is a safe and reasonable alternative to having an engineer in the boiler room constantly.

The safety requirements to qualify for remote monitoring are laid out clearly in items A through N.

A. Item A requires the boiler owner to submit an application to the Department for review and approval to participate in the remote monitoring program for unoccupied plants. It is necessary for owners to submit an application so the Department can verify the correct controls and policies are in place and the boiler meets the requirements of this subpart. It is reasonable for the Department to receive adequate information in order to enforce this rule.

B. Item B requires the building to be completely unoccupied and the boiler owner to demonstrate with substantiated data that the unattended boiler is located within a safe unoccupied radius. This requirement is necessary because if the boiler and safety controls were to fail, there must be no risk of injury or death to people from the boiler. Because the boiler owner is the responsible party, the burden is on the boiler owner to establish and demonstrate to the Department, with substantiated data, what a safe radius is surrounding the boiler and how that radius was established. The onus is put on the boiler owner because each situation will be different. For example, the location of the boiler, the size, the materials used to construct the boiler room, the number and construction of the walls to the outside and the number of nearby boilers in the plant will vary. These are some of the factors that will be considered by the boiler owner when establishing what a safe radius is for a particular boiler plant when considering remote attendance.

C. Item C requires a licensed boiler engineer to perform the remote monitoring. Consistent with statutory licensing requirements and classifications, only a licensed boiler engineer is permitted to perform the remote monitoring because the engineer is licensed by the state to operate boilers and to respond to boiler emergency situations. Additionally, Item C requires the boiler owner to develop a written policy regarding a safe response time for each individual boiler. This policy is necessary because the licensed boiler engineer must be able to access the boiler room within a safe period of time to respond to alarms and potential problems with the boiler or its appurtenances. Depending on location, environment and the boiler itself, the response time and how to meet it will vary with each boiler.

Specifically, item C requires the licensed boiler engineer to be able to respond to any of the safety concerns listed in item L within the safe response time specified in the policy. This requirement ensures the policy addresses damage prevention in addition to complete failure of the boiler in the event of an emergency. It is necessary and reasonable to require procedures that establish a timely, safe and effective response to prevent damage to the boiler and its surroundings.

D. Item D requires a licensed boiler engineer to visually observe the operating condition of the boiler and appurtenances and to document the findings and conditions in the boiler room logbook, maintained pursuant to Minnesota Rule part 5225.1110, at least once every 24 hours. This requirement is necessary to ensure the licensed boiler engineer personally checks the boiler and all appurtenances to ensure proper and safe operation. It is necessary to ensure the boiler is physically

attended at least at the minimum required time to prevent failure of the boiler and damage to the boiler or its surroundings. These observations documented in the boiler room logbook are available for review by the owner, other licensed boiler engineers, and the boiler inspector. The information in the logbook can also be used by boiler engineers and owners to help identify trends or conditions outside of the established parameters.

E. Item E requires the licensed boiler engineer who is remotely monitoring a high pressure boiler 51-500 hp to monitor several conditions. For items (1) through (3) and (7) through (10), parameters are established in Item L. There are many devices currently on the market to accomplish remote monitoring. The conditions that must be monitored for boiler safety are described below.

1) Water level for steam boilers. The water level refers to the actual water level in the steam boiler. This water level must be maintained within the manufacturers' recommended range to prevent low or high water conditions as required in Item L(1). Failure to maintain the boiler water level within the manufacturers' range may cause damage to the boiler and appurtenances.

2) Boiler Pressure. Boiler pressure refers to the pressure inside of the boiler to ensure the boiler operates as designed to prevent damage to the boiler. It is necessary and reasonable to monitor boiler pressure because high pressure could damage the boiler and low pressure could adversely affect system equipment and processes. Parameters are in Item L(2).

3) Temperature for high temperature hot liquid. The temperature for high temperature hot liquid refers to the temperature inside of the boiler. This temperature must be maintained between the parameters established in Item L(3) of this rule part to prevent damage to the boiler and maintain system equipment and processes.

4) Stack temperature. Stack temperature refers to the temperature of the combustion gases after they have passed through the boiler but before they are released to the atmosphere through the chimney or stack. This temperature should remain at a consistent temperature. Large fluctuations in this temperature or a trend up or down can indicate a problem with the boiler, burner, or stack.

