

**SUPPORTING JUSTIFICATION**  
**RAILROAD LOCOMOTIVE SAFETY STANDARDS**  
**LOCOMOTIVE EVENT RECORDERS**

RIN 210-AC16; OMB No. 2130-0004

Summary of Submission

- This submission is a request for a revision to the last approval granted by OMB on **November 21, 2012**, and which expires **November 30, 2015**.
- FRA published the required 60-day **Federal Register** Notice on June 22, 2015. See 80 FR 35712. FRA received no comments in response to this Notice.
- The total number of burden **hours requested** for this submission is **2,087,543 hours**.
- The total number of responses **previously approved** for this information collection is **2,213,623**
- The change/decrease in burden from the last approved submission is **126,080 hours**.
- Total **program changes** amount to/decreased the burden by **40 hours** (*see table in response to question 15 of this document for details*).
- Total **adjustments** amount to/decreased the burden by **126,040 hours** (*see table in response to question 15 of this document for details*).
- Total number of **responses requested** for this information collection submission is **7,509,548**.
- Total number of **responses previously approved** for this information collection is **82,168,698**.
- **Adjustments** amount to/decreased the number of responses by **74,659,130**
- **Program change** decreased the number of responses by **20** (*see table in response to question 15 of this document for details*).

• **\*\*The answer to question number 12 itemizes the hourly burden associated with each requirement of this rule (See pp. 14-68).**

## 1. **Circumstances that make collection of the information necessary.**

### Background

FRA has broad statutory authority to regulate railroad safety. The Federal railroad safety laws (formerly the Locomotive Boiler Inspection Act at 45 U.S.C. 22-34, repealed and re-codified at 49 U.S.C. 20701-20703) prohibit the use of unsafe locomotives and authorizes FRA to issue standards for locomotive maintenance and testing. In order to further FRA's ability to respond effectively to contemporary safety problems and hazards as they arise in the railroad industry, Congress enacted the Federal Railroad Safety Act of 1970 (Safety Act) (formerly 45 U.S.C. 421, 431 et seq., now found primarily in chapter 201 of Title 49). The Safety Act grants the Secretary of Transportation rulemaking authority over all areas of railroad safety (49 U.S.C. 20103(a)) and confers all powers necessary to detect and penalize violations of any rail safety law. This authority was subsequently delegated to the FRA Administrator (49 CFR 1.49). (Until July 5, 1994, the Federal railroad safety statutes existed as separate acts found primarily in title 45 of the United States Code. On that date, all of the acts were repealed, and their provisions were re-codified into title 49 of the United States Code). All references to parts and sections in this document shall be to parts and sections located in Title 49 of the Code of Federal Regulations.

Pursuant to its general statutory rulemaking authority, FRA promulgates and enforces rules as part of a comprehensive regulatory program to address the safety of, inter alia, railroad track, signal systems, communications, rolling stock, operating practices, passenger train emergency preparedness, alcohol and drug testing, locomotive engineer certification, and workplace safety. Railroad locomotive inspection requirements are one of the oldest areas of Federal safety regulations. In 1980, FRA issued the majority of the regulatory provisions currently found at 49 CFR part 229 ("part 229") addressing various locomotive related topics including: inspections and tests; safety requirements for brake, draft, suspension, and electrical systems, and locomotive cabs; and locomotive cab equipment. Since 1980, various provisions contained in part 229 have been added or revised on an ad hoc basis to address specific safety concerns or in response to specific statutory mandates.

Topics for new regulation typically arise from several sources. FRA continually reviews its regulations and revises them as needed to address emerging technology, changing operational realities, and to bolster existing standards as new safety concerns are identified. It is also common for the railroad industry to introduce regulatory issues through FRA's waiver process. Several of the rule's requirements have been previously addressed through FRA's waiver process. As detailed in Part 211, FRA's Railroad Safety Board (Safety Board) reviews, and approves or denies, waiver petitions submitted by railroads and other parties subject to the regulations. Petitions granted by the Safety Board can be utilized by only the petitioning party. By incorporating relevant regulatory waivers into Part 229, FRA intends to extend the reach of the regulatory flexibilities

permitted by waiver. Altogether, FRA is altering numerous requirements; however, the comprehensive safety regulatory structure would remain.

The requirement that a locomotive be safe to operate in the service in which it is placed remains the cornerstone of Federal regulation. Title 49 USC § 20701 provides that

[a] railroad carrier may use or allow to be used a locomotive or tender on its railroad line only when the locomotive or tender and its parts and appurtenances: (1) are in proper condition and safe to operate without unnecessary danger of personal injury; (2) have been inspected as required under this chapter and regulations prescribed by the Secretary of Transportation under this chapter; and (3) can withstand every test prescribed by the Secretary under this chapter.

The statute is extremely broad in scope and makes clear that each railroad is responsible for ensuring that locomotives used on its line are safe. Even the extensive requirements of Part 229 are not intended to be exhaustive in scope, and with or without that regulatory structure, the railroads remain directly responsible for finding and correcting all hazardous conditions. For example, even without these proposed regulations, a railroad would be responsible for repairing an inoperative alerter and an improperly functioning remote control transmitter, if the locomotive is equipped with these devices.

On July 12, 2004, the Association of American Railroads (AAR), on behalf of itself and its member railroads, petitioned FRA to delete the requirement contained in 49 CFR 229.131 related to locomotive sanders. The petition and supporting documentation asserted that contrary to popular belief, depositing sand on the rail in front of the locomotive wheels will not have any significant influence on the emergency stopping distance of a train. While contemplating the petition, FRA and interested industry members began identifying other issues related to the locomotive safety standards. The purpose of this task was to develop information so that FRA could potentially address the issues through the Railroad Safety Advisory Committee (RSAC).

The locomotive sanders final rule was published on October 19, 2007 (72 FR 59216 (2007)). FRA continued to utilize the RSAC process to address additional locomotive safety issues. On September 10, 2009, after a series of detailed discussions, the RSAC approved and provided recommendations on a wide range of locomotive safety issues, including locomotive brake maintenance, pilot height, headlight operation, danger markings, and locomotive electronics. The RSAC Working Group was unable to reach consensus on the issues related to remote control locomotives, cab temperature, and locomotive alerters. Based on its consideration of the information and views provided by the RSAC Locomotive Safety Standards Working Group, FRA also proposed rule text related to the non-consensus items. Id.

FRA then is revising the existing regulations pertaining to Railroad Locomotive Safety Standards. The revisions update, consolidate, and clarify the existing regulations. The final rule also incorporates existing industry and engineering best practices. FRA is taking this action in an effort to modernize and improve its safety regulatory program

related to locomotives.

**2. How, by whom, and for what purpose the information is to be used.**

The information collected under Subpart E (§ 229.301-§ 229.317) is used by FRA to ensure that all new or next-generation safety-critical electronic locomotive control systems, subsystems, and components (i.e., “products”) are thoroughly tested and meet Federal safety requirements before being put into operation. Specifically, under § 229.307, railroads must develop a safety analysis (SA) for each product subject to this Subpart prior to the initial use of such product on their railroad. FRA reviews each safety analysis to confirm that it does the following: (1) establishes and documents the minimum requirements that will govern the development and implementation of all products subject to this Subpart, be based on good engineering practice, and be consistent

with the guidance contained in Appendix F of this Part in order to establish that a product’s safety-critical functions will operate with a high degree of confidence in a fail-safe manner; (2) includes procedures for immediate repair of safety-critical functions; and (3) is available to FRA upon request. Each railroad must comply with the safety analysis requirements and procedures related to the development, implementation, and repair of a product subject to this Subpart.

The information collected under § 229.309 is used by FRA to be kept immediately informed whenever a safety critical change is made to a product subject to this Subpart and to ensure that railroads do the following: (1) Conduct all safety critical changes in a manner that allows the change to be audited; (2) Specify all contractual arrangements with suppliers and private equipment owners for immediate notification of any and all electronic system safety critical changes to their system, subsystem, or components, and the reasons for such changes from the suppliers or equipment owners, whether or not the railroad has experienced a failure of that safety critical system, sub-system, or component; (3) Specify the railroad’s procedures for action upon notification of a safety-critical change to the electronic system, sub-system, or component, and until the upgrade, patch, or revision has been installed; and (4) Identify all configuration/revision control measures designed to ensure that safety-functional requirements and safety-critical hazard mitigation processes are not compromised as a result of any such change, and that any such change can be audited.

The information collected under § 229.311 is used by FRA to be kept apprised of prior initial planned use of a product subject to this Subpart. Railroads are required to notify the agency of their intent to place this product in service. The notification must provide a description of the product, and identify the location where the complete safety analysis documentation described in § 229.307 and the training and qualification program described in § 229.319 are maintained. The heads-up provided by the notification enables FRA to review and/or audit the safety analysis within 60 days of the notification or any time after the product is placed in service. Under this section, railroads are

required to maintain and make available to FRA all documentation used to demonstrate the product meets the safety requirements of the safety analysis for the life-cycle of the product. After the product is placed in service, the railroad must maintain a database of all safety relevant hazards encountered with the product. The database must include all hazards identified in the safety analysis and those that had not been previously identified in the safety analysis. If the frequency of safety-relevant hazards exceeds the threshold set forth in the safety analysis, the railroad must report the inconsistency to FRA in writing within 15 days of discovery and take immediate countermeasures to reduce the frequency of the safety-relevant hazard(s) below the threshold set forth in the safety analysis. FRA reviews the databases and reports to make sure that products are safe to be placed and then kept in operation.

The information collected under § 229.313 is used by FRA to carefully scrutinize product testing results. Under this section, railroads are required to keep records of the results of product testing on preprinted forms or electronically. The testing records must contain the following information: (1) The name of the railroad; (2) The location and date that the test was conducted; (3) The equipment tested; (4) The results of tests; (5) The repairs or replacement of equipment; (6) Any preventative adjustments made; and (7) The condition in which the equipment is left. Each record must be signed by the employee conducting the test, or electronically coded, or identified by the automated test equipment number; filed in the office of a supervisory official having jurisdiction, unless otherwise noted; and made available for inspection and copying by FRA and FRA-certified State inspectors.

There are also recent requirements under § 229.15, § 229.20, and § 229.23. Under § 229.15, each remote control locomotive (RCL) is required to be tagged at the locomotive control stand throttle. This information is used by train crews and anyone else who would board the cab to immediately know that the locomotive is operating under remote control. If certain safety hazards arise while the train is operating under remote control, it would be brought to a stop. The tag must be removed when the locomotive is placed back in manual mode. The records associated with the inspection and testing requirements under § 229.15 are used by FRA to ensure that each remote control locomotive is tested each time it is placed in use. This information is also used by train crews to ensure that the operator is aware of the testing and repair history of the locomotive.

Under § 229.20, FRA has established standards for electronic recordkeeping that a railroad may elect to utilize. For each locomotive for which records of inspection or maintenance required by this Part are maintained electronically, the electronic record system must automatically notify the railroad each time the locomotive is due for an inspection, other than the daily inspection, or maintenance that the electronic system is tracking and that is required by this Part. The automatic notifications are used by railroads as a reminder that they must conduct necessary locomotive inspections.

Under § 229.23, railroads are required to maintain and provide employees performing inspections under this section with a list of the defects and repairs made on each locomotive over the last ninety-two days. This information is used by employees performing inspections to enable them to know who did the previous inspection and the nature of the work done over the last three months before they conduct their current inspections in order to facilitate more complete, thorough, and effective inspections.

The other information currently collected is used by FRA to ensure compliance with existing safety regulations and to maintain and enhance the safety of train operations. Specifically, the information collected under § 229.9 is used by FRA to ensure that locomotives with non-complying conditions are properly tagged and the engineer and other train crew members in the cab notified of the maximum speed and other restrictions so that a locomotive with one or more non-complying conditions can be safely moved as a lite or dead locomotive after a qualified person has made the determination regarding operational limitations.

The information collected under § 229.15 is used by locomotive engineers and train crew members to assure the safe movement of remote control locomotives. Each remote control locomotive (RCL) must be tagged at the locomotive stand throttle to indicate that it is being used in a remote control mode. The tag must be removed when the locomotive is placed back in manual mode. The information collected under this section is also used to ensure that, at the start of each shift and each time an operational control unit (OCU) is linked to a RCL, railroads test: (1) The air brakes and the OCU's safety features, including the tilt switch and alerter device. (2) An OCU does not continue in use with any defective safety feature or device tested for or identified in paragraph(b)(1) of this section. (3) A defective OCU is tracked under its own identification number assigned by the railroad. Records of repairs must be maintained by the railroad and made available to FRA upon request. (4) Each time an RCL is placed in service, and at the start of each shift, locomotives that utilize Product Safety Plans (PSPs) perform a conditioning run over tracks that the PSP is being utilized on to ensure that the system functions as intended.

The information collected under § 229.17 regarding accident reports is used by FRA to obtain instant and first-hand information on any accidents/incidents caused by locomotives. Railroads are required to immediately report any accidents due to a failure from any cause of a locomotive, or persons coming in contact with an energized part or appurtenance that result in serious injury or death of one or more persons by telephoning a toll-free number. Written confirmation of the oral report must be immediately mailed to FRA and must contain a detailed description of the accident, including (to the extent known) the causes and the number of persons killed and injured. The information collected assists FRA (and the NTSB) in investigating the accident or incident. The locomotive or the part or parts affected by the accident must be preserved intact by the railroad until after the FRA inspection.

The information collected under § 229.21 is used by FRA inspectors to ensure that each locomotive in use undergoes at least one inspection by a qualified railroad employee during each calendar day to prevent defective locomotives from being placed in service. A written report of the inspection must be made. This report must contain the name of the carrier; the initials and the number of the locomotive; the place, date, and time of the inspection; a description of the non-complying conditions disclosed by the inspection; and the signature of the employee making the inspection. Except as provided in §§ 229.9, 229.137, and 229.139, any conditions that constitute non-compliance with any requirement of this Part must be repaired before the locomotive is used. Except with respect to conditions that do not comply with § 229.137 or § 229.139, a notation must be made on the report indicating the nature of the repairs that have been made. Repairs made for conditions that do not comply with § 229.137 or § 229.139 may be noted on the report. The person making the repairs must sign the report. The report must be filed and retained for at least 92 days in the office of the carrier at the terminal at which the locomotive is cared for. A record must also be maintained on each locomotive showing the place, date, and time of the previous inspection. Thus, this record is displayed in the locomotives' cab for each succeeding crew until the next inspection, and is used by the crew to know the history of the locomotive/train and to facilitate the safe operation of trains.

The information collected under § 229.23 is used by FRA inspectors to ensure that each locomotive in use undergoes the required periodic inspection. The periodic inspection is a more thorough inspection than the daily inspection, and is performed at least once every 184 days. It consists of positioning the locomotive so that a person may safely inspect the entire underneath portion of the locomotive. During the periodic inspection, numerous tests, inspections and replacement of components are made to electrical equipment, event recorders, protection devices, braking system, internal combustion engine filtering, fuel, waste and lubricating systems, and wheels and running gear are measured and examined for critical defects. The information from these various inspections or tests is recorded under Items 13 through 17 on form FRA-F-6180.49A. The absence of these elements on the form will void the history and continuity of the maintenance record. The form must be signed by the person conducting the inspection and certified by that person's supervisor that the work was done. The form must be displayed under a transparent cover in a conspicuous place in the cab of each locomotive. The information collected is also used by railroads to coordinate their locomotive maintenance program. Without the required record, railroads would have no idea what maintenance inspections have been accomplished or when others are scheduled. The information collected then aids railroads in running their locomotives efficiently, cost effectively, and safely.

The information collected under §§ 229.27 and 229.29 is used by FRA inspectors to ensure that each locomotive in use undergoes required annual and biennial tests. All testing must be performed at intervals that do not exceed 368 days. While the locomotive is tied up for a periodic inspection, at the 184 day interval, various air brake components

are cleaned, repaired, tested, or replaced once every 368 or 736 days. Locomotives with load meters that indicate current (amperage) being applied to traction motors must also be tested. Each device used by the engineer to aid in the control or braking of the train or locomotive that provides an indication of air pressure electronically must be tested by comparison with a test gauge or self-test designed for this purpose. An error of greater than five percent or three pounds per square inch must be corrected. The date and place of the test must be recorded on Form FRA F 6180-49A, and the person conducting the test and that person's supervisor must sign the form. Furthermore, all valves, valve portions, MU locomotive brake cylinders and electric-pneumatic master controllers in the air brake system (including related dirt collectors and filters) must be cleaned, repaired, and tested (except for the valves and valve portions on non-MU locomotives that are cleaned, repaired, and tested as prescribed in §229.27(a)). The date and place of the cleaning, repairing, and testing is recorded under Items 18 through 24 on form FRA-F-6180.49A. A record of the parts of the air brake system that are cleaned, repaired, and tested must be kept in the railroad's files or in the cab of the locomotive. Again, the information collected is also used by railroads to monitor and carry out their locomotive maintenance program and to provide a record of compliance with this Part.

The information collected under § 229.135 from crashworthy event recorders is used by railroads to monitor railroad operations. Event recorders must capture data on train speed, direction of motion, time, distance, throttle position, brake applications and operations and, if so equipped, cab signal aspects over the last 48 hours of train operation. This information is used by the railroad's operating employees – locomotive engineers, train crews, dispatchers – to improve train handling, and promote the safe and efficient operation of trains throughout the country, based on a surer knowledge of the consequences of different control inputs.

Crashworthy event recorders provide FRA with verifiable factual information about how trains are maintained and operated. The information obtained from these requirements is used by FRA and State inspectors in their enforcement of the Locomotive Safety Standards. Specifically, the information is used to ensure that locomotives are properly maintained, and receive the required daily, periodic, and other inspections and tests. The information collected provides carriers a written record to indicate what repairs are needed, who made the repairs, and what repairs were made, and provides the engineer with the knowledge that the locomotive has been inspected, tested, and is safe to be put into service.

Most importantly, information secured from crashworthy event recorders is also used by FRA to examine the circumstances of train accidents/incidents where previously such data might not have survived the accident/incident (e.g., in cases involving fire, impact shock, crush, fluid immersion and hydrostatic pressure), or might not have been intelligible. Event recorder data provide an invaluable resource for post-accident investigations, and have been used to direct the attention of FRA, State, and railroad accident investigators to useful areas in analyzing possible causes of accidents/incidents



that were not at first considered or suspected. Such information has then been used by FRA and railroads to establish measures/procedures to prevent (reduce the likelihood of) similar accidents from recurring in the future.

