Interim Report

Safety of Remote Control Locomotive Operations

Federal Railroad Administration
May 2004

Preliminary Findings and Initial Accident/Injury Statistics

Introduction

By letter dated September 2, 2003, the Committee on Commerce, Science, and Transportation (Committee) requested that the Federal Railroad Administration (FRA) conduct an assessment of the impact of remote control locomotive (RCL) operations on safety, including a comparison of the rate of accidents, injuries, and fatalities involving RCLs with similar operations involving manned locomotives. Additionally, the Committee requested that the audit should assess the effects of RCL operations on the safety of highway rail grade crossings, hazardous materials transportation, the safety of RCLs operated in urban areas, any unique operating characteristics presented by RCLs, and an assessment of the safety benefits of such operations. The committee requested that FRA's report should include any recommendations for legislative or regulatory changes FRA determines necessary and that FRA report back to the Committee with preliminary findings and initial accidents statistics within six months, and that a detailed final report be submitted within 18 months.

FRA recognizes that RCL operations are a significant departure from traditional railroad operations. As RCL operations expand across the country, they have given rise to new issues that have never been encountered in the railroad industry. Because, RCL operations are relatively new to the U.S. railroad environment, they are carefully scrutinized by FRA and a wide range of rail industry stakeholders. Preliminary data that were prepared for this report indicate the safety record of RCL operations over the past seven months (May 1, 2003 through November 30, 2003) has been quite positive, RCL train accident rates were found to be 13.5 percent lower than the train accident rates for conventional switching operations over the same period, while employee injury rates were found to be an impressive 57.1 percent lower for RCL operations than for conventional switching operations.

The Committee can be assured of FRA's commitment to ensure the safety of this emerging technology by closely monitoring the implementation and proliferation of RCL technology and operations, by identifying and investigating potential safety issues as soon as they arise, and by working with all rail industry stakeholders to quickly mitigate RCL safety concerns.

The following report is divided into four sections: The first section provides a brief history of FRA's involvement with RCL technology and our efforts to facilitate its safe introduction into the U.S. railroad industry. The second section is a discussion of RCL safety issues that FRA has identified and has brought to the attention of the rail industry for resolution. The report discusses the status of these issues, some of which have been resolved, and some that are currently pending further investigation and resolution. FRA hopes to reach resolution of the outstanding RCL issues and make our findings known to the Committee in our final report. The third section of the report discusses several RCL related topics that FRA believes are worthy of further exploration. These issues have not been identified as posing any safety hazard; however, they may relate to the safety of RCL operations and remote control operators (RCO); and

warrant examination by our agency. The final report will discuss our findings in these areas. The fourth section of this report is a statistical comparison of the relative safety of RCL switching operations and conventional railroad switching operations.

I. The Introduction of RCL Operations In the U.S.

Remote control devices have been used to operate locomotives at various locations in the United States for many years, primarily within certain industrial sites. Railroads in Canada have made extensive use of RCLs for more than a decade. FRA began investigating remote control operations in 1994 and held its first public hearing on the subject in February 1995 to gather information and examine the safety issues relating to this new technology. On July 19, 2000, FRA held a technical conference in which all interested parties, including rail unions, remote control systems suppliers, and railroad industry representatives, shared their views and described their experiences with remote control operations. This meeting was extremely beneficial to FRA in developing facts and data about the safety issues associated with RCL technology and operations.

RCL Guidelines - Safety Advisory 2001-01

On February 14, 2001, FRA published guidelines for conducting RCL operations. See 66 Fed. Reg. 10340, Notice of Safety Advisory 2001-01 (Safety Advisory Attached). By issuing these recommendations, FRA sought to identify a set of "best practices" to guide the rail industry when implementing this technology. As this is an emerging technology, FRA believes this is the best approach because it provides flexibility to both manufacturers who are frequently upgrading RCL equipment designs and to railroads who continue to refine their RCL operations. At the same time, our Safety Advisory reinforces the importance of complying with all existing railroad safety regulations. The major railroads have used these guidelines as a basis for their own RCL programs, although not all of the recommendations have been adopted by all of the railroads.

In addition to the recommended guidelines contained in the Safety Advisory, several existing Federal railroad safety regulations pertain to RCL operations. The Advisory identified existing regulations that relate to RCL operations and technology, emphasizing that compliance with these regulations is mandatory:

> [A]lthough compliance with this Safety Advisory is voluntary, nothing in this Safety Advisory is meant to relieve a railroad from compliance with all existing railroad safety regulations. Therefore, when procedures required by regulation are cited in this Safety Advisory, compliance is mandatory. at 10343.

The Safety Advisory states that "each person operating an RCL must be certified and qualified in accordance with 49 CFR Part 240 [FRA's locomotive engineer rule] if conventional operation of a locomotive under the same circumstances would require certification under that regulation." In November 2001, all six major railroads, Burlington Northern Santa Fe Railway Company (BNSF); Conrail (CR), CSX Transportation (CSX); Kansas City Southern Railway Company (KCS); Norfolk Southern Railway (NS); and Union Pacific Railroad Company (UP) submitted to

FRA their training programs for remote control operators (RCOs) as required by Part 240. Since that initial filing, several railroads have made changes to their remote control training programs at FRA's request. FRA is closely monitoring this training and is making additional suggestions for improvement on individual railroads as they become necessary. These training programs currently require a minimum of two weeks of classroom and hands-on training for railroad workers who were previously qualified on the railroad's operating and safety rules. Federal regulations require that locomotive engineers be trained and certified to perform the most demanding type of service they will be called upon to perform. Thus, an RCO who will only be called upon to perform switching duties using an RCL would not need to be trained to operate a locomotive on main track in over-the-road operations from the control stand of the cab.

In addition to the required training, the regulations require railroads to conduct skills performance testing of RCOs that is comparable to the testing required for any other locomotive engineer performing the same type of work. Federal regulations also hold RCOs responsible for compliance with the same types of railroad operating rules and practices that other locomotive engineers are required to comply with in order to retain certification. See 49 CFR § 240.117. Any such alleged noncompliance triggers an investigation and review process. If a violation is found, the RCO will be prohibited from operating a locomotive on any railroad in the United States for a minimum of 15 days to a maximum of three years. The length of the prohibition (or revocation of the operating certificate) depends on whether the person was found to have committed other violations within the previous three years and whether the railroad, using its discretion, determined that the person had completed the necessary remedial training.

Furthermore, FRA made the connection in the Safety Advisory between the current Federal locomotive inspection requirements and the application of those requirements to the RCL technology. For example, the Safety Advisory states that "[t]he RCL system *must* be included as part of the calendar day inspection required by 49 CFR 229.21, since this equipment becomes an appurtenance to the locomotive." Id. at 10344 (emphasis added). Another example of a mandatory requirement mentioned in the guidelines is that "[t]he RCL system components that interface with the mechanical devices of the locomotive, e.g., air pressure monitoring devices, pressure switches, speed sensors, etc., should be inspected and calibrated as often as necessary, but not less than the locomotive's periodic (92-day) inspection." Id. (emphasis added); see 49 C.F.R. § 229.23. Thus, the Safety Advisory served the purpose of publishing FRA's position that the existing Federal regulations are sufficient to require inspection of the RCL equipment.

RCL Implementation and Training

On November 30, 2001, the National Railroad Passenger Corporation (Amtrak) and six of the nation's largest freight railroads: BNSF, CSX, UP, KCS, NS, and Canadian National (CN) submitted RCL training programs to FRA for approval, as required by 49 CFR Part 240. All of the aforementioned railroads submitted identical programs, which have all been approved by FRA. RCL training is currently divided into two areas: (1) training certified engineers on the new technology and (2) certifying individuals as RCOs. The former only involves training, while the latter is a full-fledged certification process. Most of these programs cover both areas. However, the majority of training involves certifying former ground crewmen, i.e., trainmen,

switchmen, and conductors, who have never operated a locomotive before. This certification training currently consists of a minimum of two weeks. The first week is composed of approximately two days in the classroom and three days of field training with the RCL. The second week entails on-the-job training, which occurs in a classification yard performing actual switching duties. This training is the minimum required by the railroad training programs. All of the railroads have assured FRA that, if additional training is needed and requested by an RCO, it will be furnished. FRA has been working closely with the railroads and rail labor organizations to ensure that proper training is provided.

The above railroads initially submitted a RCL training program to FRA that specified only one week of training: one and a half days in the classroom, two and a half days of on-the-job training, and a final day of testing. These programs were not approved. FRA would not accept an RCL training program of less than two weeks minimum of training time. The agency arrived at this position by studying the training periods that were developed and used in Canada for the past several years, by communicating with the representatives of the employees who were largely responsible for conducting these operations, and by requiring the railroads to define the duties of the RCO. All the above railroads have defined these duties as follows:

> **Remote Control Operator** (RCO) - Certified Remote Control Operator may work with equipment by means of portable controller. In the initial implementation this equipment will be used in select locations where the job will be involved in gathering and distributing freight and/or equipment that is typically required of yard, road switcher, or other similar assignments at the implementing location(s). The specific assignments involved will vary by locations and could include such work as hump, trimmer, classification operations, transfer, road switcher, industrial, and station switching.

FRA believes this definition restricts RCOs to performing "yard switching" type operations at traditional yard (slow) speeds within the "immediate vicinity" of the yards. The definition also implies some limited main track movements to move a few cars a short distance to gain access to an industrial park or shipper. Given the short RCO training periods involved, FRA does not believe RCOs are properly trained to conduct "heavy-haul" train movements on the main track or on industrial tracks that are similar to main tracks, i.e., extending through towns and over public highway-rail grade crossings for considerable distances.

During the last weeks of February 2002, the first RCL classes were conducted simultaneously on all the major railroads. FRA's major initiative during this period was to attend and evaluate these first training sessions and to obtain feedback from the trainees concerning the training curriculum. FRA made suggestions and encouraged the labor organizations and railroads to work together to evaluate these new training programs and to resolve any operating issues. FRA found that much additional training was occurring after the certification process. Given the short training period, FRA recognized that RCO operating skills would be very narrow in scope and believed RCOs would repeatedly encounter situations for which they were not adequately trained. Yard switching operations cover a broad spectrum of activities, from handling large drafts of cars weighing several thousand tons, to the precise spotting of freight cars in industries

where movements can be measured in inches. Moreover, the fundamentals of handling heavy equipment dictate that operators must be aware of the movement's characteristics in order to take action at the appropriate time.

FRA focused its inspection activities in this area and has identified many instances where RCOs were exposed to movements that they never performed during training. While teaching fundamental information may be sufficient to impart basic RCL handling skills until valuable experience is obtained, FRA believes that in this arena the RCOs should be provided practical field instruction on unfamiliar movements whenever possible. This usually entails an experienced instructor demonstrating to the RCO how the movement should be made.

Training New-Hires

The current majority of RCOs in this country were experienced train service employees before they began RCL training. They were familiar with railroad safety and operating rules and they were also familiar with working around moving freight cars in busy classification yards before they became certified RCOs. This experience is extremely important in maintaining a safe working environment. Many railroads are experiencing a large influx of new, inexperienced workers into rail operations. FRA seeks assurance that these new workers will be afforded the traditional breaking-in periods when learning their jobs, especially RCO jobs. We believe it would be inadvisable for newly hired RCOs to be confronted with learning railroad operations while simultaneously learning to switch cars by the operation of a RCL. FRA believes adequate time should be spent learning one job before moving on to the other. We intend to monitor this situation closely and consider additional modification to existing training programs to address this recent development.

RCL Operating Practices

FRA realized that RCL operations would necessitate the modification of some traditional railroad operating rules and the creation of new ones. It has been FRA's objective to ensure that safety is not compromised by these changes. One major area of interest is the rail industry's creation of remote control zones (RCZ) to relieve crews from complying with railroad operating rules requiring what is termed "point protection." Point protection rules require that the RCO must see the track ahead of the train movement each time the train changes direction to determine that the switches are properly lined and the track is clear of other movements. Complying with such rules would severely reduce the productivity of RCL operations, since the RCO must always be in a position to observe the track ahead of the train movement before moving in that direction. This would usually take the RCO away from the area of his switching duties and the RCO would be spending most of the time walking back and forth between the locomotive and the switching lead.

