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49 CFR Part 229

Locomotive Event Recorders; Proposed Rule

DEPARTMENT OF TRANSPORTATION

Federal Railroad Administration

49 CFR Part 229

[Docket No. FRA–2003–16357, Notice No. 1]

RIN 2130–AB34

Locomotive Event Recorders

AGENCY: Federal Railroad Administration (FRA), (DOT).

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: To improve the crashworthiness of railroad locomotive event recorders and to enhance the quality of information available for post-accident investigations, FRA proposes to amend its existing regulations in four major ways: By requiring that new locomotives have event recorders with ''hardened'' memory modules, proven by a requirement that the memory modules preserve stored data throughout a sequence of prescribed tests; by requiring that new locomotives have an event recorder that collects certain additional types of information; by simplifying standards for inspecting, testing, and maintaining event recorders; and by requiring the phasing out, over a six-year period, of event recorders that use magnetic tape as a data storage medium. FRA is also proposing to revise the definitions contained in the existing regulation to remove the letter designations so that the defined terms are presented in alphabetical order.

DATES: (1) Written comments must be received by August 31, 2004. Comments received after that date will be considered to the extent possible without incurring additional expenses or delays.

(2) FRA anticipates being able to resolve this rulemaking without a public, oral hearing. However, if FRA receives a specific request for a public, oral hearing prior to August 15, 2004, one will be scheduled and FRA will publish a supplemental document in the **Federal Register** to inform interested parties of the date, time, and location of any such hearing.

ADDRESSES: *Comments:* Comments related to Docket No. FRA–2003–16357, may be submitted by any of the following methods:

- *Web Site: http://dms.dot.gov.* Follow the instructions for submitting comments on the DOT electronic docket site.
- *Fax:* 1–202–493–2251.
- *Mail:* Docket Management Facility; U.S. Department of Transportation, 400 Seventh Street, SW., Nassif Building, Room PL–401, Washington, DC 20590–0001.
- *Hand Delivery:* Room PL–401 on the plaza level of the Nassif Building, 400 Seventh Street, SW., Washington, DC between 9 a.m. and 5 p.m. Monday through Friday, except Federal Holidays.
- *Federal eRulemaking Portal:* Go to *http://www.regulations.gov.* Follow the online instructions for submitting comments.

Instructions: All submissions must include the agency name and docket number or Regulatory Identification Number (RIN) for this rulemaking. Note that all comments received will be posted without change to *http://dms.dot.gov* including any personal information. Please see the Privacy Act heading in the ''Supplementary Information'' section of this document for Privacy Act information related to any submitted comments or materials.

Public Hearing: FRA anticipates being able to resolve this rulemaking without a public, oral hearing. However, if FRA receives a specific request for a public, oral hearing prior to August 15, 2004, one will be scheduled and FRA will publish a supplemental notice in the **Federal Register** to inform interested parties of the date, time, and location of any such hearing.

Docket: For access to the docket to read background documents or comments received, go to *http://dms.dot.gov* at any time or to PL–401 on the plaza level of the Nassif Building, 400 Seventh Street, SW., Washington, DC between 9 a.m. and 5 p.m. Monday through Friday, except Federal Holidays.

FOR FURTHER INFORMATION CONTACT: Edward W. Pritchard, Director, Office of Safety Assurance and Compliance, RRS–10, Mail Stop 25, Federal Railroad Administration, Department of Transportation, 1120 Vermont Avenue, NW., Washington, DC 20590 (telephone 202–493–6247), or Thomas J. Herrmann, Trial Attorney, Office of Chief Counsel, Mail Stop 10, Federal Railroad Administration, 1120 Vermont Avenue, NW., Washington, DC 20590 (telephone 202–493–6036).

SUPPLEMENTARY INFORMATION:

I. Statutory Background

Sections 10 and 21 of the Rail Safety Improvement Act of 1988 (RSIA), Public Law 100–342, 102 Stat. 624 (June 22, 1988), provide as follows:

SEC. 10. EVENT RECORDERS.

Section 202 of the Federal Railroad Safety Act of 1970 is amended by adding at the end the following new subsection:

''(m)(1)(A) The Secretary shall, within 18 months after the date of the enactment of the Rail Safety Improvement Act of 1988, issue such rules, regulations, standards, and orders as may be necessary to enhance safety by requiring that trains be equipped with event recorders within 1 year after such rules, regulations, orders, and standards are issued.

''(B) If the Secretary finds that it is impracticable to equip trains as required under subparagraph (A) within the time limit under such subparagraph, the Secretary may extend the deadline for compliance with such requirement, but in no event shall such deadline be extended past 18 months after such rules, regulations, orders, and standards are issued.

''(2) For the purpose of this subsection, the term 'event recorders' means devices that—

''(A) record train speed, hot box detection, throttle position, brake application, brake operations, and any other function the Secretary considers necessary to record to assist in monitoring the safety of train operation, such as time and signal indication; and

''(B) are designed to resist tampering.''

* * * * *

SEC. 21. TAMPERING WITH SAFETY DEVICES.

Section 202 of the Federal Railroad Safety Act of 1970 is amended by adding at the end the following new subsection:

''(o)(1) The Secretary shall * * * issue such rules, regulations, orders, and standards as may be necessary to prohibit the willful tampering with, or disabling of, specified railroad safety or operational monitoring devices.

* * * * *

Codified at 49 U.S.C. 20137–20138, superseding 45 U.S.C. 431(m) and (o).

II. Proceedings to Date

On November 23, 1988, FRA published an ANPRM (Advance Notice of Proposed Rulemaking) in FRA Docket No. LI–7, soliciting comments on how to implement these statutory mandates concerning event recorders. *See* 53 FR 47557. On June 18, 1991, FRA published an NPRM in that docket, setting forth proposed regulations on event recorders, the elements they were to record, and the preservation of data from the event recorder in the event of an accident. *See* 56 FR 27931. Two public hearings were held in order to facilitate public participation; the written comments submitted in response to the NPRM were extensive, detailed, and helpful.

FRA prescribed final event recorder rules, effective May 5, 1995 (58 FR 36605, July 8, 1993) and issued a response to petitions for reconsideration (60 FR 27900, May 26, 1995); they were codified principally at 49 CFR 229.135. In issuing the final rules, FRA noted the need to provide more refined technical standards. The National Transportation

Safety Board (NTSB) had previously noted the loss of data from event recorders in several accidents due to fire, water, and mechanical damage. NTSB proposed performance standards and agreed to serve as co-chair for a joint industry/government working group that would refine technical standards for next-generation event recorders. FRA conducted a meeting of an informal working group comprised of railroad labor and management representatives and co-chaired by NTSB on December 7, 1995, to consider development of technical standards. At the July 24–25, 1996 meeting of FRA's Railroad Safety Advisory Committee (RSAC), the Association of American Railroads (AAR) agreed to continue the inquiry and on November 1, 1996, reported the status of work on proposed industry standards to the RSAC.

On March 5, 1997, the NTSB issued several recommendations regarding testing and maintenance of event recorders as a result of its findings in the investigation of an accident on February 1, 1996, at Cajon Pass, CA. As the Board noted in its recommendation to FRA, the train that derailed in Cajon Pass ''had an event recorder that was not fully operational. The self-diagnostic light on the unit was insufficient to fully examine the unit and ensure that it was recording the data.'' The Board recommended that inspection and testing of event recorders ''include, at a minimum, a review of the data recorded during actual operations of the locomotive to verify parameter functionality. * * *'' *See* NTSB Recommendation R–96–70.

III. RSAC Overview

In March 1996, FRA established the RSAC, which provides a forum for developing consensus recommendations on rulemakings and other safety program issues. The Committee includes representation from all of the agency's major customer groups, including railroads, labor organizations, suppliers and manufacturers, and other interested parties. A list of member groups follows:

American Association of Private Railroad Car Owners (AARPCO)
American Association of State Highway & Transportation Officials (AASHTO)
American Public Transportation Association (APTA)
American Short Line and Regional Railroad Association (ASLRRA)
American Train Dispatchers Department/Brotherhood of Locomotive Engineers (ATDD/BLE)
National Passenger Railroad Corporation (Amtrak)
Association of American Railroads (AAR)
Association of Railway Museums (ARM)
Association of State Rail Safety Managers (ASRSM)
Brotherhood of Locomotive Engineers (BLE)
Brotherhood of Maintenance of Way Employees (BMWE)
Brotherhood of Railroad Signalmen (BRS)
Federal Transit Administration (FTA)*
High Speed Ground Transportation Association
Hotel Employees & Restaurant Employees International Union
International Association of Machinists and Aerospace Workers
International Brotherhood of Boilermakers and Blacksmiths
International Brotherhood of Electrical Workers (IBEW)
Labor Council for Latin American Advancement (LCLAA)*
League of Railway Industry Women*
National Association of Railroad Passengers (NARP)
National Association of Railway Business Women*
National Conference of Firemen & Oilers
National Railroad Construction and Maintenance Association
National Transportation Safety Board (NTSB)*
Railway Progress Institute (RPI)
Safe Travel America
Secretaria de Communicaciones y Transporte*
Sheet Metal Workers International Association
Tourist Railway Association Inc.
Transport Canada*
Transport Workers Union of America (TWUA)
Transportation Communications International Union/BRC (TCIU/BRC)
United Transportation Union (UTU)
*Indicates associate membership.

When appropriate, FRA assigns a task to RSAC, and after consideration and debate, RSAC may accept or reject the task. If accepted, RSAC establishes a working group that possesses the appropriate expertise and representation of interests to develop recommendations to FRA for action on the task. These recommendations are developed by consensus. A working group may establish one or more task forces to develop facts options on a particular aspect of a given task. The task force then provides that information to the working group for consideration. If a working group comes to unanimous consensus on recommendations for action, the package is presented to the RSAC for a vote. If the proposal is accepted by a simple majority of the RSAC, the proposal is formally recommended to FRA. FRA then determines what action to take on the recommendation. Because FRA staff has played an active role at the working group level in discussing the issues and options and in drafting the language of the consensus proposal, FRA is often favorably inclined toward the RSAC recommendation. However, FRA is in no way bound to follow the recommendation and the agency exercises its independent judgement on whether the recommended rule achieves the agency's regulatory goal, is soundly supported, and is in accordance with policy and legal requirements. Often, FRA varies in some respects from the RSAC recommendation in developing the actual regulatory proposal. If the working group or RSAC is unable to reach consensus on recommendations for action, FRA moves ahead to resolve the issue through traditional rulemaking proceedings.

On March 24, 1997, the RSAC indicated its desire to receive a task to consider the NTSB recommendations with regard to crash survivability, testing, and maintenance. A task was presented to, and accepted by, the RSAC on June 24, 1997. The Working Group on Event Recorders was formed and a Task Force established. Members of the Working Group, in addition to FRA, included the following:

AAR, including members from
The Burlington Northern and Santa Fe Railway Company (BNSF),
Canadian National Railway Company (CN),
Canadian Pacific Railway Company (CP),
Consolidated Rail Corporation (CR)
CSX Transportation, Incorporated (CSX),
Florida East Coast Railway Company (FEC),
Illinois Central Railroad Company (IC),
Norfolk Southern Corporation (NS),
Union Pacific Railroad Company (UP),

APTA, including members from
Southeastern Pennsylvania Transportation Authority (SEPTA)
Amtrak,
Bach-Simpson,
BLE
EDI,
General Motors Corporation/Electro-Motive Division (EMD)
IBEW,
Pulse/Wabco,
Q-Tron,
TCIU/BRC, and
UTU.

The NTSB met with the Working Group and provided staff advisors. In addition, GE-Harris, STV Incorporated, and

Peerless Institute attended many of the meetings and contributed to the technical discussions.

The Working Group and related Task Force conducted a number of meetings and discussed each of the matters proposed in this NPRM. Minutes of these meetings have been made part of the docket in this proceeding. The Working Group reached full consensus on the proposal on October 20, 2003, and transmitted the document as its recommendation to the full RSAC for its concurrence via mail ballot on October 23, 2003. By November 12, 2003, the deadline set for casting a ballot in this matter, thirty-five of the forty-eight voting members of the full RSAC had returned their ballots on the regulatory recommendation submitted by the Working Group. All thirty-five of the voting members concurred with and accepted the Working Group's recommendation. Thus, the Working Group's recommendation became the full RSAC's recommendation to FRA in this matter. After reviewing the full RSAC's recommendation, FRA adopted the recommendation with minor changes for purposes of clarity, and responsiveness to certain comments made by Working Group and RSAC members when submitting their concurrences.

