

**DEPARTMENT OF TRANSPORTATION****Federal Railroad Administration****49 CFR Part 230**

[Docket No. RSSL-98-1, Notice No. 1]

**Inspection and Maintenance Standards for Steam Locomotives; Proposed Revisions**

**AGENCY:** Federal Railroad Administration (FRA), Department of Transportation (DOT).

**ACTION:** Notice of Proposed Rulemaking (NPRM).

**SUMMARY:** FRA is proposing to update its requirements issued in 1978 ("1978 standards") for steam locomotive inspections and maintenance with new standards that represent the consensus recommendations of the Railroad Safety Advisory Committee's Tourist and Historic Working Group. The proposed standards would relax certain inspection requirements, while tightening others, to recognize and reflect the less frequent use of steam locomotives in today's national system of transportation. Significant changes would include: The creation of a "service-day" inspection system that directly relates inspection time periods to the actual use of the steam locomotive; the elimination of waivers for steam boilers, steam locomotives and their appurtenances, with certain exceptions; the inclusion of allowances which encourage the use of new technologies, such as non-destructive testing, for boiler testing and inspections; and the imposition of qualification requirements for individuals making certain repairs to steam locomotive boilers, steam locomotives and their appurtenances.

Certain of the inspection standards would be left substantively intact but would be relocated to new sections and given new section numbers. Due to the magnitude of the changes proposed, the proposed standards would replace the 1978 standards in their entirety.

**DATES:** (1) *Written comments:* Written comments must be received no later than November 24, 1998. Comments received after that date will be considered to the extent possible without incurring additional expense or delay. Requests for formal extension of the comment period must be made by October 26, 1998.

(2) *Hearing:* Because this proposal is based largely on the consensus recommendations of the agency's safety advisory committee, FRA does not intend to schedule a public hearing regarding this proposal absent a specific

request to do so. Any requests for FRA to hold a public hearing into this matter should be received by FRA by October 9, 1998.

(3) *Proposed Effective Date:* Part 230 is proposed to become effective 60 days after the publication date of the final rule.

**ADDRESSES:** (1) *Written comments:* Written comments should identify the docket and notice numbers and be submitted in triplicate to: Docket Clerk, Office of Chief Counsel, Mail Stop 10, Federal Railroad Administration, 400 Seventh Street, S.W., Washington, D.C., 20590. Persons who wish to be notified that their comments have been received should submit a stamped, self-addressed postcard with their comments. The Docket Clerk will indicate on the postcard the date on which the comments were received and will return the card to the addressee. Written comments will be available for examination, both before and after the comment period closes, during regular business hours at the Federal Railroad Administration's office space in 1120 Vermont Avenue, N.W., Washington, D.C.

**FOR FURTHER INFORMATION CONTACT:** George Scerbo, Motive Power & Equipment Specialist, Federal Railroad Administration, (telephone 202-493-6249); Lawrence Wagner, Trial Attorney, Office of Chief Counsel, FRA, 400 Seventh Street, S.W., Washington, D.C., 20590, (telephone 202-493-6063); or John Megary, Regional Administrator, Federal Railroad Administration, 8701 Bedford-Eules Road, Suite 425, Hurst, TX 76053, (telephone 817-284-8142).

**SUPPLEMENTARY INFORMATION:****I. Regulatory Background**

In his annual message in 1910, President Taft noted the need for regulation of the steam locomotive industry:

The protection of railroad employees from personal injury is a subject of the highest importance and demands continuing attention \* \* \*. It seems to me that with respect to boilers a bill might well be drawn requiring and enforcing by penalty a proper system of inspection.

Congressional Record, December 6, 1910, p. 33. At that time, there were no rules or regulations governing the inspection and maintenance of steam locomotives other than the Ash Pan Act, 45 U.S.C.S. 17 (1908), *repealed* Pub. L. 97-468 (1933), which prescribed the method for attaching ash pans to a steam boiler. On February 17, 1911, however, Congress passed the Locomotive Boiler Inspection Act (LBIA). The LBIA, which was opposed

by locomotive owners and operators, brought all locomotive steam boilers under Federal jurisdiction and established the Bureau of Locomotive Inspection and its attendant field force of 50 Locomotive Inspectors.

The LBIA became effective on July 1, 1911, and only applied to the steam locomotive boiler. It had an immediate and drastic impact; the number of incidents caused by the failure of the boiler or any of its appurtenances declined sharply. Incidents caused by failures of parts of the locomotive other than the boiler and its appurtenances began to increase, however, and railroad employees appealed to Congress for an amendment that would extend federal jurisdiction over the entire steam locomotive and tender and all its parts with the same force and effect that had previously only applied to the boiler. The railroad owners and operators were, again, vigorously opposed. A bill incorporating the proposed amendment was passed by Congress and signed by President Wilson on March 4, 1915.

When the LBIA became effective in 1911, it required each railroad subject to the Act to file copies of its rules and instructions for the inspection of locomotive boilers. An examination and comparison of the 170 rules and instructions submitted (out of approximately 2,200 railroads in the country at that time) disclosed that these rules were either substantially similar, or identical, to those promulgated by the Master Mechanics' Association. These rules, along with the 1915 amendments, formed the basis for the former Interstate Commerce Commission (ICC) rules which were adopted and have been in effect to date. Modifications to these rules were made over the years by ICC orders to enhance safety. FRA adopted all ICC rules, interpretations, and instructions when the Department of Transportation was created, effective April 1, 1967. These rules were published in the **Federal Register** and incorporated into the Code of Federal Regulations in December of 1968. Since then, the rules have been updated and amended periodically. In 1980, the regulations were removed from the CFR. However, FRA has continued to enforce them through today. For purposes of clarity, whenever those removed standards are referenced, they will be described as "the 1978 standards" since there is not current CFR citation for them.

There are currently fewer than 200 steam locomotives in operation. Most of them are used in tourist or historic service on an intermittent, seasonal basis. Several years ago, a task group of the National Board of Boiler and

Pressure Vessel Inspectors comprised of steam locomotive operators, called the Engineering Standards Committee (ESC), petitioned the FRA to change the current rules to more realistically reflect the current use and conditions of service for today's steam locomotives. The agency committed to work with this group to consider revisions to these standards. After the agency established its Railroad Safety Advisory Committee (RSAC or the Committee), the agency identified this subject as one ripe for collaborative rulemaking. Accordingly, the agency tasked the RSAC with the formal revision of steam locomotive inspection standards on July 24, 1996. It was also recommended at that time that the ESC, and the FRA representatives with whom it was working, become a Task Force to the RSAC's Tourist and Historic Working Group.

## II. Antecedents of FRA's Consensual Rulemaking Approach

In 1994, FRA established its first formal regulatory negotiation committee ("reg-neg") to address roadway worker safety. This committee successfully reached consensus conclusions and recommended an NPRM to the Administrator, persuading FRA that a more consensual approach to rulemaking would likely yield more effective, and more widely accepted, rules. In addition, President Clinton's March 1995 Regulatory Reform Initiative directed agencies to expand their efforts to promote consensual rulemaking. In response to these efforts, FRA decided to shift toward a collaborative rulemaking process by establishing, and utilizing the consensus recommendations of RSAC.

## III. The Railroad Safety Advisory Committee

The RSAC formally was established on March 25, 1996 to provide recommendations and advice to the Administrator on the development of FRA's railroad safety regulatory program, including the issuance of new regulations, the review and revision of existing regulations, and the identification of non-regulatory alternatives for improvement of railroad safety. The Committee is comprised of 48 representatives from 27 member organizations, including railroads, labor groups, equipment manufacturers, state government groups, public associations, and three associate non-voting representatives from the National Transportation Safety Board (NTSB), Canada, and Mexico. The Administrator's representative (the Associate Administrator for Safety or

that person's delegate) is the Chairperson of the Committee.

## IV. Steam Task Force of the Tourist and Historic Working Group

During the July 24, 1996 meeting of the RSAC, the agency charged the committee with recommending revisions to the regulations governing locomotive inspection standards for steam-powered locomotives (49 CFR Part 230), in order to promote the safe operation of tourist and historic rail operations, including "such additions and deletions as may be warranted by appropriate data and analysis." In its Task Statement (Task No. 96-5) to RSAC, the agency instructed the Committee to refer this task to the pre-existing Tourist and Historic Railroads working group (THWG or The Group), which it successfully did. The THWG is comprised of the following organizations:

Association of American Private Railcar Owners  
 American Short Line Railroad Association  
 Association of American Railroads  
 Association of Railway Museums  
 Brotherhood of Locomotive Engineers  
 FRA  
 Tourist Railway Association Inc. (TRAIN)

The THWG voted during its April 1996 meeting to adopt the ESC, which had been examining these issues outside of the RSAC arena, and to have it serve as a Task Force reporting to the THWG. As adopted, the Steam Standards Task Force (Task Force) is comprised of knowledgeable persons from the following organizations:

Valley Railroad Company  
 Durango & Silverton Narrow Gauge  
 Union Pacific Railroad  
 Strasburg Railroad  
 Hartford Steam Boiler Inspection & Insurance Company  
 National Board of Boiler Inspectors  
 ABB/Combustion Engineering  
 Smithsonian Institution  
 FRA

In addition, a locomotive engineer and several steam locomotive experts, now working as consultants, participated in the proceedings.

To accomplish its goal, the Task Force met approximately six or seven times during an eighteen month period. During these meetings, the Task Force evaluated a previous ESC proposal to revise Part 230, which had been presented to FRA in the early 1990's. Many of the issues in this proposal engendered much discussion and debate within the Task Force. Brief summaries of those discussions are recorded in the

appropriate parts of the section-by-section analysis portion of this document. Technical details supporting certain recommendations are not specified in this notice but are recorded in the docket and were discussed by the Task Force. A few issues have been designated by FRA as "major issues" and are more fully discussed below.

On September 19, 1997, the THWG communicated to the agency their unanimous consensus that the Task Force's proposed recommended rule text revisions to Part 230 should be forwarded to the RSAC. On January 16, 1998, both the task force, and the full THWG reached consensus that the proposed preamble should be included in the package presented to RSAC. The RSAC was presented with the entire package during its January 27, 1998 meeting. The RSAC considered this proposal and made consensus recommendations to the Administrator of FRA. This document reflects the Administrator's utilization of those recommendations, consistent with applicable law and Presidential guidance.

Throughout this document, the agency explains the rationale and deliberative thought processes of the task force of which it was a part. Unless otherwise noted, the agency agrees with the reasoning and explanations advanced by the task force for making the proposed revisions to these standards contained in this NPRM. The task force's deliberations were frequently characterized by robust debate. Throughout this document, wherever necessary to explain proposed revisions, the agency tries to recapture as much of that debate as is relevant and practical.

## V. Task Force Goals

During an early meeting, the task force identified several goals for revising Part 230:

- (1) harmonizing FRA and National Boiler Inspection Code terminology and standards;
- (2) modernizing the rules to reflect current operating realities;
- (3) eliminating any incentives, financial or otherwise, for operators to not follow the rules;
- (4) encouraging the use of new technologies; and
- (5) producing a rule that is more enforceable for being more clearly written and more understandable.

These goals are reflected throughout this document and are embodied in the changes proposed.

## VI. Reorganization of Part 230

The 1978 standards are divided into two main parts—one for the steam locomotive boiler and its appurtenances, and the other for the steam locomotive and tender. As part of the proposed revisions to Part 230, the agency has restructured the rule so that it would contain a “general” part, Subpart A, which would contain provisions that would apply to the entirety of Part 230, a boiler part, Subpart B, applicable to the boiler and its appurtenances, and a locomotive part, Subpart C, applicable to the steam locomotive and tender. Some of the concepts contained in the proposed Subpart A were formerly contained in Subparts A and B of the 1978 standards. This proposal is designed to reduce and eliminate identified redundancies in the 1978 standards, and to make the rule more clear, readable and understandable.

## VII. Major Issues

### A. Responsibility for Compliance.

The agency is proposing to change the term “railroad company” throughout the body of the rule to the term “locomotive owner and/or operator,” consistent with the task force proposal to do so, in order to reflect the change in steam locomotive operating practices. Many railroad companies are not in the business of either owning or operating steam locomotives today. While some tourist railroads own and operate their own locomotives, frequently steam locomotives are owned and/or operated by entities other than the railroad on whose line they operate. Hence, in many instances, the locomotive owner and/or operator is in a much better position than the railroad company to ensure compliance with various regulatory requirements. Thus, the task force recommended, and the agency is proposing, to more specifically affix responsibility—throughout the rule—on those who are primarily responsible for the locomotive. In most cases, that is the locomotive owner and/or operator. The task force debated how to best articulate the liability standard—whether to use “owner and operator,” “owner/operator,” or “owner or operator.” They settled on the “owner and/or operator” construct as the clearest method for affixing joint and severable liability for the inspection and maintenance of steam locomotives on the owner and operator. In certain sections of the rule, however, the owner and the operator are individually identified as the appropriate party on whom liability would rest.

Moreover, as provided by statute, the railroad would also be liable for permitting any entity to use a noncomplying locomotive on its line (see section-by-section discussion of section 230.4, below). The adoption of the owner and/or operator language is a clear signal that FRA intends to look first to the owner and/or operator to ensure compliance, whether or not that happens to be the railroad. It is important to note that the proposed applicability section, section 230.2, which the agency modified from that originally submitted by the task force, uses the term “railroad” to describe where the rule applies. As discussed in the section-by-section analysis for the applicability section, the agency is proposing this change to harmonize all of its applicability sections. Since this section best expresses where the rule applies, as contrasted with the proposed “Responsibility for Compliance” section, § 230.8, which best expresses to whom the rule applies, the agency does not expect this change to effect a substantive revision of the task force’s proposal.

### B. Inspection Scheme

In this rule, the agency is proposing to change the inspection scheme for steam locomotive boilers to allow for the changed nature of modern steam locomotive operations. The 1978 standards require steam locomotive boilers to be inspected at various time periods that are linked to an annual calendar, regardless of the amount of actual usage the locomotive has incurred. When locomotives were in continuous service, this system was not unduly burdensome. Operation of steam locomotives today, however, occurs much more infrequently, sometimes only a few times a year. Under the new inspection scheme, locomotives would be required to be inspected based on the number of “service days” they accrue, with various intermediate calendar inspection requirements retained to ensure an adequate level of safety.

#### 1. Service Days

This new scheme would be underpinned by the concept of a “service day,” which would be defined as any day the locomotive has steam pressure above atmospheric pressure and a fire in the firebox. Because good practice for steam locomotive operation requires that the locomotive boiler be slowly heated before use and slowly cooled after use, due to the damage such rapid heating and cooling can cause the metal of the boiler, a locomotive that runs on weekends could incur three service days for one actual day of “use.”

Thus, the locomotive could have fire in the firebox and pressure above atmospheric pressure for an entire day before it actually runs, for the entire day that it runs, and during the time it takes to cool down after the day it runs, which could run into a third service day. Some operators were concerned that this definition would create an incentive for operators to “dump” their fires after operating the steam locomotive to avoid incurring an extra service day. The task force was of the opinion, however, that the financial cost to operators who might so dump their fires (in terms of stress and damage to their boilers from such behavior) would likely outweigh any inspection time period benefits they might gain from such dumping. The task force also articulated its belief that, with proper damping and draft restriction, fire can be removed from the firebox (and a service day preserved) with no adverse affects for the boiler—and that this practice can be, in fact, easier on the boiler than banking the fire.

#### 2. Daily Inspection

The proposed new “daily inspection” section would make clear the inspection requirements for locomotive owners and operators. The 1978 standards contains no requirement for a daily inspection, other than a requirement that the locomotive and tender be inspected “after each trip, or day’s work.” In the proposed section, the agency would retain that general daily inspection requirement for each day that the locomotive is “offered for use,” but also would impose a “pre-departure” requirement for the locomotive to be inspected at the beginning of each day the locomotive is actually used, with particular attention called to certain safety critical items—the water glasses and gauge cocks, the boiler’s feedwater delivery systems, the air compressors and governors, and the air brake system.

#### 3. 31 and 92 Service Day Inspections

The proposed rule also requires 31 and 92 service day inspection requirements, which would roughly correspond to the monthly and three month inspections in the 1978 standards.

#### 4. Annual Inspections

The proposed rule includes annual inspection requirements that would be similar to the 1978 standards, requiring that the locomotive be inspected after 368 days have elapsed from the time of the prior annual inspection. The 1978 standards require that certain items be inspected at least “once every 12 months.” The proposal for the annual

inspection, as for all other inspections, would incorporate the inspection requirements for all inspections required to be conducted at earlier intervals. Thus, locomotives that are operated infrequently enough to not accrue either 31 or 92 service days would have those inspections conducted, at a minimum, once each 368 calendar days. In addition, this proposal would modify the inspection time period for flexible staybolts and caps from once each 2 years under the 1978 standards to during each 5th annual inspection.

#### 5. 1472 Service Day Inspection

Finally, the 1978 standards require that the boiler be inspected, at a minimum, once each 5 calendar years (boiler interior must be inspected after 48 calendar months, within 5 consecutive years, and boiler exterior must be inspected every 5 years, or if the locomotive is out of service for at least one full month, then after 60 calendar months within 6 consecutive years). This inspection is a major one, requiring the removal of the jacket and lagging to conduct the exterior inspection, and the removal of all flues in the locomotive boiler to conduct a "minute" inspection of the interior of the boiler. The agency is proposing to modify this requirement by requiring that these inspections be conducted when the locomotive has accrued 1472 service days, not to exceed 15 years. As explained earlier, in section IX(B), the proposed revisions to these standards are designed to track the amount of actual usage the steam locomotive receives. The 15 year maximum, beyond which time the 1472 service day inspection would have to be conducted, is derived from the Task Force's collective experience.

As part of the 1472 service day inspection, the agency is also proposing to require the completion, verification and updating of the locomotive's Form 4, the "specification card" required by § 230.54 of the 1978 standards. The agency is making clear that this form must be verified, and updated as necessary, to reflect the current condition of the boiler following the conduct of each 1472 service day inspection.

This recordkeeping requirement would not actually be new, although it might seem as such to some; it would merely clarify and make express what the 1978 standards already require. Because some locomotive owners and/or operators may not understand that the 1978 standards required that the Form 4 be continuously accurate,

however, this change might be perceived as new.

The 1978 standards do not expressly require periodic surveying to verify the accuracy of the current Form 4, nor the updating of any changes thereto, although doing so was required by the language of the form itself, which required a testimonial that all information was true and accurate, and by the actual language of the 1978 standards itself, which required that the Form 4 be updated to reflect boiler repairs or changes that might affect the Form 4 data.

In addition, the agency is proposing a competence requirement for the conduct of the 1472 service day inspection and for the surveying of the boiler to recalculate the Form 4. Accordingly, this proposal would require that an individual competent to do so conduct the 1472 service day inspection and, at that time, that an individual competent to do so survey the boiler to evaluate the accuracy of the current Form 4 and use those survey results to recalculate the Form 4, if necessary. The recalculated Form 4 would have to be filed within 1 month after the completion of the 1472 service day inspection.

#### 6. FRA Inspection Oversight

To ensure an adequate level of safety in light of these relaxed time periods, the group recommended, and the agency is proposing, an increased amount of FRA oversight for these inspections. Thus, for certain of these periodic inspections, the agency would be offered the opportunity to be present during the conduct of some, or all, of the inspection. In the case of the 31 service day inspection, the agency would bear the responsibility for communicating to the locomotive owner and/or operator that FRA wants to be notified prior to the inspection and given an opportunity to attend. Once that occurs, however, the owner and/or operator would have to provide the agency with a scheduled date and location for the inspection. At that time, any changes to that schedule would have to be mutually agreed upon. This proposed approach would balance competing interests and would comport with the task force's deliberations. The task force wanted to provide owners and operators the flexibility to conduct their business without unreasonable interference by FRA scheduling conflicts; however, they also intended that owners and/or operators would act in good faith and take all reasonable measures to accommodate an FRA request to be present.

In the case of the annual inspection, however, the locomotive owner and/or

operator would bear the onus of providing FRA with one month's prior notice that the annual inspection is to be conducted. The agency would then have the option of indicating a desire to be present for some, or all, of this inspection. The locomotive owner and/or operator would, at that point, have to provide FRA with a scheduled date and location for each aspect of the inspection. As with the 31 service day inspection, once scheduled, any scheduling changes would have to be mutually agreed upon.

This notification scheme would allow the agency to observe the locomotive owner and/or operator's conduct of various inspections, and would allow the FRA field personnel directly responsible for inspecting steam locomotive operations to work cooperatively with the regulated community and to obtain better information about the condition of the steam locomotives in their territories.

#### C. Elimination of Availability of Waivers

In this rule, the agency is proposing to eliminate the availability of all waivers currently available under this part. The 1978 standards contain a section that allows for the "modification of rules" for "roads operating less than 5 locomotives" upon a showing that conditions warrant it. This language predated the agency's formal waiver process, codified at 49 CFR 211.41, and was originally intended to apply only to the subpart addressing the steam locomotive and tender, and not the subpart addressing the locomotive boiler. In addition, the flue removal section in the 1978 standards would allow extensions of the time period for removing flues, and for conducting the comprehensive boiler inspection, upon formal application to the Director of the Bureau of Railroad Safety. Thus, throughout the agency's eight regions, different locomotives have been allowed to delay the conduct of the boiler inspection by varying amounts of time based, in part, on the regional processes for addressing these requests. By eliminating the waiver provision, the agency would accomplish several things: (1) regulatory clarification that the agency's waiver process in Part 211 is the appropriate vehicle for gaining relief from the requirements of this part; (2) national knowledge and coordination of all waivers considered and granted for steam locomotives; and (3) an added level of assurance that steam locomotives are being regulated consistently. The group also felt that such extensions and waivers under this part would generally no longer be necessary given the flexibility being

afforded by the proposed new inspection scheme—but where necessary, would be best addressed by the centralized waiver process provided for in Part 211.

#### *D. Standard for Repairs*

The agency is proposing to regulate the standards for making certain repairs to the steam locomotive and boiler. The task force was concerned about controlling the quality of the repairs made to steam locomotives and boilers and decided to impose, as a minimum, the requirement that repairs be made in accordance with an “accepted industry standard.” While the task force debated simply requiring that repairs be made in accordance with the National Board Inspection Code (NBIC) published by the National Board of Boiler and Pressure Vessel Inspectors (NBBPVI) or the American Petroleum Institute (API) established standards, it ultimately recommended that the agency afford industry members a measure of flexibility by acknowledging the canon of established railroad practices that have been successfully utilized over time; this proposal reflects that decision. While there was some concern about whether the term “accepted” was too vague, the task force felt that it was a knowable quantum—that industry members knew what was required to ensure that repairs are properly made. Due to the small size and close-knitness of the steam locomotive community, the group felt that imposing an “accepted industry standard” on repairs made, and allowing that standard to include “established railroad practices, or NBIC or API established standards” would result in an equivalent level of quality in the repairs made. This proposal reflects those decisions also. Finally, as used in this proposal, “established railroad practices” would mean a practice used by one or more railroads over a period of time that could be reasonably shown to have been successful in service, or that most industry members would agree is an appropriate standard to use for a given repair. In practice, the locomotive owner and/or operator would bear the onus of proving that the standard is established within the railroad community and that it is appropriate for the repair under consideration.

The agency also is proposing to expressly allow welding on both stayed and unstayed portions of the boiler, with some limitations. While the 1978 standards did not prohibit welding on unstayed portions of the boiler, it was widely understood that such welding was not allowed. Thus, by expressly

allowing it, this proposal would suggest a fairly radical change.

In section 230.33 of this proposed rule, “Welded Repairs and Alterations,” the agency is proposing requiring prior approval for any welding done on unstayed portions of high carbon boilers (greater than 0.25% carbon); the risk of welding on the boiler is much higher for boilers with a high carbon content. Welds on unstayed portions of lower carbon boilers (less than 0.25% carbon) would not be similarly restricted.

For both low and high carbon boilers, however, the agency is proposing to impose a repair standard that allows the locomotive owner and/or operator a measure of flexibility while simultaneously insuring a minimum level of safety. Accordingly, the agency is proposing to require that any welded repairs to unstayed portions of the boiler be performed in “accordance with an accepted national standard for boiler repairs.” This would modify the general repair standard discussed above to more narrowly apply to boiler repairs.

By referencing an accepted national standard for boiler repairs, the task force, and the agency, wanted to impose a measure of quality control to provide assurance that any welding done is done well, and done safely. Because there are several national organizations that prescribe such procedures, the operator would be allowed to follow any one of a number of methods. “In accordance with an accepted national standard for boiler repairs,” therefore, would mean that all physical, mechanical, and documentation requirements delineated in a particular standard, such as the NBIC, have been satisfied. The task force heavily debated simply imposing the NBIC standard itself but decided that the financial burden imposed would be too great. The NBIC program requires reporting of the final repair and third-party oversight throughout the repair, which can be very costly. The task force felt the inspector oversight and reporting requirements already mandated by the agency would perform the same function as the NBIC third-party inspection and reporting requirements. Accordingly, the task force decided to simply reference the standard to which the repair should be done, without incurring the reporting requirements, or third-party inspection requirements, of the NBIC. This proposal reflects that decision.

The task force was also very concerned about follow-up radiography for the welds conducted, and considered mandating that all welds on unstayed portions of the boiler be radiographed. At one point they considered incorporating an American

Society of Mechanical Engineers (ASME) radiography standard, which described the procedures for conducting radiography, but ultimately concluded that doing so would be more complicated than they desired this part to be, and that doing so was ultimately unnecessary because the accepted national standard would include radiography where necessary. Accordingly, this proposal does not mandate radiography separate from that required by the accepted national standard chosen for the welded repair at issue.

The task force discussed the potential for abuse of the “accepted national standard for boiler repairs” standard but felt that this section clearly requires locomotive owners and/or operators be able to establish and/or document such a national standard—to point to the procedures they followed in performing a particular weld. The locomotive owner and/or operator would bear the onus of establishing that they followed a particular national standard and did so correctly. Accordingly, this standard would require that the locomotive owner and/or operator adhere to whatever the particular national standard requires, from pre-weld treatments and welder qualifications, through post-weld inspection requirements. The locomotive owner and/or operator would also have to demonstrate that they had satisfied the accepted national standard upon request by an FRA inspector.

#### *E. Allowances Encouraging the Use of New Technologies*

The task force felt very strongly that the 1978 standards, which had not been substantively revised in over 20 years, did not adequately address new technologies. Accordingly, the task force wanted the rule to address innovations in inspection and maintenance methodology and technology. In many instances, the task force was concerned about the excessive wear on the locomotive, boiler and appurtenances from complying with aspects of the 1978 standards. The task force also felt that the altered nature of steam locomotive service today provided additional justification for updating the rule to reflect modern operating circumstances, and to encourage the use of non-destructive technologies to satisfy various inspection requirements. Accordingly, in many sections of this proposed rule, the agency is encouraging the use of advanced technologies by proposing to grant additional regulatory flexibility where such technologies are utilized. In some cases, however, the task force

recommended, and the proposal incorporates, mandatory non-destructive examination (NDE) testing for safety reasons. The main sections affected are: (1) the flue removal section, 230.31; (2) the Arch tube, water bar tube and circulator section, 230.61; (3) the dry pipe section, 230.62; (4) the main reservoir testing section, 230.72; and (5) the draw gear and draft system section, 230.92.

#### *F. Imposition of Qualification Requirements for Repair*

By referencing national standards, this proposed rule would address, for the first time, the qualification requirements for individuals making repairs to steam locomotives. Both the NTSB, and the task force, felt strongly that the rule should address minimum requirements for individuals making certain repairs. Thus, wherever national standards call out qualification requirements, steam locomotive owners and/or operators making such repairs would have to comply with these requirements. The task force considered imposing more explicit qualification requirements than those imputed from these national standards but concluded that such was not necessary at this time. FRA shares that view and is not proposing more explicit qualification requirements.

#### *G. Implementation Schedule*

FRA is proposing a gradual phase-in of Part 230 to allow locomotive owners and operators the flexibility necessary to bring their operations into compliance. See section 230.3 for a full discussion of the proposed implementation schedule. FRA is proposing that some requirements must be complied with one year after the proposed effective date for the final rule. In addition, FRA proposes that locomotive owners and/or operators will be allowed to request flue removal extensions until two years after the proposed effective date for the final rule. Finally, locomotive owners and/or operators that qualify to file a Petition for Special Consideration would be required to do so within one year from the proposed effective date for the final rule and the agency will have one year to consider and respond to any petitions filed.

### **VII. National Transportation Safety Board Recommendations**

Following their investigation of the 1995 steam boiler explosion on the Gettysburg Passenger Services railroad, the NTSB issued the following recommendations to the agency:

(1) Require that each operating steam locomotive have either a water column

or a water glass in addition to the water glass and three gage cocks that are already required. (*R-96-53*).

(2) Require steam locomotive operators to have a documented water-treatment program. (*R-96-54*).

(3) Describe basic responsibilities and procedures for functions required by regulation, such as blowing down the water glass and washing the boiler. (*R-96-55*).

(4) In cooperation with the Tourist Railway Association, Inc. (TRAIN), promote awareness of and compliance with the Hours of Service Act. (*R-96-56*).

(5) In cooperation with the National Board of Boiler and Pressure Vessel Inspectors and the TRAIN, explore feasibility of requiring a progressive crown stay feature in steam locomotives. (*R-96-57*).

(6) In cooperation with the National Board of Boiler and Pressure Vessel Inspectors and the TRAIN develop certification criteria and require that steam-locomotive operators and maintenance personnel be periodically certified to operate and/or maintain a steam locomotive. (*R-96-58*).

(7) In cooperation with the National Board of Boiler and Pressure Vessel Inspectors and the TRAIN, update 49 CFR Part 230 to take advantage of accepted practical modern boiler-inspection techniques and technologies, to minimize interpretation based on empirical experience, and to maximize the use of objective standards. (*R-96-59*).