An RCZ is a designated area where only one RCL operation exists at a time and no highway-rail grade crossing exists. No other railroad assignments are allowed into this area unless strict procedures are followed. Therefore, once the RCO responsible for establishing the RCZ

determines the RCZ limits are clear of other movements and the route is properly routed, he or she can operate without providing point protection. RCZs are established by railroad operating rules and RCZ limits are normally identified by signs. The signs are placed at the entrance tracks to each end of the zone. Movements into the zone can only be made with permission from the RCO who established it.

FRA has expressed concerns that there is little consistency within the rail industry regarding the application and design of RCZs. In many large switching yards, the procedures for establishing and utilizing these zones can become quite complicated. We continue to monitor RCZ procedures closely and are working with the railroads to ensure that RCZs are properly established and identified. FRA believes that it is imperative that all affected railroad employees are informed of the location of RCZs and have a means to determine when RCZs are activated and when they are deactivated.

Furthermore, we have made it known to the rail industry that if RCL operations extend beyond an RCZ or are conducted without RCZ protection, then such switching movements should be protected according to existing operating rules, i.e., each time the locomotive pulls out of a track, the RCO must be able to see the track ahead of the movement to determine it is clear that all switches are properly lined for the movement.

Railroad Alternatives to Safety Advisory Recommendations:

Safety Advisory 2001-01 recommends that RCOs refrain from riding on the side of railroad freight cars. FRA is concerned that RCOs could become distracted with the added responsibility of operating the locomotive and could lose sight of their situational awareness. One major railroad has prohibited the practice of permitting an RCO to ride on the side of a railroad freight car while operating the RCL. However, most railroads have elected not to adopt this practice based on the speed control features now available on the newer remote control operating units. The railroads submit that with the speed control feature, the RCO can mount the car, set the speed, and hang onto the car with both hands. During conventional operations, a switchman would be hanging onto the car with one hand and giving signals or keying a radio with the other. The railroads contend that safety is enhanced by using the RCL technology in this manner. FRA is currently monitoring this practice to determine whether an adequate level of safety can be maintained.

The Safety Advisory also recommends, in section (A) Safety Design & Operational Requirements, Item (8) that, “Each RCL should have a distinct and unambiguous audible or visual warning device that indicates to nearby personnel that the locomotive is under active remote control and subject to movement.” Association of American Railroads’ (AAR) Standard S-5507, Remote Control Locomotive Standard, dated November 2002, has identical language in Section 4.1, “Safety, Design and Operational Requirements.” The vast majority of the RCL locomotives are equipped with visual warning devices, such as flashing lights, strobes, or other

similar devices, that indicate the locomotive is in active remote control and subject to movement. Originally, at least two Class I railroads decided to apply stenciling or labels to the sides of the equipped locomotives with no other distinct and unambiguous audible or visual warning device. FRA believed the stenciling or labeling of the equipped locomotive only indicates that the locomotive is capable of being operated by remote control, not that the locomotive is actually in remote control mode. FRA's intent in the Safety Advisory was that warning be given at the locomotive was in active remote control service and subject to movement without anyone being on the locomotive. FRA has been working with the two railroads and both are currently in the process of installing suitable visual warning devices on their locomotives.

Technology Reliability

Currently, FRA is aware of four instances where an RCL failed to reduce speed when commanded to do so. These malfunctions were associated with computer software and wiring errors and have since been corrected. There were no accidents or incidents associated with these failures. The RCL technology is designed to fail safe. If for any reason the locomotive fails to receive proper communication, the system acts to stop the locomotive movement. FRA believes the RCL systems were designed to incorporate significant margins of safety and commends the manufacturers for their commitment to safety.

Outreach Efforts

FRA has worked hard to maintain an open dialogue with all rail industry stakeholders to share observations and ideas, to discuss issues and to examine trends related to RCL safety. At FRA's request, the Association of American Railroads (AAR) convened a task force composed of representatives from railroads that conduct RCL operations. The purpose of the task force is to facilitate the identification and resolution of safety issues associated with RCL operations. Also, FRA has done substantial outreach to the rail labor organizations that represent RCOs to learn firsthand about the safety concerns of operators so that we may address those concerns in an effective and timely manner. Additionally, FRA representatives have made presentations at all of the United Transportation Union's (UTU) regional meetings during the years 2002 and 2003 and several meetings of the Brotherhood of Locomotive Engineers (now known as the Brotherhood of Locomotive Engineers and Trainmen or BLET.) We also developed an RCL question and answer (Q&A) document that is posted on FRA's website. The Q&As clarify the responsibilities of the RCO and railroad under existing Federal safety regulations. We also developed a simple, user friendly format to guide union representatives and railroad employees who wish to submit safety complaints or information regarding RCL safety and operations.

Continued Oversight

FRA will continue to exercise careful oversight during the expansion of RCL operations. FRA inspectors are monitoring the evolving remote control operations and have had good success in working with railroads to resolve any safety concerns revealed by the inspections. Further, FRA has developed accident/injury reporting codes for RCL operations to ensure that any future

safety hazards related to such operations can be easily identified, investigated, and analyzed for the purpose of discovering any potential safety risks associated with this evolving technology. To date, nearly all of the FRA reportable accidents or incidents concerning RCL operations have been the result of human error and not the RCL technology. As noted previously, there were no accidents or incidents associated with the technology malfunctions. Consequently, FRA's Office of Research and Development is conducting a study of "root cause" analysis of RCL accidents and incidents to determine whether certain types of human errors may be more likely to occur in RCL operations than in conventional switching operations. Both railroad labor and management are participating in this study.

II. Identification and Resolution of RCL Issues - RCL Task Force

To address the concerns that had been identified during the early stages of RCL implementation, FRA felt it would be useful to have a forum composed of representatives from the railroads that conduct RCL operations. On October 4, 2002, FRA conducted a teleconference with the AAR wherein we recommended that AAR establish a task force to work closely with FRA on issues that arise during the implementation of RCL technology. We also suggested, that the individuals on this task force should serve as points-of-contact, who can expeditiously address RCL concerns identified by FRA on their respective railroads. Two meetings have been held thus far between FRA and the AAR task force, the most recent being on May 7, 2003. In addition to the AAR, the following railroads are represented on the task force: Burlington Northern Santa Fe Railway Company; CSX Transportation; Union Pacific Railroad Company; Kansas City Southern Railway Company; Norfolk Southern Railway; Canadian National/Illinois Central; and Amtrak. Representatives from the American Shortline and Regional Railroad Association and Transport Canada are also on the task force and participate in the discussions. The purpose of the group is to address FRA concerns regarding RCL operations and technology.

FRA is pleased that the rail industry has taken a proactive approach by establishing this forum to discuss emerging RCL issues. It has been apparent that there are many issues involving RCL operations that are new to all parties. FRA believes, that as this technology continues to evolve, it is of the utmost importance that all stakeholders work together to ensure the safety and reliability of RCL operations. If this approach is successful in maintaining a high level of safety, it will obviate the need for new regulations in this area. However, should FRA identify significant safety concerns involving RCL operations that are not successfully addressed through

collaborative efforts, FRA will not hesitate to exercise its regulatory authority. As a matter of information, the following are the issues that FRA has raised with the AAR task force regarding the implementation of RCL operations.

Operating Practices Issues

Issue 1: RCL operations outside of yard switching operations

FRA's Safety Advisory 2001-1 was intended to address RCL use in yard switching operations as is evident by the fact that nowhere in the guidelines did FRA ever address the many obvious safety concerns associated with RCL operations outside of yard switching operations. At the time the guidelines were issued, FRA based its expectations for RCL use on the Canadian experience, which according to representatives from Transport Canada the Canadian rail safety regulatory agency is limited to yard switching operations. If FRA had believed that U.S. railroads intended to operate RCLs outside of yard switching operations, FRA would have addressed that issue in the guidelines or through some other mechanism.

Generally, FRA does not believe the current state of RCL technology and the current level of RCO training are sufficient to support RCL heavy-haul train operations, i.e., large numbers of cars or high tonnage, outside of the yard switching operations. For instance, we note that the current state of RCL technology does not permit the control of in-train forces to the extent that is possible by operations from the locomotive control stand. Furthermore, the various railroad RCL training and certification programs that have been received and approved by FRA are tailored to yard switching type operations.

During our first meeting of the task force on December 7, 2002, virtually all railroad industry representatives indicated that they were unaware of RCL operations outside of the yard switching environment. However, during our most recent meeting of May 7, 2003, several main track RCL operations were identified, that could no longer be described as yard switching operations. FRA requested that the parties report back to FRA the locations and descriptions of all main track RCL operations currently in existence on their systems; in this instance, FRA's request included both heavy-haul operations and those operations that are yard type operations but involve incidental movements on main track - which can often be located within a yard. The AAR supplied to FRA the requested information for the industry.

FRA has dispatched regional safety inspectors to investigate all the known locations where RCL operations occur on main tracks. Most of the RCL main track movements were found to be short movements with limited numbers of cars and the RCOs were appropriately trained; thus, FRA has generally found these incidental movements to be safe and has not taken exception to them. Meanwhile, in some of the cases where there were heavy-haul operations, the railroads are learning that the equipment has limitations outside of the yard switching environment; in other

instances, where the main track operations have not been shown to be unsafe but approach the limits of what may be considered an appropriate use of RCL technology, railroads have complied with FRA's request not to expand these types of operations to other locations.

FRA will continue to monitor and evaluate the RCL main track operations, especially those that stretch the limits of the technology. At each location where main track RCL operations occur, we determine whether the technology can adequately accommodate the demands of the main track operations and whether the level of RCO training is sufficient. We recognize that in some instances, traditional train handling techniques may not apply to these operations given the unique characteristics of this technology. This may necessitate developing specific RCL train handling techniques. Although, FRA's evaluation of this issue is not complete, it also appears that, given the design features of the current technology, some type of restrictions on locomotive horsepower and train length may be appropriate for RCL main track operations to reduce the possibility of excessive in-train forces.

Status: FRA's knowledge about the capabilities and safety parameters of RCL operations on main track continues to evolve; therefore, FRA continues to evaluate these operations and may decide whether additional guidance is necessary. FRA intends to report its findings and actions regarding this issue to the Committee in its final report.

Issue 2: RCOs riding freight cars while actively engaged in operating the RCL

On March 7, 2003, after an incident where an RCO was thrown from the side of a moving train that he was operating, FRA Administrator Allan Rutter sent letters to all the major railroads urging them to prohibit the practice of allowing RCOs to ride the side of freight equipment when the RCO was actively engaged in controlling the movement of the RCL. This recommendation was also contained in our RCL Safety Advisory.

FRA continues to believe that, to ensure the necessary level of safety for RCOs, all railroads should adopt the recommendation in the Safety Advisory regarding this issue. The recommendation in the Safety Advisory states, "When operating an RCL, the RCO should not ride on a freight car under any circumstances." The recommendation does not preclude an RCO from riding on a rail car, locomotive or caboose when not actively engaged in operating the RCL. We believe that operating an RCL transmitter is a significantly more complex task than operating a radio. CSX is the only major railroad that has adopted this recommendation. The other railroads believe the practice is safe.

Status: FRA will continue to monitor and evaluate this activity. We will compare the safety experience of CSX with the other railroads in our evaluations. FRA intends to report its findings and actions regarding this issue to the Committee in its final report.

Issue 3: Hours of Service requirements for RCL supervisors/instructors

Generally, supervisors do not perform covered service and would not be limited in the number of hours they can legally work. However, any railroad supervisor who instructs student RCL operators when performing revenue switching operations is considered actively involved with train movements under the Hours of Service Laws in the same manner as any certified RCL operator. Since these individuals are performing covered service, both the RCL operator and the RCL supervisor/instructor must maintain hours of duty records and be covered under their railroad's alcohol and drug testing program, including pre-employment, reasonable cause, reasonable suspicion, and post-accident random testing.

