

**NATIONAL TRANSPORTATION SAFETY BOARD**  
**WASHINGTON, D.C.**

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 Forwarded to:

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SAFETY RECOMMENDATION(S)

R-85-121

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At 6:30 a.m., on February 4, 1985, an "empty" placarded railroad tankcar, NATX 9408, containing an estimated 800 gallons of anhydrous hydrogen fluoride (AHF), a corrosive liquid, was found leaking in the Consolidated Rail Corporation's Elkhart, Indiana Receiving Yard. During the following 4 hours as local emergency response agencies worked to contain the spill, a vapor cloud formed and traveled approximately 2 1/2 miles affecting nearby residential areas northwest of the yard. A total of 1,500 people within a 1.1-square-mile area adjacent to and northwest of the yard were evacuated for 9 hours as an emergency precaution. Local area hospitals treated 75 persons for minor skin and eye irritations. <sup>1/</sup>

Even though the Allied Corporation's Metropolis Works (MTW) in Metropolis, Illinois, could not determine if NATX 9408 had been emptied, the tankcar was forwarded as an empty from Metropolis to its final destination, the Allied Amherstburg, Ontario, Canada, plant. Allied had shipped NATX 9408 to MTW where the tankcar was to be unloaded completely and then returned empty to Amherstburg using a preprinted waybill provided by Amherstburg. However, when MTW determined that its unloading instrumentation was inaccurate, MTW decided that the freight weight determination should be made at Amherstburg rather than use an alternative method to verify that NATX 9408 was empty. MTW did not consult or notify anyone as to the effect of the changed procedure for the return shipment.

Ultimately, the responsibility for placarding the tankcar in accordance with the regulations when it left MTW rested with the traffic manager who was aware of the difficulties encountered during the unloading process. This responsibility, however, was delegated to the waybill clerk who, based on the recommendation of the plant shift superintendent, issued the pretyped "empty" waybill without an accurate freight weight determination. The recommendation of the superintendant was based on his opinion that nothing more could be done to determine if the tankcar was unloaded completely.

<sup>1/</sup> For more detailed information, read Hazardous Materials Accident Report— "Anhydrous Hydrogen Fluoride Release from Tankcar NATX 9408, Train No. BNEL3Y at Conrail's Receiving Yard, Elkhart, Indiana, February 4, 1985" (NTSB/HZM-85/03).

The MTW AHF receiving plant has much more limited instrumentation as compared to AHF production facilities at Amherstburg or Geismar, Louisiana. The Canadian and Louisiana AHF production facilities can determine directly with load cell instrumentation the actual amount unloaded without regard to the preexisting liquid level in the storage tanks. The use of load cells is widely accepted. Additionally, the Chemical Manufacturers Association (CMA) safety data sheets refer to load cell instrumentation during AHF unloading. While MTW will continue to use the installed liquid level devices which have given inconsistent and inaccurate readings in the past, MTW has changed its unloading procedure to require a positive displacement or indication from the liquid level device that the storage tank is at an acceptable level to receive product.

The inability of its unloading practices and the instrumentation on the receiving tanks for determining the quantity of material unloaded or the lack of a means for weighing the tankcar did not prevent MTW from returning NATX 9408 or previous shipments as "empties" to Amherstburg. These practices had not been resolved until this accident when Allied's corporate headquarters became aware of this problem and management took steps to prevent a recurrence.