5) Feedwater flow. Feedwater is the water that is pumped into the boiler. Feedwater flow is the amount of feedwater being pumped into the boiler to maintain the required water level. Feedwater flow is measured in pounds per hour. It is necessary to monitor the feedwater flow to maintain the proper boiler water level. The licensed boiler engineer can determine if a water leak has occurred in the feedwater piping system or within the boiler itself by monitoring the water level, steam flow, and feedwater flow.

6) Make-up water flow for high temperature hot liquid. All boiler systems require the addition of water or liquid to the systems periodically. Monitoring the amount of water or liquid added to the system is important to determine if the system has leaks. Also, systems using a lot of make-up water will require more chemical treatment and maintenance to ensure the integrity of the boiler internals and prevent damage to the boiler.

7) Steam flow. Steam flow refers to the amount of steam, measured in pounds per hour that the boiler produces. It is necessary to monitor steam flow because a change in steam flow

might indicate a problem. A sudden or abrupt change in the steam flow can indicate the presence of a steam leak, that a safety valve is open, or the presence of an obstruction in steam piping. Monitoring steam flow will also reveal if steam demand is increased or decreased greatly within a short period of time.

8) Fuel flow, at burner. The fuel flow at the burner refers to the amount of fuel being fed to the boiler. It is necessary to monitor the fuel flow at the burner to ensure fuel is being fed into the boiler properly. In the event of a flame failure, the fuel flow level should drop to zero. If the fuel flow does not drop to zero in the event of a flame failure, it could mean that the fuel is continuing to be fed into the boiler but not being burned, which could result in a furnace explosion. By monitoring this condition, the licensed boiler engineer will know if the fuel system is continuing to feed fuel to the boiler when the boiler is shutdown. In the event of a flame failure, the licensed boiler engineer can address the situation accordingly.

9) Gas/oil pressure. Power burners that use gas or oil are designed to operate within specific ranges for the gas or oil pressure. If the pressure exceeds the limitations of the burner established by the burner manufacturer, the burner could be damaged or could cause a dangerous fuel-rich (therefore explosive) condition inside the boiler. If the pressure is too low for the burner, the burner or boiler could be damaged due to improper mixture of the fuel-to-air ratio required for the burner.

10) Concentration of carbon monoxide in boiler room. When a boiler burns fuel, it also produces carbon monoxide, which is dangerous to breathe. A carbon monoxide detector must be installed in the boiler room to measure the level of carbon monoxide in the room. If carbon monoxide is in the boiler room, the detector will trigger an alarm that it may be unsafe to enter and safety precautions can be taken before entering.

11) A video camera providing a continuous live video feed of the burner, sight glass, and pressure gauge. The burner refers to a device that is attached to the boiler that mixes fuel and air for the combustion process. The burner has an ignition source that lights the fuel/air mixture. The burner has many moving parts that adjust the fuel air mixture and these moving parts can fail. An improperly functioning burner could cause an explosion or external fire at or near the boiler.

The sight glass is a transparent tube or glass window that allows the licensed boiler engineer to view the water level in the boiler. Failure to maintain a proper water level in the boiler can cause damage to the boiler or even a catastrophic failure as described in E(1) above.

The pressure gauge is a gauge that is located on the top of the boiler and provides a reading of the pressure in the boiler, measured in pounds per square inch. The pressure must be monitored as required in E(2) to ensure the boiler is operating within the parameters established in L(2).

It is necessary to provide a live video feed of these items so the engineer can visually monitor all of these devices to detect early warning signs of potential damage or explosion.

The live feed must be continuously available to the licensed boiler engineer for remote viewing. If the engineer receives an alarm or other notification, he or she must be able to view the devices to assess and respond to or prevent damage to the boiler or the building.

It is reasonable to require these ten conditions and the video feed because it is a reliable, effective and economical way to remotely ensure the boiler is operating safely. They enable the licensed boiler engineer to safely monitor the boiler by providing vital information.

F. Item F requires two feed pumps to supply water to the boiler. A feed pump is a pump that supplies water to the boiler at a pressure greater than the boiler pressure. This water being supplied is essential to the safe operation of the boiler because it prevents the boiler from over-heating, which would result in boiler damage. Two pumps are necessary to supply water to the boiler because if one pump fails, the licensed boiler engineer can start the second pump to ensure water flow to the boiler. Requiring two feed pumps to supply water to the boiler is an industry standard and already required by the adopted ASME codes and Minnesota Rules, part 5225.5100.³⁶ The requirement is repeated here for clarification.