This proposed rule reflects the careful consideration of these recommendations, both by the agency and the industry advisory committee members who advised the Administrator regarding revisions to this Part. That advisory committee task force was comprised of steam locomotive experts, steam railroad operators, steam boiler insurance companies, the National Boiler Inspection Code Committee, Volpe National Transportation Systems Center (Volpe Center) and several representatives from FRA. Representatives of NTSB were offered a seat at the table but declined. FRA requested that the task force address the NTSB's recommendations and suggest appropriate responses. The results of that discussion were as follows:

*R-96-53 Water Glasses*—The task force expressed support for this recommendation, and section 230.51 of this proposal, which requires a minimum of two sight glasses or a sight glass and a water column, reflects that. The proposal eliminates

the requirement that boilers be equipped with gage cocks because the task force felt that the second water glass was more accurate and easier to read. This proposal does require, however, that the gage cocks be maintained on a locomotive equipped with them.

*R-96-54 Water Treatment*—Industry members of the task force did not express support for NTSB's proposed water treatment requirement because they felt that the current regulatory focus on boiler washing was adequate to address the condition of the boiler interior, and to prevent the build up of sediment and mineral deposits. The task force also felt that water treatment programs could be unduly burdensome, especially for steam locomotives with a single water source that requires constant testing due to water quality variations, or where locomotives travel long distances and draw water from numerous sources. Finally, the industry members felt that the issue of water treatment should be addressed in a performance standard, but they indicated that it would be impossible to write a uniform performance standard. FRA agrees that the fundamental issue is the interior condition of the boiler, and the task force recommendations and FRA inspection practice adequately addresses the condition of the boiler interior.

*R-96-55 Delineation of Responsibilities*—The task force expressed support for this recommendation, and this proposal attempts to clearly delineate basic responsibilities and procedures. In addition, the Volpe Center has produced a training video for steam-locomotive operators for FRA. The video covers items required during daily inspections and pre-trip inspections, such as blowing down water glasses, checking gage cocks and other items to ensure the safe operation of a steam locomotive. This video was unveiled during TRAIN's annual convention in November of 1997, and was mailed to steam locomotive owners and operators throughout the country shortly thereafter. Finally, the industry members of the group endorsed putting together a "Recommended Practice Manual" (RPM) for many issues that this proposal does not address. The agency will continue to work with the industry on the development of a RPM.

*R-96-56 Hours of Service Act Awareness*—The industry members indicated support for FRA's working

in tandem with the TRAIN to promote awareness of the Hours of Service Act. The agency will work with TRAIN to increase awareness of Hours of Service Act requirements, and to promote compliance with the Act.

*R-96-57 Progressive Crown Stays—*

The industry representatives indicated their willingness to explore the feasibility of progressive crown-stays but did not think time would permit their addressing this issue in the Part 230 revisions. FRA has requested that the NTSB make staff assistance available to the task force to outline the steps necessary to conduct this evaluation.

*R-96-58 Certification Program—*

The industry representatives expressed support for this recommendation and are investigating the feasibility of developing certification criteria for several classes of employees or volunteers affected. Some members, however, expressed concern about the cost involved in assessing job and task requirements. The agency would prefer to promote a voluntary certification program. While the current standards for Qualification and Certification of Locomotive Engineers contain training requirements that may serve as a framework for better defining the competencies of steam locomotive operators, those regulations do not currently apply to operations off the general system of rail transportation. Administering a technically elaborate certification program that would ultimately affect the operation of fewer than 150 locomotives does not appear to be a wise use of scarce federal resources. Following completion of the Steam Locomotive Standards revision, FRA will encourage the Tourist & Historic Working Group to carry forward this discussion, with the objectives of supporting private initiatives and offering technical support for sound training programs, including evaluation of current competencies.

*R-96-59 Modernization of Part 230—*

Industry members expressed support for this recommendation and are accomplishing this through its partnership with FRA on the Railroad Safety Advisory Committee/Tourist & Historic Working Group task force.

FRA submitted responses to the NTSB's recommendations and, recently, received the NTSB's reply to our response. The NTSB was satisfied with the agency's plan, influenced by the task force recommendations, to address NTSB recommendations R-96-53, R-96-55, R-96-56, and R-96-59 but was,

however, dissatisfied with our plan to address recommendations R-96-54, R-96-57, and R-96-58. These three latter recommendations will be discussed at greater length below.

FRA concurs with the task force responses to NTSB's recommendations and believes that the proposed revisions to the steam locomotive regulations will address most of those recommendations. The agency invited NTSB staff to participate in the task force deliberations, but they were unable to do so. FRA believes that a full technical exchange of views would have been helpful to resolving the remaining recommendations. Notwithstanding the following explanation (which the agency supports) of the task force's deliberations, below, and why they did not agree with certain of the NTSB's recommendations, any party supporting those recommendations should submit data and analysis indicating the safety need for a more prescriptive approach.

NTSB's recommendation R-96-54 would require operators to maintain a documented water treatment program. The task force simply disagreed that such a program was necessary. They felt that the boiler washes were the real issue, not the chemical remediation of the owner or operator's water source. THE NTSB, in its response, concurred with the task force that the wash is "probably more directly effective in controlling boiler sediment and mineral deposits." However, the NTSB added, "a documented water treatment program does not have to be expensive, rigid or burdensome." While the agency lacks the data to evaluate the cost-effectiveness of any such program, it doesn't feel such an inquiry is necessary since all parties agree that the wash is the most "directly effective" method of preventing boiler sediment and mineral deposits. Based on discussions in the task force and field experience concerning steam boiler maintenance, it is the agency's judgement that safety will not be enhanced by incorporating this additional requirement into the rule. Operators are always free to voluntarily conduct their own water treatment programs (and many do). Given the effectiveness of the boiler wash, it does not appear to be cost-beneficial to mandate documented water treatment programs at this time. FRA is also concerned with the paperwork burdens associated with such a program. Federal agencies are mandated to reduce information collection burdens, and regulatory burdens on small entities are to be minimized. However, and notwithstanding the above, anyone with specific data and analysis supporting

this recommendation should submit it for the agency's consideration.

The NTSB's recommendation R-96-57 would require the agency to explore the feasibility of progressive crown-stays in mitigating the damage caused by boiler failures. The task force's experience with progressive crown stays was not enough, without more, to support a mandate at this time. The agency, in consultation with the task force, indicated to the NTSB its willingness to do so, but felt it lacked time and resources to adequately address this issue at this time, in this rulemaking. The NTSB found this response unacceptable. The agency told the NTSB they would appreciate the Board's making available staff assistance to the task force to help outline the steps necessary to conduct this evaluation. No assistance was forthcoming. The agency remains open to this issue but believes that research is necessary before it can conclude, one way or another, that progressive crown stays are a cost-beneficial safety enhancement. Any party with data or analysis related to progressive crown stays, and their role in mitigating boiler failures, should submit it to the agency at this time.

Finally, NTSB recommendation R-96-58 would require the agency to develop a certification program for steam locomotive operators and maintenance personnel. The agency prefers to promote a voluntary certification program, given the scarcity of federal resources available to administer a technically elaborate certification program for such a small number of affected entities. The Tourist and Historic Working Group's task force has already created and produced, with the Volpe Center, a training video for the conduct of steam locomotive daily inspections. This video was aired during the TRAIN convention held in November of 1997, and was mailed to each steam locomotive owner or operator for whom the agency had user fee records. This is but a first step in response to the NTSB's recommendation; the agency plans to work with the regulated community to carry forward this discussion and will support private initiatives, offering technical support for training programs, including the evaluation of current competencies of steam locomotive operators and maintenance personnel. Of course, any party supporting the NTSB's recommendations should submit data and analysis indicating the safety need for a more prescriptive approach.

### Section-by-Section Analysis

The following section-by-section analysis discusses the proposed changes in more detail. As an aid to readers, FRA has denominated as "new" sections of the proposed rule which lack a present counter part.

#### Subpart A—General

FRA is proposing in this subpart to add a series of provisions comparable to those found in its recent regulations. Through these uniform provisions, FRA makes explicit the scope, purposes and applicability of these rules and the potential consequences of noncompliance with the rules once adopted.

#### Section 230.1. Purpose and Scope (New)

This section proposes to make explicit the scope of Part 230, and that these proposed standards are minimum standards only.

#### Section 230.2. Applicability (New)

As described in the above "Responsibility for Compliance" discussion, the task force wanted to rewrite this Part to make clear that the steam locomotive regulations would apply primarily to steam locomotive owners and/or operators. Their proposed applicability section read as follows:

This part applies to any entity which owns a steam locomotive or operates one under a contract, agreement or lease. This part does not apply to entities that own or operate steam locomotives over track that is less than 24 inches in gage or to entities that are considered "insular" by this agency. See Appendix A for a current statement of the policy on the Federal Railroad Administration's (FRA's) exercise of jurisdiction.

Although the agency changed this language to text that is more in keeping with the purpose and language of the applicability provisions of FRA's other rules, this will not defeat the task force's clear objective to place responsibility primarily on the owner and/or operator of the locomotive, since the *Applicability* section does not indicate on whom the rule will place responsibility for compliance, but rather indicates where, geographically, the rule will apply. That is, the *applicability* section indicates on which railroads the rule will apply. By statute, FRA has jurisdiction over all railroads (except for urban rapid transit operations not connected to the general system), but it frequently limits the reach of a particular rule to something less than the entire universe of railroads, and uses the applicability section to clarify which operations are intended to be covered by

the rule. Individuals trying to determine whether they must comply with this Part should turn to section 230.8 *Responsibility for Compliance*, for guidance. That section, which captures and retains the task force intent expressed in their recommended "Applicability" language, would indicate to whom the rule applies. In this rule, that would specifically include the locomotive owner and/or operator.

Notwithstanding elimination from the *Applicability* section, the locomotive owner and/or operator remain specifically identified throughout the rule as the party or parties best able to execute certain delineated inspection and maintenance responsibilities. Thus, the fact that the locomotive owner and/or operator have been removed from the *Applicability* provision does not mean that they will not be held primarily responsible for compliance; rather, section 230.2 should be seen as standard language used to describe the extent of the agency's exercise of its statutory jurisdiction, with section 230.8 providing the practical compliance guidance that the task force included in the *Applicability* section it recommended.

Accordingly, this section proposes to make these standards apply to all railroads that operate steam locomotives. This section further carves out four categorical exceptions (three of which are "standard" exceptions) to this broad expression of regulatory authority. First, this section, as proposed, would not apply to railroads with less than 24" gage. This section is not standard, but is consistent with the agency's historical approach to exercising its safety jurisdiction. Railroads on less than 24" gage have never been considered railroads by the Federal railroad safety laws and are generally considered miniature or imitation railroads. In the context of this rule, which will clearly apply to certain operations of less than standard gage, it is important to clarify that the smallest gage railroads are not included.

Second, this section, as proposed, would not apply to "plant" railroads that exclusively operate freight trains on track inside an installation that is not part of the general system of transportation. This is a standard provision.

Third, this section, as proposed, would not apply to urban rapid-transit operations that are not connected to the general system of transportation. This is also a standard provision that merely restates the statutory limit on FRA's jurisdiction for the convenience of the reader.

Finally, this section, as proposed, would exclude from its reach a railroad that operates passenger trains only on track inside an insular installation—one that's operations are limited to a separate enclave in such a way that the safety of those who do not enter the enclave is not affected by the operations. Insularity is destroyed, however, and the rule would apply, where any of the following exists: (1) a public highway-rail crossing that is in use; (2) an at-grade rail crossing that is in use; (3) a bridge over a public road or commercially navigable waters; or (4) a common corridor with another railroad, i.e., operations conducted within 30 feet of those of any other railroad. This section, too, is standard and reflects the agency's long-standing policy on its exercise of jurisdiction over tourist and historic railroads. This language is used where FRA intends to reach tourist railroads whose operations are not over the general railroad system but affect public safety sufficiently to be covered by a particular rule. As proposed, this section includes the word "installation" in its discussion of this Part's applicability to entities that operate "passenger" trains. While the agency has included this term with specific reference to passenger operations in three of its rulemakings over the past few years,<sup>1</sup> the agency believes that the regulated industry may not be accustomed to seeing this term in the context of tourist railroads, instead of the customary "plant railroad" context. It is the agency's view that an "installation" is simply a separate enclave off the general system.

#### Section 230.3. Implementation (New)

This section proposes a staggered implementation scheme to provide additional flexibility to locomotive owners and operators who might be otherwise adversely affected by the magnitude of changes being proposed. The implementation language was strenuously debated by all members of the task force. The task force's greatest concern related to the potential that locomotive owners and/or operators would be required under the proposed rule to conduct an inspection equivalent to that required by this rule's section 230.17 sooner than they would be required to do so under section 230.10

<sup>1</sup> See Power Brake Regulations NPRM, 59 FR 47676 (September 16, 1994); Railroad Accident Reporting NPRM, 59 FR 42880 (August 19, 1994); and Grade Crossing Signal System Safety Final Rule, 59 FR 50086, (September 30, 1994). Subsequent publications in the Grade Crossing (GC) and Accident Reporting (AR) arenas have included this language as well. See 61 FR 30940 (AR) (6/18/96), 61 FR 31802 (GC), (6/20/96), and 61 FR 67477 (AR) (12/23/96).



of the 1978 standards. This concern was balanced against the concern that locomotive owners and/or operators not be granted a "windfall" and allowed more time under the proposed standards than wise to ensure an adequate level of safety.

The task force's primary desire was to apply the new inspection requirements retroactively to certain locomotives that had complied with section 230.10 and section 230.11 of the 1978 standards within a set period of time prior to the effective date of the rule. The task force had a great deal of difficulty determining the appropriate period of time prior to the rule's effective date to allow retroactive application of the proposed inspection standards. The Association of Railway Museums, in particular, wanted to allow locomotive owners and/or operators that had satisfied the inspection requirements under the 1978 standards within ten years prior to this rule's effective date to compute the time for conducting the 1472 service day/15 year inspection from the date on which those inspections were conducted.

The compromise which resulted is reflected in this section. This section would make the conduct of the 1472 service day inspection the trigger for compliance with the entire part, and would require the 1472 service day inspection to be conducted at the time the inspection under section 230.10 of the 1978 standards would be required under the 1978 standards. Thus, with the exception of certain items that become effective one year from the effective date of the rule, the locomotive owner and/or operator would have to begin to comply with the entirety of the rest of Part 230 whenever they conduct the 1472 service day inspection required under the proposed standards. Up until that time, however, compliance with the regulations in effect prior to the effective date of this rule would constitute full compliance with this part.

To provide additional flexibility, however, the agency is proposing to continue to consider flue removal extensions under the provisions of section 230.10 of the 1978 standards until two years from the effective date of the rule. Thus, in a typical case, a locomotive that had received an inspection under section 230.10 of the 1978 standards up to five years ago would have, with this flue extension provision, a potential minimum of two years from the effective date of the rule to conduct the 1472 service day inspection required by these proposed standards. If the locomotive had very recently received the inspection

required by section 230.10 of the 1978 standards, likewise, the locomotive owner and/or operator would have the entire period allowed under that section before conducting the 1472 service day inspection required by these proposed standards.

Notwithstanding the above, the implementation section also proposes allowing locomotive owners and/or operators to petition the agency for "special consideration" of the rule's implementation. In order to qualify to file a petition for special consideration, the locomotive owner and/or operator would have to have either fully or partially satisfied the proposed 1472 service day inspection requirements within three years prior to the effective date of this rule. If the locomotive had only partially satisfied the requirements of this section, it would have to be in full compliance by the time the petition is actually filed. The petition would have to be filed within one year from the effective date of the rule and would have to include all documentation necessary to establish that the locomotive had satisfied the requirements of the proposed 1472 service day inspection standards. The agency would then respond to the petition within one year. Thus, the time involved in filing a petition for special consideration, and for receiving FRA's response to that petition, would be the same as the two-year grace period allowed to non-petitioning locomotive owner and/or operators who utilize the available flue extension provision. The caveat to this, however, is the additional 6-month extension which would be allowed where the agency did not respond in a timely fashion.

As this language is proposed, the distinction between "full" and "partial" satisfaction relates to the dual requirements of this rule's section 230.17—both the inspection, and the updating and verification of the Form 4. A locomotive that had satisfied both of these requirements within three years prior to the effective date of this rule would be able to file the petition the day the rule becomes effective. A locomotive that had only satisfied one requirement, however, would have "partially" satisfied the requirements of section 230.17 and would have the term of the petition process, one year, to satisfy the second requirement. For example, a locomotive owner and/or operator who had inspected their locomotive under section 230.10 of the 1978 standards within three years prior to the effective date of this rule, without updating and verifying the Form 4 at that time, would have a full year to do so before submitting the application. Likewise, if

the Form 4 had been updated and verified within three years prior to the effective date of the rule but an inspection satisfying section 230.10 of the 1978 standards had not been conducted, the locomotive owner and/or operator would have one year to conduct the qualifying inspection before submitting their application for special consideration.

This section also contains provisions to address the requirements related to the filing of the petition. As proposed, this section would require petitions to be accompanied by documentation sufficient to allow the agency to determine the number of "service days" the locomotive has accrued from the date of the inspection conducted under the 1978 standards, and how many service days remain before the 1472 service day inspection must be conducted under this rule's section 230.17. The task force was concerned about proving the submission and response to the petition, so the proposed rule would recommend that petitions, and the agency's response thereto, be sent by some form of registered mail to ensure a record of delivery. In addition, this section contains provisions addressing the effect of the petition's disposition on the implementation requirements. If the agency were to grant the petition, the requirements would become effective upon receipt of the response letter. Likewise, if the agency were to deny the petition, the rule would become effective as though the petition had never been filed.

Finally, because many task force members were concerned about the problem of potential untimeliness in the agency's response, this section would address the effect of agency silence within the one year response time period. It would require the petitioner to notify the agency that the response has not been received, and would allow operators at the end of their inspection cycle to operate under the 1978 standards for an additional 6 months, or until they receive FRA's decision, whichever occurs first.

#### Section 230.4. Prohibited Acts (New)

This proposed section would merely restate, in regulatory language, the dictates of Chapter 207 of Title 49 of the United States Code.

#### Section 230.5 Penalties (New)

This section, as proposed, merely incorporates the maximum penalties provided for in the Federal railroad safety laws. These penalty amounts, however, have recently been adjusted for inflation pursuant to the Federal Civil Penalties Inflation Adjustment Act

of 1990, Pub. L. 101-410 Stat. 890, 28 U.S.C. 2461 note, as amended by the Debt Collection Improvement Act of 1996, Pub. L. 104-124 (4/26/96). For a more complete discussion of the agency's recent penalty adjustments see *Civil Monetary Penalty Inflation Adjustment*, 63 FR 11618 (March 10, 1998).

#### Section 230.6. Preemptive Effect (New)

FRA is proposing to add a preemption section, which would parallel the preemption language of section 20106 of Title 49 of the United States Code. As proposed, however, this section would modify that language to make clear that FRA does not intend to preempt states from regulating entities over which it is currently not exercising jurisdiction. Thus, in the case of an entity that operates steam locomotives over track of less than 24" gage, for example, FRA would allow states to regulate and provide oversight for the inspection and maintenance of those steam locomotives. FRA believes that such a modification is consistent with the legislative intent of section 20106.

#### Section 230.7. Waivers (New)

FRA is proposing to nullify all waivers previously granted under Part 230 unless they are filed for reassessment with the agency. Under the terms of this provision, the agency would review these waivers and notify applicants whether the waiver has been continued. Locomotive owners and/or operators would have to assume that their waiver had expired unless they heard otherwise from the agency, unless the waiver was for a "flue extension" that would automatically expire one year from the date granted.

With this proposal, the agency intends to rectify the misapplication of section 230.158 of the 1978 standards to the steam locomotive boiler and flues. Under the 1978 standards, railroads operating fewer than 5 locomotives can apply for a waiver from the requirements of Subpart B—Steam Locomotives and Tenders. This section was intended to apply only to those regulations in Subpart B but, instead, has been misapplied and extended to Subpart A as well. Consequently, under section 230.158 of the 1978 standards, modern operators frequently received waivers from provisions in Subpart A and applicable only to the boiler, such as the flue removal provision.

With this proposal, in addition, the agency intends to make explicit that its waiver process, described in 49 CFR Part 211, has been centralized since the last time this part was substantively revised. Thus, this proposed section

would recognize Part 211, instead of the 1978 standard's section 230.158, as the appropriate process for addressing waivers under Part 230.

#### Section 230.8. Responsibility for Compliance (New)

This section, as proposed, would indicate which party or parties is responsible for ensuring that the requirements of Part 230 are satisfied. See the discussion in section IX(A) "Responsibility for Compliance," above.

#### Section 230.9. Definitions (New)

The following is an explanation of each definition that FRA proposes to add or amend.

*Alteration*—This proposed definition incorporates the NBIC definition to harmonize concepts for the industry.

*ANSI*—This proposed definition is non-substantive and is included for clarification purposes.

*API*—This proposed definition is non-substantive and is included for clarification purposes.

*ASME*—This proposed definition is non-substantive and is included for clarification purposes.

*Boiler Surfaces*—This proposed definition was added to make explicit, and to help clarify, the portions of the boiler which are referenced throughout the rule.

*Break*—This proposed definition incorporates the distinction between "break" and "crack" delineated in Part 229.

*Code of Original Construction*—This proposed definition is non-substantive and is included for clarification purposes.

*Crack*—This proposed definition incorporates the distinction between "break" and "crack" delineated in Part 229.

*Locomotive Operator*—As discussed in the liability section above, the agency is proposing making its liability standards more specific, to acknowledge that many locomotives are owned and operated by entities other than railroad companies. This proposed definition distinguishes between these relevant entities to make clear that the locomotive may be owned and operated by separate entities.

*Locomotive Owner*—As discussed in the liability section above, the agency is proposing making its liability standards more specific, to acknowledge that many locomotives are owned and operated by entities other than railroad companies. This proposed definition distinguishes between these relevant entities to make clear that the locomotive may be owned and operated by separate entities.

*MAWP*—This proposed definition is non-substantive and is included for clarification purposes.

*NBIC*—This proposed definition is non-substantive and is included for clarification purposes.

*NDE*—This proposed definition is non-substantive and is included for clarification purposes.

*NPS*—This proposed definition is non-substantive and is included for clarification purposes.

*Railroad*—This proposed definition incorporates the statutory definition of railroad from 49 U.S.C. § 20102.

*Renewal*—This proposed definition incorporates industry concepts and is not intended to have substantive effect.

*Repair*—This proposed definition incorporates the NBIC definition to harmonize concepts for the industry.

*Serious Injury*—This proposed definition incorporates the definition of serious injury from the "FRA Guide for preparing Accident Incident Reports" (Effective: January 1997).

*Service Day*—As described in the inspection section above, the agency is proposing altering the inspection time periods throughout this part and proposing a new "service day" concept. This definition, as proposed, would make each day that the boiler has steam pressure above atmospheric pressure with fire in the firebox count as a "service day" for purposes of the accounting that is necessary for the rest of the inspection intervals.

*Stayed Portion of the Boiler*—This proposed definition establishes a threshold for distinguishing between stayed and unstayed portions of the boiler, both of which are identified in this part. It is not intended to have substantive effect. In addition, at least one group member was concerned that the preamble reflect that reinforced openings in unstayed portions of the boiler are not considered "stayed" for purposes of this definition.

*Steam Locomotive*—This proposed definition modifies the 1978 standard's definition of "locomotive" to make it specific to a "steam locomotive." It has also been rewritten for grammatical clarity.

*Unstayed Portion of the Boiler*—This proposed definition establishes a threshold for distinguishing between stayed and unstayed portions of the boiler, both of which are identified in this part. It is not intended to have substantive effect.

*Wastage*—This proposed definition is a technical definition and is proposed for purposes of clarifying required minimum thicknesses and condemning limits for the boiler.

#### Section 230.10. Information Collection (New)

This section, as proposed, is included for the convenience of the reader. It imposes no new requirements upon regulated entities, but simply represents the agency's certification that it has complied with all Office of Management and Budget review requirements pursuant to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et. seq.). The review and approval process reflected in this provision are explained in greater detail below.

#### *General Inspection Requirements*

#### Section 230.11. Repair of Non-Complying Conditions (New)

This section would import to Part 230 the requirement embodied in Part 229 that non-complying locomotives be repaired before they are returned to service. In addition, as proposed, it would affix responsibility for such repairs on the locomotive owner and/or operator, as well as the responsibility for approving any noncomplying conditions that are not repaired.

#### Section 230.12. Movement of Non-Complying Steam Locomotives (New)

This section would make Part 230 current with Part 229 by incorporating the concept of movement for the purpose of repair, which would allow a locomotive with noncomplying conditions to be moved for the purpose of repair, after the locomotive owner and/or operator has determined that the locomotive is safe to be moved. The task force felt strongly that this provision was necessary to acknowledge the operating exigencies which occur in most steam locomotive operations.

#### Section 230.13. Daily Inspection (New)

This provision, as part of the more comprehensive changes contemplated for the inspection scheme in Part 230, would not effect a substantive change to those regulations governing the inspection of steam locomotives.

#### Section 230.14.31 Service Day Inspection (New)

This provision, as part of the more comprehensive changes contemplated for the inspection scheme in Part 230, would impose no new inspection requirements for steam locomotives but it would relax the time frame within which certain inspections must occur.

#### Section 230.15.92 Service Day Inspection (New)

This provision, as part of the more comprehensive changes contemplated for the inspection scheme in Part 230,

would impose no new inspection requirements for steam locomotives but it would relax the time frame within which certain inspections must occur.

#### Section 230.16. Annual Inspection (New)

This provision would not effect a substantive change to those regulations governing annual inspection requirements for steam locomotives.

#### Section 230.17.1472 Service Day Inspection (New)

This provision, as part of the more comprehensive changes contemplated for the inspection scheme in Part 230, would impose no new inspection requirements for steam locomotives but it would relax the time frame within which certain inspections must occur and would require the verification and updating of information about the steam locomotive for which the Form 4 is filed. See the analysis in section IX(B)(5), above.

#### *Recordkeeping Requirements*

#### Section 230.18. Service Days (New)

This provision, as part of the more comprehensive changes contemplated for the inspection scheme in Part 230, would impose a new recordkeeping requirement for steam locomotives. This section would require locomotive owners and/or operators to keep a record showing the number of service days the steam locomotive has accrued since its last 31 service day, 92 service day, annual and 1472 service day inspections. This section would also require the locomotive owner and/or operator to file a report each January 31 detailing the number of service days the locomotive accrued during the preceding calendar year. The failure to file this report would result in the locomotive being considered "retired." In order to return a "retired" locomotive to service, the locomotive owner and/or operator would have to conduct a 1472 service day inspection.

The agency does not intend for this recordkeeping requirement to have a draconian effect; should a service day report be filed a day or two late, the agency will give the operator the benefit of the doubt and allow the report to take effect as though it had been timely filed.

While these proposed changes would impose additional recordkeeping requirements on regulated entities, the agency believes that any additional burdens so imposed are outweighed by the benefits which adhere to the regulated community from the new inspection time periods.

#### Section 230.19. Posting of FRA Form No. 1 and FRA Form No. 3

This section would impose no new recordkeeping requirements upon locomotive owners and/or operators. The FRA Form No. 1 is the 31 service day and 92 service day inspection report, which is currently the monthly inspection report required by sections 230.51 and 230.160 of the 1978 standards. The FRA Form No. 3 is the annual inspection report, which is identical to the annual inspection report required by sections 230.52 and 230.161 of the 1978 standards.

#### Section 230.20. Alteration and Repair Report for Steam Locomotive Boilers

This section would impose no new recordkeeping requirements upon locomotive owners and/or operators. The FRA Form No. 19 is the alteration report that regulated entities are required to file by section 230.54 of the 1978 standards. This new provision would require the locomotive owner or operator to file this form whenever alterations that affect the information on the FRA Form No. 4 are made, and would impose new requirements for filing the Form 19 whenever welded or riveted repairs are made to the unstayed portion of the locomotive boiler. This section also would require that the locomotive owner and/or operator record any welded or riveted repairs that are made to stayed portions of the locomotive boiler.

#### Section 230.21. Steam Locomotive Number Change (New)

This section would incorporate into Part 230, in the interest of harmonizing outstanding requirements addressing steam locomotives, requirements issued by the former Interstate Commerce Commission in its "Interpretations, Rulings and Explanations on Questions Raised Regarding the Laws, Rules, and Instructions for Inspection and Testing of Steam Locomotives and Tenders and Their Appurtenances" (ICC Interpretations).

#### Section 230.22. Accident Reports

As proposed, this section would retain the requirements of section 230.162 of the 1978 standards and would impose no new requirements on locomotive owners and/or operators.

#### *Subpart B—Boilers and Appurtenances*

#### Section 230.23. Responsibility for General Construction and Safe Working Pressure

This section, as proposed, would make the locomotive owner and operator, both, jointly and severally

responsible for the general design and construction of the locomotive boiler. section 230.1 of the 1978 standard's places that responsibility on the "railroad company." This change is being proposed to capture the changes which have occurred in the steam locomotive industry since the original steam rules were promulgated, and to place responsibility for the locomotive on the parties best able to satisfy that responsibility. This proposal is designed to affix responsibility on owners and operators whether or not they are railroad companies.

#### *Allowable Stress*

##### Section 230.24. Maximum Allowable Stress

This section, as proposed, does not substantively change section 230.2 of the 1978 standards, but rewrites it to clarify the concepts it expresses.

##### Section 230.25. Maximum Allowable Stress on Stays and Braces

This section, as proposed, does not substantively change section 230.3 of the 1978 standards, other than to propose removing the distinction for locomotives constructed before and after 1915. The task force felt that this distinction was no longer relevant.

#### *Strength of Materials*

##### Section 230.26. Tensile Strength of Shell Plates

This section, as proposed, would retain section 230.4 of the 1978 standards, without change.

##### Section 230.27. Maximum Shearing Strength of Rivets

This section, as proposed, would retain section 230.5 of the 1978 standards, without change.

##### Section 230.28. Higher Shearing Strength of Rivets

This section, as proposed, would retain section 230.6 of the 1978 standards, without change.

