A Written Submission of

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Brotherhood of Locomotive Engineers

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Prepared for the

Washington Utilities and Transportation Commission
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Docket No. TR-021465:

Consider Establishing Rules Related to Public and Employee Safety, and Protection of Property from Damage Associated with Remote Control Locomotive (RCL) Operations. Chapter 480-62 WAC

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Statement of Purpose

The Washington State Legislative Board (WSLB) of the Brotherhood of Locomotive Engineers (BLE) believes there is an opportunity to address Locomotive Remote Control (LRC) hazards by codifying in Washington State law various recommendations published by the Federal Railroad Administration (FRA). Engineers are of the opinion that this does not violate the preemption clause in Federal regulation in as much as the FRA has promulgated the recommendations and provided guidance for the entire US railroad industry. Rather, the WSLB-BLE believes that codifying these recommendations in State law coordinates the rail safety efforts of Washington State and the Federal Government while at the same time providing the necessary oversight to protect Washington citizens, rail workers, and the environment. The recommendations provide the minimum necessary actions from the Federal Railroad Administration's perspective for safe LRC operations. By giving these recommendations the force of law, real protection can be provided to Washingtonians and our precious environment. These recommendations are found in FRA 2001-01 and subsequent additional recommendations issued by the FRA administrator (see appendices E and F).

Washington engineers have worked for the past year to educate Washington citizens about LRC hazards. Engineers have purchased educational billboards in Seattle, Everett, Spokane, and Vancouver. Engineers have worked with operation lifesaver to get out the message that LRC technology must be implemented responsibly, not haphazardly. Washington engineers have contacted Congresspersons, Governor Locke, Washington Legislators, county and city government, and the Washington Utilities and Transportation Commission requesting action to address this rail hazard in our local communities. Engineers support new technologies, as we have for over 139 years as an organization. Locomotive Engineers have perhaps the longest collective history of implementing new technology of any organization in existence today, dating to the beginnings of the industrial revolution. Yet as engineers, our history, our experience, and our organizational wisdom tells us that regulating LRC technology is a necessity. We ask that the Washington State Utilities and Transportation Commission act quickly to codify recommendations concerning remote control locomotive operations found in FRA Notice of Safety Advisory 2001-01 and subsequent FRA recommendations into Washington State Law.

In section 1 below, the WSLB-BLE discusses federal preemption law as it applies to remote control operations. In addition, WSLB-BLE identifies WUTC authority delegated by the Revised Code of Washington (RCW). WSLB-BLE responds to the question posed by the WUTC "is the commission preempted to any degree by federal law from adopting rules establishing safety requirements relating to RCL operations?"

In Section 2, WSLB-BLE responds to the WUTC question "What are the specific dangers, if any, that exist with RCL operations but do not exist when locomotives are occupied by an engineer?" In addition, WSLB-BLE identifies local safety issues that are essentially found only in specific locations in Washington State.

In Section 3, WSLB-BLE proposes to the WUTC specific regulatory recommendations when it responds to the question "what specific state safety rules may be necessary, and why?" Each suggestion for State regulation is identified with the safety issue it will address, the source of the proposal, and any effects it might have on interstate commerce. Finally, the Revised Code of Washington authorizing WUTC action is cited for each proposed regulation.

In Section 4, WSLB-BLE provides a discussion of the WUTC question "what alternatives to mandatory requirements for RCL operations are available to assure the safety of railroad employees and the general public?"

Finally, the appendices provide additional background information. Three papers in particular provide information about RCL implementation and operation in the United States. "Out of Control Trains" provides an overview of remote control operation in Washington State. "Who's running the train" provides a comparison between remote control operation and traditional engineer controlled operation. Lastly, "A Critical Analysis of the Canadian National Reported Experience With Locomotive Remote Control Technology" provides a rebuttal of the supposed safety advantages of RCL operation including notation of a conflict of interest between the researchers and the manufacturers of RCL equipment.

The Brotherhood of Locomotive Engineers appreciates the opportunity provided by the Washington Utilities and Transportation Commission to address the serious safety issues posed by RCL operation in Washington. We look forward to engaging whole-heartedly in the workshop process.

Section 1

Authority to Regulate Railroad Operations

With exceptions, the authority to regulate railroads in the United States is delegated to the Federal Railroad Administration (FRA). This authority is not absolute however. The United States Congress in an effort to address safety issues that the Federal government failed to address, or that are essentially local in nature, delegated authority to state or local governments.

The division of authority, frequently argued by railroads as preempting any state regulation, is addressed below. Most recently (1999), the Seventh Circuit Court of Appeals confirmed this division of authority in BNSF et al v. Doyle, et al, 186 F. 3d 790 when it found that "state regulation can fill gaps where the Secretary has not yet regulated, and it can respond to safety concerns of a local rather than national character." In UPRR, et al v. California Public Utilities Commission, the United States District Court for the Northern District of California confirmed and applied this interpretation with respect to California regulations that were promulgated in response to the horrific environmental disaster near Dunsmuir, California. This case is currently under consideration by the Ninth Circuit Court of Appeals, the appeals court with jurisdiction for Washington State.

Below, WSLB-BLE outlines the division of authority in railroad regulation.

Authority Reserved to the Federal Government

The federal statute that must be considered to determine if a State or local law, regulation, or order is preempted is found in the United States Code at:

> §20106. National uniformity of regulation
>
> Laws, regulations, and orders related to railroad safety shall be nationally uniform to the extent practicable. A State may adopt or continue in force a law, regulation, or order related to railroad safety until the Secretary of Transportation prescribes a regulation or issues an order covering the subject matter of the State requirement. A State may adopt or continue in force an additional or more stringent law, regulation, or order related to railroad safety when the law, regulation, or order—
>
> (1) is necessary to eliminate or reduce an essentially local safety hazard;
>
> (2) is not incompatible with a law, regulation, or order of the United States Government; and
>
> (3) does not unreasonably burden interstate commerce.
> (Pub. L. 103-272, Sec. 1(e), July 5, 1994, 108 Stat. 866.)

The FRA, in its Safety Advisory, has taken the position that some of its language is mandatory, and would therefore be required for compliance with existing regulatory

language, while in other areas of rail operations and the technology, it has provided "guidelines." It would appear that the FRA assumes oversight on all aspects of the implementation of remote control. In any case, if proposed regulations are able to satisfy the three statutory conditions above, they would not be preempted under federal law. Further, as we will discuss below, it is possible to address many of the local safety issues in Washington State without interfering with mandatory regulations in federal law.

The FRA may argue along the lines included in the correspondence dated September 19, 2002, sent by FRA to the Honorable Nick Lampson, U.S House of Representatives:

> Based on current safety data available to FRA, there is nothing that would indicate that RCL operations are any less safe than conventional operations. Nonetheless, FRA has elected to proceed cautiously in its approach to these operations. On February 14, 2001, the FRA published guidelines for conducting RCL operations. See 66 Fed. Reg. 10340, Notice of Safety Advisory 2001-01. 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 approach serves the railroad industry by providing flexibility to both manufacturers designing the equipment and to the railroads in the different operations, while reinforcing the importance of complying with all existing railroad safety regulations. All of the major railroads have adopted these recommendations, with only slight modifications to suit individual requirements.

Regarding the enforcement of Federal regulations as they apply to RCL operations, the safety Advisory explains:

> …although 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.

With respect to the FRA position on RCL operation, the following points provide concern for the WSLB-BLE between FRA intentions and every day railroad industry actions.

- Safety data is presently not being developed in any comprehensive and systematic manner. In practice, the responsibility for collecting safety data has been relegated solely to the railroads. Given the degeneration of affairs in the railroad industry, the data collected only roughly resembles railroad operations. This ineffective application of FRA intentions produces information without any useful scientific value.
- The decision to implement remote control initially was based on data derived from Canada and has been challenged for its collection methodology and veracity. Appendix D provides a discussion of the research from the Canadian experience.

Parties having a conflict of interest in deployment of remote control operations provided much of that safety data.

- The approach to determine "best practices" is vague. There are no existing documents to refer to determine what practices are presently in place or how a best practice is determined. RCL is an experiment of trial and error. The human subjects of railroad industry experimentation are railroad employees and the general public. None of the accepted scientific precautions for experimentation with human subjects have been adhered to in the RCL implementation process.
- "Electing to proceed cautiously," as the FRA claims, does not meet the obligation required by the Railroad Safety Act where regulatory oversight is a requirement of federal law.
- Remote control operation of a locomotive is not an "emerging technology". It has a past record well documented in the steel industry and numerous accidents have resulted from its implementation. Most recently, on November 29, 2002, a remote control operator was killed in a Bethlehem Steel accident while working alone in a locomotive remote control operation. Longshoremen loading at grain elevator operations in Kalama and Tacoma, Washington have used locomotive Remote Control operation. On December 24, 2001, a private RCL operated job sideswiped a BNSF train in Kalama, WA, damaging or derailing 22 railroad cars. It has been in use in railroad operations since 1964. The Class one railroads have been using LRC technology for over a year in wide spread national implementation of this technology. On February 16, 2003, a remote control operator was killed in Manlius, NY, while working for the CSX railroad with LRC technology.
- The Safety Advisory certainly does provide flexibility to the designers of the equipment and the railroads in their implementation of remote control, but this flexibility comes with a price of less oversight and more experimentation. This "benign neglect" does not have to exist to encourage technological development. Aviation is a good example of how the two goals can be made compatible.
- Most railroads, in their submissions to Engineer Certification Programs under Part 240, have stated they will comply with the recommendations of the Safety Advisory. However, the "slight modifications" given to the railroads have included reversal or vague interpretation of those recommendations to accommodate productivity at safety's expense. As an example, the procedures for reducing the quality of point protection and riding on the side of a car have been modified in this manner.
- Most railroads, in their submissions to Engineer Certification Programs under Part 240, have reduced the amount of training provided to remote control operators from 6-12 months for locomotive engineers to just 80 hours for remote control operators (see appendix C).
- It is doubtful that the FRA can fulfill its safety oversight obligation given the potential number of remote control operations on the nation's railroads. There are fewer than 500 persons in the entire FRA. Given the wide spread implementation of remote control technology, the numerous other safety issues like fatigue that demand FRA attention, and the over-generalization of safety issues exhibited by the FRA as an organization, it is unreasonable to expect any solution to the essentially local safety problems introduced into Washington cities by RCL technology.

In summary, the FRA has failed to comprehensively address the impact of remote control technology on the accidents resulting from organizational changes and workload. The FRA has ignored "system" thinking, research, and knowledge in allowing unfettered implementation of RCL technology. Rather than providing informed, expert, and reasonable application of regulation to nationwide implementation of RCL technology, the FRA has abdicated its regulatory responsibility to the economic controls of the marketplace. All decisions to date have incorporated the will and desire of the railroad industry. The FRA has fully ignored the input, concerns, and safety needs of the citizens of the State of Washington.

Authority Reserved to the State of Washington

As exhibited in the workshops held in Washington State that established WAC 480-62-320, the railroads acknowledge the authority of the State of Washington to assume some responsibility for regulation of locomotive remote control operation. Railroads in Washington that are using RCL technology have reported to Washington under WAC 480-62-320 (see appendix G). The most recent notification dated January 13, 2003 makes no objection to the authority of the State of Washington to regulate remote control railroad operations. There has been no assertion of federal preemption, or legal challenge to WAC 480-62-320.

In the request for additional regulation of remote control operation made by the Brotherhood of Locomotive Engineers, the question should not be "does the State of Washington have authority to regulate RCL?" Rather the question might be "what limits exist on the authority of Washington to regulate remote control operation?"

In this framework, the preemption clause of the United States Code and the Revised Code of Washington form the framework for understanding the limits of the authority to regulate RCL operations. In addition, the Seventh Circuit Court of Appeals cited above provides additional guidance, though it does not necessarily follow that the federal court responsible for the State of Washington would rule in the exact same manner. Finally, the judgment in the United States District Court for the Northern District of California provides additional reference for understanding the application of the federal preemption statutes. This decision was argued before the Ninth Circuit Court of appeals on February 13, 2003, with a decision pending.

All proposals for regulation offered below use this framework of authority and observe the guidance offered by existing court decisions. WSLB-BLE acknowledges the division of authority in railroad regulation and proposes below regulations that:

1) Fill gaps in federal regulation that the FRA does not address;
2) Addresses essentially local safety hazards found in select locations in Washington State in as much as RCL operation occurs in select yards in the heart of Washington's major cities;
3) Are compatible with laws and regulations of the United States government in as much as they are drawn from guidelines formulated by the FRA; and,
4) Do not unreasonably burden interstate commerce in as much as the railroads already affirm they follow the same FRA guidelines.

Section 2

Differences between RCL and traditional rail operations

Generally speaking, a conventional rail operation and an RCL operation are intended to perform the same basic function in the railroad industry. Both operations are intended to move rail equipment thereby producing revenue for America's railroads. Here in lies the rub however, to what degree, and under what circumstances are the two methods of railroad operations interchangeable? For a complete discussion of the two forms of operation, see appendix C, "Who's Running the Train." For this section, WSLB-BLE will only outline some major assumptions and differences that suggest the most hazardous concerns for Washington citizens.