G. Item G requires that a boiler firing with gas shall have a flammable gas detection system in the boiler room with a visible and audible alarm inside the boiler room and on the remote monitoring device. Boilers that are fired with natural gas or propane could develop a leak in the piping, fuel train, or the burner, creating an explosive environment. A flammable gas detection system is a system that detects flammable gases in the boiler room and provides an audible and visible signal before the concentration of flammable gases reaches an explosive level. It is necessary for this system to be located in the boiler room because if this type of leak occurs, it would typically occur in a boiler room. By requiring a visible and audible alarm, the licensed boiler engineer can isolate the leak and potential ignition sources. This alarm will warn the licensed boiler engineer to not enter the boiler room in the event a gas leak has occurred. Requiring the alarms to be visible and audible inside the boiler room notifies the engineer to respond to the condition.

Item G also requires visible and audible alarms, an independent remote water level indicator, and remote boiler shutdown switches to all be located immediately outside the boiler room door. The direct reading remote water level indicator is a device that remotely displays the actual water level in a boiler. These devices must be located outside the boiler room door so that anyone can shut down the boiler in an alarm or emergency situation without having to enter the boiler room.

These requirements in item G are reasonable because they are an efficient and cost-effective way to notify the licensed boiler engineer of problems with the boiler or boiler systems before causing damage to the boiler and boiler room or harm to personnel. These devices also help the licensed boiler engineer generally troubleshoot problems with the boiler to ensure its safe, continuous operation.

H. Item H requires boilers using gas or liquid fuels to have a written fuel-rich condition shutdown procedure and must be available to the licensed boiler engineers. A fuel-rich condition is a condition in which the burner does not have enough air to create the proper fuel-to-air ratio for complete combustion of the fuel. A written shutdown procedure for this condition is necessary because a fuel-rich condition can become dangerous if the condition is not corrected. It is necessary to ensure the procedure is immediately available to the licensed boiler engineers because they need

³⁶ Minn. R. part 5225.5100 requires boilers over 50 hp (“having more than 500 square feet of water heating surface (50 BHP)”) to have two feed pumps. See <https://www.revisor.mn.gov/rules/?id=5225.5100>.

to be able to easily access the procedures to react correctly, safely and quickly to the situation to prevent an explosion.

I. Item I requires each boiler to have written standard and emergency operating procedures, which include testing of all safety devices at the manufacturers' recommended scheduled intervals. It is necessary to require written standard and emergency operating procedures because the licensed boiler engineer should follow specific, consistent methods and procedures for testing safety devices and responding to emergency situations. Manufacturers recommend testing controls and safety devices at regular, scheduled intervals to ensure the boilers operate correctly and efficiently. Following the manufacturers' recommended intervals is reasonable because the manufacturer develops the recommendation based on the design of the boiler. It is necessary that the procedures include testing of the safety devices at the manufacturers' recommended intervals to ensure the safety devices will function correctly when they are needed. The licensed boiler engineer will be knowledgeable about the boiler controls and safety devices from conducting these tests.

J. Item J requires a diary be maintained in the boiler room. The diary is a document that will provide a written record of all maintenance and operating actions in the boiler room. The diary must be maintained in a manner that prevents revisions, additions, or deletions of entries. The diary must be maintained for the boiler room because it documents when and why equipment is started or stopped, when tests are performed, maintenance performed, every time equipment operates outside of established parameters, and the identity of the licensed boiler engineer making the entries. It is necessary to require the documentation of these conditions because it provides the owner, inspectors and other licensed boiler engineers with an accurate depiction of the daily actions in the boiler room. Providing this information will also prevent duplication of maintenance and testing of the boiler controls and appurtenances, and provides trends to help assess any additional maintenance and testing that may be necessary. The diary is different from the logbook because the logbook records boiler operating conditions whereas the diary will record the licensed boiler engineer's boiler room actions. It is reasonable to require the diary be provided to a national board-commissioned inspector upon request to ensure compliance with this paragraph and to aid in the inspection.

K. Item K requires that the remote monitoring device and system have a communication failure alarm. This alarm is necessary to notify the licensed boiler engineer if the boiler controls stop communicating with the remote monitoring device or if the remote device fails. Item K requires the licensed boiler engineer to return to the boiler room immediately upon notification of a communication failure because without the remote monitoring in place, the boiler is no longer being monitored. The licensed boiler engineer can then verify the boiler is operating properly or quickly address any problems in person. Remote monitoring can resume only when the communication failure is resolved and all other requirements are still satisfied. This requirement is reasonable because it helps ensure that the equipment operates safely and the remote monitoring program is effective.