#### *Inspection and Repair*

##### Section 230.29. Inspection and Repair

This section, as proposed, would combine the concepts embodied in sections 230.7 and 230.12 of the 1978 standards. The task force decided to change the responsibility for inspection and repair of the locomotive boiler from the "mechanical officer in charge at each point where boiler work is done" to the steam locomotive owner and/or operator. This change was proposed since few operations still have chief mechanical officers due to the changed nature of steam operations today, and

because the task force wanted to make the "liability" as consistent as possible throughout the rule. This section also would require the locomotive owner and/or operator to remove the boiler from service whenever they, or the FRA inspector, considers it necessary due to other defects. The task force was concerned about FRA inspectors' exercise of discretion in this arena. However, it was agreed that the agency would act in good faith and do its best to minimize any disruption of the operator's service whenever such concerns arise. In addition, they agreed that FRA should allow for non-destructive testing in the investigation of any "safety concerns" identified.

This section also would make more specific the repair standard in section 230.12 of the 1978 standards, which simply requires that boilers be "thoroughly repaired, and reported to be in satisfactory condition," by requiring that all defects be repaired in accordance with accepted industry standards. These standards may include established railroad practices, or NBIC or API established standards. See section IX(D), above, for a discussion of the meaning of "established railroad practices." This section also would propose replacing the "satisfactory condition" repair standard of the 1978 standard's section 230.12 with a requirement that the boiler not be returned to service unless it is in good condition and "safe and suitable for service."

Finally, this section proposes to require that welded repairs to unstayed portions of the boiler pursuant to section 230.33, must be made in accordance with an accepted national standard for boiler repairs.

##### Section 230.30. Lap-Joint Seam Boilers

This section, as proposed, would clarify and eliminate an ambiguity in section 230.13 of the 1978 standards by explaining that "examined with special care" means removing enough lagging, jacketing, flues and tubes so that a thorough inspection of the entire joint, (inside and out) can be made. This section is otherwise unchanged and is not intended to restrict the use of modern technology which might allow the conduct of a "thorough inspection" without as much disassembly of the locomotive.

##### Section 230.31. Flues To Be Removed

This proposed section, as part of the more comprehensive changes contemplated for the inspection scheme in Part 230, would change the time period within which locomotive owners and/or operators must remove all flues

of locomotive boilers and conduct a thorough inspection of the boiler. Section 230.10 of the 1978 standards require that this be done at least once every four (4) years.

The proposal also would allow the locomotive owner and/or operator to utilize non-destructive examination (NDE) methods to assess the condition of superheater flues and leave them in the boiler during this inspection provided two conditions are satisfied: (1) that the NDE testing shows that they are safe and suitable for locomotive service; and (2) that the boiler can be entered to be cleaned and inspected without their removal. Even if these two conditions are satisfied, however, this proposal would require that the locomotive owner and/or operator remove the superheater flues if they, or if the FRA inspector, thinks doing so is necessary for some identifiable safety concern.

This proposal also would remove the language in the 1978 standards of the flue removal section that allows FRA to grant an extension of the time period within which flues must be removed. The task force felt that the 15-year "drop dead" time limit for conducting the 1472 service day inspection should be the absolute outside time period within which the flues must be removed. In the task force's experience, operators who were previously required to remove their flues once each four years, which could become five years with the use of "out of service credit," could get extensions of this requirement for up to twelve and thirteen years. Since this proposal would allow them to stretch that time period out to up to 15 years, the task force felt that no further extensions would be necessary.

As discussed above in section IX(E), the task force felt strongly that operators should be encouraged to take advantage of new technologies in the use and operation of steam locomotives. By allowing the operator to leave superheater flues in the boiler if they could determine that they were safe and suitable for service, the task force felt it was building into this section an incentive for operators to utilize NDE methods, such as ultrasound, in making that determination.

##### Section 230.32. Time and Method of Inspection

This section, as proposed, combines the inspection requirements for both the boiler interior and exterior in sections 230.9, 230.11, 230.15 and 230.16 of the 1978 standards, and rewrites them for clarity. The task force felt that rewriting this section would consolidate the

various inspection requirements and make them more explicit.

#### Section 230.33. Welded Repairs and Alterations (New)

This section, as proposed, would restrict, and therefore control, the welding which occurs on both unstayed and stayed portions of the locomotive boiler. Subsection (a) would require the locomotive owner and/or operator to obtain prior written approval of the FRA Regional Administrator before performing any welding on unstayed portions of boilers containing alloy steel, or carbon steel with a carbon content greater than .25 percent. It also would require that any welding so approved be conducted in accordance with an accepted national standard for boiler repairs. See section IX(D)(1), above, for a discussion of this standard.

In subsection (b) of this section, it is proposed that locomotive owners and/or operators perform welding on unstayed portions of boilers containing carbon steel not exceeding .25 percent carbon in accordance with an accepted national standard for boiler repairs. Both subsections (a) and (b) would require the locomotive owner and/or operator to file an FRA Form 19, Report of Welded Repair, as discussed in section 230.20.

In subsection (c) of this section, it is proposed that the locomotive owner and/or operator be restricted in the use of weld build up for wasted areas of unstayed surfaces of the boiler. This proposed restriction would require that the locomotive owner and/or operator submit a written request for approval to the Regional Administrator to build up by weld wasted areas that exceed: (1) a total of 100 square inches; or (2) the smaller of either 25% of the minimum required wall thickness or 1/2 of an inch. This subsection would also prohibit the use of weld build up for wasted sheets that have been reduced to less than 60 percent of the minimum required thickness required by these rules.

Subsection (d) of this section, proposes to restrict the installation of flush patches of any size on unstayed portions of the boiler without the locomotive owner and/or operator submitting a written request for prior approval to the FRA Regional Administrator.

Finally, subsection (e) would propose allowing locomotive owners and/or operators to perform welded repairs or alteration on stayed portions of the boiler in accordance with established railroad practices, or an accepted national standard for boiler repairs. The task force wanted to recognize the fact that many operations use their own welding procedures on stayed portions

of the boiler, and do so successfully. The task force therefore recommended that the locomotive owner and/or operator be allowed to use established "railroad practices" as an acceptable standard for conducting welding on stayed portions of the boiler.

As discussed earlier in the preamble, FRA has grave concerns about the quality of the welding being done on locomotive boilers. With these proposed changes, the agency feels comfortable that it is establishing standards that will improve safety while allowing operators the flexibility critical to their business survival by allowing them to make necessary repairs without incurring unnecessary costs.

#### Section 230.34. Riveted Repairs and Alterations (New)

This section, as proposed, would restrict, and therefore control, the riveting which occurs on both unstayed and stayed portions of the locomotive boiler. In subsection (a) the proposal would require the locomotive owner and/or operator to submit a request for prior written approval to the FRA Regional Administrator before making any riveted alterations to unstayed portions of the boiler, and to make any approved riveting in accordance with established railroad practices, or an accepted national standard for boiler repairs. See the analysis for section 230.29, above, for a discussion of these repair standards. This subsection also would require the locomotive owner and/or operator to satisfy, at this time, the reporting requirements proposed in section 230.20.

In subsections (b) and (c) of this section, the agency is proposing to establish guidelines for the conduct of riveting on locomotive boilers by requiring that riveted repairs to both stayed and unstayed portions of the boiler be made in accordance with established railroad practices, or an accepted national standard for boiler repairs.

#### *Pressure Testing of Boilers*

#### Section 230.34. Pressure Testing (New)

This section, as proposed, would establish a minimum temperature requirement for the application of any kind of pressure to locomotive boilers. It would require that the temperature of locomotive boilers be no less than 60 degrees Fahrenheit anytime the boiler is tested under any type of pressure. This change would incorporate the NBIC temperature standard and harmonize FRA standards with NBIC standards, which the task force wanted and FRA supports.

#### Section 230.36. Hydrostatic Testing of Boilers

This section, as proposed, would consolidate all 1978 standards relating to the hydrostatic testing of boilers. This section would not substantively change the parameters of section 230.17 of the 1978 standards, which merely stipulates the time of testing and the pressure at which the boiler must be tested, but it would impose an additional requirement that the boiler temperature be raised to between 60 and 120 degrees Fahrenheit each time the boiler is subjected to any hydrostatic pressure. This proposed change would incorporate the NBIC standard for hydrostatic testing into the federal regulations for steam locomotive inspection.

In its consideration of these issues, the task force was divided about the purpose of the hydrostatic test, and the concomitant pressure at which the test should be conducted. Many operators believed that the purpose of the hydrostatic test is merely to test the boiler for leaks—not to see if the boiler is structurally unsound at the time of the test. To them, therefore, testing the boiler at the maximum allowed working pressure (MAWP) (as calculated in the FRA Form No. 4) would serve the requisite safety function of disclosing such leaks without unnecessarily stressing (and prematurely destroying) the boiler. Many in the agency, however, felt strongly that the purpose of the hydrostatic test is to test the boiler's integrity—to disclose weaknesses in the structure of the boiler that have not yet developed into defects. They also felt strongly that there was no data presented that would convince them that testing the boiler at MAWP, as specified on the FRA Form No. 4, would provide an equivalent level of safety. Because the parties could not reach a consensus on this provision, the agency is not proposing any changes to this language and is proposing to leave the required pressure at 25% above MAWP, as specified on the FRA Form No. 4.

#### Section 230.37. Steam Test Following Repairs or Alterations

This section, as proposed, would substantially rewrite, largely without substantive change, section 230.20 of the 1978 standards to achieve greater clarity. The one substantive change being proposed would change the pressure required for the conduct of the steam test from "not less than the allowed working pressure" to "between 95% and 100% of the MAWP." The task force decided that imposing a lower

pressure limit would reduce the stress on the boiler without an accompanying reduction in safety—that 95 to 100 percent of MAWP would be adequate to disclose unsatisfactory conditions in the locomotive boiler.

#### Staybolts

##### Section 230.38. Telltale Holes

This section, as proposed, would consolidate 1978 standards' telltale hole provisions, sections 230.23 and 230.26, and the "reduced body" staybolt section from the ICC Interpretations in one section. As proposed, subsection (a) would retain section 230.26 of the 1978 standards but would delete, as moot, the application date. Proposed subsection (b) is a new provision created to import the ICC interpretation for reduced body staybolts to Part 230. Finally, proposed subsection (c) is derived from section 230.23 of the 1978 standards and would create a stand alone provision for clarity and to emphasize that telltale holes must be kept open at all times, except as required in section 230.41, which, as proposed, requires the telltale holes of drilled flexible staybolts to be closed with a fireproof porous material that will keep the telltale holes free of foreign matter.

##### Section 230.39. Broken Staybolts

This section, as proposed, would modify section 230.25 of the 1978 standards. Subsection (a), as proposed, would establish the maximum number of broken staybolts allowed for each locomotive boiler. Currently, section 230.25 of the 1978 standards require that a boiler be taken out of service when it develops two (2) broken or plugged staybolts adjacent to one another in any part of the firebox or combustion chamber, when three (3) or more are broken or plugged in a circle four (4) feet in diameter, and when five (5) or more are broken or plugged in the entire boiler. This section, as proposed, would change this standard by requiring that a boiler be taken out of service when it develops either two (2) broken staybolts within twenty-four (24) inches of each other, as measured inside the firebox or combustion chamber on a straight line, or more than four (4) broken staybolts within the entire firebox and combustion chamber combined.

The NBIC requires boilers with one broken staybolt to be taken out of service and repaired. While the task force wanted to harmonize these proposed standards with the NBIC, they recommended to the agency that this proposal allow for a second broken staybolt within twenty-four (24) inches

to accommodate the operational difficulties involved in immediately taking a boiler out of service when one staybolt breaks. Because prolonged exposure in a slowly progressive fail mode turns exponential as additional staybolts break, and to minimize the overload on staybolts in the area of the one which has broken, the task force also recommended that staybolts adjacent to those that break be inspected at the time the broken staybolt is replaced. As proposed, this section includes that recommendation.

Subsection (b), as proposed, would require broken staybolts detected during the 31 service day inspection to be replaced at that time, and broke staybolts detected between 31 service day inspections to be replaced no later than 30 days from the date of detection. The task force determined that a strict time period was required to ensure an adequate measure of safety, but wanted to recognize operational realities that might prevent owners and/or operators from repairing broken staybolts immediately. This proposal reflects the task force consensus that 30 days would be a reasonable period of time within which to make the necessary repairs to the boiler. It would allow owners and/or operators to plan when, within a 30-day time period, they wanted to take the locomotive out of service and replace the broken bolts. This subsection also would require, consistent with the task force's recommendation, that the locomotive owner and/or operator replace broken staybolts eight (8) inches in length or less with staybolts drilled with telltale holes three-sixteenths ( $\frac{3}{16}$ ) to seven thirty-seconds ( $\frac{7}{32}$ ) inch in diameter and not less than one and one quarter ( $1\frac{1}{4}$ ) inches deep in each end, or that have holes three-sixteenths ( $\frac{3}{16}$ ) to seven thirty-seconds ( $\frac{7}{32}$ ) inch in diameter their entire length. This expresses the task force's belief that drilled bolts are useful in revealing progressive failures before they reach catastrophic proportions.

Subsection (c), as proposed, would import from the ICC Interpretations the definition of "broken" staybolts as those that are leaking, plugged, or missing, in the interest of consolidating and centralizing all current steam locomotive requirements.

Finally, subsection (d), would prohibit welding, forging or riveting broken staybolt ends as a means of closing telltale holes. The ICC Interpretations state that telltale holes that are leaking, plugged, riveted over, or missing, will be counted as broken staybolts. This proposal would impose a stricter standard for broken staybolts,

which the task force believed was desirable.

##### § 230.40. Time and Method of Staybolt Testing

This section, as proposed, would consolidate the requirements for staybolt testing from sections 230.21, 230.22, 230.24 of the 1978 standards and the ICC Interpretations addressing the same. Because the 1978 standards do not treat rigid staybolts and flexible staybolts without caps differently, this section, as proposed, consolidates these requirements into "staybolt testing" general requirements. Since the testing requirements being proposed for flexible staybolts with caps, however, remain distinct, the agency is proposed to exclude them from this consolidation.

Currently, section 230.21 of the 1978 standards requires that staybolts be tested once a month and immediately after every hydrostatic test. In subsection (a), the agency is proposing to relax this requirement slightly by allowing the monthly inspection to be conducted once each thirty-one (31) service days, consistent with the more comprehensive changes contemplated for the inspection scheme in this Part. The 1978 requirement that the test be conducted following each hydrostatic test would be the same, but is more clearly explained in this new section. In addition, subsection (1) of subsection (a) would create an allowance for inaccessible staybolts that are drilled through their entire length. Under this allowance, any such impediments making the staybolts inaccessible (brickwork, grate bearers, etc.) need not be removed to hammer test the staybolts. The group concurred that since the through-drilled staybolt would begin to leak if it broke, safety would not be sacrificed by granting owners and/or operators a measure of flexibility in the testing of such staybolts.

Subsection (b), as proposed, is a general section that spells out the requirements for testing all forms of staybolts. The task force tried to combine all the different "method of testing" provisions from the 1978 standards (sections 230.21–230.27). The result was subsection (b) of this section. The proposed requirement that there must be "not less than 95 percent of the MAWP" applied if staybolts are tested while the boiler contains water is a new one and reflects the task force's consensus view.

##### § 230.41. Flexible Staybolts With Caps

This section, as proposed, would rewrite section 230.23 of the 1978 standards for clarity, while imposing a few new requirements.

Subsection (a), as proposed, would extend the current timetable for removing the caps and inspecting, flexible staybolts from every two (2) years to every 5th annual inspection, consistent with the comprehensive changes contemplated to the inspection scheme for this part. This proposal reflects the task force's consensus view that this would provide owners and/or operators additional flexibility without compromising the desired level of safety.

Subsection (b), as proposed, has merely been rewritten for clarity and to eliminate superfluous information. Subsections (c) and (d), likewise, would impose no substantive changes but, instead, would rewrite section 230.23 of the 1978 standards for clarity, either deleting text as repetitive, or moving it to other, more relevant, sections. For example, the 1978 requirement that the FRA Form No. 3 be kept in the railroad company's office would be relocated (and slightly modified) to the recordkeeping section of this proposal, section 230.19.

#### *Steam Gauges*

##### Section 230.42. Location of Gauges

This section, as proposed, would rewrite section 230.28 of the 1978 standards for clarity, but would not effect any substantive changes to that section.

##### Section 230.43. Gauge Siphon

This section, as proposed, would rewrite section 230.29 of the 1978 standards for clarity, but would not effect any substantive changes to that section.

##### Section 230.44. Time of Testing

This section, as proposed, would modify the requirements of section 230.30 of the 1978 standards in order to address the operational realities presented by the mobility of the gauges. In today's industry, it is common practice for owners and/or operators to remove gauges from the locomotive to prevent them from being stolen or vandalized. Sometimes the removed gauges are stored in conditions that allow for them to be jostled around, which affects their calibration and accuracy. Accordingly, as proposed, this section would require that the gauges be tested prior to being installed or reapplied. In addition, this provision would extend the time period for testing gauges from once every three months to the 92 service day inspection, consistent with the more comprehensive changes contemplated for the inspection scheme in this part. Finally, as recommended by

the task force, the proposed rule retain the requirement in section 230.30 of the 1978 standards that gauges be tested whenever any irregularity is reported.

##### Section 230.45. Method of Testing

This section, as proposed, would more completely describe the method for testing gages, but would not effect a substantive change.

##### Section 230.46. Badge Plates

This section, as proposed, would retain section 230.32 of the 1978 standards but would correct its use of incorrect terminology. The term "boiler head" is being proposed to be changed to the more correct term "boiler backhead."

##### Section 230.47. Boiler Number

This section, as proposed, would retain section 230.33 of the 1978 standards but would rewrite that section for clarity and to consolidate it with the ICC Interpretations.

#### *Safety Relief Valves*

##### Section 230.48. Number and Capacity

This section, as proposed, would retain the requirements for the number and capacity of locomotive safety relief valves in section 230.34 of the 1978 standards, with two changes. Subsection (a), as proposed, would increase the relieving tolerance from five (5) to six (6) percent above the MAWP. The task force recommended that the rule be modernized to reflect modern testing practice, which uses six percent. That figure is derived from the addition of the manufacturer's tolerance for the safety valve itself (three (3) percent) and the industry standard from the ASME 1952 Code for the testing tolerance for safety valves (an additional three (3) percent). This subsection would also make explicit the FRA inspector's right to require proof of the relieving capacity for safety relief valves on steam locomotives.

Subsection (b) of this section, as proposed, would make explicit the requirement that additional capacity be provided if the capacity testing demonstrates the need to do so. In addition, this section acknowledges the use of the accumulation test as a method for testing safety valve capacity. By including this acknowledgment, the agency does not intend to state its preference for the use of accumulation tests in determining safety relief valve capacity.

##### Section 230.49. Setting of Safety Relief Valves

In this section, the agency is proposing several changes to the

requirements for setting safety relief valves contained in section 230.35 of the 1978 standards. First, this section, as proposed, would impose a new requirement that the individual responsible for setting the safety relief valves be "thoroughly familiar with the construction and operation of the valve being set." This competency requirement was added because the group recognized that modern safety valves have seals, the security of which is certified by certain organizations, but they did not want to officially require that the valves be reset by state officials. This language would create a performance standard—one that would require that those people resetting safety valves be thoroughly familiar with their construction and operation.

Next, this section, as proposed, would change the "opening pressures" for safety relief valves contained in section 230.35 of the 1978 standards by requiring that at least one of the two required safety-relief valves open at a pressure that is no greater than the MAWP. This proposal changes the 1978 provision, which requires that both valves be set to open at pressures not exceeding 6 pounds above working pressure (MAWP). This reflects the task force consensus that requiring one of the two safety valves to set to open at pressures not greater than MAWP would achieve a greater level of safety. This section would retain, however, the 6 psi upper limit contained in section 230.35 of the 1978 standards for any additional safety valves utilized.

This section, as proposed, would retain the procedures for setting safety valves, contained in section 230.35 of the 1978 standards, without substantive change. This proposal would change the requirement for the water level to be "not above the highest gauge cock" to the equivalent requirement that it not be "higher than  $\frac{3}{4}$  of the length of the visible water glass, as measured from the bottom of the glass," consistent with this document's proposed changes to section 230.37. See the analysis for section 230.51, below.

Finally, this section, as proposed, would create a new requirement that the lowest set safety relief valve pressure be indicated on a tag or label and attached to the steam gauge so that it may clearly be read while observing the gauge. This would present a physical reminder for the locomotive engineer, or other crew members, of the pressure to which the safety relief valve is set so that valve failure might be more easily detected.

##### Section 230.50. Time of Testing

This section, as proposed, would retain the requirements of section

230.36 of the 1978 standards without change, except for the increase of the inspection time period, from three months, to ninety-two (92) service days to comport with the more comprehensive changes for the inspection scheme contemplated in the part.

#### *Water Glasses and Gauge Cocks*

##### Section 230.51. Number and Location

This section, as proposed, would change the requirements for water level indicating devices contained in section 230.37 of the 1978 standards to require that steam locomotive boilers be equipped with at least two water glasses, the lowest reading for which must be at least 3 inches above the highest part of the crown sheet. This section would not prohibit the use of gauge cocks, but it simply would no longer require it. It would require, however, that any gauge cocks installed on a steam locomotive boiler be properly maintained and located. These changes reflect the task force's recommendation that water level indicator standards be modernized. They expressed the view that water glasses are more reliable than gauge cocks, and easier to use since they do not require manual operation. They also expressed the belief that few operators know how to correctly manually operate gauge cocks anymore. The task force also felt that gauge cocks screwed directly into the backhead are more likely to provide highly inaccurate readings due to the phenomenon where the water rushes against the boiler backhead and creates a surge effect, generating a reading that is artificially high. This requirement would comport with the NTSB's recommendations following its investigation into the boiler explosion involving the Gettysburg Railroad Company, which included a recommendation that boilers be equipped with a second water glass, and with ASME standards, which no longer require that newly constructed boilers be equipped with gauge cocks.

The group was aware of the costs such a change would impose upon owners and/or operators. They discussed, at length, the extra cost this requirement would impose upon owners and/or operators, but concluded that the extra safety measure afforded would well outweigh this imposition. In addition, one member of the group pointed out that gauge cocks are no longer being manufactured, which makes their replacement extremely costly. The task force was also concerned that owners and/or operators have sufficient time to make any necessary changes to their

locomotive boilers. Accordingly, this proposal reflects the task force's belief that by delaying the implementation of this provision by one year all parties would have enough notice, and enough implementation time, to add the second water glass.

##### Section 230.52. Water Glass Valves

This section, as proposed, would rewrite section 230.38 of the 1978 standards to emphasize the functions the valves are designed to fulfill, and for clarity.

##### Section 230.53. Time of Cleaning

This section, as proposed, would require that water glass valve and gauge cock spindles be cleaned at every 31 service day inspection, and whenever testing indicates that the apparatus is malfunctioning. This change would relax the time period within which this inspection must occur, consistent with the more comprehensive changes contemplated for the inspection scheme discussed earlier. It also would add a performance standard for owners and/or operators to follow, requiring them to clean the spindles when they have indications that water glasses or gauge cocks are not functioning properly.

##### Section 230.54. Testing and Maintenance

This section, as proposed, would rewrite Section 230.40 of the 1978 standards for clarity and to emphasize the purpose for the water glass testing requirement.

##### Section 230.55. Tubular Type Water and Lubricator Glasses and Shields

As proposed, this section would modify section 230.41 of the 1978 standards to require that tubular type water glasses be renewed at each 92-service day inspection, and to require that water glasses be situated to provide the engine crew an unobstructed view from their proper positions in the locomotive cab.

This proposal reflects the task force's view, based on their collective experience, that water tubes get thin and develop a risk of breaking after approximately 90 service days. The proposed water glass placement requirements are included here to complement, and give effect to, the proposed changes in section 230.51.

##### Section 230.56. Water Glass Lamps

This section retains section 230.42 of the 1978 standards without change, consistent with the task force's recommendation.

#### *Injectors, Feedwater Pumps, and Flue Plugs*

##### Section 230.57. Injectors and Feedwater Pumps

As proposed, subsection (b) of this section would retain section 230.43 of the 1978 standards, and subsections (a) and (c) are new. Subsection (a), as proposed, would require that the locomotive be equipped with at least two means of delivering water to the boiler, and would establish, as a minimum, that one of those two means be a live steam injector. Subsection (b), as proposed, would incorporate language from the ICC Interpretations which requires bracing to "avoid" vibration. The group decided to change "avoid" to "minimize" because they felt it was a more realistic standard.

##### Section 230.58. Flue Plugs

This section, as proposed, would strengthen the rules for plugging flues contained in section 230.44 of the 1978 standards. When this section was originally created by the ICC, it was designed to accommodate the locomotive owner and/or operator's business concerns by allowing them to plug their flues in order to continue in operation until the nearest repair point where the flue could be repaired or replaced. The task force decided to recommend the retention of that concept, to still allow flue plugging, but to recommend the restriction of the manner that flues are allowed to be plugged in order to improve the safety quotient for flue failures.

The task force was concerned that a failed flue was usually a harbinger of additional flue failures since flues are typically replaced all at once, and are exposed to similar stressors which might cause failure. Accordingly, as proposed, this section would only allow one flue to be plugged at any time, and would require that the flue be repaired or replaced within 30 calendar days. In addition, the group wanted to distinguish between flues greater than 2 1/4" in OD and flues equal to or smaller than 2 1/4" in OD, and to prohibit the plugging of the latter. Subsection (b) of this section, as proposed, is largely derived from section 230.44 of the 1978 standards except that it would change that section's implied allowance of plugging flues at one end only, requiring that flues be plugged at both ends. The task force felt that plugging the flue at one end was inconsistent with the function plugging is designed to accomplish.



*Fusible Plugs*

## Section 230.59. Fusible Plugs

This section, as proposed, would retain section 230.14 of the 1978 standards and would impose no new inspection requirements for steam locomotives on locomotive owners and/or operators. Consistent with the more comprehensive changes contemplated for the inspection scheme in Part 230, it would relax the time frame within which fusible plugs must be removed, and cleaned, and their removal reported on the report of inspection.

*Washing Boilers*

## Section 230.60. Time of Washing

This section, as proposed, would retain the concepts of section 230.45 of the 1978 standards and would impose no new inspection requirements for steam locomotives on locomotive owners and/or operators, consistent with the more comprehensive changes contemplated for the inspection scheme in Part 230. It would relax the time frame within which all boilers must be washed from once each month to once each 31-service days.

In its review of the Gettysburg steam explosion, the NTSB recommended that the agency consider regulating water quality, specifically by imposing water treatment program requirements. The task force strenuously debated this topic and concluded the boiler wash itself was the best method for addressing water quality, especially since the regulation currently requires, and would similarly require as proposed, that the boiler be washed as frequently as water conditions require. This proposal gives effect to the task force's recommendation on this subject.

## Section 230.61. Arch Tubes, Water Bar Tubes, Circulators and Thermic Siphons

This section, as proposed, would expand the requirements of section 230.46 of the 1978 standards by requiring, in addition to their mere removal, the cleaning and inspection of arch tubes and water bar tubes each time the boiler is washed. In addition, this section proposes the addition of condemning limits for arch tubes and water bar tubes. Both of these proposals are derived from the ICC Interpretations and reflect the task force's desire to incorporate the Interpretations into this part.

Finally, this section would require NDE evaluation of arch tubes, water bar tubes and circulators during the annual inspection in order to assess reduced wall thickness. The task force was concerned about the cost this would

impose, and debated whether this requirement would prove too onerous for smaller operations. They concluded, however, that ultrasonic testing was affordable and that the safety levels assured by requiring this testing were worth the imposition of the cost.

*Steam Pipes*

## Section 230.62. (NEW) Dry Pipe

This section would require locomotive owners and/or operators to inspect dry pipes that are subject to pressure during each annual inspection for the purpose of measuring the pipe wall thickness. It would establish a performance standard for owners and/or operators to remove from service pipes that are no longer "suitable for the service intended."

## Section 230.63. Smoke Box, Steam Pipes and Pressure Parts (New)

This section would require locomotive owners and/or operators to inspect the smoke box, steam pipes and pressure parts at each annual inspection, or whenever conditions warrant, by entering the smoke box and examining it for signs of leaks from any of its pressure parts, as well as by examining all draft appliances.

*Steam Leaks*

## Section 230.64. Leaks Under Lagging

This section, as proposed, would retain the concepts of section 230.49 of the 1978 standards without substantive change, but would rewrite them for clarity.

## Section 230.65. Steam Blocking View of Engine Crew

This section, as proposed, would retain the concepts of section 230.50 of the 1978 standards without substantive change, but would rewrite them for clarity.

*Subpart C—Steam Locomotives and Tenders*

## Section 230.66. Design, Construction and Maintenance

This section, as proposed, would retain section 230.101 of the 1978 standards without substantive change other than that necessary to reflect the proposed changed liability standard; see section IX(A).

## Section 230.67. Responsibility for Inspection and Repairs

This section, as proposed, would change section 230.102 of the 1978 standards by making the locomotive owner and/or operator, not the mechanical officer, the party responsible for the inspection and repair

of all locomotives and tenders under their control. In addition, this section would parallel proposed section 230.23 by delineating the standard for repairs and by requiring that the locomotive not be returned to service unless they are in good condition and safe and suitable for service.

*Speed Indicators*

## Section 230.68. Speed Indicators (New)

This section would require all locomotives that operate at speeds in excess of 20 mph over the general system of transportation to be equipped with speed indicators, consistent with the requirements in Part 229 for non-steam locomotives. Likewise, this section would require these indicators to be maintained to ensure proper functioning. The task force discussed, and wanted to address, the interplay between this part and Part 240's engineer certification standards. Because locomotive engineers may be decertified for speeding, the task force felt that locomotives operating more than 20 mph, consistent with the standards in Part 229, should be equipped with speed indicators.

*Ash Pans*

## Section 230.69. Ash Pans

This section, as proposed, would retain section 230.105 of the 1978 standards without substantive effect, but would rewrite it for clarity.

*Brake and Signal Equipment*

## Section 230.70. Safe Condition

This section, as proposed, would retain section 230.106 of the 1978 standards without substantive effect, but would reorganize and rewrite it for clarity.

