17. Some of the firemen's protective clothing was not adequate to resist the impingement of fire.
18. The fire-fighting forces in this case were not provided with adequate equipment to handle fires of this type and size.
19. The evacuation of the town and the warnings to firemen of the hazard in fighting the fire were given by the Illinois State Police. This warning resulted in substantially lower casualties than otherwise would have occurred.

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V. PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of this accident was the breaking of the L-4 journal of CB&Q 182544, the 20th car, due to excessive overheating, which permitted the truck side to drop to the track and derail the leading wheels of the car. The cause of the overheating could not be determined.

The cause of the initial fire was the puncturing of one tank during the derailment, the jumbling of the derailed cars, and the large volume of propane released which immediately ignited and subjected the other tanks to impingement of fire.

The cause of the explosive rupture of several tanks was localized heating which weakened the steel of the tank so that it could no longer resist the pressure of the propane. Contributing to the explosive rupture were (1) the placement of a number of tank cars together in the train which permitted interaction between cars, (2) the speed of the train which tended to allow jumbling of cars to occur, and (3) the absence of heat insulation of the cars which was formerly required.

The injury to the firemen and spectators was due to the lack of appreciation by firemen of the large scope of fire and explosion which could occur in a fire of this type.

VI. RECOMMENDATIONS

The National Transportation Safety Board recommends that:

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1. The Federal Railroad Administration conclude the proposed rulemaking regarding the transportation of liquefied flammable gases in tank cars of DOT Specifications 112A and 114A having capacities exceeding 25,000 gallons. This rulemaking was initiated with the Hazardous Materials Regulations Board's "Request for Public Advice on Speed Restriction on Tank Cars," Docket No. HM-60, published in the Federal Register on October 15, 1970.

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2. The Association of American Railroads and the Federal Railroad Administration encourage the expeditious completion of the testing of insulating materials for the coating of the outside of tanks, and, if a satisfactory material is found, require its use on all tank cars transporting flammable liquids (liquefied flammable gases).

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3. The Federal Railroad Administration encourage the expeditious completion of the RPI-AAR Railroad Tank Car Safety Research and Test Project and take steps to insure that the results of the research are applied to enhance the safety of transportation of hazardous materials.

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4. The Federal Railroad Administration promptly publish their current study of the failure of freight car journals, and if necessary, continue such studies so that regulations can be promulgated to establish standards for freight car journals and their maintenance.
5. All railroads which proposed action in response to the July 7, 1970, letter of the Chairman of the National Transportation Safety Board advise the Federal Railroad Administration of the action taken by them and that these railroads and all others who transport liquefied flammable gas in DOT Specification 112A and 114A tank cars

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having capacities exceeding 2,500 gallons, as a minimum precaution, initiate such additional action for full compliance with the recommendations of the General Committee, Operating Transportation Division, Association of American Railroads, made in response to the above letter.

The Safety Board reiterates and emphasizes the following recommendations made in previous accident reports:

Railroad Accident Report, Pennsylvania Railroad Company Dunreith, Indiana, January 1, 1968:

> 8. The Board recommends that the Department of Transportation study means of improving the training methods available to local fire departments so that they can upgrade their skills in their handling of emergencies created by the increasing transportation of hazardous materials. The problems of controlling such accidents are especially troublesome because of the daily introduction into commerce of numerous new kinds of hazardous materials. The Board believes that local emergency organizations cannot be expected to be conversant with necessary procedures to handle situations involving the many possible emergencies involving the transportation of hazardous materials unless some form of assistance in training is provided such as a model type training course. R-69-12 & R-69-21

Railroad Accident Report, Southern Railway Company, Laurel, Mississippi, January 25, 1969:

> 5. The Safety Board recommends that the Association of American Railroads and the American Short Line Railroad Association develop plans that will result in the fire chief of each community through which the track of a member road passes knowing where immediate information can be obtained, describing the location and characteristics of all hazardous materials in any train involved in a train accident that affects a community. This recommendation can be accomplished in a relatively short time regardless of the level of training which may be achieved later by fire departments. R-69-22

BY THE NATIONAL TRANSPORTATION SAFETY BOARD:

/s/JOHN H. REED
Chairman

/s/OSCAR M. LAUREL
Member

/s/FRANCIS H. McADAMS
Member

/s/LOUIS M. THAYER
Member

/s/ISABEL A. BURGESS
Member

March 29, 1972