L. Item L requires a flame sensor and a primary and a secondary setpoint to be established for certain operating conditions. Exceeding the primary setpoint will trigger an alarm and notify the licensed boiler engineer when the boiler conditions go outside of the boiler's normal operating range but are still within a temporarily safe operating range. Exceeding the secondary setpoint will shut down the boiler automatically and initiate an alarm. The licensed boiler engineer and recommendations of the boiler manufacturer determine the primary and secondary setpoints. It is

important that the eight conditions listed have two setpoints in the interest of safety, including automatic shutdown if necessary. That is, the licensed boiler engineer must be notified of any conditions that fall outside of the established setpoints so he or she can return to the boiler room to identify the problem and correct it before the second setpoint is reached, if possible.

Two setpoints are required for the following conditions: 1) high and low water level for steam boilers, 2) high and low boiler pressure, 3) temperature for high temperature hot water heating, 4) concentration of carbon monoxide in the boiler room, 5) fuel flow, 6) steam flow, 7) gas/oil pressure, and 8) flammable gas detection. The safety reasons and importance of these items is explained above in subpart 5(E) and (G). It is necessary to set levels for these key conditions and monitor them because boilers require specific conditions to operate safely. If any of the conditions monitored fall outside of the established setpoints, the licensed boiler engineer will need immediate notification to respond to the condition and prevent damage to the boiler.

A flame sensor detects the presence or absence of a flame. If there is no flame, the flame sensor triggers an automatic boiler shut down to prevent boiler damage or an explosion.

M. Item M requires a national board-commissioned inspector to conduct both an initial internal and external inspection of the boiler to determine the boiler operates correctly and complies with the rule to qualify for remote monitoring. It is necessary and reasonable to determine and establish that the boiler meets the requirements to be monitored to ensure it will operate safely without a licensed boiler engineer onsite to attend to the boiler. Item M requires that the boiler must not be in operation to conduct the internal inspection. This is necessary so the inspector can access both the fire side and the water side of the boiler without fire or water in the boiler. Specifically, the inspector looks for any corrosion, erosion, or damage.

Item M requires the external inspection to be conducted while the boiler is in operation. It is necessary for the boiler to be operating during the external inspection so the inspector can witness the active function of all boiler controls and safety devices. Item M requires that annually thereafter, an inspector shall conduct internal and external inspections for continued compliance with the remote monitoring program established in the proposed rule. Annual inspections are necessary to ensure the boiler continues to meet the established parameters and operates safely. Item M requires the inspection reports to be submitted to the state chief boiler inspector for compliance with the requirements of this subpart. Item M requires the inspector to document the name of the water treatment company and the name of the certified water treatment specialist. Correct water treatment is vital to safe operation of the boiler. The water treatment specialist must be certified to treat, test, and monitor the boiler water. It is necessary and reasonable to require information about the water treatment company and specialist to ensure the individual overseeing the water treatment program is certified to perform this function.

N. Item N requires the water treatment specialist to establish a water treatment program that contains boiler water quality parameters. The specialist must monitor the program at least every 60 days by testing the boiler water and reviewing the results. It is necessary to ensure the boiler water is monitored by a water treatment program and tested at least every 60 days to ensure the licensed boiler engineers are properly testing and maintaining the boiler water according to the established parameters. Item N additionally requires the licensed boiler engineer to test the boiler water and document the results of the test at least every 24 hours. The test results must be made available to the

specialist and inspector upon request. It is necessary for the licensed boiler engineer to test the boiler water and document the results every 24 hours because the boiler water chemistry constantly changes. To ensure the water quality stays within the established parameters, it must be tested frequently and consistently, which is a current industry practice. It is necessary for the specialist and inspector to view the test results to ensure the water treatment program is maintained correctly.

The second paragraph of item N requires the boiler owner or the licensed boiler engineer to ensure that the participating boiler meets the requirements of the remote monitoring program. If the participating boiler or any of the required devices fail to operate as required in subpart 5, then they must immediately comply with the constant attendance requirements in subpart 3 until the deficiencies are corrected and compliance is restored. It is the engineer's responsibility to document everything that happened in the diary for an accurate accounting of the occurrence.