## Section 230.71. Orifice Testing of Compressors

This section, as proposed, would retain section 230.107 of the 1978 standards without substantive effect, but would reorganize and rewrite it for clarity. In addition, it would, consistent with the more comprehensive changes contemplated for the inspection scheme in Part 230, relax the time frame within which compressors must be orifice-tested from once each three months, to once each 92-service days. Finally, it would expand the table listing the testing criteria to include a 120 LP Westinghouse compressor, which is frequently used.

## Section 230.72. Testing Main Reservoirs

Subsection (a) of this section, as proposed, would retain the concepts in Section 230.108 of the 1978 standard's

but would rewrite them for clarity. Subsections (b) through (d) of this section are new. Subsection (b), as proposed, would incorporate Part 229's allowance for drilling of welded main reservoirs. The group felt that drilling was a good idea because it facilitates reservoir failures in a non-catastrophic manner. This section is largely derived from section 229.31 and reflects the task force's desire to harmonize these sections. Subsection (c), as proposed, would encourage the use of appropriate NDE methods for testing the wall thickness of the welded main reservoirs. It would allow welded main reservoirs without longitudinal lap seams to be NDE tested instead of the more destructive hammer and hydrostatic testing otherwise required. The formula for the condemning limits for welded main reservoirs is derived from the ASME Section VIII, Div I. The spacing for the sampling points is derived from section 229.31.

Finally, subsection (d), as proposed, would require NDE testing for welded or riveted longitudinal lap seam main reservoirs. While the task force seriously debated recommending that the use of lap seam main reservoirs be prohibited, they felt that they didn't have a strong enough safety basis for justifying this action. They felt that lap seam main reservoirs would eventually be phased out for economic reasons.

#### Section 230.73. Air Gauges

This section, as proposed, would retain section 230.109 of the 1978 standards, with minor substantive changes, but would reorganize and rewrite it for clarity. As part of the more comprehensive changes contemplated for the inspection scheme in Part 230, it would relax the time frame for air gauge testing from once each 3 months to the 92 service day inspection. It also would add the requirement that gauges be tested prior to reapplication following removal. The task force recommended that gauges that are removed be retested because they were concerned about the jostling of the gauges that may occur during the time that they are off the locomotive, requiring recalibration before being reapplied. The method of testing required by this section would remain the same as that in section 230.109 of the 1978 standards.

#### Section 230.74. Time of Cleaning

This section, as proposed, would modify Section 230.110 of the 1978 standard's by broadening the scope of the section to all valves in the air brake system, by specifying a testing procedure, and by relaxing the time

frame for conducting the inspection. The task force recommended harmonizing this section, to the largest extent possible, with section 232.10. Many industry members on the task force were concerned about requiring this cleaning too frequently because, in their collective experience, the cleaning process itself disturbs the proper functioning of the valves—once you open the system to clean the valves, dirt gets moved around inside and affects the rest of the system, ruining it. While the task force discussed the testing intervals, from the 1978 standard's six months to a proposed once each fifth annual, they ultimately concluded that the appropriate time period for this cleaning was at least once every 368 service days, but no more than during every second annual inspection.

#### Section 230.75. Stenciling Dates of Tests and Cleaning

This section, as proposed, would retain section 230.111 of the 1978 standards but would rewrite it for clarification and to eliminate the requirement that testing dates be stamped on metal tags and attached to the locomotive.

Section 230.76. Piston Travel  
This section, as proposed, would retain section 230.112 of the 1978 standards without substantive change.

#### Section 230.77. Foundation Brake Gear

This section, as proposed, would retain section 230.113 of the 1978 standards without substantive change.

#### Section 230.78. Leakage

This section, as proposed, would retain section 230.114 of the 1978 standards without substantive change, but would identify specific inspection time periods and requirements in the rule text.

#### Section 230.79. Train Signal System

This section, as proposed, would retain section 230.115 of the 1978 standards with minor changes. It would recognize other forms of "onboard communication" and would relax the train signal system testing requirements from before each trip made, to the beginning of each day the locomotive is used.

#### *Cabs, Warning Signals, and Sanders*

#### Section 230.80. Cabs

This section, as proposed, would change Section 230.116 of the 1978 standard's by removing all the cab curtain requirements and rewriting the standards for clarity. Subsection (a) of this proposed section would incorporate the general provision section of the 1978

standard's, while updating the requirements to parallel Part 229's cab condition language. The task force discussed the language relating to the cab climate at length and agreed to try and draft a performance standard for the cab, rather than select temperature ranges and specific environment controls. The task force also decided to delete all the cab curtain requirements because they believed that the curtains don't adequately keep temperature in the proper range, and that the performance standard in subsection (a) was a better way to achieve the desired outcome.

This section's requirement that the environment not "unreasonably interfere with the engine crew's performance of duties under ordinary conditions of service" would establish the performance standard the cab climate must satisfy—therefore, a cab with poor ventilation which gets so hot that the engineer begins to lose consciousness, or to get sleepy, would be in noncompliance with this section. The "ordinary conditions of service" language, however, would recognize the type of conditions that are unavoidable in steam locomotive service, such as extreme amounts of heat from the locomotive boiler fire box. The task force wanted to make clear that only cab conditions that were "abnormal" for steam locomotive service would constitute noncompliance with this section. The group wanted to move toward a "common sense" perspective on cab conditions which would simultaneously be enforceable, and yet not unreasonably interfere with steam locomotive operations by using "comfort" as the delimiting factor since most steam locomotive service, by nature, is uncomfortable for the engineer.

Subsection (b) of the proposed section, addressing steam pipes, would retain the Section 230.116 of the 1978 standard's but would make more specific the "double strength pipe" description. The task force recommended that, at a minimum, the pipe be "schedule 80" to recognize what is more common industry verbiage/terminology.

All other subsections of section 230.116 of the 1978 standard's would be deleted as unnecessary.

#### Section 230.81. Cab Aprons

This section, as proposed, would expand the requirements of section 230.117 of the 1978 standards by delineating standards for the width of the apron. The group wanted to incorporate the ICC Interpretations regarding apron width that address

individuals standing on the cab apron having their foot crushed when the locomotive goes around a curve, or individuals standing on the apron falling between the locomotive and tender when the safety chains are taut or the drawbar disconnected.

#### Section 230.82. Fire Doors and Mechanical Stokers

This section, as proposed, would eliminate the requirement contained in section 230.118 of the 1978 standards that all locomotives have mechanically operated fire doors. The task force decided to do so because some smaller locomotives are incapable, by design, of having them. The task force considered making the mechanically operated fire door requirement contingent upon the weight of the locomotive, and the agency is requesting comments on that idea; whether this section should, for example, require that locomotives over 100,000 pounds be equipped with mechanically operated fire doors.

In addition, the task force recommended the removal of subsections (b) and (c) of section 230.118 of the 1978 standards, relating to stokers.

#### Section 230.83. Cylinder Cocks

This section, as proposed, would retain section 230.119 of the 1978 standards without substantive change, but would rewrite it for clarity.

#### Section 230.84. Sanders

This section, as proposed, would retain section 230.120 of the 1978 standards without substantive change, but would rewrite it for clarity. Consistent with the changes to the pre-departure inspection concept contemplated by this part, the inspection time period has been relaxed from each trip to the beginning of each day the locomotive is used.

#### Section 230.85. Audible Warning Device

This section, as proposed, would modernize section 230.121 of the 1978 standards by replacing its whistle requirement with a requirement that steam locomotives be equipped with audible warning devices. The decibel thresholds and the methodology for measuring the sound level are directly derived from section 229.129, which requires audible warning devices for locomotives other than steam locomotives.

#### Lights

#### Section 230.86. Required Illumination

This section, as proposed, would retain Section 230.129 and 230.131 of the 1978 standards, but would

consolidate and rewrite them for clarity. In addition, this section would eliminate the distinction in the 1978 standards for locomotives in yard and road service, consistent with the task force's recommendation, since any justification for treating them differently disappeared as the nature of steam locomotive operations changed.

#### Section 230.87. Cab Lights

This section, as proposed, would retain section 230.132 of the 1978 standards without substantive change, other than to extend this section to all locomotives, instead of merely those used between sunset and sunrise. The task force felt that this imposed no hardship upon locomotive owners and/or operators, and would address operating circumstances that could occur during "daylight" hours, but which might require being able to see control instruments, or to read timetables within the cab.

#### Throttle and Reversing Gear

#### Section 230.88. Throttles

This section, as proposed, would retain section 230.156 of the 1978 standards, without substantive change.

#### Section 230.89. Reverse Gear

This section, as proposed, would retain section 230.157 of the 1978 standards but would reorganize and rewrite it for clarity. The proposed subsection (a) would retain the general language that appears before subsection (a) verbatim. This section would not retain subsections (a) and (b) of the 1978 standards because the task force believed that many locomotives in service do not have power-operated reverse gear and have suffered no ill-consequences. In addition, the view was expressed that power-reverse gear can be dangerous as well. The group considered attaching a weight restriction to this requirement, but concluded that the problem would be self-regulating since it would be impractical to move certain locomotives with manual reverse operating gear. The proposed subsections (b) and (c) are derived from subsection (c) of the 1978 standards.

#### Draw Gear and Draft Systems

#### Section 230.90. Draw Gear Between Steam Locomotive and Tender

Subsection (a) of this section, as proposed, would retain most of the requirements of subsection (a) of section 230.122 of the 1978 standards, except it proposes requiring NDE testing of draw pins and the drawbar during every annual inspection. This section also

would require the use of an additional NDE testing method where visual inspection does not disclose any defects. The task force wanted to accommodate the industry's business concerns about conducting this test too frequently, and recommended requiring the use of better technology as the trade-off for extending the inspection time-period from three months to one year. This proposal reflects that recommendation.

Subsection (b) of this section, as proposed, would modify the 1978 standards' requirements for safety bars or chains and their relative strength. The industry task force members disagreed with the 1978 standards' "two or more safety bars or safety chains" language, arguing that some locomotives are designed with one (1) safety bar. The consensus was that the old rule was addressing smaller draw bars that could take the place of safety chains, and not the double drawbar design where two bars are on the same pins with one pin bearing no load in normal use. The bar with no load is the safety bar. In addition, this section would incorporate the ICC interpretation of the 1978 standard's "ample strength" to require the combined strength of safety chains or bars and their fastenings to be at least 50 percent of the strength of the drawbar and its connections.

Subsections (c), (d), and (e) would retain the subsections (c), (d), and (e) of section 230.122 of the 1978 standards without change.

#### Section 230.91. Chafing Irons

This section, as proposed, would retain section 230.123 of the 1978 standards without substantive change, but would rewrite it for clarity.

#### Section 230.92. Draw Gear and Draft Systems

This section, as proposed, would retain section 230.124 of the 1978 standards without substantive change, but would modify it to include couplers, which were not previously addressed.

#### Driving Gear

#### Section 230.93. Pistons and Piston Rods

This section, as proposed, would retain section 230.127 of the 1978 standards but would revise it by eliminating the stamping requirement for rods and by adding standards for fasteners. The task force debated whether or not they wanted to retain a mechanism for tracing materials and concluded that they did not want Part 230 to require it. The task force discussed working on a "recommended practices" handbook for the operators,

not related to this rule, and including traceability there.

#### Section 230.94. Crossheads

This section, as proposed, would retain section 230.125 of the 1978 standards without substantive change, but would rewrite it for clarity.

#### Section 230.95. Guides

This section, as proposed, would retain section 230.126 of the 1978 standards without substantive change.

#### Section 230.96. Main, Side, and Valve Motion Rods

Subsection (a) of this section, as proposed, would retain subsection (a) of section 230.128 of the 1978 standards without substantive change, but would rewrite it for clarity.

Subsection (b) of this section, as proposed, would change section 230.128 of the 1978 standards by expressly allowing welding of main, side and valve motion rods subject to FRA approval of requests to do so. The task force debated how to control the welding methodology and concluded that requiring the welding in accordance with an accepted national standard was the easiest and most thorough way to do so. The task force concluded that this section should be harmonized with section 230.33 of these proposed standards. See the analysis of welding concerns in that section, which is identical to the task force's discussion of this subsection.

Subsection (c) of this section, as proposed, would retain subsection (c) of section 230.128 of the 1978 standards in its entirety and, for clarity, would add a sentence to address floating bushings.

Subsection (d) of this section, as proposed, would retain subsection (d) of section 230.128 of the 1978 standards without change.

Subsection (e) of this section, as proposed, would retain subsection (e) of section 230.128 of the 1978 standards but would very narrowly rewrite it for clarity.

Subsection (f) of this section, as proposed, would retain subsection (f) of section 230.128 of the 1978 standards without change.

Subsection (g) of this section, as proposed, would retain subsection (g) of section 230.128 of the 1978 standards without change.

This section, as proposed, would not retain subsections (h) and (i) of section 230.128 of the 1978 standards, to reflect the removal throughout this proposed rule of distinctions between road and yard service. As discussed previously, the justification for treating these types of service differently no longer exists.

#### Section 230.97. Crank Pins

Subsection (a) of this section, as proposed, would change section 230.136 of the 1978 standards by eliminating the stamping requirement, consistent with section 230.92 of this proposal. The task force felt very strongly that it is unnecessary to know, and to have stamped on the pin, the application date.

This subsection also would expand the prohibition for shimming or prick punching to include "securing the fit of a loose crank pin by shimming, prick punching, or welding."

Subsection (b) of this section, as proposed, would retain the subsection (b) of section 230.136 of the 1978 standards but would change the word "bolts" to "fasteners." This change is non-substantive and reflects the acceptable use of other mechanisms as fasteners.

#### *Running Gear*

#### Section 230.98. Driving, Trailing, And Engine Truck Axles

This section, as proposed, would retain section 230.133 of the 1978 standards with minor substantive change and would rewrite and reorganize it for clarity. As proposed, this section would relax the wear allowance on secondary driving axles. The task force decided to make this change to harmonize the regulation with their operational experience.

#### Section 230.99. Tender Truck Axles

This section, as proposed, would retain section 230.134 of the 1978 standards without substantive change.

#### Section 230.100. Defects in Tender Truck Axles and Journals

This section, as proposed, would retain section 230.135 of the 1978 standards without substantive change.

#### Section 230.101. Steam Locomotive Driving Journal Boxes

This section, as proposed, would retain section 230.137 of the 1978 standards without substantive change, but would reorganize and rewrite it for clarity.

#### Section 230.102. Tender Plain Bearing Journal Boxes (New)

This section, as proposed, would impose condemning limits for plain bearing journal boxes, consistent with the task force's recommendation to do so. The task force collaborated and identified issues that might affect the operational integrity/function of the journal.

#### Section 230.103. Tender Roller Bearing Journal Boxes (New)

This section, as proposed, would impose maintenance requirements for tender roller bearing journal boxes, consistent with the task force's recommendation to do so. The task force did not find it necessary to impose specific condemning limits for roller bearing journal boxes, believing that the performance standard "safe and suitable" would suffice.

#### Section 230.104. Driving Box Shoes and Wedges

This section, as proposed, would retain section 230.138 of the 1978 standards without change.

#### Section 230.105. Lateral Motion

This section, as proposed, would retain section 230.140 of the 1978 standards without change.

#### *Trucks and Frames and Equalizing System*

#### Section 230.106. Steam Locomotive Frame

This section, as proposed, would retain section 230.139 of the 1978 standards but would modify it by adding a section which would allow locomotive owners and/or operators to continue in existence locomotives with broken frames that are properly patched or secured in a way to restore the rigidity of the frame.

#### Section 230.107. Tender Frame and Body

This section, as proposed, would retain section 230.152 of the 1978 standards and would add a section that would contain condemning limits for a tender frame, consistent with the task force's recommendation.

#### Section 230.108. Steam Locomotive Leading and Trailing Trucks

This section, as proposed, would retain section 230.143 of the 1978 standards but would modify it to require that all centering devices not permit lost motion in excess of 1/2 inch, consistent with the task force's recommendation.

#### Section 230.109. Tender Truck

This section, as proposed, would retain section 230.155 of the 1978 standards but would modify it to establish condemning limits for springs and to include truck centering devices.

#### Section 230.110. Pilots

This section, as proposed, would retain section 230.141 of the 1978 standards without change but would clarify that minimum and maximum

clearances of the pilot above the rail must be measured on tangent level track.

#### Section 230.111. Spring Rigging

This section, as proposed would retain section 230.142 of the 1978 standards with minor modifications. This section would change the 1978 standards to allow the adjusting of load weights by shifting weights from one pair of wheels to another, and to allow broken springs within the condemning limits for spring rigging to be repaired by clipping, provided the clips can be secured so as to stay in place.

#### *Wheels and Tires*

#### Sectopm 230.112. Wheels and Tires

This section, as proposed, would combine the 1978 standards of Sections 230.144, 230.150, and 230.151. Subsections (a), (b) and (c) reflect section 230.144 with a few modifications. Subsection (a), as proposed, would change "pressed" to "mounted." This change was recommended to acknowledge the process of shrinking wheels onto the axle, which is not acknowledged by the use of the word "pressed." Next, subsection (b), as proposed, would add a sentence to address gage for track that is less than standard gage. The figures used were derived from back to back measurement. The task force spent a fair amount of time debating the inclusion of standards for "wide-flange" wheels, but concluded that they would wait to see if the industry became more saturated with "wide-flange" wheels before addressing it. This proposal reflects that recommendation. Finally, subsection (c) would retain subsection (c) of section 230.144 of the 1978 standards without change.

Subsections (d) and (e) new and are derived from sections 230.150 and 230.151 of the 1978 standards. Subsection (d) would retain section 230.151 of the 1978 standards without substantive change but would rewrite it for clarity. Subsection (e) would combine the standards embodied in section 230.150(d) and (e) of the 1978 standards but would rewrite them for clarity.

#### Section 230.113. Wheels and Tire Defects

This section, as proposed, would combine sections 230.145, 230.146, and 230.149 of the 1978 standards but would rewrite them to make the standards more specific, to eliminate redundancies, and for clarity.

#### Section 230.114. Wheel Centers

This section, as proposed, would combine sections 230.147 and 230.148 of the 1978 standards but would rewrite them to make the standards more specific and to address welding on wheel centers. The task force recommended that welding on wheel centers be allowed in accordance with section 229.75(m) of the 1978 standards. This proposal reflects that recommendation.

#### *Steam Locomotive Tanks*

#### Section 230.115. Feed Water Tanks

This section, as proposed, would retain section 230.153 of the 1978 standards, largely without change, but would rewrite it for clarity. Subsection (a) of this section would change section 230.153 of the 1978 rule by requiring that all locomotives, regardless of the date of their manufacture or method of use, be equipped with a water level measurement device capable of being read from the cab or tender deck of the locomotive. The task force felt that this was capable of being accomplished very cheaply and eliminated the need for locomotive operators to climb atop the tender tank to check the water levels. In addition, this section would extend the inspection time period for inspecting feed water tanks from once each month to once each 92-service days, consistent with the comprehensive changes to the inspection scheme contemplated by this part.

#### Section 230.116. Oil Tanks

This section, as proposed, would retain section 230.154 of the 1978 standards without substantive change, but would rewrite it for clarity.

#### *Appendices*

FRA proposes to include at least five appendices to this rule. A brief description for each is provided below.

#### Appendix A—FRA's Exercise of Jurisdiction Over Tourist and Historic Railroads.

FRA proposes to include a statement of the agency's long standing policy concerning the exercise of its broad authority to regulate railroads. The policy statement is being included to help clarify the extent to which it currently exercises its jurisdiction.

#### Appendix B—Inspection Requirements

FRA proposes to provide in this appendix a simple reference guide for those who would be conducting the inspections required under these regulations. It is not intended to modify

the specific requirements contained in any particular section.

#### Appendix C—FRA Inspection Forms

This appendix contains examples of the six forms being proposed by FRA for recording compliance with the inspection and repair activities contained in various sections of the proposed rule. Use of these forms would be mandatory since, FRA does not contemplate individual operators as being given the freedom to create their own forms for recording this data. FRA will make a concentrated effort to make access to these forms readily available assuming that use of these forms becomes mandatory.

#### Appendix D—Drawings and Diagrams [Reserved]

In the final rule, this appendix would contain a series of drawings and diagrams that would be cross referenced to various sections of the rule. Each drawing or diagram visually demonstrates how the rule language should be applied. For example, it would depict how to apply an instrument in order to correctly take measurements of objects such as wheels to determine the size of flanges, flat spots, and broken rims for compliance purposes.

#### Appendix E—Schedule of Civil Penalties [Reserved]

In the final rule, this appendix would contain a penalty schedule similar to those that FRA has issued for its other regulations. Although such FRA penalty schedules are statements of policy and the obligation to provide notice and opportunity to comment prior to their issuance is not required under law, FRA would welcome comments from interested parties expressing their views on what penalties might be appropriate. FRA suggests that those interested in commenting on this issue examine FRA's current policy statement concerning the manner in which the agency enforces the rail safety laws. This policy statement is contained in Appendix A to 49 CFR Part 209,

#### **Regulatory Impact**

##### *A. Executive Order 12866 and DOT Regulatory Policies and Procedures*

This rule has been evaluated in accordance with existing policies and procedures, and determined to be non-significant under both Executive Order 12866 and DOT policies and procedures (44 FR 11034; February 26, 1979). FRA has prepared and placed in the docket a Regulatory Impact Analysis (RIA) addressing the economic impact of this rule. Document inspection and copying

facilities are available at 1120 Vermont Avenue, N.W., 7th Floor, Washington, D.C. Photocopies may also be obtained by submitting a written request to the FRA Docket Clerk at Office of Chief Counsel, Federal Railroad Administration, 400 Seventh Street, S.W., Washington, D.C. 20590.

As part of the regulatory impact analysis, FRA has assessed quantitative measurements of costs and benefits expected from the adoption of the final rule. For a twenty year period the Net Present Value (NPV) of the potential societal benefits is \$11,548,440, and the NPV of the estimated quantified costs is \$1,605,679. A majority of the costs would be caused by the transition from the current rule to the proposed rule. A majority of the savings would occur from the changes in the inspection frequencies that occur once an operator is operating under the proposed rule's requirements.

FRA anticipates that this rule will not only reduce the federally mandated burden for the average steam locomotive owner/operator, but also reduce the risk involved in their operations. The NPV of the net benefits is \$9.9 million.

#### *B. Regulatory Flexibility Act*

The Regulatory Flexibility Act of 1980 (5 U.S.C. 601 *et seq.*) requires a review of proposed and final rules to assess their impact on small entities. FRA has prepared and placed in the docket an Initial Regulatory Flexibility Assessment (IRFA) which assesses the small entity impact. Document inspection and copying facilities are available at 1120 Vermont Avenue, 7th Floor, Washington, D.C. Photocopies may also be obtained by submitting a written request to the FRA Docket Clerk at Office of Chief Counsel, Federal Railroad Administration, 400 Seventh Street, S.W., Washington, D.C. 20590.

FRA has recently published an interim policy which formally establishes "small entities" as being railroads which meet the line haulage revenue requirements of a Class III railroad. For other entities, the same dollar limit on revenues is established to determine whether a railroad shipper or contractor is a small entity. FRA is proposing to use this alternative definition of "small entity" for this rulemaking. Since this is still considered to be an alternative definition, FRA is using this definition in consultation with the Office of

Advocacy, SBA, and therefore requests public comments on its use.

The IRFA concludes that this proposed rule would have an economic impact on a sizable number of small entities. However, FRA certifies that this proposed rule is not expected to have a significant economic impact on a substantial number of small entities. The significance of the impact on the potentially affected small entities varies according to the current level of maintenance and inspection that a steam locomotive receives. Thus, an owner and/or operator of a steam locomotive which has only been marginally maintained could be significantly impacted by this proposed rule. In order to determine the significance of the economic impact FRA requests comments to the docket that will provide additional data on the economic impact caused by this proposed rule. The FRA will consider the comments and data it receives—or lack of comments and data—in making a final decision on the significance of the economic impact.

For this proposed rulemaking there are potentially 150 steam locomotives that fall under the FRA's jurisdiction which could be affected. These locomotives are owned by 82 operators. FRA estimates that the somewhere between 85 and 95 percent of these operators are small entities. These operators primarily use their steam locomotives in a tourist, historic, excursion, or museum railway operations. Since this proposed regulation is primarily being imposed on small entities, readers interested in further details about the impacts on these entities should review the NPRM's Regulatory Impact Analysis (RIA).

The impacts that this proposed regulation will have on the affected steam locomotive operators will vary for the 82 different operators. The impact will be inversely proportional to the level of inspection, maintenance and repair that each steam locomotive is currently given. Thus, steam locomotives that have been inspected, maintained and repaired properly should be impacted less than ones that have not. FRA estimates that the Net Present Value (NPV) of the average cost of this rule, per steam locomotive, is approximately \$10,000 over twenty years. One of the more significant economic impacts that will affect all steam locomotives is the cost for

transitioning from the current rule to the proposed. A proposed change that could impact a small quantity of steam locomotives each year is the proposed change involving replacing broken staybolts. Proposed new equipment requirements, such as a second water glass, total less than \$50,000 for all affected steam locomotives over the twenty-year period.

Since this proposed regulation impacts primarily small entities, most of the provisions in it were formed with the recognition that small operations would have to be burdened with its implementation and cost. In other words, all provisions of this proposed rule considered the potential impact to small entities when consensus was being formed on the rule-text. Because of this consideration, all requirements for specific equipment (i.e., cab lights, water glass etc . . . ) allow for the operators to have one year from the effective date of the final rule to implement these sections.

The largest impact and the greatest savings occur when a steam locomotive transitions from the current rule to the proposed. The proposed implementation for this is therefore gradually phased in. This proposal would allow steam locomotive owners and operators the flexibility necessary to bring their operations into compliance.

#### *C. Small Business Regulatory Enforcement Fairness Act of 1996*

Pursuant to Section 312 of the Small Business Regulatory Enforcement Fairness Act of 1996 (P.L. 104-121), FRA will issue a Small Entity Compliance Guide to summarize the requirements of this rule. The Guide will be made available to all affected small entities to assist them in understanding the actions necessary to comply with the rule. The Guide will in no way alter the requirements of the rule, but will be a tool to assist small entities in the day-to-day application of those requirements.

#### *D. Paperwork Reduction Act*

The information collection requirements in this final rule have been submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1995, 44 U.S.C. 3501 *et seq.* The sections that contain the new information collection requirements and the estimated time to fulfill each requirement are as follows:

CFR section	Respondent universe	Total annual responses	Average time per response	Total annual burden hours	Total annual burden cost
230.3—Implementation:					
—Interim Flue Extensions .....	82 owners/operators .....	30 letters .....	30 minutes .....	15	\$450
—Petitions for Special Consideration.	82 owners/operators .....	30 petitions .....	1 hour .....	30	1,020
—Agency Silence .....	82 owners/operators .....	1 notification .....	1 hour .....	1	30
230.12—Conditions for Movement of Non-Complying Steam Locomotives.	82 owners/operators .....	10 tags .....	6 minutes .....	1	30
230.13—Inspection Reports:					
—Recordkeeping .....	82 owners/operators .....	3,650 forms .....	2 .....	122 hours	3,660
230.14—31 Service Day Inspection ....	82 owners/operators .....	100 reports .....	20 minutes .....	33	990
—FRA Notification .....	82 owners/operators .....	2 notifications .....	5 minutes .....	.17	5
230.15—92 Day Service Inspection ....	82 owners/operators .....	100 reports .....	20 minutes .....	33	990
230.16—Annual Inspection .....	82 owners/operators .....	100 reports .....	30 minutes .....	50	1,500
—FRA Notification .....	82 owners/operators .....	100 notifications .....	5 minutes .....	8	240
230.17—1472 Service Day Inspection (Form No. 4).	82 owners/operators .....	15 forms .....	30 minutes .....	8	240
—Recordkeeping (Form No. 3) ....	82 owners/operators .....	15 reports .....	15 minutes .....	4	120
230.18—Service Day Report (Form No. 5):					
—Recordkeeping .....	82 owners/operators .....	150 reports .....	15 minutes .....	38	1,140
230.19—Posting of Copy:					
—Recordkeeping .....	82 owners/operators .....	300 forms .....	1 minute .....	5	150
230.20—Alteration Reports For Steam Locomotive Boilers (Form No. 19).	82 owners/operators .....	5 reports .....	1 hour .....	5 hours	150
230.21—Steam Locomotive Number Change.	82 owners/operators .....	5 documents .....	2 minutes .....	17	5
230.33—Welded Repairs and Alterations.	82 owners/operators .....	5 letters .....	50 minutes .....	1	30
—Wastage and Flush Patches .....	82 owners/operators .....	12 letters .....	10 .....	1	60
230.34—Riveted Repairs and Alterations.	82 owners/operators .....	37 requests .....	5 minutes .....	3	90
230.41—Flexible Staybolts with Caps:					
—Recordkeeping .....	82 owners/operators .....	10 entries .....	1 minute .....	.17	5
230.46—Badge Plates:					
—Recordkeeping .....	82 owners/operators .....	1 report .....	30 minutes .....	.50	15
230.47—Boiler Number:					
—Recordkeeping .....	82 owners/operators .....	1 report .....	15 minutes .....	.25	8
230.75—Stenciling Dates of Tests and Cleaning:					
—Recordkeeping .....	82 owners/operators .....	54 tests .....	1 minute .....	1	30
230.96—Main, Side, and Valve Rods ..	82 owners/operators .....	1 letter .....	10 minutes .....	.17 hour	5
230.98—Driving, Trailing, and Engine Truck Axles:					
Journal Diameter Stamped .....	82 owner/operators .....	1 stamp .....	15 minutes .....	.25	8
230.116—Oil Tanks .....	82 owners/operators .....	150 signs .....	1 minute .....	3	90

All estimates include the time for reviewing instructions; searching existing data sources; gathering or maintaining the needed data; and reviewing the information. Pursuant to 44 U.S.C. 3506(c)(2)(B), the FRA solicits comments concerning: whether these information collection requirements are necessary for the proper performance of the function of FRA, including whether the information has practical utility; the accuracy of FRA's estimates of the burden of the information collection requirements; the quality, utility, and clarity of the information to be collected; and whether the burden of collection of information on those who are to respond, including through the use of automated collection techniques or other forms of information technology, may be minimized. For

information or a copy of the paperwork package submitted to OMB contact Robert Brogan at 202-493-6292.