FRA maintains that RCL supervisors/instructors are covered under the Hours of Service Laws when they are the only certified RCOs on the assignment working and they are engaged in directly supervising uncertified RCOs in training who are switching cars in revenue service. The railroads indicated that they intend to abide by the Hours of Service requirements as outlined by FRA.

Status: This issue has been resolved.

Issue 4: Application of Federal safety regulations regarding unattended locomotives

A question arose regarding the application of Federal safety regulations requiring the securement of unattended locomotives relative to RCLs. The regulation requires certain procedures to prevent the unintended movement of locomotives when the locomotive is left "unattended." For traditional locomotive operations, a locomotive is considered unattended when there are no crew members in the immediate vicinity to control its movement. Given that an RCL can be controlled by an RCO who is a considerable distance away from the locomotive, railroad representatives asked when should an RCL be considered as "unattended."

FRA responded that it considers an RCL to be unattended when its operator is out of the immediate vicinity of the RCL and cannot respond immediately to an unauthorized movement, regardless of whether or not that individual is wearing an active remote control transmitter.

Under these conditions, FRA expects the locomotive handbrake to be applied, and if applicable, the locomotive air brakes fully applied. All railroads agreed with FRA's guidance and issued operating instructions to that effect.

Status: This issue has been resolved.

Issue 5: Point protection and remote control zones

The leading cause of train accidents in conventional switching operations involves the failure of train crews to provide "point protection" for the train movement. As noted above, point protection refers to the practice (required by railroad operating rules) of having a member of the train crew in position to see the track ahead of the train movement to ensure that the track is clear and that switches are properly lined each time the train changes direction. Failure to provide point protection has also been a causal factor in many RCL train accidents.

Establishing point protection for RCL operations raises challenges since there is no engineer on the locomotive to provide the point protection on that end of the train movement. While one solution would be to require an RCO to protect the point each time there is an RCL train movement, this practice would greatly reduce the speed and efficiency of RCL operations because RCOs would constantly have to reposition themselves from the point of the movement to the point in the train where cars are coupled or uncoupled. To meet this challenge, railroads have adopted a Canadian practice of establishing RCZs.

FRA has seen a wide array of differing procedures used by railroads to establish RCZs. There is often variation of RCZ procedures across individual railroads. Some RCZ procedures appear to be more effective than others, and some RCZ procedures appear to be excessively complicated. Also, FRA has found varying levels of training and oversight regarding the implementation of RCZs. While FRA supports the establishment of RCZs as a means of providing point protection, we have concerns about the implementation of RCZs on various properties and locations.

Status: The railroads have been advised that FRA will conduct audits covering an RCZ and railroad operations testing to ensure train crew compliance with point protection rules and RCZ procedures. All railroads agreed to focus operating rule efficiency tests on RCL operations to determine compliance with rules and instructions relating to point protection (stopping within half the range of vision) and establishing/re-establishing RCZs. Audits will be conducted during the remainder of the safety assessment period. FRA intends to report its findings and actions regarding this issue to the Committee in its final report.

Mechanical Issues

Issue 6: **Distinct and unambiguous RCL warning devices**

Safety Advisory 2001-01, Section (A) Safety Design & Operational Requirements, Item (8), states, "Each RCL should have a distinct and unambiguous audible or visual warning device that indicates to nearby personnel that the locomotive is under active remote control and subject to movement." AAR Standard S-5507, Remote Control Locomotive Standard, dated November 2002, has identical language in Section 4.1, "Safety, Design and Operational Requirements." FRA intended that RCLs should be equipped with active warning devices that can alert people on the ground whether the RCL was currently being operated in the remote mode. Two of the railroads on the AAR task force expressed some disagreement with FRA's interpretation of the language in its Safety Advisory and in the Standard S-5507. These railroads believed that a passive warning device, such as a sign or stencil, would suffice as an adequate warning device.

The majority of the RCL locomotives are equipped with visual warning devices, such as flashing lights, strobes, or other similar devices, that indicate the locomotive is in active remote control mode and subject to movement. Only two Class I railroads had decided to apply stenciling or labels to the sides of the equipped locomotives with no other active, unambiguous audible or visual warning device. Stenciling or labeling of an RCL only indicates that the locomotive is capable of being operated in remote control and not that the locomotive is actually in remote control mode. FRA's intent in the Safety Advisory was to encourage railroads to give warning that the locomotive was in active remote control service and subject to movement at any time.

In discussion with the RCL task force, FRA commented that many railroads (including Class I carriers, regional railroads and short lines) have elected to use flashing lights, strobe lights, other arrangements of lights and audible warning devices to meet this important recommendation. We informed the task force of our firm belief that the use of stenciling or labels does not provide sufficient warning to grounds persons and other crews that a locomotive is operating in remote mode. Such signs are difficult to read from a distance or at night. Also, they fail to distinguish when the locomotive is operating remotely from when it may be operating in the conventional mode. As a result of our discussions, all the railroads on the task force have agreed to utilize active warning devices on their RCLs. These active warning devices are either already in place or in the process of being installed.

Status: This issue has been resolved.

Highway- Rail Grade Crossings

Issue 7: Remote operation of RCLs over highway-rail grade crossings

Under all circumstances, when railroads are conducting "switching operations"[1] over public highway-rail grade crossings, train crews are required by federal regulation to provide proper protection at the crossing. All railroads have operating rules in effect to comply with the regulation. Typically, these railroad operating rules require crews engaged in switching operations to approach the crossing at a very slow speed until a member of the crew has observed the activation of the crossing warning devices (if the crossing is equipped with flashing lights and/or gates) for a sufficient length of time to provide adequate warning to motorists. If there are no active warning devices at a crossing, the switching crew must provide flag protection for the RCL movement over the crossing.

These railroad operating rules essentially require train crew members to be at the crossing each time a switching movement travels over the crossing. There is one exception to this railroad rule that applies at crossings equipped with gates when it can be determined that the gates are in the fully lowered position and that the crossing is clear of vehicles and/or pedestrians. If all the conditions of this exception are met, railroad operating rules allow the movement to proceed over the crossing without a train crew member being physically located on the crossing.

To increase the productivity of RCL operations, one major railroad has begun utilizing a remote camera system to provide the required protection. In conventional operations, a locomotive engineer was always positioned in the cab of the locomotive and could provide this protection. Without the engineer or another crew member in the locomotive or at the point of the movement, the RCO must determine that the crossing protection is working and the crossing is clear of vehicles and pedestrians before proceeding over the crossing. This would entail the RCO walking up to the crossing each and every time the RCL operates over the crossing to make these determinations. With the installation of a remote camera system, the RCO remains on the switching lead and observes the crossing from a video monitor. The railroad believes that crossing protection rules can be observed using this system and it has installed cameras at several crossings.

Once FRA became aware that this system was being implemented, we immediately requested that the railroad cease any further installations until an evaluation of the system could be conducted to determine whether the remote camera system could offer the same or better level of

[1]Switching operations entail operating a locomotive back and forth many times on a switching lead track to classify freight cars. Because of the location of rail yards, many switching lead tracks have crossings over them.

protection for switching movement over crossings as the traditional methods. The railroad complied with FRA's request.

FRA headquarters staff and field inspectors visited and evaluated this system at two locations: Rochelle, IL, and Warm Springs, CA. Following these evaluations, FRA made the following recommendations:

- Before camera assisted RCL operations are permitted at highway-rail grade crossings, a Crossing Diagnostic Team should evaluate the crossing. The Diagnostic Team should have representatives from the railroad, FRA, the State Department of Transportation (or another state agency having jurisdiction over the highway), and local government authorities. The Diagnostic Team should evaluate the suitability of each crossing for remote camera operations. They should consider factors such as average daily traffic counts; number of highway lanes; highway speed limits; number of railroad tracks; volume of school bus, transit bus, emergency vehicle, large truck and hazardous material traffic over the crossing; minimum RCL operator sight distances of roadway approaches to the crossing; and other relevant factors that could effect the safety of the crossing. The Diagnostic Team should also consider the appropriate number of cameras and appropriate camera angles needed to provide for the remote operation of RCLs' over the crossing.
- Remote cameras should only be used at crossings equipped with warning lights, gates, and constant warning and motion sensor devices.
- The cameras should be arranged so as to give the RCO a view of the rail approaches to the crossing from each direction to accurately judge the locomotive's proximity to the crossing.
- The cameras should be arranged so as to give the RCO a clear view to determine the speed and driver behavior (e.g. speeding, driving erratically) regarding any approaching motor vehicles.
- Either, the camera resolution should be sufficient to determine whether the flashing lights and gates are working as intended or the crossing should be equipped with a remote health monitoring system that is capable of notifying the RCO immediately if the flashing lights and gates are not working as intended.
- The railroad should notify local FRA offices when this type of protection has been installed and activated at a crossing to ensure that FRA grade crossing specialists and signal inspectors can monitor these operations.

We also suggested, that if a highway-rail crossing were equipped with supplemental safety devices that prevent motorists from driving around lowered gates, then perhaps some of the above recommendations may not be necessary to permit the safe remote operation of RCLs.

However, a Diagnostic Team should make such determinations. FRA recognizes that camera assisted remote operation of RCLs may not be a viable alternative at all highway-rail grade crossings.

Status: The railroads are currently considering FRA's recommendations. To our knowledge, there have not been any new camera installations to permit remote operation of RCLs over highway-rail grade crossings. FRA intends to continue to monitor these operations and report any further findings and actions regarding this issue to the Committee in its final report.

III. Additional Areas of Inquiry

FRA is examining several topics related to RCL technology and operations outside of its work with the AAR task force. The additional areas of inquiry are not necessarily associated with any alleged safety risk; rather, these inquiries are intended to broaden our understanding of the nature of RCL technology and operations to optimize their safety and effectiveness. We will briefly outline these areas of inquiry below and we intend to provide the Committee with a more detailed assessment of the results of our inquiry in our final report.

Inquiry Topic 1: Root cause analysis and probabilistic risk assessment

Despite the very positive preliminary safety data that indicates that RCL operations may lead to fewer accidents and injuries than conventional operations, FRA believes that it is prudent to undertake a formal root cause analysis of RCL accidents and injuries and to conduct a safety risk assessment of RCL operations. Root cause analysis is a method of identifying system vulnerabilities after a loss has occurred while risk assessment is a pro-active method of identifying system vulnerabilities before there is any type of "loss" (e.g., personnel, property, productivity). Whenever a new technology or process is introduced into a work environment, it is common to expect a change in the nature and distribution of workplace accidents and injuries. While the new technology or process may very well prove to be much safer than the existing technology or process a root cause analysis and a risk assessment should be performed as they are both tools that can help identify ways to minimize losses and maximize operating efficiencies.

FRA's Office of Research and Development has contracted with Foster-Miller Inc., a company with vast experience and an excellent reputation in the area of transportation safety research, to conduct a root cause analysis of incidents involving remotely controlled locomotives. The project has already received the support of the railroad industry. Railroad members of the AAR task force have agreed to cooperate with the study and so have the two operating rail unions who represent RCOs, the United Transportation Union and the Brotherhood of Locomotive Engineers and trainmen. A protocol for performing the root cause analysis has been prepared and was discussed with stakeholders at a meeting held on December 15, 2003.

Work on the probabilistic risk assessment is underway. The main focus of this work will be the human contribution to risk (i.e., human error). Currently, the contractor is defining scenarios for the assessment that can be used to make appropriate comparisons. Event trees and fault trees have been established and will be used to evaluate these scenarios which will reflect the most common types of operations. FRA will report on the findings of the root cause accident analysis and probabilistic risk assessment in the final report to the Committee.

Inquiry Topic 2: Electromagnetic fields generated by remote control units

The remote control units, also known as "beltbacks" control the RCL by transmitting radio signals. Like all radio transmitters, these units emit electromagnetic fields (EMF). The manufacturers of remote control units have asserted that the EMFs generated by their equipment pose no safety hazard and meets all applicable standards for EMF transmission. To be prudent, FRA has decided to investigate the EMF levels generated by RCL transmitters to verify that these transmissions remain at safe levels.