During the final development of the Working Group's recommendation, FRA received written suggestions and recommendations from LTK Engineering Services (through APTA) and AAR. In addition, the BLE when entering its vote on the Working Group's recommendation to the full RSAC, concurred with the recommendation but provided separate written comments on the recommendation. FRA permits Working Group members to either ''non-concur,'' ''concur,'' or ''concur with comment'' when voting on any Working Group recommendation. In cases where a Working Group member ''concurs with comment,'' the verbatim comment is provided to the full RSAC for consideration with the Working Group's recommendation and the comment is incorporated into the preamble discussion of any developed regulatory document, if FRA believes it to be appropriate. In this instance, the written submissions of APTA, AAR, and BLE have been incorporated into the preamble discussion and have been made part of the docket in this proceeding.

Throughout the preamble discussion of this proposal, FRA refers to comments, views, suggestions, or recommendations made by members of the Working Group. When using this terminology, FRA is referring to views, statements, discussions or positions identified or contained in either the minutes of the Working Group and Task Force meetings or the specific written submissions discussed above. These documents have been made part of the docket in this proceeding and are available for public inspection as discussed in the preceding **ADDRESSES** portion of this document. These points are discussed to show the origin of certain issues and the course of discussions on those issues at the task force or working group level. We believe this helps illuminate factors FRA has weighed in making its regulatory decisions, and the logic behind those decisions. The reader should keep in mind, of course, that only the full RSAC makes recommendations to FRA, and it is the consensus recommendation of the full RSAC on which FRA is acting.

IV. Technical Background

The AAR Universal Machine Language Equipment Register (UMLER) file had approximately 28,000 locomotives registered as of January 1, 2000, including locomotives operated by shortline and regional railroads, Canadian and Mexican railroads, and Amtrak. Portions of the Canadian and Mexican fleet operate in the United States. Every major railroad uses event recorders, and no railroads report a difficulty in complying with the 1995 regulations requiring event recorders on the lead locomotive of any train operated faster than 30 miles per hour. As noted above, this proceeding builds on the current regulations in Part 229 and adds requirements for crash survivability and enhanced data collection by event recorders. In addition, this proposed rule would require the installation of these current ''state-of-the-art'' event recorders in new locomotives and would require that, if a locomotive with an event recorder is remanufactured, it be equipped with a certified survivable version of its previous event recorder.

During the discussions and review of draft language leading to the development of this document, members of the RSAC Working Group on Event Recorders and the full RSAC raised a number of important issues.

A. Adoption of Alternate, or Industry, Standards

Several members of the RSAC Working Group suggested that FRA adopt crashworthiness or data collection/accuracy standards already existing within the industry. One standard, in particular, was advanced by the Vehicular Technology Society. It is the Institute of Electrical and Electronics Engineers (IEEE) Standard 1482.1–1999, the IEEE Standard for Rail Transit Vehicle Event Recorders. A technically advanced standard, the crashworthiness requirements of the IEEE standard were claimed to be significantly less expensive to meet than some of the other potential standards considered by the Working Group. For example, FRA staff originally suggested that the Working Group adopt a fire standard based on earlier work used to validate the thermal protective insulation on tank cars transporting flammable and toxic gases; this standard was based on the heat of a flame fueled by liquified petroleum gas. While that standard is entirely appropriate for tank cars that often travel in combination with other tank cars similarly laden, the practical truth is that the typical and most likely fuel for a fire impinging on a locomotive-mounted event recorder is diesel fuel from the locomotive's own tanks. Consequently, the proposed performance criteria for certifying event recorders as crashworthy and contained in Appendix D of this NPRM has been amended to include the open flame burn temperature of diesel fuel. FRA also proposes adopting many of the data elements contained in the IEEE standard as applicable to heavy electric commuter (MU) operations. FRA considered removing the requirements for certifying a crashworthy event recorder memory module (proposed in Appendix D of this document) and simply cross-referencing a voluntary industry (AAR) standard that the industry would ''expeditiously consider'' adopting. However, FRA is not willing to withdraw a major portion of this proposal and wait for an industry consensus standard that does not now exist and may never exist.

B. Record Retention

Although the Electronic Signatures in Global and National Commerce Act (Pub. L. 106–229, 114 Stat. 464, June 30, 2000) requires that regulated entities be allowed to keep records electronically, in appropriate circumstances. FRA believes that the tenor and language of this proposed rule make it unnecessary to discuss the specifics of whether or not the Electronic Signatures Act applies to the subject matter of this proposed rule because nothing in this rule is intended to circumvent the requirements of that act. With the exception of the ''maintenance instructions of the manufacturer, supplier, or owner'' of the event recorder (see proposed § 229.25(e)), and any notations this rule proposes to require on the ''cab card'' (Form FRA F6180–49A), all other records required

by this proposed rule may be kept electronically. Proposed § 229.25(e) requires that the maintenance instructions for the event recorder may be kept electronically, but must be available in hard copy at the maintenance/repair point so they can be used by workers on the shop floor, at the point of testing and repair. Maintenance instructions printed from an electronically maintained master copy would satisfy this requirement. The proposed ''hard copy'' requirement tracks common quality assurance (QA) program requirements; for example, the QA requirements applicable to tank cars contained at 49 CFR 179.7(d). The applicable cab card provisions are existing regulatory requirements that are not being amended by this rulemaking and are intended to establish whether the locomotive is ''equipped'' or not, in the field, without requiring reference or access to a data base at some other location.

C. Throttle Position

There is considerable controversy within the railroad industry about the use of the term ''throttle position.'' Among the earliest mechanical engines were those powered by steam: A pound of water occupies .2 cubic feet of space. Apply heat and convert that pound of water into steam and the result occupies 27 cubic feet of space (at atmospheric pressure). If the steam remains in the same vessel it was heated in, pressure will rise—and from this pressure differential, power can be generated either directly by moving a piston, or indirectly by spinning a turbine and generating electricity. The early throttle was a means to control, or limit, the amount of steam leaving the generating chamber and entering the device in which work would be performed. (Imagine a locomotive that always ran at top speed; stopping at a station to load passengers or freight would be impossible.) The control handle, called the ''throttle handle,'' manipulated a valve to direct the steam, and to determine the quantity so directed, either into the working mechanism or into the atmosphere, wasted. Over time, the ''throttle handle'' used to control the flow of steam was shortened to today's ''throttle,'' but the process remained the same—controlling the output of the locomotive. As electric and diesel-electric locomotives came into use, the physical controlling device gained an additional name, ''master controller.'' Other than the few remaining historic and tourist steam locomotives, the two names are synonymous.

Ignoring for the purposes of this discussion those master controllers—''throttles''—which combine brake control and power control in a single-handle design, the function of the throttle handle is unchanged over history: to control the power output of the locomotive. The vast majority of the master controllers which are used to perform the throttle control function do so by creating discrete positions of the throttle handle which in turn send electric-current specific combinations of train line wire energization patterns. These train line wire energization patterns are interpreted by the engine or propulsion control systems as the locomotive engineer's request for a specific speed/tractive effort characteristic. In most diesel-electric freight locomotives used in the United States, the throttle arc is divided into nine discrete positions: ''Idle,'' and eight ''notches'' of energization.

The point that the throttle handle positions—''notches''—correspond to speed/tractive effort characteristics is important and should not be overlooked. It is convenient to say that they correspond to an engine's revolutions per minute (RPM), and, for diesel-electric locomotives, that is correct. However, to extend that to say that they correspond to *power* is only correct in a non-rigorous use of the term. For purposes of this rule, FRA will consider that the ''throttle'' controls speed/tractive effort characteristics rather than ''power.'' Over most—but not all—of the operating speed range of a diesel-electric locomotive, the speed/tractive effort characteristic is approximately a constant horsepower characteristic. Unfortunately, the same is not true of electric locomotives, be they locomotives in the conventional sense or electric multiple unit (EMU) locomotives. Application of speed/tractive effort characteristics instead of ''power'' as the result of throttle handle position will enable coverage of all types of locomotives.

Almost all throttles have at least a few discrete output positions, and some have continuously variable segments as well. Those discrete positions do not, unfortunately, correspond to uniform fractions of maximum engine RPM or current. For diesel-electric locomotives, they do correspond roughly to uniform fractions of the maximum speed/tractive effort characteristic, but the actual diesel engine speed schedule utilized to achieve a given speed/tractive effort characteristic will be tailored by the manufacturer based on a number of design considerations. For electric locomotives, especially EMU locomotives, the throttle positions often reflect the design configuration of the EMU's propulsion system, and may reflect such things as motor connections (series versus series-parallel, for example), motor field strength, transformer tap position, and the like.

For those throttles with continuously variable segments, the output, and ''power requested'' corresponding thereto, vary from minimum to maximum. Minimum may be ''zero,'' or it may be a small, non-zero positive value of the control variable. ''Maximum'' depends on the design of the master controller, and may be some level of DC or AC control current, some control voltage, or some percentage pulse-width-modulation value of a control output current or voltage approaching or equal to 100 percent. It may also be a stream of binary bits, interpreted by the engine and/or propulsion control system as a control variable. The ''power'' equivalent to the maximum output value of the control variable will be the maximum speed/tractive effort characteristic of which the locomotive is capable.

In order to give a meaningful resolution of such continuously variable outputs for recording purposes, and to be consistent with digital communications that are emerging in the industry, digital to analog (or vice versa) conversion of no less than eight-bit resolution would appear appropriate, and FRA solicits comments on this concept. Some existing EMU locomotives have fewer than eight discrete throttle ''power'' positions. For example, the SEPTA Silverliner IV EMUs have four. It would be both physically impossible and meaningless to artificially require these locomotives to have event recorders which capture one-eighth of the full output, as these EMU's cannot physically operate at intermediate levels of speed/tractive effort other than the four provided by their propulsion systems. Historically, some locomotives have had more than eight discrete throttle positions. The number of such locomotives remaining in service and subject to the proposed rule is believed to be quite small and may, in fact, be zero. While FRA may wish to limit the resolution of the discrete throttle positions to one-eighth of full power, it does not appear burdensome to require that all available discrete positions be recorded. FRA seeks comments and suggestions from all interested parties on this issue.

D. Post-accident Data Preservation

In this rulemaking, FRA proposes a modification to the current standard. As § 229.135(d) is now written, after an accident, a railroad may ''extract and analyze'' data from the event recorder, if the railroad preserves ''the original or

a first-order accurate copy'' of the data. Experience since the present event recorder rule became effective shows that the phrase ''first-order accurate copy'' is not easily understood by those first on scene at a derailment. First responders must primarily deal with wrecked equipment, the potential need for life-saving actions, and the ever-present danger—especially if hazardous materials are present—of fire, smoke, and explosion. FRA believes it has clarified the requirement. The proposal here permits the railroad to extract and analyze such data, provided the original downloaded data file, or an unanalyzed exact copy of it, is retained subject to the direction and control of FRA or the NTSB. In the case of microprocessor-based machines, the ''original'' copy of the data will not show any immediately prior downloads, while the ''copies'' may show that previous downloads have occurred. Certainly this is not a requirement to put a ''marker,'' or some indication in the downloaded data to show the ''order'' in which multiple downloads were made; the proposed rule would, as does the present requirement, mandate that the original download be preserved for analysis by FRA or NTSB.

Both the current rule and this proposal require efforts, ''to the extent possible,'' and ''to the extent consistent with safety,'' to preserve all the data stored in any locomotive-mounted recording device designed to record information concerning the functioning of the locomotive or train. FRA is well aware of the difficulty of performing field downloads of data retention devices not so designed; FRA is also aware that such downloads may be more dangerous, especially in an accident situation, than extracting the data from a crash-hardened event recorder memory module designed for easy field downloads. FRA's experience is that those who serve as the railroad's incident commanders are well schooled in safety and the preservation of life and property, and this agency is comfortable with the decisions they will make about the safety of entering a hostile atmosphere to gather knowledge about the dynamics immediately preceding an accident.

E. Data Element—Horn Control

One data element proposed in this Notice for new locomotives with new event recorders generated a significant amount of controversy—the recording of the horn control handle activation. FRA believes this data element will enhance the investigatory tools available in highway-rail grade crossing accidents. Users of event recorder data for purposes other than accident investigation (such as supporting claims in accident-related litigation) should bear in mind that the event recorder samples what is going on in the locomotive and there are gaps between the time the recorder first ''looks'' for the data from the horn switch activation sensor and the time it next takes that ''look.'' Even a gap of a second, at main line track speeds, can yield an inaccurate, false record of when, exactly, or where, exactly, the horn was blown. Further, horns are air-operated on freight locomotives and, once the switch is activated, there is a lag—short, to be sure—before the horn blows; the horn may also fail en route and the engineer activate its switch only to have no sound come out. As reported in the daily press, emergency responders complain that automobile drivers with their windows up, radios on, and air conditioning on often do not react to the sirens or air horns on fire trucks. The same phenomena exist when a railroad engineer blows his horn at an automobile starting across a crossing with too little time to clear. Finally, the locomotive horn is external to the cab of the locomotive and subject to becoming blocked by snow or sleet in the wintertime.