Organizations and individuals desiring to submit comments on the collection of information requirements should direct them to the Office of Management and Budget, Attention: Desk Officer for the Federal Railroad Administration, Office of Information and Regulatory Affairs, Washington, D.C. 20503, and should also send a copy of their comments to Robert Brogan, Federal Railroad Administration, RRS-21, Mail Stop 25, 400 7th Street, S.W., Washington, D.C. 20590.

OMB is required to make a decision concerning the collection of information requirements contained in this final rule between 30 and 60 days after publication of this document in the **Federal Register**. Therefore, a comment

to OMB is best assured of having its full effect if OMB receives it within 30 days of publication. The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

FRA cannot impose a penalty on persons for violating information collection requirements which do not display a current OMB control number, if required. FRA intends to obtain current OMB control numbers for any new information collection requirements resulting from this rulemaking action prior to the effective date of a final rule. The valid OMB control number for this information collection is 2130-0505.

*E. Federalism Implications*

This final rule will not have a substantial effect on the states, on the

relationship between the national government and the states, or the distribution of power and responsibilities among the various levels of government. Thus, in accordance with Executive Order 12612, preparation of a Federalism assessment is not warranted.

#### *F. Compliance With the Unfunded Mandates Reform Act of 1995*

Pursuant to the Unfunded Mandates Reform Act of 1995 (Pub. L. 104-4) each federal agency "shall, unless otherwise prohibited by law, assess the effects of Federal Regulatory actions on State, local, and tribal governments, and the private sector (other than to the extent that such regulations incorporate requirements specifically set forth in law)." Section 201. Section 202 of the Act further requires that "before promulgating any general notice of proposed rulemaking that is likely to result in promulgation of any rule that includes any Federal mandate that may result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of \$100,000,000 or more (adjusted annually for inflation) in any 1 year, and before promulgating any final rule for which a general notice of proposed rulemaking was published, the agency shall prepare a written statement \* \* \* detailing the effect on State, local and tribal governments and the private sector." The final rule issued today will not result in the expenditure, in the aggregate, of \$100,000,000 or more in any one year, and thus preparation of a statement is not required.

#### *G. Request for Public Comments*

In accordance with Executive Order 12866, FRA is allowing 60 days for comments. FRA believes that a 60 day comment period is appropriate to allow parties with interests not represented on the Tourist and Historic Working Group of the Railroad Safety Advisory Committee to comment on this proposed rule. As noted earlier, FRA has not scheduled a public hearing and will not do so unless requested to do in writing. FRA solicits written comments on all aspects of this proposed rule and FRA may make changes to the final rule based on comments received in response to this notice.

In the very near future, FRA's docket system will be integrated with the centralized DOT docket facility which will enable the public to view all documents in a public docket through the Internet. At that time, all comments received in this proceeding will be transferred to the central docket facility and all subsequent documents relating

to this proceeding will be filed directly in, and be available for inspection through, the centralized docket system. A notice of the docket system change with complete filing and inspection information will be published in the **Federal Register** at the appropriate time.

#### **List of Subjects in 49 CFR Part 230**

Steam locomotives, Railroad safety, Penalties, Reporting and recordkeeping requirements.

#### **The Proposed Rule**

For the reasons set out above, FRA proposes revising Part 230 of Title 49 of the Code of Federal Regulations to read as follows:

### **PART 230—STEAM LOCOMOTIVE INSPECTION AND MAINTENANCE STANDARDS**

#### **Subpart A—General**

Sec.

- 230.1 *Purpose and scope.*
- 230.2 *Applicability.*
- 230.3 *Implementation.*
- 230.4 *Prohibited acts.*
- 230.5 *Penalties.*
- 230.6 *Preemptive effect.*
- 230.7 *Waivers.*
- 230.8 *Responsibility for compliance.*
- 230.9 *Definitions.*
- 230.10 *Information collection.*

#### **General Inspection Requirements**

- 230.11 *Repair of non-complying conditions.*
- 230.12 *Movement of non-complying locomotives.*
- 230.13 *Daily inspection.*
- 230.14 *Thirty-one (31) service day inspection.*
- 230.15 *Ninety-two (92) service day inspection.*
- 230.16 *Annual inspection.*
- 230.17 *One thousand four hundred seventy-two (1472) service day inspection.*

#### **Recordkeeping Requirements**

- 230.18 *Service days.*
- 230.19 *Posting of FRA Form No. 1 and FRA Form No. 3.*
- 230.20 *Alteration and repair report for steam locomotive boilers.*
- 230.21 *Steam locomotive number change.*
- 230.22 *Accident reports.*

#### **Subpart B—Boilers and Appurtenances**

- 230.23 *Responsibility for general construction and safe working pressure.*

#### **Allowable Stress**

- 230.24 *Maximum allowable stress.*
- 230.25 *Maximum allowable stress on stays and braces.*

#### **Strength of Materials**

- 230.26 *Tensile strength of shell plates.*
- 230.27 *Maximum shearing strength of rivets.*
- 230.28 *Higher shearing strength of rivets.*

#### **Inspection and Repair**

- 230.29 *Inspection and repair.*
- 230.30 *Lap-joint seam boilers.*
- 230.31 *Flues to be removed.*
- 230.32 *Time and method of inspection.*
- 230.33 *Welded repairs and alterations.*
- 230.34 *Riveted repairs and alterations.*

#### **Pressure Testing of Boilers**

- 230.35 *Pressure testing.*
- 230.36 *Hydrostatic testing of boilers.*
- 230.37 *Steam test following repairs or alterations.*

#### **Staybolts**

- 230.38 *Telltale holes.*
- 230.39 *Broken staybolts.*
- 230.40 *Time and method of staybolt testing.*
- 230.41 *Flexible staybolts with caps.*

#### **Steam Gauges**

- 230.42 *Location of gauges.*
- 230.43 *Gauge siphon.*
- 230.44 *Time of testing.*
- 230.45 *Method of testing.*
- 230.46 *Badge plates.*
- 230.47 *Boiler number.*

#### **Safety Relief Valves**

- 230.48 *Number and capacity.*
- 230.49 *Setting of safety relief valves.*
- 230.50 *Time of testing.*

#### **Water Glasses and Gauge Cocks**

- 230.51 *Number and location.*
- 230.52 *Water glass valves.*
- 230.53 *Time of cleaning.*
- 230.54 *Testing and maintenance.*
- 230.55 *Tubular type water and lubricator glasses and shields.*
- 230.56 *Water glass lamps.*

#### **Injectors, Feedwater Pumps, and Flue Plugs**

- 230.57 *Injectors and feedwater pumps.*
- 230.58 *Flue plugs.*

#### **Fusible Plugs**

- 230.59 *Fusible plugs.*

#### **Washing Boilers**

- 230.60 *Time of washing.*
- 230.61 *Arch tubes, water bar tubes, circulators and thermic siphons.*

#### **Steam Pipes**

- 230.62 *Dry pipe.*
- 230.63 *Smoke box, steam pipes and pressure parts.*

#### **Steam Leaks**

- 230.64 *Leaks under lagging.*
- 230.65 *Steam blocking view of engine crew.*

#### **Subpart C—Steam Locomotives and Tenders**

- 230.66 *Design, construction, and maintenance.*
- 230.67 *Responsibility for inspection and repairs.*

#### **Speed Indicators**

- 230.68 *Speed indicators.*

#### **Ash Pans**

- 230.69 *Ash pans.*



**Brake and Signal Equipment**

- 230.70 *Safe condition.*
- 230.71 *Orifice testing of compressors.*
- 230.72 *Testing main reservoirs.*
- 230.73 *Air gauges.*
- 230.74 *Time of cleaning.*
- 230.75 *Stenciling dates of tests and cleaning.*
- 230.76 *Piston travel.*
- 230.77 *Foundation brake gear.*
- 230.78 *Leakage.*
- 230.79 *Train signal system.*

**Cabs, Warning Signals, Sanders and Lights**

- 230.80 *Cabs.*
- 230.81 *Cab aprons.*
- 230.82 *Fire doors and mechanical stokers.*
- 230.83 *Cylinder cocks.*
- 230.84 *Sanders.*
- 230.85 *Audible warning device.*
- 230.86 *Required illumination.*
- 230.87 *Cab lights.*

**Throttles and Reversing Gear**

- 230.88 *Throttles.*
- 230.89 *Reverse gear.*

**Draw Gear and Draft Systems**

- 230.90 *Draw gear between locomotive and tender.*
- 230.91 *Chafing irons.*
- 230.92 *Draw gear and draft systems.*

**Driving Gear**

- 230.93 *Pistons and piston rods.*
- 230.94 *Crossheads.*
- 230.95 *Guides.*
- 230.96 *Main, side and valve motion rods.*
- 230.97 *Crank pins.*

**Running Gear**

- 230.98 *Driving, trailing, and engine truck axles.*
- 230.99 *Tender truck axles.*
- 230.100 *Defects in tender truck axles and journals.*
- 230.101 *Steam locomotive driving journal boxes.*
- 230.102 *Tender plain bearing journal boxes.*
- 230.103 *Tender roller bearing journal boxes.*
- 230.104 *Driving box shoes and wedges.*
- 230.105 *Lateral motion.*

**Trucks and Frames and Equalizing System**

- 230.106 *Steam locomotive frame.*
- 230.107 *Tender frame and body.*
- 230.108 *Steam locomotive leading and trailing trucks.*
- 230.109 *Tender trucks.*
- 230.110 *Pilots.*
- 230.111 *Spring rigging.*

**Wheels and Tires**

- 230.112 *Wheels and tires.*
- 230.113 *Wheel and tire defects.*
- 230.114 *Wheel centers.*

**Steam Locomotive Tanks**

- 230.115 *Feed water tanks.*
- 230.116 *Oil tanks.*

*Appendix A to Part 230—FRA's Exercise of Jurisdiction Over Tourist and Historic Railroads.*

*Appendix B to Part 230—Inspection Requirements.*

*Appendix C to Part 230—FRA Inspection Forms.*

*Appendix D to Part 230—Drawings and Diagrams. [Reserved]*

*Appendix E to Part 230—Schedule of Civil Penalties. [Reserved]*

**Authority:** 49 U.S.C. 20103, 20701, 20702; 49 CFR 1.49.

**Subpart A—General.****§ 230.1 Purpose and scope.**

This part prescribes minimum Federal safety standards for all steam-propelled locomotives. This part does not restrict a railroad from adopting and enforcing additional or more stringent requirements not inconsistent with this part.

**§ 230.2 Applicability.**

(a) Except as provided in paragraph (b) of this section, this part applies to all railroads that operate steam locomotives.

(b) This part does not apply to:

- (1) A railroad with track gage of less than 24 inches;
- (2) A railroad that operates exclusively freight trains and does so only on track inside an installation that is not part of the general system of transportation;
- (3) Rapid transit operations in an urban area that are not connected to the general system of transportation; or
- (4) A railroad that operates passenger trains and does so only on track inside an installation that is insular, i.e., its operations are limited to a separate enclave in such a way that there is no reasonable expectation that the safety of the public—except a business guest, a licensee of the railroad or an affiliated entity, or a trespasser—would be affected by the operation. An operation will not be considered insular if one or more of the following exists on its line:
  - (i) A public highway-rail crossing that is in use;
  - (ii) An at-grade rail crossing that is in use;
  - (iii) A bridge over a public road or waters used for commercial navigation; or
  - (iv) A common corridor with another railroad, i.e., its operations are conducted within 30 feet of those of any other railroad.

(c) See Appendix A of this part for a current statement of the Federal Railroad Administration's (FRA's) policy on its exercise of jurisdiction.

**§ 230.3 Implementation.**

Except as provided in paragraphs (a) through (c) of this section, the locomotive owner and/or operator shall perform a 1472 service day inspection that meets the requirements of § 230.17 when the locomotive's flues would be

required to be removed pursuant to § 230.10, of the regulations in effect prior to [the effective date of the final rule]. (See 49 CFR Parts 200–299, revised October 1, 1978). At the time the locomotive owner and/or operator completes this inspection, it must begin to comply with the rest of the provisions of this part. Up until such time, and except as provided in paragraphs (a) through (c) of this section, compliance with the regulations in effect prior to [the effective date of the final rule] (See 49 CFR Parts 200–299, revised October 1, 1978) will constitute full compliance with this part. Any interested person may obtain the October 1, 1978 revision of 49 CFR Parts 200–999 by contacting the Federal Railroad Administration, Office of Chief Counsel, 400 7th Street, S.W., Washington, D.C. 20590.

(a) *One year after effective date of the final rule.* The following sections of this part must be complied with by [one year after effective date of the final rule]:

§§ 230.7, 230.51, 230.57, 230.68, 230.70, 230.85, 230.87, 230.115, and 230.116.

(b) *Interim Flue Removal Extensions.* FRA will continue to consider requests for flue removal extensions under the provisions of § 230.10 of the regulations in effect prior to [effective date of the final rule] (See 49 CFR Parts 200–299, revised October 1, 1978) until [two (2) years after the effective date of the final rule].

(c) *Petition for Special Consideration.* The locomotive owner or operator may petition FRA for special consideration of this part's implementation with respect to any locomotive that has either fully or partially satisfied the requirements of § 230.17 within three (3) years prior to [the publication date of the final rule], provided the locomotive is in full compliance with § 230.17 by the time the petition is actually filed<sup>1</sup>.

(1) *Petition process.* Petitions must be filed by [one year after effective date of the final rule] and must be accompanied by all relevant documentation to be considered, including a FRA Form 4 (see Appendix C of this Part) that has been calculated in accordance with § 230.17, and all records that demonstrate the number of days the locomotive has been in service. Based

<sup>1</sup> **Note:** As an example, where the locomotive has received a proper boiler inspection within 3 years prior to the publication date of this rule, but has not had its Form 4 updated, the locomotive owner or operator may update and verify the Form 4 for that locomotive, and submit a timely petition that requests retroactive credit for the boiler inspection that was conducted within the past three years pursuant to §§ 230.10 and 230.11 of the regulations in effect prior to [effective date of the final rule]. (See 49 CFR Parts 200–299, revised October 1, 1978).

upon the documentation provided, the agency will calculate the number of "service days" the locomotive has accrued and will notify the petitioner of the number of service days that remain in the locomotive's 1472 service day cycle. Petitions should be sent to the agency by some form of registered mail to ensure a record of delivery. The agency will investigate these petitions and will respond to these petitions within one year of their receipt. The agency will send its response by some form of registered mail to ensure that a record of delivery is created. In its response, the agency may grant the petition or deny it. If the agency grants the petition, the entirety of the revised requirements will become effective upon receipt of the agency's response, unless the agency's response indicates otherwise. If the agency denies the petition, the rule will become effective as provided in the first paragraph of this section.

(2) *Agency silence.* Anyone who does not receive a response within one year of the date they filed their petition, whether through administrative or postal error, must notify FRA that the response has not been received. The notification should be provided to the agency by some form of registered mail to ensure a record of delivery. Upon receipt of this notification, FRA will ensure that a response is either issued, or re-issued, as soon as possible. In the interim, however, any operator who is at the end of their inspection cycle under the rules in effect prior to [effective date of final rule] (See 49 CFR Parts 200-299, revised October 1, 1978) will be allowed to remain in service without conducting the required inspection under § 230.17 for an additional six months, or until they receive FRA's decision, whichever occurs first.

#### § 230.4 Prohibited acts.

Chapter 207 of Title 49 of the United States Code makes it unlawful for any railroad to use or permit to be used on its line any steam locomotive or tender unless the entire steam locomotive or tender and its parts and appurtenances—

- (a) Are in proper condition and safe to operate in the service to which they are put, without unnecessary danger of personal injury; and
- (b) Have been inspected and tested as required by this part.

#### § 230.5 Penalties.

(a) Any person who violates any requirement of this part or causes the violation of any such requirement is subject to a civil penalty of at least \$500 and not more than \$11,000 per

violation, except that: Penalties may be assessed against individuals only for willful violations, and, where a grossly negligent violation or a pattern of repeated violations has created an imminent hazard of death or injury to persons, or has caused death or injury, a penalty not to exceed \$22,000 per violation may be assessed. Each day a violation continues shall constitute a separate offense. See Appendix E to this part for a statement of agency civil penalty policy.

(b) Any person who knowingly and willfully falsifies a record or report required by this part may be subject to criminal penalties under 49 U.S.C. 21311.

#### § 230.6 Preemptive effect.

Under 49 U.S.C. 20106, issuance of this part preempts any State law, regulation, or order covering the same subject matter, except an additional or more stringent law, regulation, or order that is necessary to eliminate or reduce an essentially local safety hazard; is not incompatible with a law, regulation, or order of the United States Government; and does not unreasonably burden interstate commerce. By issuance of this part, the FRA does not intend to preempt state laws authorizing safety inspections, by state officials pursuant to their own boiler safety programs, of steam locomotive boilers over which the FRA is not currently exercising its safety jurisdiction.

#### § 230.7 Waivers.

(a) A person subject to a requirement of this part may petition the Administrator for a waiver of compliance with such requirement. The filing of such a petition does not affect that person's responsibility for compliance with that requirement while the petition is being considered.

(b) Each petition for waiver under this section must be filed in the manner and contain the information required by part 211 of this chapter.

(c) If the Administrator finds that a waiver of compliance is in the public interest and is consistent with railroad safety, the Administrator may grant the waiver subject to any conditions the Administrator deems necessary. Where a waiver is granted, the Administrator publishes a notice containing the reasons for granting the waiver.

(d) All waivers of every form and type from any requirement of any order or regulation implementing the Locomotive Boiler Inspection Act, 36 Stat. 913, as amended, 49 U.S.C. 20702, applicable to one or more steam locomotives, shall lapse on [effective date of final rule] unless a copy of the

grant of waiver is filed for reassessment prior to that date with the Office of Safety, Federal Railroad Administration, 400 Seventh Street, Washington, D.C. 20590. FRA will review the waiver and notify the applicant whether the waiver has been continued.

#### § 230.8 Responsibility for compliance.

(a) The locomotive owner and/or operator is directly responsible for ensuring that all requirements of this part are satisfied, and is the entity primarily responsible for compliance with this part.

(b) Although the duties imposed by this part are generally stated in terms of the duties of a railroad or a steam locomotive owner and/or operator, any person, including a contractor for a railroad, who performs any function covered by this part must perform that function in accordance with this part.

#### § 230.9 Definitions.

As used in this part, the terms listed in this section have the following definitions:

*Administrator.* The Administrator of the Federal Railroad Administration or the Administrator's delegate.

*Alteration.* Any change to the boiler which affects its pressure retention capability. Rating changes are considered alterations.

*ANSI.* American National Standards Institute.

*API.* American Petroleum Institute.

*ASME.* American Society of Mechanical Engineers.

*Boiler surfaces.* The boiler interior is all the space inside a boiler occupied by water or steam under pressure, and all associated surfaces inside that space exposed to that water and steam. The boiler exterior is the opposite surface of all components directly exposed to the boiler interior. This includes the fire side of the firebox sheets.

*Break.* A fracture resulting in complete separation into parts.

*Code of original construction.* The manufacturer's or industry code in effect when the boiler was constructed. If the exact code is not known, the closest contemporary code may be used provided it does not pre-date the construction date of the boiler.

*Crack.* A fracture without complete separation into parts, except that castings with shrinkage cracks or hot tears that do not significantly diminish the strength of the member are not considered to be cracked.

*FRA.* The Federal Railroad Administration.

*Locomotive operator.* Person or entity which operates, but which does not necessarily own, one or more steam

locomotives. This term means, for purposes of inspection and maintenance responsibility, the entity responsible for the day-to-day operation of the steam locomotive, or their delegate.

**Locomotive owner.** Person or entity which owns, but which does not necessarily operate, one or more steam locomotives. For purposes of inspection and maintenance responsibility, this term includes their delegate as well.

**MAWP.** Maximum allowable working pressure as specified by the steam locomotive specification FRA Form No. 4. (See appendix C of this part)

**NBIC.** National Board Inspection Code published by the National Board of Boiler and Pressure Vessel Inspectors.

**NDE.** Non-destructive Examination.

**NPS.** Nominal Pipe Size.

**Person.** An entity of any type covered under 1 U.S.C. 1, including but not limited to the following: a railroad; a manager, supervisor, official, or other employee or agent of a railroad; any owner, manufacturer, lessor, or lessee of railroad equipment, track, or facilities; any independent contractor providing goods or services to a railroad; and any employee of such owner, manufacturer, lessor, lessee, or independent contractor.

**Railroad.** Any form of non-highway ground transportation that runs on rails or electromagnetic guideways and any entity providing such transportation, including commuter or other short-haul railroad passenger service in a metropolitan or suburban area and commuter railroad service that was operated by the Consolidated Rail Corporation on January 1, 1979; and high speed ground transportation systems that connect metropolitan areas, without regard to whether those systems use new technologies not associated with traditional railroads; but does not include rapid transit operations in an urban area that are not connected to the general railroad system of transportation.

**Renewal.** Replacement in kind with a newly manufactured or remanufactured (restored to original tolerances) component. Materials shall be suitable for the service intended.

**Repair.** Any work which results in a restoration in kind.

**Serious injury.** An injury that results in the amputation of any appendage, the loss of sight in an eye, the fracture of a bone, or the confinement in a hospital for a period of more than 24 consecutive hours.

**Service day.** Any calendar day that the boiler has steam pressure above atmospheric pressure with fire in the firebox. In the case of a fireless steam locomotive, any calendar day that the

boiler has steam pressure above atmospheric pressure.

**Stayed portion of the boiler.** That portion of the boiler designed to require support to retain internal pressure by the addition of strength members, such as staybolts, braces, diagonal stays, tubes, etc.

**Steam locomotive.** A self-propelled unit of equipment powered by steam that is either designed or used for moving other equipment. This includes a self-propelled unit designed or used to carry freight and/or passenger traffic.

**Unstayed Portion of the Boiler.** That portion of the boiler designed to be self-supported in retaining internal pressure without additional strength members such as staybolts, braces, diagonal stays, tubes, etc.

**Wastage.** A reduction in the thickness of a mechanical component, such as a pipe or sheet.

#### § 230.10 Information collection.

(a) [Reserved]

(b) The information collection requirements are found in the following sections: 230.3, 230.12 through 230.21, 230.33, 230.34, 230.41, 230.46, 230.47, 230.75, 230.96, 230.98, and 230.116.

#### General Inspection Requirements

##### § 230.11 Repair of non-complying conditions.

The steam locomotive owner and/or operator shall repair any steam locomotive that fails to comply with the conditions of this part, and shall approve any such repairs made, before placing the locomotive back into service.

##### § 230.12 Movement of non-complying steam locomotives.

(a) **General limitations on movement.** A steam locomotive with one or more non-complying conditions may be moved only as a lite steam locomotive or a steam locomotive in tow, except as provided in paragraph (b) of this section. Cars essential to the movement of the steam locomotive and tender(s), including tool cars and a bunk car, may accompany lite movements.

(b) **Conditions for movement.** Prior to movement, the steam locomotive owner and/or operator shall determine that it is safe to move the locomotive, determine the maximum speed and other restrictions necessary for safely conducting the movement, and notify in writing the engineer in charge of the defective steam locomotive and, if towed, the engineer in charge of the towing locomotive consist, as well as all other crew members in the cabs, of the presence of the non-complying steam locomotive and the maximum speed

and other movement restrictions. In addition, a tag bearing the words "non-complying locomotive" shall be securely attached to each defective steam locomotive and shall contain the following information:

- (1) The steam locomotive number;
- (2) The name of the inspecting carrier;
- (3) The inspection location and date;
- (4) The nature of the defect;
- (5) Movement restrictions, if any;
- (6) The destination; and
- (7) The signature of the person

making the determinations required by this paragraph (b).

(c) **Non-complying conditions developed en route.** The locomotive owner and/or operator may continue in use a steam locomotive that develops a non-complying condition en route until the next daily inspection or the nearest forward point where the repairs necessary to bring it into compliance can be made, whichever is earlier. Before continuing en route, the steam locomotive owner and/or operator shall determine that it is safe to move the steam locomotive, determine the maximum speed and other restrictions necessary for safely conducting the movement, and notify in writing the engineer in charge of the defective steam locomotive and, if towed, the engineer in charge of the towing steam locomotive consist, as well as all other crew members in the cabs, of the presence of the non-complying steam locomotive and the maximum speed and other movement restrictions.

(d) **Special notice for repair.** Nothing in this section authorizes the movement of a steam locomotive subject to a Special Notice for Repair unless the movement is made in accordance with the restrictions contained in the Special Notice.

##### § 230.13 Daily inspection.

(a) **General.** An individual competent to conduct the inspection shall inspect each steam locomotive and its tender and appurtenances each day that they are offered for use to determine that they are safe and suitable for service. The daily inspection shall be conducted to comply with all sections of this part, and a daily inspection report filed, by an individual competent to conduct the inspection. See appendices B and C of this part.

(b) **Pre-departure.** At the beginning of each day the steam locomotive is used, an individual competent to do so shall, together with the daily inspection required above, inspect the steam locomotive and its tender and appurtenances to ensure that they are safe and suitable for service, paying special attention to the following items:

(1) Water glasses and gauge cocks;  
 (2) Boiler feedwater delivery systems, such as injectors and feedwater pumps; and

(3) Air compressors and governors, and the air brake system.

(c) *Inspection reports.* The results of the daily inspection shall be entered on an FRA Form No. 2 (See appendix C of this part) which shall contain, at a minimum, the name of the railroad, the initials and number of the steam locomotive, the place, date and time of the inspection, the signature of the employee making the inspection, a description of the non-complying conditions disclosed by the inspection, conditions found in non-compliance during the day and repaired and the signature of the person who repaired the non-conforming conditions. This report shall be filed even if no non-complying conditions are detected. A competent individual shall sign the report, certifying that all non-complying conditions were repaired before the steam locomotive is operated. This report shall be filed and retained for at least 92 days at the location designated by the steam locomotive owner and/or operator.

**§ 230.14 Thirty-one (31) service day inspection.**

(a) *General.* An individual competent to conduct the inspection shall perform the 31 service day inspection after the steam locomotive has accrued 31 "service-days." This inspection shall consist of all 31 service day inspection items and all daily inspection items. See appendix B of this part. Days in service shall be counted, recorded and readily available for inspection when requested by an FRA inspector.

(b) *FRA notification.* FRA Regional Administrators, or their delegate(s), may require a steam locomotive owner or operator to provide FRA with notification before a 31 service day inspection. If the Regional Administrator or their delegate indicates their desire to be present for the 31 service day inspection, the steam locomotive owner and/or operator shall provide them a scheduled date and location for inspection. Once scheduled, the inspection must be performed at the time and place specified, unless the Regional Administrator and the steam locomotive owner and/or operator mutually agree to reschedule.

(c) *Filing inspection reports.* Within 10 days of conducting the 31 service day inspection, the steam locomotive owner and/or operator shall file, for each steam locomotive inspected, a report of inspection (FRA Form No. 1), in the place where the steam locomotive is

maintained and with the FRA Regional Administrator for that region. When the report of annual inspection (FRA Form No. 3), is filed, the FRA Form No. 1 does not have to be filed until the next 31 service day inspection. (See appendix C of this part)

**§ 230.15 Ninety-two (92) service day inspection.**

(a) *General.* An individual competent to conduct the inspection shall perform the 92 service day inspection after the steam locomotive has accrued 92 "service-days." This inspection shall include all daily, all 31 service day, and all 92 service day inspection items. See Appendix B of this part. Days in service shall be counted, recorded, and readily available for inspection when requested by an FRA inspector.

(b) *Filing inspection reports.* Within 10 days of conducting the 92 service day inspection, the steam locomotive owner and/or operator shall file, for each steam locomotive inspected, a report of inspection (FRA Form No. 1), in the place the locomotive is maintained and with the Regional Administrator for that region. When the report of annual inspection (FRA Form No. 3), is filed, the FRA Form No. 1 does not have to be filed until the next 92 service day inspection. (See appendix C of this part)

**§ 230.16 Annual inspection.**

(a) *General.* (1) An individual competent to conduct the inspection shall perform the annual inspection after 368 calendar days have elapsed from the time of the previous annual inspection. This inspection shall include all daily, all 31 service day, all 92 service day, and all annual inspection items. See Appendix B of this part.

(2) *Fifth annual inspection.* An individual competent to do so shall perform a flexible staybolt and cap inspection in accordance with § 230.41 at each fifth annual inspection.

(b) *FRA notification.* FRA Regional Administrators shall be provided written notice at least one month prior to an annual inspection and afforded an opportunity to be present. If the Regional Administrator or their delegate indicates a desire to be present, the steam locomotive owner and/or operator will provide a scheduled date and location for the inspection. Once scheduled, the inspection must be performed at the time and place specified, unless the Regional Administrator and the steam locomotive owner and/or operator mutually agree to reschedule.

(c) *Filing inspection reports.* Within 10 days of completing the annual

inspection, the steam locomotive owner and/or operator shall file, for each steam locomotive inspected, a report of inspection (FRA Form No. 3), in the place where the steam locomotive is maintained and with the Regional Administrator for that region. (See appendix C of this part)

**§ 230.17 One thousand four hundred seventy-two (1472) service day inspection.**

(a) *General.* Before any steam locomotive is initially put in service or brought out of retirement, and after 1472 service days or 15 years, whichever is earlier, an individual competent to conduct the inspection shall inspect the entire boiler. This 1472 service day inspection shall include all annual, and 5th annual, inspection requirements, as well as any items required by the steam locomotive owner and/or operator or the FRA inspector. At this time, the locomotive owner and/or operator shall complete, update and verify the locomotive specification card (FRA Form No. 4), to reflect the condition of the boiler at the time of this inspection. See appendices B and C of this part.

(b) *Filing inspection reports.* Within 30 days of completing the 1472 service day inspection, the steam locomotive owner and/or operator shall, for each steam locomotive inspected, file in the place where the steam locomotive is maintained and with the FRA Regional Administrator for that region a report of inspection, (FRA Form No. 3), and a completed FRA Form No.4. (See appendix C of this part)

**Recordkeeping Requirements**

**§ 230.18 Service days.**

(a) *Service day record.* For every steam locomotive currently in service, the steam locomotive owner and/or operator shall have available, and be able to show an FRA inspector upon request, a current copy of the service day record that contains the number of service days the steam locomotive has accrued since the last 31, 92, Annual and 1472 service day inspections.

