

RAILROAD ACCIDENT INVESTIGATION

Ex Parte No 213

ILLINOIS CENTRAL RAILROAD COMPANY

MT PULASKI, ILL

JUNE 1, 1958

INTERSTATE COMMERCE COMMISSION

Washington

INTERSTATE COMMERCE COMMISSION

Ex Parte No. 213

ACCIDENT NEAR MT. PULASKI, ILL.

Decided October 16, 1958

Accident at Mt. Pulaski, Ill., on June 1, 1958, caused by the explosion of a tank car loaded with nitromethane.

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Clarence W. Greenwald for City of Niagara Falls, N. Y.

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T. B. Hart for the Order of Railway Conductors and Firemen

Clyde Thompson for the Brotherhood of Railroad Trainmen

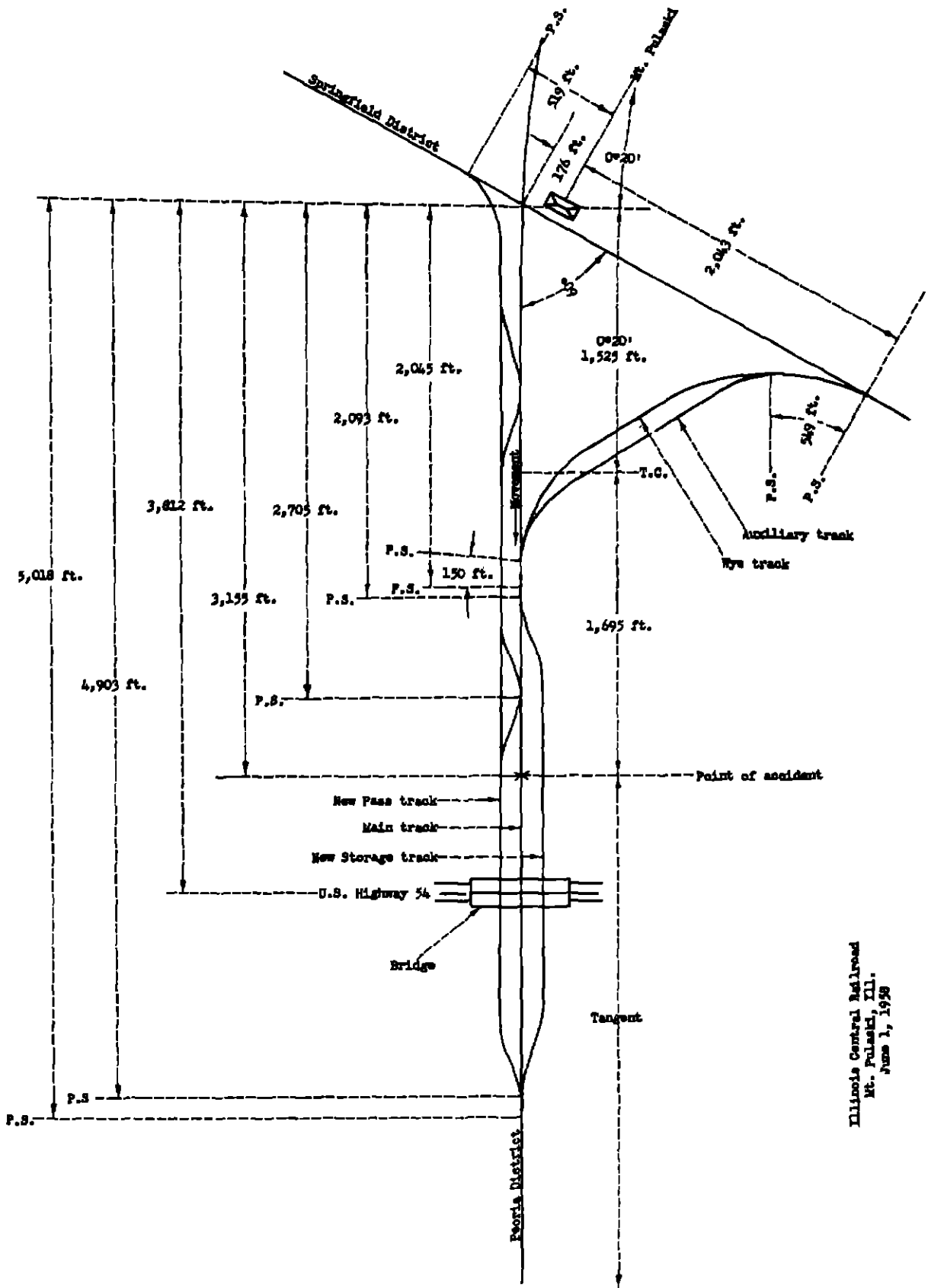
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REPORT OF THE COMMISSION