The importance of reliable and accurate waybill information accompanying tankcars transporting hazardous materials being returned as "empty," particularly as it affects the placarding of tankcars, was demonstrated on May 22, 1981, when 39 cars of a Southern Pacific Transportation Company train derailed at Surf, California.<sup>2/</sup> During the derailment, an "empty" DOT 112A400W tankcar, which last contained hydrogen fluoride being shipped by Allied, struck the locomotive of Extra 1507, and a gash about 36 inches long was cut in the side of the tank. Because of the gash, gas from an unknown residual amount of hydrogen fluoride in the tankcar, at approximately 16 psi, escaped and formed a gas cloud. In that accident, the contents of the "empty" hazardous materials tankcar injured 17 persons. The exact quantity of the hydrogen fluoride in the car could not be determined from documents furnished to the railroad. Despite the stenciling of the product name on the car and the "empty" placards, the carrier and others had no way of assessing the danger posed by the "empty" car in the accident without knowledge as to the amount of the product left in the car. As a result of its investigation, the Safety Board issued the following Safety Recommendations to the Materials Transportation Bureau of the Research and Special Programs Administration (RSPA) on October 6, 1981:

R-81-97

Amend 49 CFR 171.8 to define in specific quantities the maximum quantity of a hazardous material that may be moved in a tankcar placarded under 49 CFR 172.525 and offered for transportation by a shipper as an "empty" tankcar under DOT regulations.

R-81-98

Amend 49 CFR 174.25(c) to require that shippers show on shipping papers the approximate weight of a hazardous material contained in a tankcar offered by the shipper to a carrier as an "empty" tankcar for movement under Rule 35 of the Uniform Freight Classification Tariff.

<sup>2/</sup> Railroad Accident Report--"Derailment of Southern Pacific Transportation Company Freight Train Extra 9164 West, Surf, California, May 22, 1981" (NTSB-RAR-81-8).

On July 23, 1981, RSPA published an Advance Notice of Proposed Rulemaking (ANPRM), Docket HM-180, in response to a petition by the International Association of Fire Chiefs (IAFC) requesting that reference to "EMPTY" placards be removed from the regulations because it believed the placards were misleading. On October 20, 1981, the Safety Board commented on the ANPRM reminding RSPA of Safety Recommendations R-81-97 and -98 which were pertinent to the proposed action and advising that the proposed action, by itself, still would not provide information concerning the quantity of material remaining in a tankcar sufficient for emergency response officials to estimate the potential hazards. The Safety Board urged that the EMPTY placard provide a specific, consistent meaning for all persons. Also, the Board advocated that the use of EMPTY placards be limited only to tankcars containing residual quantities and forms of hazardous materials which would pose no reasonable risks during transportation emergencies.

Following its evaluations of comments made to the ANPRM, RSPA published on August 10, 1984, Notice of Proposed Rulemaking (NPRM) Notice 84-6, proposing to require that tankcars containing residual amounts of hazardous materials be placarded the same as loaded tankcars and that the notation "Residual" or "Residue: Last Contained \_\_\_\_\_" followed by the commodity name of the material be entered on the shipping papers for "empties." On November 6, 1984, the Safety Board commented on the NPRM cautioning that the proposal was a less desirable approach than that proposed in Safety Recommendations R-81-97 and -98. The Safety Board agreed that substituting a RESIDUE placard for the EMPTY placard would communicate better the potential hazards posed by "empties" and that the changes proposed for the shipping papers would make them more useful to emergency response personnel. These changes, by requiring railroads to improve the accuracy and availability of information about their train consists would overcome differences they frequently encountered in the past. The Safety Board's response cautioned, however, that the effectiveness of the proposed regulations would depend upon the railroads providing emergency personnel more comprehensive response information than had been provided in the past. Finally, the Safety Board's response emphasized that concerted education and training efforts by public response agencies and the railroads concerning the changes in the placarding of "empties" would be imperative if the improvements in communication of response information were to be realized.

On September 26, 1985 (50 FR 39005), RSPA issued a final rule for the placarding of "empties." In formulating the final rule, RSPA acknowledged the IAFC's and the Safety Board's concerns that "empties" may pose uniquely different hazards than those posed by fully loaded tankcars and that there should be a specific maximum quantity of material allowed to remain in a tankcar when transported as an "empty." The final rule establishes a RESIDUE placard for use on tankcars that have been "emptied." The use of this placard (except for DOT Specifications 106 and 110 tankcars) means that a quantity of material no greater than 3 percent of the car's marked volumetric capacity remains in the tankcar.