(b) *Service day report.* By the 31st of every January, every steam locomotive owner and/or operator shall file a service day report, FRA Form No. 5, with the Regional Administrator accounting for the days the steam locomotive was in service from January 1 through December 31st of the preceding year. If the steam locomotive was in service zero (0) days during that period, a report must still be filed to prevent the steam locomotive from being considered retired by FRA. (See appendix C of this part)

(c) *Retirement where no service day reports filed.* Where the steam

locomotive owner and/or operator does not file the required service day report for a steam locomotive, that steam locomotive may be considered retired by FRA. The steam locomotive owner and/or operator must complete all 1472 service day inspection items to return a retired steam locomotive to service.

**§ 230.19 Posting of FRA Form No. 1 and FRA Form No. 3.**

(a) *FRA Form No. 1.* The steam locomotive owner and/or operator shall place a copy of the 31 and 92 service day inspection report, (FRA Form No. 1), properly filled out, under transparent cover in a conspicuous place in the cab of the steam locomotive before the boiler inspected is put into service. This FRA Form No. 1 will not be required for the first 31 service days following an annual inspection and the posting of an FRA Form No. 3. (See appendix C of this part)

(b) *Form No. 3.* In addition to the FRA Form No. 1, the steam locomotive owner and/or operator shall also maintain in the cab a current copy of FRA Form No. 3 in the manner described in paragraph (a) of this section. (See appendix C of this part)

**§ 230.20 Alteration and repair report for steam locomotive boilers.**

(a) *Alterations.* When an alteration is made to a steam locomotive boiler, the steam locomotive owner and/or operator shall file an alteration report (FRA Form No. 19), detailing the changes to the locomotive with the FRA Regional Administrator within 30 days from the date the work was completed. This form shall be attached to, and maintained with, the FRA Form No. 4 until such time as a new FRA Form No. 4 reflecting the alteration is submitted to the Regional Administrator. Alteration reports shall be filed and maintained for the life of the boiler. (See appendix C of this part)

(b) *Welded and riveted repairs to unstayed portions of the boiler.* Whenever welded or riveted repairs are performed on unstayed portions of a steam locomotive boiler, the steam locomotive owner and/or operator shall file with the FRA Regional Administrator, within 30 days from the time the work was completed, a repair report, FRA Form No. 19, that details the work done to the steam locomotive. Repair reports shall be filed and maintained for the life of the boiler. (See appendix C of this part)

(c) *Welded and riveted repairs to stayed portions of the boiler.* Whenever welded or riveted repairs are performed on stayed portions of a steam locomotive boiler, the steam locomotive

owner and/or operator shall complete a repair report (FRA Form No. 19), detailing the work done. Repair reports shall be maintained for the life of the boiler. (See appendix C of this part)

**§ 230.21 Steam locomotive number change.**

When a steam locomotive number is changed, the steam locomotive owner and/or operator must reflect the change in the upper right-hand corner of all documentation related to the steam locomotive by showing the old and new numbers:

Old No. 000  
New No. XXX

**§ 230.22 Accident reports.**

In the case of an accident due to failure, from any cause, of a steam locomotive boiler or any part or appurtenance thereof, resulting in serious injury or death to one or more persons, the railroad on whose line the accident occurred shall immediately report the accident by toll free telephone, Area Code 800-424-0201. The report shall state the nature of the accident, the number of persons killed or seriously injured, the place at which it occurred, as well as where the steam locomotive may be inspected. Confirmation of this report shall be immediately mailed to the Associate Administrator for Safety, Federal Railroad Administration, Washington, D.C. 20590, and contain a detailed report of the accident, including, to the extent known, the causes and a complete list of the casualties.

**Subpart B—Boilers and Appurtenances**

**§ 230.23 Responsibility for general construction and safe working pressure.**

The steam locomotive owner and operator are responsible for the general design and construction of the steam locomotive boilers under their control. The steam locomotive owner shall establish the safe working pressure for each steam locomotive boiler, after giving full consideration to the general design, workmanship, age, and overall condition of the complete boiler unit. The condition of the boiler unit shall be determined by, among other factors, the minimum thickness of the shell plates, the lowest tensile strength of the plates, the efficiency of the longitudinal joint, the inside diameter of the course, and the maximum allowable stress value allowed. The steam locomotive operator shall not place the steam locomotive in service before ensuring that the steam locomotive's safe working pressure has been established.

**Allowable Stress**

**§ 230.24 Maximum allowable stress.**

(a) *Maximum allowable stress value.* The maximum allowable stress value on any component of a steam locomotive boiler shall not exceed 1/4 of the ultimate tensile strength of its material.

(b) *Safety factor.* When it is necessary to use the code of original construction in boiler calculations, the safety factor value shall not be less than 4.

**§ 230.25 Maximum allowable stress on stays and braces.**

The maximum allowable stress per square inch of net cross sectional area on fire box and combustion chamber stays shall be 7,500 psi. The maximum allowable stress per square inch of net cross sectional area on round, rectangular, or gusset braces shall be 9,000 psi.

**Strength of Materials**

**§ 230.26 Tensile strength of shell plates.**

When the tensile strength of steel or wrought-iron shell plates is not known, it shall be taken at 50,000 psi for steel and 45,000 psi for wrought iron.

**§ 230.27 Maximum shearing strength of rivets.**

The maximum shearing strength of rivets per square inch of cross sectional area shall be taken as follows:

Rivets	Pounds per square inch
Iron Rivets in Single Shear .....	38000
Iron Rivets in Double Shear .....	76000
Steel Rivets in Single Shear .....	44000
Steel Rivets in Double Shear .....	88000

**§ 230.28 Higher shearing strength of rivets.**

A higher shearing strength may be used for rivets when it can be shown by test that the rivet material used is of such quality as to justify a higher allowable shearing strength.

**Inspection and Repair**

**§ 230.29 Inspection and repair.**

(a) *Responsibility.* The steam locomotive owner and/or operator shall inspect and repair all steam locomotive boilers and appurtenances under their control. They shall immediately remove from service any boiler that has developed cracks in the barrel. The steam locomotive owner and/or operator shall also remove the boiler from service whenever either of them, or the FRA inspector, considers it necessary due to other defects.

(b) *Repair standards.* (1) All defects disclosed by any inspection shall be repaired in accordance with accepted industry standards, which may include established railroad practices, or NBIC or API established standards, before the steam locomotive is returned to service. The steam locomotive owner and/or operator shall not return the steam locomotive boiler or appurtenances to service unless they are in good condition and safe and suitable for service.

(2) Any welding to unstayed portions of the boiler made pursuant to § 230.33 shall be made in accordance with an accepted national standard for boiler repairs. The steam locomotive owner and/or operator shall not return the steam locomotive boiler or appurtenances to service unless they are in good condition and safe and suitable for service.

#### § 230.30 Lap-joint seam boilers.

Every boiler having lap-joint longitudinal seams without reinforcing plates shall have enough lagging, jacketing, flues, and tubes removed at every annual inspection so that an inspection of the entire joint, inside and out, can be made, taking special care to detect grooving or cracks at the edges of the seams.

#### § 230.31 Flues to be removed.

(a) *Inspection of the boiler interior.* During the 1472 service day inspection, the steam locomotive owner and/or operator shall remove all flues of steam locomotive boilers in service, except as provided in paragraph (b) of this section, for the purpose of inspecting the entire interior of the boiler and its bracing. After removing the flues, the steam locomotive owner and/or operator shall enter the boiler to remove scale from the interior and thoroughly clean and inspect it.

(b) *NDE testing.* If the boiler can be thoroughly cleaned and inspected without removing the superheater flues, and it can be shown through appropriate NDE testing methods that they are safe and suitable for service, their removal may not be required at this time. Their removal may be required, however, if the FRA inspector, or the steam locomotive owner and/or operator, considers it necessary due to identifiable safety concerns.

#### § 230.32 Time and method of inspection.

(a) *Time of inspection.* The entire boiler shall completely be inspected at the 1472 service day inspection. The jacket, lagging and any other components interfering with the provision of inspection access shall be

removed at this time. Those portions of the boiler that are exposed and able to be inspected as required by the daily, 31 service day, annual and fifth annual inspections shall be inspected at those times. The interior of the boiler also shall be inspected at each annual inspection, after the completion of any hydrostatic test above MAWP, and whenever a sufficient number of flues are removed to allow examination. The jacket, lagging and any other components shall also be removed to provide inspection access whenever the FRA inspector, or the steam locomotive owner and/or operator, considers it necessary due to identifiable safety concerns.

(b) *Method of Inspection.*—(1) *Entire boiler.* During the 1472 service day inspection, the entire boiler shall be examined for cracks, pitting, grooving, or indications of overheating and for damage where mud has collected, or heavy scale formed. The edges of plates, all laps, seams, and points where cracks and defects are likely to develop, shall be thoroughly inspected. Rivets shall be inspected for corrosion and looseness.

(2) *Boiler interior.* When inspecting the boiler interior, it must be seen that braces and stays are taut, that pins are properly secured in place, and that each is in condition to support its proportion of the load. Washout plugs shall be removed for access and visual inspection of the water side of the firebox sheets. Washout plug threads, sleeves and threaded openings shall be examined at this time.

(3) *Boiler exterior.* A thorough inspection shall be made of the entire exterior of the boiler while under hydrostatic pressure.

#### § 230.33 Welded repairs and alterations.

(a) *Unstayed portions of the boiler containing alloy steel or carbon steel with a carbon content over 0.25 percent.* Prior to welding on unstayed portions of the boiler, the steam locomotive owner and/or operator shall submit a written request for approval to the FRA Regional Administrator. If the approval is granted, the steam locomotive owner and/or operator shall perform any welding to unstayed portions of the boiler in accordance with an accepted national standard for boiler repairs. The steam locomotive owner and/or operator shall satisfy reporting requirements in § 230.20 at this time.

(b) *Unstayed portions of the boiler containing carbon steel not exceeding 0.25 percent carbon.* The steam locomotive owner and/or operator shall perform any welding to unstayed portions of the boiler in accordance with an accepted national standard for

boiler repairs. The steam locomotive owner and/or operator shall satisfy reporting requirements in § 230.20 at this time.

(c) *Wastage.* The steam locomotive owner and/or operator shall submit a written request for approval to the FRA Regional Administrator before performing weld build up on wasted areas of unstayed surfaces of the boiler that exceed a total of 100 square inches, or the smaller of 25 percent of minimum required wall thickness or 1/2 of an inch. Wasted sheets shall not be repaired by weld build up if the wasted sheet has been reduced to less than 60 percent of the minimum required thickness as required by this part.

(d) *Flush patches.* The steam locomotive owner and/or operator shall submit a written request for approval to the FRA Regional Administrator for the installation of flush patches of any size on unstayed portions of the boiler.

(e) *Stayed portions of the boiler.* The steam locomotive owner and/or operator shall perform welded repairs or alterations on stayed portions of the boiler in accordance with established railroad practices, or an accepted national standard for boiler repairs. The steam locomotive owner and/or operator shall satisfy reporting requirements in § 230.20 at this time.

#### § 230.34 Riveted repairs and alterations.

(a) *Alterations to unstayed portions of the boiler.* Prior to making riveted alterations on unstayed portions of the boiler, the steam locomotive owner and/or operator shall submit a written request for approval to the FRA Regional Administrator. If approval is granted, the steam locomotive owner and/or operator shall perform any riveting to unstayed portions of the boiler in accordance with established railroad practices, or an accepted national standard for boiler repairs. The steam locomotive owner and/or operator shall satisfy reporting requirements in § 230.20 at this time.

(b) *Repairs to unstayed portions of the boiler.* The steam locomotive owner and/or operator shall perform any riveted repairs to unstayed portions of the boiler in accordance with established railroad practices, or an accepted national standard for boiler repairs. The steam locomotive owner and/or operator shall satisfy reporting requirements in § 230.20 at this time.

(c) *Repairs to stayed portions of the boiler.* The steam locomotive owner and/or operator shall perform riveted repairs or alterations on stayed portions of the boiler in accordance with established railroad practices, or an accepted national standard for boiler

repairs. The steam locomotive owner and/or operator shall satisfy reporting requirements in § 230.20 at this time.

#### Pressure Testing of Boilers

##### § 230.35 Pressure testing.

The temperature of the steam locomotive boiler shall be raised to at least 60 °F any time pressure is applied to the boiler.

##### § 230.36 Hydrostatic testing of boilers.

(a) *Time of test.* The locomotive owner and/or operator shall hydrostatically test every boiler at the following times:

(1) During the 1472 service day inspection, and at every annual inspection thereafter;

(2) After making any alteration to the boiler;

(3) After installing a flush patch on an unstayed portion of the boiler; and

(4) After any riveting on an unstayed portion of the boiler.

(b) *Method of testing.* The metal temperature of the boiler shall be between 60 °F and 120 °F each time it is subjected to any hydrostatic pressure. Hydrostatic testing required by these rules shall be conducted at 25 percent above the MAWP.

(c) *Internal inspection.* An internal inspection of the boiler shall be conducted following any hydrostatic test where the pressure exceeds MAWP.

##### § 230.37 Steam test following repairs or alterations.

Upon completion of any repair or alteration, the locomotive owner and/or operator shall conduct a steam test of the boiler with steam pressure raised to between 95 percent and 100 percent of the MAWP. At this time, the boiler shall be inspected to ensure that it is in a safe and suitable condition for service.

#### Staybolts

##### § 230.38 Telltale holes.

(a) *Staybolts less than 8 inches long.* All staybolts shorter than 8 inches, except flexible bolts, shall have telltale holes  $\frac{3}{16}$  inch to  $\frac{7}{32}$  inch diameter and at least  $1\frac{1}{4}$  inches deep in the outer end.

(b) *Reduced body staybolts.* On reduced body staybolts, the telltale hole shall extend beyond the fillet and into the reduced section of the staybolt. Staybolts may have through telltale holes.

(c) *Telltale holes kept open.* All telltale holes, except as provided for in § 230.41, must be kept open at all times.

##### § 230.39 Broken staybolts.

(a) *Maximum allowable number of broken staybolts.* No boiler shall be

allowed to remain in service with two broken staybolts located within 24 inches of each other, as measured inside the firebox or combustion chamber on a straight line. No boiler shall be allowed to remain in service with more than 4 broken staybolts inside the entire firebox and combustion chamber, combined.

(b) *Staybolt replacement.* Broken staybolts must be replaced during the 31 service day inspection, if detected at that time. Broken staybolts detected in between 31 service day inspections must be replaced no later than 30 calendar days from the time of detection. When staybolts 8 inches or less in length are replaced, they shall be replaced with bolts that have telltale holes  $\frac{3}{16}$  inch to  $\frac{7}{32}$  inch in diameter and at least  $1\frac{1}{4}$  inches deep at each end, or that have telltale holes  $\frac{3}{16}$  inch to  $\frac{7}{32}$  inch in diameter their entire length. At the time of replacement of broken staybolts, adjacent staybolts shall be inspected.

(c) *Assessment of broken staybolts.* Telltale holes leaking, plugged, or missing shall be counted as broken staybolts.

(d) *Prohibited methods of closing telltale holes.* Welding, forging or riveting broken staybolt ends is prohibited as a method of closing telltale holes.

##### § 230.40 Time and method of staybolt testing.

(a) *Time of hammer testing.—(1) General.* All staybolts shall be hammer tested at every 31 service day inspection, except as provided in paragraph (a)(2) of this section. All staybolts also shall be hammer tested under hydrostatic pressure any time hydrostatic pressure above the MAWP specified on the boiler specification form (FRA Form No. 4), is applied to the boiler. (See appendix C of this part)

(2) *Exception for inaccessible staybolts.* The removal of brickwork or grate bearers for the purpose of hammer testing staybolts during each 31 service day inspection will not be required if the staybolts behind these structural impediments have a telltale hole  $\frac{3}{16}$  inch to  $\frac{7}{32}$  inch in diameter their entire length. Whenever the brickwork or grate bearers are removed for any other reason, however, the bolts shall be inspected at that time.

(b) *Method of hammer testing.* If staybolts are tested while the boiler contains water, the hydrostatic pressure must be not less than 95 percent of the MAWP. The steam locomotive owner and/or operator shall tap each bolt with a hammer and determine broken bolts from the sound or the vibration of the

sheet. Whenever staybolts are tested while the boiler is not under pressure, such as during the 31 service day inspection, the staybolt test must be made with all the water drained from the boiler.

##### § 230.41 Flexible staybolts with caps.

(a) *General.* Flexible staybolts with caps shall have their caps removed during every 5th annual inspection for the purpose of inspecting the bolts for breakage, except as provided in paragraph (b) of this section.

(b) *Drilled flexible staybolts.* For flexible staybolts that have telltale holes between  $\frac{3}{16}$  inch and  $\frac{7}{32}$  inch in diameter, and which extend the entire length of the bolt and into the head not less than one third of the diameter of the head, the steam locomotive owner and/or operator need not remove the staybolt caps if it can be established, by an electrical or other suitable method, that the telltale holes are open their entire length. Any leakage from these telltale holes during the hydrostatic test indicates that the bolt is broken and must be replaced. Before the steam locomotive is placed in service, the inner ends of all telltale holes shall be closed with a fireproof porous material that will keep the telltale holes free of foreign matter and permit steam or water to exit the telltale hole when the bolt is broken or fractured.

(c) *Recordkeeping.* The removal of flexible staybolt caps and other tests shall be reported on FRA Form No. 3. (See appendix C of this part)

(d) *Testing at request of FRA inspector.* Staybolt caps also shall be removed, or any of the above tests made, whenever the FRA inspector or the steam locomotive owner and/or operator considers it necessary due to identifiable safety concerns about the condition of staybolts, staybolt caps or staybolt sleeves.

#### Steam Gauges

##### § 230.42 Location of gauges.

Every boiler shall have at least one steam gauge which will correctly indicate the working pressure. The gauge shall be positioned so that it will be kept reasonably cool and can conveniently be read by the engine crew.

##### § 230.43 Gauge siphon.

The steam gauge supply pipe shall have a siphon on it of ample capacity to prevent steam from entering the gauge. The supply pipe shall directly enter the boiler and be maintained steam tight. The supply pipe and its connections shall be cleaned each time the gauge is tested.

**§ 230.44 Time of testing.**

Steam gauges shall be tested prior to being installed or being reapplied, during the 92 service day inspection, and whenever any irregularity is reported.

**§ 230.45 Method of testing.**

Steam gauges shall be compared with an accurate test gauge or dead weight tester. While under test load at the MAWP of the boiler to which the gauge will be applied, the gauge shall be set to read that pressure as accurately as the physical limitations of the gauge will allow. Under test the gauge shall read within the manufacturer's tolerance at all points on the gauge up to 25 percent above the allowed pressure. If the manufacturer's tolerance is not known, the gauge must read within 2 percent full scale accuracy at all points on the gauge up to 25 percent above allowed pressure.

**§ 230.46 Badge plates.**

A metal badge plate showing the allowed steam pressure shall be attached to the boiler backhead in the cab. If boiler backhead is lagged, the lagging and jacket shall be cut away so that the plate can be seen.

**§ 230.47 Boiler number.**

(a) *Generally.* The builder's number of the boiler, if known, shall be stamped on the steam dome or manhole flange. If the builder's number cannot be obtained, an assigned number, which shall be used in making out specification cards, shall be stamped on the steam dome or manhole flange.

(b) *Numbers after January 10, 1912.* Numbers which are stamped after January 10, 1912 shall be located on the front side of the steam dome or manhole flange at the upper edge of the vertical surface, oriented in a horizontal manner, and have figures at least  $\frac{3}{8}$  inch high.

(c) *Name of manufacturer or owner.* The number shall be preceded by the name of the manufacturer if the original number is known or the name of the steam locomotive owner if a new number is assigned.

**Safety Relief Valves****§ 230.48 Number and capacity.**

(a) *Number and capacity.* Every boiler shall be equipped with at least two safety relief valves, suitable for the service intended, that are capable of preventing an accumulation of pressure greater than 6 percent above the MAWP under any conditions of service. An FRA inspector may require verification of sufficient safety valve relieving capacity.

(b) *Determination of capacity.* Safety relief valve capacity may be determined by making an accumulation test with the fire in good, bright condition and all steam outlets closed. Additional safety relief valve capacity shall be provided if the safety relief valves allow an excess pressure of more than 6 percent above the MAWP during this test.

**§ 230.49 Setting of safety relief valves.**

(a) *Qualifications of individual who adjusts.* Safety relief valves shall be set and adjusted by a competent person who is thoroughly familiar with the construction and operation of the valve being set.

(b) *Opening pressures.* At least one safety relief valve shall be set to open at a pressure not exceeding the MAWP. Safety relief valves shall be set to open at pressures not exceeding 6 psi above the MAWP.

(c) *Setting procedures.* When setting safety relief valves, two steam gauges shall be used, one of which must be so located that it will be in full view of the persons engaged in setting such valves; and if the pressure indicated by the gauges varies more than 3 psi they shall be removed from the boiler, tested, and corrected before the safety relief valves are set. Gauges shall in all cases be tested immediately before the safety relief valves are set or any change made in the setting. When setting safety relief valves, the water level shall not be higher than  $\frac{3}{4}$  of the length of the visible water glass, as measured from the bottom of the glass.

(d) *Labeling of lowest set pressure.* The set pressure of the lowest safety relief valve shall be indicated on a tag or label attached to the steam gauge so that it may be clearly read while observing the steam gauge.

**§ 230.50 Time of testing.**

All safety relief valves shall be tested, and adjusted if necessary, under steam at every 92 service day inspection, and also when any irregularity is reported.

**Water Glasses and Gauge Cocks****§ 230.51 Number and location.**

Every boiler shall be equipped with at least two water glasses. The lowest reading of the water glasses shall not be less than 3 inches above the highest part of the crown sheet. If gauge cocks are used, the reading of the lowest gauge cock shall not be less than 3 inches above the highest part of the crown sheet.

**§ 230.52 Water glass valves.**

All water glasses shall be equipped with no more than two valves capable of isolating the water glass from the

boiler. They shall also be equipped with a drain valve capable of evacuating the glass when it is so isolated.

**§ 230.53 Time of cleaning.**

The spindles of all water glass valves and of all gauge cocks shall be removed and valves and cocks thoroughly cleaned of scale and sediment at every 31 service day inspection, and when testing indicates that the apparatus may be malfunctioning. In addition, the top and bottom passages of the water column shall be cleaned and inspected at each annual inspection.

**§ 230.54 Testing and maintenance.**

(a) *Testing.* All water glasses must be blown out, all gauge cocks must be tested, and all passages verified to be open at the beginning of each day the locomotive is used, and as often as necessary to ensure proper functioning.

(b) *Maintenance.* Gauge cocks, water column drain valves, and water glass valves must be maintained in such condition that they can easily be opened and closed by hand, without the aid of a wrench or other tool.

**§ 230.55 Tubular type water and lubricator glasses and shields.**

(a) *Water glasses.* Tubular type water glasses shall be renewed at each 92 service day inspection.

(b) *Shields.* All tubular water glasses and lubricator glasses must be equipped with a safe and suitable shield which will prevent the glass from flying in case of breakage. This shield shall be properly maintained.

(c) *Location and maintenance.* Water glasses and water glass shields shall be so located, constructed, and maintained that the engine crew can at all times have an unobstructed view of the water in the glass from their proper positions in the cab.

**§ 230.56 Water glass lamps.**

All water glasses must be supplied with a suitable lamp properly located to enable the engine crew to easily see the water in the glass.

**Injectors, Feedwater Pumps, and Flue Plugs****§ 230.57 Injectors and feedwater pumps.**

(a) *Water delivery systems required.* Each steam locomotive must be equipped with at least two means of delivering water to the boiler, at least one of which is a live steam injector.

(b) *Maintenance and testing.* Injectors and feedwater pumps must be kept in good condition, free from scale, and must be tested at the beginning of each day the locomotive is used, and as often as conditions require, to ensure that



they are delivering water to the boiler. Boiler checks, delivery pipes, feed water pipes, tank hose and tank valves must be kept in good condition, free from leaks and from foreign substances that would obstruct the flow of water.

(c) *Bracing.* Injectors, feedwater pumps, and all associated piping shall be securely braced so as to minimize vibration.

#### § 230.58 Flue plugs.

(a) *When plugging is permitted.* Flues greater than 2¼ inches in outside diameter (OD) shall not be plugged. Flues 2¼ inches in outside diameter (OD) or smaller may be plugged following failure, provided only one flue is plugged at any one time. Plugs must be removed and proper repairs made no later than 30 days from the time the plug is applied.

(b) *Method of plugging.* When used, flue plugs must be made of steel. The flue must be plugged at both ends. Plugs must be tied together by means of a steel rod not less than 5/8 inch in diameter.

#### Fusible Plugs

##### § 230.59 Fusible plugs.

If boilers are equipped with fusible plugs, the plugs shall be removed and cleaned of scale each time the boiler is washed, but not less frequently than during every 31 service day inspection. Their removal shall be noted on the FRA Form No. 1 or FRA Form No. 3. (See appendix C of this part)

#### Washing Boilers

##### § 230.60 Time of washing.

(a) *Frequency of washing.* All boilers shall thoroughly be washed as often as the water conditions require, but not less frequently than at each 31 service day inspection. The date of the boiler wash shall be noted on the FRA Form No. 1 or FRA Form No. 3. (See appendix C of this part)

(b) *Plug removal.* All washout plugs, arch tube plugs, thermic siphon plugs, circulator plugs and water bar plugs must be removed when boilers are washed.

(c) *Plug maintenance.* All washout plugs, washout plug sleeves and threaded openings shall be maintained in a safe and suitable condition for service and shall be examined for defects each time the plugs are removed.

(d) *Fusible plugs cleaned.* Fusible plugs shall be cleaned in accordance with § 230.59.

##### § 230.61 Arch tubes, water bar tubes, circulators and thermic siphons.

(a) *Frequency of cleaning.* Each time the boiler is washed, arch tubes and water bar tubes shall thoroughly be

cleaned mechanically, washed, and inspected. Circulators and thermic siphons shall thoroughly be cleaned, washed and inspected.

(b) *Defects.* Arch tubes and water bar tubes found blistered, bulged, or otherwise defective shall be renewed. Circulators and thermic siphons found blistered, bulged or otherwise defective shall be either repaired or renewed.

(c) *Method of examination.* Arch tubes, water bar tubes and circulators shall be examined using an appropriate NDE method that accurately measures wall thickness at each annual inspection. All arch brick shall be removed for this inspection. If any are found with wall thickness reduced below that required to render them safe and suitable for the service intended at the MAWP specified on the boiler specification FRA Form No. 4, they must be replaced or repaired. (See appendix C of this part)

#### Steam Pipes

##### § 230.62 Dry pipe.

Dry pipes subject to pressure shall be examined at each annual inspection to measure wall thickness. Dry pipes with wall thickness reduced below that required to render the pipe suitable for the service intended at the MAWP must be replaced or repaired.

##### § 230.63 Smoke box, steam pipes and pressure parts.

The smoke box, steam pipes and pressure parts shall be inspected at each annual inspection, or any other time that conditions warrant. The individual conducting the inspection must enter the smoke box to conduct the inspection, looking for signs of leaks from any of the pressure parts therein and examining all draft appliances.

#### Steam Leaks

##### § 230.64 Leaks under lagging.

The steam locomotive owner and/or operator shall take out of service at once any boiler that has developed a leak under the lagging due to a crack in the shell, or to any other condition which may reduce safety. Pursuant to § 230.29, the boiler must be repaired before being returned to service.

##### § 230.65 Steam blocking view of engine crew.

The steam locomotive owner and/or operator shall keep the boiler, and its piping and appurtenances, in such repair that they do not emit steam in a manner that obscures the engine crew's vision.

#### Subpart C—Steam Locomotives and Tenders

##### § 230.66 Design, construction, and maintenance.

The steam locomotive owner and operator are responsible for the general design, construction and maintenance of the steam locomotives and tenders under their control.

##### § 230.67 Responsibility for inspection and repairs.

The steam locomotive owner and/or operator shall inspect and repair all steam locomotives and tenders under their control. All defects disclosed by any inspection shall be repaired in accordance with accepted industry standards, which may include established railroad practices, before the steam locomotive or tender is returned to service. The steam locomotive owner and/or operator shall not return the steam locomotive or tender to service unless they are in good condition and safe and suitable for service.

#### Speed Indicators

##### § 230.68 Speed indicators.

Steam locomotives that operate at speeds in excess of 20 mph over the general system of railroad transportation shall be equipped with speed indicators. Where equipped, speed indicators shall be maintained to ensure accurate functioning.

#### Ash Pans

##### § 230.69 Ash pans.

Ash pans shall be securely supported from mud-rings or frames with no part less than 2½ inches above the rail. Their operating mechanism shall be so arranged that they may be safely operated and securely closed.

#### Brake and Signal Equipment

##### § 230.70 Safe condition.

(a) *Pre-departure inspection.* At the beginning of each day the locomotive is used, the steam locomotive operator shall ensure that:

- (1) The brakes on the steam locomotive and tender are in safe and suitable condition for service;
  - (2) The air compressor or compressors are in condition to provide an ample supply of air for the locomotive service intended;
  - (3) The devices for regulating all pressures are properly performing their functions;
  - (4) The brake valves work properly in all positions; and
  - (5) The water has been drained from the air-brake system.
- (b) *Brake pipe valve required.* Each steam locomotive shall have a brake

pipe valve attached to the front of the tender, the rear of the back cab wall, or adjacent to the exit of a vestibuled cab. The words "Emergency Brake Valve" shall be clearly displayed near the valve.

**§ 230.71 Orifice testing of compressors.**

(a) *Frequency of testing.* The compressor or compressors shall be tested for capacity by orifice test as often as conditions may require, but not

less frequently than once every 92 service days.