In sum, this collection of information is used by FRA to accomplish its primary mission, which is to promote and enhance rail safety throughout the United States.

**3. Extent of automated information collection.**

Over the years, FRA has highly encouraged and strongly endorsed the use of advanced information technology, wherever possible, to reduce burden. In keeping with the requirements of the Government Paperwork Elimination Act (GPEA) and the goals of the Paperwork Reduction Act (PRA), all records required by this rule may be kept electronically, except the “daily inspection record maintained on the locomotive required by § 229.21, the cab copy of Form FRA F 6180.49 required by § 229.23, the fragmented air brake record required by § 229.27, and records required under § 229.9. Also, records concerning “maintenance instructions of the manufacturer, supplier or owner of the event recorder” (see § 229.25(e)) may not be kept electronically. The maintenance instructions for the event recorder must be in hard copy so they can be used at the point of testing and repair. The cab card is an existing requirement not amended by this rulemaking, and establishes the locomotive as “equipped” or not in the field without requiring reference to a database somewhere else.

As noted in the two previous submissions, the National Transportation Safety Board (NTSB) has strongly advised that maintenance of locomotive event recorders verify that the entire event recorder system—including the recorder, the memory module, the cabling, and the sensors—accurately records what the locomotive has actually done. Although the regulatory text does not specify how records of successful tests are to be maintained, FRA has no objections to keeping the records electronically, as long as the electronic “record” is the full and complete “data verification result” required by this section. Moreover, since event recorders themselves are electronic recordkeeping devices, they readily lend themselves to cost (labor) and burden hour savings by functioning properly.

Also, as mentioned in the last submission, FRA has been working steadily with the major railroads to establish approved electronic recordkeeping systems to convert more of the required daily inspection records under § 229.21 from a paper to an electronic format. Substantial progress has been achieved in this effort. With recent additions to these records, FRA now estimates that a total of 5,215,600 daily inspection records are now being kept electronically. Thus, 76% of all these required records are currently being kept electronically.

Overall then, based on the final rule’s language, approximately **98%** of all responses may now be kept electronically, if railroads so choose. *[Note: To further aid railroads and other users, FRA has installed all of its safety forms, including Form FRA F 6180.49A, on its Website so that they can easily be downloaded. Also, Form FRA F 6180.49A is now available on the agency Website in a fillable PDF format too.]*

#### **4. Efforts to identify duplication.**

This information to our knowledge is not duplicated anywhere.

Similar data are not available from any other source.

**5. Efforts to minimize the burden on small businesses.**

“Small entity” is defined in 5 U.S.C. § 601. Section 601(3) defines a “small entity” as having the same meaning as “small business concern” under § 3 of the Small Business Act. This includes any small business concern that is independently owned and operated, and is not dominant in its field of operation. Section 601(4) includes not-for-profit enterprises that are independently owned and operated, and are not dominant in their field of operations within the definition of “small entities.” Additionally, § 601(5) defines as “small entities” governments of cities, counties, towns, townships, villages, school districts, or special districts with populations less than 50,000.

The U.S. Small Business Administration (SBA) stipulates “size standards” for small entities. It provides that the largest a for-profit railroad business firm may be (and still classify as a “small entity”) is 1,500 employees for “Line-Haul Operating” railroads, and 500 employees for “Short-Line Operating” railroads.

SBA size standards may be altered by Federal agencies in consultation with SBA, and in conjunction with public comment. Pursuant to the authority provided to it by SBA, FRA has published a final policy, which formally establishes small entities as railroads that meet the line haulage revenue requirements of a Class III railroad. Currently, the revenue requirements are \$20 million or less in annual operating revenue, adjusted annually for inflation. The \$20 million limit (adjusted annually for inflation) is based on the Surface Transportation Board’s threshold of a Class III railroad carrier, which is adjusted by applying the railroad revenue deflator adjustment. The same dollar limit on revenues is established to determine whether a railroad shipper or contractor is a small entity. FRA is using this definition for this rulemaking.

There are approximately 685 small railroads meeting the definition of “small entity” as described above. FRA estimates that all of these small entities could potentially be impacted by one or more of the proposed changes in this rulemaking. Note, however, that approximately 50 of these railroads are subsidiaries of large short line holding companies with the technical multidisciplinary expertise and resources comparable to larger railroads. It is important to point out that many of the changes or additions in this rulemaking will not impact all or many small railroads. The nature of some of the changes would dictate that the impacts primarily fall on large railroads that purchase new and/or electronically advanced locomotives. Small railroads generally do not purchase new locomotives; they tend to buy used locomotives from larger railroads. Also, two of the final rule provisions – requirements for alerters and RCL standards – would burden very few, if any, small railroads. The most burdensome requirement for small railroads would be the revisions to cab temperature since older locomotives are less likely to meet the revised standards and small railroads tend to own older locomotives. It is also important to note that the finalized changes only apply to non-steam locomotives. There are some small railroads that own one or more steam locomotives which these changes will not impact. There are a few small railroads that own all or almost all steam

locomotives. Most of these entities are either museum railroads or tourist railroads. For these entities this finalized regulations would have very little or no impact. FRA estimates that there are about five small railroads that only own steam locomotives.

Additionally, FRA is very aware of cost burdens on railroads and the importance of easing them, where possible. AAR, APTA, and their member railroads suggested a date of January 1, 2010, as the date after which any replacement event recorder must be equipped with a crashworthy memory module pursuant to Appendix D of this rule. These parties claim that a provision drafted in such a manner would allow railroads to continue to acquire solid state event recorders for the immediate future, and would allow railroads to deplete their in-stock event recorders without imposing any significant financial burden. FRA has incorporated this recommendation into this final rule. Moreover, FRA has eased the burden of specific “annual test dates” by acknowledging that any time an event recorder is downloaded, reviewed for the relevant elements as required in § 229.135(b), and successfully passes that review, a new 368-day interval begins. The added flexibility provided by this section could mean that locomotives equipped with microprocessor-based event recorders need never visit a shop just to check the event recorder.

It should be mentioned again that representatives of small railroads participated in the RSAC discussions that provided the basis for FRA’s recent final rule. Finally, the agency is confident that this rule will not impose a significant economic impact on a substantial number of small entities. FRA estimates that only 12 percent of the total cost associated with implementing the final rule would be borne by small entities, and most of that will be the cost for the cab temperature change.

## **6. Impact of less frequent collection of information.**

If this collection of information were not conducted or conducted less frequently, railroad safety throughout the country would be seriously hampered. Specifically, without the information to be collected under Subpart E of this final rule, FRA would have no way to review, assess, and approve new/novel safety-critical electronic locomotive control systems, subsystems, and components (i.e., “products” as defined in § 229.305) before they are put in service by railroads. Without prior review and evaluation on new locomotive technology/products before being placed in service, there might be increased and more severe rail accidents with corresponding injuries, fatalities, and property damage.

Without the locomotive accident report information collected under this regulation, FRA would have no way to track accidents caused by failure of a locomotive or any part of appurtenance of a locomotive. Without such data and the ability to amass locomotive accident reporting historical data over time, FRA and railroads would be unable to determine the cause(s) of such failures, detect trends, and devise necessary safety countermeasures to prevent such locomotive caused accidents from recurring. Without

corrective or remedial measures to address locomotive failures, recurrence of such failures would be inevitable, leading to greater numbers of rail accidents/incidents and casualties that accompany them.

Without the daily and periodic locomotive inspection records kept by railroads, FRA would have no way to verify that railroads are carrying out these critical inspections to maintain safety. Also, FRA would have no way to track or follow up on non-complying conditions that were disclosed by the daily inspection. FRA inspectors review these daily inspection reports to assure regulatory compliance and to confirm that necessary repairs are completed by qualified railroad personnel. Without a means of verifying locomotive inspection and repair, defective locomotives could be placed in service, causing avoidable accidents/incidents and preventable casualties to railroad personnel and the general public, as well as costly and needless property damage.

Without the collection of information provided by event recorders, FRA and railroads would be unable to monitor daily operations of locomotives so as to ensure safe train movements of passengers and goods all across the United States. Without periodic inspections of event recorders and without event recorder data verification readout records, there would be no way of ensuring that the locomotive event recorders are working properly and are truly capturing required data which are representative of the locomotive's actual operations. The lack of this essential and highly useful information could have an extremely adverse impact on train handling and rail safety since railroads and train crews would be unaware of those critical areas where management and labor need to focus their efforts in order to eliminate problems or potential problems. This, in turn, could lead to increased numbers of accident/incidents, resulting in greater and more severe injuries and increased deaths and higher property damage and, in cases involving the transport of hazardous materials, greater harm to the environment and surrounding communities.

Additionally, without event recorder information, FRA, railroads, and other investigators would be unable to extract and analyze vital data needed to determine the cause(s) of an accident/incident that would provide valuable insight into preventing similar accidents/incidents from occurring in the future. By supplying investigators with information on speed, throttle position, and braking, as well as a record of all the significant actions taken before the accident, event recorder data often become the foundation of the accident investigation. Without event recorder data, other data or testimony may be misinterpreted; accident causation identification may be either incomplete, or erroneous; and improper or insufficient remedial actions may be put in place.

In this rule, FRA has incorporated requirements for the capture of additional data parameters and for crash-hardening the event recorder memory module. Without certification that event recorders have crashworthy memory modules, critical data might be lost because the event recorder did not survive an accident/incident due to fire, impact shock, crush, fluid immersion, or hydrostatic pressure. Without the vital information that

crash-hardened event recorder memory modules provide in such an accident/incident investigations, FRA and the railroads would be seriously hindered in developing essential measures and procedures that would forestall similar accidents/incidents from occurring in the future.

In sum, this collection of information aids FRA in fulfilling its primary mission of promoting and enhancing rail safety throughout the United States and contributes as well to DOT's Primary Strategic Goal of transportation safety.

**7. Special circumstances.**

All information collection requirements are in compliance with this section.

**8. Compliance with 5 CFR 1320.8.**

In accordance with the Paperwork Reduction Act of 1995, Pub.L. No.104-13, § 2, 109 Stat. 163 (1995) (codified as revised at 44 U.S.C. §§ 3501-3520), and its implementing regulations, 5 CFR Part 1320, FRA published a notice in the Federal Register on June 22, 2015, soliciting public comments on these information collection requirements. See 80 FR 35712. FRA received no comments in response to this Notice.

**9. Payments or gifts to respondents.**

There are no monetary payments or gifts made to respondents associated with the information collection requirements contained in this final regulation.

**10. Assurance of confidentiality.**

Information collected is not of a confidential nature, and the Federal Railroad Administration (FRA) pledges no confidentiality.

**11. Justification for any questions of a sensitive nature.**

There are no questions of a sensitive or private nature involving this final regulation and its associated information collection requirements.

**12. Estimate of burden hours for information collected.**

*Note: According to the latest (2014) FRA data, there are approximately 779 railroads currently in operation that will be affected by this final rule broken down as follows:*

|                            |            |
|----------------------------|------------|
| <i>Class I Railroads</i>   | <i>7</i>   |
| <i>Class II Railroads</i>  | <i>11</i>  |
| <i>Class III Railroads</i> | <i>730</i> |
| <i>Commuter/Amtrak</i>     | <i>31</i>  |

*Also, for this analysis, it is estimated that the total number of locomotives is 26,500.*

Prohibited Acts and Penalties (229.7)

Any person who knowingly and willfully falsifies a record or report required by this Part is subject to criminal penalties under 49 U.S.C. 21311.

*The burden for this requirement is included under that of the reports and records listed below. Consequently, there is no additional burden associated with this requirement.*

Movement of Non-Complying Locomotive (229.9)

Except as provided in paragraphs (b), (c), §229.125(g), and §229.131(b) and (c)(1), a locomotive with one or more conditions not in compliance with this Part may be moved only as a lite locomotive or a dead locomotive after the carrier has complied with the following: (1) A qualified person must determine that (i) it is safe to move the locomotive; and (ii) The maximum speed and other restrictions necessary for safely conducting the movement. (2)(i) The engineer in charge of the movement of the locomotive must be notified in writing and inform all other crew members in the cab of the presence of the non-complying locomotive and the maximum speed and other restrictions determined under paragraph (a)(1)(ii) of this section; (ii) A copy of the tag described in paragraph (a)(3) of this section may be used to provide the notification required by paragraph (a)(2)(i) of this section. (3) A tag bearing the words “non-complying locomotive” and containing the following information must be securely attached to the control stand on each MU or control cab locomotive and to the isolation switch or near the engine start switch on every other type of locomotive:(i) The locomotive number; (ii) The name of the inspecting carrier; (iii) The inspection location and date; (iv) The nature of each defect; (v) Movement restrictions, if any; (vi) The destination; and (vii) The signature of the person making the determinations required by this paragraph.

FRA estimates that approximately 21,000 tags a year will be complete under this requirement. It is estimated that the average tag takes approximately one (1) minute to complete. Total annual burden for this requirement is 350 hours.

|                             |              |
|-----------------------------|--------------|
| Respondent Universe:        | 44 railroads |
| Burden time per response:   | 1 minute     |
| Frequency of Response:      | On Occasion  |
| Annual number of Responses: | 21,000 tags  |

Annual Burden: 350 hours

**Calculation:** 21,000 tags. x 1 min. = 350 hours

Remote Control Locomotives (229.15)

(a.) Design and Operation.

(11) Each Remote Control Locomotive (RCL) must be tagged at the locomotive control stand throttle indicating the locomotive is being used in a remote control mode. The tag must be removed when the locomotive is placed back in manual mode.

FRA estimates that there will be approximately 3,000 remote control locomotives will be tagged each year under the above requirement. It is estimated that it will take approximately two (2) minutes to tag each locomotive control unit. Total annual burden for this requirement is 100 hours.

|                             |                |
|-----------------------------|----------------|
| Respondent Universe:        | 44 railroads   |
| Burden time per response:   | 2 minutes      |
| Frequency of Response:      | On Occasion    |
| Annual number of Responses: | 3,000 RCL tags |
| Annual Burden:              | 100 hours      |

**Calculation:** 3,000 RCL tags x 2 min. = 100 hours

(b.) Inspection Testing and Repair. (1) Each time an OCU is linked to a RCL, and at the start of each shift, a railroad shall test: (i) The air brakes and the OCU's safety features, including the tilt switch and alerter device; and (ii) The man down/tilt feature automatic notification. (2) An OCU shall not continue in use with any defective safety feature identified in paragraph (b)(1) of this section. (3) A defective OCU shall be tracked under its own identification number assigned by the railroad. Records of repairs shall be maintained by the railroad and made available to FRA upon request. (4) Each time an RCL is placed in service and at the first practical time after the start of each shift, but no more than two (2) hours after the start of that shift, locomotives that utilize a positive train stop system shall perform a conditioning run over tracks that the positive train stop system is being utilized on to ensure that the system functions as intended.

FRA estimates that approximately 200 repair records will be kept under the above requirement. It is estimated that it will take approximately five (5) minutes to conduct the necessary test, identify any problem(s), make the necessary repair, and complete the required repair records. Total annual burden for this requirement is 17 hours.

|                           |              |
|---------------------------|--------------|
| Respondent Universe:      | 44 railroads |
| Burden time per response: | 5 minutes    |
| Frequency of Response:    | On Occasion  |



Annual number of Responses: 200 repair records  
Annual Burden: 17 hours

**Calculation:** 200 repair records x 5 min. = 17 hours

Total annual burden for this entire requirement is 117 hours (100 + 17).

#### Accident Reports (229.17)

In the case of an accident due to a failure from any cause of a locomotive or any part or appurtenance of a locomotive, or a person coming in contact with an electrically energized part or appurtenance that results in serious injury or death of one or more persons, the carrier operating the locomotive must immediately report the accident by toll-free telephone, Area Code 800-424-0201. The locomotive or the part or parts affected by the accident must be preserved intact by the carrier until after the FRA inspection.

Written confirmation of the oral report required by paragraph (a) of this section must be immediately mailed to the Federal Railroad Administration (FRA), RRS-25, Washington, D.C. 20590, and must contain a detailed description of the accident, including to the extent known, the causes and the number of persons killed and injured. The written report required by this paragraph is in addition to the reporting requirements of 49 CFR Part 225.

Accidents caused by locomotives occur very infrequently. FRA estimates that there will be approximately one (1) locomotive-related accident per year. It is estimated that it will take approximately 15 minutes to report the accident and complete the written confirmation. Total annual burden for this requirement is .25 hour.

Respondent Universe: 44 railroads  
Burden time per response: 15 minutes  
Frequency of Response: On Occasion  
Annual number of Responses: 1 report  
Annual Burden: .25 hour

**Calculation:** 1 report x .25 hour = .25 hour

#### Electronic Recordkeeping (229.20)

(a) For purposes of compliance with the recordkeeping requirements of this Part, except for the daily inspection record maintained on the locomotive required by § 229.21, the cab copy of Form FRA F 6180-49-A required by § 229.23, the fragmented air brake maintenance record required by § 229.27, and records required under § 229.9, a railroad may create, maintain, and transfer any of the records required by this Part through electronic transmission, storage, and retrieval provided that all of the requirements contained in this section are met.

(b) Design requirements. Any electronic record system used to create, maintain, or transfer a record required to be maintained by this Part shall meet the following design requirements:

(1) The electronic record system shall be designed such that the integrity of each record is maintained through appropriate levels of security such as recognition of an electronic signature, or other means, which uniquely identify the initiating person as the author of that record. No two persons shall have the same electronic identity;

(2) The electronic system shall ensure that each record cannot be modified, or replaced, once the record is transmitted;

(3) Any amendment to a record shall be electronically stored apart from the record which it amends. Each amendment to a record shall uniquely identify the person making the amendment;

(4) The electronic system shall provide for the maintenance of inspection records as originally submitted without corruption or loss of data; and

(5) Policies and procedures shall be in place to prevent persons from altering electronic records, or otherwise interfering with the electronic system.

*Since railroads have already received agency approval for their electronic recordkeeping systems under waiver petitions, FRA estimates that there will be zero (0) requests to modify their electronic recordkeeping systems. Consequently, there is no burden associated with the above requirement.*

(c) Operational requirements. Any electronic record system used to create, maintain, or transfer a record required to be maintained by this Part shall meet the following operating requirements:

(1) The electronic storage of any record required by this Part shall be initiated by the person performing the activity to which the record pertains within 24 hours following the completion of the activity; and

(2) For each locomotive for which records of inspection or maintenance required by this Part are maintained electronically, the electronic record system shall automatically notify the railroad each time the locomotive is due for an inspection, or maintenance that the electronic system is tracking. The automatic notification tracking requirement does not apply to daily inspections.