The last paragraph states that if the Department or the national board-commissioned inspector determines a boiler fails to comply with the requirements of this subpart, the boiler is immediately disapproved for remote monitoring and must comply with subpart 3. Rather than assume participating plants will know that if they fall out of compliance with subpart 5 that they must comply with subpart 3, this provision clearly states it. This provision also explains how to be reinstated as a participating and approved plant for remote monitoring. This provision is reasonable because plants out of compliance with subpart 5 could become dangerous if remotely monitored without sufficient safety controls in place. If the owner wishes the boiler to be approved for the remote monitoring program, the owner must correct the deficiencies and have the boiler re-inspected by the national board-commissioned inspector to ensure compliance. The owner must obtain evidence of this inspection and provide it to the chief boiler inspector for review before reapproval to participate in the program. This step is necessary to ensure that the non-compliant boiler meets program requirements before reinstatement into the program.

CONCLUSION

The proposed rule reflects the recommendations of the work group and represents the minimum safety requirements they recommended for remote monitoring.

Based on the foregoing, the proposed rules are both needed and reasonable.

Date

Ken B. Peterson, Commissioner
Department of Labor and Industry

This Statement of Need and Reasonableness was made available for public view on _____, 2017.

**SONAR Attachment A - Legislative Report: High Pressure
Boiler Attendance Rule**

Legislative Report

High Pressure Boiler Attendance Rule

October 1, 2015



443 Lafayette Road North
St. Paul, MN 55155-4307

dli.communications@state.mn.us

Information in this report can be obtained in alternative formats by calling the Department of Labor and Industry at 651.284.5010 or 1.800.342.5354.

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.

This paragraph expires August 1, 2016.

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

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

SONAR Attachment B

High Pressure Boilers: There are approximately 1,390 high pressure boilers in the state.¹ Based on a horsepower rating of 51-500, 465 of these boilers could be eligible to exercise the option in subpart 5.

Additional Controls required for Subpart B:

Subp. 2(B)(1): Drain valve. This is a small valve that might need to be added to the system for approximately \$50-\$100 per valve, including installation.

Subp. 5(E): Each of the items will require some type of monitoring device to transmit the measured data to a computer or handheld device for remote monitoring. Some measuring devices that might not already be in place and not otherwise required by code include the following*:

1. Stack temperature (\$200-\$300)
2. Feedwater flow (\$300 - \$500)
3. Make-up water flow for high temperature hot liquid (\$400-\$600)
4. Fuel flow (\$1,500-\$2,000)
5. Concentration of carbon monoxide (\$300-\$500)

Subp. 5(G): Two of the three items required here are not generally installed and not otherwise required by code:

1. Visible and audible alarms (\$500-\$1,000)
2. Independent remote water level indicator (\$3,000-\$5,000)

*Note: These costs will vary based on the piping, valve arrangement, current location of sensors, and size of boiler room. Therefore, an average cost range is provided.

One anticipated result of the proposed rule is that boiler owners will see reduced labor costs once the licensing rule and attendance rule horsepower limits are aligned. The labor cost savings can be calculated based on the wage rates provided by Sprung Services.

¹ As of October 2016, there are approximately 1,390 registered high pressure boilers. From that total, the Department derived the approximate number of registered boilers that are 51-500 horsepower.

Sprung Services Wage Estimates²

License	Low End	High End
Special	\$14/hr	\$25/hr
2nd Class, Grade B	\$20/hr	\$26/hr
1st Class, Grade B	\$22/hr	\$30/hr
Chief, Grade B	\$25/hr	\$32/hr
2nd Class, Grade A	\$20/hr	\$26/hr
1st Class, Grade A	\$29/hr	\$36/hr
Chief, Grade A	\$32/hr	\$40/hr
Typical Package Boiler Used For Processing	\$24/hr	\$27/hr
Large Package Boilers or Boilers with solid fuel, cogeneration or other unusual features (maybe just unusually complicated)	\$32/hr	\$36/hr
Utility Plants - Entry level Operations	\$20/hr	\$27/hr
Utility Plants - Assistant Plant Operators	\$30/hr	\$34/hr
Utility Plants - Plant Operators	\$32/hr	\$36/hr
Utility Plants - Shift Supervisors	\$36/hr	\$40/hr

² Sprung Services is a company that outsources licensed boiler engineers. This data is used with permission from Sprung Services.