(b) *Orifice testing criteria.* (1) Compressors in common use, as listed in the following table, shall have orifice test criteria as follows:

Make	Compressor size	Single strokes per minute	Diameter of orifice (in inches)	Air pressure maintained (in pounds)
Westinghouse .....	9½ .....	120	1 1/64	60
Westinghouse .....	11 .....	100	3/16	60
Westinghouse .....	150 HP 8½ CC .....	100	9/32	60
Westinghouse .....	120 LP 8½ CC .....	100	15/64	60
New York .....	2a .....	120	5/32	60
New York .....	6a .....	100	13/64	60
New York .....	5b .....	100	15/64	60

NOTE: This table shall be used for altitudes to and including 1,000 feet. For altitudes over 1,000 feet the speed of compressor may be increased 5 single strokes per minute for each 1,000 feet increase in altitude.

(2) For compressors not listed in the table in paragraph (b) (1) of this section, the air pressure to be maintained shall be no less than 80 percent of the manufacturer's rated capacity for the compressor.

**§ 230.72 Testing main reservoirs.**

(a) *Hammer and hydrostatic testing.* Except as described below, every main reservoir, except those cast integrally with the frame, shall be hammer and hydrostatically tested during each annual inspection. The reservoir shall be hammer tested while empty and with no pressure applied. If no defective areas are detected, a hydrostatic test of MAWP shall be applied.

(b) *Drilling of main reservoirs.* (1) Each welded main reservoir originally constructed to withstand at least five times the MAWP may be drilled over its entire surface with telltale holes that are 3/16 of an inch in diameter. The holes shall be spaced not more than 12 inches apart, measured both longitudinally and circumferentially, and drilled from the outer surface to an extreme depth determined by the following formula:

$$D = (.6PR / (S - .6P))$$

Where:

D = Extreme depth of telltale holes in inches but in no case less than one-sixteenth inch;

P = certified working pressure in psi;

S = 1/5 of the minimum specified tensile strength of the material in psi; and

R = inside radius of the reservoir in inches.

(2) One row of holes shall be drilled lengthwise of the reservoir on a line intersecting the drain opening. When main reservoirs are drilled as described in paragraph (b)(1) of this section, the hydrostatic and hammer tests described in paragraph (a) of this section are not

required during the annual inspection. Whenever any telltale hole shall have penetrated the interior of any reservoir, the reservoir shall be permanently withdrawn from service.

(c) *Welded main reservoirs without longitudinal lap seams.* For welded main reservoirs that do not have longitudinal lap seams, an appropriate NDE method that can measure the wall thickness of the reservoir may be used instead of the hammer test and hydrostatic test required in paragraph (a) of this section. The spacing of the sampling points for wall thickness shall not be greater than 12 inches longitudinally and circumferentially. The reservoir shall permanently be withdrawn from service where the NDE testing reveals wall thickness less than the value determined by the following formula:

$$t = (PR / (S - .6P))$$

Where:

t = Minimum value for wall thickness;

P = Certified working pressure in psi;

S = 1/5 of the minimum specified tensile strength of the material in psi, or 10,000 psi if the tensile strength is unknown; and

R = Inside radius of the reservoir in inches.

(d) *Welded or riveted longitudinal lap seam main reservoirs.* (1) For welded or riveted longitudinal lap seam main reservoirs, an appropriate NDE method that can measure wall thickness of the reservoir shall be used instead of, or in addition to, the hammer test and hydrostatic test. The spacing of the sampling points for wall thickness shall not be greater than 12 inches longitudinally and circumferentially. Particular care shall be taken to measure along the longitudinal seam on both plates at an interval of no more than 6 inches longitudinally. The reservoir

shall be withdrawn permanently from service where NDE testing reveals wall thickness less than the value determined by the following formula:

$$t = (PR / (0.5S - 0.6P))$$

Where:

t = Minimum value for wall thickness;

P = Certified working pressure in psi;

S = 1/5 of the minimum specified tensile strength of the material in psi, or 10,000 psi if the tensile strength of steel is unknown; and

R = Inside radius of the reservoir in inches.

(2) Repairs of reservoirs with reduced wall thickness are prohibited.

**§ 230.73 Air gauges.**

(a) *Location.* Air gauges shall be so located that they may be conveniently read by the engineer from his usual position in the cab. No air gauge may be more than three psi in error.

(b) *Frequency of testing.* Air gauges shall be tested prior to reapplication following removal, as well as during the 92 service day inspection and whenever any irregularity is reported.

(c) *Method of testing.* Air gauges shall be tested using an accurate test gauge or dead weight tester designed for this purpose.

**§ 230.74 Time of cleaning.**

All valves in the air brake system, including related dirt collectors and filters, shall be cleaned and tested in accordance with accepted brake equipment manufacturer's specifications, or as often as conditions require to maintain them in a safe and suitable condition for service, but not less frequently than after 368 service days or during the second annual inspection, whichever occurs first.

**§ 230.75 Stenciling dates of tests and cleaning.**

The date of testing and cleaning, and the initials of the shop or station at which the work is done, shall legibly be stenciled in a conspicuous place on the tested parts, or placed on a card displayed under a transparent cover in the cab of the steam locomotive.

**§ 230.76 Piston travel.**

(a) *Minimum piston travel.* The minimum piston travel shall be sufficient to provide proper brake shoe clearance when the brakes are released.

(b) *Maximum piston travel.* The maximum piston travel when steam locomotive is standing shall be as follows:

Type of wheel brake	Maximum piston travel (in inches)
Cam Type Driving Wheel Brake .....	3½
Other forms of Driving Wheel Brake .....	6
Engine Truck Brake .....	8
Tender Brake .....	9

**§ 230.77 Foundation brake gear.**

(a) *Maintenance.* Foundation brake gear shall be maintained in a safe and suitable condition for service. Levers, rods, brake beams, hangers, and pins shall be of ample strength, and shall not be fouled in any way which will affect the proper operation of the brake. All pins shall be properly secured in place with cotter pins, split keys, or nuts. Brake shoes must be properly applied and kept approximately in line with the tread of the wheel.

(b) *Distance above the rails.* No part of the foundation brake gear of the steam locomotive or tender shall be less than 2½ inches above the rails.

**§ 230.78 Leakage.**

(a) *Main reservoirs and related piping.* Leakage from main reservoir and related piping shall be tested at every 92 service day inspection and shall not exceed an average of 3 psi per minute in a test of 3 minutes duration that is made after the pressure has been reduced to 60 percent of the maximum operating pressure.

(b) *Brake cylinders.* Leakage from brake cylinders shall be tested at every 92 service day inspection. With a full service application from maximum brake pipe pressure, and with communication to the brake cylinders closed, the brakes on the steam locomotive and tender must remain applied for a minimum of 5 minutes.

(c) *Brake pipes.* Steam locomotive brake pipe leakage shall be tested at the

beginning of each day the locomotive is used, and shall not exceed 5 psi per minute.

**§ 230.79 Train signal system.**

Where utilized, the train signal system, or any other form of on-board communication, shall be tested and known to be in safe and suitable condition for service at the beginning of each day the locomotive is used.

**Cabs, Warning Signals, Sanders and Lights****§ 230.80 Cabs.**

(a) *General provisions.* Cabs shall be securely attached or braced and maintained in a safe and suitable condition for service. Cab windows of steam locomotives shall provide an undistorted view of the track and signals for the crew from their normal position in the cab. Cab floors shall be kept free of tripping or slipping hazards. The cab climate shall be maintained to provide an environment that does not unreasonably interfere with the engine crew's performance of their duties under ordinary conditions of service.

(b) *Steam pipes.* Steam pipes shall not be fastened to the cab. New construction or renewals made of iron or steel pipe greater than ½ inch NPS that are subject to boiler pressure in cabs shall have a minimum wall thickness equivalent to schedule 80 pipe, with properly rated valves and fittings. Live steam heating radiators must not be fastened to the cab. Exhaust steam radiators may be fastened to the cab.

(c) *Oil-burning steam locomotives.* If the cab is enclosed, oil burning steam locomotives that take air for combustion through the fire-door opening shall have a suitable conduit extending from the fire-door to the outside of the cab.

**§ 230.81 Cab aprons.**

(a) *General provisions.* Cab aprons shall be of proper length and width to ensure safety. Cab aprons shall be securely hinged, maintained in a safe and suitable condition for service, and roughened, or other provision made, to afford secure footing.

(b) *Width of apron.* The cab apron shall be of a sufficient width to prevent, when the drawbar is disconnected and the safety chains or the safety bars are taut, the apron from dropping between the steam locomotive and tender.

**§ 230.82 Fire doors and mechanical stokers.**

(a) *General provisions.* Each steam locomotive shall have a fire door which shall latch securely when closed and which shall be maintained in a safe and suitable condition for service. Fire doors

on all oil-burning locomotives shall be latched securely with a pin or key.

(b) *Mechanically operated fire doors.* Mechanically operated fire doors shall be so constructed and maintained that they may be operated by pressure of the foot on a pedal, or other suitable appliance, located on the floor of the cab or tender at a suitable distance from the fire door, so that they may be conveniently operated by the person firing the steam locomotive.

(c) *Hand-operated doors.* Hand operated fire doors shall be so constructed and maintained that they may be conveniently operated by the person firing the steam locomotive.

**§ 230.83 Cylinder cocks.**

Each steam locomotive shall be equipped with cylinder cocks which can be operated from the cab of the steam locomotive. All cylinder cocks shall be maintained in a safe and suitable condition for service.

**§ 230.84 Sanders.**

Steam locomotives shall be equipped with operable sanders that deposit sand on the rail head in front of a set of driving wheels. Sanders shall be tested at the beginning of each day the locomotive is used.

**§ 230.85 Audible warning device.**

(a) *General provisions.* Each steam locomotive shall be equipped with an audible warning device that produces a minimum sound level of 96db(A) at 100 feet in front of the steam locomotive in its direction of travel. The device shall be arranged so that it may conveniently be operated by the engineer from his normal position in the cab.

(b) *Method of measurement.* Measurement of the sound level shall be made using a sound level meter conforming, at a minimum, to the requirements of ANSI S1.4-1971, Type 2, and set to an A-weighted slow response. While the steam locomotive is on level, tangent track, the microphone shall be positioned 4 feet above the ground at the center line of the track and shall be oriented with respect to the sound source in accordance with the microphone manufacturer's recommendations.

**§ 230.86 Required illumination.**

(a) *General provisions.* Each steam locomotive used between sunset and sunrise shall be equipped with an operable headlight that provides illumination sufficient for a steam locomotive engineer in the cab to see, in a clear atmosphere, a dark object as large as a man of average size standing at least 800 feet ahead and in front of

such headlight. If a steam locomotive is regularly required to run backward for any portion of its trip other than to pick up a detached portion of its train or to make terminal movements, it shall also be equipped on its rear end with an operable headlight that is capable of providing the illumination described in this paragraph (a).

(b) *Dimming device.* Such headlights shall be provided with a device whereby the light from same may be diminished in yards and at stations or when meeting trains.

(c) *Where multiple locomotives utilized.* When two or more steam locomotives are used in the same train, the leading steam locomotive only will be required to display a headlight.

#### § 230.87 Cab lights.

Each steam locomotive shall have cab lights that sufficiently illuminate the control instruments, meters and gauges to enable the engine crew to make accurate readings from their usual and proper positions in the cab. These lights shall be so located and constructed that the light will shine only on those parts requiring illumination and does not interfere with the engine crew's vision of the track and signals. Each steam locomotive shall also have a conveniently located additional lamp that can be readily turned on and off by the persons operating the steam locomotive, and that provides sufficient illumination for them to read train orders and timetables.

#### Throttle and Reversing Gear

##### § 230.88 Throttles.

Throttles shall be maintained in safe and suitable condition for service, and efficient means provided to hold the throttle lever in any desired position.

##### § 230.89 Reverse gear.

(a) *General provisions.* Reverse gear, reverse levers, and quadrants shall be maintained in a safe and suitable condition for service. Reverse lever latch shall be so arranged that it can be easily disengaged, and provided with a spring which will keep it firmly seated in quadrant. Proper counterbalance shall be provided for the valve gear.

(b) *Air-operated power reverse gear.* Steam locomotives that are equipped with air operated power reverse gear shall be equipped with a connection whereby such gear may be operated by steam or by an auxiliary supply of air in case of failure of the main reservoir air pressure. The operating valve handle for such connection shall be conveniently located in the cab of the locomotive and shall be plainly marked. If an independent air reservoir is used as the

source of the auxiliary supply for the reverse gear, it shall be provided with means to automatically prevent loss of pressure in event of failure of the main reservoir air pressure.

(c) *Power reverse gear reservoirs.* Power reverse gear reservoirs, if provided, must be equipped with the means to automatically prevent the loss of pressure in the event of a failure of main air pressure and have storage capacity for not less than one complete operating cycle of control equipment.

#### Draw Gear and Draft Systems

##### § 230.90 Draw gear between steam locomotive and tender.

(a) *Maintenance and testing.* The draw gear between the steam locomotive and tender, together with the pins and fastenings, shall be maintained in safe and suitable condition for service. The pins and drawbar shall be removed and tested for defects using an appropriate NDE method at every annual inspection. Where visual inspection does not disclose any defects, an additional NDE testing method shall be employed. Suitable means for securing the drawbar pins in place shall be provided. Inverted drawbar pins shall be held in place by plate or stirrup.

(b) *Safety bars and chains generally.* One or more safety bar(s) or two or more safety chains shall be provided between the steam locomotive and tender. The combined strength of the safety chains or safety bar(s) and their fastenings shall be not less than 50 percent of the strength of the drawbar and its connections. These shall be maintained in safe and suitable condition for service, and inspected at the same time draw gear is inspected.

(c) *Minimum length of safety chains or bars.* Safety chains or safety bar(s) shall be of the minimum length consistent with the curvature of the railroad on which the steam locomotive is operated.

(d) *Lost motion.* Lost motion between steam locomotives and tenders not equipped with spring buffers shall be kept to a minimum and shall not exceed 1/2 inch.

(e) *Spring buffers.* When spring buffers are used between steam locomotives and tenders the spring shall be applied with not less than 3/4 inch compression, and shall at all times be under sufficient compression to keep the chafing faces in contact.

##### § 230.91 Chafing irons.

Chafing irons that permit proper curving shall be securely attached to the steam locomotive and tender, and shall be maintained to permit lateral and vertical movement.

##### § 230.92 Draw gear and draft systems.

Couplers, draft gear and attachments on steam locomotives and tenders shall be securely fastened, and maintained in safe and suitable condition for service.

#### Driving Gear

##### § 230.93 Pistons and piston rods.

(a) *Maintenance and testing.* Pistons and piston rods shall be maintained in safe and suitable condition for service. Piston rods shall be inspected for cracks each time they are removed, and shall be renewed if found defective.

(b) *Fasteners.* Fasteners (keys, nuts, etc.) shall be kept tight and shall have some means to prevent them from loosening or falling out of place.

##### § 230.94 Crossheads.

Crossheads shall be maintained in a safe and suitable condition for service, with not more than 1/4 inch vertical or 5/16 inch lateral clearance between crossheads and guides.

##### § 230.95 Guides.

Guides shall be securely fastened and maintained in a safe and suitable condition for service.

##### § 230.96 Main, side, and valve motion rods.

(a) *General.* Main, side or valve motion rods developing cracks or becoming otherwise defective shall be removed from service immediately and repaired or renewed.

(b) *Repairs.* Repairs, and welding, of main, side or valve motion rods shall be made in accordance with an accepted national standard. The steam locomotive owner and/or operator shall submit a written request for approval to the FRA Regional Administrator prior to welding defective main rods, side rods, and valve gear components.

(c) *Bearings and bushings.* Bearings and bushings shall so fit the rods as to be in a safe and suitable condition for service, and means shall be provided to prevent bushings from turning in the rod. Straps shall fit and be securely bolted to rods. Floating bushings need not be provided with means to prevent bushings from turning.

(d) *Side motion of rods.* The total amount of side motion of each rod on its crank pin shall not exceed 1/4 inch.

(e) *Oil and grease cups.* Oil and grease cups shall be securely attached to rods, and grease cup plugs shall be equipped with a suitable fastening that will prevent them from being ejected.

(f) *Main rod bearings.* The bore of main rod bearings shall not exceed pin diameters more than 3/32 inch at front or back end. The total lost motion at both ends shall not exceed 5/32 inch.

(g) *Side rod bearings.* The bore of side rod bearings shall not exceed pin diameters more than 5/32 inch on main pin nor more than 3/16 inch on other pins.

**§ 230.97 Crank pins.**

(a) *General provisions.* Crank pins shall be securely applied. Securing the fit of a loose crank pin by shimming, prick punching, or welding is not permitted.

(b) *Maintenance.* Crank pin collars and collar fasteners shall be maintained in a safe and suitable condition for service.

**Running Gear**

**§ 230.98 Driving, trailing, and engine truck axles.**

(a) *Condemning defects.* Driving, trailing, and engine truck axles with any of the following defects shall be removed from service immediately and repaired, see appendix B of this part for inspection requirements:

- (1) Bent axle;
- (2) Cut journals that cannot be made to run cool without turning;
- (3) Transverse seams in iron or steel axles;
- (4) Seams in axles causing journals to run hot;
- (5) Axles that are unsafe on account of usage, accident or derailment;
- (6) Any axle worn 1/2 inch or more in diameter below the original/new journal diameter, except as provided in paragraph (a)(7) of this section;
- (7) Any driving axles other than main driving axles with an original or new diameter greater than 6 inches that are worn 3/4 inch or more in diameter below the original/new diameter.

(b) *Journal diameter stamped.* For steam locomotives with plain bearings, the original/new journal diameter shall be stamped on one end of the axle by [5 years after effective date of the final rule].

(c) *Journal diameter stamped.* For steam locomotives with plain bearings, the original/new journal diameter shall be stamped on one end of the axle by [5 years after effective date of the final rule].

**§ 230.99 Tender truck axles.**

The minimum diameters of axles for various axle loads shall be as follows:

Axle load (in pounds)	Minimum diameter of journal (in inches)	Minimum diameter of wheel seat (in inches)	Minimum diameter of center (in inches)
50000 .....	5 1/2	7 3/8	6 7/16
38000 .....	5	6 3/4	5 7/8
31000 .....	4 1/2	6 1/4	5 5/16
22000 .....	3 3/4	5	4 3/8
15000 .....	3 1/4	4 5/8	3 7/8

**§ 230.100 Defects in tender truck axles and journals.**

(a) *Tender truck axle condemning defects.* Tender truck axles with any of the following defects shall be removed from service immediately and repaired:

- (1) Axles that are bent;
- (2) Collars that are broken, cracked, or worn to 1/4 inch or less in thickness;
- (3) Truck axles that are unsafe on account of usage, accident, or derailment;
- (4) A fillet in the back shoulder that is worn out; or
- (5) A gouge between the wheel seats that is more than 1/8 of an inch in depth.

(b) *Tender truck journal condemning defects.* Tender truck journals with any of the following defects shall be removed from service immediately and repaired :

- (1) Cut journals that cannot be made to run cool without turning;
- (2) Seams in axles causing journals to run hot;
- (3) Overheating, as evidenced by pronounced blue black discoloration;
- (4) Transverse seams in journals of iron or steel axles; or
- (5) Journal surfaces having any of the following:
  - (i) A circumferential score;
  - (ii) Corrugation;
  - (iii) Pitting;
  - (iv) Rust; or (v) Etching.

**§ 230.101 Steam locomotive driving journal boxes.**

(a) *Driving journal boxes.* Driving journal boxes shall be maintained in a safe and suitable condition for service. Not more than one shim may be used between the box and bearing.

(b) *Broken bearings.* Broken bearings shall be renewed.

(c) *Loose bearings.* Loose bearings shall be repaired or renewed.

**§ 230.102 Tender plain bearing journal boxes.**

Plain bearing journal boxes with the following defects shall be removed from service immediately and repaired:

- (a) A box that does not contain visible free oil;
- (b) A box lid that is missing, broken, or open except to receive servicing;
- (c) A box containing foreign matter, such as dirt, sand, or coal dust that can reasonably be expected to damage the bearing; or have a detrimental effect on the lubrication of the journal and bearing;
- (d) A lubricating pad that:
  - (1) Is missing;
  - (2) Is not in contact with the journal;
  - (3) Has a tear extending half the length or width of the pad, or more, except by design;

(4) Shows evidence of having been scorched, burned, or glazed;

(5) Contains decaying or deteriorated fabric that impairs proper lubrication of the pad;

(6) Has an exposed center core (except by design); or

(7) Has metal parts contacting the journal;

(e) A plain bearing that:

- (1) Is missing, cracked, broken;
- (2) Has a bearing liner loose;
- (3) Has a broken out piece; or
- (4) Has indications of having been overheated, as evidenced by:

(i) Melted babbitt;

(ii) Smoke from hot oil; or

(iii) Journal surface damage; or

(f) A plain bearing wedge that:

- (1) Is missing, cracked or broken; or
- (2) Is not located in its design position.

**§ 230.103 Tender roller bearing journal boxes.**

Tender roller bearing journal boxes shall be maintained in a safe and suitable condition.

**§ 230.104 Driving box shoes and wedges.**

Driving box shoes and wedges shall be maintained in a safe and suitable condition for service.

**§ 230.105 Lateral motion.**

(a) *Condemning limits.* The total lateral motion or play between the hubs of the wheels and the boxes on any pair of wheels shall not exceed the following limits:

Engine truck wheels (with swing centers).....	1"
Engine truck wheels (with rigid centers) .....	1 1/2"
Trailing truck wheels.....	1"
Driving wheels.....	3/4"

(b) *Limits increased.* These limits may be increased on steam locomotives operating on track where the curvature exceeds 20 degrees when it can be shown that conditions require additional lateral motion.

(c) *Non-interference with other parts.* The lateral motion shall in all cases be kept within such limits that the driving wheels, rods, or crank pins will not interfere with other parts of the steam locomotive.

**Trucks, Frames and Equalizing System**

**§ 230.106 Steam locomotive frame.**

(a) *Maintenance and inspection.*

Frames, decks, plates, tailpieces, pedestals, and braces shall be maintained in a safe and suitable condition for service, and shall be cleaned and thoroughly inspected each time the steam locomotive is in shop for heavy repairs.

(b) *Broken frames.* Broken frames properly patched or secured by clamps or other suitable means which restores the rigidity of the frame are permitted.

**§ 230.107 Tender frame and body.**

(a) *Maintenance.* Tender frames shall be maintained in a safe and suitable condition for service.

(b) *Height difference.* The difference in height between the deck on the tender and the cab floor or deck on the steam locomotive shall not exceed 1½ inches.

(c) *Gangway minimum width.* The minimum width of the gangway between steam locomotive and tender, while standing on tangent track, shall be 16 inches.

(d) *Tender frame condemning defects.* A tender frame with any of the following defects shall be removed from service immediately and repaired:

(1) Portions of the tender frame or body (except wheels) that have less than a 2½ inches clearance from the top of rail;

(2) Tender center sill that is broken, cracked more than 6 inches, or permanently bent or buckled more than 2½ inches in any six foot length;

(3) Tender coupler carrier that is broken or missing;

(4) Tender center plate, any portion of which is missing or broken or that is not properly secured; or

(5) Tender that has a broken side sill, crossbearer, or body bolster.

**§ 230.108 Steam locomotive leading and trailing trucks.**

(a) *Maintenance.* Trucks shall be maintained in safe and suitable condition for service. Center plates shall fit properly, and the male center plate shall extend into the female center plate not less than ¾ inch. All centering devices shall be properly maintained and shall not permit lost motion in excess of ½ inch.

(b) *Safety chain required.* A suitable safety chain shall be provided at each front corner of all four wheel engine trucks.

(c) *Clearance required.* All parts of trucks shall have sufficient clearance to prevent them from interfering with any other part of the steam locomotive.

**§ 230.109 Tender trucks.**

(a) *Tender truck frames.* A tender truck frame shall not be broken, or have a crack in a stress area that affects its structural integrity. Tender truck center plates shall be securely fastened, maintained in a safe and suitable condition for service, and provided with a center pin properly secured. The male center plate must extend into the female

center plate at least ¾ inch. Shims may be used between truck center plates.

(b) *Tender truck bolsters.* Truck bolsters shall be maintained approximately level.

(c) *Condemning defects for springs or spring rigging.* Springs or spring rigging with any of the following defects shall be taken out of service immediately and renewed or properly repaired:

(1) An elliptical spring with its top (long) leaf or any other five leaves in the entire spring pack broken;

(2) A broken coil spring or saddle;

(3) A coil spring that is fully compressed;

(4) A broken or cracked equalizer, hanger, bolt, gib or pin;

(5) A broken coil spring saddle; and

(6) A semi-elliptical spring with a top (long) leaf broken or two leaves in the top half broken, or any three leaves in the entire spring broken.

(d) *Tender securing arrangement.*

Each tender shall have a device or securing arrangement to prevent the truck and tender body from separating in case of derailment. This arrangement shall be maintained in a safe and suitable condition for service.

(e) *Side bearings and truck centering devices.* Where equipped, side bearings and truck centering devices shall be maintained in a safe and suitable condition for service.

(f) *Friction side bearings.* Friction side bearings shall not be run in contact, and shall not be considered to be in contact if there is clearance between them on either side when measured on tangent level track.

(g) *Side bearings.* All rear trucks shall be equipped with side bearings.

When the spread of side bearings is 50 inches, their maximum clearance shall be ⅜ inch on each side for rear trucks and ¼ inch on each side for front trucks, where used. When the spread of the side bearings is increased, the maximum clearance shall be increased proportionately.

**§ 230.110 Pilots.**

(a) *General provisions.* Pilots shall be securely attached, properly braced, and maintained in a safe and suitable condition for service.

(b) *Minimum And maximum clearance.* The minimum clearance of pilot above the rail shall be 3 inches and the maximum clearance shall be 6 inches measured on tangent level track.

**§ 230.111 Spring rigging.**

(a) *Arrangement of springs and equalizers.* Springs and equalizers shall be arranged to ensure the proper distribution of weight to the various wheels of the steam locomotive,

maintained approximately level and in a safe and suitable condition for service. Adjusting weights by shifting weights from one pair of wheels to another is permissible.

(b) *Spring or spring rigging condemning defects.* Springs or spring rigging with any of the following defects shall be removed from service immediately and renewed or properly repaired:

(1) Top leaf broken or two leaves in top half or any three leaves in spring broken. (The long side of a spring to be considered the top.) Broken springs not exceeding these requirements may be repaired by applying clips providing the clips can be made to remain in place;

(2) Any spring with leaves excessively shifting in the band;

(3) Broken coil springs; or

(4) Broken driving box saddle, equalizer, hanger, bolt, or pin.

**Wheels and Tires**

**§ 230.112 Wheels and tires.**

(a) *Mounting.* Wheels shall be securely mounted on axles. Prick punching or shimming the wheel fit will not be permitted. The diameter of wheels on the same axle shall not vary more than ⅜ inch.

(b) *Gage.* Wheels used on standard gage track will be out of gage if the inside gage of flanges, measured on base line is less than 53 inches or more than 53⅜ inches. Wheels used on less than standard gage track will be out of gage if the inside gage of flanges, measured on base line, is less than the relevant track gage less 3½ inches or more than the relevant track gage less 3⅛ inches.

(c) *Flange distance variance.* The distance back to back of flanges of wheels mounted on the same axle shall not vary more than ¼ inch.

(d) *Tire thickness.* Wheels may not have tires with a minimum thickness less than that indicated in the table in this paragraph (d). When retaining rings are used, measurements of tires to be taken from the outside circumference of the ring, and the minimum thickness of tires may be as much below the limits specified earlier in this paragraph (d) as the tires extend between the retaining rings, provided it does not reduce the thickness of the tire to less than 1⅛ inches from the throat of flange to the counterbore for the retaining rings. The required minimum thickness for tires, by wheel center diameter and weight per axle, is as follows:

Weight per axle (weight on drivers divided by number of pairs of driving wheels)	Diameter of wheel center (inches)	Minimum thickness (inches)
30,000 pounds and under .....	44 and under .....	1¼
	Over 44 to 50 .....	1 <sup>5</sup> / <sub>16</sub>
	Over 50 to 56 .....	1 <sup>3</sup> / <sub>8</sub>
	Over 56 to 62 .....	1 <sup>7</sup> / <sub>16</sub>
	Over 62 to 68 .....	1½
	Over 68 to 74 .....	1 <sup>9</sup> / <sub>16</sub>
	Over 74 .....	1 <sup>5</sup> / <sub>8</sub>
Over 30,000 to 35,000 pounds .....	44 and under .....	1 <sup>5</sup> / <sub>16</sub>
	Over 44 to 50 .....	1 <sup>3</sup> / <sub>8</sub>
	Over 50 to 56 .....	1 <sup>7</sup> / <sub>16</sub>
	Over 56 to 62 .....	1½
	Over 62 to 68 .....	1 <sup>9</sup> / <sub>16</sub>
	Over 68 to 74 .....	1 <sup>5</sup> / <sub>8</sub>
	Over 74 .....	1 <sup>11</sup> / <sub>16</sub>
Over 35,000 to 40,000 pounds .....	44 and under .....	1 <sup>3</sup> / <sub>8</sub>
	Over 44 to 50 .....	1 <sup>7</sup> / <sub>16</sub>
	Over 50 to 56 .....	1½
	Over 56 to 62 .....	1 <sup>9</sup> / <sub>16</sub>
	Over 62 to 68 .....	1 <sup>5</sup> / <sub>8</sub>
	Over 68 to 74 .....	1 <sup>11</sup> / <sub>16</sub>
	Over 74 .....	1 <sup>3</sup> / <sub>4</sub>
Over 40,000 to 45,000 pounds .....	44 and under .....	1 <sup>7</sup> / <sub>16</sub>
	Over 44 to 50 .....	1½
	Over 50 to 56 .....	1 <sup>9</sup> / <sub>16</sub>
	Over 56 to 62 .....	1 <sup>5</sup> / <sub>8</sub>
	Over 62 to 68 .....	1 <sup>11</sup> / <sub>16</sub>
	Over 68 to 74 .....	1 <sup>3</sup> / <sub>4</sub>
	Over 74 .....	1 <sup>13</sup> / <sub>16</sub>
Over 45,000 to 50,000 pounds .....	44 and under .....	1½
	Over 44 to 50 .....	1 <sup>9</sup> / <sub>16</sub>
	Over 50 to 56 .....	1 <sup>5</sup> / <sub>8</sub>
	Over 56 to 62 .....	1 <sup>11</sup> / <sub>16</sub>
	Over 62 to 68 .....	1 <sup>3</sup> / <sub>4</sub>
	Over 68 to 74 .....	1 <sup>13</sup> / <sub>16</sub>
	Over 74 .....	1 <sup>7</sup> / <sub>8</sub>
Over 50,000 to 55,000 pounds .....	44 and under .....	1 <sup>9</sup> / <sub>16</sub>
	Over 44 to 50 .....	1 <sup>5</sup> / <sub>8</sub>
	Over 50 to 56 .....	1 <sup>11</sup> / <sub>16</sub>
	Over 56 to 62 .....	1 <sup>3</sup> / <sub>4</sub>
	Over 62 to 68 .....	1 <sup>13</sup> / <sub>16</sub>
	Over 68 to 74 .....	1 <sup>7</sup> / <sub>8</sub>
	Over 74 .....	1 <sup>15</sup> / <sub>16</sub>
Over 55,000 pounds .....	44 and under .....	1 <sup>5</sup> / <sub>8</sub>
	Over 44 to 50 .....	1 <sup>11</sup> / <sub>16</sub>
	Over 50 to 56 .....	1 <sup>3</sup> / <sub>4</sub>
	Over 56 to 62 .....	1 <sup>13</sup> / <sub>16</sub>
	Over 62 to 68 .....	1 <sup>7</sup> / <sub>8</sub>
	Over 68 to 74 .....	1 <sup>15</sup> / <sub>16</sub>
	Over 74 .....	2

(e) *Tire width.* Flanged tires shall be no less than 5½ inches wide for standard gage and no less than 5 inches wide for narrow gage. Plain tires shall be no less than 6 inches wide for standard gage and no less than 5½ inches wide for narrow gage.