To summarize: FRA proposes to require the recording of the horn control handle activation because it will provide one tool, among many, in the investigation of railroad accidents and in the monitoring of equipment and the people who operate it. FRA believes that the use of the data for other purposes should be made only after fully considering the limited usefulness of such data as briefly discussed above. This proposal reflects FRA's responsibility to implement 49 U.S.C. 20153. The Working Group and the full RSAC were not able to reach a recommendation regarding this issue.

F. Inspection and Maintenance

Older styled event recorders used eight-track tape cartridges as their recording medium; while this proposed rule will ''sunset'' such equipment, it needs to be maintained in order to perform satisfactorily. The present rule provides for this, at 49 CFR 229.25(e). Microprocessor-based event recorders, typified by virtually all of the recorders now being installed in locomotives, are similar to many consumer solid state electronic devices; either they work or they do not. Maintenance consists of checking for satisfactory operation and, if there is a failure, replacing either the failed component or the entire unit.

What further complicates the newest installations is that there is no ''black box,'' as such. Rather, the entire locomotive is wired with sensors and, as an illustration, those elements necessary for routine maintenance of the locomotive are routed to one collection point and those required for accident analysis are routed to another. There are also ways to retrieve any particular subset of data out of a single data port by using what is popularly called a ''smart card'' to query the computer for a predetermined set of data. Accident investigators would get the data elements specified in proposed § 229.135(b), locomotive electrical maintainers would get the set of data applicable to their work, and a person evaluating the engineer's performance over the last run would download a data set preprogramed for that purpose. Data necessary for accident analysis, as proposed here, would be routed to a crash-hardened memory module.

Essentially all modern event recorder systems are also equipped with self-test circuitry that constantly compares data flowing in with the data being stored and signals (a red light is typical) when there is a fault. In a sense, maintenance is simple: If the red light is off (and the unit is still receiving power), the unit is in good working order. However, experts in the field, and there are no experts more familiar with black boxes than the NTSB, warn that the whole event recorder system needs to be verified to know that the recorder is capturing ''real'' data. Recorders, sensors, and cables all fail, and at unpredictable intervals. To ensure that the recorder is indeed capturing data representative of the locomotive's actual operations, this proposal requires that, sometime within 30 days of each annual periodic inspection, the railroad download and review the data required by § 229.135(b), as captured by the event recorder's crashworthy memory module. This download might be part of any other download a railroad might choose to perform, whether as a part of locomotive maintenance, employee monitoring, service planning, or whatever. The downloaded data would be compared to the known operations of the locomotive over the past 48 hours and, if all required channels were recording and the required elements were representative of actual operations, the recorder—assuming always that the fault light is not on—would require no further maintenance or checking. This added flexibility in the proposed rule could mean that locomotives equipped with microprocessor-based event recorders need never visit a shop just to check the recorder.

G. New Technologies

FRA is well aware of the pace at which technology is changing. Locomotives, once controlled by mechanical levers and wheels, now read the ''input'' of a moved lever and adjust multiple aspects of their operating systems to produce the desired result; they can accept a cruise control setting and adjust power to maintain a constant speed as the grade increases. New methods for monitoring and controlling train operations, some of them using global-positioning satellites as the basis for position determination, are now being deployed. Where these technologies affect the operation and safety of trains, the event recorder needs to be able to capture data elements that will enable analysis of the locomotive's operations. As just one example, if a positive train control system (PTC) ''took away'' control of a locomotive to enforce train separation protocols, the recorder needs to capture the information that an input from outside the cab caused the train to speed up or slow down.

With PTC, the recorder needs to identify both the fact of an incoming signal and the response to it, whether automated or an engineer override. Just as the recording of cab signals is relatively easy because the signal system's aspect is already on board, so too it should be easy to capture a PTC signal and record any display elements on which the engineer is expected to rely and any commands sent to initiate braking and knock down power. The existing regulation requires that the cab signal display be recorded, but this technology may be superseded in the future. In the Working Group meetings, the Brotherhood of Locomotive Engineers has consistently raised a concern with respect to determining the source of penalty brake applications initiated by innovative train control systems (*i.e.*, not only what was the source of the brake application, but what indication was displayed to the engineer and on what basis this was determined). Although it may not be possible to specify clearly all of the information that would be required to determine the basis for every penalty application, given the wide variety of possible system architectures, FRA proposes to require that the following be recorded:

- Applications and operations of the train automatic air brake, including emergency applications. The system shall 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 shall record, or provide a means of determining, the involvement of any such computer; and
- 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.

These proposed provisions are discussed in greater detail in the section-by-section analysis related to § 229.135(b)(3).

FRA seeks information and comments from interested parties regarding whether the data elements that are required to be entered into the system should be recorded and retained in the memory module where a train's braking system utilizes braking algorithms. Although the current rule and this proposal require that the ''applications and operations'' of the train's braking system be recorded, FRA does not currently require the recording of all the data related to such ''applications and operations.'' If braking algorithms are dependent on or dictated by track profile information, or train and consist data, is there a need for FRA to specifically mandate that the data or information actually entered into the system also be recorded and retained in the memory module? Similarly, in order to ensure accurate analysis, should FRA require that the braking algorithm software version (and identifying number, as appropriate) be recorded or derivable from external data? FRA seeks comments from interested parties regarding the need, capability, and costs associated with capturing this type of data.

As electronics improve, and, with it, the ability to remotely control large and complex machinery, it is imperative that any such operations within the scope of this proceeding be recorded. The existing event recorder rule, and this proposed amendment, require event recorders on locomotives when operated at speeds of more than thirty miles per hour. If locomotive remote control systems can function at speeds greater than 30 miles per hour, it is only logical to require the recording of both the commands issued by the operator as well as the response by the locomotive to those commands. FRA has not included specific data elements in proposed § 229.135(b)(3) or (4) but is prepared to if comments warrant. In one view, locomotive remote control systems are like cruise control: Unless rendered incapable of operation above 30 miles per hour, it is vital that data on their use be recorded.

H. Data Accuracy, Resolution, and Sampling Rates

In its first event recorder rulemaking, FRA Docket No. LI–7 (58 FR 36605, July 8, 1993), FRA mandated the installation of event recorders on trains traveling faster than 30 mph. In this rulemaking, FRA is proposing requirements for the capture of additional data elements and for crash-hardening the event recorder memory module. In both proceedings, the topics of data accuracy, resolution, and sampling rate have been raised. In this proceeding, as in the first, FRA notes the current requirements for the accuracy of brake system air gauges and for speed indicators, 49 CFR 229.53 and 229.117. The issues of accuracy, resolution, and sampling rate remain unresolved in this proposal. The Working Group concentrated on the crashworthiness aspects of the event recorder memory module, together with enhancing the kind of data to be collected for post-accident analysis. FRA believes that this was both an ordering of priorities and a recognition that the industry has an economic and operational incentive to make the data as accurate as possible. What the event recorder stores are data that are, first and foremost, indispensable to the operation of the locomotive. Because the railroads have operational needs for the same data elements that are also vital to accident analysis, the ''numbers'' tend to be accurate and, with microprocessor-based event recorders, the data thus generated during the ordinary course of business are not diminished in accuracy just because they are stored. Finally, microprocessor-based event recorders run so fast that the sampling intervals are naturally short, and they may be adjusted differently for different elements.

The Rail Transit Vehicle Interface Standards Committee of the Institute of Electrical and Electronics Engineers has developed the IEEE Standard for Rail Transit Vehicle Event Recorders (IEEE

Std 1482.1–1999). While, as noted elsewhere, this standard is not applicable to the railroad industry, FRA seeks comments on whether or not the agency should adopt a requirement similar to the IEEE's standard for sampling and storage rates, from paragraph 4.2 of that standard:

> 4.2 Sampling and storage rate(s)
>
> The event recorder shall be capable of sampling signals at a maximum of 20 ms intervals (minimum 50 samples per second) to ensure that changes that affect operation are detected.
>
> Signals shall be processed and stored to ensure that changes that affect operation are captured. Repetitive samples of identical information reflecting no state change may be stored at a lower storage rate than other signals. The storage rate depends on the individual rate of change under operating or failure conditions for each signal. Thresholds, ranges, and durations for defining state changes shall be determined for each signal. Signals shall be stored at least once per second.
>
> To conserve memory, stored data more than 10 hours old may be reprocessed to eliminate data samples that reflect no change from consecutive samples to a minimum storage rate of 1 sample per 15 seconds.
>
> Crashworthy nonvolatile memory shall preserve a minimum of 48 hours worth of data.

One member of the Working Group, in a written submission to FRA, suggests that if FRA adopts requirements for data accuracy, resolution, and sampling rates, then any such requirements should not force the manufacture of distinctly different event recorders for transit and railroad operations in those instances where the devices could otherwise be the same, particularly with regard to hardware. This member notes that commonality of equipment between transit and rail operations is expected to result in reduced costs and more mature designs. If there are particular technical needs for railroads, then it is suggested that FRA work with the Institute of Electrical and Electronics Engineers (IEEE) to determine whether common requirements could be developed. While the difference between railroad and transit equipment will force differences in event recorders, the principle of commonality, wherever possible, is desirable.

I. Distributed Power

A distributed power system places locomotives within the train consist to add their tractive and braking effort to the movement of, typically, long and heavy trains. The locomotives ''distributed'' back in the train are controlled by signals from the lead locomotive. The Working Group agreed not to include a proposed requirement that new event recorders capture ''miscompare'' messages between the lead locomotive and the remotely distributed locomotive due to the extremely high costs associated with monitoring and capturing such data. One member of the Working Group, in a written submission to FRA, disagreed with the removal of this data element but agreed to move forward with the rulemaking with the opportunity to further discuss this issue at the final rule stage. This member voiced concern that locomotive engineers should be given an opportunity to show that they were not responsible for the failure of a remote control locomotive to respond properly to a control input because of a problem with the communication link or other failure originating from software or hardware faults on a locomotive.

This member seeks to introduce the term ''Locomotive Engineer Coupling'' (LEC) which is based on the term ''Aircraft-Pilot Coupling'' (APC) used in the aviation industry where the phenomenon it describes is found to exist in modern aircraft flown ''by wire'' (electronic or radio controlled). It is contended that the operation of locomotives ''by wire'' is becoming commonplace in the industry and is utilized in distributed power. The term ''Discordant APC'' is used to describe the loss of control phenomena resulting from dynamic distortion of the pilot-aircraft control system, which will occur in two areas: 1. In the information upon which the pilot judges the aircraft's response to his control input (the feedback loop); and 2. in the actual response of the aircraft to the pilot's control inputs (the feed forward loop).[1]

This member notes the similarity between APC and LEC especially with respect to remotely controlled distributed power locomotives. The locomotive engineer expects the control input to be executed as requested and many control inputs do not immediately feedback to the engineer. When something goes wrong the only feedback may be an emergency application of the train's braking system. The absence of a record of the control input sent by the locomotive engineer will leave the engineer vulnerable to accusation that any resulting mishap was due to that individual's negligence. This member further asserts that the investigation of accidents that have occurred while the lead locomotive consist is doing one thing and the distributed power is doing something different from what the engineer intended have revealed that the distributed power locomotives indicated a communication loss.

Due to the type of confusion described above, this member believes that FRA should require fully operational locomotive event recorders on all lead distributed power locomotives and requests that FRA ensure that any final rule apply to such locomotives. This individual strongly believes that the rule must avoid an injustice to individuals when the technology they have been given fails and no record of that failure can be made.

Based on the above, FRA seeks further comments from all interested parties on the need and the ability to capture ''miscompare'' messages between the lead locomotive and the remotely distributed locomotive as well as any information on the potential economic consequences of any such requirement. FRA also seeks comments and information on the issue of whether remotely distributed locomotives (or the unit that receives signals from the head end and relays them to the other remote locomotives) should also be required to be equipped with an event recorder to capture not only the receipt of a message from the lead locomotive but also the remote locomotive's response to that message. This would allow not only the capture of miscompare messages but would also allow an analysis of those messages.

V. Section-by-Section Analysis

Section 229.5

In this proposed section, the existing section is being entirely rewritten to remove the letter designations for the subparagraphs so that the terms defined in this section are simply presented in alphabetical order. In addition, the definitions of two terms have been substantially revised, and definitions of several new terms are added. The substantive changes to the existing section are limited to the following provisions:

Cruise control is an added definition that describes the device that controls locomotive power output to maintain a targeted speed. Primarily used on through-route passenger equipment, this device allows the engineer a choice between automated controls or the traditional throttle handle. Devices that only function at or below 30 miles per hour, such as those used in the loading/unloading of unit trains of bulk commodities, or those used to move equipment through car or locomotive

[1] *A Case for Higher Data Rates,* Ralph A. 'Harrah HQ; George Kaseote, FAA HQ; at page 2 of the proceedings of the International Symposium on Transportation Recorders on May 3–5, 1999.

washers, are not considered cruise controls for purposes of this part.