Over the past 30 years, the railroad industry has relied on new technology to reduce its work force. Many forms of technology have been offered to improve railroad safety, but to date only two forms of technology or railroad safety improvements have made it into common use. The first way for new technology to gain acceptance in the railroad industry is to offer railroads the opportunity to reduce manpower requirements. In the operating crafts, technology has driven the crew manning requirements for railroad operation from as many as five to as few as one today. Likewise, computer advancement in office work has seriously decimated the clerical forces in the railroad industry.

The second method of technological innovation comes from government mandates, most often following serious if not catastrophic railroad accidents. For example, the FRA mandated end of train devices in common use today only after several high profile railroad accidents. When railroads first began removing cabooses from train operation, labor groups advocated strongly that a device capable of signaling the end of the train under all weather conditions as well as permitting application of the brakes at the rear end of the train from a remote location in the controlling cab of the train was the minimum necessary safety measure for railroad operation under these new conditions. This became the FRA mandate to the railroads only after those high profile accidents.

Another example of regulation forcing innovation or change in railroad operations can be found in the individual State's experience. Wisconsin passed a crew manning regulation in response to one-man crew operation after a catastrophic chemical spill and environmental disaster in a major Wisconsin tributary. Most recently, the California Public Utilities Commission has regulated railroad operation following an accident and environmental catastrophe in Dunsmuir, CA. The Ninth Circuit Court of Appeals is now scrutinizing those regulations.

Understanding the history of innovation in the railroad industry often leads to a misperception in the public that all arguments about technological change are centered on saving jobs. This is only half of the story, and the half of the story that is left to collective bargaining. The other half of the story about technological innovation is the safety aspect for the remaining employees, the general public, and the environment. These are not collective bargaining issues. No private enterprise has the authority to participate in any bargaining, collectively or otherwise, that may compromise public safety without the input of the general public or their elected representatives. Thus, the

difference between traditional operation and RCL operation of interest in a public venue are those differences affecting public safety.

In essence, the core difference between conventional engineer operated trains and remote control operated trains is the amount of trust and reliance society is willing to place on technology. With all technological advances, certain things are understood from thousands of years of human experience. First, advances in technology demand effective and extensive education. For example, before the computer, grade school kids learned penmanship as a core communication technique. Since the computer, penmanship is augmented with learning effective "computer key board" skills. We do not cease to educate using pen and pencil; rather we rely on both sets of skills in an ever-changing world.

Second, technology is not perfect. The term "fail-safe" is a movie metaphor rather than a real world safety net. There is no better example of the limits of technology than the recent space shuttle tragedy. NASA is perhaps the preeminent example of implementing cutting edge technology. Yet, with all the expertise of this group of highly educated, skilled, and competent individuals, the space shuttle Columbia was destroyed. Americans painfully learned once again that technology is not perfect.

Finally, technology often works better under controlled circumstances. Often, an experiment in a lab will offer a hopeful new technology. However, when the technology moves from a controlled environment into the real world, the vagaries of the human environment may identify the failings of the new technology. Significant in this process, however, is the degree of risk that is acceptable to achieve a particular benefit.

With few exceptions, railroads are implementing new remote control technology with minimal training (see appendix C). Contrary to the known human experience of increasing education and training with increased reliance on technology, the railroads are depending wholly on the efficacy of the remote control equipment to replace the skill level of their employees.

Second, though the railroad industry is prepared to rely heavily on remote control technology asserting a "fail-safe" mode of operation, this is a misguided assumption that the citizens of Washington may not choose to accept. The assertion that the system is fail-safe is Madison Avenue nonsense. Reports indicate that the technology has failed on occasion. In addition, operators of the technology as human beings are not fail-safe. The union representing remote control operators has asserted human error in numerous remote control accidents.

Finally, other pieces of social and mechanical technology in the railroad system are not fail-safe. For example, reliance on mechanical operation of crossing gates is not a fail-safe process. Also, social structures used to integrate technology are strained in the railroad industry. Therefore, in all cases of public safety, it is not enough to state a single technological device is safe. Public and employee safety demands that the device, when used as intended in a natural local environment like Seattle or Tacoma, is safe for the citizens of Washington.

In contrast with remote control operation, conventional engineer operation relies on extensively trained, competent, and responsible locomotive engineers. While conventional operation relies heavily on technology, that technological dependence is coupled with a human being right at the point of the movement to interject human reason and judgment into the real world environment that railroads operate in. When the

railroad's technological system nears or reaches the point of failure, there is a human being in place to address the failure and on numerous occasions avoid that failure in railroad operations.

Part of the difference that Washington citizens struggle with is the very high risk to our cities and the environment of railroad operating failure. The FRA frequently points to a declining accident rate to assert that railroads are becoming safer. For many reasons, such as data collection processes, railroad reporting practices, and sometimes the very questions that the research is asking, there exists an argument that the railroads are not getting safer. This alternative conclusion asserts that the hazards are very real, and these researchers often point to fatalities in the industry as an indication of this on going hazard. By what measure then can citizens of Washington assess the risk to our communities? The answer is no further than one of our largest communities.

In Tacoma, Washington, in December, 2002, a tank car loaded with alcohol was punctured in switching operations and resulted in a spectacular fire that caused an evacuation in part of one Washington's largest cities. The ensuing traffic congestion, hazard to our community, environmental cleanup and highway damage provided only a minor warning of the hazard railroad operations pose to our local communities. This avoidable accident posed a significant risk for Tacoma residents. Yet, the benefits of railroad operations accrue primarily to railroad owners. This risk-benefit equation is unacceptable to many Washington citizens.

Local Safety Issues

In bringing the concerns to a local level, WSLB-BLE outlines below local safety issues in major Washington cities that reduced human observation and control from remote control operations introduce. For additional discussion of local safety hazards see appendix B.

Seattle

In Seattle, Washington's largest city, remote control operations are implemented in the core of the city. Congestion from road and pedestrian traffic competes with rail operations at crossings too numerous to note here (see appendix G). Seattle has invested in two premiere sports stadiums that are sandwiched between locomotive remote control operations. On game day, tens of thousands of sports fans deluge railroad crossings. Reduced railroad personal monitoring operations leave these citizens in danger.

Railroad operations abut Seattle's waterfront with its bourgeoning international trade and cruise ship tourism. Many of these tourists and visitors do not even speak English, let alone are aware of the hazards associated with reduced attention to the movement of trains by America's railroads.

Seattle has extensive passenger rail operations, including commuter railroad operations. Washington State and the Puget Sound Region have invested heavily in both capital improvements and railroad operations to improve passenger rail service as an alternative to other modes of transportation. On February 3, 2003, a remote control crew operating in Seattle passed an absolute block signal with a stop indication, entered the main track without authority, did not realize the violation of Federal law, reversed the

movement and derailed several cars. In the meantime, Amtrak train # 8 was just seconds from this location. Only by chance was a potential catastrophic collision between a remote control operation and a passenger train narrowly averted.

In Seattle, railroad operations are not secure from trespassers boarding railroad equipment. Numerous incidents of trespassers boarding locomotives have been reported in the congested downtown area. In traditional operation, the engineer provided the security from vandalism, theft, and terrorism, posed to the community from day to day railroad operation. Removing the engineer poses a new security threat in high population, high risk areas, where railroad operations in Seattle occur.

Everett

In Everett, rail operations handle a disproportionate amount of hazardous materials due to the customer base in this city. The railroad operation is integrated throughout the core of the city. Any accident with hazardous materials would have a serious impact to the citizens of Everett, just as the recent accident in Tacoma highlighted.

In addition, Everett has extensive passenger rail operations, including future commuter railroad operations. Washington State and the Puget Sound Region are investing heavily in both capital improvements and railroad operations to improve passenger rail service as an alternative to other modes of transportation. Everett to Seattle is key to this future investment. An unnecessary rail accident between remote control operation and passenger railroad operation would seriously impact, if not end, the effort by Washington citizens to implement rail-centered forms of mass transportation. Washington citizens are already concerned about the investment in this solution to the Puget Sound traffic problem.

Tacoma

Tacoma has extensive passenger rail operations, including existing and future commuter railroad operations. Tacoma is also in the proposed high-speed rail corridor. Washington State and the Puget Sound Region are investing heavily in both capital improvements and railroad operations in Tacoma to improve passenger rail service as an alternative to other modes of mass transportation. Tacoma to Seattle is a significant link in this investment. An unnecessary rail accident between remote control operation and passenger railroad operation would seriously impact, if not end, the effort by Washington citizens to implement rail-centered forms of mass transportation. Washington citizens are already concerned about the investment in this solution to the Puget Sound traffic problem.

Tacoma is also the location of 5 freight railroad operations. Two class 1 railroads, 1 Terminal railroad, and two industry railroads all operate on common track in the heart of downtown Tacoma. Disparate and unregulated operating processes pose an impossible risk to the citizens of Tacoma with the implementation of remote control operations. The recent hazardous material accident in downtown Tacoma showcased the hazard posed to local citizens from a self-interested railroad operation.

Finally, the Port of Tacoma is the fastest growing container port on the west coast of the US. Confined railroad operations in the heart of the city require efficient rail operations and un-averted attention to detail in order to avoid any disruption to service. The lack of observation in remote control operation poses a significant threat in this high volume, limited capacity rail operation. Recent investments by the Port of Tacoma in plant infrastructure, grade separation, and other rail improvements did not envision the additional strains posed to the system by remote control operation. Thus, these railroad-operating changes result in minimizing the true benefit of this vast public investment in railroad infrastructure.

Spokane

Spokane has passenger rail operations. In addition, railroad operations bisect the city effectively separating important sectors of the community. Spokane depends heavily on Havana Street, Park Road and Vista Road, for emergency responder access across this division. Reduced railroad attention to the local community where it operates seriously impacts Spokane residents in emergency situations.

Spokane is a high volume terminus, transshipping much of Washington's originating and terminating commodities. Various railroad connections converge on Spokane. These operations require significant numbers of employees constantly entering or leaving the work place. Lack of attention from RCL operation affects the lives of these workers unnecessarily.

Finally, grades in Spokane are not conducive to RCL transfer movements resulting in ineffective movement of equipment within the heart of the city. Ineffective operating practices with hazardous materials is just as devastating in the heart of Washington's largest city east of the Cascades as in Tacoma, Washington.

Pasco

Pasco, Kennewick, and Richland form the "Tri-cities" of Washington State. The Tri-Cities have passenger rail operations. Pasco Terminal is just north of the mighty Columbia River. To the south is located the City of Kennewick and an Interchange track with the Union Pacific Railroad. With no regulation of RCL operations, the railroads might attempt to interchange cars using RCL equipment in Kennewick. This might involve movement of hazardous materials over the Columbia River by RCL operations jeopardizing the citizens of Pasco, Kennewick, and the Colombia River environment.

Pasco Terminal is situated in the middle of another major surface transportation route---U.S. Highway 395. "395" runs adjacent to the eastern border of Pasco Terminal for approximately 3 miles, then crosses over the entire southern portion of the yard by way of an overpass. An RCL accident under this structure could have devastating impact on public safety, public transportation, business, tourism, and motor freight commerce as witnessed in the Tacoma, Washington accident.

Finally, an industry where hazardous materials are transported by railcar is located in close proximity to the Snake River. An RCL operations incident resulting in a spill could have grave impact on the river environment of the Snake and Columbia Rivers.

Vancouver

Vancouver has extensive passenger rail operations, including future high-speed rail corridor operations. On the west side of the main yard in Vancouver is an LPG facility that directly abuts a large neighborhood. This facility has 4 tank cars on spot and 8 tank cars on an adjacent storage track. Regular RCL operation at this facility endangers the Hough neighborhood of Vancouver, WA. Within 6 blocks of this facility is Clark County's Courthouse, Jail, administration building and other vital offices of the county government. In addition, an elementary school is within 6 blocks of this facility.

In the Tacoma alcohol hazardous material accident, arguably minor compared to an LPG hazardous material accident, more than 6 blocks of the core of Tacoma was evacuated because of the accident. A hazardous material accident at the above Vancouver location would not only devastate a local community, it would also paralyze the local governing structure necessary to respond to the disaster as the location of those services would necessarily be part of the accident scene.

Shelton

Shelton has an interesting local railroad structure. Shelton rests in the bottom of a bowl with significant railroad grades descending into the heart of the city from both directions. The August 6, 2002, accident by remote control operation did not account for the limitations of remote control in main line, grade operation. The accident pictures available in the BLE submission of October 30, 2002, to the WUTC, evidence the Shelton hazard.