**§ 230.113 Wheels and tire defects.**

Steam locomotive and tender wheels or tires developing any of the defects listed in this section shall be removed from service immediately and repaired. Except as provided in § 230.114, welding on wheels and tires is prohibited. A wheel that has been welded is a welded wheel for the life of the wheel.

(a) *Cracks or breaks.* Wheels and tires may not have a crack or break in the flange, tread, rim, plate, hub or brackets.

(b) *Flat spots.* Wheels and tires may not have a single flat spot that is 2½ inches or more in length, or two adjoining spots that are each two or more inches in length.

(c) *Chipped flange.* Wheels and tires may not have a gouge or chip in the flange that is more than 1½ inches in length and ½ inch in width.

(d) *Broken rims.* Wheels and tires may not have a circumferentially broken rim if the tread, measured from the flange at a point ⅝ inch above the tread, is less than 3¾ inches in width.

(e) *Shelled-out spots.* Wheels and tires may not have a shelled-out spot 2½ inches or more in length, or two adjoining spots that are each two or more inches in length, or so numerous as to endanger the safety of the wheel.

(f) *Seams.* Wheels and tires may not have a seam running lengthwise that is within 3¾ inches of the flange.

(g) *Worn flanges.* Wheels and tires may not have a flange worn to a 1<sup>5</sup>/<sub>16</sub> inch thickness or less, as measured at a point ⅜ inch above the tread.

(h) *Worn treads.* Wheels and tires may not have a tread worn hollow ⅝ inch or more.

(i) *Flange height.* Wheels and tires may not have a flange height of less than

1 inch nor more than 1½ inches, as measured from the tread to the top of the flange.

(j) *Rim thickness.* Wheels may not have rims less than 1 inch thick.

(k) *Wheel diameter.* Wheels may not have wheel diameter variance, for wheels on the same axle or in the same driving wheel base, greater than 3/32 inch, when all tires are turned or new tires applied to driving and trailing wheels. When a single tire is applied the diameter must not vary more than 3/32 inch from that of the opposite wheel on the same axle. When a single pair of tires is applied the diameter must be within 3/32 inch of the average diameter of the wheels in the driving wheel base to which they are applied.

#### § 230.114 Wheel centers.

(a) *Filling blocks and shims.* Driving and trailing wheel centers with divided rims shall be properly fitted with iron or steel filling blocks before the tires are applied, and such filling blocks shall be properly maintained. When shims are inserted between the tire and the wheel center, not more than two thicknesses of shims may be used, one of which must extend entirely around the wheel. The shim which extends entirely around the wheel may be in three or four pieces, providing they do not lap.

(b) *Wheel center condemning defects.* Wheel centers with any of the following defects shall be removed from service immediately and repaired:

- (1) Wheels centers loose on axle;
- (2) Broken or defective tire fastenings;
- (3) Broken or cracked hubs, plates, bolts or spokes, except as provided in paragraph (b)(4) of this section; or (4) Driving or trailing wheel center with three adjacent spokes or 25 percent or more of the spokes in the wheel broken.

(c) *Wheel center repairs.* Wheel centers may be repaired by welding or brazing provided that the defect can properly be so repaired and, following the repair, the crankpin and axle shall remain tight in the wheel. Banding of the hub is permitted.

(d) *Counterbalance maintenance.* Wheel counterbalances shall be maintained in a safe and suitable condition for service.

#### Steam Locomotive Tanks

##### § 230.115 Feed water tanks.

(a) *General provisions.* Tanks shall be maintained free from leaks, and in safe and suitable condition for service. Suitable screens must be provided for tank wells or tank hose and shall be maintained in a manner that allows the unobstructed flow of water. Feed water tanks shall be equipped with a device that permits the measurement of the

quantity of water in the tender feed water tank from the cab or tender deck of the steam locomotive. Such device shall be properly maintained.

(b) *Inspection frequency.* As often as conditions warrant but not less frequently than every 92 service days, the interior of the tank shall be inspected, and cleaned if necessary.

(c) *Top of tender.* Top of tender behind fuel space shall be kept clean, and means provided to carry off excess water. Suitable covers shall be provided for filling holes.

##### § 230.116 Oil tanks.

The oil tanks on oil burning steam locomotives shall be maintained free from leaks. The oil supply pipe shall be equipped with a safety cut-off device that:

- (a) Is located adjacent to the fuel supply tank or in another safe location;
- (b) Closes automatically when tripped and that can be reset without hazard; and
- (c) Can be hand operated from clearly marked locations, one inside the cab and one accessible from the ground on each exterior side of the steam locomotive.

#### Appendix A to Part 230—FRA's Exercise of Jurisdiction Over Tourist and Historic Railroads

1. *Basic Statutory Concept.* FRA's authority to regulate railroads arises from Title 49 of the United States Code section 20103 which gives the agency plenary authority over "every area of railroad safety." 49 U.S.C. 20103. "Railroad" is defined by statute as "all forms of non-highway ground transportation that run on rails or electromagnetic guideways \* \* \*" 49 U.S.C. 20102(1). The definition excludes only rapid transit systems that operate in urban areas and are not connected to the general railroad system of transportation.<sup>1</sup> "Railroad carrier" is defined by the statute as "a person providing railroad transportation." 49 U.S.C. 20102(2). For resource and policy reasons, FRA does not extend the reach of most of its regulations as far as the statute permits. (See 49 CFR Part 209, Appendix A.) In an effort to clarify the proper extent of the exercise of FRA's jurisdiction, FRA has recently settled on several principles that it will use as guidelines.

2. *Programmatic Approach.* FRA will exercise jurisdiction over all tourist operations, whether or not they operate over the general railroad system, except those that are (1) less than 24 inches in gage and/or (2) insular. Operations with less than 24-inch gage have never been considered railroads under the Federal railroad safety laws and are generally considered miniature or

imitation railroads. FRA will consider a tourist operation insular if its operations are limited to a separate enclave in such a way that there is no reasonable expectation that the safety of any member of the public—except a business guest, a licensee of the tourist operation or an affiliated entity, or a trespasser—would be affected by the operation. An operation will *not* be considered insular if one or more of the following exists on its line: a public highway-rail crossing that is in use; an at-grade rail crossing that is in use; a bridge over a public road or waters used for commercial navigation; or a common corridor with a railroad, i.e., its operations are within 30 feet (track centers) of those of any railroad. Thus, the mere fact that a tourist operation is not connected to the general railroad system would not make it insular under these criteria. While these criteria will tend to sort out the insular theme parks and museums, there will still be a need to do case-by-case analysis in some close situations.

3. *How the Safety Regulations Apply.* If the railroad operates on the general system, all statutes and regulations apply unless and until any appropriate waiver has been applied for and granted. Of course, FRA generally lacks authority to waive statutory requirements. However, note that a mere physical connection to a general system railroad does not necessarily make the tourist or historic railroad part of the general system or the connecting general system railroad operates on its property. The fact that the tourist or historic railroad acts as a shipper or consignee of rail rolling stock delivered from or to the connecting railroad does not make the shipper/consignee a general system railroad, so long as the two operations are kept physically separate to ensure safety. FRA Regional Administrators are authorized to evaluate means of separating tourist and historic railroads from the general system so as to ensure no interference between freight and passenger operations. Examples might include use of a locked derail, locked or spiked switch, or temporary removal of a section of rail when tourist or historic passenger operations are being conducted. Some railroads are neither insular nor part of the general system (i.e., stand-alone lines with no freight traffic). For these railroads, only the following regulations and statutory provisions apply: (a) 49 U.S.C. 20102, 20301, 20302, 20502–20505, 20902, 21302, 21304 (formerly 45 U.S.C. 1, 2, 4, 9, 11 of the Safety Appliance Act and 45 U.S.C. 22 of the Locomotive Inspection Act); (b) Federal signal inspection laws, 49 U.S.C. 20102, 20502–20505, 20902, 21302, 21304; (c) Hazardous materials regulations (49 CFR Parts 171–179); (d) FRA's procedural regulations at 49 CFR Parts 209, 211, and 216; (e) Noise emission regulations (49 CFR Part 210); but note that the regulations do NOT apply to steam locomotives; (f) Freight car safety standards (49 CFR Part 215) applicable only to standard gage lines; (g) Accident/incident reporting regulations (49 CFR Part 225); (h) Hours of Service restrictions on duty hours (but NOT reporting or record keeping); (i) Steam locomotive inspection regulations (49 CFR

<sup>1</sup> "General railroad system of transportation" is defined at 49 CFR Part 209, Appendix A as: "the network of standard gage railroads over which the interchange of goods and passengers throughout the nation is possible."



Part 230); (j) Grade crossing signal system safety regulations (49 CFR Part 234); and (k) All general power and enforcement provisions of the rail safety statutes (e.g., subpoena authority, civil penalty authority, disqualification authority, and emergency order authority). Thus, there are many FRA regulations that do not presently apply to tourist railroads that are not operated over the general system. However, FRA's emergency order authority permits it to address a true safety emergency arising from conditions (e.g., the proper functioning of air brakes) covered by those regulations or any other regulations (e.g., the track safety standards) that do not apply outside of the general system. Thus, even off-the-system tourist railroads should understand that FRA has *jurisdiction* to inspect their operations and to take emergency action if those operations pose an imminent hazard of death or injury.

### Appendix B to Part 230—Inspection Requirements

The lists in this appendix are intended as guidance only. Adherence to this list does not relieve the steam locomotive owner and/or operator of responsibility for either: (1) completing the inspection and maintenance requirements described in this part; or (2) ensuring that the steam locomotive, tender and its parts and appurtenances are safe and suitable for service.

#### Daily Inspection Requirements; § 230.13

1. Observance of lifting pressure of the lowest safety valve.
2. Testing of water glasses and gauge cocks.\*
3. Inspection of tubular water glass shields.
4. Inspection of all cab lamps.\*
5. Inspection of boiler feedwater delivery systems.\*
6. Inspection of lagging for indication of leaks.

7. Inspection for leaks obstructing vision of engine crew.
8. Observance of compressor(s) and governor to ascertain proper operation.\*
9. Inspection of brake and signal equipment.\*
10. Inspection of brake cylinders for piston travel.
11. Inspection of foundation brake gear.
12. Inspection of sanders.\*
13. Inspection of draw gear and chafing irons.
14. Inspection of draft gear.
15. Inspection of crossheads and guides.
16. Inspection of piston rods and fasteners.
17. Inspection of main, side, and valve motion rods.
18. Inspection of headlights and classification lamps.\*
19. Inspection of running gear.
20. Inspection of tender frames and tanks.
21. Inspection of tender trucks for amount of side bearing clearance.

**Note:** All items marked (\*) should be checked at the beginning of each day the locomotive is used.

#### 31 Service Day Inspection Requirements; § 230.14

1. Washing of boiler.
2. Cleaning and inspection of water glass valves and gauge cocks.
3. Cleaning, washing and inspection of arch tubes, water bar tubes, circulators and siphons.
4. Removal and inspection of all washout and water tube plugs.
5. Testing of all staybolts.
6. Removal, cleaning and inspection of fusible plugs (if any).

#### 92 Service Day Inspection Requirements; § 230.15

1. Removal and testing of all air and steam gauges.

2. Cleaning of steam gauge siphon pipe.
3. Renewal of tubular water glasses.
4. Testing and adjusting of safety relief valves.
5. Testing of main reservoir and brake cylinder leakage.
6. Entering and inspection of tender tank interior.

#### Annual Inspection Requirements; § 230.16

1. Testing of thickness of arch and water bar tubes (arch brick to be removed)
2. Hydrostatic testing of boiler.
3. Testing of all staybolts.
4. Interior inspection of boiler.
5. Thickness verification of dry pipes.
6. Smoke box inspection.
7. Main reservoir hammer or UT testing and hydrostatic testing (for non-welded and drilled main reservoirs)
8. Removal and inspection of steam locomotive drawbar(s) and pins (NDE testing other than merely visual)
9. Inspection of longitudinal lap joint boiler seams.

#### 5 Year Inspection Requirements; § 230.16

1. Inspection of flexible staybolt caps and sleeves.

#### 1472 Service Day Inspection Requirements; § 230.17

1. Removal of boiler flues (as necessary) and cleaning of boiler interior.
2. Removal of jacket and lagging and inspection of boiler interior and exterior.
3. Hydrostatic testing of boiler.
4. Thickness verification (boiler survey) and recomputation and update of steam locomotive specification card, (FRA Form No. 4).

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Appendix C to Part 230 - FRA Inspection Forms**FRA Form No. 1****31 and 92 Service Day Inspection Report**

Date of Inspection \_\_\_\_\_ Owner \_\_\_\_\_ Locomotive Initials \_\_\_\_\_  
 Operator \_\_\_\_\_ Locomotive No. \_\_\_\_\_

**31 and 92 Service Day Requirements**

**Instructions:** Non-complying conditions shall be repaired and this report approved before the locomotive is returned to service. Where condition is called for, enter either: **(1) Good** - No defects which could be discovered by a reasonable inspection; **(2) Fair** - Functioning less than optimally but safe and suitable and not in violation of the regulations; or **(3) Poor** - Not in compliance with the regulations. In any case N/A means - not applicable.

Was boiler washed? _____	Were steam leaks repaired? _____
Were water gauge and valve passages cleaned? _____	Condition of draft system and draw gear. _____
Were gauge cock passages cleaned? _____	Condition of running gear. _____
Were all washout plugs removed and inspected? _____	Condition of driving gear. _____
Were arch tubes, circulators, siphons and water bar tubes cleaned and inspected? _____	Condition of spring/equalizing system. _____
Were fusible plugs removed, cleaned & inspected? _____	Condition of tender running gear. _____
Were staybolts hammer tested? _____	Condition of brake equipment. _____
Were all broken staybolts replaced? _____	Were injectors tested and in good condition? _____
	Was feedwater pump tested and in good condition? _____

**92 Service Day Requirements**

Date of previous 92 Service Day Inspection _____	Were tubular water glasses renewed? _____
Safety relief valves pop at _____ psi _____ psi _____ psi	Were air compressor(s) orifice tested? _____
Were all steam gauges tested? _____	Was main reservoir tested for leakage? _____
Were all air brake gauges tested? _____	Were brake cylinders tested for leakage? _____
Were steam gauge siphon pipe(s) cleaned? _____	Was tender tank entered and inspected? _____
If no 92 Service Day Inspection is done, enter number of service days used since last 92 Service Day Insp. _____	

\_\_\_\_\_  
**INSPECTOR**

The above work has been performed and the report is approved. \_\_\_\_\_  
**OFFICER IN CHARGE**

\_\_\_\_\_  
**INSPECTOR**

FRA Form No. 2

## Daily Locomotive Inspection Report

Date of Inspection \_\_\_\_\_ Owner \_\_\_\_\_ Locomotive Initials \_\_\_\_\_  
 Operator \_\_\_\_\_ Locomotive No. \_\_\_\_\_

**Instructions:** Non-complying conditions shall be repaired and this report approved before locomotive is returned to service. This report shall be filed even if no non-complying conditions are reported, however it does not have to be approved before the locomotive is returned to service if no non-complying conditions are reported. Locomotive, including its tender and appurtenances, shall be inspected each day it is offered for use.

Repairs needed:	Repairs done by:

CONDITION OF WATER GLASSES: _____	CONDITION OF AIR COMPRESSOR: _____
CONDITION OF GAUGE COCKS: _____ LP _____ psi	MAIN RESERVOIR PRESS.: HP _____ psi,
CONDITION OF INJECTORS / PUMPS: _____	BRAKE PIPE PRESSURE: _____ psi
BOILER SAFETY VALVE LIFTS AT: _____ psi	LOCOMOTIVE BRAKE PIPE LEAKAGE: _____ lbs. per minute
SEATS AT: _____ psi	CONDITION OF BRAKES: _____
CONDITION OF PISTON ROD AND VALVE STEM PACKING _____	CONDITION OF SANDERS: _____

Where condition is called for enter:  
**Good** - No defects which could be discovered by a reasonable inspection.  
**Fair** - Functioning less than optimally but is in safe and suitable condition, and not in violation of the rules.  
**Poor** - Not in compliance.  
**N/A** - Not applicable.

Inspector's signature: \_\_\_\_\_ Occupation: \_\_\_\_\_

The above work has been performed, except as noted, and the report is approved by: \_\_\_\_\_  
Occupation \_\_\_\_\_  
Date Approved \_\_\_\_\_

**Note: Additional items may be added to this form if desired.**



FRA Form No. 4

**BOILER SPECIFICATION CARD**

Locomotive No. \_\_\_\_\_; Boiler No. \_\_\_\_\_; Date built \_\_\_\_\_  
 Boiler built by: \_\_\_\_\_  
 Owned by: \_\_\_\_\_  
 Operated by: \_\_\_\_\_  
 Type of boiler: \_\_\_\_\_; Dome, where located: \_\_\_\_\_

**BOILER SURVEY DATA**

Where **condition** is called for, use: **New** - New material at the time of the boiler survey; **Good** - Little or no wear and/or corrosion; **Fair** - Obvious wear and/or corrosion.

**Boiler Shell Sheets**

Material:	Type of Material (wrought iron, carbon steel, or alloy steel)	Carbon Content	Condition
1st course (front)	_____	_____	_____
2nd course	_____	_____	_____
3rd course	_____	_____	_____
Rivets	_____	n/a	n/a

Documentation of how material was determined shall be attached to this form.

Measurements:		At Seam	Thinnest	
Front flue sheet,	thickness	n/a	_____	
1st course,	thickness	_____	_____	ID _____, ID _____
2nd course,	thickness	_____	_____	ID _____, ID _____
3rd course,	thickness	_____	_____	ID _____, ID _____

When courses are not cylindrical give ID at each end

Is boiler shell circular at all points? \_\_\_\_\_  
 If shell is flattened, state location and amount \_\_\_\_\_  
 Are all flattened areas of shell stayed adequately for the pressure allowed by this form? \_\_\_\_\_

Water Space at Mud Ring: Sides \_\_\_\_\_, Front \_\_\_\_\_, Back \_\_\_\_\_  
 Width of water space at sides of fire box measured at center line of boiler: Front \_\_\_\_\_, Back \_\_\_\_\_

**Firebox and Wrapper Sheets**

Firebox sheets:	Thickness	Material	Condition
Rear flue sheet	_____	_____	_____ Crown
Sides	_____	_____	_____
Door	_____	_____	_____
Combustion chamber	_____	_____	_____
Inside throat	_____	_____	_____
<b>Wrapper sheets:</b>			
Throat	_____	_____	_____
Back head	_____	_____	_____
Roof	_____	_____	_____
Sides	_____	_____	_____

**Steam Dome**

Dome is made of \_\_\_\_\_ pieces (not including seam welts, if any), Top opening diameter \_\_\_\_\_  
 Middle cylindrical portion - ID \_\_\_\_\_, Opening in boiler shell, longitudinally - \_\_\_\_\_

Dome sheets:	Thickness	Material	Condition
Base	_____	_____	_____
Middle cylindrical portion	_____	_____	_____
Top	_____	_____	_____
Lid	_____	_____	_____

**Boiler shell liner for steam dome opening:** \_\_\_\_\_  
 Is liner part of longitudinal seam? \_\_\_\_\_

**Arch Tubes, Flues, Circulators, Thermic Siphons, Water Bar Tubes, Superheaters, and Dry Pipe**

**Arch tubes:** OD \_\_\_\_\_, wall thickness \_\_\_\_\_; number \_\_\_\_\_; condition \_\_\_\_\_

**Flues:**

OD \_\_\_\_\_, wall thickness \_\_\_\_\_, length \_\_\_\_\_; number \_\_\_\_\_; condition \_\_\_\_\_  
 OD \_\_\_\_\_, wall thickness \_\_\_\_\_, length \_\_\_\_\_; number \_\_\_\_\_; condition \_\_\_\_\_  
 OD \_\_\_\_\_, wall thickness \_\_\_\_\_, length \_\_\_\_\_; number \_\_\_\_\_; condition \_\_\_\_\_

**Circulators:** OD \_\_\_\_\_, wall thickness \_\_\_\_\_; number \_\_\_\_\_; condition \_\_\_\_\_

**Thermic siphons:** number \_\_\_\_\_; plate thickness \_\_\_\_\_; condition \_\_\_\_\_  
 neck OD \_\_\_\_\_, neck thickness \_\_\_\_\_; condition \_\_\_\_\_

**Water bar tubes:** OD \_\_\_\_\_, wall thickness \_\_\_\_\_

**Superheater units directly connected to boiler with no intervening valve:**

Type \_\_\_\_\_, Tube OD \_\_\_\_\_, wall thickness \_\_\_\_\_; number \_\_\_\_\_; condition \_\_\_\_\_

**Dry pipe subject to pressure:**

OD \_\_\_\_\_, wall thickness \_\_\_\_\_, material \_\_\_\_\_; condition \_\_\_\_\_

**Stay Bolts, Crown Bar Rivets, and Braces**

**Stay bolts:**

Smallest crown stay diameter \_\_\_\_\_, avg. spacing \_\_\_\_\_ X \_\_\_\_\_; condition \_\_\_\_\_  
 Smallest stay bolt diameter \_\_\_\_\_, avg. spacing \_\_\_\_\_ X \_\_\_\_\_; condition \_\_\_\_\_  
 Smallest combustion chamber stay bolt dia. \_\_\_\_\_,  
 avg. spacing \_\_\_\_\_ X \_\_\_\_\_; condition \_\_\_\_\_

**Measurement at smallest diameter**

**Crown bar bolts & rivets:**

Roof sheet rivets, smallest dia. \_\_\_\_\_, ave. spacing \_\_\_\_\_ X \_\_\_\_\_; condition \_\_\_\_\_  
 Roof sheet bolts, smallest dia. \_\_\_\_\_, ave. spacing \_\_\_\_\_ X \_\_\_\_\_; condition \_\_\_\_\_  
 Crown sheet rivets, smallest dia. \_\_\_\_\_, ave. spacing \_\_\_\_\_ X \_\_\_\_\_; condition \_\_\_\_\_  
 Crown sheet bolts, smallest dia. \_\_\_\_\_, ave. spacing \_\_\_\_\_ X \_\_\_\_\_; condition \_\_\_\_\_

**Braces:**

	Number	Total Area Stayed	Total Cross Sectional Area of Braces	
			Actual	Equivalent Direct Stay
Backhead	_____	_____	_____	_____
Throat sheet	_____	_____	_____	_____
Front tube sheet	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

**Safety Valves, Heating Surface, and Grate Area**

**Safety valves:** Total number of safety valves on locomotive \_\_\_\_\_  
 Valve Size \_\_\_\_\_ Manufacturer \_\_\_\_\_ No. valves of this size and manufacture \_\_\_\_\_

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

**Heating Surface:**

Heating surface, as part of a circulating system in contact on one side with water or wet steam being heated and on the other side with gas or refractory being cooled, shall be measured on the side receiving heat.

Firebox and Combustion Chamber	_____	square feet
Flue Sheets (less flue ID areas)	_____	square feet
Flues	_____	square feet
Circulators	_____	square feet
Arch Tubes	_____	square feet
Thermic Siphons	_____	square feet
Water Bar Tubes	_____	square feet
Superheaters (front end throttle only)	_____	square feet
Other	_____	square feet
<b>Total Heating Surface</b>	_____	square feet

**Grate area:** \_\_\_\_\_ square feet

**Water Level Indicators, Fusible Plugs, and Low Water Alarms**

Height of lowest reading of gauge glasses above crown sheet: \_\_\_\_\_

Height of lowest reading of gauge cocks above crown sheet: \_\_\_\_\_

Is boiler equipped with fusible plug(s)? \_\_\_\_\_, number \_\_\_\_\_

Is boiler equipped with low water alarm(s)? \_\_\_\_\_, number \_\_\_\_\_

**Calculations**

**Staybolt stresses:**

Stay bolt under greatest load, maximum stress	_____	psi
Location _____		
Crown stay under greatest load, maximum stress	_____	psi
Location _____		
Combustion chamber stay bolt under greatest load, maximum stress	_____	psi
Location _____		

**Braces:**

Round or rectangular brace under greatest load, maximum stress	_____	psi
Location _____		
Gusset brace under greatest load, maximum stress	_____	psi
Location _____		

**Boiler shell plate tension:**

Greatest tension on net section of plate in longitudinal seam \_\_\_\_\_ psi  
 Location (course #) \_\_\_\_\_ ; Seam Efficiency \_\_\_\_\_

**Boiler plate and components, minimum thickness required @ tensile strength:**

Front tube sheet	_____ @ _____	Rear flue sheet	_____ @ _____
1st course at seam	_____ @ _____	1st course not at seam	_____ @ _____
2nd course at seam	_____ @ _____	2nd course not at seam	_____ @ _____
3rd course at seam	_____ @ _____	3rd course not at seam	_____ @ _____
Roof sheet	_____ @ _____	Crown sheet	_____ @ _____

Side wrapper sheets	_____ @ _____	Firebox side sheets	_____ @ _____
Back head	_____ @ _____	Door sheet	_____ @ _____
Throat sheet	_____ @ _____	Inside throat sheet	_____ @ _____
Combustion chamber	_____ @ _____	Dome, top	_____ @ _____
Dome, middle	_____ @ _____	Dome, base	_____ @ _____
Arch tubes	_____ @ _____	Dome, lid	_____ @ _____
Water bar tubes	_____ @ _____	Thermic siphons	_____ @ _____
Dry pipe	_____ @ _____	Circulators	_____ @ _____

**If tensile strength used is greater than 50,000 psi for steel or greater than 45,000 psi for wrought iron, supporting documentation must be furnished.**

**Boiler Steam Generating Capacity:** \_\_\_\_\_ pounds per hour

**The following may be used as a guide for estimating steaming capacity:**

**Pounds of Steam Per Hour Per Square Foot of Heating Surface:**

Hand fired	8 lbs. per hr.
Stoker fired	10 lbs. per hr.
Oil, gas or pulverized fuel fired	14 lbs. per hr.







**FRA Form No. 5**

**Locomotive Service Day Record**

Locomotive Initial and No. \_\_\_\_\_ owned by

\_\_\_\_\_ and operated

by \_\_\_\_\_ was placed in service following a 1472 Service Day Inspection on (start date) \_\_\_\_\_. This locomotive shall not be operated after (date) \_\_\_\_\_, or it shall not be operated after it has accumulated 1472 service days from the above start date, whichever comes first, at which time it shall be due for a 1472 Service Day Inspection.

	Year											
Serv. days since last insp.												
<b>Annual Date</b>												
Serv. days since last insp.												
<b>31 Service Day Date</b>												
Serv. days since last insp.												
<b>31 Service Day Date</b>												
Serv. days since last insp.												
<b>92 Service Day Date</b>												
Serv. days since last insp.												
<b>31 Service Day Date</b>												
Serv. days since last insp.												
<b>31 Service Day Date</b>												
Serv. days since last insp.												
<b>92 Service Day Date</b>												
Serv. days since last insp.												
<b>31 Service Day Date</b>												
Serv. days since last insp.												
<b>31 Service Day Date</b>												
Serv. days since last insp.												
<b>92 Service Day Date</b>												
Serv. days since last insp.												
<b>31 Service Day Date</b>												
Serv. days since last insp.												
<b>31 Service Day Date</b>												
Serv. days since last insp.												
<b>Annual Date</b>												
<b>TOTAL</b>												

A copy of this record shall be filed with the Regional Administrator after 31 December and prior to 31 January of each year.

Signed \_\_\_\_\_ Officer in Charge

FRA Form No. 19

**Report of  
ALTERATION   
or  
Welded or Riveted REPAIR**

Locomotive Initials \_\_\_\_\_ Locomotive No. \_\_\_\_\_; Boiler No. \_\_\_\_\_;

Owned by \_\_\_\_\_

Operated by \_\_\_\_\_

Date work completed \_\_\_\_\_

Description of work: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Stress Calculations:

Remarks: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Attach drawings used in the repair or alteration or make drawings on back of this form.

Work done by: \_\_\_\_\_;

Certified by: \_\_\_\_\_

**Appendix D to Part 230—Diagrams and Drawings [Reserved]**

**Note:** The text of this appendix will be included when this part is published as a final rule.

**Appendix E to Part 230—Civil Penalty Schedule [Reserved]**

**Note:** The text of this appendix will be included when this part is published as a final rule.

Issued in Washington, D.C. on August 28, 1998.

**Jolene M. Molitoris,**

*Administrator.*

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