These notifications are programmed into the system. FRA estimates that approximately 21,000 automatic notifications will be take place each year under the above requirement.

It is estimated that it will take approximately one (1) second to complete each notification. Total annual burden for this requirement is six (6) hours.

|                             |                                |
|-----------------------------|--------------------------------|
| Respondent Universe:        | 44 railroads                   |
| Burden time per response:   | 1 second                       |
| Frequency of Response:      | On Occasion                    |
| Annual number of Responses: | 21,000 automatic notifications |
| Annual Burden:              | 6 hours                        |

**Calculation:** 21,000 automatic notifications x 1sec. = 6 hours

(d) Accessibility and availability requirements. Any electronic record system used to create, maintain, or transfer a record required to be maintained by this Part shall meet the following access and availability requirements:

(1) Except as provided in § 229.313(c)(2), the carrier shall provide FRA with all electronic records maintained for compliance with this Part for any specific locomotives at any mechanical department terminal upon request;

(2) Paper copies of electronic records and amendments to those records that may be necessary to document compliance with this Part shall be provided to FRA for inspection and copying upon request. Paper copies shall be provided to the FRA no later than 15 days from the date the request is made; and

(3) Inspection records required by this Part shall be available to persons who performed the inspection and to persons performing subsequent inspections on the same locomotive.

*The burden for recordkeeping is included below under the individual recordkeeping requirements associated with this rule. Consequently, there is no additional burden associated with this provision.*

#### Daily Inspection (229.21)

Except for MU locomotives, each locomotive in use must be inspected at least once during each calendar day. A written report of the inspection must be made. This report must contain the name of the carrier; the initials and the number of the locomotive; the place, date, and time of the inspection; a description of the non-complying conditions disclosed by the inspection; and the signature of the employee making the inspection. Except as provided in §§ 229.9, 229.137, and 229.139, any conditions that constitute non-compliance with any requirement of this Part must be repaired before the locomotive is used. Except with respect to conditions that do not comply with § 229.137 or § 229.139, a notation must be made on the report indicating the nature of the repairs that have been

made. Repairs made for conditions that do not comply with § 229.137 or §229.139 may be noted on the report, or in electronic form. The person making the repairs must sign the report. The report must be filed and retained for at least 92 days in the office of the carrier at the terminal at which the locomotive is cared for. A record must also be maintained on each locomotive showing the place, date, and time of the previous inspection. Thus, this record is displayed in the locomotives' cab for each succeeding crew until the next inspection.

Sometimes railroads leave locomotives at outlying points for periods of up to 92 days and different crews are subject to its use. Without a method of notification, defective locomotives could be placed in service and employees, as well as the public, would be subjected to hazards they have no control over. The daily inspection is basically a walk around visual observation for any defective or non-complying condition obvious to the railroad inspector, or en route problems that might occur while the engineer is operating the locomotive. This type of inspection should find – before they become critical – defective brakes, wheels, broken or inoperative devices, and oil or fuel leakages that could cause slipping or fire hazards. To validate the inspection, the inspector must complete a written report indicating any defects which are found.

FRA estimates that approximately 26,500 locomotives will require a daily inspection. On an annual basis, a total of 6,890,000 daily inspections will be conducted (based on a five day week) for these locomotives. Each inspection will have a corresponding record. After obtaining FRA approval for their electronic recordkeeping systems, three major railroads – the Union Pacific (UP), the Burlington Northern Santa Fe (BNSF), and Norfolk Southern (NS) – are now keeping even more of these the required records electronically. Thus, approximately 20,060 of the 26,500 locomotives mentioned above, or a total of 5,215,600 records are kept electronically. Approximately 76 % then of all the required records are now kept electronically by these three railroads. The rest of the daily inspection records (1,674,400) will be kept by paper. It is estimated that it will take 15 minutes to complete each daily inspection and approximately three (3) additional minutes to complete each paper record and approximately one (1) additional minute to complete each electronic record. Total annual burden for this requirement is approximately 1,893,147 hours.

|                             |                                      |
|-----------------------------|--------------------------------------|
| Respondent Universe:        | 779 railroads                        |
| Burden time per response:   | 16 minutes or 18 minutes             |
| Frequency of Response:      | Daily                                |
| Annual number of Responses: | 6,890,000 inspection reports/records |
| Annual Burden:              | 1,893,147 hours                      |

**Calculation:** 1,674,400 paper insp. records x 18 min. + 5,215,600 electronic insp. records x 16 min. = 1,893,147 hours

(b) Each MU locomotive in use shall be inspected at least once during each calendar day

and a written report of the inspection shall be made. This report may be part of a single master report covering an entire group of MU's. If any non-complying conditions are found, a separate, individual report shall be made containing the name of the carrier; the initials and number of the locomotive; the place, date, and time of the inspection; the non-complying conditions found; and the signature of the inspector. Except as provided in §§ 229.9, 229.137, and 229.139, any conditions that constitute non-compliance with any requirement of this part shall be repaired before the locomotive is used. Except with respect to conditions that do not comply with § 229.137 or § 229.139, a notation shall be made on the report indicating the nature of the repairs that have been made. Repairs made for conditions that do not comply with § 229.137 or § 229.139 may be noted on the report, or in electronic form. A notation shall be made on the report indicating the nature of the repairs that have been made. The person making the repairs shall sign the report. The report shall be filed in the office of the carrier at the place where the inspection is made or at one central location and retained for at least 92 days.

FRA estimates that there are approximately 5,000 MU locomotives that operate approximately 300 days per year that will be inspected at least once during each calendar day and have a written report made. Each written report will have approximately 10 entries. FRA estimates then that approximately 150,000 written reports will be completed (5,000 inspections x 300 days divided by 10 = 150,000) each year under the above requirement. Additionally, FRA estimates that 80,000 separate, individual written reports will be completed when non-complying conditions are found. Thus, a total of approximately 230,000 written reports will be completed each year under the above requirement. It is estimated that it will take approximately 10 minutes for the required inspection and an additional three (3) minutes to complete the accompanying written report. Total annual burden for this requirement is 49,833 hours. ***(Note: FRA's previous estimate of 250 written reports grossly underestimated the number of MU locomotives in daily operation that require calendar day inspections and corresponding written reports. Also, the previous estimate did not account for the separate, individual written reports that are required to be completed when a non-complying condition is found. The adjusted/revised burden estimate now corrects these earlier mistakes.)***

|                             |                         |
|-----------------------------|-------------------------|
| Respondent Universe:        | 779 railroads           |
| Burden time per response:   | 13 minutes              |
| Frequency of Response:      | On Occasion             |
| Annual number of Responses: | 230,000 written reports |
| Annual Burden:              | 49,833 hours            |

**Calculation:** 230,000 written reports x 13 min. = 49,833 hours

Total annual burden for this requirement is 1,893,201 hours (1,893,147 + 49,833).

Locomotive Inspection and Repair Record (Form FRA-F- 6180.49A)

Items 1 through 10 and 12 detail the identity, characteristics, owner and operator of each

locomotive operating under the Locomotive Inspection Act. Without full identification, there is a good chance that the locomotive maintenance history will become erroneously identified or misrepresented. Positive identification is essential to the railroad safety plan.

As mentioned earlier, FRA estimates that there are approximately 26,500 locomotives in use presently. For approximately 22,500 locomotives, the necessary information is computer generated. For the rest, one form is required per locomotive or a total of approximately 4,000 forms per year. It is estimated that it takes approximately two (2) minutes to transfer this data onto a new form each year. Each form will have eight (8) entries. Thus, it will take a total of 16 minutes (8 entries per form x 2 min.) to complete each form. Total annual burden for this requirement is 1,067 hours.

|                             |               |
|-----------------------------|---------------|
| Respondent Universe:        | 779 railroads |
| Burden time per response:   | 2 minutes     |
| Frequency of Response:      | Annually      |
| Annual number of Responses: | 4,000 forms   |
| Annual Burden:              | 1,067 hours   |

**Calculation:** 4,000 forms x 2 minutes = 1,067 hours

Below is a breakdown of the various inspections or tests required to be performed and recorded on this form along with the burden hours associated with each.

(1) Locomotive Noise Emission Test (210.31)

The following data determined by any locomotive noise emission test conducted after December 31, 1976, must be recorded in the "Remarks" section on the reverse side of Form FRA F 6180.49: (1) Location of the test; (2) Type of test; (3) Date of test; and (4) The A-weighted sound level reading in decibels obtained during the pass by test, or the readings obtained at idle throttle setting and maximum throttle setting during a load cell test.

*Locomotive pre-testing is now all done by the manufacturer before the locomotive is delivered to the railroad. Consequently, there is no burden associated with this requirement.*

(2) Periodic Inspection (49 CFR 229.23) – General

(a) Each locomotive must be inspected at each periodic inspection to determine whether it complies with this Part. Except as provided in § 229.9, all non-complying conditions must be repaired before the locomotive is used. Except as provided in § 229.33 and paragraph (b) of this section, the interval between any two periodic inspections may not

exceed 92 days. Periodic inspections must only be made where adequate facilities are available. At each periodic inspection, a locomotive must be positioned so that a person may safely inspect the entire underneath portion of the locomotive.

(b) For each locomotive equipped with microprocessor-based on-board electronic condition monitoring controls:

(1) The interval between periodic inspections shall not exceed 184 days; and

(2) At least once each 33 days, the daily inspection required by § 229.21 shall be performed by a mechanical inspector as defined by § 229.5. A record of the inspection that contains the name of the person performing the inspection and the date that it was performed shall be maintained in the locomotive cab until the next periodic inspection is performed. *(Note: The burden for records of daily inspections is included above under that of § 229.21. Consequently, there is no additional burden associated with this requirement.)*

(c) Each new locomotive shall receive an initial periodic inspection before it is used.

(d) At the initial periodic inspection, the date and place of the last tests performed that are the equivalent of the tests required by §§ 229.27, 229.29, and 229.31 shall be entered on Form FRA F 6180–49A. These dates shall determine when the tests first become due under §§ 229.27, 229.29, and 229.31. Out of use credit may be carried over from Form FRA F 6180–49 and entered on Form FRA F 6180–49A.

(e) Each periodic inspection shall be recorded on Form FRA F 6180–49A. The form shall be signed by the person conducting the inspection and certified by that person's supervisor that the work was done. The form shall be displayed under a transparent cover in a conspicuous place in the cab of each locomotive. A railroad maintaining and transferring records as provided for in § 229.20 shall print the name of the person who performed the inspections, repairs, or certified work on the Form FRA F 6180-49A that is displayed in the cab of each locomotive.

(f) At the first periodic inspection in each calendar year, the carrier shall remove from each locomotive Form FRA F 6180–49A covering the previous calendar year. If a locomotive does not receive its first periodic inspection in a calendar year before April 2 July 3 if it is a locomotive equipped with advanced microprocessor-based on-board electronic condition monitoring controls, because it is out of use, the form shall be promptly replaced. The Form FRA F 6180–49A covering the preceding year for each locomotive, in or out of use, shall be signed by the railroad official responsible for the locomotive and filed as required in § 229.23(f). The date and place of the last periodic

inspection and the date and place of the last tests performed under §§ 229.27, 229.29, and 229.31 shall be transferred to the replacement Form FRA F 6180-49A.

(g) The railroad mechanical officer who is in charge of a locomotive must maintain in his office a secondary record of the information reported on Form FRA 6180.49A under this Part. The secondary record must be retained until Form FRA 6180.49A has been removed from the locomotive and filed in the railroad office of the mechanical officer in charge of the locomotive. If the Form FRA 6180.49A removed from the locomotive is not clearly legible, the secondary record must be retained until the Form FRA 6180.49A for the succeeding year is filed. The Form FRA 6180.49A removed from a locomotive must be retained until the Form FRA 6180.49A for the succeeding year is filed.

The periodic inspection is a more thorough inspection than the daily inspection, and is performed at least once every 184 days. It consists of positioning the locomotive so that a person may safely inspect the entire underneath portion of the locomotive. During the periodic inspection, numerous tests, inspections and replacement of components are made to electrical equipment, event recorders, protection devices, braking system, internal combustion engine filtering, fuel, waste and lubricating systems, and wheels and running gear are measured and examined for critical defects. The information from these various inspections or tests is recorded under Items 13 through 17 on form FRA-F-6180.49A. The absence of these elements on the form will void the history and continuity of the maintenance record. As noted above, the form must be signed by the person conducting the inspection and certified by that person's supervisor that the work was done. The form must be displayed under a transparent cover in a conspicuous place in the cab of each locomotive. Without the record, again, there is no coordinated maintenance program. The railroads would have no idea what maintenance inspections have been accomplished or when others are scheduled.

(h) The railroad shall maintain, and provide employees performing inspections under this section with, a list of the defects and repairs made on each locomotive over the last ninety-two days.

(i) The railroad shall provide employees performing inspections under this section with a document containing all tests conducted since the last periodic inspection, and procedures needed to perform the inspection.

Under §229.23 (g) above, the mechanical officer of each railroad who is in charge of a locomotive must maintain in his office a secondary record of the information reported on Form FRA 6180.49A under this Part. These records are usually computer generated. FRA estimates then that approximately 9,500 secondary records of the information kept on Form FRA F 6180.49A will be kept by the mechanical officer of each railroad under the above requirement. It is estimated that it will take approximately two (2) minutes to complete each secondary record. Total annual burden for this requirement is 317 hours.



|                             |                         |
|-----------------------------|-------------------------|
| Respondent Universe:        | 779 railroads           |
| Burden time per response:   | 2 minutes               |
| Frequency of Response:      | On Occasion             |
| Annual number of Responses: | 9,500 secondary records |
| Annual Burden:              | 317 hours               |

**Calculation:** 9,500 secondary records x 2 min. = 317 hours

Under §229.23 (h) above, each railroad must maintain and provide to employees performing inspections under this section with a list of the defects and repairs made on each locomotive over the last ninety-two days. FRA estimates that approximately 4,000 lists of the defects and repairs made on each locomotive will be maintained by railroads and 4,000 copies of these lists will be provided to employees performing inspections under the above requirement. It is estimated that it will take approximately two (2) minutes to complete/maintain each list and another two (2) minutes to make each copy and provide it to the appropriate employee. Total annual burden for this requirement is 266 hours.

|                             |                                 |
|-----------------------------|---------------------------------|
| Respondent Universe:        | 754 railroads                   |
| Burden time per response:   | 2 minutes + 2 minutes           |
| Frequency of Response:      | On Occasion                     |
| Annual number of Responses: | 4,000 lists + 4,000 list copies |
| Annual Burden:              | 266 hours                       |

**Calculation:** 4,000 lists x 2 min. + 4,000 list copies x 2 min. = 266 hrs.

Under §229.23 (i) above, each railroad must provide employees performing inspections under this section with a document containing all tests conducted since the last periodic inspection, and procedures needed to perform the inspection. FRA estimates that approximately 9,500 documents will be provided to employees under the above requirement. It is estimated that it will take approximately two (2) minutes to provide the document to the appropriate employee. Total annual burden for this requirement is 317 hours.

|                             |                         |
|-----------------------------|-------------------------|
| Respondent Universe:        | 779 railroads           |
| Burden time per response:   | 2 minutes               |
| Frequency of Response:      | On Occasion             |
| Annual number of Responses: | 9,500 documents/records |
| Annual Burden:              | 317 hours               |

**Calculation:** 9,500 documents/records x 2 min. = 317 hours

(b) Annual Air Brake System Calibration and Testing (49 CFR 229.27 and 229.29)

All testing under this section shall be performed at intervals that do not exceed 368 calendar days.

Load meters that indicate current (amperage) being applied to traction motors shall be tested. Each device used by the engineer to aid in the control or braking of the train or locomotive that provides an indication of air pressure electronically shall be tested by comparison with a test gauge or self-test designed for this purpose. An error of greater than five percent or greater than three pounds per square inch shall be corrected. The date and place of the test shall be recorded on Form FRA F 6180-49A, and the person conducting the test and that person's supervisor shall sign the form.

While the locomotive is tied up for a periodic inspection, at the 92 day interval, various air brake components are cleaned, repaired, tested, or replaced once every 368 or 736 days. The load meter is also tested. Moreover, all valves, valve portions, MU locomotive brake cylinders and electric-pneumatic master controllers in the air brake system (including related dirt collectors and filters) must be cleaned, repaired, and tested (except for the valves and valve portions on non-MU locomotives that are cleaned, repaired, and tested as prescribed in §229.27(a)). The date and place of the cleaning, repairing, and testing is recorded under Items 18 through 24 on form FRA-F-6180.49A. When the Locomotive Safety Standards were being developed, a request was made to permit fragmentation of air brake work if the cleaning dates were kept on the record currently in use. The regulation was changed to permit any railroad to use whichever procedure best suited their operations. The date and place of the test must be recorded on Form FRA F 6180.49A, and the person conducting the test and that person's supervisor must sign the form. A record of the parts of the air brake system that are cleaned, repaired, and tested shall be kept in the carrier's files or in the cab of the locomotive.

(c) Main Reservoir Tests (49 CFR 229.31)

The drilling of telltale holes in welded main air reservoirs is generally performed at the time the reservoirs are originally constructed. It is a one-time procedure, and those locomotives with welded reservoirs are already done.

This type of construction requires the reservoirs to receive a hydrostatic hammer test every 736 days. However, there are no locomotives which have riveted air reservoirs. This test then does not have to be done. It should be noted that the nation's railroads include numerous routine work on locomotives not required by FRA regulations at this inspection. FRA is unable to separate specific items as each railroad does its own thing. This one-time procedure has already been done for 21,750 of the estimated 26,500 locomotives currently in use. Consequently, FRA estimates that the remaining 4,750 locomotives will need to undergo periodic inspections two times a year. As a result, it is estimated then that approximately 9,500 periodic inspections will take place. It is further estimated that it takes approximately eight (8) hours to perform the above inspections; make repairs and adjustments; and enter the data on the Locomotive and Inspection and

Repair Report (FRA-F-6180.49A). Total annual burden for this requirement is 76,000 hours. (Note: As mentioned in the previous submission, periodic inspections are now required only twice per year.)

|                             |                   |
|-----------------------------|-------------------|
| Respondent Universe:        | 779 railroads     |
| Burden time per response:   | 8 hours           |
| Frequency of Response:      | One-time          |
| Annual number of Responses: | 9,500 tests/forms |
| Annual Burden:              | 76,000 hours      |

**Calculation:** 9,500 tests/forms x 8 hrs. = 76,000 hours

(3) Out-of-Use Credit (49 CFR 229.33)

When a locomotive is out of use for 30 or more consecutive days or is out of use when it is due for any test or inspection required by §§ 229.23, 229.25, 229.27, 229.29, or 229.31, an out-of-use notation showing the number of out-of-use days must be made on an inspection line on Form FRA F 6180.49A. A supervisory employee of the carrier who is responsible for the locomotive must attest to the notation. If the locomotive is out of use for one or more periods of at least 30 consecutive days each, the interval prescribed for any test or inspection under this Part may be extended by the number of days in each period the locomotive is out of use since the last test or inspection in question. A movement made in accordance with § 229.9 is not a use for purposes of determining the period of the out-of-use credit.