Data element is an added definition to clarify that the data recorded may be directly passed through or they may be derived from other data. As an example, speed may be calculated from time and distance; the event recorder may capture ''speed'' by calculating that value using the common formula of dividing distance by time. An alternative term ''data parameter'' is not used in this proposal because a ''parameter'' connotes one value standing for all others of a class and an ''element'' is a discrete value. Data may be derived from both recorded and unrecorded ''facts'' in the memory module. For instance, the distance element in the calculation of speed may be derived from a count of the wheel revolutions (data from the memory module) and the wheel diameter or wheel circumference (data measured directly from a physical component and, thus, not stored in the memory module).

Distributed power system is an added definition that describes a system to allow the engineer in the lead unit to automatically control locomotive power units placed within the train consist. Typically, a radio link is established between the lead unit and the remote power consist so that a single engineer can control several locomotives not directly coupled to the lead unit.

Event recorder is a revised definition. The definition that is currently in the regulations is modified so that the list of data elements to be recorded will now appear in rewritten § 229.135(b). This change is necessary because the event recorders proposed to be required on new locomotives will record more data elements than the recorders now required by the regulation.

Event recorder memory module is a new definition that describes the portion of the event recorder that will be required to meet the crashworthy standard proposed in Appendix D to Part 229.

Lead locomotive is a definition moved from current § 229.135(a) and revised to reflect current industry practice and to make it clear that ''lead locomotive'' describes a set position in the train rather than the locomotive from which the crew is operating the train. This change was necessary, among other reasons, to accurately record the signal indications displayed to the crew of the train.

Mandatory directive is a definition also contained in § 220.5 of this chapter and is being included in this part to aid in understanding the type of data that is to be captured by the event recorder when a railroad utilizes a train control system pursuant to Part 236 of this chapter.

Remanufactured locomotive is a new definition added to clarify when an existing event recorder-equipped locomotive must be equipped with a crashworthy event recorder.

Self-monitoring event recorder is a new definition added to clearly state the conditions under which an event recorder does not require periodic maintenance. One member of the Working Group, in a written submission to FRA, suggests that this definition be slightly altered to state that a self-monitoring event recorder is one that has the ability to monitor its own operation and to display an indication to the locomotive operator when any data required to be stored are not stored or *when the input signal or stored signal is detected as out-of-range.* This commenter stated that there is no way to verify whether the stored data matches the data received from the sensor or data collection point as described in the proposed definition. Examples of this are when a sensor fails open and the locomotive computer does not pass that information to the event recorder, or when a speed sensor is not producing any output due to certain failure modes. However, certain data elements can be programmed with a minimum or maximum range and if the sensor input is outside that range then an appropriate indication can be provided to the operator. FRA seeks comments from all interested parties on this suggested change to the definition of self-monitoring event recorder.

Throttle position is a new definition added to capture the industry understanding about this parameter of locomotive operation. As discussed in more detail earlier, while typical diesel-electric freight locomotives have positions, or ''notches'' for eight power positions and ''Idle,'' many other locomotives, especially those in passenger and heavy electric passenger service, do not. The proposed definition calls for measuring the power requested by the engineer/operator at any and all of the discrete output positions of the throttle. If the throttle quadrant on a locomotive has continuously variable segments, the recorder would be required to capture the exact level of speed/tractive effort requested, on a scale of zero (0) to 100 percent (100%) of the output variable or a value converted from a percentage to a comparable 0 to 8 digital system. FRA does not believe that there is a need to specify the specific parameters by which throttle position is recorded. FRA realizes, based on Working Group discussions, that some parties believe these parameters should be specified and recorded. Therefore, FRA seeks comments from interested parties on the need to include the specific methods contained in this definition for reporting and recording the power requested by an engineer or operator.

Section 229.25

This proposed rule would amend § 229.25(e) by moving the language dealing with microprocessor-based event recorders from subparagraph (e)(2) to the lead paragraph and providing that microprocessor-based event recorders with a self-monitoring feature are exempt from the 92-day periodic inspection and are to be inspected annually as required under proposed § 229.27(d). Other types of event recorders would require inspection and maintenance at 92-day intervals, as before. FRA recognizes that railroads cannot test event recorders over the *full* range of recorded parameters. Such testing might require operating locomotives at speeds far higher than safe over a particular railroad's track and some events, such as EOT valve failure are extremely rare. The proposed rule would require ''cycling, as practicable, all required recording elements * * * '' in recognition of the above stated fact. Although the proposed regulatory text does not specify how records of successful tests are to be maintained, FRA has no objection to keeping the records electronically, provided; the electronic ''record'' is the full and complete ''data verification result'' required by this proposed section, the record is secure, the record is accessible to FRA for review and monitoring, and the record is made available upon request to FRA or any other governmental agent with the authority to request them.

Section 229.27

This proposed rule would amend the introductory text of this section for clarity and to add a specific reference to proposed paragraph (d), dealing with the annual maintenance requirements for microprocessor-based event recorders with a self-monitoring feature. Proposed paragraph (d) has two potential triggers for required maintenance. A self-monitoring microprocessor-based event recorder would require ''maintenance'' in the sense of opening the box and making adjustments only if either or both of the following occurred: (1) The event recorder displayed an indication of a failure, or (2) the railroad has downloaded and reviewed the data for the past 48 hours of the locomotive's use and found that any required

channels were not recording data representative of the actual operations of the locomotive during this time period.

The proposed rule recognizes that certain data elements do not regularly recur and may not, in fact, have been seen for a long time. Such elements might include EOT emergency applications, EOT communications loss, EOT valve failure, and specific channels devoted to distributed power operations when such operations have not occurred to the locomotive within the past 48 hours. FRA has eased the burden of specific ''annual test dates'' by proposing 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. (Non-self-monitoring recorders require maintenance at quarterly intervals, under the requirements of § 229.25.)

The users and vendors of self-monitoring event recorders have discovered that, in common with many electronic devices, either the unit works or it does not. If it is working—if it is recording all the data it is required to record and if it is accurately storing the data sent by the sensors or other data collection points—no tweaking, lubricating, adjusting, or other traditional maintenance practice will make it work better or more accurately. If a self-monitoring event recorder is not working, that fact will be displayed, and the experience of the users and builders is that a circuit board, or other electronic component, will have to be exchanged. By the same token, the NTSB has strongly urged that maintenance of locomotive event recorders verify that the entire event recorder system—including the recorder, the memory module, the cabling, and the sensors—is accurately recording what the locomotive has actually done. The regulatory proposal here would require a review of the past 48 hours of the locomotive's operations because that is the required recording period for the current (and the proposed) rule. Although the proposed regulatory text does not specify how records of successful tests are to be maintained, FRA has no objection to keeping the records electronically, provided the electronic ''record'' is the full and complete ''data verification result'' required by this proposed section, the record is secure, the record is accessible to FRA for review and monitoring, and the record is made available upon request to FRA or any other governmental agent with the authority to request them.

Section 229.135

Paragraph (a) is essentially unchanged, except as necessary to accommodate the proposed changes or additions to subsequent paragraphs in § 229.135. This proposed paragraph does modify the existing provision by requiring the make and model of the event recorder to be entered on Form FRA F6180–49A (blue card). Some members of the Working Group, at meetings and in written submissions to FRA, questioned the need to record this information on the blue card as there is no known instance where a problem was encountered downloading data or locating appropriate analysis software. These members assert that railroads and event recorder manufacturers are well aware of the type of event recorder installed on a locomotive and which software to employ for downloads. This item was requested by NTSB, and based on NTSB's stated need for the information, FRA has decided to include the provision in this proposal. FRA believes there is very little burden placed on the railroads by requiring the information to be recorded as the presence of any such recorder is already required under the existing regulation and the benefit to an accident investigator may be considerable. FRA seeks comment from interested parties regarding the benefits and costs associated with including this requirement in the final rule.

Paragraph (b) is totally rewritten to detail the proposed new requirements for when a new or remanufactured locomotive must be equipped with a certified crashworthy memory modules and details the information that must be captured and stored by both new and existing event recorders. In order to avoid confusion when locomotives are re-sold after the original purchase from the manufacturer (*i.e.*, sold from one user to another), the proposed rule specifies that the equipment required on a specific locomotive is determined by the date it was originally manufactured. The introductory text is new and would require that the data recorded be at least as accurate as the data required to be displayed to the engineer. Further, the rule would require the crashworthy event recorder memory module to be mounted for its maximum protection, stating that a module mounted behind the collision posts and above the platform will be deemed to be appropriately mounted.

Several members of the Working Group, in meetings and in written submissions to FRA, emphasized that the language contained in this proposed provision regarding the placement of the crashworthy event recorder memory module may be interpreted to limit the placement of the module. They assert that the placement of the module in an electrical cabinet may not necessarily be below the top of the collision posts and yet such placement would provide adequate protection and would actually provide superior crush resistance, be more fire resistant, and be a longer distance from the point of impact. Similarly, a module located in the nose of the locomotive may not be above the platform level and yet it would be sufficiently protected. The illustration contained in the proposed provision was intended to provide one example of a module properly mounted for its maximum protection. FRA agrees that there may be other mounting options that provide at least equal protection, and has added language to the proposed rule text making this point very clear. FRA seeks suggestions and comments from interested parties regarding potential language or approaches to this issue that address the concerns of these Working Group members.

The proposed requirements relating to when a new locomotive is required to be equipped with the crashworthy event recorder memory module is based on the date that the locomotive was originally ordered. Paragraphs (b)(3) and (b)(4) propose that any locomotive ordered one year after the effective date of the final rule must be equipped with a crashworthy event recorder memory module. FRA notes that no outside parameter has been included in this proposal. Thus, as the proposal is currently written, any locomotive ordered prior to the one-year period would not be required to be equipped with a crashworthy event recorder even if not delivered and placed in service until ten years later. FRA believes there should be a placed-in-service date included in the final rule after which any new locomotive must be properly equipped. For example, most of FRA's regulations that contain a design requirement for new equipment generally define the new equipment as any that is ordered after a certain date or that is placed in service after a certain date. *See* 49 CFR part 232 and 238. Generally these two dates are several years apart in order to provide sufficient time for an equipment order to be fully manufactured and placed in service. Rather than include an arbitrary date, FRA seeks comments and suggestions from interested parties as to an appropriate date to include in the final rule for ensuring that any applicable locomotive placed in service after that

date is properly equipped with a crashworthy memory module.

Subparagraph (b)(1) restates the equipment requirements for current event recorders that use a recording medium other than magnetic tape. This section proposes to permit the continued use of these current event recorders on any locomotive manufactured until one year after the effective date of a final rule in this proceeding. At the initial meetings with the RSAC Working Group, FRA made clear that this rule was not intended to involve the retrofitting of existing locomotives with event recorders containing crashworthy memory modules. FRA continues to believe that, except for the need to replace event recorders using magnetic tape to record information, any significant retrofit requirement of existing locomotive event recorders cannot be justified from a cost/benefit perspective. In addition to the cost of the crashwothy event recorder, it would be cost prohibitive to retrofit many existing locomotives with the ability to monitor many of the data elements described in this paragraph. Consequently, except for remanufactured locomotives and locomotives equipped with an event recorder utilizing magnetic tape, this proposal does not contain any provision requiring a locomotive manufactured prior to one year from the effective date of any final rule issued in this proceeding to be equipped with an event recorder containing a crashworthy memory module described in Appendix D of this proposal.

Although this proposal does not require the retrofitting of existing locomotives in most cases, FRA believes that the industry and the marketplace will dictate that as older style event recorders fail they will be replaced with event recorders containing crashworthy memory modules. In addition, the operational benefits derived from the newer crashworthy event recorders will likely drive the railroads' decisions when acquiring replacement event recorders for existing locomotives. Moreover, as the newer crashworthy event recorders become more prevalent and are manufactured in greater numbers, the costs of the recorders will likely be more comparable to currently produced event recorders and thus, many railroads may find it economically advantageous to purchase the new crashworthy event recorders as replacements for the older model event recorders on existing locomotives.

With these thoughts in mind, FRA seeks comments from interested parties as to whether a provision could or should be added to this rule which establishes a specific date after which any replacement event recorder on an existing locomotive must have a crashworthy memory module pursuant to Appendix D of this proposal. FRA wishes to make clear that any such provision would only be applied to existing locomotives when the event recorder with which it is equipped is replaced and it is not FRA's intention to increase the data elements required to be captured. It should be noted that FRA is not proposing to ''sunset'' the use of event recorders using magnetic tape until six years after the effective date of the final rule in this proceeding. Thus, any provision related to other current event recorders should probably not apply until at least that time. To summarize: FRA seeks comments or information from interested parties as to whether there is some future date, that would impose little or no cost burden to the industry, after which any event recorder that is replaced on an existing locomotive should be replaced with an event recorder containing a crashworthy memory module described in Appendix D of this proposal.