DIVISION 3, COMMISSIONERS TUGGLE, MURPHY, AND McPHERSON

TUGGLE, Commissioner

This is an investigation by the Commission on its own motion with respect to the facts, conditions and circumstances connected with an accident which occurred on the Illinois Central Railroad at Mt. Pulaski, Ill., on June 1, 1958. Hearings were had at Springfield, Ill., on August 20, 1958. The accident resulted in the death of 2 train service employees, and the injury of 4 train service employees.



Illinois Central Railroad
 Mt. Pleasant, Ill.
 June 1, 1938

Location of Accident and Method of Operation

This accident occurred on that part of the Springfield Division designated as the Peoria District and extending between Mattoon and I C Junction, Ill., 110.0 miles. This is a single-track line over which trains are operated by timetable, train orders, and an automatic block-signal system. At Mt. Pulaski, Ill., 63.8 miles north of Mattoon, a single-track line of the Springfield District crosses the main track at grade at an angle of 60°. Geographic directions are approximately east and west on the Peoria District, and north and south on the Springfield District. Timetable directions are north and south on both districts. Timetable directions on the Peoria District, except as indicated, are used in this report. The station at Mt. Pulaski is located in the north-east angle of the crossing at a point 176 feet east of the crossing. A wye track diverges to the east from the main track. The switch of this track, which is facing-point for northbound movements, is located 2,045 feet south of the station. This track connects with the main track of the Springfield District at a point 2,043 feet east of the station. An auxiliary track parallels the wye track on the south. The west switch of this track is located 150 feet north of the west wye-track switch, and the east switch is located 549 feet west of the east wye-track switch. An auxiliary track, designated as the New Storage Track, parallels the main track on the east. The north and south switches of this track, connecting the track with the main track, are located, respectively, 2,093 feet and 4,903 feet south of the station. An auxiliary track, designated as the New Pass Track, parallels the main track on the west. The south switch of this track, connecting the track with the main track, is located 5,018 feet south of the station. This track diverges to the west in the vicinity of the crossing and connects with the Springfield District main track at a point 519 feet west of the station. Four crossovers connect the main track with the New Pass Track. The north switch of the most southerly crossover, which is facing-point for southbound movements on the main track, is located 2,705 feet south of the station. U. S. Highway 54 spans the railroad on a steel and concrete bridge. The centerline of the bridge is located 3,812 feet south of the station. The accident occurred within yard limits on the main track at a point 3,155 feet south of the station. From the south on the main track there are, in succession, a tangent throughout a considerable distance to the point of accident and 1,695 feet northward, and a 0°20' curve to the right 1,525 feet to the crossing and a considerable distance northward. The grade is level at the point of accident.

The maximum authorized speed for the type of freight trains involved in this accident was 35 miles per hour on the Peoria District and 50 miles per hour on the Springfield District.

Description of Accident

No. 292, a northbound second-class freight train, departed from Mattoon at 9:05 a. m., 3 hours 5 minutes late. Switching operations were performed en route. When the train arrived at Mt. Pulaski at 1:05 p. m., 3 hours 15 minutes late, it consisted of road-switcher type diesel-electric units 9198 and 9136, coupled in multiple-unit control, 31 cars, and a caboose. Switching operations were performed at Mt. Pulaski by the members of the crew before the arrival of No. 68.