FRA estimates that approximately 8,000 locomotives have been stored for several years and, if returned to service, will be overdue for most tests, depending upon length of out-of-service time. We do not know if the railroads will want to take advantage of this procedure when subject locomotives are returned to service. Some will, and some will not.

In addition, approximately 1,000 of the locomotives that are in operation are held out-of-service at various times for periods exceeding 30 consecutive days, which permits them to acquire out-of-use credits.

So that the railroad industry can take full advantage of periods of non-use and so that railroads, Federal and State inspectors can account for these periods, the out-of-service procedure was designed.

FRA estimates that there will be approximately 500 out-of-use credits, or 500 out-of-use notations per year. It is estimated that each notation takes approximately five (5) minutes to record the required data on the form (under Item 11 on Form FRA-F-6180.49A). Total annual burden for this requirement is 42 hours.

|                      |               |
|----------------------|---------------|
| Respondent Universe: | 779 railroads |
|----------------------|---------------|

|                             |                                    |
|-----------------------------|------------------------------------|
| Burden time per response:   | 5 minutes                          |
| Frequency of Response:      | On Occasion                        |
| Annual number of Responses: | 500 out-of-use notations (credits) |
| Annual Burden:              | 42 hours                           |

**Calculation:** 500 notations x 5 minutes = 42 hours

*NOTE:* Total annual burden hours associated with the Locomotive and Inspection Repair Report (FRA-F-6180.49A) is as follows:

|   |   |                                |     |
|---|---|--------------------------------|-----|
|   |   | Transferring of data           | -   |
|   |   | 1,067                          |     |
|   |   | Locomotive Noise Emission Test | - 0 |
| Periodic, Annual, Biennial and Main Reservoir Tests and Inspections | - | 76,000                         |     |
| Secondary Records   | - | 317                            |     |
| Lists of Defects/Repairs ( <b>new</b> )                             | - | 266                            |     |
| Document of Tests ( <b>new</b> )                                    | - | 317                            |     |
| Out-of-Use Credit   | - | <u>42</u>                      |     |
|   |   | <b>Total Hours</b>             |     |
|   |   | <b>78,009</b>                  |     |

**RECORDKEEPING REQUIREMENTS FOR EVENT RECORDERS**

Tests: Every Periodic Inspection (229.25)

Event Recorder. A microprocessor-based self-monitoring event recorder, if installed, is exempt from periodic inspection under paragraphs (d)(1) through (d)(5) of this section and must be inspected annually as required by § 229.27(c). Other types of event recorders, if installed, must be inspected, maintained, and tested in accordance with instructions of the manufacturer, supplier, or owner thereof and in accordance with the following criteria: (1) A written or electronic copy of the instructions in use must be kept at the point where the work is performed, and a hard-copy version, written in the English language, must be made available upon request to FRA. (2) The event recorder must be tested before any maintenance work is performed on it. At a minimum, the event recorder test must include cycling, as practicable, all required recording elements and determining the full range of each element by reading out recorded data. (3) If the pre-maintenance test reveals that the device is not recording all the specified data and that all recordings are within the designed recording elements, this fact must be noted, and maintenance and testing must be performed as necessary until a subsequent test is successful. (4) When a successful test is accomplished, a copy of the data-verification

results must be maintained in any medium with the maintenance records for the locomotive until the next one is filed. (5) A railroad's event recorder shall be considered effective if 90 percent of the recorders on the locomotives inbound for periodic inspection in any given calendar month are still fully functional; maintenance practices and test intervals shall be adjusted as necessary to yield effective periodic maintenance.

(1) *Written Copy of Instructions.* The written copy of instructions has been accomplished by most railroads. FRA estimates that approximately 200 amendments will be made annually to the manufacturer's instructions. FRA estimates that it will take approximately 15 minutes per respondent to make copies of the manufacturer's amended instructions and distribute them to their repair shops. Total annual burden for this requirement is 50 hours.

|                             |                |
|-----------------------------|----------------|
| Respondent Universe:        | 754 railroads  |
| Burden time per response:   | 15 minutes     |
| Frequency of Response:      | On Occasion    |
| Annual number of Responses: | 200 amendments |
| Annual Burden:              | 50 hours       |

**Calculation:** 200 amendments x .25 hours = 50 hours

(2) *Data Verification Readout Record.* Event recorders during routine maintenance must be run through the full range of each of the operational parameters they were recording and a verification of the correct functioning of the recorder – in the form of a read out tape – must be filed with other locomotive maintenance records until the next inspection and maintenance period.

FRA estimates that approximately 16,100 locomotives are equipped with event recorders. Verification tests will be required to be performed four (4) times a year on approximately 50% of the above total or 8,050 locomotives (a total of 32,200 verification tests per year) because they have event recorders covered under the current rule. The other 50% of the above total (8,050 locomotives) will have microprocessor-based event recorders, and will be covered by the final rule, requiring a verification test only once a year (a total of 8,050 verification tests per year). A grand total then of 40,250 verification tests will be completed a year.

FRA believes that approximately 90% of the event recorders are passing this required test. When this happens, little or no analysis is required. However, approximately 10% will fail, requiring these event recorders to be run through the full range of each of the operational parameters they were recording and necessitating a data verification readout record demonstrating the correct functioning of the recorder. A total then of 4,025 verification test reports will be completed. It is estimated that it will take approximately 90 minutes for maintenance personnel to pick up the verification machine, hook it up to the event recorder, print out the verification data, analyze the data, and file the verification report with the locomotive's maintenance records. Total annual burden for

this requirement is 6,038 hours.

|                             |                               |
|-----------------------------|-------------------------------|
| Respondent Universe:        | 754 railroads                 |
| Burden time per response:   | 90 minutes                    |
| Frequency of Response:      | Quarterly/Annually            |
| Annual number of Responses: | 4,025 readout records/reports |
| Annual Burden:              | 6,038 hours                   |

**Calculation:** 4,025 read records/ reports x .5 hour = 6,038 hours

(3) *Pre-Maintenance Tests -- Failures.* FRA estimates that approximately 700 event recorders will fail the pre-maintenance test under the above requirement. It is estimated that it will take approximately 30 minutes to conduct the inspection and test, and make the required notation on the data verification result. Total annual burden for this requirement is 350 hours.

|                             |                            |
|-----------------------------|----------------------------|
| Respondent Universe:        | 754 railroads              |
| Burden time per response:   | 30 minutes                 |
| Frequency of Response:      | On occasion                |
| Annual number of Responses: | 700 test failure notations |
| Annual Burden:              | 350 hours                  |

**Calculation:** 700 test failure notations x 30 min. = 350 hours

(4.) When a successful test is accomplished, a copy of those data-verification results shall be maintained, in any media, with the maintenance records for the locomotive until the next one is filed.

*The burden for this requirement is included under (2) above. Consequently, there is no additional burden associated with it.*

Total annual burden for this entire requirement is 6,438 hours (50 + 6,038 + 350).

#### Event Recorders (229.135)

(A.) *Removal from service.* Notwithstanding the duty established in paragraph (a) of this section to equip certain locomotives with an in-service event recorder, a railroad may remove an event recorder from service and, if a railroad knows that an event recorder is not monitoring or recording required data, shall remove the event recorder from service. When a railroad removes an event recorder from service, a qualified person shall record the date that the device was removed from service on Form FRA F6180.49A, under the REMARKS section, unless the event recorder is designed to allow the locomotive to assume the lead position only if the recorder is properly functioning.

An event recorder may be removed from service by disconnecting its power source, by physically removing it from the locomotive on which it is installed, or by removing its recording medium. The reasons for removing the device from service and the period within which the device will remain out of service must be recorded on a tag applied to the device or to the place from which the device was removed. A railroad may design its own tag to be used for this purpose or may record the required data on a "non-complying locomotive tag" as described in 49 CFR 229.9(a)(3).

FRA estimates that approximately 1,000 event recorders will be removed annually from locomotives for either repair or other purposes. It is estimated that it will take approximately one (1) minute to record the reason why the event recorder was removed. Total annual burden for this requirement is 17 hours.

|                             |                    |
|-----------------------------|--------------------|
| Respondent Universe:        | 779 railroads      |
| Burden time per response:   | 1 minute           |
| Frequency of Response:      | On Occasion        |
| Annual number of Responses: | 1,000 removal tags |
| Annual Burden:              | 17 hours           |

**Calculation:** 1,000 removal tags x 1 min. = 17 hours

*(B.) Preserving accident data.* If any locomotive equipped with an event recorder, or any other locomotive-mounted recording device or devices designed to record information concerning the functioning of a locomotive or train, is involved in an accident/incident that is required to be reported to FRA under part 225 of this chapter, the railroad that was using the locomotive at the time of the accident shall, to the extent possible, and to the extent consistent with the safety of life and property, preserve the data recorded by each such device for analysis by FRA. This preservation requirement permits the railroad to extract and analyze such data, *provided* the original downloaded data file, or an unanalyzed copy of it, shall be retained in secure custody and shall not be utilized for analysis or any other purpose except by direction of FRA or the National Transportation Safety Board. This preservation requirement shall expire one (1) year after the date of the accident unless FRA or the Board notifies the railroad in writing that the data are desired for analysis.

According to the most recent agency accident data, FRA estimates that there will be approximately 3,100 reportable events a year involving locomotives equipped with event recorders. Most of these are very minor accidents where a railroad will decide to preserve the data for its own use. It is estimated that it will take approximately 15 minutes to abstract the information from the device and file it with the appropriate office location. Total annual burden for this requirement is 775 hours.

|                             |                             |
|-----------------------------|-----------------------------|
| Respondent Universe:        | 779 railroads               |
| Burden time per response:   | 15 minutes                  |
| Frequency of Response:      | On Occasion                 |
| Annual number of Responses: | 3,100 accident data reports |

Annual Burden: 775 hours

**Calculation:** 3,100 accident data reports x .25 hr. = 775 hours

Total annual burden for this entire requirement is 792 hours (17 + 775).

## **OTHER REQUIREMENTS**

### **Annual Tests (229.27)**

A microprocessor-based event recorder, with a self-monitoring feature equipped to verify that all data elements required by this Part are recorded, requires further maintenance only if either or both of the following conditions exist:

(1) The self-monitoring feature displays an indication of a failure. If a failure is displayed, further maintenance and testing must be performed until a subsequent test is successful. When a successful test is accomplished, a record, in any medium, must be made of that fact and of any maintenance work necessary to achieve the successful result. This record must be available at the location where the locomotive is maintained until a record of a subsequent successful test is filed.

FRA estimates that approximately 700 event recorders with a self-monitoring feature will have tests that display an indication of failure, and will then require further maintenance and testing. It is estimated that it will take approximately 90 minutes to perform the additional maintenance and testing, and make the required record. Total annual burden for this requirement is 1,050 hours.

|                             |                  |
|-----------------------------|------------------|
| Respondent Universe:        | 779 railroads    |
| Burden time per response:   | 90 minutes       |
| Frequency of Response:      | On occasion      |
| Annual number of Responses: | 700 test records |
| Annual Burden:              | 1,050 hours      |

**Calculation:** 700 test records x 90 min. = 1,050 hours

(2) A download of the event recorder, taken within the preceding 30 days and reviewed for the previous 48 hours of locomotive operation, reveals a failure to record a regularly recurring data element or reveals that any required data element is not representative of the actual operations of the locomotive during this time period. If the review is not successful, further maintenance and testing must be performed until a subsequent test is successful. When a successful test is accomplished, a record, in any medium, must be made of that fact and of any maintenance work necessary to achieve the successful result. This record must be kept at the location where the locomotive is maintained until a record of a subsequent successful test is filed. The download must be taken from information



stored in the certified crash hardened event recorder memory module if the locomotive is so equipped.

*The burden for this requirement is included under the burden listed in (1) above. Consequently, there is no additional burden associated with it.*

Total burden for this requirement is 1,050 hours.

#### Air Brake System Maintenance and Testing (229.29)

(a) A locomotive's air brake system shall receive the calibration, maintenance, and testing as prescribed in this section. The level of maintenance and testing and the intervals for receiving such maintenance and testing of locomotives with various types of air brake systems shall be conducted in accordance with paragraphs (d) through (f) of this section. Records of the maintenance and testing required in this section shall be maintained in accordance with paragraph (g) of this section.

(b) Except for DMU or MU locomotives covered under § 238.309 of this chapter, the air flow method (AFM) indicator shall be calibrated in accordance with section 232.205(c)(1)(iii) at intervals not to exceed 92 days, and records shall be maintained as prescribed in paragraph (g)(1) of this section.

(c) Except for DMU or MU locomotives covered under § 238.309 of this chapter, the extent of air brake system maintenance and testing that is required on a locomotive shall be in accordance with the following levels:

(1) Level one: Locomotives shall have the filtering devices or dirt collectors located in the main reservoir supply line to the air brake system cleaned, repaired, or replaced.

(2) Level two: Locomotives shall have the following components cleaned, repaired, and tested: brake cylinder relay valve portions; main reservoir safety valves; brake pipe vent valve portions; and, feed and reducing valve portions in the air brake system (including related dirt collectors and filters).

(3) Level three: Locomotives shall have the components identified in this paragraph removed from the locomotive and disassembled, cleaned and lubricated (if necessary), and tested. In addition, all parts of such components that can deteriorate within the inspection interval as defined in paragraphs (d) through (f) of this section shall be replaced and tested. The components include: all pneumatic components of the locomotive equipment's brake system that contain moving parts, and are sealed against air leaks; all valves and valve portions, electric-pneumatic master controllers in the air brake system, and all air brake related filters and dirt collectors.

(d) Except for MU locomotives covered under § 238.309 of this chapter, all locomotives shall receive level one air brake maintenance and testing as described in this section at intervals that do not exceed 368 days.

(e) Locomotives equipped with an air brake system not specifically identified in paragraphs (f)(1) through (f)(3) of this section shall receive level two air brake maintenance and testing as described in this section at intervals that do not exceed 368 days and level three air brake maintenance and testing at intervals that do not exceed 736 days.

(f) Level two and level three air brake maintenance and testing shall be performed on each locomotive identified in this paragraph at the following intervals:

(1) At intervals that do not exceed 1,104 days for a locomotive equipped with a 26-L or equivalent brake system;

(2) At intervals that do not exceed 1,472 days for locomotives equipped with an air dryer and a 26-L or equivalent brake system and for locomotives not equipped with an air compressor and that are semi-permanently coupled and dedicated to locomotives with an air dryer; or

(3) At intervals that do not exceed 1,840 days for locomotives equipped with CCB-1, CCB-2, CCB-26, EPIC 1 (formerly EPIC 3102), EPIC 3102D2, EPIC 2, KB-HS1, or Fastbrake brake systems.

*The burden for this entire requirement is included above under that of 229.27/29/31. Consequently, there is no additional burden associated with this requirement.*

(g) Records of the air brake system maintenance and testing required by this section shall be generated and maintained in accordance with the following:

(1) The date of AFM indicator calibration shall be recorded and certified on Form F6180-49A.

(2) The date and place of the cleaning, repairing and testing required by this section shall be recorded on Form FRA F 6180-49A, and the work shall be certified. A record of the parts of the air brake system that are cleaned, repaired, and tested shall be kept in the railroad's files or in the cab of the locomotive.

(3) At its option, a railroad may fragment the work required by this section. In that event, a separate record shall be maintained under a transparent cover in the cab. The air record shall include: the locomotive number; a list of the air brake components; and the date and place of the inspection and testing of each component. The signature of the person performing the work and the signature of that person's supervisor shall be included for each component. A duplicate record shall be maintained in the railroad's files.

As indicated above, a railroad may fragment the work required by this section. Railroads are required to calibrate the Air Flow Meter (AFM) indicator at a periodic interval not to exceed 92 days. FRA estimates that approximately 22,000 locomotives per year will need to have the AFM calibrated or tested and recorded on the appropriate form on the locomotive. This will occur four times per year (88,000 tests). It is estimated that it will take approximately 60 seconds to conduct the test and record the results on the form. Total annual burden for this requirement is 1,467 hours.

|                             |                         |
|-----------------------------|-------------------------|
| Respondent Universe:        | 779 railroads           |
| Burden time per response:   | 60 seconds              |
| Frequency of Response:      | On Occasion             |
| Annual number of Responses: | 88,000 AFM test/records |
| Annual Burden:              | 1,467 hours             |

**Calculation:** 88,000 AFM test/records x 60 sec. = 1,467 hours

Total annual burden for this entire requirement is 1,467 hours.

Brakes:General 229.46

(a) Before each trip, the railroad shall know the following:

(1) The locomotive brakes and devices for regulating pressures, including but not limited to the automatic and independent brake control systems, operate as intended; and

(2) The water and oil have been drained from the air brake system of all locomotives in the consist.

(b) A locomotive with an inoperative or ineffective automatic or independent brake control system will be considered to be operating as intended for purposes of paragraph (a) of this section, if all of the following conditions are met:

(1) The locomotive is in a trailing position and is not the controlling locomotive in a distributed power train consist;

(2) The railroad has previously determined, in conjunction with the locomotive and/or airbrake manufacturer, that placing such a locomotive in trail mode adequately isolates the non-functional valves so as to allow safe operation of the brake systems from the controlling locomotive;

(3) If deactivation of the circuit breaker for the air brake system is required, it shall be specified in the railroad's operating rules;

(4) A tag shall immediately be placed on the isolation switch of the locomotive giving the date and location and stating that the unit may only be used in a trailing position and may

not be used as a lead or controlling locomotive;

(5) The tag required in paragraph (b)(4) of this section remains attached to the isolation switch of the locomotive until repairs are made; and

(6) The inoperative or ineffective brake control system is repaired prior to or at the next periodic inspection.