Subparagraph (b)(2) proposes a ''sunset'' date for current event recorders using magnetic tape as their recording medium. Because it is essentially impossible to make a crashworthy event recorder memory module that uses magnetic tape, the proposed rule would establish that, six years after the effective date of a final rule, all such recorders must be replaced with recorders using ''hardened'' memory modules, but recording the same elements as they do now. The principal supplier of this type of equipment has ceased manufacturing it and has recently discontinued supplying replacement recording media. Accordingly, FRA believes that this provision should not constitute a significant burden. FRA seeks comments and information from all interested parties regarding any significant burden imposed by this proposed provision.

Subparagraph (b)(3) contains the proposed standards for new event recorders and make new event recorders that meet these standards mandatory equipment for freight (diesel) locomotives (other than MU locomotives) manufactured one year after the effective date of a final rule in this proceeding. The new recorder would have a certified crashworthy event recorder memory module and would record the following data elements in addition to the data elements recorded by current event recorders:

- emergency brake applications initiated by the engineer or by an on-board computer;
- a loss of communications from the EOT (End of train) device;
- messages related to the ECP (electronic controlled pneumatic) braking system;
- EOT messages relating to ''ready status,'' an emergency brake command, and an emergency brake application, valve failure indication, end-of-train brake pipe pressure, the ''in motion'' signal, the marker light status, and low battery status;
- the position of the switches for headlights and for the auxiliary lights on the lead locomotive;
- activation of the horn control;
- the locomotive number;
- the automatic brake valve cut in;
- the locomotive position (lead or trail);
- tractive effort;
- the activation of the cruise control; and
- safety-critical train control display elements with which the engineer is required to comply.

Two of the data elements proposed in this subparagraph and in subparagraph (b)(4) are somewhat controversial and deserve additional explanation and clarification. FRA seeks comments, information, and suggestions from interested parties on both of the proposed data elements discussed below as well as any of the other proposed data elements contained in subparagraph (b)(3) and (b)(4).

The proposed data element contained in subparagraphs (b)(3)(vi) and (b)(4)(vi) requires that the system 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 would have to record, or provide a means of determining, the involvement of any such computer.

These additional proposed requirements concerning the operation of the automatic braking system are necessary in order to take into account the proliferation of processor-based technology that is now extensively used to control the functions of locomotives, including on-board computers constituting subsystems of train control systems. When the present event recorder rule was being prepared, the

automatic brake on most locomotives functioned by mechanical and pneumatic means, responding directly to manipulations of the controls by the locomotive engineer; and train control (where provided) addressed braking and power ''knock down'' functions very directly as well. Increasingly, braking functions are controlled electronically based on requests from the control stand, and the electronic commands themselves may pass through a second locomotive computer before being executed. Major manufacturers of locomotives have plans to run braking software on their own host processors. Further, some developing train control projects contemplate routing commands through other on-board computers.

In general, new electronic systems have functioned well, but there have been notable failures. It is obviously a dangerous situation when service braking is not available (requiring the engineer to employ the emergency braking feature). The unintended application of train brakes can also constitute a safety hazard, particularly in freight operations where management of in-train forces is a significant challenge. In the event of an accident, it is critical that data be logged in the event recorder memory module that is sufficient to determine the source of brake applications and releases. It should be known whether or not they were requested, and whether or not they occurred as requested, from the control stand. In the event no action was taken at the control stand that can explain the brake application, it is important to know (insofar as is feasible) the source of the application. While not every source of an unintended brake application can be determined in real time and monitored electronically, on-board computers capable of issuing a command for application or release of the brakes or executing such commands should be monitored to determine their role.

The proposed data element contained in subparagraphs (b)(3)(xxv) and (b)(4)(xxii) requires that safety-critical train control data routed to the locomotive engineer's display, with which the engineer is required to comply, be recorded. The data to be recorded would in every case include text messages conveying mandatory directives and maximum authorized speed. It may be necessary to record other data elements depending on the design of the train control system and the type of information displayed to the engineer (*e.g.*, distance to a ''target'' at which a particular action must be taken). The format, content, and proposed duration for retention of such data would be specified by the railroad in the product safety plan (PSP) submitted for the train control system under the new subpart H of 49 CFR Part 236, subject to FRA approval under this paragraph. FRA would expect to approve this element of the PSP if it was clear that data sufficient to determine the proper functioning of the train control system is routed to the memory module and retained for a sufficient period to support accident investigation. FRA anticipates that railroads will elect to record additional train control data elements in a crashworthy module (*e.g.*, train consist data entered by the crew that is critical to the correctness of the braking curve), and FRA will welcome inclusion of this additional data.

Train control systems are still evolving, and it is therefore difficult to anticipate what should be selected for recording; consequently, it may be difficult to plan for such eventualities. FRA believes that the proposed rule provides flexibility to address these future needs by determining data recording needs appropriate to various systems, including a shorter duration for data retention if appropriate to the subject matter. Contemporary solid state recorders are programmable and should be capable of receiving and retaining the necessary data. If, for some reason not presently foreseen, data retention requirements for a train control system exceed the capacity of the primary memory modules, secondary modules associated with the on-board train control computer could be used to meet the need.

The proposed provision uses the term ''safety-critical'' which is intended to have a meaning consistent with the meaning assigned in 49 CFR § 236.903. That section provides that ''safety-critical,'' as applied to a function, a system, or any portion thereof, means the correct performance of which is essential to safety of personnel and/or equipment, or the incorrect performance of which could cause a hazardous condition, or allow a hazardous condition which was intended to be prevented by the function or system to exist. In the present context, then, safety-critical data would be data displayed to the locomotive engineer that is integral to a safety-critical train control function (such as avoiding over-speed operation, preventing a collision, or preventing an incursion into a work zone). The safety-critical functions of a new train control system are defined by the railroad in the requirements section of the PSP (consistent with the assumptions specified in the accompanying risk assessment). In addition, the term ''mandatory directive,'' as used in this provision, has the meaning assigned to the term in 49 CFR § 220.5 (''any movement authority or speed restriction that affects a railroad operation'') and that definition has been duplicated in proposed § 229.5.

Subparagraph (b)(4) is a similar set of proposed new requirements for MU locomotives manufactured after one year from the effective date of the rule. Differences between subparagraphs (b)(3) and (b)(4) reflect the differences between freight locomotives and heavy electric commuter equipment, primarily in the particular brake application data required to be stored.

Subparagraph (b)(5) would require, when a locomotive equipped with an event recorder is remanufactured, that it be equipped with a certified crashworthy event recorder memory module capable of capturing the same data as the recorder on the pre-remanufactured locomotive.

Paragraph (c) is essentially the same as current paragraph (c), modified for clarity and to reflect the specific equipment requirements in paragraph (b).

Paragraph (d) is essentially the same as the current paragraph (b), rewritten to clarify that its provisions apply notwithstanding the duty to equip specified in paragraph (a).

Paragraph (e) combines and simplifies current paragraphs (d) and (d)(1). This paragraph proposes the requirement that, while the railroad may download the event recorder immediately following an accident/incident, the original downloaded data file must be preserved for FRA or the NTSB.

Paragraph (f) is the present paragraph (d)(2). It was separated for clarity and ease of citation.

Paragraph (g) is the present paragraph (e).

Appendix D. Appendix D contains the proposed criteria for certification of an event recorder memory module (ERMM) as crashworthy. Its elements were the result of the collaborative efforts of a task group of the RSAC Event Recorder Working Group and were adopted by the full RSAC in its recommendation to FRA. FRA agrees with the recommendation of the full RSAC This appendix establishes the general requirements, the testing sequence, and the required marking for memory modules certified by their manufacturers as crashworthy. This appendix also contains the proposed performance criteria for survivability from fire, impact shock, crush, fluid immersion, and hydrostatic pressure.

The proposed performance criteria contained in Section C of Appendix D

are presented in two tables which represent alternative performance criteria under which an ERMM could be tested for crashworthiness. During the development of this proposal the Working Group discussed and reviewed various performance criteria which some manufacturers of event recorders began using in an effort to pre-qualify their ERMMs. Rather than penalizing these manufacturers by including only the final draft performance criteria contained in Table 1, FRA also provides the performance criteria contained in Table 2 as an acceptable alternative. FRA expects that ERMMs built to Table 2 criteria would survive more extreme conditions than those built under Table 1. FRA is also advised by manufacturers that have already designed and tested Table 2 ERMMs that the incremental cost of event recorders built to those more rigorous criteria will be *less than* the incremental cost of Table 1 ERMMs (for which the differential associated with increased fire protection over the IEEE criteria is said to be the cost driver).

The proposed performance criteria contained in Table 1 of this appendix are adapted from the Institute of Electrical and Electronics Engineers, Inc., IEEE Std 1482.1–1999, *IEEE Standard for Rail Transit Vehicle Event Recorders.* Virtually all of the criteria contained in this table are included in Section 4.5 of the above noted IEEE standard. FRA has slightly modified the fire criteria to make it consistent with the conditions an event recorder would encounter in actual operation. FRA increased the IEEE high temperature fire standard from 650 degrees Celsius to 750 degrees Celsius because the higher temperature is consistent with the temperature at which locomotive diesel fuel burns. FRA also did not include IEEE's penetration standard as FRA finds it unnecessary for purposes of an event recorder mounted inside a locomotive. Although FRA and the Working Group explored other performance criteria, FRA believes that the criteria proposed in Table 1 are most likely to be acceptable to the vast majority of the parties participating in and affected by this regulation. Several manufacturer's of event recorders noted that they currently manufacture or are capable of manufacturing a crashworthy ERMM consist with IEEE's standard. Furthermore, the NTSB indicated its potential acceptance of the criteria contained in this proposal.

Table 2 of this appendix contains alternative performance criteria to those adapted from IEEE's standard. FRA has included the performance criteria contained in this table based on comments received from certain manufacturers indicating that they were currently producing crashworthy ERMMs based on the criteria contained in this table. The performance criteria contained in Table 2 are based on discussions conducted with the Working Group, were accepted by the full RSAC, and were contained in its recommendation to FRA. FRA considers them to be superior to those contained in Table 1. Thus, in order to accommodate those manufacturer's that took the lead in developing crashworthy ERMMs, FRA believes it is appropriate to include the criteria previously discussed and considered by the Working Group and recommended to FRA by the full RSAC as an alternative to the adapted IEEE standards. Therefore, manufacturers that have developed crashworthy ERMMs based on the criteria proposed in Table 2, would not need to retest their devices under the criteria contained in Table 1.

Table 2 contains two options for meeting the Impact Shock performance criteria. When using Table 2 criteria, crashworthy ERMMs may utilize either the IEEE impact shock performance criteria or the impact shock criteria developed by the Working Group. FRA believes that either impact shock criteria would be acceptable. FRA recognizes that the duration of the impact pulse proposed by the Working Group may be far more expensive to produce than that contained in the IEEE standard and that there are only a few testing laboratories capable of performing a test for that duration. FRA realizes that there is a trade-off between a higher impact value for a short duration as opposed to a lower impact pulse for a longer duration. FRA sees merit in both criteria and is not willing to espouse the benefits of either criterion over the other, and is therefore purposing to permit the use of either criterion when testing the ERMM.

FRA is proposing the performance criteria in Table 1 and 2 as alternative methods of certifying an ERMM as crashworthy. FRA seeks comments, information, and potential cost estimates for both sets of performance criteria from interested parties. Based on the comments received in response to this notice, FRA may seek to require the use of one or both sets of performance criteria (as may be suitable for a given segment of the railroad industry) or may develop different parameters altogether.

It should be noted that each set of criteria is a performance standard and FRA has not included any specific test procedures to achieve the required level of performance. Although FRA and the Working Group considered specific testing criteria, FRA does not believe it is necessary to include specific testing criteria in this regulation. FRA believes that the industry and the involved manufacturers are in the best position to determine the exact methods by which they will test for the specified performance parameters. The Working Group did consider the testing criteria contained in the following international standards: (1) The European Organization for Civil Aviation Equipment (EUROCAE), ED–55, *Minimum Operational Performance Specification for Flight Data Recorder System* (May 1990); (2) EUROCAE ED–56A, *Minimum Operational Requirement for Cockpit Voice Recorder System* (December 1993); and (3) The *Fluid Immersion Test Procedures* contained in the National Fire Protection Association's *Fire Protection Handbook*, 18th Edition. Although FRA endorses the use of any of the above standards, FRA is not proposing to mandate their use at this time. Appendix D makes clear that any testing procedures employed by a manufacturer must be documented, recognized, and acceptable. FRA seeks comments from any interested parties regarding the need to include specific testing criteria. Such comments should specifically identify the testing procedures sought to be included and provide a detailed analysis indicating the need for such inclusion.

FRA wishes to inform all interested parties that they may obtain a copy of the standards noted in the above discussion through the following: (1) The EUROCAE standards may be obtained from The European Organization for Civil Aviation Equipment, 17, rue Hamelin, 75783 PARIS CEDEX 16, France; (2) the *Fire Protection Handbook,* 18th Edition, may be obtained from the National Fire Protection Association, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269–9101; and (3) the *IEEE Standard for Rail Transit Event Recorders*, IEEE Std 1482.1–1999, may be obtained from The Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, NY 10017–2394. Interested parties may also inspect a copy of any of these materials during normal business hours at the Federal Railroad Administration, Docket Clerk, Suite 7000, 1120 Vermont Avenue, NW., Washington DC 20590.