The new rule is intended "to improve the hazardous materials communication system" by providing a clear, consistent meaning to placards used on tankcars and thereby prevent emergency response personnel from being misinformed and misled by the use of the EMPTY placard on tankcars. While the new rule is an improvement over previous practice, further improvement is needed to accomplish the stated purpose. First, it is not clear from the wording of the rule, or clarified in the discussion in the preamble of the final rulemaking action, the form of the material (liquid, gas, etc.) intended to be used when applying the rule. Through discussion with RSPA staff, Safety Board investigators learned that the rule is intended to be applied to material in the liquid form. The Safety

Board agrees that such quantity determinations should be based on the liquid form of materials; however, this should be stated explicitly in the rule so as to eliminate the need for interpretation. A second shortcoming in the new rule for accomplishing the stated purposes is the fact that the rule is not applied uniformly to all tankcars: DOT Specifications 106 and 110 tankcars may be placarded RESIDUE without regard to the 3 percent capacity limitation. Although small in size and few in number, these tankcars nevertheless may be involved in derailments or other accidents. When used on tankcars, the RESIDUE placard should convey to emergency response personnel a consistent meaning and should be accompanied by a recommended emergency response procedure contained in the Department of Transportation Emergency Response Guide which addresses the uniquely different hazards posed by RESIDUE placarded tankcars. Furthermore, the Safety Board's search of the docket (HM-180) identified no basis for the different treatment for DOT Specifications 106 and 110 tankcars nor did it identify any response to the docket justifying separate treatment. Until the above noted deficiencies in the final rule are addressed satisfactorily, Safety Recommendations R-81-97 and -98 are being held in an "Open--Acceptable Action" status.

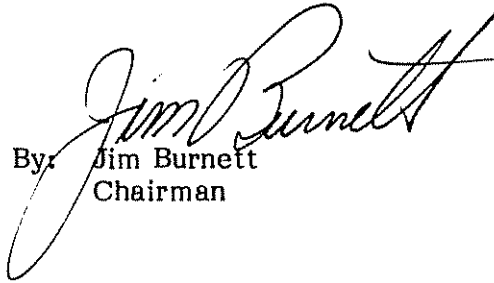
Tankcars that are billed as "empty" are moved free by the railroads. For a tankcar to qualify as an "empty" it must not contain more than 3 percent of its last load. Railroad scales are used for determining freight revenue and since there is no revenue involved in the movement of an "empty" tankcar, railroads do not weigh them. To avoid paying the railroad for moving the "empty" tankcar on the return trip, shippers declare the tankcar to be "empty," even though they may not be able to determine the exact amount of the commodity remaining in the tankcar or they may not fully unload the tank car. The Safety Board has not determined how widespread these practices are, but it encourages the CMA to take action to ensure that all shippers and railroads make an accurate determination of weight before treating a tankcar as "empty." As this accident demonstrated, emergency personnel require accurate data, particularly in regard to the quantity of the commodity involved, so that they can make an accurate assessment of its effects, the duration of the emergency, the extent of downwind travel of the cloud, and other special requirements that may be necessary in neutralizing and disposing of the contaminants. These data must be prepared reliably and accurately by the shipper before the emergency, not during an emergency. As a result of this investigation, the Safety Board believes that Allied should take immediate steps to develop uniform and consistent practices for all of its facilities to require compliance with CFR 49 Part 171.7 as to product freight weight classification determination.

As a result of its investigation of this accident, the National Transportation Safety Board recommends that the Allied Corporation:

Revise hydrogen fluoride unloading procedures at all its facilities to ensure compliance with Federal regulations regarding the amount of commodity remaining in "empty" placarded tankcars. (Class II, Priority Action) (R-85-121)

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 action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation R-85-121 in your reply.

BURNETT, Chairman, GOLDMAN, Vice Chairman, and LAUBER, Member,  
concurred in this recommendation.

  
By: Jim Burnett  
Chairman