FRA estimates that approximately 2,100 locomotives will be affected by this new requirement and thus 2,100 tags will be placed on the isolation switch of the locomotive annually under the above requirement. It is estimated that it will take approximately two (2) minutes to complete each tag and place it on the isolation switch. Total annual burden for this requirement is 70 hours.

|                             |               |
|-----------------------------|---------------|
| Respondent Universe:        | 779 railroads |
| Burden time per response:   | 2 minutes     |
| Frequency of Response:      | On Occasion   |
| Annual number of Responses: | 2,100 tags    |
| Annual Burden:              | 70 hours      |

**Calculation:** 2,100 tags x 2 min. = 70 hours

#### High Voltage Danger: Doors, Cover Plates, or Barriers (229.85)

All doors, cover plates, or barriers providing direct access to high voltage equipment shall be marked "Danger-High Voltage" or with the word "Danger" and the normal voltage carried by the parts so protected.

The required marking is done at the factory. However, there will be instances where the marking will fade and need to be repainted or a new decal affixed. FRA estimates that approximately 1,000 doors, cover plates, or barriers will need to be appropriately marked or have a decal placed each year with the words "Danger-High Voltage" or with the word "Danger" under the above requirement. It is estimated that it will take approximately one (1) minute to complete the repainting/place the decal. Total annual burden for this requirement is 17 hours.

|                             |                           |
|-----------------------------|---------------------------|
| Respondent Universe:        | 779 railroads             |
| Burden time per response:   | 1 minute                  |
| Frequency of Response:      | On Occasion               |
| Annual number of Responses: | 1,000 re-paintings/decals |
| Annual Burden:              | 17 hours                  |

**Calculation:** 1,000 re-paintings/decals x 1 min. = 17 hours

#### Steam Generator Warning Notice (29.113)

Whenever any steam generator has been shut down because of defects, a distinctive warning notice giving reasons for the shut-down must be conspicuously attached near the steam generator starting controls until the necessary repairs have been made. The locomotive in which the steam generator displaying a warning notice is located may continue in service until the next periodic inspection.

*There are currently no steam generators in use. FRA keeps this provision just in case a railroad decides to use one. Consequently, there is no burden associated with this requirement.*

#### Steam Generator Inspections and Tests (229.114)

(a) Periodic steam generator inspection. Except as provided in § 229.33, each steam generator shall be inspected and tested in accordance with paragraph (d) of this section at intervals not to exceed 92 days, unless the steam generator is isolated in accordance with paragraph (b) of this section. All non-complying conditions shall be repaired or the steam generator shall be isolated as prescribed in paragraph (b) of this section before the locomotive is used.

(b) Isolation of a steam generator. A steam generator will be considered isolated if the water suction pipe to the water pump and the leads to the main switch (steam generator switch) are disconnected, and the train line shut-off-valve is wired closed or a blind gasket is applied. Before an isolated steam generator is returned to use, it shall be inspected and tested pursuant to paragraph (d) of this section.

(c) Each periodic steam generator inspection and test shall be recorded on Form FRA F 6180-49A required by paragraph § 229.23. When Form FRA F 6180-49A for the locomotive is replaced, data for the steam generator inspections shall be transferred to the new Form FRA F6180-49A.

(d) Each periodic steam generator inspection and test shall include the following tests and requirements:

(1) All electrical devices and visible insulation shall be inspected.

(2) All automatic controls, alarms and protective devices shall be inspected and tested.

(3) Steam pressure gauges shall be tested by comparison with a dead-weight tester or a test gauge designed for this purpose. The siphons to the steam gauges shall be removed and their connections examined to determine that they are open.

(4) Safety valves shall be set and tested under steam after the steam pressure gauge is tested.

(e) Annual steam generator tests. Each steam generator that is not isolated in accordance with paragraph (b) of this section shall be subjected to a hydrostatic pressure at least 25 percent above the working pressure and the visual return water-flow indicator shall be removed and inspected. The testing under this paragraph shall be performed at intervals that do not exceed 368 calendar days.

*Again, there are currently no steam generators in use. FRA keeps this provision just in case a railroad decides to use one. Consequently, there is no burden associated with this requirement.*

Pilots, Snowplows, End Plates (229.123)

(a) Each lead locomotive shall be equipped with a pilot, snowplow, or end plate that extends across both rails. The minimum clearance above the rail of the pilot, snowplow or end plate shall be three (3) inches. Except as provided in paragraph (b) of this section, the maximum clearance shall be six (6) inches. When the locomotive is equipped with a combination of the equipment listed in this paragraph, each extending across both rails, only the lowest piece of that equipment must satisfy the requirements of this section.

(b) To provide clearance for passing over retarders, locomotives utilized in hump yard or switching service at hump yard locations may have pilot, snowplow, or end plate maximum height of nine (9) inches.

(1) Each locomotive equipped with a pilot, snowplow, or end plate with clearance above 6 inches shall be prominently stenciled at each end of the locomotive with the words “9-inch Maximum End Plate Height, Yard or Trail Service Only.”

(2) When operated in switching service in a leading position, locomotives with a pilot, snowplow, or end plate clearance above six (6) inches shall be limited to 10 miles per hour over grade crossings.

All existing locomotives have this stenciling. FRA estimates that approximately 20 locomotives equipped as described will be appropriately stenciled each year under the above requirement. It is estimated that it will take approximately two (2) minutes to complete each stenciling. Total annual burden for this requirement is one (1) hour.

|                             |                           |
|-----------------------------|---------------------------|
| Respondent Universe:        | 779 railroads             |
| Burden time per response:   | 2 minutes                 |
| Frequency of Response:      | On Occasion               |
| Annual number of Responses: | 20 locomotive stencilings |
| Annual Burden:              | 1 hour                    |

**Calculation:** 20 locomotive stencilings x 2 min. = 1 hour

(3) Train crews shall be notified in writing of the restrictions on the locomotive, by label or stencil in the cab, or by written operating instruction given to the crew and maintained in the cab of the locomotive.

*The burden for this requirement is already covered under that of § 229.9. Consequently, there is no additional burden associated with this requirement.*

(4) Pilot, snowplow, or end plate clearance above six (6) inches shall be noted in the remarks section of Form FRA 6180-49a.

FRA estimates that approximately 20 notations will be completed each year under the above requirement. It is estimated that it will take approximately two (2) minutes to complete each notation. Total annual burden for this requirement is one (1) hour.

|                             |               |
|-----------------------------|---------------|
| Respondent Universe:        | 779 railroads |
| Burden time per response:   | 2 minutes     |
| Frequency of Response:      | On Occasion   |
| Annual number of Responses: | 20 notations  |
| Annual Burden:              | 1 hour        |

**Calculation:** 20 notations x 2 min. = 1 hour

Total annual burden for this entire requirement is two (2) hours (1 + 1).

#### Event Recorders (229.135)

(a) *Duty to equip and record.* Except as provided in paragraphs (c) and (d) of this section, a train operated faster than 30 miles per hour must have an in-service event recorder, of the type described in paragraph (b) of this section, in the lead locomotive. The presence of the event recorder must be noted on Form FRA F6180.49A (by writing the make and model of event recorder with which the locomotive is equipped) under the REMARKS section, except that an event recorder designed to allow the locomotive to assume the lead position only if the recorder is properly functioning is not required to have its presence noted on Form FRA F6180.49A. For the purpose of this section, "train" includes a locomotive or group of locomotives with or without cars. The duty to equip the lead locomotive may be met with an event recorder located elsewhere than the lead locomotive, provided that such event recorder monitors and records the required data as though it were located in the lead locomotive. The event recorder must record the most recent 48 hours of operation of the electrical system of the locomotive on which it is installed.

*The burden for this requirement is included under that of Form FRA F 6180.49A above. Consequently, there is no additional burden associated with this requirement.*

(b) *Equipment requirements.* Event recorders must monitor and record data elements required by this paragraph with at least the accuracy required of the indicators displaying any of the required elements to the engineer. (1) A lead locomotive originally ordered before October 1, 2006, and placed in service before October 1, 2009, including a controlling remote distributed power locomotive, a lead manned helper locomotive, a DMU locomotive, and an MU locomotive, except as provided in paragraphs (c) and (d) of this section, must have an in-service event recorder that records the following data elements: (i) Train speed; (ii) Selected direction of motion; (iii) Time (of day); (iv) Distance; (v) Throttle position; (vi) Applications and operations of the train automatic air brake; (vii) Applications and operations of the independent brake; (viii) Applications and operations of the dynamic brake, if so equipped; and (ix) Cab signal aspect(s), if so equipped and in use. (2) A locomotive originally manufactured before October 1, 2006, and equipped with an event recorder that uses magnetic tape as its recording medium must have the recorder removed from service on or before October 1, 2009, and replaced with an event recorder with a certified crashworthy event recorder memory module that meets the requirements of Appendix D of this part and that records at least the same number of data elements as the recorder it replaces.

*The burden for this requirement is one-time, and has already been fulfilled.*

*Consequently, there is no additional burden associated with this requirement.*

(3) A lead locomotive, a lead manned helper locomotive, and a controlling remotely distributed power locomotive, other than a DMU or MU locomotive, originally ordered on or after October 1, 2006, or placed in service on or after October 1, 2009, must be equipped with an event recorder with a certified crashworthy event recorder memory module that meets the requirements of Appendix D of this part. The certified event recorder memory module must be mounted for its maximum protection. (Although other mounting standards may meet this standard, an event recorder memory module mounted behind and below the top collision posts and above the platform level is deemed to be mounted “for its maximum protection”). The event recorder must record, and the certified crashworthy event recorder memory module must retain, the following data elements: (i) Train speed; (ii) Selected direction of motion; (iii) Time (of day); (iv) Distance; (v) Throttle position; (vi) Applications and operations of the train automatic air brake, including emergency applications. The system must record, or provide a means of determining, that a brake application or release resulted from manipulation of brake controls at the position normally occupied by the locomotive engineer. In the case of a brake application or release that is responsive to a command originating from or executed by an on-board computer (e.g., electronic braking system controller, locomotive electronic control system, or train control computer), the system must record, or provide a means of determining, the involvement of any such computer; (vii) Applications and operations of the independent brake; (viii) Applications and operations of the dynamic brake, if so equipped; (ix) Cab signal aspect(s), if so equipped and in use; (x) End-of-train (EOT) device loss of communication front to rear and rear to front; (xi) Electronic controlled pneumatic braking (ECP) message (and loss of such



message), if so equipped; (xii) EOT armed, emergency brake command, emergency brake application; (xiii) Indication of EOT valve failure; (xiv) EOT brake pipe pressure (EOT and ECP devices); (xv) EOT marker light on/off; (xvi) EOT "low battery" status; (xvii) Position of on/off switch for headlights on lead locomotive; (xviii) Position of on/off switch for auxiliary lights on lead locomotive; (xix) Horn control handle activation; (xx) Locomotive number; (xxi) Locomotive automatic brake valve cut in; (xxii) Locomotive position in consist (lead or trail); (xxiii) Tractive effort; (xxiv) Cruise control on/off, if so equipped and in use; and (xxv) Safety-critical train control data routed to the locomotive engineer's display with which the engineer is required to comply, specifically including text messages conveying mandatory directives, and maximum authorized speed. The format, content, and proposed duration for retention of such data shall be specified in the product safety plan submitted for the train control system under subpart H of part 236 of this chapter, subject to FRA approval under this paragraph. If it can be calibrated against other data required by this part, such train control data may, at the election of the railroad, be retained in a separate certified crashworthy memory module.

*The burden for this requirement is one-time, and has already been fulfilled. Consequently, there is no additional burden associated with this requirement.*

(4) A DMU and an MU locomotive originally ordered on or after October 1, 2006, or placed in service on or after October 1, 2009, must be equipped with an event recorder with a certified crashworthy event recorder memory module that meets the requirements of Appendix D of this part. The certified event recorder memory module must be mounted for its maximum protection. (Although other mounting standards may meet this standard, an event recorder memory module mounted behind and below the top collision posts and above the platform level is deemed to be mounted "for its maximum protection"). The event recorder must record, and the certified crashworthy event recorder memory module must retain, the following data elements: (i) Train speed; (ii) Selected direction of motion; (iii) Time (of day); (iv) Distance; (v) Throttle position; (vi) Applications and operations of the train automatic air brake, including emergency applications. The system must record, or provide a means of determining, that a brake application or release resulted from manipulation of brake controls at the position normally occupied by the locomotive engineer. In the case of a brake application or release that is responsive to a command originating from or executed by an on-board computer (e.g., electronic braking system controller, locomotive electronic control system, or train control computer), the system must record, or provide a means of determining, the involvement of such computer; (vii) Applications and operations of the independent brake, if so equipped; (viii) Applications and operations of the dynamic brake, if so equipped; (ix) Cab signal aspect(s), if so equipped and in use; (x) Emergency brake application(s); (xi) Wheel slip/slide activation (with a property-specific minimum duration); (xii) Lead locomotive headlight activation switch on/off; (xiii) Lead locomotive auxiliary lights activation switch on/off; (xiv) Horn control handle activation; (xv) Locomotive number; (xvi) Locomotive position in consist (lead or trail); (xvii) Tractive effort; (xviii) Brakes apply summary train line; (xix) Brakes released

summary train line; (xx) Cruise control on/off, if so equipped and used; and (xxi) Safety-critical train control data routed to the locomotive engineer's display with which the engineer is required to comply, specifically including text messages conveying mandatory directives, and maximum authorized speed. The format, content, and proposed duration for retention of such data must be specified in the product safety plan submitted for the train control system under subpart H of part 236 of this chapter, subject to FRA approval under this paragraph. If it can be calibrated against other data required by this part, such train control data may, at the election of the railroad, be retained in a separate certified crashworthy memory module.

*The certification for all DMU locomotives has been completed. Consequently, there is no burden associated with this requirement.*

(5) A locomotive equipped with an event recorder that is re-manufactured, as defined in this part, on or after October 1, 2007, must be equipped with an event recorder with a certified crashworthy event recorder memory module that meets the requirements of Appendix D to this part and is capable of recording, at a minimum, the same data as the recorder that was on the locomotive before it was re-manufactured.

*Under this provision, no new certificates are required. The usual practice is to replace memory modules with those whose designs have previously been certified. Consequently, there is no additional burden associated with this requirement.*

(6) An event recorder originally manufactured after January 1, 2010, that is installed on any locomotive identified in paragraph (b)(1) of this section shall be an event recorder with a certified crashworthy event recorder memory module that meets the requirements of Appendix D to this part and that is capable of recording, at a minimum, the same data as the event recorder that was previously on the locomotive.

*Under this provision as well, no new certificates are required. The usual practice is to replace memory modules with those whose designs have previously been certified. Consequently, there is no additional burden associated with this requirement.*

#### Alerters (229.140)

All alerters shall provide an audio alarm upon expiration of the timing cycle interval. An alerter on a locomotive that is placed in service on or after June 10, 2013, shall display a visual indication to the operator at least five seconds prior to the audio alarm. The visual indication on an alerter so equipped must be visible to the operator from their normal position in the cab.

*No record is required to be made or kept under the above provision. Consequently, this is not a paperwork requirement, and there is no burden associated with this requirement.*

#### **SUBPART E – LOCOMOTIVE ELECTRONICS**

Applicability (229.303)

(a) The requirements of this Subpart apply to all safety-critical electronic locomotive control systems, subsystems, and components (i.e.; “products” as defined in § 229.305 of this section), except for the following:

- (1) products that are in service prior to June 8, 2012.
- (2) products that are under development as of October 9, 2012, and are fully developed prior to October 9, 2017.
- (3) products that commingle or interface with safety critical processor based signal and train control systems;
- (4) products that are used during on-track testing within a test facility; and
- (5) products that are used during on-track testing out-side a test facility, if approved by FRA. To obtain FRA approval of on-track testing outside of a test facility, a railroad shall submit a request to FRA that provides: (i) Adequate information regarding the function and history of the product that it intends to use; (ii) The proposed tests; (iii) The date, time and location of the tests; and (iv) The potential safety consequences that will result from operating the product for purposes of testing.

FRA estimates that approximately 20 requests for approval of on-track testing of products outside of a facility with the necessary documentation will be made each year under the above requirement. It is estimated that it will take approximately eight (8) hours to complete each request. Total annual burden for this requirement is 160 hours.

|                             |               |
|-----------------------------|---------------|
| Respondent Universe:        | 779 railroads |
| Burden time per response:   | 8 hours       |
| Frequency of Response:      | On Occasion   |
| Annual number of Responses: | 20 requests   |
| Annual Burden:              | 160 hours     |

**Calculation:** 20 requests x 8 hrs. = 160 hours

(b) Railroads and vendors shall identify all products identified in paragraph (a)(2) of this section by February 9, 2013.

*This timeframe for this provision has expired. Consequently, there is no burden associated with it.*

Total annual burden for this entire requirement is 160 hours.

Safety Analysis (SA) (229.307)

(a) A railroad shall develop a Safety Analysis (SA) for each product subject to this Subpart prior to the initial use of such product on their railroad.

(b) The SA shall:

(1) establish and document the minimum requirements that will govern the development and implementation of all products subject to this Subpart, and be based on good engineering practice and should be consistent with the guidance contained in Appendix F of this Part in order to establish that a product's safety-critical functions will operate with a high degree of confidence in a fail-safe manner;

(2) include procedures for immediate repair of safety-critical functions; and

(3) be made available to FRA upon request.

(c) Each railroad shall comply with the SA requirements and procedures related to the development, implementation, and repair of a product subject to this Subpart.

FRA estimates that approximately 50 safety analyses will be completed by railroads under the above requirement. It is estimated that it will take approximately 240 hours to complete each safety analysis. Total annual burden for this requirement is 12,000 hours.

|                             |                              |
|-----------------------------|------------------------------|
| Respondent Universe:        | 779 railroads                |
| Burden time per response:   | 240 hours                    |
| Frequency of Response:      | On Occasion                  |
| Annual number of Responses: | 50 safety analysis documents |
| Annual Burden:              | 12,000 hours                 |

**Calculation:** 50 safety analysis docs x 240 hrs. = 12,000 hours

#### Safety-Critical Changes (229.309)

(a) Whenever a safety-critical design change is made to a product subject to this Subpart, the railroad shall:

(1) notify FRA's Associate Administrator for Safety of the design changes;

(2) update the SA as required;

*Note: The burden for Safety Analyses (SAs) is included above in § 229.307. Consequently, there is no additional burden associated with it.*

(3) conduct all safety critical changes in a manner that allows the change to be audited;

(4) specify all contractual arrangements with suppliers and private equipment owners for notification of any and all electronic system safety critical changes as well as safety critical failures in their system, subsystem, or components, and the reasons from the suppliers or equipment owners, whether or not the railroad has experienced a failure of that safety critical system, sub-system, or component;

(5) specify the railroad's procedures for action upon notification of a safety-critical change or failure of an electronic system, sub-system, or component, and until the upgrade, patch, or revision has been installed; and

(6) identify all configuration/revision control measures designed to ensure that safety-functional requirements and safety-critical hazard mitigation processes are not compromised as a result of any such change, and that any such change can be audited.