We have enlisted the services of the John A. Volpe National Transportation Systems Center (Volpe Center) to conduct this investigation. The Volpe Center requested and received information from all of the manufacturers of remote control devices regarding Radio Frequency characteristics and FCC license documentation. The Volpe Center will now review the information received from the manufacturers and evaluate it. The next task is to perform an independent validation and verification of the EMF emissions and susceptibility to electromagnetic interference. We will report our findings to this Committee in our final report.

Inquiry Topic 3: RCL signal system integrity

Of paramount importance in RCL operations are the signals which direct the movement of the locomotive. The implications of an unauthorized movement can be severe and result in injury, death or a breach in security. FRA sought to protect the integrity of the RCL system by recommending certain RCL design features in its Safety Advisory in the section entitled "Safety Design and Operational Requirements." 66 Fed. Reg. at 10343.

The manufacturers of this equipment have asserted that they have designed sophisticated signal relay systems to protect the integrity and security of the RCL. The signals or bits of information sent to the RCL are encrypted with a unique address for that particular locomotive. If a control signal fails, or is corrupted, or is interfered with in any way, the RCL system immediately acts to stop locomotive movement. Additionally, the RCLs are equipped with manual emergency "shutdown" push buttons on each side of the RCL. These buttons allow anyone close to the locomotive to immediately shut the locomotive down in the event of an emergency. FRA intends to review RCL signal integrity and security to verify industry claims that this technology does not pose a safety and security risk.

IV. RCL Operational Data

Effective May 1, 2003, the new RCL accident/incident reporting codes came into effect. By developing these codes, FRA is able to obtain data specifically relating to RCL operations. With this data, FRA can identify the types of injuries and accidents that may be associated with RCL operations (see enclosures 1, 2 and 3). The initial data reported on Enclosure 1 indicated that the RCL ratio of accidents per one million yard switching miles is 13.5 percent less than the conventional ratio of accidents per one million yard switching miles. Enclosure 2 shows that the RCL ratio of employee injuries per one million yard switching miles is 57.1 percent less than the conventional ratio of accidents per one million yard switching miles. Following is a table which compares train accident rates and casualty rates between RCL and conventional switching operations.

FRA recognizes that there may be several factors that help account for the disparity in the accident and injury rates, such as the relative simplicity of switching operations where RCLs have been instituted, or the relative age distribution of RCOs vs conventional switching crews. Nonetheless, a 57 percent reduction in injury rates is substantial and may reflect inherent safety advantages of the technology and the careful attention that the rail industry and FRA are devoting to the implementation of RCL operations.

Conclusion to Preliminary RCL Report

FRA recognizes that the growth and evolution of this technology is not yet complete. Railroads will continue to explore innovative uses for RCL operations, while RCL manufactures will continue to expand the capabilities of RCL technology. We wish to assure the Committee that FRA will continue to actively work with all interested parties to closely monitor the continued use and expansion of RCL operations, to identify potential safety issues as soon as they arise, and to address any safety issues as quickly and effectively as possible. FRA intends to issue a final RCL report to this Committee within one year of the date of this report. The final report will report on the resolution of the open items discussed above. It will also provide additional safety data, based on 18 months of RCL operations. In addition, the final report will contain findings and recommendations regarding any additional activities that FRA deems necessary to ensure the continued safety of RCL operations. Such recommendations could include further guidance based on the identification of additional best practices or recommendations regarding possible regulatory action, if it is deemed necessary.

In closing, we commend all the railroad industry stakeholders who have worked diligently with FRA over the last three years to bring about the safe implementation of RCL operations. We look forward to an on-going partnership to ensure the continuing safety of RCL operations wherever they may occur on our Nation's railroad network.

Enclosures

U.S. Department
of Transportation

**Federal Railroad
Administration**

Administrator

**1120 Vermont Ave., NW.
Washington, DC 20590**

MAY 13 2004

The Honorable John McCain
Chairman, Committee on Commerce, Science,
and Transportation
United States Senate
Washington, DC 20510-6125

Dear Mr. Chairman:

This is in further response to your letter dated September 2, 2003, co-signed by Senator Ernest R. Hollings, on behalf of the Committee on Commerce, Science, and Transportation concerning the safety of remote control locomotive (RCL) operations. You request that the Federal Railroad Administration (FRA) conduct an assessment of the impact of RCL operations on safety, including a comparison of the rate of accidents, injuries, and fatalities involving RCLs with similar operations involving manned locomotives.

Additionally, you requested that the audit should assess the effects of RCL operations on the safety of highway-rail grade crossings, hazardous materials transportation, the safety of RCL in urban areas, any unique operation characteristics presented by RCLs, and assessment of the safety benefits of such operations. You requested that FRA's report should include any recommendations for legislative or regulatory changes FRA determines necessary and that FRA report back to the Committee with preliminary findings and initial accident statistics within six months, and that a detailed report be submitted within 18 months.

We have concluded the initial assessment of RCL operations. The enclosed document contains our preliminary findings and available RCL accident statistics, including a comparison of RCL accident and injury rates with accident and injury rates from conventional switching operations. The enclosed report also contains a brief history of FRA's efforts to ensure the safe implementation of RCL technology. FRA intends to issue its final report on RCL operations to your Committee within a year of the date of this report.

Based on the data we've collected since we added new RCL accident/incident reporting codes, RCL operations have been quite safe for the seven-month period from May to November 2003. RCL train accident rates have been 13.5 % lower than rates for conventional switching operations, and employee injury rates have been an impressive 57.1% lower than rates for conventional switching operations. To date, nearly all of the FRA reportable accidents or incidents concerning RCL operations have been the result of human error and not the RCL technology, and no accidents or incidents have been associated with technology malfunctions. No new technology is without its problems, but we are encouraged by the results of our FRA-AAR RCL Task Force in resolving issues associated with operation of this new equipment.

I appreciate your interest in railroad safety, and the FRA looks forward to continuing to work with you and the Committee on transportation issues. An identical letter has been sent to Senator Ernest R. Hollings.

Sincerely,

Allan Rutter
Administrator

Enclosure

U.S. Department
of Transportation

**Federal Railroad
Administration**

Administrator

**1120 Vermont Ave., NW.
Washington, DC 20590**

MAY 13 2004

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Ranking Member
Committee on Commerce, Science,
and Transportation
United States Senate
Washington, DC 20510-6125

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Sincerely,

Allan Rutter
Administrator

Enclosure

Enclosure No. 1

Comparison - Reportable Rail Equipment Accidents/Incidents on Yard/Industry Tracks Involving RCL Operations and Conventional Operations (May 1 through November 30, 2003)

Reporting Threshold: For calendar year 2003, a rail equipment accident/incident must be reported to the Federal Railroad Administration if the combined amount of equipment and track damage exceeds $6,700.

					Yard Switching Miles			Ratio of Accidents per 1 Million Yard Switching Miles		
Distribution of Accidents by Railroads:	RCL	Conv	Total	% RCL	RCL	Conv	Total	RCL	Conv	Total
Union Pacific Railroad (UP)	97	192 =	289	33.6	3,251,051	5,651,059 =	8,902,110	29.84	33.98	32.46
Burlington Northern Santa-Fe (BNSF)	39	149 =	188	20.7	2,080,873	5,585,742 =	7,666,615	18.74	26.68	24.52
CSX Transportation Inc. (CSX)	27	147 =	174	15.5	2,070,967	5,272,965 =	7,343,932	13.04	27.88	23.69
Norfolk Southern Railroad (NS)	5	91 =	96	5.2	431,750	7,104,466 =	7,536,216	11.58	12.81	12.74
Alton and Southern Railway (ALS)	4	3 =	7	57.1	217,564	333,903 =	551,467	18.39	8.98	12.56
Belt Railway Company of Chicago (BRC)	3	7 =	10	30.0	77,537	171,688 =	249,225	38.69	40.77	40.12
Kansas City Southern (KCS)	3	29 =	32	9.4	212,022	526,238 =	738,260	14.14	55.11	43.35
Conrail Shared Assets (CRSH)	1	20 =	21	0.0	24, 528	1,046,154 =	1,070,682	40.77	1 9.12	19.61
Montana Rail Link (MRL)	1	2 =	3	33.3	155,293	113,250 =	268,543	6.44	17.66	11.17
San Luis & Rio Grande Railroad (SLRG)	1	0 =	1	100.0	697	3,500 =	4,197	1,434.72	0.00	238.27
Birmingham Southern (BS)*	0	1 =	1	0.0	0	9,835 =	9,835	0.00	101.68	101.68
California Northern (CFNR)	0	1 =	1	0.0	3,623	2,963 =	6,586	0.00	337.50	151.84
Cleveland Works Railway (CWRO)*	0	7 =	7	0.0	0	4,622 =	4,622	0.00	1,514.50	1,514.50
Consolidated Grain & Barge (CGBX)	0	0 =	0	0.0	9,002	0 =	9,002	0.00	0.00	0.00
Florida East Coast (FEC)	0	3 =	3	0.0	5,900	241,718 =	247,618	0.00	12.41	12.11
Illinois Central (IC)	0	24 =	24	0.0	4,770	1,478,104 =	1,482,874	0.00	16.24	16.18
Indiana Railroad (INRD)	0	2 =	2	0.0	5,945	17,825 =	23,770	0.00	112.20	84.14
Jefferson Warrior Railroad (JEFW)	0	0 =	0	0.0	4,942	266 =	5,208	0.00	0.00	0.00
McKeesport Connecting Railroad (MKC)*	0	0 =	0	0.0	0	5,416 =	5,416	0.00	0.00	0.00
Pennsylvania Southwestern RR (PSWR)	0	0 =	0	0.0	36,216	3,354 =	39,570	0.00	0.00	0.00
Puget Sound & Pacific (PSAP)	0	1 =	1	0.0	1,462	1,648 =	3,110	0.00	606.80	321.54
Wheeling & Lake Erie (WE)	0	6 =	6	0.0	1,212	109,235 =	110,447	0.00	54.93	54.32
Wisconsin Central (WC)	0	2 =	2	0.0	25,632	611,632 =	637,264	0.00	3.26	3.14
Total =	181	687 =	868	20.9	8,620,986	28,295,583 =	36,916,569	21.00	24.28	23.51

* Designates railroads that operate remote control locomotives, but only in that portion of their operations designated as a "plant railroad."