In general, numerous safety hazards are posed to locations throughout Washington from locomotive remote control technology. These hazards are increased due to the lack of human attention these operations rely on to achieve the movement of trains in our communities. These hazards are compounded by a technology in a system that is not fail-safe, does not incorporate the vagaries of local Washington issues, and does not attend to the reasonable safety concerns of Washington citizens. The railroads are benefiting from reduced employee needs and do not have an incentive to respond to the needs of Washington communities. The FRA is too distant and too undermanned to address the local safety issues brought to our communities by the railroad industry with LRC technology. In this vacuum of civic interaction, the State of Washington has the authority and responsibility to address the safety concerns of Washington Citizens.

Section 3

Proposed Regulations

In general, a State's regulation of RCL operations would not encumber interstate commerce as the application of this technology is almost exclusively in yard operations that could easily be considered within the boundaries of a single state and essentially posing a local safety hazard. In addition, the proposals here are intended to address local issues that were outlined in Section 2 above. All of the regulations proposed here would be "compatible with a law regulation, or order of the United States Government" since the regulations are drawn from FRA recommendations. Finally, since all railroads in Washington acknowledge adherence to FRA recommendations, the proposed regulations do not unreasonably burden interstate commerce.

In this section, each suggestion for State regulation is identified with the safety issue it will address, the source of the proposal, and any effects it might have on interstate commerce. Finally, sections of the Revised Code of Washington authorizing WUTC action is cited for each proposed regulation.

Definitions

WSLB-BLE proposes that the following definitions be placed in the appropriate section of the Washington Administrative Code concerning remote control train operations:

"A Remote Control (RC) operation includes all train and engine movements controlled from any distant location."

"Locomotive Remote Control (LRC or RCL) refers to train and engine movements designed with the intent of the operator controlling the locomotive and/or train from a location outside of the cab of the controlling locomotive from a distance not exceeding 1.5 miles."

Main Line Passenger Rail Protection

WSLB-BLE proposes, **"No railroad will at anytime allow locomotive remote control (RCL) operation on any main line track that serves regularly scheduled passenger trains. Railroads will maintain derails in derailing position between active remote control operations and any main line track that serves regularly scheduled passenger trains."**

Discussion

This proposal to restrict RCL operation from certain mainlines is taken from the FRA admonition to avoid using locomotive remote control technology in passenger service found in the FRA 2001-01 guidelines (appendix E), and the FRA's subsequent letter to the AAR (appendix F) restricting RCL operation from mainlines.

In order to understand the hazard to passenger service from RCL operation it is important to remember that passenger and freight rail operations are symbiotic, interdependent, and intertwined. The two operations are not segregated absolutely. Rather, barriers separating the two classes of rail operation are based on social systems supported by technology that serve to separate the operations where safety and efficiency require. The systems designed to segregate passenger and freight rail operations are not "fail-safe" systems. Rather railroads have relied on rigorous training (see appendix C) and strict rule compliance to ensure the current level of passenger safety enjoyed in the US railroad industry.

In this "brave new world" of RCL technology, where the technology is designed to replace the rigorously trained and rule compliant locomotive engineer, new social and technological solutions need also be applied to ensure continued passenger safety.

For example, on February 5, 2003, a locomotive remote control crew operating in BNSF's Balmer yard in Seattle, Washington, unknowingly and without authority, entered the main line track within seconds of Amtrak # 8 passing this location. The LRC crew, still unaware of its mistake, continued operation resulting in several freight cars being derailed. Had the passenger train been one minute sooner reaching this location, or the LRC crew been one minute later in its switching routine the LRC accident would have involved the Amtrak train and all of its passengers. It is important to note that the Amtrak train was over an hour late on its schedule on this particular night.

Montana Rail Link (MRL) uses derails to separate remote control operation from main track operation. In addition, MRL uses strobe warning lights on the ground, strobe warning lights on the engine, and warning signs specifying "RCL Zones." Montana Rail Link has more experience operating RCL equipment than other US railroads, since MRL was one of the first railroads to implement RCL technology in the US. MRL, like Puget Sound and Pacific (PSAP), uses Remote Control Operators (RCO's) that are also fully trained conventional locomotive engineers.

Finally, the term "mainline" as used in the FRA letter is not well defined for railroad operations in Washington. One railroad may assert a particular segment of track to be a main line, while a similar track on another railroad might be considered a branch line, a yard track, or even an industrial spur. In order to reasonably focus this regulation on the most hazardous local safety issue as noted above and in section 2, the proposed regulation incorporates and qualifies the mainline admonition with the passenger service admonition. Thus, the regulation is designed to be narrowly targeted and not unreasonably burdensome.

WUTC authority for this proposed regulation may be found in RCW 81.44.010, RCW 81.28.010, RCW 81.104.120, RCW 81.80.130, RCW 81.80.130, RCW 81.28.240, RCW 81.44.065, RCW 81.44.050.

Crossing Protection

WSLB-BLE proposes, **"Before occupying any public or private road crossing at grade, an employee of the railroad will position him/herself in a safe location that maintains a 180 degree view of the crossing until the movement over the crossing fully occupies the crossing with the train or engine."**

Discussion

According to FRA statistics, one fourth of all highway-rail incidents in Washington occur at crossings with warning devices that include gates, flashing lights, and cross bucks. An additional 20 % of highway rail incidents in Washington occur at crossings with flashing lights and cross bucks for warning.

FRA recommendations (see appendix E) admonish railroads to adhere to point protection, as do railroad operating rules. Yet, in BNSF notifications on remote control operation (see appendix G), the railroad informs the State of Washington that no employee is required to be "on the ground or on the locomotive at the crossing at grade to warn traffic until the crossing is occupied…if [sp] crossing is equipped with crossing gates that are fully lowered or [sp] crewmember has clearly seen that no traffic is approaching or stopped at the crossing." There exists a "disconnect" between recommendations from the FRA, railroad operating practices, and the new locomotive remote control operation.

In order to resolve the confusion created by remote control operating practices and address the local safety hazard to drivers in section 2 evidenced in the statistics above, the proposed regulation would clarify railroad-crossing protection over Washington State roads.

WUTC authority for this proposed regulation may be found in RCW 81.04.160, RCW 81.28.010, RCW 81.28.240, RCW 81.44.010, RCW 81.44.050, RCW 81.44.065, RCW 81.48.060, RCW 81.80.130.

Signs

WSLB-BLE proposes, **"Signs must be posted and maintained warning railroad workers and the public at all locations where remote control locomotive is being operated. The signs must be clearly readable from a 150' distance. The signs must be of reflective material for nighttime warning. At a minimum, signs must be posted at or near all private and public railroad crossings, all locations that are known to be used by pedestrian traffic, and at the entrance to any location providing railroad access to the remote control operation."**

Discussion

This proposal is drawn from the FRA guidelines (appendix E). Disparity in signage by railroads in Washington has resulted in some signs that are not clearly readable from a reasonable distance in certain high traffic, densely populated local situations noted in section 2 above. In addition, many local areas needing signs for public and worker protection do not have those signs.

WUTC authority for this proposed regulation may be found in RCW 81.04.160, RCW 81.28.010, RCW 81.28.240, RCW 81.44.010, RCW 81.44.050, RCW 81.44.065, RCW 81.48.060, RCW 81.80.130.

Grade Operation

WSLB-BLE proposes, **"No railroad will use Locomotive Remote Control technology in any location where the ascending/descending grade exceeds 0.5%, or in any other location where railroad track structures may be expected to exceed the operational abilities of the remote control equipment or operator."**

Discussion

The foundation for this recommendation originates in the FRA 2001-01 guidelines (see appendix E). The Shelton, Washington, remote control accident on August 6, 2002, provides the clearest example of the failure of railroads to adequately respond to the intent of the FRA guidelines. As discussed above, RCL operation on the grades in Shelton, Washington, as demonstrated, pose a safety hazard to workers and the public. Additional information about this accident is available in the original petition for remote control regulation to the WUTC dated October 30, 2002, from the WSLB-BLE. Attempting to address the local safety issue presented in a city such as Shelton, Washington, wholly exceeds the attention of the FRA. For example, the FRA did not investigate this accident even though their own guidelines asserted that the FRA would pay close attention to remote control accidents and incidents.

Though the FRA may not have the resources, manpower, or interest to address the essentially local safety issues in the State of Washington, power reserved to the State by the US Congress and authorized by the Legislature of the State of Washington provides the authority for Washington to respond to this local safety issue.

WUTC authority for this proposed regulation may be found in RCW 81.04.160, RCW 81.28.010, RCW 81.28.240, RCW 81.44.010, RCW 81.44.050, RCW 81.44.065, RCW 81.48.060, RCW 81.80.130.

Hazardous Materials

WSLB-BLE proposes, **"Remote control locomotives cannot be used to transport hazardous materials, switch cars containing hazardous materials, or switch other cars on or near tracks occupied by hazardous materials."**

Discussion

On December 13, 2002, an accident involving hazardous materials happened in the BNSF switching yard in Tacoma, Washington. The resulting fire endangered the very heart of one of Washington's largest cities. Traffic was disrupted for hours. Evacuation and disruption of Tacoma businesses, along with Washington citizens, resulted in severe inconvenience. Environmental cleanup, including concerns about environmental damage to the Puyallup River in the immediate vicinity of Puget Sound, lasted for weeks. Damage to a Washington State Highway overpass is still being repaired months later. The damage suffered by Tacoma, Washington, was mitigated by the reality that this material was not the most dangerous material being handled in the core of Washington's major cities. The same accident with other hazardous commodities may have resulted in radioactive contamination, violent explosions with impacts over many city blocks, or poison gas exposure capable of killing many Washington citizens.

Contrary to published reports quoting railroad officials, this accident was entirely avoidable. Highly trained railroad employees avoid accidents like this on a daily basis. Since the railroad has embarked on a course of reduced training (see appendix C), reduced number of employees overseeing the safe switching operations, and reduced attention to the movement of the train, the State of Washington is faced with the need to protect its citizens. This incident in traditional switching operations highlights the hazard to the cities of Seattle, Tacoma, Everett, Spokane, Vancouver, and Pasco posed from switching hazardous material operations without due care and caution.

WUTC authority for this proposed regulation may be found in RCW 81.04.160, RCW 81.28.010, RCW 81.28.240, RCW 81.44.010, RCW 81.44.050, RCW 81.44.065, RCW 81.48.060, RCW 81.80.130.

Public Protection

WSLB-BLE proposes, **"A railroad must provide effective and reliable protection at the point of movement in any location accessible to the general public for any remote control operations."**

Discussion

This proposal is drawn from FRA 2001-01 guidelines. While improvements have been made in highway crossing protection through efforts of the railroads, the State of Washington, Operation Lifesaver, the Federal Government, and labor groups, the statistics for pedestrian fatalities have not improved statistically for many years. On average, 15 Washington citizens are killed every year straying into the path of trains. For the railroad and the FRA, these Washington citizens are "trespassers." In Washington, these are people attracted to the majesty of Puget Sound, or people experiencing the magnificent beauty of our natural environment, or people trying to live their lives with a railroad bisecting the heart of many of its largest cities. In many cases, there is no opportunity for the railroad to avoid the fatality. On the other hand, because these citizens cross a railroad track does not relieve the railroad from making an effort to warn these people, make any possible effort to avoid the accident, or mitigate the damage in the event of an accident.

In traditional railroad operations, particularly within rail yards in the cities of Tacoma, Seattle, Everett, Spokane, and Vancouver, locomotive engineers have exercised responsibility to warn citizens away from the forward movement of the switching operation. While 15 citizens on average have died and another 13 citizens on average have been injured in railroad-pedestrian accidents annually in Washington, numerous near misses and successfully avoided accidents go unreported every day. The WSLB-BLE proposal is intended to address this local safety issue in Washington's most densely populated locations.

WUTC authority for this proposed regulation may be found in RCW 81.04.160, RCW 81.28.010, RCW 81.28.240, RCW 81.44.010, RCW 81.44.050, RCW 81.44.065, RCW 81.48.060, RCW 81.80.130.

Riding Cars

WSLB-BLE proposes, **"When operating an RCL, the remote control operator shall not ride on a freight car under any circumstances; mount or dismount moving equipment; operate any other type of machinery (such as a car, truck, mule, etc.); or stand or walk within the gage of the track or foul the track on which the movement is occurring while physically located in front of the movement."**

Discussion

This proposal is taken directly from FRA 2001-01 guidelines. In order to accommodate the equipment necessary to perform remote control operation, the operator is required to use his/her hands. In traditional railroad operation, the switch person's hands were "freer" to perform the task of riding on railroad cars or mounting and dismounting moving equipment. In addition, the added attention required to perform the duties previously performed by the extensively trained locomotive engineer present a division of employee attention that may result in personal injury or public hazard. In order to mitigate this hazard in the heart of Washington's most densely populated cities, the WUTC has the power to regulate unnecessary and distracting operator behavior to protect employee safety and the corresponding hazard to the public.

WUTC authority for this proposed regulation may be found in RCW 81.04.160, RCW 81.28.010, RCW 81.28.240, RCW 81.44.010, RCW 81.44.050, RCW 81.44.065, RCW 81.48.060, RCW 81.80.130.

Section 4

Alternatives to Regulation

The Washington Utilities and Transportation Commission asks the question "what alternatives to mandatory requirements for RCL operations are available to assure the safety of railroad employees and the general public?"