FRA estimates that approximately 10 notifications with the required information will be completed by railroads under the above requirement. It is estimated that it will take approximately 16 hours to complete each notification. Total annual burden for this requirement is 160 hours.

|                             |                  |
|-----------------------------|------------------|
| Respondent Universe:        | 779 railroads    |
| Burden time per response:   | 16 hours         |
| Frequency of Response:      | On Occasion      |
| Annual number of Responses: | 10 notifications |
| Annual Burden:              | 160 hours        |

**Calculation:** 10 notifications x 16 hrs. = 160 hours

(b) Product suppliers and private equipment owners shall report any safety-critical changes and previously unidentified hazards to each railroad using the product.

(c) Private equipment owners shall establish configuration/revision control measures for control of safety critical changes and identification of previously unidentified hazards.

FRA estimates that approximately 30 reports will be completed by product suppliers/private equipment owners under the above requirement. It is estimated that it will take approximately eight (8) hours to complete each report. Total annual burden for this requirement is 240 hours.

|                             |                 |
|-----------------------------|-----------------|
| Respondent Universe:        | 3 Manufacturers |
| Burden time per response:   | 8 hours         |
| Frequency of Response:      | On Occasion     |
| Annual number of Responses: | 30 reports      |

Annual Burden: 240 hours

**Calculation:** 30 reports x 8 hrs. = 240 hours

Total annual burden for this entire requirement is 400 hours (160 + 240).

Review of Safety Analyses (SAs) (229.311)

(a) Prior to the initial planned use of a product subject to this subpart, a railroad must inform the Associate Administrator for Safety, FRA, 1200 New Jersey Avenue SE., Mail Stop 25, Washington, DC 20590, of the intent to place this product in service. The notification must provide a description of the product, and identify the location where the complete Safety Analysis (SA) documentation described in § 229.307 and the training and qualification program described in § 229.319 are maintained.

*Note: The burden for SA documentation is included above under § 229.307 and the burden for the training and qualification program is included below under § 229.319.*

FRA estimates that approximately 50 notifications will be completed by railroads each year under the above requirement. It is estimated that it will take approximately two (2) hours to complete each report. Total annual burden for this requirement is 100 hours.

|                             |                  |
|-----------------------------|------------------|
| Respondent Universe:        | 779 railroads    |
| Burden time per response:   | 2 hours          |
| Frequency of Response:      | On Occasion      |
| Annual number of Responses: | 50 notifications |
| Annual Burden:              | 100 hours        |

**Calculation:** 50 notifications x 2 hrs. = 100 hours

(b) FRA may review and/or audit the SA within 60 days of receipt of the notification or any time after the product is placed in use.

(c) A railroad shall maintain and make available to FRA upon request all documentation used to demonstrate the product meets the safety requirements of the SA for the life-cycle of the product.

FRA estimates that approximately 50 documents per year will be maintained by railroads under the above requirement. It is estimated that it will take approximately two (2) hours to maintain each document. Total annual burden for this requirement is 100 hours.

|                      |               |
|----------------------|---------------|
| Respondent Universe: | 779 railroads |
|----------------------|---------------|

|                             |              |
|-----------------------------|--------------|
| Burden time per response:   | 2 hours      |
| Frequency of Response:      | On Occasion  |
| Annual number of Responses: | 50 documents |
| Annual Burden:              | 100 hours    |

**Calculation:** 50 documents x 2 hrs. = 100 hours

(d) After a product is placed in service, the railroad must maintain a database of all safety relevant hazards encountered with the product. The database must include all hazards identified in the SA and those that had not been previously identified in the SA.

FRA estimates that approximately 50 databases will be maintained by railroads under the above requirement. It is estimated that it will take approximately four (4) hours to maintain each database. Total annual burden for this requirement is 200 hours.

|                             |               |
|-----------------------------|---------------|
| Respondent Universe:        | 779 railroads |
| Burden time per response:   | 4 hours       |
| Frequency of Response:      | On Occasion   |
| Annual number of Responses: | 50 databases  |
| Annual Burden:              | 200 hours     |

**Calculation:** 50 databases x 4 hrs. = 200 hours

(d) (Continued) If the frequency of the safety-relevant hazards exceeds the threshold set forth in the SA, then the railroad must:

(1) Report the inconsistency by mail, facsimile, e-mail, or hand delivery to the Director, Office of Safety Assurance and Compliance, FRA, 1200 New Jersey Avenue SE., Mail Stop 25, Washington, DC 20590, within 15 days of discovery;

FRA estimates that approximately 10 written reports will be completed by railroads under the above requirement. It is estimated that it will take approximately two (2) hours to complete each report. Total annual burden for this requirement is 20 hours.

|                             |                    |
|-----------------------------|--------------------|
| Respondent Universe:        | 779 railroads      |
| Burden time per response:   | 2 hours            |
| Frequency of Response:      | On Occasion        |
| Annual number of Responses: | 10 written reports |
| Annual Burden:              | 20 hours           |

**Calculation:** 10 written reports x 2 hrs. = 20 hours

(2) Take immediate countermeasures to reduce the frequency of the safety-relevant



hazard(s) below the threshold set forth in the SA; and

(3) Provide a final report to the FRA, Director, Office of Safety Assurance and Compliance, on the results of the analysis and countermeasures taken to reduce the frequency of the safety relevant hazard(s) below the calculated probability of failure threshold set forth in the SA when the problem is resolved. For hazards not identified in the SA, the threshold shall be exceeded at one occurrence.

FRA estimates that approximately 10 written final reports will be completed by railroads under the above requirement. It is estimated that it will take approximately four (4) hours to complete each final report. Total annual burden for this requirement is 40 hours.

|                             |                          |
|-----------------------------|--------------------------|
| Respondent Universe:        | 779 railroads            |
| Burden time per response:   | 4 hours                  |
| Frequency of Response:      | On Occasion              |
| Annual number of Responses: | 10 written final reports |
| Annual Burden:              | 40 hours                 |

**Calculation:** 10 written final reports x 4 hrs. = 40 hours

Total annual burden for this entire requirement is 460 hours (100 + 100 + 200 + 20 + 40).

#### Product Testing Results and Records (229.313)

(a) Results of product testing conducted in accordance with this Subpart shall be recorded on preprinted forms provided by the railroad, or stored electronically. Electronic record keeping or automated tracking systems, subject to the provisions contained in paragraph (e) of this section, may be utilized to store and maintain any testing or training record required by this Subpart.

(b) The testing records shall contain all of the following: (1) the name of the railroad;

(2) the location and date that the test was conducted; (3) the equipment tested; (4) the results of tests; (5) the repairs or replacement of equipment; (6) any preventative adjustments made; and (7) the condition in which the equipment is left.

(c) Each record shall be: (1) signed by the employee conducting the test, or electronically coded, or identified by the automated test equipment number; (2) filed in the office of a supervisory official having jurisdiction, unless otherwise noted; and (3) available for inspection and copying by FRA.

(d) The results of the testing conducted in accordance with this Subpart must be retained as follows: (1) The results of tests that pertain to installation or modification of a product

must be retained for the life-cycle of the product tested and may be kept in any office designated by the railroad; (2) The results of periodic tests required for the maintenance or repair of the product tested must be retained until the next record is filed and in no case less than one year; (3) The results of all other tests and training must be retained until the next record is filed and in no case less than one year.

(e) Electronic or automated tracking systems used to meet the requirements contained in paragraph (a) of this section shall be capable of being reviewed and monitored by FRA at any time to ensure the integrity of the system. FRA's Associate Administrator for Safety may prohibit or revoke a railroad's authority to utilize an electronic or automated tracking system in lieu of preprinted forms if FRA finds that the electronic or automated tracking system is not properly secured, is inaccessible to FRA, FRA-certified State inspectors, or railroad employees requiring access to discharge their assigned duties, or fails to adequately track and monitor the equipment. The Associate Administrator for Safety will provide the affected railroad with a written statement of the basis for the decision prohibiting or revoking the railroad from utilizing an electronic or automated tracking system.

FRA estimates that approximately 120,000 product tests and corresponding records will be completed by railroads under the above requirement. It is estimated that it will take approximately five (5) minutes to conduct the product test and complete the required record. Total annual burden for this requirement is 10,000 hours.

|                             |                                 |
|-----------------------------|---------------------------------|
| Respondent Universe:        | 779 railroads                   |
| Burden time per response:   | 5 minutes                       |
| Frequency of Response:      | On Occasion                     |
| Annual number of Responses: | 120,000 product testing records |
| Annual Burden:              | 10,000 hours                    |

**Calculation:** 120,000 product testing records x 5 min. = 10,000 hours

#### Operations and Maintenance Manual (229.315)

(a) The railroad shall maintain all documents pertaining to the installation, maintenance, repair, modification, inspection, and testing of a product subject to this Part in one Operations and Maintenance Manual (OMM).

(1) The OMM shall be legible and shall be readily available to persons who conduct the installation, maintenance, repair, modification, inspection, and testing, and for inspection by FRA.

(2) At a minimum, the OMM shall contain all product vendor operation and maintenance guidance.

(b) The OMM shall contain the plans and detailed information necessary for the proper maintenance, repair, inspection, and testing of products subject to this Subpart. The plans shall identify all software versions, revisions, and revision dates.

FRA estimates that approximately 45 new and approximately 255 updated Operations and Maintenance Manuals (Manual) will be kept by railroads under the above requirement. It is estimated that it will take approximately 40 hours to put together each new manual and approximately five (5) hours to put together each updated manual to conform to the above requirements. Total annual burden for this requirement is 3,075 hours.

|                             |                    |
|-----------------------------|--------------------|
| Respondent Universe:        | 779 railroads      |
| Burden time per response:   | 40 hours + 5 hours |
| Frequency of Response:      | On Occasion        |
| Annual number of Responses: | 300 Manuals        |
| Annual Burden:              | 3,075 hours        |

**Calculation:** 45 new manuals x 40 hrs. + 255 updated manuals x 5 hrs. = 3,075 hours

(c) Hardware, software, and firmware revisions shall be documented in the OMM according to the railroad's configuration management control plan.

FRA estimates that approximately 45 new configuration management control plans and 255 updated configuration management control plans will be developed/kept by railroads under the above requirement. It is estimated that it will take approximately eight (8) hours to complete each new configuration management control plan and approximately two (2) hours to complete each updated configuration management control plan. Total annual burden for this requirement is 870 hours.

|                             |                                      |
|-----------------------------|--------------------------------------|
| Respondent Universe:        | 779 railroads                        |
| Burden time per response:   | 8 hours                              |
| Frequency of Response:      | On Occasion                          |
| Annual number of Responses: | 300 configuration mgt. control plans |
| Annual Burden:              | 870 hours                            |

**Calculation:** 45 new config. mgt. control plans x 8 hrs. + 255 updated config. mgt control plans x 2 hrs. = 870 hours

(d) Safety-critical components, including spare products, shall be positively identified, handled, replaced, and repaired in accordance with the procedures specified in the railroad's configuration management control plan.

(e) A railroad shall determine that the requirements of this section have been met prior to placing a product subject to this subpart in use on their property.

FRA estimates that approximately 60,000 safety-critical components will be identified under the above requirement. It is estimated that it will take approximately five (5) minutes to identify each safety-critical component. Total annual burden for this requirement is 5,000 hours.

|                             |                        |
|-----------------------------|------------------------|
| Respondent Universe:        | 779 railroads          |
| Burden time per response:   | 5 minutes              |
| Frequency of Response:      | On Occasion            |
| Annual number of Responses: | 60,000 i.d. components |
| Annual Burden:              | 5,000 hours            |

**Calculation:** 60,000 i.d. components x 5 min. = 5,000 hours

Total annual burden for this entire requirement is 8,945 hours (3,075 + 870 + 5,000).

Training and Qualification Program (229.317)

(a) A railroad shall establish and implement training and qualification program for products subject to this Subpart. These programs shall meet the requirements set forth in this section and in § 229.319.

FRA estimates that approximately 300 training and qualification programs will be established and implemented under the above requirement. It is estimated that it will take approximately 40 hours to develop each training and qualification program. Total annual burden for this requirement is 12,000 hours.

|                             |               |
|-----------------------------|---------------|
| Respondent Universe:        | 779 railroads |
| Burden time per response:   | 40 hours      |
| Frequency of Response:      | On Occasion   |
| Annual number of Responses: | 300 programs  |
| Annual Burden:              | 12,000 hours  |

**Calculation:** 300 programs x 40 hrs. = 12,000 hours

(b) The program shall provide training for the individuals identified in this paragraph to ensure that they possess the necessary knowledge and skills to effectively complete their duties related to the product. These include:

(1) individuals whose duties include installing, maintaining, repairing, modifying, inspecting, and testing safety-critical elements of the product;

(2) individuals who operate trains or serve as a train or engine crew member subject to instruction and testing under Part 217 of this chapter;

(3) roadway and maintenance-of-way workers whose duties require them to know and understand how the product affects their safety and how to avoid interfering with its proper functioning; and

(4) direct supervisors of the individuals identified in paragraphs (b)(1) through (b)(3) of this section.

FRA estimates that approximately 10,000 specified railroad employees will be trained under the above requirement. It is estimated that it will take approximately 30 minutes to train each individual. Total annual burden for this requirement is 5,000 hours.

|                             |                                   |
|-----------------------------|-----------------------------------|
| Respondent Universe:        | 779 railroads                     |
| Burden time per response:   | 30 minutes                        |
| Frequency of Response:      | On Occasion                       |
| Annual number of Responses: | 10,000 trained railroad employees |
| Annual Burden:              | 5,000 hours                       |

**Calculation:** 10,000 trained employees x 30 min. = 5,000 hours

(c) When developing the training and qualification program required in this section, a railroad shall conduct a formal task analysis. The task analysis must:

(1) identify the specific goals of the program for each target population (craft, experience level, scope of work, etc.), task(s), and desired success rate;

(2) identify the installation, maintenance, repair, modification, inspection, testing, and operating tasks that will be performed on the railroad's products, including but not limited to the development of failure scenarios and the actions expected under such scenarios;

(3) develop written procedures for the performance of the tasks identified; and

(4) identify any the additional knowledge, skills, and abilities above those required for basic job performance necessary to perform each task.

*The burden for this requirement is included in the burden of the training and qualification program under § 229.317(a) above. Consequently, there is no additional*

*burden associated with this requirement.*

(d) Based on the task analysis, a railroad shall develop a training curriculum that includes formally structured training designed to impart the knowledge, skills, and abilities identified as necessary to perform each task.

*The burden for this requirement is included in the burden of the training and qualification program under § 229.317(a) above. Consequently, there is no additional burden associated with this requirement.*

(e) All individuals identified in paragraph (b) of this section shall successfully complete a training curriculum and pass an examination that covers the product and appropriate rules and tasks for which they are responsible (however, such persons may perform such tasks under the direct onsite supervision of a qualified person prior to completing such training and passing the examination);

*The burden for this requirement is included in the burden for that pertaining to trained railroad employees under § 229.317(b) above. Consequently, there is no additional burden associated with this requirement.*

(f) A railroad shall conduct periodic refresher training at intervals to be formally specified in the program, except with respect to basic skills for which proficiency is known to remain high as a result of frequent repetition of the task.

FRA estimates that the necessary periodic refreshed training will occur every three years and that approximately 3,000 specified railroad employees will be trained under the above requirement. Thus, 1,000 employees will be trained each year. It is estimated that it will take approximately 20 minutes to retrain each individual. Total annual burden for this requirement is 333 hours.

|                             |                                    |
|-----------------------------|------------------------------------|
| Respondent Universe:        | 779 railroads                      |
| Burden time per response:   | 20 minutes                         |
| Frequency of Response:      | Triennially                        |
| Annual number of Responses: | 1,000 retrained railroad employees |
| Annual Burden:              | 333 hours                          |

**Calculation:** 1,000 retrained employees x 20 min. = 333 hours

(g) A railroad shall conduct regular and periodic evaluations of the effectiveness of the training program, verifying the adequacy of the training material and its validity with respect to the railroad's products and operations.

FRA estimates that approximately 300 evaluations of the effectiveness of their training

programs will be conducted annually by railroads under the above requirement. It is estimated that it will take approximately four (4) hours to conduct each evaluation. Total annual burden for this requirement is 1,200 hours.

|                             |                 |
|-----------------------------|-----------------|
| Respondent Universe:        | 779 railroads   |
| Burden time per response:   | 4 hours         |
| Frequency of Response:      | Annually        |
| Annual number of Responses: | 300 evaluations |
| Annual Burden:              | 1,200 hours     |

**Calculation:** 300 evaluations x 4 hrs. = 1,200 hours

(h) A railroad shall maintain records that designate individuals who are qualified under this section until new designations are recorded or for at least one year after such persons leave applicable service. These records shall be maintained in a designated location and be available for inspection and replication by FRA and FRA-certified State inspectors. FRA estimates that approximately 10,000 records designating qualified individuals will be kept under the above requirement. It is estimated that it will take approximately 10 minutes to keep each record. Total annual burden for this requirement is 1,667 hours.

|                             |                |
|-----------------------------|----------------|
| Respondent Universe:        | 779 railroads  |
| Burden time per response:   | 20 minutes     |
| Frequency of Response:      | On occasion    |
| Annual number of Responses: | 10,000 records |
| Annual Burden:              | 1,667 hours    |

**Calculation:** 10,000 records x 10 min. = 1,667 hours

Total annual burden for this entire requirement is 1,667 hours (12,000 + 5,000 + 333 + 1,200 + 1,667)

#### Operating Personnel Training (229.319)

(a) The training required under § 229.317 shall address all of the following elements for any locomotive engineer or other person who participates in the operation of a train using an onboard electronic locomotive control system and shall be specified in the training program:

(1) Familiarization with the electronic control system equipment onboard the locomotive and the functioning of that equipment as part of the system and in relation to other onboard systems under that person's control;

- (2) Any actions required of the operating personnel to enable or enter data into the system and the role of that function in the safe operation of the train;
- (3) Sequencing of interventions by the system, including notification, enforcement, penalty initiation and post penalty application procedures as applicable;
- (4) Railroad operating rules applicable to control systems, including provisions for movement and protection of any unequipped trains, or trains with failed or cut-out controls;
- (5) Means to detect deviations from proper functioning of onboard electronic control system equipment and instructions explaining the proper response to be taken regarding control of the train and notification of designated railroad personnel; and,
- (6) Information needed to prevent unintentional interference with the proper functioning of onboard electronic control equipment.