Distribution of Accidents by State:	RCL	Conv	Total
Texas	28	75 =	103
Arkansas	19	10 =	29
Illinois	18	79 =	97
California	14	41 =	55
Missouri	13	14 =	27
Kansas	10	15 =	25
Nebraska	10	17 =	27
Alabama	8	14 =	22
Washington	8	16 =	24
Maryland	7	11 =	18
Colorado	5	15 =	20
Minnesota	5	14 =	19
North Dakota	5	1 =	6
Oregon	5	10 =	15
Ohio	4	52 =	56
North Carolina	3	15 =	18
Florida	2	15 =	17
Kentucky	2	11 =	13
Louisiana	2	23 =	25
Wyoming	2	10 =	12
Georgia	2	25 =	27
Michigan	2	3 =	5
Tennessee	2	22 =	24
Utah	2	11 =	13
Indiana	1	29 =	30
Montana	1	4 =	5
South Carolina	1	2 =	3
Other States (RCL Railroads Only)	0	133 =	133
Total =	181	687 =	868

Distribution by Month:	RCL	Conv	Total
May	18	114 =	132
June	15	107 =	122
July	26	98 =	124
August	31	102 =	133
September	39	100 =	139
October	21	70 =	91
November	31	96 =	127
Total =	181	687 =	868

Distribution by Major Cause Classification:	RCL	Conv	Total	% RCL
Train Operations - Human Factors	110	355 =	465	23.7
Miscellaneous Causes	26	91 =	117	22.2
Track, Roadbed and Structures	23	200 =	223	10.3
Signal and Communications	15	14 =	29	51.7
Mechanical and Electrical Failures	7	27 =	34	20.6
Total =	181	687 =	868	20.9

Railroad/Location Distribution of Reportable Rail Equipment Accidents involving Remote Control Locomotives:

Union Pacific:

San Antonio, Texas	12	(2)	Wide gage (due to defective or missing crossties)
		(2)	Shoving move, absence of man on leading end of movement
		(1)	Coupler mismatch, high/low
		(1)	Coupling speed excessive
		(1)	Passed couplers
		(1)	Cars left foul
		(1)	Object or equipment fouling track
		(1)	Defective or missing crossties/Coupler mismatch, high/low
		(1)	Switch previously run through
		(1)	Switch improperly lined
N. Little Rock, Arkansas	11	(2)	Other general switching rules
		(1)	Shoving move, absence of man on leading end of movement
		(1)	Failure to comply with restricted speed
		(1)	Switch improperly lined
		(1)	Instructions to train/yard crew improper
		(1)	Yard skate slide and failed to stop car
		(1)	Classification yard automatic control system retarder failure
		(1)	Failure to release handbrakes on car(s)
		(1)	Automatic hump retarder failed to slow car-foreign matter on wheels
		(1)	Switch (hand operated) stand mechanism broken, loose or worn
Kansas City, Missouri	9	(6)	Yard skate slide and failed to stop car
		(1)	Buffing or slack action excessive-train handling
		(1)	Failure to comply with restricted speed
		(1)	Cars left foul
Pine Bluff, Arkansas	8	(2)	Other signal failures
		(1)	Improperly Loaded Car
		(1)	Cars left foul
		(1)	Broken rail, horizontal split head
		(1)	Switch not latched or locked
		(1)	Flangeway clogged
		(1)	Shoving move, absence of man on leading end of movement

Railroad/Location Distribution of Reportable Rail Equipment Accidents involving Remote Control Locomotives:

North Platte, Nebraska	8	(2)	Classification yard automatic control system retarder failure
		(2)	Interaction lateral/vertical forces
		(1)	Power switch failure
		(1)	Radio communication, failure to comply
		(1)	Other train operation/human factor
		(1)	Buffing or slack action excessive-train handling
Kansas City, Kansas	7	(2)	Other general switching rules
		(1)	Passed couplers
		(1)	Knuckle broken or defective
		(1)	Failure to couple
		(1)	Other rail/joint bar defects
		(1)	Remote control transmitter defective
Roseville, California	6	(1)	Shoving move, absence of man on leading end of movement
		(1)	Switch previously run through
		(1)	Radio communication, improper
		(1)	Other general switching rules
		(1)	Instructions to train/yard crew improper
		(1)	Failure to apply sufficient handbrake(s) on car(s)
Fort Worth, Texas	3	(1)	Vandalism of on-track equipment (e.g., brakes released)
		(1)	Lateral drawbar force on curve excessive-train makeup
		(1)	Use of brakes, other
Hermiston, Oregon	3	(1)	Classification yard automatic control system retarder failure
		(1)	Shoving move, absence of man on leading end of movement
		(1)	Humping or cutting off in motion equipment susceptible to damage
Houston, Texas	3	(1)	Classification yard automatic control system switch failure
		(1)	Other train operations/human factor cause
		(1)	Broken rail - transverse/compound fissure
Laporte, Texas	3	(3)	Classification yard automatic control system retarder failure
Dallas, Texas	2	(1)	Failure to comply with restricted speed
		(1)	Switch point worn or broken

Railroad/Location Distribution of Reportable Rail Equipment Accidents involving Remote Control Locomotives:

Denver, Colorado	2	(1)	Passed couplers
		(1)	Switch improperly lined
Northlake, Illinois	2	(1)	Switch improperly lined
		(1)	Failure to comply with restricted speed
Rochelle, Illinois	2	(2)	Switch improperly lined
Seattle, Washington	2	(1)	Moving cars with loading ramp not in position
		(1)	Failure to properly secure hand brake on car(s)
Tacoma, Washington	2	(1)	Switch damaged or out of adjustment
		(1)	Shoving move, man on leading end of movement, failure to control
Eugene, Oregon	1	(1)	Other brake components damaged, worn, broken or defective
Laredo, Texas	1	(1)	Deviation from uniform top of rail profile
Melrose Park, Illinois	1	(1)	Shoving move, absence of man on leading end of movement
St. Louis, Missouri	1	(1)	Other track geometry defects
Salt Lake City, Utah	1	(1)	Passed couplers
Stockton, California	1	(1)	Shoving move, absence of man on leading end of movement
W. Sacramento, California	1	(1)	Wide gage (due to defective or missing crossties)
Pioneer, Utah	1	(1)	Shoving move, man on end of movement, failure to control
Tracy, California	1	(1)	Wide gage (due to defective or missing crossties)
Portland, Oregon	1	(1)	Broken rail-base
Green River, Wyoming	1	(1)	Load shifted
Cheyenne, Wyoming	1	(1)	Switch improperly lined
Total =	97		

Burlington Northern Santa Fe:

Galesburg, Illinois	4	(1)	Switch point worn or broken
		(1)	Other frog, switch or track appliance defect
		(1)	Broken rail, detail fracture from shelling or head check
		(1)	Other signal failures
Barstow, California	3	(1)	Failure to allow air brakes to fully release before proceeding
		(1)	Use of switches, other
		(1)	Coupler retainer pin/cross key missing

Railroad/Location Distribution of Reportable Rail Equipment Accidents involving Remote Control Locomotives:

Kansas City, Kansas	3	(1)	Object on or fouling track (motor vehicle not at a crossing)
		(1)	Buffing or slack action excessive-train handling
		(1)	Shoving move, absence of man on leading end of movement
Denver, Colorado	2	(1)	Shoving move, absence of man on leading end of movement
		(1)	Failure to comply with restricted speed
Everett, Washington	2	(1)	Other general switching rules
		(1)	Worn rail
Grand Forks, North Dakota	2	(1)	Switch damaged or out of adjustment
		(1)	Failure to comply with restricted speed
Lincoln, Nebraska	2	(1)	Classification yard automatic control system retarder failure
		(1)	Yard skate slide and failed to stop car
Minneapolis, Minnesota	2	(1)	Coupling speed excessive
		(1)	Shoving move, man on end of movement, failure to control
St. Louis, Missouri	2	(1)	Shoving move, absence of man on leading end of movement
		(1)	Track damage caused by non-railroad interference with track
San Bernardino, California	2	(1)	Failure to properly secure hand brake on car(s)
		(1)	Object such as lading chains or straps fouling wheels
Temple, Texas	2	(1)	Failure to properly secure hand brakes on car
		(1)	Turnout frog (spring) worn or broken
Amarillo, Texas	1	(1)	Shoving move, absence of man on leading end of movement
Birmingham, Alabama	1	(1)	Buffing or slack action excessive-train handling
Dilworth, Minnesota	1	(1)	Wide gage (due to defective or missing ties)/due to loose gage rods
E. Grand Forks, N. Dakota	1	(1)	Shoving move, absence of man on leading end of movement
Fridley, Minnesota	1	(1)	Switch improperly lined
Logistics Park, Illinois	1	(1)	Failure to properly secure engine(s)
Mandan, North Dakota	1	(1)	Failure to comply with restricted speed
Memphis, Tennessee	1	(1)	Yard skate slid and failed to stop cars
Minot, North Dakota	1	(1)	Shoving move, absence of man on leading end of movement
Northtown, Minnesota	1	(1)	Instructions to train/yard crew improper

Railroad/Location Distribution of Reportable Rail Equipment Accidents involving Remote Control Locomotives:

Pasco, Washington	1	(1)	Manual intervention of class yard auto control system modes by optr
Spokane, Washington	1	(1)	Interference with railroad operations by non-railroad employee
Springfield, Missouri	1	(1)	Shoving move, man on end of movement, failure to control
Total =	39		
CSX:			
Cumberland, Maryland	6	(2)	Speed, other
		(1)	Buffing or slack action excessive-train handling
		(1)	Retarder, improper manual operation
		(1)	Side bearings missing
		(1)	Other communication equipment failure/Knuckle broken or defective
Tarrant, Alabama	3	(1)	Failure to comply with restricted speed
		(1)	Failure to stop train in clear
		(1)	Object or equipment on or fouling track
Cincinnati, Ohio	3	(1)	Broken rail, transverse/compound fissure
		(1)	Switch previously run through
		(1)	Shoving move, absence of man on leading end of movement
Louisville, Kentucky	2	(1)	Buffing or slack action excessive-train handling
		(1)	Other signal failures
Atlanta, Georgia	1	(1)	Shoving move, absence of man on leading end of movement
Baltimore, Maryland	1	(1)	Shoving move, man on end of movement, failure to control
Jacksonville, Florida	1	(1)	Failure to apply sufficient hand brakes on cars
Evansville, Indiana	1	(1)	Shoving move, absence of man on leading end of movement
Hamlet, N. Carolina	1	(1)	Shoving move, man on end of movement, failure to control
Mobile, Alabama	1	(1)	Failure to comply with restricted speed
Montgomery, Alabama	1	(1)	Switch previously run through
Nashville, Tennessee	1	(1)	Failure to properly secure engine(s)
Riverside, Illinois	1	(1)	Brake rigging down or dragging
Rocky Mount, N. Carolina	1	(1)	Switch improperly lined/Shoving move, absence of man at lead end of movement
Savannah, Georgia	1	(1)	Shoving move, man on end of movement, failure to control
Wilmington, North Carolina	1	(1)	Independent (engine) brake, improper use (except actuation)
Walbridge, Ohio	1	(1)	Passed couplers
Total =	27		

Railroad/Location Distribution of Reportable Rail Equipment Accidents involving Remote Control Locomotives:

Norfolk Southern:			
Birmingham, Alabama	2	(1)	Yard skate slide and failed to stop car
		(1)	Switch improperly lined
Childs, S. Carolina	1	(1)	Failure to comply with restricted speed
Oakwood, Michigan	1	(1)	Switch improperly lined
Jasper, Florida	1	(1)	Other misc. causes (Ineffective braking contamination brake shoes)
Total =	5		
Alton and Southern:			
E. St. Louis, Illinois	4	(1)	Shoving move, man on end of movement, failure to control
		(1)	Yard skate slid and failed to stop cars
		(1)	Radio communication, failure to give/receive
		(1)	Failure to comply with restricted speed
Total =	4		
Belt Railway of Chicago:			
Bedford Park, Illinois	2	(1)	Switch improperly lined
		(1)	Extreme Environmental Conditions-Extreme Wind Velocity
Chicago, Illinois	1	(1)	Switch improperly lined
Total =	3		
Kansas City Southern:			
Shreveport, Louisiana	2	(1)	Shoving move, absence of man on leading end of movement
		(1)	Failure to comply with restricted speed
Wylie, Texas	1	(1)	Cars left foul
Total =	3		
Conrail Shared Assets:			
Detroit, Michigan	1	(1)	Passed couplers
Total =	1		
Montana Rail Link:			
Missoula, Montana	1	(1)	Shoving move, absence of man on leading end of movement
Total =	1		

Railroad/Location Distribution of Reportable Rail Equipment Accidents involving Remote Control Locomotives:

San Luis & Rio Grande:

Monte Vista, Colorado	1	(1)	Object or equipment fouling track (motor vehicle not at crossing)
Total =	1		

Grand Total = 181

Listing of Remote Control Accidents in Chronological Order: May 1 - November 30, 2003:

