



National Transportation Safety Board

Washington, D.C. 20594
Safety Recommendation

Date: JUL 1 1991

In reply refer to: R-91-17 and -18

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The Safety Board has had a long-standing concern about emergency response management of railroad accidents involving hazardous materials and the hazardous materials training of railroad personnel. Between 1977 and 1987, the Safety Board investigated several railroad accidents and incidents involving hazardous materials in which the lack of adequate written emergency response plans and the lack of practice with the emergency response procedures between the railroads and the community presented major safety problems.¹ In these accidents/incidents, the lack of planning (a) hindered efforts made by the community response personnel to handle the emergency and to minimize the risk to the public, (b) increased the severity of the damage or consequences resulting from the accident, and/or (c) lengthened the duration of the evacuation period and disruption to businesses. As a result of its investigations, the Board issued safety recommendations to various agencies, organizations, and railroads to improve the safety of the transport of hazardous materials by rail.

In 1988, the Safety Board began a safety study to determine whether the recurring problems seen in the earlier accidents were continuing, and if so, to identify remedial actions and to issue safety recommendations requesting remedial action.² As a part of the study, the Safety Board conducted investigations of 45 selected railroad accidents or incidents (hereinafter called cases) that occurred in a 1-year period, March 1988 through February 1989. The Board also reviewed reports of its past major accident

¹ (a) As used in this letter, an incident refers to a release of hazardous materials, such as a leak, that was not the result of an accident. (b) The events occurred in Rockingham, North Carolina (1977); Crestview, Florida (1979); Sommerville, Massachusetts (1980); Livingston, Louisiana (1982); North Little Rock, Arkansas (1984); Elkhart, Indiana (1985); Pine Bluff, Arkansas (1985); Miamisburg, Ohio (1986); and New Orleans, Louisiana (1987).

² National Transportation Safety Board. 1991. Transport of hazardous materials by rail. Safety Study NTSB/SS-91/01. Washington, DC. 187 p.

investigations and special studies, studies performed by other organizations, and the training on hazardous materials provided by some railroads. Results of the safety study indicate that improvements are still needed in emergency response planning between railroads and communities and in hazardous materials training provided to railroad employees.

Emergency Response Planning

In its 1985 special investigation on railroad yard safety, the Board addressed the need for coordinated emergency response planning for railroad yards, through which pass a high volume of hazardous materials and where the release of the materials pose great threats to public safety.³ The special investigation identified many accidents/incidents in which the coordination needed to handle the emergency was inadequate and in which the inadequacy resulted from a lack of planning and joint disaster drills between the railroad and emergency response personnel. Based on its special investigation, on June 6, 1985, the Safety Board issued the following safety recommendation to all railroads that operate rail yards:

R-85-53

In coordination with communities adjacent to your railroad yards, develop and implement emergency planning and response procedures for handling releases of hazardous materials. These procedures should address, at a minimum, initial notification procedures, response actions for the safe handling of releases of the various types of hazardous materials transported, identification of key contact personnel, conduct of emergency drills and exercises, and identification of the resources to be provided and the actions to be taken by the railroad and the community.

Of the 54 railroads that received the recommendation, only 6 indicated that they have been in contact with communities to develop and implement emergency planning and response procedures.⁴ Consequently, the Safety Board believes that action is still needed between most railroads that operate rail yards and the communities in which the yards are located.

The Safety Board is concerned that so few of the railroads that were recipients of Safety Recommendation R-85-53 have acted in a positive manner, especially because the Board learned in its investigations of the 45 cases occurring between March 1988 and February 1989 that many communities and the railroads that operate trains carrying hazardous materials through those

³ National Transportation Safety Board. 1985. Railroad yard safety--hazardous materials and emergency preparedness. Special Investigation Report NTSB/SIR-85/02. Washington, DC. 59 p.