Generally speaking, alternatives to regulation are what have resulted in the local safety hazards identified in this submission. The FRA's practiced efforts have been to avoid mandatory requirements with the resulting Washington accidents cited here. For the sake of argument, however, two safety issues, fatigue and remote control operation, and attempts to resolve them provide a clear example of the failure of a dependence on "alternatives to mandatory requirements" in the railroad industry.

In the case of railroad operator fatigue, the Brotherhood of Locomotive Engineers worked to pass HB 2695 in the Washington State Legislature in 2002. This proposal was designed to address railroad worker fatigue that was first identified by the National Transportation Safety Board in the late 1980's and continues to this date. The most recent NTSB reported fatigue investigation resulted from an accident November 15, 2001, resulting in two fatalities and two serious injuries. Contrary to NTSB warnings, on February 7, 2002, before the Washington House Commerce and Labor Committee, the BNSF testified that there was not a need for HB 2695 to address fatigue in the railroad industry, since existing federal law addressed the issue of fatigue in railroad operations. On September 15, 2002, in Vader, Washington, a train traveling 41 mph struck the rear of a standing train resulting in a fire and subsequent destruction of BNSF property. The only rail connection serving the Seattle to Portland corridor was closed for several days disrupting both passenger and freight service. BNSF investigation cited "inattention" as a contributing cause of this accident. However, using newly available fatigue software being developed by the Federal Railroad Administration, both crewmembers of the following train showed signs of operator fatigue that may have contributed to the accident.

In 2003, Transport Canada has mandated by regulation that trains operated in Canada must conform to a "Fatigue Management Plan" submitted by the individual railroads. BNSF in cooperation with operating unions is submitting a fatigue plan to adhere to Canadian law. Ironically, though railroad workers originating from Seattle will work both trains in Washington and Canada, only those workers that actually work into Canada will benefit from the fatigue management plan. Workers that are called to work, but are too fatigued to perform their duties under Canadian law, will only be used to operate trains in Washington State.

Without regulation, the relationship between Washington citizens and the railroad industry is very similar to that seen in some multi-national corporations and lesser-developed nations. Washington residents are demeaned and abused to achieve the broader economic goals of an out-of-state corporation. In the fatigue case, the "alternative to mandatory requirements" has resulted in this dichotomy of railroad worker protection in Washington State. Tragically, Washington citizens will gain better

protection from fatigue in the workplace if their duties require them to work some portion of their shift in Canada. Washington communities will not have the luxury of those progressive Canadian laws to protect essentially local safety hazards from fatigue within the State.

In the second example, we need look no further than the original Puget Sound and Pacific accident on August 6, 2002. In a submission to the Federal Railroad Administration (FRA-2000-7325-28), PSAP boasted that it had gone 528 days injury free and without a reportable derailment during a period beginning in February 1999. In addition, PSAP boasted that all of its remote control operators were fully trained locomotive engineers. Was it an aberration that the accident happened on August 6, 2002?

With careful study it is possible to identify both PSAP operating rules violations and deficiencies in those rules that fully accounted for the accident on August 6, 2002. Because there was no regulatory oversight, there was no safety net to protect the citizens of Shelton, Washington, from PSAP's drive for "cost competitiveness" as documented in its FRA 2000-7325-28 submissions on remote control operation.

But is a State regulation the most effective process for addressing essentially local safety issues resulting from RCL operations?

On September 5, 2002, Baton Rouge, Louisiana, was the first city in the US to pass a resolution banning locomotive remote control technology within its local jurisdiction. The resolution requested the FRA to address local safety issues in Baton Rouge posed by RCL operation. The FRA took no action to respond to Baton Rouge's request for assistance. In addition, the Kansas City Southern (KCS) Railroad ignored the request from Baton Rouge to address identified local safety issues and continued RCL operation.

On February 12, 2003, a Kansas City Southern RCL operation carrying empty chemical tank cars derailed on a highway overpass, damaging cars below and closing the highway for hours. Baton Rouge tried, but failed, to address an essentially local safety hazard short of regulation. The railroad industry and the FRA have demonstrated indifference to the local safety and security of workers and the public with respect to remote control operation. No action to date, all short of regulation, have been demonstrated to effectively address worker safety or public safety in the railroad industry on the remote control issue.

WSLB-BLE strongly encourages the WUTC to step up and address the local safety issues created by RCL implementation in Washington State. We hope through a regulatory process to objectively protect Washington citizens from the internal economic and political considerations of a private railroad industry. We thank you for your attention, and look forward to participating in the workshop process.

Appendix A

Relevant Excerpts from the Revised Code of Washington

RCW 81.04.020

Procedure before commission and courts.

Each commissioner shall have power to administer oaths, certify to all official acts, and to issue subpoenas for the attendance of witnesses and the production of papers, waybills, books, accounts, documents and testimony in any inquiry, investigation, hearing or proceeding in any part of the state.

The superior court of the county in which any such inquiry, investigation, hearing or proceeding may be had, shall have power to compel the attendance of witnesses and the production of papers, waybills, books, accounts, documents and testimony as required by such subpoena. The commission or the commissioner before which the testimony is to be given or produced, in case of the refusal of any witness to attend or testify or produce any papers required by the subpoena, shall report to the superior court in and for the county in which the proceeding is pending by petition, setting forth that due notice has been given of the time and place of attendance of said witnesses, or the production of said papers, and that the witness has been summoned in the manner prescribed in this chapter, and that the fees and mileage of the witness have been paid or tendered to the witness for his attendance and testimony, and that the witness has failed and refused to attend or produce the papers required by the subpoena, before the commission, in the cause or proceedings named in the notice and subpoena, or has refused to answer questions propounded to him in the course of such proceeding, and ask an order of said court, compelling the witness to attend and testify before the commission. The court, upon the petition of the commission, shall enter an order directing the witness to appear before said court at a time and place to be fixed by the court in such order, and then and there show cause why he has not responded to said subpoena. A copy of said order shall be served upon said witness. If it shall appear to the court that said subpoena was regularly issued by the commission, the court shall thereupon enter an order that said witness appear before the commission at said time and place as fixed in said order, and testify or produce the required papers, and upon failing to obey said order, said witness shall be dealt with as for contempt of court.

[1961 c 14 § 81.04.020. Prior: 1911 c 117 § 75, part; RRS § 10413, part.]

RCW 81.04.160

Rules and regulations.

The commission is hereby authorized and empowered to adopt, promulgate and issue rules and regulations covering the bulletining of trains, showing the time of arrival and departure of all trains, and the probable arrival and departure of delayed trains; the conditions to be contained in and become a part of contracts for transportation of persons and property, and any and all services concerning the same, or connected therewith; the time that station rooms and offices shall be kept open; rules governing demurrage and reciprocal demurrage, and to provide reasonable penalties to expedite the prompt movement of freight and release of cars, the limits of express deliveries in cities and towns, and generally such rules as pertain to the comfort and convenience of the public concerning the subjects treated of in

this title. Such rules and regulations shall be promulgated and issued by the commission on its own motion, and shall be served on the public service company affected thereby as other orders of the commission are served. Any public service company affected thereby, and deeming such rules and regulations, or any of them, improper, unjust, unreasonable, or contrary to law, may within twenty days from the date of service of such order upon it file objections thereto with the commission, specifying the particular grounds of such objections. The commission shall, upon receipt of such objections, fix a time and place for hearing the same, and after a full hearing may make such changes or modifications thereto, if any, as the evidence may justify. The commission shall have, and it is hereby given, power to adopt rules to govern its proceedings, and to regulate the mode and manner of all investigations and hearings: PROVIDED, No person desiring to be present at such hearing shall be denied permission. Actions may be instituted to review rules and regulations promulgated under this section as in the case of orders of the commission.

[1961 c 14 § 81.04.160. Prior: 1911 c 117 § 85; RRS § 10427.]

RCW 81.28.010
Duties as to rates, services, and facilities.

All charges made for any service rendered or to be rendered in the transportation of persons or property, or in connection therewith, by any common carrier, or by any two or more common carriers, shall be just, fair, reasonable and sufficient.

Every common carrier shall construct, furnish, maintain and provide, safe, adequate and sufficient service facilities, trackage, sidings, railroad connections, industrial and commercial spurs and equipment to enable it to promptly, expeditiously, safely and properly receive, transport and deliver all persons or property offered to or received by it for transportation, and to promote the safety, health, comfort and convenience of its patrons, employees and the public.

All rules and regulations issued by any common carrier affecting or pertaining to the transportation of persons or property shall be just and reasonable.

[1961 c 14 § 81.28.010. Prior: 1911 c 117 § 9; RRS § 10345.]

RCW 81.28.240
Commission may order improved facilities and service.
Whenever the commission shall find, after such hearing, that the rules, regulations, practices, equipment, appliances, facilities or service of any such common carrier in respect to the transportation of persons or property are unjust, unreasonable, unsafe, improper, inadequate or insufficient, the commission shall determine the just, reasonable, safe, adequate, sufficient and proper rules, regulations, practices, equipment, appliances, facilities or service to be observed, furnished, constructed or enforced and be used in the transportation of persons and property by such common carrier, and fix the same by its order or rule.

[1961 c 14 § 81.28.240. Prior: 1911 c 117 § 53, part; RRS § 10389, part.]

RCW 81.28.280

Reports of wrecks, etc.

Every public service company shall give immediate notice to the commission of every accident resulting in death or injury to any person occurring on its lines or system, in such manner as the commission may prescribe.

Such notice shall not be admitted as evidence or used for any purpose against the company giving it in any action for damages growing out of any matter mentioned in the notice. The commission may require reports to be made by any common carrier of all wrecks, collisions, or derailments occurring on its line.

[1961 c 14 § 81.28.280. Prior: 1953 c 104 § 3; prior: 1911 c 117 § 63, part; RRS § 10399, part.]

RCW 81.28.290

Investigation of accidents, wrecks.

The commission shall investigate all accidents that may occur upon the lines of any common carrier resulting in loss of life, to any passenger or employee, and may investigate any and all accidents or wrecks occurring on the line of any common carrier. Notice of the investigation shall be given in all cases for a sufficient length of time to enable the company affected to participate in the hearing and may be given orally or in writing, in such manner as the commission may prescribe.

Such witnesses may be examined as the commission deems necessary and proper to thoroughly ascertain the cause of the accident or wreck and fix the responsibility therefor. The examination and investigation may be conducted by an inspector or deputy inspector, and they may administer oaths, issue subpoenas, and compel the attendance of witnesses, and when the examination is conducted by an inspector or deputy inspector, he shall make a full and complete report thereof to the commission.

[1961 c 14 § 81.28.290. Prior: 1953 c 104 § 4; prior: 1911 c 117 § 63, part; RRS § 10399, part.]

RCW 81.44.010

Commission may order improved facilities.

Whenever the commission shall, after a hearing had upon its own motion or upon complaint, find that, additional tracks, switches, terminals, terminal facilities, stations, motive power or any other property, apparatus, equipment, facilities or device for use by any common carrier in, or in connection with the transportation of persons or property, ought reasonably to be provided, or any repairs or improvements to, or changes in, any theretofore in use ought reasonably to be made, or any additions or changes in construction should reasonably be made thereto, in order to promote the security or convenience of the public or employees, or in order to secure adequate service or facilities for the transportation of passengers or property, the commission may, after a hearing, either on its own motion or after complaint, make and serve an order directing such repairs, improvements, changes or additions to be made.

[1961 c 14 § 81.44.010. Prior: 1911 c 117 § 64; RRS § 10400.]

RCW 81.44.050

Power of commission as to appliances.

The commission shall, as soon as practicable, after the taking effect of chapter 117, Laws of 1911, designate the number, dimensions, location and manner of application of the appliances provided for in RCW 81.44.031 and 81.44.040, or such as may be prescribed by the commission, and shall give notice of such designation to all railroad companies and street railroad companies subject to the provisions of this title, by such means as the commission may deem proper, and thereafter such number, dimensions, location, and manner of application as designated by the commission shall remain as the standards of equipment to be used on all cars and locomotives subject to the provisions of this title. The commission shall have power to add to, change, or modify said standards of equipment at any time or to provide different standards under different circumstances and conditions: PROVIDED, That the commission may, upon full hearing, for good cause, extend the period within which any railroad or street railroad may comply with the provisions of RCW 81.44.031 through 81.44.060 with respect to the equipment of locomotives or cars actually in service on the date of passage of chapter 117, Laws of 1911. The commission is hereby given authority to fix the time within which such modification or change shall become effective or obligatory. After the time so fixed it shall be unlawful to use any car, motor, or locomotive which does not comply with the standards so prescribed by the commission: PROVIDED, That when any car, motor, or locomotive shall have been properly equipped as provided in this title, and such equipment shall have become defective or insecure while such car, motor, or locomotive was being used by such railroad company upon its line of railroad, such car, motor, or locomotive may be hauled from the place where such equipment was first discovered to be defective or insecure to the nearest available point where such car, motor, or locomotive can be repaired, without liability for the penalties imposed herein if such movement is necessary to make such repairs, and such repairs cannot reasonably be made except at such repair point. Nothing in this proviso shall be construed to permit the hauling of defective cars by means of chains instead of drawbars in revenue trains, or in association with other cars that are commercially used, unless such defective cars contain livestock or perishable freight.