5/01/03	NS	Oakwood	MI	Human - H702	Switch improperly lined
5/04/03	MRL	Missoula	MT	Human - H306	Shoving move, absence of man on leading end of movement
5/04/03	UP	N. Little Rock	AR	Misc - M407	Automatic hump retarder failed to slow car -foreign matter on wheels
5/05/03	CSX	Tarrant	AL	Human - H401	Failure to stop train in clear
5/05/03	UP	Ft. Worth	TX	Misc - M502	Vandalism of on-track equipment (e.g., brakes released)
5/06/03	BNSF	Grand Forks	ND	Track - T311	Switch damaged or out of adjustment
5/06/03	UP	Kansas City	KS	Human - H399	Other general switching rules (movement entered RCL zone)
5/10/03	UP	Dallas	TX	Track - T314	Switch point worn or broken
5/11/03	UP	N. Little Rock	AR	Human - H702	Switch improperly lined
5/11/03	UP	North Platte	NE	Human - H210	Radio communication, failure to comply
5/11/03	BNSF	Spokane	WA	Misc - M501	Interference with railroad operations by non-railroad employee
5/15/03	NS	Jasper	FL	Misc - M599	Other misc. causes-Ineffective braking contamination brake shoes
5/17/03	BNSF	Lincoln	NE	Misc - M408	Yard skate slid and failed to stop car
5/19/03	UP	Hermiston	OR	Signal - S007	Classification yard automatic control system retarder failure
5/23/03	UP	Hermiston	OR	Human - H306	Shoving move, absence of man on leading end of movement
5/26/03	CSX	Cincinnati	OH	Track - T220	Broken rail - Transverse/compound fissure
5/28/03	BNSF	Springfield	MO	Human - H307	Shoving move, man on end of movement, failure to control
5/28/03	UP	North Platte	NE	Signal - S007	Classification yard automatic control system retarder failure
6/02/03	UP	North Platte	NE	Misc - M405	Interaction of lateral/vertical forces
6/07/03	UP	Kansas City	MO	Misc - M408	Yard skate slid and failed to stop cars
6/14/03	CSX	Rocky Mount	NC	Human - H702/H306	Switch improperly lined/Shoving move, absence of man on lead end
6/14/03	BNSF	Galesburg	IL	Track - T314	Switch point worn or broken
6/14/03	UP	Roseville	CA	Human - H211	Radio communication, improper
6/20/03	BNSF	Everett	WA	Human - H399	Other general switching rules
6/20/03	BNSF	Minneapolis	MN	Human - H601	Coupling speed excessive
6/20/03	UP	Seattle	WA	Human - H018	Failure to properly secure hand brake on car(s)
6/23/03	ALS	E St. Louis	IL	Human - H307	Shoving move, man on end of movement, failure to control
6/24/03	NS	Childs	SC	Human - H607	Failure to comply with restricted speed
6/25/03	UP	Kansas City	KS	Human - H312	Passed couplers
6/25/03	UP	Tracy	CA	Track - T111	Wide gage (due to defective or missing crossties)

Listing of Remote Control Accidents in Chronological Order: (continued):

6/27/03	UP	Pine Bluff	AR	Misc - M204	Improperly loaded car
6/28/03	CSX	Cincinnati	OH	Human - H704	Switch previously run through
6/30/03	BNSF	Galesburg	IL	Track - T399	Other frog, switch or track appliance defect
7/01/03	UP	Kansas City	MO	Human - H503	Buffing or slack action excessive, train handling
7/03/03	UP	Kansas City	MO	Misc - M408	Yard skate slid and failed to stop car
7/05/03	BNSF	Temple	TX	Human - H018	Failure to properly secure hand brakes on car(s)
7/06/03	UP	Dallas	TX	Human - H607	Failure to comply with restricted speed
7/07/03	BNSF	St. Louis	MO	Human - H306	Shoving move, absence of man on leading end of movement
7/08/03	BNSF	Galesburg	IL	Track - T207	Broken rail - Detail fracture from shelling or head check
7/08/03	UP	San Antonio	TX	Mech - E31C	Coupler mismatch, high/low
7/08/03	UP	Kansas City	MO	Misc - M408	Yard skate slid and failed to stop car
7/10/03	UP	Roseville	CA	Human - H306	Shoving move, absence of man on leading end of movement
7/11/03	UP	San Antonio	TX	Human - H306	Shoving move, absence of man on leading end of movement
7/14/03	UP	Pine Bluff	AR	Human - H302	Cars left foul
7/16/03	UP	Rochelle	IL	Human - H702	Switch improperly lined
7/17/03	BRC	Bedford Park	IL	Human - H702	Switch improperly lined
7/17/03	CSX	Mobile	AL	Human - H607	Failure to comply with restricted speed
7/17/03	UP	Kansas City	KS	Human - H399	Other general switching rules
7/17/03	UP	Tacoma	WA	Track - T311	Switch damaged or out of adjustment
7/20/03	BNSF	Barstow	CA	Human - H514	Failure to allow air brakes to fully release before proceeding
7/22/03	UP	San Antonio	TX	Human - H302	Cars left foul
7/23/03	BNSF	Denver	CO	Human - H306	Shoving move, absence of man on leading end of movement
7/23/03	CSX	Tarrant	AL	Human - H607	Failure to comply with restricted speed
7/25/03	UP	San Antonio	TX	Track - T205, E31L	Defective or missing crossties/Coupler mismatch, high/low
7/26/03	UP	N Little Rock	AR	Human - H306	Shoving move, absence of man on leading end of movement
7/28/03	BNSF	Kansas City	KS	Human - H306	Shoving move, absence of man on leading end of movement
7/28/03	CSX	Jacksonville	FL	Human - H020	Failure to apply sufficient hand brakes on cars
7/31/03	BNSF	St. Louis	MO	Misc - M506	Track damage caused by non-railroad interference with track
7/31/03	CSX	Cumberland	MD	Human - H503	Buffing or slack action excessive, train handling
8/02/03	BNSF	Minneapolis	MN	Human - H307	Shoving move, man on end of movement, failure to control

Listing of Remote Control Accidents in Chronological Order: (continued):

8/05/03	UP	N Little Rock	AR	Human - H607	Failure to comply with restricted speed
8/05/03	UP	Rochelle	IL	Human - H702	Switch improperly lined
8/05/03	UP	San Antonio	TX	Track - T110	Wide gage (due to defective or missing crossties)
8/09/03	BNSF	Temple	TX	Track - T318	Turnout frog (spring), worn or broken
8/09/03	NS	Birmingham	AL	Misc - M408	Yard skate slid and failed to stop car
8/10/03	CSX	Tarrant	AL	Misc - M402	Object or equipment on or fouling track
8/12/03	UP	Pine Bluff	AR	Track - T212	Broken rail, horizontal split head
8/13/03	UP	Cheyenne	WY	Human - H702	Switch improperly lined
8/13/03	UP	St. Louis	MO	Track - T199	Other track geometry defects
8/14/03	CSX	Walbridge	OH	Human - H312	Passed couplers
8/14/03	UP	San Antonio	TX	Misc - M402	Object or equipment on or fouling track
8/15/03	ALS	E St. Louis	IL	Misc - M408	Yard skate slid and failed to stop cars
8/16/03	BNSF	Minot	ND	Human - H306	Shoving move, absence of man on leading end of movement
8/17/03	UP	Houston	TX	Signal - S006	Classification yard automatic control system switch failure
8/18/03	BNSF	Mandan	ND	Human - H607	Failure to comply with restricted speed
8/18/03	UP	Pine Bluff	AR	Human - H703	Switch not latched or locked
8/18/03	UP	North Platte	NE	Signal - S011	Power switch failure
8/20/03	UP	Roseville	CA	Human - H399	Other general switching rules
8/21/03	BNSF	Galesburg	IL	Signal - S099	Other signal failures
8/21/03	UP	Pine Bluff	AR	Signal - S099	Other signal failures
8/21/03	UP	San Antonio	TX	Human - H601	Coupling speed excessive
8/22/03	BNSF	Lincoln	NE	Signal - S007	Classification yard automatic control system retarder failure
8/22/03	UP/BN	Tacoma	WA	Human - H307	Shoving move, man on leading end of movement, failure to control
8/22/03	UP	Kansas City	MO	Human - H607	Failure to comply with restricted speed
8/25/03	UP	Roseville	CA	Human - H704	Switch previously run through
8/27/03	UP	Seattle	WA	Human - H311	Moving cars with loading ramp not in position
8/30/03	BNSF	Northtown	MN	Human - H305	Instructions to train/yard crew improper
8/30/03	KCS	Shreveport	LA	Human - H607	Failure to comply with restricted speed
8/30/03	UP	Kansas City	KS	Mech - E330C	Knuckle broken or defective
8/30/03	UP	Stockton	CA	Human - H306	Shoving move, absence of man on leading end of movement

Listing of Remote Control Accidents in Chronological Order: (continued):

9/01/03	BNSF	Kansas City	KS	Misc - M402	Object on or fouling track (motor vehicle not at a crossing)
9/01/03	CSX	Cumberland	MD	Human - H313	Retarder, improper manual operation
9/01/03	UP	LaPorte	TX	Signal - S007	Classification yard automatic control system retarder failure
9/01/03	UP	Melrose Park	IL	Human - H306	Shoving move, absence of man on leading end of movement
9/02/03	UP	Pine Bluff	AR	Track - T402	Flangeway clogged
9/02/03	UP	Pine Bluff	AR	Signal - S099	Other signal failures
9/02/03	UP	San Antonio	TX	Track - T110	Wide gage (due to defective or missing crossties)
9/04/03	CSX	Cumberland	MD	Human - H699	Speed, other
9/06/03	BNSF	Birmingham	AL	Human - H503	Buffing or slack action excessive-train handling
9/07/03	BNSF	Barstow	CA	Human - H799	Use of switches, other
9/08/03	BNSF	SanBernardino,	CA	Human - H018	Failure to properly secure hand brakes on car(s)
9/09/03	CSX	Nashville	TN	Human - H017	Failure to properly secure engine(s)
9/09/03	UP	N. Little Rock	AR	Human - H305	Instructions to train/yard crew improper
9/09/03	UP	San Antonio	TX	Human - H312	Passed couplers
9/11/03	ALS	E St. Louis	IL	Human - H212	Radio communication, failure to give/receive
9/11/03	CSX	Cumberland	MD	Human - H699	Speed, other
9/12/03	KCS	Shreveport	LA	Human - H306	Shoving move, absence of man on leading end of movement
9/13/03	UP	Ft. Worth	TX	Human - H506	Lateral drawbar force on curve excessive - train make-up
9/15/03	UP	Pioneer	UT	Human - H307	Shoving move, man on end of movement, failure to control
9/15/03	UP	San Antonio	TX	Human - H306	Shoving movement, absence of man on leading end of movement
9/16/03	UP	Hermiston	OR	Human - H317	Humping/cutting off in motion equipment susceptible to damage
9/17/03	BNSF	Kansas City	KS	Human - H503	Buffing or slack action excessive-train handling
9/17/03	UP	Houston	TX	Human - H999	Other train operations/human factor cause
9/18/03	CSX	Hamlet	NC	Human - H307	Shoving move, man on end of movement, failure to control
9/18/03	UP	Kansas City	MO	Misc - M408	Yard skate slid and failed to stop cars
9/18/03	UP	Green River	WY	Misc - M201	Load shifted
9/19/03	UP	N. Little Rock,	AR	Signal - S007	Classification yard automatic control system retarder failure
9/20/03	BNSF	Logistics Park,	IL	Human - H017	Failure to properly secure engine(s)
9/20/03	UP	Kansas City	KS	Human - H310	Failure to couple
9/21/03	UP	Ft. Worth	TX	Human - H099	Use of brakes, other

Listing of Remote Control Accidents in Chronological Order: (continued):