⁴ Of the 54 railroads, 29 did not respond, 16 responded, and 9 no longer exist because of mergers or other corporate changes.

communities either do not have proper emergency response plans or are not properly exercising the plans.⁵

In at least 21 of the 45 cases (47 percent), the incident commander did not have a hazardous materials emergency response plan to follow. Emergency response plans were followed in 15 of the 45 cases.⁶ The value of an emergency response plan is illustrated by the accident in Punta Gorda, Florida.

On March 10, 1988, 40 cars in a freight train derailed in Punta Gorda, Florida. One of the derailed cars, a covered hopper car, contained ammonium nitrate (an oxidizer). Because the product was potentially explosive, and two tank cars containing liquified petroleum gas (a flammable gas) were in the immediate area, local authorities ordered an evacuation of 300 persons in the vicinity of the derailment.

The local community did not have an emergency response plan, and the railroad and local emergency response agencies had not previously participated in any planning activity to prepare for an emergency. No one answered a published telephone number for the railroad, which is usually call-forwarded to the railroad agent's residence after the close of business, and the railroad had not published an emergency telephone number. Consequently, the local fire chief did not know how to contact the railroad to obtain information about the ammonium nitrate. The Safety Board's investigation concluded that had the community had an emergency response plan which listed an emergency number for the railroad, the problems experienced by responding personnel in obtaining information about the hazardous materials could have been avoided.

In the cases in which the incident commander followed emergency response plans, the plans contributed to the effectiveness of the emergency response. The benefit of written emergency response plans is illustrated by the accident at Elberton, Georgia.

On August 8, 1988, 61 cars in a freight train derailed near Elberton, Georgia. Five tank cars containing xylene (a flammable liquid) and one containing ferric chloride solution (a corrosive) were damaged and released product. Although no fire resulted from the accident, 25 persons were treated for chemical exposure and 300 persons were evacuated. In addition, the ground water was contaminated.

Emergency response agencies of Elbert County, in which Elberton is located, were notified immediately after the derailment. Within 10 minutes,

⁵ The communities are identified and more detailed discussion is presented in the safety study report (NTSB/SS-91/01).

⁶ In 9 of the 45 cases, personnel responding to the emergency did not use an emergency response plan because either evacuations were not conducted or the emergency was resolved quickly; for example, the leak of hazardous materials from the fitting on a standing tank car, which was quickly stopped.

personnel from the responding fire department made contact with the train's conductor, who supplied the fire department with information about the hazardous materials. The evacuation followed the guidelines of the Elberton-Elbert County Emergency Operations Plan.

The investigation of the accident concluded that the effective and efficient emergency response, which followed the emergency response plan, limited the number of persons who would have been exposed to the potential harmful effects of the product xylene had the product ignited, and also limited the number of injuries resulting from exposure to the xylene.

In at least 19 of the 45 cases (42 percent), the local incident commanders and the railroads had not been in contact before the accidents to plan actions to take in the event of a train accident involving hazardous materials.

Rail carriers transport a variety of hazardous materials that, if released, pose great threats to public safety of the communities along their routes. The ability of community response agencies to respond effectively to a railroad accident involving hazardous materials depends on the adequacy of the information that is available to them. Development of a written emergency response plan is the most efficient means to ensure that the incident commander (whose role it is to coordinate the emergency response) has the information needed to respond effectively, whether the accidents involve a single, standing tank car or many tank cars scattered over a large area and posing multiple hazards. The incident commander should be knowledgeable of the content of the community emergency response plan, which should include up-to-date information on items such as key railroad personnel and means of contact, procedures to identify the hazardous materials being transported, identification of resources for technical assistance that may be needed during the response effort, and procedures for coordination of activities between railroad officials and emergency response agencies after an accident. In addition, rail carriers that routinely transport hazardous materials through communities have a responsibility to provide to the community current information that would enable the community to establish appropriate emergency response procedures to cope with a release of, or fire or explosion involving, hazardous materials.