[1983 c 3 § 208; 1961 c 14 § 81.44.050. Prior: 1911 c 117 § 66, part; RRS § 10402, part.]

RCW 81.44.065

Devolution of powers and duties relative to safety of railroads.

The utilities and transportation commission shall exercise all powers and duties in relation to the inspection of tracks, bridges, structures, equipment, apparatus, and appliances of railroads with respect to the safety of employees and the public and the administration and enforcement of all laws providing for the protection of the public and employees of railroads which prior to April 1, 1955 were vested in and required to be performed by the director of labor and industries.

[1961 c 14 § 81.44.065. Prior: 1955 c 165 § 1. Formerly RCW 43.53.055.]

RCW 81.48.010
Failure to ring bell -- Penalty -- Exception.

Every engineer driving a locomotive on any railway who shall fail to ring the bell or sound the whistle upon such locomotive, or cause the same to be rung or sounded at least eighty rods from any place where such railway crosses a traveled road or street on the same level (except in cities, or in counties that enact ordinances applying only to crossings equipped with supplemental safety measures as provided in RCW 81.48.015), or to continue the ringing of such bell or sounding of such whistle until such locomotive shall have crossed such road or street, shall be guilty of a misdemeanor.

This section shall not apply to an engineer operating a locomotive within yard limits or when on track, which is not main line track, where crossing speed is restricted by published special instruction or bulletin to ten miles per hour or less.

[1995 c 315 § 1; 1961 c 14 § 81.48.010. Prior: 1909 c 249 § 276; RRS § 2528.]

RCW 81.48.050
Trains to stop at railroad crossings.
All railroads and street railroads, operating in this state shall cause their trains and cars to come to a full stop at a distance not greater than five hundred feet before crossing the tracks of another railroad crossing at grade, excepting at crossings where there are established signal towers, and signal men, interlocking plants or gates.
[1961 c 14 § 81.48.050. Prior: 1911 c 117 § 69; RRS § 10405.]

RCW 81.48.060
Penalty for violation of duty endangering safety.
Every engineer, motorman, gripman, conductor, brakeman, switch tender, train dispatcher or other officer, agent or servant of any railway company, who shall be guilty of any wilful violation or omission of his duty as such officer, agent or servant, by which human life or safety shall be endangered, for which no punishment is specially prescribed, shall be guilty of a misdemeanor.
[1961 c 14 § 81.48.060. Prior: 1909 c 249 § 277; RRS § 2529.]

RCW 81.53.010
Definitions.

The term "commission," when used in this chapter, means the utilities and transportation commission of Washington.

The term "highway," when used in this chapter, includes all state and county roads, streets, alleys, avenues, boulevards, parkways and other public places actually open and in use, or to be opened and used, for travel by the public.

The term "railroad," when used in this chapter, means every railroad, including interurban and suburban electric railroads, by whatsoever power operated, for the public

use in the conveyance of persons or property for hire, with all bridges, ferries, tunnels, equipment, switches, spurs, sidings, tracks, stations and terminal facilities of every kind, used, operated, controlled, managed, or owned by or in connection therewith. The said term shall also include every logging and other industrial railway owned or operated primarily for the purpose of carrying the property of its owners or operators or of a limited class of persons, with all tracks, spurs and sidings used in connection therewith. The said term shall not include street railways operating within the limits of any incorporated city or town.

The term "railroad company," when used in this chapter, includes every corporation, company, association, joint stock association, partnership or person, its, their or his lessees, trustees or receivers appointed by any court whatsoever, owning, operating, controlling or managing any railroad, as that term is defined in this section.

The term "over-crossing," when used in this chapter, means any point or place where a highway crosses a railroad by passing above the same.

The term "under-crossing," when used in this chapter, means any point or place where a highway crosses a railroad by passing under the same.

The term "over-crossing" or "under-crossing," shall also mean any point or place where one railroad crosses another railroad not at grade.

The term "grade crossing," when used in this chapter, means any point or place where a railroad crosses a highway or a highway crosses a railroad or one railroad crosses another, at a common grade.

[1961 c 14 § 81.53.010. Prior: 1959 c 283 § 2; prior: (i) 1913 c 30 § 1; RRS § 10511. (ii) 1941 c 161 § 1; Rem. Supp. 1941 § 10511-1. Formerly RCW 81.52.080, part.]

RCW 81.53.190

Abatement of illegal crossings.

If an under-crossing, over-crossing, or grade crossing is constructed, maintained, or operated, or is about to be constructed, operated, or maintained, in violation of the provisions of this chapter, or in violation of any order of the commission, such construction, operation, or maintenance may be enjoined, or may be abated, as provided by law for the abatement of nuisances. Suits to enjoin or abate may be brought by the attorney general, or by the prosecuting attorney of the county in which the unauthorized crossing is located.

[1961 c 14 § 81.53.190. Prior: 1913 c 30 § 16; RRS § 10526. Formerly RCW 81.52.260.]

RCW 81.53.200

Mandamus to compel performance.

If any railroad company, county, municipality, or officers thereof, or other person, shall fail, neglect, or refuse to perform or discharge any duty required of it or them under this chapter or any order of the commission, the performance of such duty may be compelled

by mandamus, or other appropriate proceeding, prosecuted by the attorney general upon request of the commission.
[1961 c 14 § 81.53.200. Prior: 1913 c 30 § 17; RRS § 10527. Formerly RCW 81.52.270.]

RCW 81.80.130

Regulatory power of commission over common carriers.
The commission shall supervise and regulate every "common carrier" in this state; make, fix, alter, and amend, just, fair, reasonable, minimum, maximum, or minimum and maximum, rates, charges, classifications, rules, and regulations for all "common carriers"; regulate the accounts, service, and safety of operations thereof; require the filing of reports and other data thereby; and supervise and regulate all "common carriers" in all other matters affecting their relationship with competing carriers of every kind and the shipping and general public: PROVIDED, The commission may by order approve rates filed by common carriers in respect to certain designated commodities and services when, in the opinion of the commission, it is impractical for the commission to make, fix, or prescribe rates covering such commodities and services.
[1961 c 14 § 81.80.130. Prior: 1957 c 205 § 5; 1937 c 166 § 9; 1935 c 184 § 11; RRS § 6382-11.]

RCW 81.104.120

Commuter rail service--Voter approval.
(1) Transit agencies and regional transit authorities may operate or contract for commuter rail service where it is deemed to be a reasonable alternative transit mode. A reasonable alternative is one whose passenger costs per mile, including costs of trackage, equipment, maintenance, operations, and administration are equal to or less than comparable bus, entrained bus, trolley, or personal rapid transit systems.

(2) A county may use funds collected under RCW 81.100.030 or 81.100.060 to contract with one or more transit agencies or regional transit authorities for planning, operation, and maintenance of commuter rail projects which: (a) Are consistent with the regional transportation plan; (b) have met the project planning and oversight requirements of RCW 81.104.100 and 81.104.110; and (c) have been approved by the voters within the service area of each transit agency or regional transit authority participating in the project. For transit agencies in counties adjoining state or international boundaries where the high capacity transportation system plan and financing plan propose a bi-state or international high capacity transportation system, such voter approval shall be required from only those voters residing within the service area in the state of Washington. The phrase "approved by the voters" includes specific funding authorization for the commuter rail project.

(3) The utilities and transportation commission shall maintain safety responsibility for passenger rail service operating on freight rail lines. Agencies providing passenger rail service on lines other than freight rail lines shall maintain safety responsibility for that service.

WAC 480-62-320 **Remote controlled operations.**

(1) Railroad companies, including logging and industrial railroad companies, must report their intention to use remote control devices to operate trains thirty days before operations begin. The report must include:

(a) The name of the railroad company;

(b) The date operations will start;

(c) The location of the operations; and

(d) Whether trains with locomotives operated by remote control will travel over at-grade pedestrian or vehicular crossings.

(2) If remote controlled trains will be operated over crossings, the railroad company must list the affected crossings.

(3) Each railroad company using remote control devices on the effective date of this rule must submit the report within thirty days after the effective date.

[Statutory Authority: RCW 80.01.040, 81.04.160, 81.24.010, 81.28.010, 81.28.290, 81.40.110, 81.44.010, 81.44.020, 81.44.101-81.44.105, and chapters 81.48, 81.53, 81.54, 81.60, and 81.61 RCW. 01-04-026 (Docket No. TR-981102, General Order No. R-477), § 480-62-320, filed 1/30/01, effective 3/2/01.]

Appendix B

Out of Control Trains?

An Overview of Remote Control Train Operations in Washington State

By Mark K. Ricci, Ph.D.

On April 6, 2002, the Burlington Northern Santa Fe (BNSF) railroad notified the Washington Utilities and Trade Commission (WUTC) that it would begin remote control train operations in Seattle, Everett and Spokane, Washington on or after May 6, 2002. BNSF, Union Pacific (UP), and other class 1 railroads in the United States are implementing a "pilot project" of remote control locomotive (RCL) technology that has been used in Canada, on limited access industrial plants, and on short line or regional railroads. Though described as a pilot project, for Washington this new technology will be used widely and in the heart of our largest cities. Is this technology, as it is being used, safe for Washington residents and our environment? Are there legitimate concerns that Washington residents need to be educated about? Are those folks that have knowledge of railroading considering the interests of Washington residents? What should people know, and when should they be made aware of information from the railroads for their personal safety?

What does remote control operation mean?

Remote controlled locomotives are engines that are operated by a person from the ground perhaps as far as a mile away. Technologically, it is nearly possible to operate trains remotely from thousands of miles away. In this operation, nobody needs to be in the cab of the engine to make the train stop or go, back up or go forward. Practically speaking, there is not a restriction on the length or weight of the train.

Legally, there are not any laws that require the railroads to have someone in the cab of the engine while going over a public or private crossing. There are not any laws that require that a person be on the ground at all public crossings until the crossing is occupied. Beyond notifying the State of Washington that remote control operation is in use, there are not any laws regulating the operation of this technology. For many, this lack of regulation is a wonderful environment to do business. For others, this lack of regulation is an invitation to disaster. Somewhere in the middle, the citizens of the State of Washington must decide if they want remote control technology in their communities.

In 1999, the Federal Railroad Administration (FRA) issued recommendations for implementing remote control technology in the United States. These recommendations do not have the force of law; rather the FRA expected the railroads to cooperate with unions and government to implement this new technology within reasonable bounds. In many pages of documents the FRA assumed in those recommendations that the railroads would use fully educated Train Service Engineers. The FRA expected the railroads would use a process that was safe for employees, the public and the environment. Finally, the FRA assumed that this new technology would be consistent with existing processes in the railroad industry. Arguably, the FRA abdicated its regulatory

responsibility in favor of rail industry self-regulation. For some, this action is seen as placing the safety of the citizens of Washington in a precarious position.

Several companies, such as CANAC INC. a corporate offshoot of the Canadian National (CN) railroad, manufacture remote control technology. The FRA used the CN/CANAC report to formulate its policy on remote control operation. This report has some significant research flaws (Ricci, 2002; FRA, 1999), flaws that have not been answered by the railroad industry. These flaws suggest that perhaps remote control operation is not as safe as what the railroad industry would ask the citizens of Washington to believe.

While there exist experiences in US operations to evaluate and regulate the implementation of this new technology, the FRA has chosen to take a "hands off" approach. For example, the Montana Rail Link (MRL) and the Florida East Coast (FEC) railroads both use remote control operations. Elevator operations in Kalama and Tacoma, Washington, are proving grounds for the risks and benefits of remote control technology. The Puget Sound and Pacific uses remote control operations in Aberdeen, Washington. These operations could be studied and incorporated into any regulatory decisions that affect Washington State. Rather than using this process, the FRA has decided to stand back to see if the railroad industry hopes are fulfilled, or Washingtonian concerns are realized.

What are the concerns the public should know about?

There are many concerns about remote control trains inside the rail industry that may affect the public inadvertently. In these cases, the public must hope that an effective process within the railroad industry will safeguard the public interest. Respectfully, these issues are reserved for Management and/or Labor to resolve. We do not address that complex debate here. Rather, we look at three issues that directly affect Washington residents:

- **Possible collisions between trains and cars, trucks or pedestrians at legally designated railroad crossings.**
- **Possible death or injury to Washington citizens at other than legally designated crossings sometimes referred to by industry insiders as "trespassers."**
- **Possible collisions or other accidents of, or between trains in the heart of major Washington Cities.**

At legal railroad public and private crossings in Washington there were 371 highway-rail incidents between 1995 and 2000. In 2000, these type of accidents occurred at crossings with "gates" 25.84% of the time; at crossings with "flashing lights" 20.02% of the time; at crossings with "stop signs" 13.48% of the time; and at crossings with "cross bucks" 34.72% of the time. Contrary to a belief in society, accidents between trains and vehicles occur at crossings with "active warning devices" such as lights, gates, and ringing bells frequently.