No. 68, a northbound second-class freight train by timetable directions on the Springfield District, departed from East St. Louis, 121.5 miles south of Mt. Pulaski, at 9:00 a. m., 3 hours late. Switching operations were performed en route. When the train arrived at Mt. Pulaski at 2:35 p. m., 4 hours late, it consisted of road-switcher type diesel-electric units 9174 and 9019, coupled in multiple-unit control, 78 cars, and a caboose. GATX 29633, a tank car, was the 36th car in the train. The 1st to the 36th cars, inclusive, were detached from the train and moved over the wye-track auxiliary track and main track to the New Storage Track. The locomotive was then detached from these cars and, after further switching operations were performed, was moved with a cut of cars to the Springfield District main track.

Shortly before the accident occurred, the 26th to the 31st cars, inclusive, and the caboose of No. 292 were standing on the main track with the north end of the cut 810 feet south of the point of accident. A cut

of 4 cars was standing on the main track a short distance north of the highway bridge. A cut of approximately 17 cars was standing on the New Pass Track with the north end approximately 100 feet north of the point of accident. The locomotive of No. 292 with the 1st diesel-electric unit headed northward and with 9 cars coupled to the south end moved southward on the main track and entered the New Storage Track at the north switch. This movement was coupled to the 36 cars placed on that track by the crew of No. 68. The locomotive and the cut of cars then entered the main track and proceeded southward. The movement was stopped when the 6th car from the south end of the cut cleared the north switch of the most southerly crossover. These 6 cars, with car GATX 29633 at the south end, were detached and the movement returned to the New Storage Track. Twenty-one cars were then detached from the movement. The north end of this cut was located approximately 270 feet north of the point of accident. The movement proceeded northward and 9 cars were detached with the north end of the cut 770 feet north of the point of accident. The movement, then consisting of the locomotive and 9 cars, entered the main track and proceeded southward. It was stopped when the locomotive was approximately 1,300 feet north of the point of accident. Immediately afterward car GATX 29633 exploded.

The explosion blasted a crater approximately 100 feet in diameter and 36 feet deep. The track structure in the immediate vicinity of the crater was destroyed. Cars standing on the main track, the New Storage Track, and the New Pass Track were plow from the tracks. Two cars stopped in the vicinity of the highway bridge and east of the tracks. Another car stopped approximately 300 feet south of the point of accident and 250 feet east of the tracks. The other derailed cars stopped within a radius of 250 feet of the point of accident. GATX 29633 and 17 other cars were destroyed. Twelve cars were heavily damaged by the explosion and some of these cars were further damaged by fire resulting from the explosion. Six other cars were somewhat damaged. The explosion scattered fragments of wreckage over a wide area. Considerable damage was caused to buildings in Mt. Pulaski by the fragments and by concussion. The highway bridge was damaged slightly.

The conductor and the swing brakeman of the crew of No. 292 were killed, and the engineer, the fireman, the front brakeman, and the flagman were injured.

It was raining at the time of the accident, which occurred about 3:10 p. m.

The shell of the tank of GATX 29633 consisted of 3 sections of steel plate 31 feet 1/4 inch in length over caulking edges secured together by double-riveted lap joints. The 2 top sections and the bottom section were, respectively, 3/8 inch and 1/2 inch thick. The inside diameter of the shell was 7 feet 3-1/2 inches. The concave steel heads were 1/2 inch thick and were secured to the shell by double-riveted lap joints. The dome shell consisted of 2 sections of steel plate 3/8 inch thick secured together by double-riveted lap joints. It extended 1 foot 9 inches above the top of the tank shell and was secured to the tank shell by a double row of rivets. The inside diameter of the dome shell was 5 feet 1 1/2 inches. The head of the dome was secured to the dome shell by a single row of rivets. It was provided with a 1-foot 4-7/8-inch diameter opening with cover, and 2 safety valves set to open at a pressure of 25 pounds per square inch. All rivets were 3/4 inch in diameter. The tank was not lined and was not provided with heater pipes. The specified capacity of the tank was 10,000 gallons.