In a similar manner, the railroad's emergency response plan should document appropriate and up-to-date information from the community, including the identification of the local emergency response personnel for hazardous materials emergencies, sources of specialized equipment (such as foam equipment) within the local area, and resource capabilities of the local emergency response agencies and organizations. However, results of the last official survey on emergency response planning reported by the Federal Emergency Management Agency (FEMA) and conducted by the Federal Railroad Administration (FRA) hazardous materials staff in October 1986 indicate that only 110 of 408 operating railroads responding to the survey have published emergency response plans that address railroad accidents/incidents involving hazardous materials. (About 100 additional railroads did not respond or were not surveyed.) Because most railroads handle at least some hazardous materials, these data suggest that many of the operating railroads that

responded to the survey have not addressed the issue of the safe transport of hazardous materials in published emergency response plans.

It is important for railroad personnel and local emergency response organizations to exercise or "test" the procedures outlined in a documented emergency response plan. A joint, full-scale disaster drill of a simulated emergency could identify any shortcomings in the plan and would better prepare responding personnel for emergencies involving hazardous materials. In at least 26 of the 45 cases (58 percent), the local emergency response coordinators and railroad personnel had not participated in joint disaster drills. The accident in Elm Grove, Wisconsin, illustrates the positive effects of disaster drills.

On August 10, 1988, 24 of 116 cars in a freight train derailed at Elm Grove, Wisconsin. Of the derailed cars, one was a tank car loaded with isobutane (a flammable gas) and two were tank cars loaded with methanol (a flammable liquid); the tank cars did not release their products. Two other tank cars involved in the accident contained hazardous materials residue (sodium hydroxide). Emergency response personnel were immediately notified of the accident. Within 5 minutes after the accident the command post was set up, from which the actions of three fire departments were coordinated. Because of the hazards of the isobutane and methanol, emergency response personnel evacuated 300 persons from the area; the evacuation remained in effect for 30 hours until the tank cars containing hazardous materials were re-railed. Responding personnel followed the community's documented emergency response plan. In addition, railroad and emergency response personnel had participated in joint disaster drills prior to the accident. The Safety Board believes that the results of proper emergency planning, including the conduct of joint disaster drills, facilitated the management of the emergency, demonstrating the value of such planning and testing.

The Association of American Railroads (AAR) also has recognized the need for adequate hazardous materials emergency response plans. In guidelines prepared under contract for the FRA, the AAR cited several problems addressed in Safety Board reports, including (1) the inability of emergency response crews to quickly obtain the description of the cargo from the shipping papers on the train, (2) a lack of sufficient involvement by railroads in the emergency response planning and preparedness of local organizations, and (3) inadequate communication between railroad and public officials at the accident site.⁷ The AAR also urged railroads to coordinate their plans with local organizations so that emergency response personnel of the railroad and the local organizations will be familiar with one another's plans. In addition, the AAR believes that railroads should consider periodic drills to evaluate the emergency response capabilities of the railroads and of the State and local emergency response agencies.

⁷ Association of American Railroads. 1989. Hazardous materials emergency response plan guidance document for railroads. Federal Railroad Administration Contract No. DTFR 53-81C-00238. Washington, DC. 29 p. plus appendixes.

Further, an Inter-Industry Task Force on the Safe Transportation of Hazardous Materials, comprising representatives of the AAR and the Chemical Manufacturers Association, has designated hazardous materials routes as routes on which railroads should focus training and assistance related to community contingency planning.