In Seattle, the BNSF railroad has said it will implement remote control operation over "five public crossings, each of which has active warning devices." These crossings

are on or near the Seattle waterfront, a high volume tourist center bringing visitors from around the world to board cruise ships, experience Puget Sound, and enjoy the diverse culture of the Pacific Northwest. Small signs in English are the only education provided by railroads for the public. This may not suffice to warn tourists and guests to Seattle of the potential hazard of remote control operation over public crossings. This of course assumes that an effective education campaign is undertaken for Seattle residents to protect their safety, something that has not yet happened.

In Everett, there are eleven public and private crossings slated for use with remote control operation, only five of these have some form of active warning devices. The remaining crossings rely on passive warning signs such as "cross bucks," or stop signs. Everett has a considerable amount of hazardous material in the city moved both by rail and truck, consistent with a city having Everett's industrial base. Failures to ensure railroad-crossing safety by ignoring a potential transportation hazard could be catastrophic in Everett.

Finally, in Spokane, all three of the public crossings designated for use with remote control trains have active warning devices. One of these crossings is on a significant emergency medical access route for the city of Spokane. Do the citizens of Spokane even know the potential hazard of this situation?

As remote control operations expand in Washington, each city will need to evaluate the potential hazards introduced into its community by these alternative railroad operations. Remote control implementation information is available from the Washington Utilities and Trade Commission on request.

The second issue of "trespassers" crossing railroad tracks at other than legal crossings needs to be considered. In 2001, 16 Washington citizens lost their lives crossing railroad tracks at other then designated railroad crossings. Trespassers under Washington law can be prosecuted. Regardless of ownership, the price pedestrian's may pay for crossing railroad tracks is not a fine but their life. Has the railroad done everything *reasonable* to minimize this sobering fact?

Prior to remote control operation, pedestrian fatalities primarily occurred on higher speed main tracks between the centers of Washington's largest cities. In low speed yard operation, the locomotive engineer was in a position to avert many pedestrian fatalities due to his or her location in the cab of the engine leading the train. Engineers in Washington report taking action to protect Washington citizens in yard operation on a daily basis. With remote control operation, the engineer is removed from the engine and no one is required by federal regulation to physically occupy the engine or precede the movement to warn or watch out for pedestrians crossing railroad tracks. Further, there are not sufficient police resources on the railroads or in the cities to mitigate the hazard. Operation Lifesaver, a nationwide effort to promote railroad-crossing safety, is not prepared to confront this issue presently. Will trespass fatalities increase in Washington from railroad remote control operation? Are increased pedestrian fatalities on railroad property acceptable to Washington residents?

Finally, there is a need for Washington citizens to be knowledgeable about the hazards of two trains colliding with each other, particularly if this happens in the heart of one of Washington's major cities. Trains frequently transport hazardous materials for

America's industrial production. Historically, railroads have been the safest way to transport these commodities throughout the United States.

Unfortunately, train accidents involving hazardous materials still happen. In 2000, 35 train incidents involving hazardous materials causing the evacuation of 5,258 people occurred in the United States. Remote control train operations removes one member of the crew from the train, increasing the need for the remaining 1 or 2 members to protect the train movement in often congested yard operations. In addition, Class 1 railroad implementation has chosen to remove the Locomotive Engineer, the most highly trained and skilled member of the crew (Ricci, 2002a). Does this increase the likelihood of train accidents in major cities in Washington?

Unfortunately, the industry study does not address specifically this serious question (Ricci, 2002). We know from FRA statistics that yard accidents by crews failing to see other trains resulted in 1 death and 20 injuries in 2000 in the United States. These accidents occurred in spite of on average three people watching out for the movement of the train. Can this statistic improve by reducing the number of people watching out for the train's movement?

There are many unanswered questions associated with remote control operations; much information is needed to answer these questions. The citizens of Washington, just like a lab rat, are participating in a pilot project in Seattle, Everett, and Spokane to collect this information for the railroad industry. This experimentation may soon come to cities throughout Washington State.

What can be done to avoid these safety hazards?

The railroad industry has begun a revolutionary pilot project in Washington cities that may become the prototype for rail operation anywhere and everywhere in the US. This pilot project may soon lead to railroads operating without any human on board the train. Technologically, fully functioning computer rail operation is possible. The primary impediment to full implementation is the willingness of Americans to accept machines operating in their cities, towns, and countryside without any physical human oversight to provide the judgment necessary to safeguard the citizens in an emergency. How many people will die from railroad remote control operation is unknown. Will these deaths exceed the deaths that occur in conventional railroad operations? Will citizens accept these fatalities as part of life in a brave new 21st century world?

The industries CN/CANAC study suggests that remote control operation is safer than conventional rail operation, yet other reports argue that the CN/CANAC study might be flawed or incomplete (Ricci, 2002; FRA, 2001). Regardless, the railroads are using Washington cities to resolve these questions. The stakes are extremely high. In a Railway Age article a Wall Street analyst suggests Class 1 railroads could save $250 million a year in operating expenses (Ytuarte, 2002). Whether this number is attainable is not important. The *possibility* that these savings exist for the industry provides a mythological goal, like a "Holy Grail," for America's railroads to chase after.

The WUTC has fulfilled its legal function to collect information from the railroads about the location of remote control operations. Federal law by and large preempts involvement by state and local governments. While some local action is possible, the railroads often claim only the Federal government has the authority for

interstate commerce. While this claim is debatable, concerns from Washington citizens may be directed to the Federal government for redress. In other words, the **Federal Railroad Administration,** a division of the United States Department of Transportation, is the government agency mandated to address the railroad safety issues associated with remote control operation in Washington State. In the absence of that action, the WUTC may adopt regulations to address local safety issues from railroad operations in Washington State.

To date, the FRA has not aggressively addressed remote control issues in the United States. The Brotherhood of Locomotive Engineers (BLE) has filed suit in Federal court to get the FRA to enforce what the BLE believes to be existing Federal law. That lawsuit has not been resolved, nor has it impeded railroad implementation of remote control technology.

Currently, politicians in Washington State and Washington, D.C. are beginning to learn about this issue. Politically, Washington citizens rely on their congressional delegation, Senators and Representatives, to oversee the action or inaction of Federal agencies. Concerned Citizens have contacted these elected officials in Congress and requested effective oversight of the FRA so that it might protect Washington citizens from questionable railroad industry practices. Citizens of Washington have asked the Governor and other State and Local officials to become educated and proactive in the Locomotive Remote Control issue. They have asked elected officials at all levels to demand answers from the FRA to the myriad of questions raised by railroad actions. Concerned citizens can now contact their elected Senators and Representatives for answers to these questions.

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Appendix C

Who's Running the Train?

A Technical Analysis of Proposed Remote Control Operators in Major Railroad Operations in Washington

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Federal law (49 CFR 240) requires that anyone who "moves a locomotive or group of locomotives regardless of whether they are coupled to rolling equipment" in connection with the "general railroad system of transportation" be a qualified individual. The Federal Railroad Administration (FRA) calls this individual a Locomotive Engineer, but goes on to say that any other label used in the railroad industry for an individual performing these duties falls under these Federal rules.

The FRA recognizes three classes of Locomotive Operators: train service, locomotive servicing, and student engineers (49 CFR 240.107). The railroads may impose "additional conditions or operational restrictions" so long as they are not inconsistent with this part [49 CFR 240]. Until recently, the licensing process allowed for "train service engineers," able to operate any train in any territory on a particular railroad. There were also "hostler" licenses for mechanical forces to move locomotives without any cars attached for maintenance purposes. Finally, there were "student licenses," a learner's permit of sorts that allowed the individual to operate trains under the direct supervision of a fully qualified train service engineer.

The FRA requires the railroads to certify that the individual operator has been trained in "personal safety, operating rules and practices, mechanical condition of equipment, methods of safe train handling (including familiarity with physical characteristics…), and relevant Federal safety rules." In addition, the individual must be free from any alcohol or drug use that can compromise railroad safety. Unlike an automobile driver's or a commercial truck driver's license that is issued by a state government agency, the FRA defers to the individual railroads to issue and monitor Locomotive Engineer's licenses in railroad operations.

With the introduction of Locomotive Remote Control (LRC) technology, the major, Class 1 railroads in the United States have chosen to create a new position called ***Remote Control Operator (RCO)***. This individual would replace the existing train service engineer in certain railroad operations. The FRA has interpreted Federal law to allow the railroads this option, provided the RCO is consistent with 49 CFR 240. Is this a safe course for railroad operations? Perhaps you will be able to make a reasoned conclusion by reading this report.

This report addresses the BNSF 49 CFR Part 240 submission failings to create a safe and educated work force. The RCO as proposed is a seriously "dumbed down" replacement for the existing Locomotive Engineer. The training of the RCO does not meet the requirements of the job, specifically rules of operation, train handling, and mechanical knowledge. This report goes on to address the significant leap beyond the Canadian National experience the BNSF 49 CFR Part 240 submission to the FRA makes,

a reported experience in and of itself problematic in the LRC technology debate (Ricci, 2002).

Are these people safe to operate trains?

There are two Class 1 freight railroads operating trains in Washington State: the Burlington Northern Santa Fe Railroad (BNSF) and the Union Pacific Railroad (UP). There are also 15 regional or short line railroads with operations in Washington. This paper focuses on the BNSF Remote Control Operator submission to the FRA for the following reasons:

1) BNSF operates in most major cities in Washington, and
2) BNSF operates more miles of railroad track, employs more Washington residents, and operates through more environmentally sensitive areas than any other railroad in Washington.

Having said that, many issues discussed in this paper are transferable to the operations of some if not all other railroads in Washington. This excludes passenger and commuter rail operation since these railroads are not suggesting Remote Control Operation at this time. However, all of the safety issues raised by Remote Control (RC) changes will affect passenger rail operations to the extent that railroads jointly operate rail lines.

In the United States, trains are generally operated by a knowledgeable, well-trained and experienced train service Locomotive Engineer. This has not always been the case. Prior to the 1970's, Locomotive Engineers acquired their skills experientially without a formalized training process. Working years as a Locomotive Fireman, an apprenticeship of sorts, the individual would learn the "ropes" from an experienced Locomotive Engineer. After many years, the Locomotive Fireman would take a test, and begin working as an Engineer on a relief or an as needed basis, continuing to work and gain experience as a Locomotive Fireman when not needed. This process produced well-qualified and experienced engineers.

With the elimination of the Fireman from the train crew in the early 1970's, the railroads implemented a formal classroom education for Locomotive Engineers. During this period, Engineers often failed to receive sufficient experiential training to augment the theoretical base to safely operate trains. In some locales, new Engineers were referred to as "60 day wonders," a reference to the minimal training new engineers received. By the late 1980's, the Federal Government, motivated by some high profile rail accidents, implemented minimum requirements for education and training that resulted in the highly capable engineers that operate trains in the United States today.

With the implementation of Remote Control Operators, the railroads are taking a significant step back in the evolution of Locomotive Engineer training. First, the railroads are not using experiential knowledge within the existing workforce to supplement formal classroom training. After 150 years of railroad operating knowledge passed from one generation of Locomotive Engineers to another by sharing operating experience, the railroads are making a break with existing craft knowledge to start a new craft, without any experiential base to draw upon. Second, the mechanical training does

not provide sufficient knowledge of the equipment to allow for minimum compliance with Federal regulations. Finally, the railroads have reduced the testing requirements to the point that it is not possible to "determine that the person has sufficient knowledge of the railroads rules and practices for the safe operation of trains."(49 CFR 240.125) In part two below, I will go on to address the full complexity of the requirements of Remote Control operations and how the BNSF submission exceeds existing railroad experience as reported to the FRA. Here, I will address in detail the three implementing issues just raised.

Within the existing work force, there is a wealth of knowledge that far exceeds any information that can be presented in classroom education. The best research into adult education emphasizes the need to couple formal education with experiential application. Experience, such as on the job training, can come from a mentoring process, or it can be trial and error. Mentoring processes have worked effectively to augment textbook education in all industries, including the railroad industry. Emphasis in the mid to late 1980's incorporating experience into the formal Engineer training program may very well have contributed to the decline in FRA reported incidents in the railroad industry in the early 1990's. The proposed RCO training is a giant step backward in creating a well-trained, skilled work force to operate trains in the United States.

In addition to discarding the operating experience of the existing group of Locomotive Engineers, ignoring the experience of this group of individuals also ignores the wealth of mechanical knowledge of the equipment that the railroad tacitly benefits from on a daily basis. FRA regulations (49 CFR 229.21) require a daily inspection of locomotives. The railroads might argue that mechanical personnel accomplish this task, however in practice the Locomotive Engineer is often the only skilled person available to fulfill this Federal regulation. Without effective training, the daily inspection intended to ensure that the equipment is safe to operate may not be completed.