Section E of appendix D contains a proposed testing exception for new model crashworthy ERMMs that represent an evolution or upgrade of an older model ERMM meeting the performance criteria contained in this appendix. FRA has included this

exception based on its determination that there is no reason to subject a new model ERMM to the proposed testing where no material change has been made to the unit that would impact any of the performance criteria. For example, if a memory chip is modified but the remainder of the box is left unchanged, there would likely be no reason to subject the unit to all or any of the required tests. In this example, the only performance criteria, if any, potentially affected might be the fire standard. This proposed section makes clear that the new model ERMM need only be tested for compliance with those performance criteria contained in Section C of appendix D that are potentially affected by the upgrade or modification. FRA will consider a performance criteria to not be potentially affected if a preliminary engineering analysis or other pertinent data establishes that the modification or upgrade will not affect the crashworthy performance criteria established by the older model ERMM. The proposed provision requires the manufacturer to retain and make available to FRA upon request any analysis or data relied upon to make a determination relating to the crashworthiness impacts of any upgrade or modification to an older model ERMM.

VI. Regulatory Impact and Notices

Executive Order 12866 and DOT Regulatory Policies and Procedures

This proposed rule has been evaluated in accordance with existing policies and procedures, and determined to be significant under both Executive Order 12866 and DOT policies and procedures (44 FR 11034; Feb. 26, 1979). FRA has prepared and placed in the docket a regulatory evaluation addressing the economic impact of this rule. Document inspection and copying facilities are available at the Department of Transportation Central Docket Management Facility located in Room PL–401 on the Plaza level of the Nassif Building, 400 Seventh Street, SW., Washington, DC 20590. Access to the docket may also be obtained electronically through the Web site for the DOT Docket Management System at *http://dms.dot.gov.* Photocopies may also be obtained by submitting a written request to the FRA Docket Clerk at Office of Chief Counsel, Stop 10, Federal Railroad Administration, 1120 Vermont Avenue, NW., Washington, DC 20590; please refer to Docket No. FRA–2003–16357. FRA invites comments on this regulatory evaluation.

Event recorders have successfully improved the safety of rail operations by monitoring railroad operations and by capturing the pre-accident inputs to the train control. This impartial collection of data has improved the ability of the railroads and the railroad operating employees, the ability of the railroads and governmental agencies to investigate accidents, and the ability of FRA and the States to regulate railroad operations. These contributions have, in turn, tended to reduce the number and severity of incidents, accidents, and resulting damage and casualties. The higher standards proposed in this NPRM can be expected to produce even greater safety progress. Therefore, dilution of the existing standards or rejection of the higher standards proposed in this NPRM would create the potential for an increase in property damage, injuries, and fatalities resulting from rail accidents.

The Regulatory Impact Analysis (RIA) developed in connection with this proposed rule uses a break-even analysis approach to assessing the monetary impacts and safety benefits of this proposal. This approach is appropriate for this particular rule because event recorders do not directly prevent accidents. Event recorders may indirectly prevent future accidents by allowing for in-depth accident causation analysis to take place using complete information, thereby allowing accurate causation determinations, and the development of appropriate and effective countermeasures. Because event recorders also allow the railroad to monitor train handling performance and rules compliance in a widespread and economical way, FRA believes that event recorders might have the potential of increasing skillful train handling and encouraging rules compliance. The extent of the event recorders' contribution to accident analyses, train handling, and rules compliance is somewhat open to interpretation and argument. FRA is not in a position to claim a particular degree of improvement in these areas from event recorders. Therefore, the RIA simply states the level of effectiveness (avoided accidents, etc.) that event recorders would have to reach such that the cost of the proposed rule would be ''paid for'' by the benefits expected to be achieved. It should be noted that the accident figures used in FRA's analysis do not include the costs of environmental cleanup or evacuations related to human factor caused accidents.

FRA expects that overall the rule will not impose a significant additional cost on the rail industry over the next twenty years. FRA believes it is reasonable to expect that several accidents, injuries, and fatalities will be avoided as a result of implementing this proposed rule. FRA believes that this safety benefit alone justifies the measures proposed in this document. FRA also believes that the safety of rail operations will be compromised if this rule is not implemented. The RIA indicates that an accident reduction of approximately 2 percent (2%) annually during the first twenty years ''breaks-even'' with the expected costs of the proposed rule. In FRA's judgement this level of Human Factor Accident reduction is clearly achievable, and is likely to be exceeded. This is all the more likely if one or more of the accidents prevented is a passenger train accident. Passenger train accidents usually have more casualties than other types of train accidents, just based on the fact that more people are exposed to the dangers and damages of the accident. Also, those types of accidents tend to be much more disastrous than a typical freight train accident, such as a derailment or an accident that does not involve hazardous materials, thus costing much more than the assigned average value of a human factor accident.

Although FRA believes this proposed regulation is justified by safety benefits alone, the addition of clear and substantial business benefits makes the proposal obviously justified. For example, the estimated savings resulting from just the proposed requirement of the floating year approach to the inspection period is a total 20-year benefit of approximately $ 1.2 million. In addition to this quantified business benefit there are other benefits which may result from this proposed rule that are not quantified in the RIA. For example, the quality and quantity of information gained by recorded data resulting in increased knowledge of train handling and pre-accident inputs (events occurring just prior to impact which may have contributed to the cause) and the public perception that the railroads offer higher levels of safety and efficiency are not easily quantified benefits.

The following table presents estimated twenty-year *monetary* impacts associated with the proposed new requirement for crashworthy event recorders. The table contains the estimated costs and benefits associated with this NPRM and provides the total 20-year value as well as the 20-year net present value (NPV) for each indicated item. The dollar amounts presented in this table have been rounded to the nearest thousand. For exact estimates, interested parties should consult the

RIA that has been made part of the docket in this proceeding.

Description	20-year total($)	20-year NPV($)
Costs:		
Replacement of Magnetic Tape Recorders:	6,310,000	4,976,000
Crashworthy ERMM no new parameters:	558,000	296,000
Crashworthy ERMM new parameters:	16,494,000	8,706,000
Maintenance/Inspections:	16,107,000	8,281,000
Total Costs:	39,469,000	22,258,000
Benefits:		
Safety: Reduction of Human Factor accidents and injuries (2% effectiveness):	42,808,000	22,675,000
Business: Magnetic tape inspection savings:	1,751,000	1,201,000
Total Benefits:	44,559,000	23,876,000

Regulatory Flexibility Act and Executive Order 13272

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) and Executive Order 13272 require a review of proposed and final rules to assess their impact on small entities. FRA has prepared and placed in the docket an Analysis of Impact on Small Entities (AISE) that assesses the small entity impact of this proposal. Document inspection and copying facilities are available at the Department of Transportation Central Docket Management Facility located in Room PL–401 on the Plaza level of the Nassif Building, 400 Seventh Street, SW., Washington, DC 20590. Docket material is also available for inspection on the Internet at *http://dms.dot.gov.* Photocopies may also be obtained by submitting a written request to the FRA Docket Clerk at Office of Chief Counsel, Stop 10, Federal Railroad Administration, 1120 Vermont Avenue, NW., Washington, DC 20590; please refer to Docket No. FRA–2003–16357.

''Small entity'' is defined in 5 U.S.C. 601 as a small business concern that is independently owned and operated, and is not dominant in its field of operation. The U.S. Small Business Administration (SBA) has authority to regulate issues related to small businesses, and stipulates in its size standards that a ''small entity'' in the railroad industry is a railroad business ''line-haul operation'' that has fewer than 1,500 employees and a ''switching and terminal'' establishment with fewer than 500 employees. SBA's ''size standards'' may be altered by Federal agencies, in consultation with SBA and in conjunction with public comment.

Pursuant to that authority FRA has published a final statement of agency policy that formally establishes ''small entities'' as being railroads that meet the line-haulage revenue requirements of a Class III railroad. *See* 68 FR 24891 (May 9, 2003). Currently, the revenue requirements are $20 million or less in annual operating revenue. The $20 million limit is based on the Surface Transportation Board's (STB's) threshold of a Class III railroad carrier, which is adjusted by applying the railroad revenue deflator adjustment (49 CFR part 1201). The same dollar limit on revenues is established to determine whether a railroad, shipper, or contractor is a small entity. FRA uses this alternative definition of ''small entity'' for this rulemaking.

The AISE developed in connection with this NPRM concludes that this proposal would not have a significant economic impact on a substantial number of small entities. Thus, FRA certifies that this proposed rule is not expected to have a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act or Executive Order 13272.

While about 645 of the approximately 700 railroads operating in the United States are considered small businesses by FRA, this proposed rule would only apply to railroads that operate passenger or freight trains at speeds greater than 30 mph. Very few of these smaller railroads conduct operations on track that is suitable for top speeds of greater than 30 mph, i.e., track maintained above Class 2 standards; thus, FRA believes that the vast majority of small railroads would not be impacted by the proposed rule. Further, most small railroads own older locomotives and, thus, would not be affected by the new equipment requirements of this rule. FRA estimates that approximately only 350 locomotives operated by these smaller railroads would be affected by the provisions contained in this proposed rule. The AISE associated with this proposal estimates that the economic impact on these operations will have an NPV of less than $400,000 over a 20-year period. Representatives of small railroads participated in the RSAC discussion that provided the basis for this proposal. FRA seeks comments and input from all interested parties regarding the estimates contained in the AISE developed in connection with this NPRM.

Paperwork Reduction Act

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

CFR Section	Respondent universe	Total annual responses	Average time per response	Total annual burden hours	Total annual burden cost
229.9—Movement of Non-Complying Locomotives.	685 Railroads	21,000 tags	1 minute	350	$12,250.
229.17—Accident Reports	685 Railroads	1 report	15 minutes	.25	$10.
229.21—Daily Inspection	685 Railroads	5,655,000 rcds.	1 or 3 min.	263,383	$10,798,703.
Form FRA F 6180.49A Locomotive Insp/Repair Rcd.	685 Railroads	14,750 forms	2 minutes	492	$17,220.
210.31—Locomotive Noise Emission Test	685 Railroads	100 tests/remarks	15 minutes	25	$850.

CFR Section	Respondent universe	Total annual responses	Average time per response	Total annual burden hours	Total annual burden cost
229.23/229.27/229.29/229.31—Periodic Inspection/Annual Biennial Tests/Main Res. Tests.	685 Railroads	87,000 tests	8 hours	696,000	$24,360,000.
229.33—Out-of Use Credit	685 Railroads	1,000 notations	5 minutes	83	$2,822.
229.25(1)—Test: Every Periodic Insp.—Written Copies of Instruction.	685 Railroads	200 amendments	15 minutes	50	$1,700.
229.25(2)—Duty Verification Readout Record.	685 Railroads	4,025 records	30 minutes	2,013	$58,377.
229.25(3)—Pre-Maintenance Test—Failures.	685 Railroads	700 notations	30 minutes	350	$10,150.
229.135(A.)—Removal From Service	685 Railroads	1,000 tags	1 minute	17	$578.
229.135(B.)—Preserving Accident Data	685 Railroads	100 reports	15 minutes	25	$850.
NEW REQUIREMENTS					
229.27—Annual Tests	685 Railroads	700 Test Records	90 minutes	1,050	$30,450.
229.135(b)(1) & (2)—Equipment Rqmnts—Mag Tap Replacements.	685 Railroads	850 Cert. Mem Modules.	2 hours + 200 hours	1,900	Included in RIA.
229.135(b)(3)—Equipment Rqmnts—Lead Locomotives.	685 Railroads	600 Cert. Mem Modules.	2 hours	1,200	Included in RIA.
229.135(b)(4)—Equipment Rqmnts—MU Locomotives.	685 Railroads	255 Cert. Mem Modules.	2 hours	510	Included in RIA.
229.135(b)(5)—Equipment Rqmnts—Other Locomotives.	685 Railroads	1,040 Cert. Mem Modules.	2 hours	2,080	Included in RIA

All estimates include the time for reviewing instructions; searching existing data sources; gathering or maintaining the needed data; and reviewing the information. Pursuant to 44 U.S.C. 3506(c)(2)(B), the FRA solicits comments concerning: whether these information collection requirements are necessary for the proper performance of the function of FRA, including whether the information has practical utility; the accuracy of FRA's estimates of the burden of the information collection requirements; the quality, utility, and clarity of the information to be collected; and whether the burden of collection of information on those who are to respond, including through the use of automated collection techniques or other forms of information technology, may be minimized. For information or a copy of the paperwork package submitted to OMB contact Robert Brogan at 202–493–6292.