The continuation of problems related to the lack of coordinated emergency response planning as seen in the accidents investigated by the Safety Board indicates that not all communities and railroads have taken the necessary actions to adequately plan for hazardous materials emergencies in rail yards and along hazardous materials routes. Accordingly, the Board revises the status of Safety Recommendation R-85-53 from "Open--[Various Actions]" to "Closed/Superseded" according to the following categories: (a) to railroads that did not respond to R-85-53, the status is "Closed--Unacceptable Action--No Response Received/Superseded"; and (b) to railroads that responded with positive action, the status is "Closed--Acceptable Action/Superseded." Safety Recommendation R-85-53 is superseded by Safety Recommendations R-91-15 to Class I railroads and two large regional railroads and R-91-17 to the American Short Line Railroad Association (for local and other regional railroads), that urge the railroads to develop, implement, and keep current, in coordination with communities adjacent to railroad yards and along hazardous materials routes, written emergency response plans and procedures for handling releases of hazardous materials. The procedures should address, at a minimum, key railroad personnel and means of contact, procedures to identify the hazardous materials being transported, identification of resources for technical assistance that may be needed during the response effort, procedures for coordination of activities between railroad and emergency response personnel, and the conduct of disaster drills or other appropriate methods to test emergency response plans.

Railroad Employee Training for Hazardous Materials Emergencies

The Safety Board first addressed the need for improved railroad employee training for emergencies in 1976 and has continued to issue safety recommendations about railroad employee training to the FRA and to various railroad carriers whose personnel were involved in hazardous materials accidents.⁸ Some carriers took action to improve the training provided to employees; other carriers did not take action.

The Safety Board remains concerned about the adequacy of hazardous materials training, especially because interviews with crewmembers involved

⁸ Two of the reports that address the issue are the following: (a) National Transportation Safety Board. 1976. Collision of Penn Central Transportation Company operated passenger trains number 132, 944, and 939 near Wilmington, Delaware, October 17, 1975. Railroad Accident Report NTSB-RAR-76-7. Washington, DC. 19 p. (b) National Transportation Safety Board. 1980. Railroad emergency procedures. Special Study NTSB-RSS-80-1. Washington, DC. 16 p.

in 31 of the 45 cases investigated between March 1988 and February 1989 indicate that 16 of 31 conductors and 15 of 31 engineers had not received any hazardous materials training apart from rules examinations.

Discussions between Safety Board staff and personnel of several rail carriers and evidence from the Safety Board's accident investigations, indicate that the type of training currently provided to employees varies substantially among rail carriers and sometimes varies within the same company. Generally, much of the information provided to railroad employees is through the company's operating rules and timetables.⁹ Although the FRA requires that railroads file their operating rules with the agency (49 CFR Part 217), the Federal rule does not identify any specific requirements regarding instruction in hazardous materials safety or procedures.¹⁰ Each railroad carrier, therefore, determines the types of information its employees are to be provided in the rulebook. Training provided by the carrier may include any or all of these elements as a part of the information provided to employees: classroom instruction on operating rules, procedures, and Federal regulations; efficiency checks, tests, and examinations; videotapes; and simulations and drills. Railroads require that employees be given a test on the information, termed a "rules examination." Most railroads offer a review class to help employees prepare for a rules examination; the class is often held the same day as the test to minimize time away from work. The railroad determines the frequency of the rules examination; generally the examination is given annually.

Actions of the traincrew immediately after the February 26, 1989, accident in Akron, Ohio, illustrated that, despite the rail carrier's previous efforts to improve its training program for employees, traincrews needed specific training in addition to that provided in operating rules classes.¹¹ Based on interviews with personnel from several rail carriers,¹²

⁹ Timetables often include safety information about hazardous materials including, but not limited to, placarding, emergency procedures, switching procedures, and other company rules.

¹⁰ The FRA rule requires railroads to have a general program of periodic instruction, operational tests, and inspections. The railroads with more than 40,000 total employee hours are required to report annually a summary of the number, type, and result of each operational test and inspection by operating division and per 10,000 train miles. The rule does not specify any specific hazardous materials program of instruction, operational tests, or inspections.

¹¹ National Transportation Safety Board. 1990. Derailment of a CSX Transportation freight train and fire involving butane, Akron, Ohio, February 26, 1989. Hazardous Materials Accident Report NTSB/HZM-90/02. Washington, DC. 101 p.