As figure 1 shows, existing Locomotive Engineers receive one week of mechanical training while RCO's will receive 1.5 days of total classroom instruction that includes all operating, safety, and equipment education. The one-week mechanical training that Locomotive Engineers complete is a minimum necessary requirement to acquire sufficient knowledge to comply with the daily inspection. Usually, only after extensive experience on the job does the individual hone those skills learned in that week to reach a level of proficiency adequate to complete the task. The minimal training for RCO's by railroads fully ignores the Federal Regulations as mandated by the US Government.

Finally, when considered in their entirety, the RCO training and testing fails to meet the threshold of "sufficient" expertise for the "safe operation of trains"(49 CFR 240.125). As Figure 1 shows, the proposed RCO training is a ten-day course, compared to a 24-week course for existing train service engineers. While existing train service engineers receive weeks of formal training covering the use of air brakes and train handling (ABTH), operating rules, mechanical and simulator training followed by 16 weeks of hands on mentored training; proposed remote control training is focused primarily on remote control equipment, general remote control operations, and field operation of remote control equipment. The remote control training assumes that individuals will have knowledge of railroad operating and air brake rules, Hazmat (hazardous materials), and switching operations. However, training for ground service

employees has historically lagged training for Locomotive Engineers. Only recently have training methods for ground service employees been formalized. Many ground service employees remain experientially educated. For these, there is no formal training and no structured verification of operational skills. There exists no body of fact that supports an assumption that the highly technical requirements of train operation can be attained through the process of "osmosis." Yet, the railroads assume that ground service employees can accomplish the tasks of a Locomotive Engineer with minimal additional training. As stated above, the only reasoned process requires extensive formal education coupled with hands on mentored training.

Testing has been more rigorous for Locomotive Engineers, with more questions asked, and a higher required score for passing than ground service employees. Again, Figure I compares the testing requirements of a Locomotive Engineer and a Remote Control Operator. Initial testing for an Engineer allows only one failure before determining that the individual is not capable of performing the duties of a Locomotive Engineer. Proposed RCO guidelines establish no limits on the number of times an individual can test and fail before finally passing the RCO examination.

Further, while train service, portable pack remote operators (a special circumstance in a particular maintenance location), and locomotive servicing engineers "failing the second attempt will fail the program and will no longer be eligible for the position…" Remote Control Operators "that fail the written examination will be given remedial training on the questions missed and a retake of only questions missed will be required." The minimum 50 questions asked an RCO is only a fraction of the several hundred questions a potential Locomotive Engineer is required to answer. While both Locomotive Engineers and Remote Control Operators must answer 90% of questions correctly to pass the test, the paltry number of questions an RCO must answer in no way begins to incorporate the complexity of a dynamic transportation system like a US railroad. The testing requirements are not sufficient to determine whether an individual knows and can apply the information required to safely operate a train.

It is tempting, as major US railroads would have us believe, that the elimination of education and training is acceptable because there is a corresponding reduction of tasks required by the new craft. Railroads argue that the computer replaces the engineer and the RCO is just communicating with the computer in the same way that a ground service employee would communicate with a Locomotive Engineer. This erroneous conclusion assumes first that any computer in common use is capable of higher reasoning, including judgment. Computer technology in common use has not achieved this level of artificial intelligence.

Second as Figure II shows, all functions performed by an engineer are also performed by an RCO, including discerning speed for the immediate condition, use of brakes as necessary, and evaluating the proper use of safety appliances such as the bell or whistle for the current situation. If anything, the new technology increases the need for operator training, judgment, and attention. This can be understood in greater detail in part two below, where I challenge the premise that it is possible to reduce training because the requirements of the job are reduced. I also highlight the increase in the type of jobs that will be performed as compared to the original data provided by the industry to the FRA.

Figure 1

A Comparison of Training Between Locomotive Engineer and Remote Control Operator

Training	**Locomotive Engineer** (Conventional Cab Operation)	**Remote Control Operator** (Unmanned Cab Operation)
Familiarization	1 Week	
Formal Classroom		1.5 Days
Air Brake & Train Handling (ABTH)	1 Week	none
Operating Rules	1 Week	none
Mechanical Inspection	1 Week	none
Simulator	12 Hours	none
Hands on Train Handling (Mentored)	17 Weeks	7.5 Days
Advanced Train Handling, Operating Rules, Simulator, Final Examination	2 Weeks	1.0 Days
Total Training Time	**24 Weeks**	**10 Days**

Testing Requirements

Number of Attempts	2	Unlimited
Operating Rules	90% to pass	90% to pass
Second Attempt	All questions	Only questions missed on previous testing attempt
Simulator	70% to pass	None
On Board Skill Evaluation	2 hours or 50 miles Minimum evaluation by qualified superior.	Superior determine pass/fail No observation time limits required.

Figure II

A Comparison of Functional Control Between Locomotive Engineer and Remote Control Operator

Function	Locomotive Engineer (Conventional Cab Operation)	Remote Control Operator (Unmanned Cab Operation)
Throttle Control	9 settings	Up to 8 settings*
Independent Brake Control	variable	Up to 5 settings*
Automatic Brake Control	5 settings	Up to 6 settings*
Direction Setting	3	3
Headlight Control	yes	yes
Sand Control	yes	yes
Horn/Bell	yes	yes
Tilt Control	n/a**	yes
Attention Control	yes***	yes
Pitch and Catch	n/a**	yes

*Number of functions may vary by Remote Control brand.
**Not applicable to conventional cab operation.
***Some yard service locomotives may not be equipped with this feature.

Does this submission conform to existing experiences in LRC technology?

Figure III compares the requirements and restrictions of a Locomotive Engineer and a Remote Control Operator. With few exceptions, the duties performed by a Locomotive Engineer and a Remote Control Operator are very similar. While the railroads argue that there is sufficient difference between the two jobs to justify reduced training, reduced train handling abilities, and sub-standard operation, Figure III tells a different story.

There is virtually no difference between the allowable tasks a Remote Control Operator may perform, and the allowable tasks a Locomotive Engineer may perform. Initial implementation does not envision all tasks will be performed by RCO's immediately; rather an incremental process will replace existing conventional cab operation with unmanned operation. However, from experience the usual course of implementation of new technology in the railroad industry is an initial "structured start," resulting in a period of "confusion and indecision," followed by a "hands off---let the employees make it work" period. During the last period, any supposed limitations placed on operations by the railroad may be modified at will, often in the middle of the night, many times without any reasoned process that attends to the various safety issues. Thus, if there is an assumption comparing a Locomotive Engineer and a Remote Control Operator it is that the Remote Control Operator will at some point perform every function, in every situation, as a Locomotive Engineer.

The BNSF remote control operation as Figure III illustrates is broad reaching and inclusive in its intended use. However, the original study produced by the Canadian National railroad makes a point of stating that the conclusions produced by the data, flawed as they may be (Ricci, 2002), are based primarily on "hump and flat yard

Figure III

Comparison of Tasks/Requirements of Locomotive Engineer and Remote Control Operator

Task	Locomotive Engineer (Conventional Cab Operation)	Remote Control Operator (Unmanned Cab Operation)
Type of Operation		
Yard	No Restriction	No Restriction
Local	No Restriction	No Restriction*
Thru Freight	No Restriction	No Restriction*
Assignments		
Hump	No Restriction	No Restriction
Trimmer	No Restriction	No Restriction
Classification	No Restriction	No Restriction
Transfer	No Restriction	No Restriction
Road Switcher	No Restriction	No Restriction
Industrial or Station Switching	No Restriction	No Restriction
Specific Tasks/Requirements		
Speed Limits**	No Restriction	No Restriction
Tonnage Handled	No Restriction	No Restriction
Length of Train	No Restriction	No Restriction
Grades (inclines)	No Restriction	No Restriction
Operation Over Crossings		
Public	No Restriction	No Restriction
Private	No Restriction	No Restriction
Pedestrian***	No Restriction	No Restriction

*Not planned in initial implementation.
**Additional speed restrictions other than posted track speed.
***Pedestrian traffic may include unauthorized/trespasser traffic.

switching." If the Canadian National experience could be replicated without exception in the United States, that experience would not address the extensive use of Locomotive

Remote Control technology as envisioned in the United States. The industry may be taking an unacceptable risk with the current implementation of LRC technology by any measurement of safety.

There are examples of remote control operation in Washington, including the regional railroad, Puget Sound and Pacific (PS&P). In this case, PS&P has placed restrictions on its own operation including:

1) Using fully qualified train service Locomotive Engineers,
2) Restricting the proximity of remote control operation to other rail operations, and
3) Instituting protections for the general public.

In addition, PS&P operates LRC technology in low-density rail operations, on track that is not jointly operated with other railroads, and in low population towns in Washington. Even so, unpublished reports suggest additional scrutiny of these operations may be desirable.

Contrary to the existing experience in Washington, BNSF is implementing LRC technology on a broad scale, in high-density, jointly operated rail corridors, that include passenger traffic in Washington's largest cities. Further, BNSF is implementing few if any processes to avoid incidents between trains, between trains and automobiles at crossings, and between trains and pedestrians crossing the tracks.

Conclusion

The railroads assert that the computer has replaced the decision-making functions of the engineer. However, the railroads have essentially transferred those functions to the RCO. As stated above, the computer is a modification to an existing technology first invented in the early 1800's. Historically, Locomotive Engineers have responded to the unanticipated, uncontrolled, and life threatening circumstances that no mechanical brain can mimic. Computers are still a manipulator of data, not a cognitive functioning brain. The RCO must now be depended upon to fulfill all of the safety and operating functions that are conventionally performed by a Locomotive Engineer. Research tells us that effective formal and experiential training is necessary to function safely in a dynamic system such as freight rail transportation. The training proposed by the railroads and permitted by the FRA does not appear to reach an adequate threshold of safety.

Rigorous training is not for the day-to-day, rote application of a list of skills; rigorous training is for that instantaneous, heart thumping, unexpected circumstance that the operator must see, interpret, and respond to in a split second. Railroad remote control operation as envisioned is a static application of technology in a dynamic system. The decisions to implement LRC technology under the present proposals need to be revisited by the railroads and the FRA. Barring that, the Citizens of Washington through their elected officials need to ask the railroad industry some very tough questions if they want to remain safe and protect the beauty of Washington State.

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Appendix D

A Critical Analysis of the Canadian National Reported Experience With Locomotive Remote Control Technology

By Mark K. Ricci, Ph.D.

In November, 2000, the Canadian National Railroad (CN) submitted a report to the Federal Railroad Administration (FRA 2000-7325) on it's "Experience with Locomotive Remote Control Technology," asserting a unique position based on experience and expertise with remote control technology. This report has been quoted in industry journals, by industry representatives, and by Federal and State regulators. The report is sometimes referred to as the CANAC study, taking its name from the subsidiary of the Canadian National Railroad that produces Locomotive Remote Control (LRC) technology.

The CN/CANAC study suggests that CN's experience with LRC demonstrated "clear safety advantages of this technology." With little critique, the report has become a centerpiece in the debates surrounding implementation of LRC technology in the United States.

While questions continue to swirl in the railroad industry concerning the safety and implementation of LRC technology there are several issues associated with the CN/CANAC report that have not yet been explored. Thus, this analysis first looks at claims by the CN/CANAC report of improved communication resulting in improved safety. In part two, assumptions in the report that neglect to incorporate railroad processes are discussed. Finally, the independence of the data collection process in the study is explored. This analysis suggests that the application of certain flawed assumptions seriously compromises the veracity of the industry study; and industry regulator's dependence on this flawed research calls into question the independence of those government authorities.

Are two people safer than three?

The communication processes addressed in the study conclude that two persons are better than three persons as a work group. The CN report presents an abbreviated flow chart to describe the process of communication between the ground person, the engineer, and the locomotive controls. The report suggests that removing the engineer from the communication loop reduces the incidence of miscommunication by allowing the ground person to "communicate" directly with the locomotive controls. The CN/CANAC report uses an "analysis of CN yard incident causes" to support what might be considered a reductionistic and mechanistic interpretation of intra-group communication.

Railroad operations are a combination of humans and machines that together form a functioning system (Lewin, 1951) that transports a significant portion of all the goods that make up the US economy. To understand the complex relationships that form the communication network in the rail industry, the industry might benefit from incorporating research from the past half century into group process. In addition, the industry might fully incorporate the recommendations of research specifically looking at railroads, like the Switching Operation Fatality Analysis (SOFA) report. This 1999 study by industry, labor, and government looked at 76 fatal incidents in railroad switching operations. The SOFA report, and accompanying recommendations are based on a holistic assumption. Selectively cherry picking from the recommendations distorts the results of the study. The SOFA report is address further below, but first the reductionist view of communication theory from the perspective of the CN report is explored.

The CN/CANAC conclusion that safety is improved by eliminating the locomotive engineer is an assumption that fails to incorporate the advancing research into work groups. Wilfred Bion (1961) postulated the existence of behaviors in groups independent of the size of the group. The relevant behaviors of Dependence, Fight/Flight, and Pairing are not understood as better or worse than one another; rather the groups must be considered as different. This statement does not include differences associated with groups larger than 6 members, in as much as these groups are not relevant to this analysis of railroad working groups.