9/25/03	NS	Birmingham	AL	Human - H702	Switch improperly lined
9/26/03	UP	N. Little Rock	AR	Misc - M408	Yard skate slid and failed to stop cars
9/26/03	UP	Laredo	TX	Track - T103	Deviation from uniform top of rail profile
9/27/03	CSX	Evansville	IN	Human - H306	Shoving move, absence of man on leading end of movement
9/27/03	UP	North Platte	NE	Misc - M405	Interaction of lateral/vertical forces
9/28/03	UP	North Platte	NE	Signal - S007	Classification yard automatic control system retarder failure
9/29/03	SLRG	Monte Vista	CO	Misc - M402	Object or equipment fouling track (motor vehicle not at crossing)
9/29/03	UP	Kansas City	KS	Track - T299	Other rail and joint bar defects
9/30/03	UP	Kansas City	MO	Human - H302	Cars left foul
10/01/03	KCS	Wylie	TX	Human - H302	Cars left foul
10/01/03	UP	North Platte	NE	Human - H503	Buffing or slack action excessive-train handling
10/02/03	CSX	Savannah	GA	Human - H307	Shoving move, man on end of movement, failure to control
10/02/03	CSX	Cumberland	MD	Mech - E43C	Side bearings missing
10/06/03	CSX	Baltimore	MD	Human - H307	Shoving move, man on end of movement, failure to control
10/07/03	CSX	Wilmington	NC	Human - H525	Independent (engine) brake, improper use (except actuation)
10/09/03	UP	LaPorte	TX	Signal - S007	Classification yard automatic control system retarder failure
10/09/03	UP	Roseville	CA	Human - H305	Instructions to train/yard crew improper
10/12/03	CSX	Louisville	KY	Signal - S099	Other signal failures
10/13/03	UP	Kansas City	MO	Misc - M408	Yard skate slid and failed to stop cars
10/14/03	BNSF	Amarillo	TX	Human - H306	Shoving move, absence of man on leading end of movement
10/18/03	UP	N. Little Rock	AR	Human - H019	Failure to release handbrakes on car(s)
10/19/03	BNSF	Grand Forks	ND	Human - H607	Failure to comply with restricted speed
10/20/03	UP	Portland	OR	Track - T202	Broken rail - base
10/23/03	CSX	Cincinnati	OH	Human - H306	Shoving move, absence of man on leading end of movement
10/24/03	BNSF	Pasco	WA	Human - H316	Manual intervention of class yard auto control sys modes by optr
10/25/03	CSX	Louisville	KY	Human - H503	Buffing or slack action excessive-train handling
10/26/03	ALS	E. St. Louis	IL	Human - H607	Failure to comply with restricted speed
10/27/03	BNSF	Barstow	CA	Mech - E33C	Coupler retainer pin/cross key missing
10/28/03	UP	San Antonio	TX	Human - H704	Switch previously run through
10/31/03	BNSF	Fridley	MN	Human - H702	Switch improperly lined

Listing of Remote Control Accidents in Chronological Order: (continued):

11/01/03	CSX	Cumberland	MD	Mech	- S013/E30C	Other comm. equip. failure/Knuckle broken or defective
11/02/03	BNSF	Memphis	TN	Misc	- M408	Yard skate slid and failed to stop cars
11/03/03	CSX	Riverdale	IL	Mech	- E07C	Brake rigging down or dragging
11/03/03	UP	Northlake	IL	Human	- H702	Switch improperly lined
11/05/03	UP	Denver	CO	Human	- H312	Passed couplers
11/07/03	CRSH	Detroit	MI	Human	- H312	Passed couplers
11/07/03	UP	Denver	CO	Human	- H702	Switch improperly lined
11/07/03	UP	N. Little Rock,	AR	Human	- H399	Other general switching rules
11/07/03	UP	North Platte	NE	Human	- H999	Other train operation/human factors
11/09/03	BRC	Chicago	IL	Human	- H702	Switch improperly lined
11/09/03	CSX	Montgomery	AL	Human	- H704	Switch previously run through
11/10/03	UP	Pine Bluff	AR	Human	- H306	Shoving move, absence of man on leading end of movement
11/11/03	BNSF	Dilworth	MN	Track	- T110/T112	Wide gage (due to defective or missing ties)/(due to loose gage rods)
11/11/03	UP	Roseville	CA	Human	- H020	Failure to apply sufficient number of handbrake(s) on car(s)
11/11/03	UP	Salt Lake City	UT	Human	- H312	Passed couplers
11/12/03	UP	Eugene	OR	Mech	- E04C	Other brake components damaged, worn, broken or disconnected
11/13/03	BNSF	Everett	WA	Track	- T222	Worn rail
11/14/03	CSX	Atlanta	GA	Human	- H306	Shoving move, absence of man on leading end of movement
11/17/03	UP	LaPorte	TX	Signal	- S007	Classification yard automatic control system retarder failure
11/17/03	UP	Kansas City	MO	Misc	- M408	Yard skate slid and failed to stop cars
11/17/03	UP	San Antonio	TX	Human	- H702	Switch improperly lined
11/18/03	UP	Sacramento	CA	Track	- T110	Wide gage (due to defective or missing crossties)
11/19/03	UP	Northlake	IL	Human	- H607	Failure to comply with restricted speed
11/22/03	BNSF	Denver	CO	Human	- H607	Failure to comply with restricted speed
11/22/03	UP	N. Little Rock,	AR	Track	- T309	Switch (hand operated) stand mechanism broken, loose or worn
11/23/03	BNSF	SanBernardino,	CA	Misc	- M410	Object such as lading chains or straps fouling wheels
11/23/03	BRC	Bedford Park	IL	Misc	- M105	Extreme Environmental Condition-Extreme Wind Velocity
11/23/03	UP	Kansas City	KS	Signal	- S101	Remote control transmitter defective
11/26/03	UP	N. Little Rock,	AR	Human	- H399	Other general switching rules

Listing of Remote Control Accidents in Chronological Order:(continued):

11/30/03	BNSF	Grand Forks	ND	Human - H306/H702	Shoving move, abs. of man on lead end of move/Switch imp. lined
11/30/03	UP	Houston	TX	Track - T220	Broken rail - Transverse/compound fissure

Total RCL = 181

Note: The reportable rail equipment accidents/incidents shown above are those that occurred when remote controlled locomotives were in use, and did not necessarily occur because of the use of a remote controlled locomotive.

Remote Control Accidents That Included Hazardous Material Shipment(s):

Thirty eight of the 181, RCL accidents listed above included hazardous materials shipments. The thirty eight RCL accidents included 315 cars carrying hazardous material. Seventy two of the 315 cars were damaged or derailed. One of the 315 cars experienced a hazardous material release. With respect to similar conventional railroad operations, there were 887 accidents that included hazardous material shipments. The 887 accidents included 1,647 cars carrying hazardous material. Two hundred seven of the 1,647 cars were damaged or
derailed. Four of the 207 cars experienced a hazardous material release.

	Remote Control Operations	Conventional Railroad Operations
Number of Accidents	38	887
Cars transporting hazardous materials	315	1,647
Cars damaged or derailed	72	207
Cars releasing hazardous materials	1	4

Listing of Remote Control Accidents That Included Hazardous Material Shipment(s):

Date	RR	City	State	Cause	Cars Carrying	Cars Damaged or Derailed	Cars Releasing
5/15/03	NS	Jasper	FL	Misc - M599	8	8	0
6/25/03	UP	Kansas City	KS	Human - H312	9	2	0
6/30/03	BNSF	Galesburg	IL	Track - T399	5	0	0
7/01/03	UP	Kansas City	MO	Human - H503	1	1	0
7/05/03	BNSF	Temple	TX	Human - H018	1	1	0
7/08/03	BNSF	Galesburg	IL	Track - T207	1	1	0
7/17/03	UP	Kansas City	KS	Human - H399	4	0	0
7/23/03	BNSF	Denver	CO	Human - H306	3	3	0
7/28/03	CSX	Jacksonville	FL	Human - H020	1	0	0
8/09/03	BNSF	Temple	TX	Track - T318	2	2	1
8/10/03	CSX	Tarrant	AL	Misc - M402	1	0	0
8/12/03	UP	Pine Bluff	AR	Track - T212	5	0	0
8/17/03	UP	Houston	TX	Signal - S006	5	3	0
8/30/03	KCS	Shreveport	LA	Human - H607	16	0	0
9/01/03	UP	LaPorte	TX	Signal - S007	36	25	0
9/02/03	UP	Pine Bluff	AR	Signal - S099	1	1	0
9/07/03	BNSF	Barstow	CA	Human - H799	9	0	0
9/11/03	ALS	E St. Louis	IL	Human - H212	1	1	0
9/17/03	BNSF	Kansas City	KS	Human - H503	1	1	0
9/17/03	UP	Houston	TX	Human - H999	7	0	0
9/18/03	CSX	Hamlet	NC	Human - H307	16	1	0
9/28/03	UP	North Platte	NE	Signal - S007	13	0	0
10/01/03	UP	North Platte	NE	Human - H503	2	0	0
10/02/03	CSX	Cumberland	MD	Mech - E43C	21	0	0
10/07/03	CSX	Wilmington	NC	Human - H525	8	0	0
10/09/03	UP	LaPorte	TX	Signal - S007	46	4	0
10/14/03	BNSF	Amarillo	TX	Human - H306	25	1	0
11/01/03	CSX	Cumberland	MD	Mech - S013/E30C	12	2	0
11/02/03	BNSF	Memphis	TN	Misc - M408	1	0	0
11/07/03	UP	North Platte	NE	Human - H999	16	1	0
11/11/03	BNSF	Dilworth	MN	Track - T110/T112	4	3	0

11/13/03	BNSF	Everett	WA	Track	- T222	2		2		0	

Listing of Remote Control Accidents That Included Hazardous Material Shipment(s) continued:

11/14/03	CSX	Atlanta	GA	Human	- H306	1		0		0	
11/17/03	UP	LaPorte	TX	Signal	- S007	2		0		0	
11/17/03	UP	Kansas City	MO	Misc	- M408	8		5		0	
11/22/03	BNSF	Denver	CO	Human	- H607	14		0		0	
11/26/03	UP	N. Little Rock	AR	Human	- H399		5		1		0
11/30/03	UP	Houston	TX	Track	- T220	3		0		0	

Enclosure No. 2

Comparison - Reportable Employee Casualties to Transportation Crafts occurring on Yard/Industry Tracks Involving RCL Operations and Conventional Operations (May 1 through November 30, 2003):

Employee Casualty Reporting Criteria: Each event or exposure arising from the operation of a railroad that results in: (1) Death; (2) Injury or occupational illness that requires medical treatment; a day away from work; restricted work activity or job transfer; loss of consciousness; (3) a "significant" injury (as defined); or (4) an illness or injury that meets specific case criteria (as defined). (See the current FRA Guide for Preparing Accident/Incident Reports, effective May 1, 2003, for the exact and complete requirements.)

					Yard Switching Miles			Ratio of Employee Injuries per 1 Million Yard Switching Miles		
Distribution of Casualties by Railroads:	RCL	Conv	Total	% RCL	RCL	Conv	Total	RCL	Conv	Total
Union Pacific Railroad (UP)	28	153 =	181	15.5	3,251,051	5,651,059 =	8,902,110	8.61	27.07	20.33
CSX Transportation, Inc. (CSX)	16	135 =	151	10.6	2,070,967	5,272,965 =	7,343,932	7.73	25.60	20.56
Burlington Northern Santa-Fe (BNSF)	12	93 =	105	11.4	2,080,873	5,585,742 =	7,666,615	5.77	16.65	13.70
Alton and Southern Railway (ALS)	5	1 =	6	83.3	217,564	333,903 =	551,467	22.98	2.99	10.88
Montana Rail Link (MRL)	4	6 =	10	40.0	155,293	113,250 =	268,543	25.76	52.98	37.24
McKeesport Connecting Railroad (MKC)*	0	0 =	0	0.0	0	5,416 =	5,416	0.00	0.00	0.00
Belt Railway Company of Chicago (BRC)	2	1 =	3	66.7	77,537	171,688 =	249,225	25.79	5.82	12.04
Kansas City Southern Railway (KCS)	1	24 =	25	4.0	212,022	526,238 =	738,260	4.72	45.61	33.86
Norfolk Southern Railway (NS)	1	62 =	63	1.6	431,750	7,104,466 =	7,536,216	2.32	8.73	8.36
Pennsylvania Southwestern RR (PSWR)	1	0 =	1	100.0	36,216	3,354 =	39,570	27.61	0.00	25.27
Birmingham Southern (BS)*	0	2 =	2	0.0	0	9,835 =	9,835	0.00	203.36	203.36
California Northern (CFNR)	0	0 =	0	0.0	3,623	2,963 =	6,586	0.00	0.00	0.00
Cleveland Works Railway (CWRO)*	0	2 =	2	0.0	0	4,622 =	4,622	0.00	432.71	432.71
Conrail Shared Assets (CRSH)	0	10 =	10	0.0	24, 528	1,046,154 =	1,070,682	0.00	9.56	9.34
Consolidated Grain & Barge (MGRR)	0	0 =	0	0.0	9,002	0 =	9,002	0.00	0.00	0.00
Florida East Coast (FEC)	0	5 =	5	0.0	5,900	241,718 =	247,618	0.00	20.69	20.19
Illinois Central (IC)	0	23 =	23	0.0	4,770	1,478,104 =	1,482,874	0.00	15.56	15.51
Indiana Railroad (INRD)	0	0 =	0	0.0	5,945	17,825 =	23,770	0.00	0.00	0.00
Jefferson Warrior Railroad	0	0 =	0	0.0	4,942	266 =	5,208	0.00	0.00	0.00
Puget Sound & Pacific (PSAP)	0	0 =	0	0.0	1,462	1,648 =	3,110	0.00	0.00	0.00
San Luis & Rio Grande Railroad (SLRG)	0	0 =	0	0.0	697	3,500 =	4,197	0.00	0.00	0.00
Wheeling & Lake Erie (WE)	0	1 =	1	0.0	1,212	109,235 =	110,447	0.00	9.15	9.05
Wisconsin Central (WC)	0	18 =	18	0.0	25,632	611,632 =	637,264	0.00	29.43	28.25
Total =	70	536 =	606	11.6	8,620,986	28,295,583 =	36,916,569	8.12	18.94	16.47

* Designates railroads that operate remote control locomotives, but only in that portion of their operations designated as a "plant railroad."