¹² The Atchinson, Topeka & Santa Fe Railway Company, Burlington Northern Railroad Company, Conrail, Guilford Transportation Industries, Inc., and SOO Line Railroad Company.

the Safety Board is aware that some rail carriers have recognized a need for additional training and have increased or have plans to increase the level of hazardous materials training provided.

The U.S. Department of Transportation has also recognized a need for additional training. On July 26, 1989, the Research and Special Programs Administration (RSPA) issued HM-126F, Training for Hazardous Materials, as a notice of proposed rulemaking (54 FR 31144-31155). The purpose of the proposed requirements is to reduce the incidence of hazardous materials accidents caused by human error by increasing the awareness of safety considerations through a uniform level of training for persons involved in the transportation of hazardous materials. According to the RSPA staff, a final rule is expected by the end of 1991.

As a result of its accident investigations and its interviews with personnel of several railroads, the Safety Board believes that current employee training, when limited primarily to rules examinations based on classroom instruction, has not adequately prepared railroad employees to handle an accident/incident involving hazardous materials. Railroad employees involved in or responsible for the safe transport of hazardous materials, such as traincrews and first-line supervisors, must not only know the rules, but the employees should also be able to apply the rules in simulated and in actual emergencies. The Safety Board believes that in addition to classroom instruction, railroads that transport hazardous materials should also evaluate the employee's knowledge of emergency procedures and the employee's ability to apply such knowledge in an emergency. Evaluations of employees could be performed during efficiency checks, disaster drills, or simulated emergencies.

Therefore, as a result of the safety study, the National Transportation Safety Board recommends that the American Short Line Railroad Association:

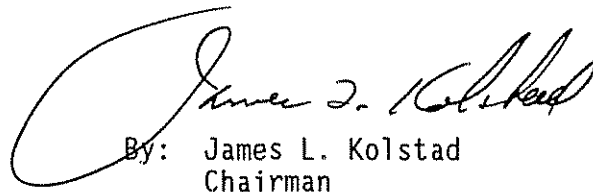
Encourage the regional and local railroads in your membership that transport hazardous materials to develop, implement, and keep current, in coordination with communities adjacent to their railroad yards and along their hazardous materials routes, written emergency response plans and procedures for handling releases of hazardous materials. The procedures should address, at a minimum, key railroad personnel and means of contact, procedures to identify the hazardous materials being transported, identification of resources for technical assistance that may be needed during the response effort, procedures for coordination of activities between railroad and emergency response personnel, and the conduct of disaster drills or other appropriate methods to test emergency response plans. (Class II, Priority Action) (R-91-17) (Supersedes R-85-53)

Encourage the regional and local railroads in your membership that transport hazardous materials to establish, for employees responsible for the safe transport of hazardous materials (such as traincrews and first-line supervisors), methods to evaluate (a) the employee's level of knowledge of emergency procedures, and (b) the employee's ability to apply such knowledge in an actual emergency. Evaluations of employees could be performed during efficiency checks, disaster drills, or simulated emergencies. (Class II, Priority Action) (R-91-18)

Also as a result of the safety study, the Safety Board issued recommendations to the Research and Special Programs and the Federal Railroad Administration of the U.S. Department of Transportation; the Association of American Railroads; Class I railroads and railroad systems; Guilford Transportation, Inc.; MidSouth Rail Corporation; the Chemical Manufacturers Association; the American Petroleum Institute; the National Fire Protection Association; the National League of Cities; the National Association of Counties; the International Association of Fire Chiefs; the International Association of Chiefs of Police; and the National Sheriffs' Association.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "...to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations R-91-17 and -18 in your reply.

KOLSTAD, Chairman, COUGHLIN, Vice Chairman, and LAUBER, BURNETT, and HART, Members, concurred in these recommendations.



By: James L. Kolstad
Chairman