*The burden for training programs is included above. The burden for other persons who participate in the operation of a train using an onboard electronic locomotive control (conductors) will be included under that for Part 240 (Qualifications for Locomotive Engineers/Conductors (OMB No. 2130-0533) at the time that this final rule becomes effective. Consequently, there is no additional burden associated with this requirement.*

(b) The training required under this Subpart for a locomotive engineer, together with required records, shall be integrated into the program of training required by Part 240 of this chapter.

*The burden for this requirement will be included under that for the Qualifications for Locomotive Engineers (OMB No. 2130-0533) at the time that this final rule becomes effective. Consequently, there is no additional burden associated with this requirement.*

#### **APPENDIX D TO PART 229 – CRITERIA FOR CERTIFICATION OF CRASHWORTHY EVENT RECORDER MEMORY MODULE**

Section 229.135(b) requires that certain locomotives be equipped with an event recorder that includes a certified crashworthy event recorder memory module (ERMM). This appendix prescribes the requirements for certifying an event recorder memory module as crashworthy, including the performance criteria and test sequence for establishing the crashworthiness of the ERMM as well as the marking of the event recorder containing the crashworthy ERMM.

##### **A. General Requirements**



(1) Each manufacturer that represents its ERMM as crashworthy must, by marking it as specified in Section B of this appendix, certify that the ERMM meets the performance criteria contained in this appendix and that test verification data are available to a railroad or to FRA upon request; (2) The test verification data must contain, at a minimum, all pertinent original data logs and documentation that the test sample preparation, test set up, test measuring devices and test procedures were performed by designated, qualified personnel using recognized and acceptable practices. Test verification data must be retained by the manufacturer or its successor for as long as the specific model of ERMM remains in service on any locomotive; (3) A crashworthy ERMM must be marked by its manufacturer as specified in Section B of this appendix.

*The burden for this requirement is included under § 229.135(b) above. Consequently, there is no additional burden associated with this requirement.*

#### B. Marking Requirements

(1) The outer surface of the event recorder containing a certified crashworthy ERMM must be colored international orange. In addition, the outer surface must be inscribed, on the surface allowing the most visible area, in black letters on an international orange background, using the largest type size that can be accommodated, with the words **CERTIFIED DOT CRASHWORTHY**, followed by the ERMM model number (or other such designation), and the name of the person manufacturing the event recorder. The information may be displayed as shown in this section of Appendix D. Marking “CERTIFIED DOT CRASHWORTHY” on an event recorder designed for installation in a railroad locomotive is the certification that all performance criteria contained in this appendix have been met and all functions performed by, or on behalf of, the manufacturer whose name appears as part of the marking, conform to the requirements specified in this appendix; (2) Retro-reflective material must be applied to the edges of each visible external surface of an event recorder containing a certified crashworthy event recorder memory module (ERMM).

*The burden for this requirement is included under § 229.135(b) above. Consequently, there is no additional burden associated with this requirement.*

#### C. Performance Requirements

An ERMM is crashworthy if it has been successfully tested for survival under conditions of fire, impact shock, static crush, fluid immersion, and hydro-static pressure contained in one of the two tables shown in this section of Appendix D. (See Tables 1 and 2.) Each ERMM must meet the individual performance criteria in the sequence established in Section D of this appendix. A performance criterion is deemed to be met if, after undergoing a test established in this Appendix D for that criterion, the ERMM has preserved all of the data stored in it. The data set stored in the ERMM to be tested shall

include all the recording elements required by § 229.135(b). The following tables describe alternative performance criteria that may be used when testing an ERMM's crashworthiness. A manufacturer may utilize either table during its testing but may not combine the criteria contained in the two tables listed in this section (Section C of Appendix D).

*The burden for this requirement is included under § 229.135(b) above. Consequently, there is no additional burden associated with this requirement.*

#### D Testing Exception

If a new model ERMM represents an evolution or upgrade from an older model ERMM that was previously tested and certified as meeting the performance criteria contained in Section C of this appendix, the new model ERMM need only be tested for compliance with those performance criteria contained in Section C of this appendix that are potentially affected by the upgrade or modification. FRA will consider a performance criterion not to be potentially affected if a preliminary engineering analysis or other pertinent data establishes that the modification or upgrade will not change the performance of the older model ERMM against the performance criterion in question. The manufacturer shall retain and make available to FRA upon request any analysis or data relied upon to satisfy the requirements of this paragraph to sustain an exception from testing.

*The burden for this requirement is included under § 229.135(b) above. Consequently, there is no additional burden associated with this requirement.*

## **APPENDIX F TO PART 229 – RECOMMENDED PRACTICES FOR DESIGN AND SAFETY ANALYSIS**

### **Safety Assessments – Recommended Contents**

The safety-critical assessment of each product should include all of its interconnected subsystems and components and, where applicable, the interaction between such subsystems. FRA recommends that such assessments contain the following:

- (a) A complete description of the product, including a list of all product components and their physical relationship in the subsystem or system;
- (b) A description of the railroad operation or categories of operations on which the product is designed to be used;
- (c) An operational concepts document, including a complete description of the product functionality and information flows;

(d) A safety requirements document, including a list with complete descriptions of all functions, which the product performs to enhance or preserve safety, and that describes the manner in which product architecture satisfies safety requirements;

(e) A hazard log consisting of a comprehensive description of all safety relevant hazards addressed during the life cycle of the product, including maximum threshold limits for each hazard (for unidentified hazards, the threshold shall be exceeded at one occurrence);

(1) The analysis should document any assumptions regarding the reliability or availability of mechanical, electric, or electronic components. Such assumptions include MTTF projections, as well as Mean Time to Repair (MTTR) projections, unless the risk assessment specifically explains why these assumptions are not relevant to the risk assessment. The analysis should document these assumptions in such a form as to permit later automated comparisons with in-service experience (e.g., a spreadsheet). The analysis should also document any assumptions regarding human performance. The documentation should be in a form that facilitates later comparisons with in-service experience.

(2) The analysis should also document any assumptions regarding software defects. These assumptions should be in a form which permits the railroad to project the likelihood of detecting an in-service software defect and later automated comparisons with in-service experience.

(3) The analysis should document all of the identified safety-critical fault paths. The documentation should be in a form that facilitates later comparisons with in-service faults.

(f) A risk assessment.

(1) The risk metric for the proposed product should describe with a high degree of confidence the accumulated risk of a locomotive control system that operates over a life-cycle of 25 years or greater. Each risk metric for the proposed product should be expressed with an upper bound, as estimated with a sensitivity analysis, and the risk value selected is demonstrated to have a high degree of confidence.

(2) Each risk calculation should consider the totality of the locomotive control system and its method of operation. The failure modes of each subsystem or component, or both, should be determined for the integrated hardware/ software (where applicable) as a function of the Mean Time to Hazardous Events (MTTHE), failure restoration rates, and the integrated hardware/software coverage of all processor based subsystems or components, or both. Train operating and movement rules, along with components that are layered in order to enhance safety-critical behavior, should also be considered.

(3) An MTTHE value should be calculated for each subsystem or component, or both, indicating the safety-critical behavior of the integrated hardware/software subsystem or component, or both. The human factor impact should be included in the assessment, whenever applicable, to provide an integrated MTTHE value. The MTTHE calculation should consider the rates of failures caused by permanent, transient, and intermittent faults accounting for the fault coverage of the integrated hardware/software subsystem or component, phased-interval maintenance, and restoration of the detected failures.

(4) MTTHE compliance verification and validation should be based on the assessment of the design for verification and validation process, historical performance data, analytical methods and experimental safety critical performance testing performed on the subsystem or component. The compliance process shall be demonstrated to be compliant and consistent with the MTTHE metric and demonstrated to have a high degree of confidence.

(5) The safety-critical behavior of all non-processor based components, which are part of a processor-based system or subsystem, should be quantified with an MTTHE metric. The MTTHE assessment methodology should consider failures caused by permanent, transient, and intermittent faults, phase interval maintenance and restoration of failures and the effect of fault coverage of each non-processor-based subsystem or component. The MTTHE compliance verification and validation should be based on the assessment of the design for verification and validation process, historical performance data, analytical methods and experimental safety critical performance testing performed on the subsystem or component. The non-processor based quantification compliance should also be demonstrated to have a high degree of confidence.

(g) A hazard mitigation analysis, including a complete and comprehensive description of all hazards to be addressed in the system design and development, mitigation techniques used, and system safety precedence followed;

(h) A complete description of the safety assessment and verification and validation processes applied to the product and the results of these processes;

(i) A complete description of the safety assurance concepts used in the product design, including an explanation of the design principles and assumptions; the designer should address each of the following safety considerations when designing and demonstrating the safety of products covered by this Part. In the event that any of these principles are not followed, the analysis should describe both the reason(s) for departure and the alternative(s) utilized to mitigate or eliminate the hazards associated with the design principle not followed.

(1) *Normal operation.* The system (including all hardware and software) should demonstrate safe operation with no hardware failures under normal anticipated operating conditions with proper inputs and within the expected range of environmental conditions. All safety-critical functions should be performed properly under these normal conditions. Absence of specific operator actions or procedures will not prevent the system from operating safely. There should be no hazards that are categorized as unacceptable or undesirable. Hazards categorized as unacceptable should be eliminated by design.

(2) *Systematic failure.* It should be shown how the product is designed to mitigate or eliminate unsafe systematic failures—those conditions which can be attributed to human error that could occur at various stages throughout product development. This includes unsafe errors in the software due to human error in the software specification, design or coding phases, or both; human errors that could impact hardware design; unsafe conditions that could occur because of an improperly designed human-machine interface; installation and maintenance errors; and errors associated with making modifications.

(3) *Random failure.* The product should be shown to operate safely under conditions of random hardware failure. This includes single as well as multiple hardware failures, particularly in instances where one or more failures could occur, remain undetected (latent) and react in combination with a subsequent failure at a later time to cause an unsafe operating situation. In instances involving a latent failure, a subsequent failure is similar to there being a single failure. In the event of a transient failure, and if so designed, the system should restart itself if it is safe to do so. Frequency of attempted restarts should be considered in the hazard analysis. There should be no single point failures in the product that can result in hazards categorized as unacceptable or undesirable. Occurrence of credible single point failures that can result in hazards shall be detected and the product should achieve a known safe state before falsely activating any physical appliance. If one non-self-revealing failure combined with a second failure can cause a hazard that is categorized as unacceptable or undesirable, then the second failure should be detected and the product should achieve a known safe state before falsely activating any physical appliance.

(4) *Common Mode failure.* Another concern of multiple failures involves common mode failure in which two or more subsystems or components intended to compensate one another to perform the same function all fail by the same mode and result in unsafe conditions. This is of particular concern in instances in which two or more elements (hardware or software, or both) are used in combination to ensure safety. If a common mode failure exists, then any analysis cannot rely on the assumption that failures are independent. Examples include: the use of redundancy in which two or more elements perform a given function in parallel and when one (hardware or software) element checks/monitors another element (of hardware or software) to help ensure its safe operation. Common mode failure relates to independence, which shall be ensured in these instances. When dealing with the effects of hardware failure, the designer should

address the effects of the failure not only on other hardware, but also on the execution of the software, since hardware failures can greatly affect how the software operates.

(5) *External influences*. The product should operate safely when subjected to different external influences, including:

(i) Electrical influences such as power supply anomalies/transients, abnormal/improper input conditions (e.g., outside of normal range inputs relative to amplitude and frequency, unusual combinations of inputs) including those related to a human operator, and others such as electromagnetic interference or electrostatic discharges, or both;

(ii) Mechanical influences such as vibration and shock; and Climatic conditions such as temperature and humidity.

(6) *Modifications*. Safety must be ensured following modifications to the hardware or software, or both. All or some of the concerns previously identified may be applicable depending upon the nature and extent of the modifications.

(7) *Software*. Software faults should not cause hazards categorized as unacceptable or undesirable.

(8) *Closed Loop Principle*. The product design should require positive action to be taken in a prescribed manner to either begin product operation or continue product operation.

(j) A human factors analysis, including a complete description of all human-machine interfaces, a complete description of all functions performed by humans in connection with the product to enhance or preserve safety, and an analysis of the physical ergonomics of the product on the operators and the safe operation of the system;

(k) A complete description of the specific training of railroad and contractor employees and supervisors necessary to ensure the safe and proper installation, implementation, operation, maintenance, repair, inspection, testing, and modification of the product;

(l) A complete description of the specific procedures and test equipment necessary to ensure the safe and proper installation, implementation, operation, maintenance, repair, inspection, test, and modification of the product. These procedures, including calibration requirements, should be consistent with or explain deviations from the equipment manufacturer's recommendations;

(m) A complete description of the necessary security measures for the product over its life-cycle;

- (n) A complete description of each warning to be placed in the Operations and Maintenance Manual and of all warning labels required to be placed on equipment as necessary to ensure safety;
- (o) A complete description of all initial implementation testing procedures necessary to establish that safety-functional requirements are met and safety-critical hazards are appropriately mitigated;
- (p) A complete description of all post-implementation testing (validation) and monitoring procedures, including the intervals necessary to establish that safety-functional requirements, safety-critical hazard mitigation processes, and safety-critical tolerances are not compromised over time, through use, or after maintenance (repair, replacement, adjustment) is performed; and
- (q) A complete description of each record necessary to ensure the safety of the system that is associated with periodic maintenance, inspections, tests, repairs, replacements, adjustments, and the system's resulting conditions, including records of component failures resulting in safety relevant hazards;
- (r) A complete description of any safety-critical assumptions regarding availability of the product, and a complete description of all backup methods of operation; and
- (s) The configuration/revision control measures designed to ensure that safety-functional requirements and safety-critical hazard mitigation processes are not compromised as a result of any change. Changes classified as maintenance require validation.

*The burden for this entire requirement is included under § 229.307 above. Consequently, there is no additional burden associated with this requirement.*

### **Guidance Regarding the Application of Human Factors in the Design of Products**

The product design should sufficiently incorporate human factors engineering that is appropriate to the complexity of the product; the gender, educational, mental, and physical capabilities of the intended operators and maintainers; the degree of required human interaction with the component; and the environment in which the product will be used. HMI design criteria minimize negative safety effects by causing designers to consider human factors in the development of HMIs. As used in this discussion, “designer” means anyone who specifies requirements for—or designs a system or subsystem, or both, for—a product subject to this part, and “operator” means any human who is intended to receive information from, provide information to, or perform repairs or maintenance on a safety critical locomotive control product subject to this part.

I. FRA recommends that system designers should:

- (a) Design systems that anticipate possible user errors and include capabilities to catch errors before they propagate through the system;
- (b) Conduct cognitive task analyses prior to designing the system to better understand the information processing requirements of operators when making critical decisions;
- (c) Present information that accurately represents or predicts system states; and
- (d) Ensure that electronics equipment radio frequency emissions are compliant with appropriate Federal Communications Commission (FCC) regulations. The FCC rules and regulations are codified in Title 47 of the Code of Federal Regulations (CFR).

II. Human factors issues designers should consider with regard to the general functioning of a system include:

(a) *Reduced situational awareness and over-reliance.* HMI design shall give an operator active functions to perform, feedback on the results of the operator's actions, and information on the automatic functions of the system as well as its performance. The operator shall be "in-the loop." Designers should consider at minimum the following methods of maintaining an active role for human operators:

- (1) The system should require an operator to initiate action to operate the train and require an operator to remain "in-the-loop" for at least 30 minutes at a time;
- (2) The system should provide timely feedback to an operator regarding the system's automated actions, the reasons for such actions, and the effects of the operator's manual actions on the system;
- (3) The system should warn operators in advance when they require an operator to take action;
- (4) HMI design should equalize an operator's workload; and
- (5) HMI design should not distract from the operator's safety related duties.

(b) *Expectation of predictability and consistency in product behavior and communications.* HMI design should accommodate an operator's expectation of logical and consistent relationships between actions and results. Similar objects should behave consistently when an operator performs the same action upon them. End users have a limited memory and ability to process information. Therefore, HMI design should also minimize an operator's information processing load.



(1) To minimize information processing load, the designer should: (i) Present integrated information that directly supports the variety and types of decisions that an operator makes; (ii) Provide information in a format or representation that minimizes the time required to understand and act; and (iii) Conduct utility tests of decision aids to establish clear benefits such as processing time saved or improved quality of decisions.

(2) To minimize short-term memory load, the designer should integrate data or information from multiple sources into a single format or representation (“chunking”) and design so that three or fewer “chunks” of information need to be remembered at any one time. To minimize long-term memory load, the designer should design to support recognition memory, design memory aids to minimize the amount of information that should be recalled from unaided memory when making critical decisions, and promote active processing of the information.

(3) When creating displays and controls, the designer shall consider user ergonomics and should: (i) Locate displays as close as possible to the controls that affect them; (ii) Locate displays and controls based on an operator’s position; (iii) Arrange controls to minimize the need for the operator to change position; (iv) Arrange controls according to their expected order of use; (v) Group similar controls together; (vi) Design for high stimulus-response compatibility (geometric and conceptual); (vii) Design safety-critical controls to require more than one positive action to activate (e.g., auto stick shift requires two movements to go into reverse); (viii) Design controls to allow easy recovery from error; and (ix) Design display and controls to reflect specific gender and physical limitations of the intended operators.

(4) Detailed locomotive ergonomics human machine interface guidance may be found in “Human Factors Guidelines for Locomotive Cabs” (FRA/ORD-98/03 or DOT-VNTSC-FRA-98-8)

(5) The designer should also address information management. To that end, HMI design should: (i) Display information in a manner which emphasizes its relative importance; (ii) Comply with the ANSI/HFS 100–1988 standard; (iii) Utilize a display luminance that has a difference of at least 35cd/m<sup>2</sup> between the foreground and background (the displays should be capable of a minimum contrast 3:1 with 7:1 preferred, and controls should be provided to adjust the brightness level and contrast level); (iv) Display only the information necessary to the user; (v) Where text is needed, use short, simple sentences or phrases with wording that an operator will understand and appropriate to the educational and cognitive capabilities of the intended operator; (vi) Use complete words where possible; where abbreviations are necessary, choose a commonly accepted abbreviation or consistent method and select commonly used terms and words that the operator will understand; (vii) Adopt a consistent format for all display screens by placing each design element in a consistent and specified location; (viii) Display critical information in the center of the operator’s field of view by placing items that need to be

found quickly in the upper left hand corner and items which are not time-critical in the lower right hand corner of the field of view; (ix) Group items that belong together; (x) Design all visual displays to meet human performance criteria under monochrome conditions and add color only if it will help the user in performing a task, and use color coding as a redundant coding technique; (xi) Limit the number of colors over a group of displays to no more than seven; (xii) Design warnings to match the level of risk or danger with the alerting nature of the signal; and (xiii) With respect to information entry, avoid full QWERTY keyboards for data entry.