FRA believes that soliciting public comment will promote its efforts to reduce the administrative and paperwork burdens associated with the collection of information mandated by Federal regulations. In summary, FRA reasons that comments received will advance three objectives: (i) Reduce reporting burdens; (ii) ensure that it organizes information collection requirements in a ''user friendly'' format to improve the use of such information; and (iii) accurately assess the resources expended to retrieve and produce information requested. *See* 44 U.S.C. 3501.

Comments must be received no later than September 28, 2004. Organizations and individuals desiring to submit comments on the collection of information requirements should direct them to Robert Brogan, Federal Railroad Administration, RRS–21, Mail Stop 17, 1120 Vermont Ave., NW., MS–17, Washington, DC 20590. Comments may also be sent to Robert Brogan via e-mail at the following address: *robert.brogan@fra.dot.gov.*

OMB is required to make a decision concerning the collection of information requirements contained in this proposed rule between 30 and 60 days after publication of this document in the **Federal Register**. Therefore, a comment to OMB is best assured of having its full effect if OMB receives it within 30 days of publication. The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

FRA cannot impose a penalty on persons for violating information collection requirements which do not display a current OMB control number, if required. FRA intends to obtain current OMB control numbers for any new information collection requirements resulting from this rulemaking action prior to the effective date of a final rule. The OMB control number, when assigned, will be announced by separate notice in the **Federal Register.**

Federalism Implications

FRA has analyzed this proposed rule in accordance with the principles and criteria contained in Executive Order 13132, issued on August 4, 1999, which directs Federal agencies to exercise great care in establishing policies that have federalism implications. *See* 64 FR 43255. This proposed rule will not have a substantial effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among various levels of government. This proposed rule will not have federalism implications that impose any direct compliance costs on State and local governments.

FRA notes that the RSAC, which endorsed and recommended this proposed rule to FRA, has as permanent members two organizations representing State and local interests: the American Association of State Highway and Transportation Officials (AASHTO) and the Association of State Rail Safety Managers (ASRSM). Both of these State organizations concurred with the RSAC recommendation endorsing this proposed rule. The RSAC regularly provides recommendations to the FRA Administrator for solutions to regulatory issues that reflect significant input from its State members. To date, FRA has received no indication of concerns about the Federalism implications of this rulemaking from these representatives or of any other representatives of State government. Consequently, FRA concludes that this proposed rule has no federalism implications, other than the preemption of state laws covering the subject matter of this proposed rule, which occurs by operation of law under 49 U.S.C. 20106 whenever FRA issues a rule or order.

Environmental Impact

FRA has evaluated this regulation in accordance with its ''Procedures for Considering Environmental Impacts'' (FRA's Procedures) (64 FR 28545, May 26, 1999) as required by the National Environmental Policy Act (42 U.S.C. 4321 *et seq.*), other environmental statutes, Executive Orders, and related regulatory requirements. FRA has determined that this regulation is not a major FRA action (requiring the preparation of an environmental impact statement or environmental assessment) because it is categorically excluded from detailed environmental review pursuant to section 4(c)(20) of FRA's Procedures. 64 FR 28547, May 26, 1999. Section 4(c)(20) reads as follows:

(c) Actions categorically excluded. Certain classes of FRA actions have been determined to be categorically excluded from the requirements of these Procedures as they do not individually or cumulatively have a significant effect on the human environment. * * * The following classes of FRA actions are categorically excluded:

* * *

(20) Promulgation of railroad safety rules and policy statements that do not result in significantly increased emissions or air or water pollutants or noise or increased traffic congestion in any mode of transportation.

In accordance with section 4(c) and (e) of FRA's Procedures, the agency has further concluded that no extraordinary circumstances exist with respect to this regulation that might trigger the need for a more detailed environmental review. As a result, FRA finds that this proposed regulation is not a major Federal action significantly affecting the quality of the human environment.

Unfunded Mandates Reform Act of 1995

Pursuant to Section 201 of the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4, 2 U.S.C. 1531), each Federal agency ''shall, unless otherwise prohibited by law, assess the effects of Federal regulatory actions on State, local, and tribal governments, and the private sector (other than to the extent that such regulations incorporate requirements specifically set forth in law).'' Section 202 of the Act (2 U.S.C. 1532) further requires that ''before promulgating any general notice of proposed rulemaking that is likely to result in the promulgation of any rule that includes any Federal mandate that may result in expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of $100,000,000 or more (adjusted annually for inflation) in any 1 year, and before promulgating any final rule for which a general notice of proposed rulemaking was published, the agency shall prepare a written statement'' detailing the effect on State, local, and tribal governments and the private sector. The proposed rule would not result in the expenditure, in the aggregate, of $100,000,000 or more in any one year, and thus preparation of such a statement is not required.

Energy Impact

Executive Order 13211 requires Federal agencies to prepare a Statement of Energy Effects for any ''significant energy action.'' 66 FR 28355 (May 22, 2001). Under the Executive Order, a ''significant energy action'' is defined as any action by an agency (normally published in the **Federal Register**) that promulgates or is expected to lead to the promulgation of a final rule or regulation, including notices of inquiry, advance notices of proposed rulemaking, and notices of proposed rulemaking: (1)(i) that is a significant regulatory action under Executive Order 12866 or any successor order, and (ii) is likely to have a significant adverse effect on the supply, distribution, or use of energy; or (2) that is designated by the Administrator of the Office of Information and Regulatory Affairs as a significant energy action. FRA has evaluated this NPRM in accordance with Executive Order 13211. FRA has determined that this NPRM is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Consequently, FRA has determined that this regulatory action is not a ''significant energy action'' within the meaning of Executive Order 13211.

Privacy Act

FRA wishes to inform all potential commenters that anyone is able to search the electronic form of all comments received into any agency docket by the name of the individual submitting the comment (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the **Federal Register** published on April 11, 2000 (Volume 65, Number 70; Pages 19477–78) or you may visit *http://dms.dot.gov.*

List of Subjects in 49 CFR Part 229

Accident investigation, Data preservation, Event recorders, Locomotives, National Transportation Safety Board, Penalties, Railroad safety, Railroads, Reporting and record keeping requirements.

The Proposed Rule

For the reasons discussed in the preamble, the Federal Railroad Administration proposes to amend part 229 of chapter II, subtitle B of Title 49, Code of Federal Regulations, as follows:

PART 229—[AMENDED]

1. The authority citation for part 229 is revised to read as follows:

Authority: 49 U.S.C. 20102–03, 20107, 20133, 20137–38, 20143, 20701–03, 21301–02, 21304; 28 U.S.C. 2401, note; and 49 CFR1.49(c),(m).

2. Section 229.5 is revised to read as follows:

§ 229.5 Definitions.

As used in this part—

Break means a fracture resulting in complete separation into parts.

Cab means that portion of the superstructure designed to be occupied by the crew operating the locomotive.

Carrier means *railroad,* as that term is defined below.

Commuter Service means the type of railroad service described under the heading ''Commuter Operations'' in 49 CFR part 209, appendix A.

Commuter work train is a non-revenue service train used in the administration and upkeep service of the commuter railroad.

Control cab locomotive means a locomotive without propelling motors but with one or more control stands.

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

Cruise control means a device that controls locomotive power output to obtain a targeted speed. A device that functions only at or below 30 miles per hour is NOT considered a ''cruise control'' for purposes of this part.

Data element means data point(s) or value(s) reflecting on-board train operations at a particular time. Data may be actual or ''passed through'' values or may be derived from a combination of values from other sources.

Dead locomotive means—

(1) A locomotive, other than a control cab locomotive, that does not have any traction device supplying tractive power; or

(2) A control cab locomotive that has a locked and unoccupied cab.

Distributed power system means a system that provides automatic control of a number of locomotives dispersed throughout a train from a controlling locomotive located in the lead position. The system provides control of the rearward locomotives by command signals originating at the lead locomotive and transmitted to the remote (rearward) locomotives.

Electronic air brake means a brake system controlled by a computer which provides the means for control of the locomotive brakes or train brakes or both.

Event recorder means a device, designed to resist tampering, that monitors and records data, as detailed in § 229.135(b), over the most recent 48 hours of operation of the electrical system of the locomotive on which the device is installed. However, a device, designed to resist tampering, that monitors and records the specified data only when the locomotive is in motion meets this definition if the device was installed prior to November 5, 1993 and if it records the specified data for the last eight hours the locomotive was in motion.

Event recorder memory module means that portion of the event recorder used to retain the recorded data as detailed in § 229.135(b).

High voltage means an electrical potential of more than 150 volts.

In-service event recorder means an event recorder that was successfully tested as prescribed in § 229.27(d) and whose subsequent failure to operate as intended, if any, is not actually known by the railroad operating the locomotive on which it is installed.

Lead locomotive means the first locomotive proceeding in the direction of movement.

Lite locomotive means a locomotive or a consist of locomotives not attached to any piece of equipment or attached only to a caboose.

Locomotive means a piece of on-track equipment other than hi-rail, specialized maintenance, or other similar equipment—

(1) With one or more propelling motors designed for moving other equipment;

(2) With one or more propelling motors designed to carry freight or passenger traffic or both; or

(3) Without propelling motors but with one or more control stands.

Mandatory directive means any movement authority or speed restriction that affects a railroad operation.

Modesty lock means a latch that can be operated in the normal manner only from within the sanitary compartment, that is designed to prevent entry of another person when the sanitary compartment is in use. A modesty lock may be designed to allow deliberate forced entry in the event of an emergency.

MU locomotive means a multiple operated electric locomotive—

(1) With one or more propelling motors designed to carry freight or passenger traffic or both; or

(2) Without propelling motors but with one or more control stands.

Other short-haul passenger service means the type of railroad service described under the heading ''Other short-haul passenger service'' in 49 CFR part 209, Appendix A.

Potable water means water that meets the requirements of 40 CFR part 141, the Environmental Protection Agency's Primary Drinking Water Regulations, or water that has been approved for drinking and washing purposes by the pertinent state or local authority having jurisdiction. For purposes of this part, commercially available, bottled drinking water is deemed potable water.

Powered axle is an axle equipped with a traction device.

Railroad means all forms of non-highway ground transportation that run on rails or electromagnetic guideways, including commuter or other short-haul rail passenger service in a metropolitan or suburban area, and high speed ground transportation systems that connect metropolitan areas, without regard to whether they use new technologies not associated with traditional railroads. Such term does not include rapid transit operations within an urban area that are not connected to the general railroad system of transportation.

Remanufactured locomotive means a locomotive rebuilt or refurbished from a previously used or refurbished underframe (''deck''), containing fewer than 25 percent previously used components (weighted by dollar value of the components).

Sanitary means lacking any condition in which any significant amount of filth, trash, or human waste is present in such a manner that a reasonable person would believe that the condition might constitute a health hazard; or of strong, persistent, chemical or human waste odors sufficient to deter use of the facility, or give rise to a reasonable concern with respect to exposure to hazardous fumes. Such conditions include, but are not limited to, a toilet bowl filled with human waste, soiled toilet paper, or other products used in the toilet compartment, that are present due to a defective toilet facility that will not flush or otherwise remove waste; visible human waste residue on the floor or toilet seat that is present due to a toilet that overflowed; an accumulation of soiled paper towels or soiled toilet paper on the floor, toilet facility, or sink; an accumulation of visible dirt or human waste on the floor, toilet facility, or sink; and strong, persistent chemical or human waste odors in the compartment.

Sanitation compartment means an enclosed compartment on a railroad locomotive that contains a toilet facility for employee use.

Self-monitoring event recorder means an event recorder that has the ability to monitor its own operation and to display an indication to the locomotive operator when any data required to be stored are not stored or when the stored data do not match the data received from sensors or data collection points.

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

Switching service means the classification of railroad freight and passenger cars according to commodity or destination; assembling cars for train movements; changing the position of cars for purposes of loading, unloading, or weighing; placing locomotives and cars for repair or storage; or moving rail equipment in connection with work service that does not constitute a train movement.

Throttle position means any and all of the discrete output positions indicating the speed/tractive effort characteristic requested by the operator of the locomotive on which the throttle is installed. Together, the discrete output positions shall cover the entire range of possible speed/tractive effort characteristics. If the throttle has continuously variable segments, the event recorder shall capture either:

(1) The exact level of speed/tractive effort characteristic requested, on a scale of zero (0) to one hundred percent (100%) of the output variable; or

(2) A value converted from a percentage to a comparable 0 to 8 digital signal.

Time means either ''time-of-day'' or ''elapsed time'' (from an arbitrarily determined event) as determined by the manufacturer. In either case, the recorder must be able to convert to an accurate time-of-day with the time zone stated unless it is GMT(UTC).

Toilet facility means a system that automatically or on command of the user removes human waste to a place where it is treated, eliminated, or retained such that no solid or non-treated liquid waste is thereafter permitted to be released into the bowl, urinal, or room and that prevents harmful discharges of gases or persistent offensive odors.

Transfer service means a freight train that travels between a point of origin and a point of final destination not exceeding 20 miles and that is not performing switching service.