2.

Distribution of Casualties by State:	RCL	Conv	Total
California	10	63 =	73
Illinois	9	46 =	55
Texas	5	40 =	45
Montana	5	8 =	13
Colorado	4	12 =	16
Nebraska	4	14 =	18
Indiana	3	13 =	16
Kansas	3	12 =	15
Ohio	3	30 =	33
Wyoming	3	5 =	8
Kentucky	2	14 =	22
Louisiana	2	19 =	21
Michigan	2	14 =	16
Missouri	2	14 =	16
Oregon	2	5 =	7
Tennessee	2	20 =	22
Alabama	1	19 =	20
Georgia	1	21 =	22
Maryland	1	5 =	6
Minnesota	1	1 =	2
New Mexico	1	5 =	6
North Dakota	1	2 =	3
Pennsylvania	1	8 =	9
South Carolina	1	12 =	13
Wisconsin	1	16 =	17
All Other States (RCL Railroads)	0	112 =	112
Total =	70	536 =	606

Distribution of Casualties by Month:	RCL	Conv	Total
May	11	64 =	75
June	8	71 =	79
July	7	69 =	76
August	9	83 =	92
September	9	94 =	103
October	21	81 =	102
November	5	74 =	79
Total =	70	536 =	606

Listing of Employee Reportable Casualties:

5/03/03	UP	Fresno	CA	Bruise mouth.	Lost hold on grab-iron and fell due to wet weather.
5/04/03	CSX	Vanderburgh	IN	Cut Hip.	Pulling pin on freight car, slipped and fell, muddy conditions.
5/11/03	UP	Jackson	MO	Sprain ankle.	While walking, slipped on railroad tie.
5/13/03	UP	Placer	CA	Bruise elbow.	Fell to ground, handhold came off due to missing bolt.
5/15/03	UP	Santa Clara	CA	Bruise knee.	Jumped off car before car ran through switch and derailed.
5/19/03	UP	Bexar	TX	Sprain neck.	Fell from car when locomotive struck car he was riding.
5/20/03	UP	Umatilla	OR	Amputation arm.	Walking, struck by own RCL.
5/20/03	BNSF	San Joaquin	CA	Bruise skull.	Fell from car while applying a handbrake.
5/21/03	CSX	Jefferson	KY	Sprain upper arm.	Pulling a pin lifter on car, felt pop in bicep left arm.
5/27/03	CSX	Wayne	MI	Sprain shoulder.	Throwing switch, felt pain in shoulder.
5/31/03	UP	Bexar	TX	Sprain neck	Collision while riding side of car.
6/02/03	CSX	Mobile	AL	Sprain lower back.	Jerking motion of locomotive.
6/03/03	CSX	Hamilton	OH	Hernia.	Setting handbrake on engine, tension released.
6/03/03	UP	Placer	CA	Sprain ankle.	Stepped on ballast when getting off freight car.
6/08/03	UP	Lincoln	NE	Sprain ankle.	Sudden car movement caused employee to quickly move.
6/21/03	UP	Lincoln	NE	Strain back.	Adjusting drawbar, overexertion.
6/24/03	MRL	Yellowstone	MT	Sprain knee.	Pulling a pin lifter on car.
6/27/03	BNSF	Wyandotte	KS	Sprain knee.	While stepping up onto stirrup.
6/29/03	KCS	Caddo	LA	Bruise ankle.	While riding moving freight car, struck ankle against object.
7/03/03	BNSF	Douglas	WI	Sprain back.	Slack action while riding ladder of freight car.
7/08/03	UP	Multnomah	OR	Strain elbow.	Adjusting drawbar, overexertion.
7/09/03	BNSF	Wyandotte	KS	Sprain hip.	Jumped from moving locomotive when derailed.
7/14/03	UP	Alameda	CA	Laceration head.	Struck by piece of metal protruding from freight car.
7/15/03	UP	Larimie	WY	Bruise upper leg.	Releasing handbrake, sudden movement of equipment.
7/17/03	CSX	Davidson	TN	Bruise finger.	Removing skate from yard track with hammer.
7/21/03	CSX	Allegany	MD	Sprain elbow.	Adjusting drawbar, overexertion.
8/01/03	UP	Lincoln	NE	Fracture finger.	Struck by pin lifter.
8/01/03	UP	Solano	CA	Fracture leg.	Impact when riding on side of car.
8/05/03	UP	Placer	CA	Foreign Object Eye.	While walking in yard.
8/19/03	MRL	Yellowstone	MT	Sprain back.	While lining switch.
8/21/03	CSX	Charleston	SC	Sprain knee.	Walking alongside track pulling pins, felt pain in knee.
8/27/03	CSX	Davidson	TN	Sprain back.	Pulling a pin lifter on car.
8/28/03	CSX	Vandenburgh	IN	Sprain knee.	Slipped when getting off freight car.
8/28/03	PSWR	Beaver	PA	Puncture foot.	Getting off locomotive, stepped on object.

Listing of Employee Reportable Casualties (continued):

8/30/03	UP	Dallas	TX	Sprain shoulder.	Lost balance and fell.
9/01/03	UP	Harris	TX	Sprain knee.	Unexpected movement of equipment when walking beside track.
9/02/03	ALS	St. Clair	IL	Sprain lower back.	Dismounting car, his belt-pack caught rung of ladder, and fell.
9/07/03	CSX	Marion	IN	Cut finger.	Caught finger in door of locomotive.
9/11/03	ALS	St. Clair	IL	Sprain lower back.	Fell from steps to ground when locomotive struck by cut of cars.
9/15/03	CSX	Jefferson	KY	Cut head.	Fell from side ladder of car due to unexpected movement.
9/18/03	BRC	Cook	IL	Sprain ankle.	Fell from side ladder of car to the ground.
9/20/03	BNSF	Denver	CO	Bruise lower leg.	Walking in cab or on walkway of locomotive.
9/25/03	BNSF	Grand Forks	ND	Sprain shoulder.	Pulling pin lifter on car.
9/30/03	BNSF	Denver	CO	Sprain neck.	Descending steps of locomotive, sprained neck.
10/03/03	CSX	St. Clair	MI	Sprain upper leg.	Getting on locomotive, overexertion.
10/05/03	CSX	Wood	OH	Bruise skull.	Standing beside track, struck in head by protruding board.
10/10/03	UP	Scott	MN	Fracture foot.	Coupling air hoses, slipped and fell.
10/11/03	MRL	Missoula	MT	Sprain ankle.	Getting of standing freight car, stepped on object.
10/13/03	MRL	Missoula	MT	Sprain shoulder.	Pulling pin lifter, overexertion.
10/13/03	BNSF	SanBernardino	CA	Bruise lower arm.	Riding on side of car, struck by thrown object.
10/13/03	BNSF	SanBernardino	CA	Bruise knee.	Riding on side of car, struck by thrown object.
10/16/03	UP	Denver	CO	Dislocation shoulder.	Crossing between standing cars, missed handhold.
10/21/03	BNSF	Wyandotte	KS	Sprain knee.	Adjusting drawbar, overexertion.
10/21/03	UP	Tarrant	TX	Sprain neck.	Sitting in locomotive on freight train which was struck by RCL.
10/23/03	UP	Mesa	CO	Sprain neck.	Riding side of freight car, slack action.
10/24/03	ALS	St. Clair	IL	Sprain lower back.	Adjusting drawbar, overexertion.
10/25/03	BRC	Cook	IL	Sprain shoulder.	Pulling pin lifter, overexertion.
10/25/03	CSX	Orleans	LA	Object in eye.	While on locomotive, received foreign object in eye.
10/26/03	ALS	St. Clair	IL	Sprain lower back.	Collision with another RCL job.
10/26/03	ALS	St. Clair	IL	Sprain knee.	Collision with another RCL job.
10/26/03	BNSF	Bernalillo	NM	Fracture finger.	Uncoupling air hoses, struck by hose.
10/27/03	UP	Sweetwater	WY	Sprain neck.	Sitting in locomotive on freight train which was struck by RCL.
10/27/03	UP	Sweetwater	WY	Sprain upper back.	Sitting in locomotive on freight train which was struck by RCL.
10/28/03	CSX	Chatham	GA	Bruise knee.	Slipped on ballast while pulling pin lifter.
10/31/03	UP	Cook	IL	Cut hand.	Adjusting hose connections.
11/05/03	BNSF	Cascade	MT	Rupture.	Reaching, sudden movement.
11/13/03	UP	Lincoln	NE	Sprain shoulder.	Applying handbrake, overexertion.
11/23/03	NS	Erie	OH	Sprain knee.	Getting off locomotive, stepped on object.

Listing of Employee Reportable Casualties (continued):

11/23/03	UP	Cook	IL	Sprain neck.	Riding side of car, slack action.
11/26/03	UP	Jackson	MO	Fracture hand.	Struck by on-track equipment.

Total = 70

Note: The casualties shown above are those that occurred when remote controlled locomotives were in use, and did not necessarily occur because of the use of a remote controlled locomotive.

Enclosure No. 3

Comparison - Highway-Rail Grade Crossing Accidents/Incidents on Yard/Industry Tracks Involving RCL Operations and Conventional Operations (May 1 through November 30, 2003)

Listing of RCL Highway-Rail Grade Crossing Accidents:

For Highway-Rail Grade Crossing Accidents (HRX), May through November 2003, we show three incidents involving RCL operations, and 86 similar incidents involving conventional railroad operations. The three RCL, HRX accidents are listed below.

1.	BNSF	10/16/03	Barstow	CA	Yard assignment (one locomotive shoving 16 cars) struck highway user at 10 mph on private crossing, train pushing, no injuries. This was a shoving movement with a crew member riding the side of a car at the leading end of the shove, and the remote control operator down the lead in a yard track. The vehicle that was struck was backing up and fouled the track. The crewman riding the end of the shoving move placed the train into emergency braking, and dismounted prior to impact. This accident occurred at a private crossing within the railroad yard.
2.	BNSF	11/20/03	Minneapolis	MN	Yard assignment (one locomotive pulling one car) struck highway user at 4 mph on public crossing, no injuries. The vehicle pulled up to the crossing and stopped, but the front of the automobile did not clear the track. The locomotive was unable to stop before impact. This accident occurred at a public crossing with passive warning consisting of special devices.
3.	UP	11/10/03	Alton	IL	Yard assignment (one locomotive shoving five cars) struck highway user at 4 mph on public crossing, no injuries. The switch foreman was on the ground at the crossing providing flag protection for vehicular traffic when an automobile failed to stop and proceeded onto the crossing and was struck. The crossing had passive warning in the form of crossbucks only, and was being flagged by the crew at the time of the accident.