Stevens-Long (1993) suggests that different groups might be better suited to perform different tasks, but this research does not support the conclusion offered by the CN/CANAC report. Contrary to the CN/CANAC conclusion of improved group process and communication, a significant argument can be made that increased cohesion in a two-person group (dyad) can result in assumptions that fail to incorporate the necessary tension and communication associated with railroad operations. In other words, two people might be more likely to follow each other over a cliff so to speak, not checking the hazardous assumptions of the other member of the group, than a three-person group.

Rather than attempting to eliminate the process of communication by eliminating people from the communication loop, railroads might consider incorporating better communication into work groups through education and training. Elimination of the engineer does not eliminate the hazard from intra-group miscommunication; there still exists the same hazards associated with two-member crew communications that are associated with a three-member crew. At any time, one or the other crewmember could cause an unintended or undesirable movement resulting in the death or incapacitation of one or both crewmembers. In addition, by introducing LRC technology, the railroads are increasing the chances of failure associated with any mechanical process. Although the CN/CANAC report suggests that LRC technology is "fail-safe," any one operating a system made by humans, from NASA to the computer on your desk, knows that mechanical, information, and human systems fail. By applying redundant elements in the system, safety can be preserved. In railroad LRC technology, the loss of a member of the crew will reduce redundancy in the operation. Further, LRC technology does nothing to address human and group assumptions that may contribute to hazards in the railroad industry. In order to produce the safety results that the CN/CANAC report envisions, the railroad industry might do better to incorporate the group relations' research cited above

as the SOFA report corroborates. Further, the railroad industry might consider a holistic application of the SOFA report recommendations.

A meta-analysis of the SOFA report identifies two broad issues that encompass all five of the major findings: Communication and Training. The SOFA report found that incomplete or inadequate communication among crewmembers was an important contributing factor:

> Sometimes this was a failure of, or improper use of communications equipment, but more often it was a failure or reluctance of the crew member to elevate the importance of communications impacting on safety to the level needed to assure successful, safe operations.

As long as the railroad industry follows paths that are contrary to existing science and experience, there may be no significant advancement in the safety of railroad workers. For example, the conclusion CN/CANAC draws from the SOFA study is only half way to a reasonable conclusion. The CN/CANAC report notes the SOFA report when it concludes:

> Compelling evidence in this study [SOFA] suggested that many fatalities in yard switching operations resulted from unexpected train movement, particularly at very low speed. By removing the intermediary and giving control of the movement to the person on the ground, the LRC technology eliminates major sources of risk.

The SOFA report identified 11 of 76 employee fatalities associated with movement of their own train. At the same time, SOFA reported that 20 of 76, nearly twice as many, employees were struck by equipment other than their own. Contrary to the CN/CANAC conclusion, "removing the intermediary" would have no positive impact on safety in these cases. Further, depending on the circumstance or positioning of the additional crewmember, it is possible that a negative impact on safety might result in an increase of fatalities from railroad movements that are other than their own trains. This conclusion stems in part from the common practice in the railroad industry for crewmembers to notify members of their crew concerning the movement of equipment on adjacent tracks. As people are removed from the crew, there are less people to watch out for the remaining workers.

Assumptions may mislead the reader

Sometimes, research makes assumptions that either misleads the reader or is incorrect in their entirety. Sometimes what is not reported by the research is more telling than what is reported. The CN/CANAC report makes assumptions in the presentation of data that fail to incorporate an understanding of railroad processes. The CN/CANAC report fails to incorporate significant information about incidents in LRC operations caused by violations of the restricted speed rule, any increased incidence of trespass fatalities, and/or any increase in crossing accidents as compared to conventional cab operation.

As an example of the CN/CANAC failure to express an understanding of railroad processes consider the following. The report assumes, for the sake of focusing "on those accidents associated with the operation of the assignment," that the data exclude mechanical incidents or accidents, such as accidents caused by a broken rail. This conclusion ignores a fundamental difference in the comparison between conventional cab and LRC technology operation. One primary reason for having an engineer in the cab of the locomotive is to provide eyes, ears, and cognitive abilities that accompany the leading movement of the train. One of those functions is to watch out for broken rails, a function that LRC technology is not able to perform. The General Code of Operating Rules (GCOR), in use on many railroads in the United States, establishes this engineer function:

> **6.13 …All movements entering or moving within yard limits must be made at restricted speed…**
>
> **6.27 When a train or engine is required to move at restricted speed, movement must be made at a speed that allows stopping within half the range of vision short of: Train, Engine, Railroad car, Men or equipment fouling the track, stop signal, derail or switch lined improperly. The crew must keep a lookout for broken rail…**

The assumption that this data should be exempted is a serious flaw that compromises the conclusion that LRC technology is safer than conventional engineer in the cab operation. In 2000 in the United States, Human Factors caused 35.9% of railroad accidents with the largest single factor accounting for 5.1% of all accidents being a switch improperly lined. At the same time, track defects accounted for 32.4% of railroad accidents with wide gauge accounting for 7.9% of total accidents. Just as LRC technology does not eliminate accidents caused by improperly lined switches, conventional cab operation will not eliminate track defect incidents. However, without anyone in the cab of the engine watching out for broken rail and other track defects, it is reasonable to conclude that mechanical type accidents may increase. The CN/CANAC study makes an assumption, either out of ignorance or calculation, which purposely chooses to ignore this significant possibility.

While this is an example of a faulty assumption, even more interesting is what the CN/CANAC report failed to include: FRA cause codes for restricted speed, coupling speed, and excessive speed. Again, in 2000 in the US, these three categories collectively accounted for 2.2 percent of all accidents. This included 49 accidents inside Yards that resulted in 20 injuries and one death. The effects of LRC technology on these categories are important data since experience (see also Gamst, 2000) suggests that all three of these categories may have increased occurrences in LRC technology operations.

Along these same lines, the CN/CANAC report hails a 92% reduction of incidents in the combined FRA categories associated with "failure to communicate."

In the FRA 2000 report, these combined categories accounted for 0.8% of all accidents with no reported casualties, either fatal or nonfatal. Everyone inside and outside of the railroad industry agrees that it is important to reduce any incidents. However, it is telling that the CN/CANAC report hails success in categories that in the US in 2000 only resulted in property damage, while at the same time ignored categories that resulted in injuries and even a death.

Independence of data collection

In order to ensure some scientific validity, a minimum requisite for determining the efficacy of LRC technology, the data collection needs to be independently analyzed and critiqued. The conclusions formulated must be able to be substantiated with more than an industry sales person saying, "Trust us." The data produced by the CN/CANAC report cannot be independently corroborated. The CN railroad does not, contrary to any impression provided in the CN/CANAC study, report to the Federal Railroad Administration statistics on its Canadian operations. Data available from Transport Canada does not transfer adequately for a comparison with FRA statistics.

The US portions of the Canadian National Railroad, the Illinois Central and the Grand Trunk Western, do report FRA statistics. The CN/CANAC report does not clearly explain the inclusion and exclusion criteria for data from these operations. For example, it appears to exclude IC data while including GTW data at certain places in the report. Again, because the statistics are not independently available through an objective source, these questions cannot be satisfactorily answered. If we compare the safety statistics of the CN railroad as provided by the CN/CANAC report with the FRA reported statistics of the IC and GTW (see figure 1), there are some interesting questions.

Figure 1
Comparison of accident frequency per 1,000,000 train miles

	1995	1996	1997	1998	1999	2000
CN-IC *	n/a	3.01	2.15	2.29	2.21	n/a
IC	7.79	9.14	6.37	7.82	6.48	6.13
GTW	8.95	5.85	4.42	3.91	4.05	3.71
BNSF	3.98	3.11	2.84	2.67	2.96	3.57
NS	1.51	2.37	2.64	2.19	2.91	2.87
CSX	1.61	1.95	3.07	3.71	4.02	4.23
UP	3.88	4.00	3.51	4.62	4.08	4.19

* CN-IC data taken from CN/CANAC report; all other data taken from FRA sources.

First, the CN/CANAC report does not correctly reproduce FRA statistics. The discrepancies are minor, but confusing. Are there technical discrepancies that are not reported in the accompanying notes? Are these relevant to the conclusions of the report? Again, these cannot be independently verified.

Second, while it is commonplace to compare relative safety information based on "per million train miles" ratios; the use of LRC technology is primarily a yard-based phenomenon. The reported ratio does not allow effective comparison to regional, shortline, and terminal railroads. This is significant in as much as the use of LRC technology in the United States has to date primarily been on regional and industrial railroads. If the CN/CANAC study is to offer any relevant perspective on the LRC debate in the United States, industry analysts must use comparable data. In other words, compare apples to apples and oranges to oranges. Figure 2 shows a comparison of incidents on US railroads based on "200,000 hours worked." Again, CN-IC Canada operations data is not available for this comparison.

Figure 2
Comparison of employee on duty cases frequency per 200,000 hours worked

	1995	1996	1997	1998	1999	2000
CN-IC	n/a	n/a	n/a	n/a	n/a	n/a
IC	3.45	3.53	2.91	2.80	3.10	3.85
GTW	7.94	6.77	6.35	7.00	5.52	5.79
BNSF	2.86	2.01	1.74	2.20	2.39	2.61
NS	1.54	1.26	.94	1.07	1.27	1.46
CSX	1.73	2.05	2.15	2.45	2.70	2.89
UP	3.86	2.91	2.89	3.16	3.49	3.10

Note: CN-IC data taken from CN/CANAC report; all other data taken from FRA sources.

Finally, the CN/CANAC report uses a definition of yard accidents that includes all incidents regardless of damage or injury. FRA statistics have an objective criteria based on injuries and/or a dollar amount of damage sustained. While the CN/CANAC

report suggests that the statistics used are more meaningful because "any accident has the potential to cause serious injury or damage;" in practice this is not true. On some US railroads, there have been incidents that when fully investigated did not support the claim by management that an incident occurred as first reported. This is why there is an investigatory process in United States railroad labor relations. There might be instances where a manager, for various reasons, inflates the seriousness of an incident; or conversely minimizes the seriousness of an accident. For this reason, the FRA objective measurement based on injury and/or financial damage is the more reliable measurement.

Conclusion

The move to implement new technology in the railroad industry is as old as the railroad industry itself. In this century alone, steam locomotion was replaced by diesel electric locomotion, radio communication has replaced visual signals, and end of train devices have replaced caboose operations to name just a few innovations. There have been several forces driving change. For the railroad industry, change has been driven by a desire to reduce employment. Diesel locomotion eventually resulted in the elimination of the fireman position on the crew. End of train devices allowed for a crew size reduction in road service, while radio communication has allowed for reduced crew size in both road and yard service.

For Government, innovation has been welcomed to quiet political unrest. When a major accident gets the public's attention, government imposes regulations to respond to the upset in the body politic. For example, end of train devices when originally introduced on some US railroads did not have the ability to apply the brakes by radio from the lead locomotive. Accidents in the United States identified a need for this basic improvement, and government regulators imposed new rules that require this technological improvement in various circumstances. Some workers requested this function prior to the aforementioned accidents, but unfortunately their pleas went unanswered.

At the same time, labor has implemented each new technology envisioned by management and government over the years. Often, labor has advocated for technological advancement to overcome a safety issue. The only plea from labor is that technological improvements minimize the disruption on employment, and that it be as safe or safer than existing processes. Rarely is either of these pleas answered as new technology comes on line.

Research indicates that effective implementation of any new process or technology requires education, training, and integration with the existing processes in the environment. In this case, the CN/CANAC report does not produce verifiable evidence that effective integration into the existing railroad operations has occurred. This information is available from FRA statistics of railroads operating LRC technology in the United States such as the Montana Rail Link, Puget Sound and Pacific, or the Florida East Coast railroads. All of these operate LRC technology; all produce FRA statistics; and all subscribe to the political realities of the individual States.

Before this technology moves ahead, the FRA needs to ensure that the many questions associated with this major change in the railroad industry have been answered. To date, actions by this regulatory agency have been minimal, if not irresponsible,

suggesting a laissez faire attitude toward the application of LRC technology in US railroad operations.

With the complexity of the US railroad system, the large population surrounding the transit centers employing this new technology, and the hazardous nature of the commodities transported, railroad employees and citizens of the United States deserve informed, responsible, and independent oversight of the implementation of LRC technology in US communities. The Federal Railroad Administration within the US Department of Transportation is the primary regulatory agency to provide this function for United States citizenry. Only time will tell if the FRA will proactively address the safety concerns of LRC technology, or if the FRA will react to accidents associated with LRC technology.

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While working as an engineer, Dr. Ricci earned a Bachelor of Arts degree in Liberal Studies from the University of Washington, Tacoma. He earned a Master of Art's degree in Organization Development and a Doctor of Philosophy in Human and Organizational Systems, both from the Fielding Institute in Santa Barbara, California.

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