Unsanitary means having any condition in which any significant amount of filth, trash, or human waste is present in such a manner that a reasonable person would believe that the condition might constitute a health hazard; or strong, persistent, chemical or human waste odors sufficient to deter use of the facility, or give rise to a reasonable concern with respect to exposure to hazardous fumes. Such conditions include, but are not limited to, a toilet bowl filled with human waste, soiled toilet paper, or other products used in the toilet compartment, that are present due to a defective toilet facility that will not flush or otherwise remove waste; visible human waste residue on the floor or toilet seat that is present due to a toilet that overflowed; an accumulation of soiled paper towels or soiled toilet paper on the floor, toilet facility, or sink; an accumulation of visible dirt or human waste on the floor, toilet facility, or sink; and strong, persistent chemical or human waste odors in the compartment.

Washing system means a system for use by railroad employees to maintain personal cleanliness that includes a secured sink or basin, water, antibacterial soap, and paper towels; or antibacterial waterless soap and paper towels; or antibacterial moist towelettes and paper towels; or any other combination of suitable antibacterial cleansing agents.

3. Section 229.25 is amended by revising paragraph (e) to read as follows:

§ 229.25 Tests: Every periodic inspection.

* * * * *

(e) *Event Recorder.* A microprocessor-based self-monitoring event recorder, if installed, is exempt from periodic inspection under paragraphs (e)(1) through (e)(5) of this section and shall be inspected annually as required by § 229.27(d). Other types of event recorders, if installed, shall 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 shall be kept at the point where the work is performed and a hard-copy version, written in the English language, shall be made available upon request of a governmental agent empowered to request it.

(2) The event recorder shall be tested before any maintenance work is performed on it. At a minimum, the event recorder test shall 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 does not reveal that the device is recording all the specified data and that all recordings are within the designed recording elements, this fact shall be noted, and maintenance and testing shall be performed as necessary until a subsequent test is successful.

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

(5) A railroad's event recorder periodic maintenance shall be considered effective if 90 percent of the recorders on 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.

4. Section 229.27 is amended by revising the introductory text and by adding a new paragraph (d) to read as follows:

§ 229.27 Annual tests.

A locomotive, except for an MU locomotive, shall be subjected to the tests and inspections prescribed in paragraphs (a), (b), and (c) of this section. An MU locomotive shall be subjected to the tests and inspections prescribed in paragraphs (b) and (c) of this section. A locomotive, including an MU locomotive, equipped with a microprocessor-based event recorder that includes a self-monitoring feature, shall be subjected to the tests and inspections prescribed in paragraph (d) of this section, at intervals that do not exceed 368 calendar days.

* * * * *

(d) 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, shall be made of that fact and of any maintenance work necessary to achieve the successful result. This record shall be available at the location where the locomotive is maintained until a record of a subsequent successful test is filed.

(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 shall be performed until a subsequent test is successful. When a successful test is accomplished, a record, in any medium, shall be made of that fact and of any maintenance work necessary to achieve the successful result. This record shall be kept at the location where the locomotive is maintained until a record of a subsequent successful test is filed. The download shall be taken from information stored in the certified crashworthy crash hardened event recorder memory module if the locomotive is so equipped.

5. Section 229.135 is revised to read as follows:

§ 229.135 Event recorders.

(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 shall 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 shall 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 shall record the most recent 48 hours of operation of the electrical system of the locomotive on which it is installed.

(b) *Equipment requirements.* Event recorders shall 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 manufactured before [date one (1) year after the effective date of the final rule],

including a controlling remote distributed power locomotive and an MU locomotive, except as provided in paragraphs (c) and (d) of this section, shall have an in-service event recorder that records the following data elements:

(i) Train speed;

(ii) Selected direction of motion;

(iii) Time;

(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 [date one (1) year after the effective date of the final rule] and equipped with an event recorder that uses magnetic tape as its recording medium shall have the recorder removed from service on or before [date six (6) years after the effective date of the final rule] 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.

(3) A lead locomotive and a controlling remotely distributed power locomotive, other than an MU locomotive, originally ordered on or after [date one (1) year after effective date of the final rule] shall 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 shall 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 of the collision posts and above the platform level is deemed to be mounted ''for its maximum protection.'') The event recorder shall record, and the certified crashworthy event recorder memory module shall retain, the following data elements:

(i) Train speed;

(ii) Selected direction of motion;

(iii) Time;

(iv) Distance;

(v) Throttle position;

(vi) Applications and operations of the train automatic air brake, including emergency applications. The system shall 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 shall 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.

(4) An MU locomotive originally ordered on or after [date one (1) year after effective date of the final rule] shall 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 shall be mounted for its maximum protection. (Although other mounting standards may meet this standard, an event recorder memory module mounted behind the collision posts and above the platform level is deemed to be mounted ''for its maximum protection.'') The event recorder shall record, and the certified crashworthy event recorder memory module shall retain, the following data elements:

(i) Train speed;

(ii) Selected direction of motion;

(iii) Time;

(iv) Distance;

(v) Throttle position;

(vi) Applications and operations of the train automatic air brake, including emergency applications. The system shall 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 shall record, or provide a means of determining, the involvement of any 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);

(xii) Wheel slip/slide alarm activation (with a property-specific minimum duration);

(xiii) Lead locomotive headlight activation switch on/off;

(xiv) Lead locomotive auxiliary lights activation switch on/off;

(xv) Horn control handle activation;

(xvi) Locomotive number;

(xvii) Locomotive position in consist (lead or trail);

(xviii) Tractive effort;

(xix) Brakes apply summary train line;

(xx) Brakes released summary train line;

(xxi) Cruise control on/off, if so equipped and used; and

(xxii) 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.

(5) A locomotive equipped with an event recorder that is remanufactured, as defined in this part, on or after [date two (2) years after effective date of the final rule], shall 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 remanufactured.

(c) *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.

(d) *Response to defective equipment.* Notwithstanding the duty established in paragraph (a) of this section to equip certain locomotives with an in-service event recorder, a locomotive on which the event recorder has been taken out of service as provided in paragraph (c) of this section may remain as the lead locomotive only until the next calendar-day inspection. A locomotive with an inoperative event recorder is not deemed to be in improper condition, unsafe to operate, or a non-complying locomotive under §§ 229.7 and 229.9, and, other than the requirements of appendix D of this part, the inspection, maintenance, and testing of event recorders are limited to the requirements set forth in §§ 229.25(e) and 229.27(d).

(e) *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 exact 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 30 days after the date of the accident unless FRA or the Board notifies the railroad in writing that the data are desired for analysis.

(f) *Relationship to other laws.* Nothing in this section is intended to alter the legal authority of law enforcement officials investigating potential violation(s) of State criminal law(s), and nothing in this chapter is intended to alter in any way the priority of National Transportation Safety Board investigations under 49 U.S.C. 1131 and 1134, nor the authority of the Secretary of Transportation to investigate railroad accidents under 49 U.S.C. 5121, 5122, 20107, 20111, 20112, 20505, 20702, 20703, and 20902.

(g) *Disabling event recorders.* Except as provided in paragraph (c) of this section, any individual who willfully disables an event recorder is subject to civil penalty and to disqualification from performing safety-sensitive functions on a railroad as provided in § 218.55 of this chapter, and any individual who tampers with or alters the data recorded by such a device is subject to a civil penalty as provided in appendix B of part 218 of this chapter and to disqualification from performing safety-sensitive functions on a railroad if found unfit for such duties under the procedures in part 209 of this chapter.

6. A new appendix D is added to part 229 to read as follows:

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. This appendix prescribes the requirements for certifying an event recorder memory module (ERMM) 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 shall, 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 shall 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 shall be retained by the manufacturer or its successor as long as the specific model of ERMM remains in service on any locomotive.

3. A crashworthy ERMM shall be marked by its manufacturer as specified in Section B of this appendix.

B. Marking Requirements

1. The outer surface of the event recorder containing a certified crashworthy ERMM shall be colored international orange. In addition, the outer surface shall 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 manufacturer of the event recorder. This information may be displayed as follows:

CERTIFIED DOT CRASHWORTHY

Event Recorder Memory Module Model Number

Manufacturer's Name

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 shall be applied to the edges of each visible external surface of an event recorder containing a certified crashworthy ERMM.

C. Performance Criteria for the ERMM

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 contained in this section of appendix D. (See Tables 1 and 2 of this appendix.) Each ERMM must met the individual performance criteria in the sequence established in Section D of this appendix. Performance criteria are deemed to be met if 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.

TABLE 1.—ACCEPTABLE PERFORMANCE CRITERIA—OPTION A

Parameter	Value	Duration	Remarks
Fire, High Temperature	750°C (1400°F)	60 minutes	Heat source: Oven.
Fire, Low Temperature	260°C (500°F)	10 hours.	
Impact Shock	55g	100 ms	½ sine crash pulse.
Static Crush	110kN (25,000 lbf)	5 minutes.	
Fluid Immersion	#1 Diesel #2 Diesel Water Salt Water Lube Oil	Any *single* fluid, 48 hours.	
	Fire Fighting Fluid	10 minutes, following immersion above.	Immersion followed by 48 hours in a dry location with out further disturbance.
Hydrostatic Pressure	Depth equivalent = 15 m. (50 of ft.).	48 hours at nominal temperature of 25°c (77°F).	

TABLE 2.—ACCEPTABLE PERFORMANCE CRITERIA—OPTION B

Parameter	Value	Duration	Remarks
Fire, High Temperature	1000°C (1832°F)	60 minutes	Heat source: Open flame.
Fire, Low Temperature	260°C (500°F)	10 hours	Heat source: Oven.
Impact Shock—Option 1	23gs	250 ms.	
Impact Shock—Option 2	55gs	100 ms	½ sine crash pulse.
Static Crush	111.2kN (25,000lbf)	5 minutes.	
	445.5kN (10,000lbf)	(single ''squeeze'')	Applied to 25% of surface of largest face.
Fluid Immersion	#1 Diesel #2 Diesel Water Salt Water Lube Oil Fire Fighting Fluid	48 hours *each*.	
Hydrostatic Pressure	46.62 psig (= 30.5 m. or 100 ft.)	48 hours at nominal temperature of 25°c (77°F).	

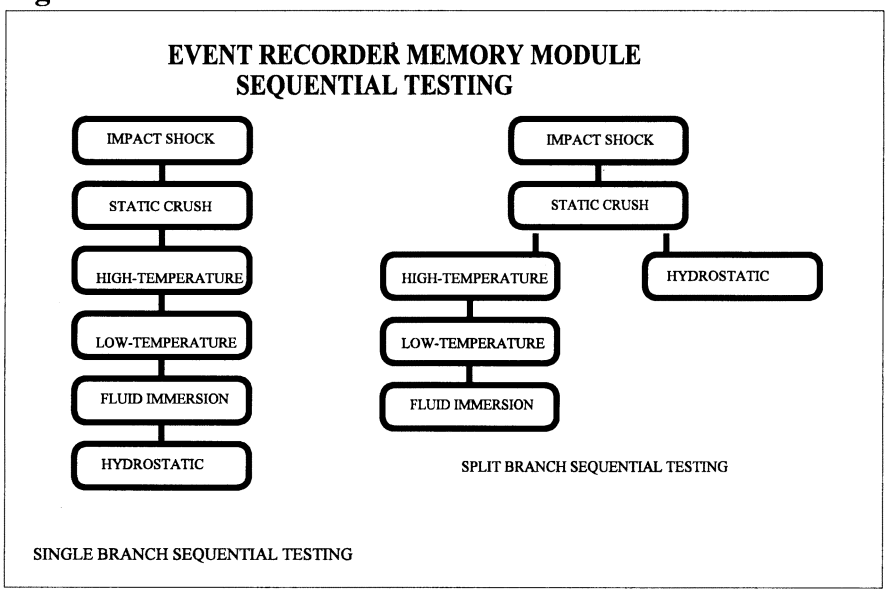
D. Testing Sequence

In order to reasonably duplicate the conditions an event recorder may encounter, the ERMM shall meet the various performance criteria, described in Section C of this appendix, in a set sequence. (See Figure 1). If all tests are done in the set sequence (single branch testing), the same ERMM must be utilized throughout. If a manufacturer opts for split branch testing, each branch of the test must be conducted using an ERMM of the same design type as used for the other branch. Both alternatives are deemed equivalent, and the choice of single branch testing or split branch testing may be determined by the party representing that the ERMM meets the standard.

E. 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 criteria to not be potentially affected if a preliminary engineering analysis or other pertinent data establishes that the modification or upgrade will not affect the crashworthy performance criteria established by the older model ERMM. The manufacturer shall retain and make available to FRA upon request any analysis or data relied upon to make a determination relating to the crashworthiness impacts of any upgrade or modification to an older model ERMM.

Figure 1



Issued in Washington, DC, on June 23, 2004.

Betty Monro,

Acting Administrator, Federal Railroad Administration.

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