(6) With respect to problem management, the HMI designer should ensure that the HMI design: (i) enhances an operator's situation awareness; (ii) supports response selection and scheduling; and (iii) supports contingency planning.

(7) Designers should comply with FCC requirements for Maximum Permissible Exposure limits for field strength and power density for the transmitters operating at frequencies of 300 kHz to 100 GHz and specific absorption rate (SAR) limits for devices operating within close proximity to the body. The Commission's requirements are detailed in Parts 1 and 2 of the FCC's Rules and Regulations [47 CFR 1.1307(b), 1.1310, 2.1091, 2.1093]. The FCC has a number of bulletins and supplements that offer guidelines and suggestions for evaluating compliance. These documents are not intended to establish mandatory procedures, other methods and procedures may be acceptable if based on sound engineering practice.

*The burden for this entire requirement is included under § 229.307 above. Consequently, there is no additional burden associated with this requirement.*

### **Guidance for Verification and Validation of Products**

The goal of this assessment is to provide an evaluation of the product manufacturer's utilization of safety design practices during the product's development and testing phases, as required by the applicable railroad's requirements, the requirements of this part, and any other previously agreed-upon controlling documents or standards. The standards employed for verification or validation, or both, of products shall be sufficient to support achievement of the applicable requirements of this part.

(a) The latest version of the following standards have been recognized by FRA as providing appropriate risk analysis processes for incorporation into verification and validation standards.

(1) U.S. Department of Defense Military Standard (MIL-STD) 882C, "System Safety Program Requirements" (January 19, 1993),

(2) CENELEC Standards as follows:

- (i) EN50126: 1999, Railway Applications: Specification and Demonstration of Reliability, Availability, Maintainability and Safety (RAMS);
  - (ii) EN50128 (May 2001), Railway Applications: Software for Railway Control and Protection Systems;
  - (iii) EN50129: 2003, Railway Applications: Communications, Signaling, and Processing Systems-Safety Related Electronic Systems for Signaling; and
  - (iv) EN50155:2001/A1:2002, Railway Applications: Electronic Equipment Used in Rolling Stock.
- (3) ATCS Specification 140, Recommended Practices for Safety and Systems Assurance.
- (4) ATCS Specification 130, Software Quality Assurance.
- (5) Safety of High Speed Ground Transportation Systems. Analytical Methodology for Safety Validation of Computer Controlled Subsystems. Volume II: Development of a Safety Validation Methodology. Final Report September 1995. Author: Jonathan F. Luedeke, Battelle. DOT/FRA/ORD-95/10.2.
- (6) IEC 61508 (International Electro-technical Commission), Functional Safety of Electrical/Electronic/ Programmable/Electronic Safety (E/E/P/ES) Related Systems, Parts 1-7 as follows:
- (i) IEC 61508-1 (1998-12) Part 1: General requirements and IEC 61508-1 Corr. (1999-05) Corrigendum 1-Part 1: General Requirements.
  - (ii) IEC 61508-2 (2000-05) Part 2: Requirements for electrical/electronic/ programmable electronic safety-related systems.
  - (iii) IEC 61508-3 (1998-12) Part 3: Software requirements and IEC 61508-3 Corr.1(1999-04) Corrigendum 1-Part3: Software requirements.
  - (iv) IEC 61508-4 (1998-12) Part 4: Definitions and abbreviations and IEC 61508-4 Corr.1(1999-04) Corrigendum 1-Part 4: Definitions and abbreviations.
  - (v) IEC 61508-5 (1998-12) Part 5: Examples of methods for the determination of safety integrity levels and IEC 61508-5 Corr.1 (1999-04) Corrigendum 1 Part 5: Examples of methods for determination of safety integrity levels.
  - (vi) IIEC 61508-6 (2000-04) Part 6: Guidelines on the applications of IEC 61508-2 and 3.

(vii) IEC 61508–7 (2000–03) Part 7: Overview of techniques and measures.

(b) When using unpublished standards, including proprietary standards, the standards should be available for inspection and replication by the railroad and FRA and should be available for public examination.

*The burden for the above requirements is included under § 229.307 above. Consequently, there is no additional burden associated with this requirement.*

(c) *Third party assessments.* The railroad, the supplier, or FRA may conclude it is necessary for a third party assessment of the system. A third party assessor should be “independent”. An “independent third party” means a technically competent entity responsible to and compensated by the railroad (or an association on behalf of one or more railroads) that is independent of the supplier of the product. An entity that is owned or controlled by the supplier, that is under common ownership or control with the supplier, or that is otherwise involved in the development of the product would not be considered “independent”.

(1) The reviewer should not engage in design efforts, in order to preserve the reviewer’s independence and maintain the supplier’s proprietary right to the product. The supplier should provide the reviewer access to any, and all, documentation that the reviewer requests and attendance at any design review or walk through that the reviewer determines as necessary to complete and accomplish the third party assessment. Representatives from FRA or the railroad might accompany the reviewer.

(2) Third party reviews can occur at a preliminary level a functional level, or implementation level. At the preliminary level, the reviewer should evaluate with respect to safety and comment on the adequacy of the processes, which the supplier applies to the design, and development of the product. At a minimum, the reviewer should compare the supplier processes with industry best practices to determine if the vendor methodology is acceptable and employ any other such tests or comparisons if they have been agreed to previously with the railroad or FRA. Based on these analyses, the reviewer shall identify and document any significant safety vulnerabilities that are not adequately mitigated by the supplier’s (or user’s) processes. At the functional level, the reviewer evaluates the adequacy, and comprehensiveness, of the safety analysis, and any other documents pertinent to the product being assessed for completeness, correctness, and compliance with applicable standards. This includes, but is not limited to the Preliminary Hazard Analysis (PHA), all Fault Tree Analyses (FTA), all Failure Mode and Effects Criticality Analysis (FMECA), and other hazard analyses. At the implementation level the reviewer randomly selects various safety-critical software modules for audit to verify whether the system process and design requirements were followed. The number of modules audited shall be determined as a representative number sufficient to provide confidence that all

un-audited modules were developed in similar manner as the audited module. During this phase the reviewer would also evaluate and comment on the adequacy of the plan for installation and test of the product for revenue service.

FRA estimates that one (1) third party assessment will be completed each year. It is estimated that it will take approximately 4,000 hours to complete the third party assessment. Total annual burden for this requirement is 4,000 hours.

|                             |                               |
|-----------------------------|-------------------------------|
| Respondent Universe:        | 779 railroads/3 Manufacturers |
| Burden time per response:   | 4,000 hours                   |
| Frequency of Response:      | On Occasion                   |
| Annual number of Responses: | 1 third party assessment      |
| Annual Burden:              | 4,000 hours                   |

**Calculation:** 1 third party assessments x 4,000 hrs. = 4,000 hours

(d) *Reviewer Report.* Upon completion of an assessment, the reviewer prepares a final report of the assessment. The report should contain the following information:

- (1) The reviewer's evaluation of the adequacy of the risk analysis, including the supplier's MTTHE and risk estimates for the product, and the supplier's confidence interval in these estimates;
- (2) Product vulnerabilities which the reviewer felt were not adequately mitigated, including the method by which the railroad would assure product safety in the event of a hardware or software failure (i.e., how does the railroad or vendor assure that all potentially hazardous failure modes are identified?) and the method by which the railroad or vendor addresses comprehensiveness of the product design for the requirements of the operations it will govern (i.e., how does the railroad and/or vendor assure that all potentially hazardous operating circumstances are identified? Who records any deficiencies identified in the design process? Who tracks the correction of these deficiencies and confirms that they are corrected?);
- (3) A clear statement of position for all parties involved for each product vulnerability cited by the reviewer;
- (4) Identification of any documentation or information sought by the reviewer that was denied, incomplete, or inadequate;
- (5) A listing of each design procedure or process which was not properly followed;

(6) Identification of the software verification and validation procedures for the product's safety-critical applications, and the reviewer's evaluation of the adequacy of these procedures;

(7) Methods employed by the product manufacturer to develop safety-critical software, such as use of structured language, code checks, modularity, or other similar generally acceptable techniques; and

(8) Methods by which the supplier or railroad addresses comprehensiveness of the product design which considers the safety elements.

FRA estimates that one (1) final report containing the necessary information will be completed each year. It is estimated that it will take approximately 80 hours to complete final report. Total annual burden for this requirement is 80 hours.

|                             |                               |
|-----------------------------|-------------------------------|
| Respondent Universe:        | 779 railroads/3 manufacturers |
| Burden time per response:   | 80 hours                      |
| Frequency of Response:      | On Occasion                   |
| Annual number of Responses: | 1 final report                |
| Annual Burden:              | 80 hours                      |

**Calculation:** 1 final reports x 80 hrs. = 80 hours

Total annual burden for this entire requirement is 4,080 hours (4,000 + 80).

The total annual burden for this entire information collection is 2,087,543 hours.

### 13. **Estimate of total annual costs to respondents.**

Costs to respondents associated with the proposed rule include the following:

- 1.) Tags/Decals - §§ 229.9, 229.15, 229.46, 229.85, 229.135 - (28,100 @ \$.03 each) = \$843
- 2.) Locomotive Stencilings -- §229.123 (20@\$100 each) = \$2,000
- 3.) Mailing Cost – Written reports - § 229.311 – (20 @ \$5 each) = \$100
- 4.) Mailing/Fed Ex – Final Report – Subpart E – Appendix F – (1 Rpt @ \$20) = \$20

---

**SUBTOTAL = \$2,963**

**RESPONDENTS' COST – Current Rule**

\$180,000\* Personal Computers (60 @ \$3,000 each)

\$5,000    Miscellaneous Expense

\$185,000    TOTAL (\* Based on the types of event recorders available today, respondents will have to purchase personal computers for use in complying with the information collection requirement for event recorder data verification readout records. Most of these computers were purchased during the first 18 months the event recorder regulations were in effect. Constant replacement rate is approximately 60 computers per year. The computers in use today rarely need maintenance. When they do, they are often replaced. The 60 per year replacement rate should cover maintenance.

**GRANDTOTAL = \$187,963**

**14.    Estimate of Cost to Federal Government.**

Besides the normal salary of program staff and safety inspectors who will monitor and enforce this proposed regulation, there are no additional costs to the Federal government.

**15.    Explanation of program changes and adjustments.**

The burden has decreased by **126,080 hours**. The decrease in burden is due to one (1) **program change** and multiple **adjustments**. The following table reflects the **program change**:

**TABLE FOR PROGRAM CHANGE(S)**

| Part 229 Sec.   | Responses & Avg. Time (Previous Submission) | Responses & Avg. Time (This Submission) | Burden Hours (Previous Submission) | Burden Hours (This Submission) | Difference (plus/minus)        |
|---|---|---|------------------------------------|--------------------------------|--------------------------------|
| 229.303 (b)–RRs and vendors ID of all products identified in paragraph (a)(2) of this section by Feb. 9, 2013 | 20 I.D. documents<br>2 hours                | <i>Provision has expired</i>            | 40 hours                           | 0 hours                        | -- 40 hours<br>-- 20 responses |

**Program Change(s)** above decreased the burden amount by **40 hours**, and decreased the number of responses by 20.

**TABLE FOR ADJUSTMENTS**

| Part 229 Sec. | Responses & Avg. Time | Responses & Avg. Time | Burden Hours | FRA Burden | Difference (plus/minus) |
|---------------|-----------------------|-----------------------|--------------|------------|-------------------------|
|---------------|-----------------------|-----------------------|--------------|------------|-------------------------|

|   | (Previous Submission)   | (This Submission)   | (Previous Submission)      | Hours (This Submission)    |  |
|---|---|---|----------------------------|----------------------------|--|
| 229.21(a) – Daily Inspection Reports/ Records   | 6,890,000 rpts.<br>16/18 minutes<br>(4,656,600 elec. records + 2,233,400 paper records) | 6,890,000 insp. reports/records<br>16/18 minutes<br>(5,215,600 elec. records + 1,674,400 paper records) | 1,911,780 hour             | 1,893,147 hrs              | - 18,633 hours<br>0 responses                                |
| 229.21(b)- Inspection MU Locomotives – Written Reports + Separate individual written report of non-complying condition                          | 250 reports<br>13 minutes   | 150,000 written reports + 80,000 separate written reports<br>13 minutes                                 | 54 hours                   | 49,833 hours               | + 49,779 hours<br>+229,750 resp.                             |
| FRA F 6180.49A – Locomotive Insp. and Repair Record   | 4,000 forms<br>2 minutes (1 entry per form)   | 4,000 forms<br>2 minutes + 16 minutes (8 entries per form)  | 133 hours                  | 1,067 hours                | + 934 hours<br>0 responses                                   |
| 229.135(b)- Preserving accident data – reportable accidents   | 10,000 reports<br>15 minutes  | 3,100 reports<br>15 minutes   | 2,500 hours                | 775 hours                  | - 1,725 hours<br>- 6,900 resp.                               |
| 229.29(g)(3) – Air Flow Meter (AFM) tests/records   | 88,000 tests/ records<br>15 seconds   | 88,000 tests/ records<br>60 seconds   | 367 hours                  | 1,467 hours                | + 1,100 hours<br>0 responses                                 |
| 229.140- Alerters – visual indicator to operator  | 74,880,000 mechanical visual indications<br>4 seconds                                   | <b>not a paperwork requirement as no record is required</b>   | 83,200 hours               | 0 hours                    | - 83,200 hours<br>-74,880,000 responses                      |
| 229.307- Safety Analysis  | 300 analyses<br>240 hours   | 50 analyses<br>240 hours  | 72,000 hours               | 12,000 hours               | - 60,000 hours<br>- 250 resp.                                |
| 229.309- Safety-Critical Changes – Suppliers report to RRs of product changes and unidentified hazards  | 10 reports<br>8 hours   | 30 reports<br>8 hours   | 80 hours                   | 240 hours                  | + 160 hours<br>+ 20 resp.                                    |
| 229.311-(a) -Notice to FRA of RR Intent to use product subject to this subpart<br>(b & c) – RR documentation to FRA demonstrating product meets | 300 notices<br>2 hours<br><br>300 documents<br>2 hours                                  | 50 notices<br>2 hours<br><br>50 documents<br>2 hours  | 600 hours<br><br>600 hours | 100 hours<br><br>100 hours | - 500 hours<br>- 250 resp.<br><br>- 500 hours<br>- 250 resp. |



|  |                          |   |              |             |                              |
|--|--------------------------|---|--------------|-------------|------------------------------|
| requirements of Safety Analysis for life-cycle of product (d) RR database of all safety-relevant hazards after product is placed in service  | 300 databases<br>4 hours | 50 databases<br>4 hours                                     | 1,200 hours  | 200 hours   | - 1,000 hours<br>- 250 resp. |
| 229.315-(a & b)RR Operations and Maintenance Manual of all documents pertaining to the installation, maintenance, repair, modification, inspection, and testing of a product subject to this subpart | 300 manuals<br>40 hours  | 45 new manuals<br>40 hours + 255 updated manuals<br>5 hours | 12,000 hours | 3,075 hours | - 8,925 hours<br>0 responses |
| (c) documentation of hardware, software, and firmware in configuration management control plan   | 300 plans<br>8 hours     | 45 new plans<br>8 hours + 255 updated plans<br>2 hours      | 2,400 hours  | 870 hours   | - 1,530 hours<br>0 responses |

**Adjustments** above decreased the burden by **126,040 hours** and decreased the number of responses by **74,659,130**.

The current burden OMB inventory for this information collection shows a total of **2,213,623** hours, while the present submission exhibits a burden total of **2,087,543** hours. Hence, there is an overall burden decrease of **126,080** hours.

The cost to respondents has decreased by \$12,000 from the last approved submission. The decrease is due to an **adjustment** for the one-time cost for training materials required under final rule's section 29.317 having already been incurred/accounted for. The previous estimated cost amounted to **\$199,963** while the present submission exhibits a total cost of **\$187,963**. Hence, there is a decrease in cost to respondents of **\$12,000**.

**16. Publication of results of data collection.**

There are no publications involving these information collection requirements.

**17. Approval for not displaying the expiration date for OMB approval.**

Once OMB approval is received, FRA will publish the approval number for these information collection requirements in the Federal Register.

**18. Exception to certification statement.**

No exceptions are taken at this time.

Meeting Department of Transportation (DOT) Strategic Goals

This information collection supports the top DOT strategic goal, namely transportation

safety. Without this collection of information, rail safety in the U.S. would be seriously impeded. Specifically, the information collected provides railroads a written record to indicate what repairs are needed, who made the repairs, and what repairs were made. The information collected provides the engineer with the knowledge that the locomotive has been inspected and is in proper condition for service. Without this collection of information, the discovery and correction of minor defects would not occur in time to prevent them from becoming major defects. This could lead to an increased number of train accidents/incidents, such as derailments and collisions, where there are grave injuries and fatalities to train crews and the traveling public, as well as significant property damage. In the case of trains carrying hazardous materials, there could be significant harm to the environment and surrounding communities.

This collection of information promotes rail safety by mandating new requirements that new locomotives have event recorders which collect certain types of additional information and also that locomotives be equipped with crashworthy event recorder memory modules. In cases where previously data from event recorders did not survive the accident/incident or the information was unintelligible, accident investigators would now have available vital event recorder data needed to determine the cause of an accident/incident because of the crash hardened memory modules. Such data can be used by FRA, the National Transportation Safety Board (NTSB), and railroads to prevent similar accidents/incidents from occurring in the future. The information provided by the requirements of this collection is a valuable and constant resource that can be used by the railroads and FRA to implement appropriate and necessary safety measures which will serve to accomplish the following: (i) reduce the number of rail-related deaths; (ii) reduce the number and severity of injuries to railroad workers and the public; and (iii) reduce damage to property and the environment caused by accidents involving carriers of hazardous materials. In sum, this collection of information helps FRA to fulfill its mission of promoting and enhancing rail safety throughout the United States.

In this information collection, as in all its information collection activities, FRA seeks to do its utmost to fulfill DOT Strategic Goals and to be an integral part of One DOT.