Discussion

As the locomotive of No. 292 with 9 cars coupled to the south end was moving southward on the main track approaching the point where the accident occurred, the enginemen were in their respective locations in the control compartment of the diesel-electric unit at the north end of the movement. The conductor and the swing brakeman were between the main track and the New Storage Track in the vicinity of the cut of cars

containing car GATX 29633. The front brakeman and the flagman were standing between the main track and the New Storage Track at locations, respectively, approximately 750 feet and 400 feet north of the point of accident. The switches of the most southerly crossover were lined for movement from the main track to the New Pass Track. The engineer said that the first he became aware of anything being wrong was when he observed a white vapor apparently being emitted from one of the cars of the cut containing car GATX 29633. He immediately initiated a brake application. The movement stopped with the south end approximately 800 feet north of the north end of the cut of cars. The explosion occurred shortly after the movement stopped. The first the other surviving members of the crew knew of anything being wrong was when the explosion occurred.

Car GATX 29633 was loaded with approximately 10,000 gallons of nitromethane on May 28, 1958, at the Commercial Solvents Corporation plant at Sterlington, La., on the Missouri Pacific Railroad, and was delivered to the Alton and Southern Railroad at East St. Louis. The car was destined to Peoria, Ill., via the Alton and Southern and the Illinois Central Railroads. It was delivered in interchange by the Alton and Southern to the Illinois Central at East St. Louis on May 31, 1958. It was assembled in No. 68 during the morning of the day of the accident.

Nitromethane is one of a group of four solvents designated as nitroparaffins. During 1952 tests of nitromethane were performed by members of the staff of the Bureau of Explosives of the Association of American Railroads, who act as advisors to this Commission regarding explosives and other dangerous articles. It was found that the material did not come within the definitions of a dangerous article as defined in the Code of Federal Regulations (49 CFR 71.1). Consequently, at the time the accident occurred shipment of the material was not regulated by the Commission. A similar explosion involving a tank car loaded with nitromethane occurred at Niagra Falls, N. Y., on January 22, 1958. Shortly after that accident, a series of tests of nitromethane were initiated by members of the staff of the Bureau of Explosives and these tests are still in progress. The Chief Chemist of the Bureau of Explosives testified at the hearing that they were unable to detonate nitromethane by impact. He further testified that certain contaminants could cause the material to become an extremely sensitive explosive.

Since car GATX 29633 and its lading were destroyed by the explosion, the cause of the explosion could not be determined. The car was standing and a coupling was not being made to either end of the cut of cars containing the car when the explosion occurred. Records indicate that the car was last loaded with 2-nitropropane before being loaded with the lading involved in the accident. The Chief Chemist testified that 2-nitropropane would act as an inhibitor and tend to prevent the explosion of nitromethane. An official of the United States Department of Commerce Weather Bureau witnessed the explosion. He said in a statement that he did not hear thunder or observe lightning at any time during the afternoon of the day of the accident.

Although tests of nitromethane performed to date by the Bureau of Explosives indicate that the material does not come within the definitions of a dangerous article, it is evident that under certain conditions, unknown at the present time, when shipped in tank cars nitromethane can become a dangerous explosive. In view of this, on June 4, 1958, the Car Service Division of the Association of American Railroads, upon the Commission's request, issued an embargo on all tank car shipments of nitromethane. As a further safety measure, an order of the Commission entered on September 10, 1958, prohibits the bulk transportation of nitromethane in railroad tank cars and in tank motor vehicles when transported by common, contract, or private carriers by motor vehicles.

We find that

1. The cause of the accident was the explosion of a tank car loaded with nitromethane.
2. The cause of the explosion could not be determined from the facts developed in this investigation.
3. Under certain conditions nitromethane can become a dangerous explosive.

In view of these findings we recommend that the Bureau of Explosives of the Association of American Railroads continue the investigation of the properties of nitromethane in order that adequate regulations can be formulated for the classification and preparation for transportation of other than bulk shipments of the material in tank cars and in tank motor vehicles when transported by common contract, or private carriers by motor vehicles.

By the Commission, Division 3

HAROLD D. MCCOY,

Secretary.

(SEAL)

