INV. 289
September 14, 1915.

RE: INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE CHESAPEAKE & OHIO RAILWAY NEAR ALTMAN, W. VA., ON AUGUST 17, 1915.

On August 17, 1915, there was a derailment of a passenger train on the Chesapeake & Ohio Railway near Altman, W. Va., which resulted in the death of 4 passengers and the injury of 9 passengers. After investigation the Chief of the Division of Safety reports as follows:

Eastbound passenger train No. 214 consisted of locomotive 71, 1 express car, 1 mail and baggage car, 1 smoking car, and 2 day coaches, in charge of Conductor Halstead and Engineman Wentz. This train left St. Albans, W. Va., at 8:10 a.m. en route to Sovereign, W. Va., left McCorkle, W. Va., the last open telegraph station before reaching the point of derailment, at 9:43 a.m., and was derailed in Pinnacle tunnel, 3.3 miles east of McCorkle and 1.2 miles west of Altman, at 9:53 a.m., while running at a speed estimated to have been about 20 miles per hour.

The train came to a stop with the locomotive, express car and mail and baggage car outside the east portal of the tunnel with the rear trucks of the express car and both trucks of the mail and baggage car derailed, but standing in an upright position. The remaining portion of the train was in the tunnel with both trucks of the smoking car and the forward trucks of the adjoining car derailed. The smoking

car left the track to the north, came in contact with the upright tunnel timbers, and displaced eight posts and five circles, allowing the top timbers, lagging and loose rocks and earth to fall, which crushed in the roof of the smoking car and filled the car about one-half its length from the forward end. All of the killed and injured were in this car.

The division on which this accident occurred is a single-track line, operated by train orders and time-table rights, with a manual block system in use during the hours the operators are on duty. The track is laid with 75-pound steel rails, 30 feet in length, with 18 oak ties under each rail, single spiked without tie plates or rail braces, and laid on about 12 inches of crushed sandstone ballast, all of which was in fairly good condition. Approaching the point of derailment from the west there is a curve to the left of about 5 degrees, then about 300 feet of tangent and then an 8 degree curve to the right about one-quarter of a mile long and extending through Pinnacle tunnel. The track is on an ascending grade of about 1 per cent for eastbound trains.

Pinnacle tunnel is 307 feet long, 17 feet 5 inches wide, and 17 feet 10 inches high, cut through sandstone. About 182 feet of the western portion of this tunnel is supported by upright wooden posts and circles spaced four feet apart; the posts and circles are 10" x 10", in good condition, and the roof is properly supported by wooden lagging. The.

train had proceeded around this 6° curve for a distance of about 300 feet when it was derailed at a point about 95 feet east of the west portal of the tunnel. The weather at the time was clear.

A careful inspection of the track disclosed a broken rail on the north side of the track about 95 feet east of the west portal of the tunnel. It was a 75-pound A.S.C.E. Bessemer Steel rail, heat No. 13843, Carnegie E. T. December 1899. At a point 7 feet 6 inches from the receiving end the ball was broken off on the gauge side for a distance of 5 feet 9 inches, and on the outside 4 feet 4 inches; there was an old crack between the ball and the base of the rail for a part of this distance. That portion of the ball which was broken off was broken in seven pieces. Inspection of the broken rail disclosed it to be defective in having a piped web. The pipe extended vertically and almost entirely through the head of the rail, through the fracture, and for at least 21 inches each way from the fractured ends of the head. A flange mark was found on the ball of the rail, extending from point of fracture diagonally across the rail a distance of 4 feet 6 inches to the point where the wheel dropped on the outside. The rail also shows that it was broken at a point 9 feet 6 inches from the receiving end, with an incomplete fracture extending downward through the web on each side of complete fracture, which was said to have been caused by handling the rail after its removal from

the track. The broken rail was a relaid rail and was placed in this track in 1907.

Engineman Wentz of train No. 214 stated that in passing through the tunnel his train had proceeded but a short distance when he felt the engine give a little jar or jerk, and thinking it was caused by a broken rail he immediately applied the air brakes. Upon looking back he saw that the baggage car was derailed and when his train came to a stop he went back to find out what the trouble was. He then cut the engine off from the remainder of the train and went to Altman and notified the dispatcher of the wreck. At the time he felt the engine jerk he was not working steam but thought the speed of his train was about 20 miles per hour. Upon returning from Altman he examined the track where the wreck occurred and found that the rail on the left hand side of the track going east was broken; that the ball was broken near the center of the rail in two pieces. Upon examining the rail he found that the break in the ball and web was an old break but it did not extend entirely through the rail; near the surface the fracture was a fresh one. He stated that he came through this tunnel on his westbound trip at 5:59 a.m. on the day of the accident and did not notice anything wrong with the track.

Fireman Turner of train No. 214 stated that he was sitting on the fireman's seat when he felt a little jar

and heard the air brakes being applied. Upon looking back he saw the first car bumping up and down and knew that it was derailed. He thought the speed of his train was about 18 or 20 miles per hour.

Conductor Halstead of train No. 214 stated that he was collecting fares at the time and had no intimation of the accident until he felt the air brakes being applied, followed almost immediately by a crash. After the accident he examined the wreck and found that the rear trucks of the express car, both trucks of the baggage car, both trucks of the smoking car, and the front trucks of the coach immediately behind the smoking car were derailed, while the rear coach remained on the tracks. The smoking car was standing upright with about two-thirds of the forward portion of its roof crushed in and filled with stone, dirt and timbers. When the train came to a stop the locomotive and the two forward cars had broken loose and came to a stop 60 or 70 feet in front of the remainder of the train. Upon examining the track he found a broken rail on the left hand or north side of the track.

Section Foreman Walker, in charge of the track in Pinnacle tunnel, stated that he examined the track in this tunnel on August 13, 1915, four days before the accident, and it appeared to be in good condition. He stated that no regular track walker was employed to go over this section of track, but occasionally in bad weather one of the sectionmen was used for that purpose. He further stated that the track in this

section was inspected about twice a week. After the accident he examined the track and found a rail which was broken partially in two. In taking it out of the track it broke completely in two.

Supervisor of Track Owen stated that he examined the broken rail after the accident and found an old crack under the ball of the rail about four or five feet in length, and that the crack was in such a position that it could not have been detected by ordinary inspection. He stated that this rail was laid in the track in 1907 and was not a new rail when laid. He said that no regular track walker was employed and he did not think one was necessary. He further stated that the foreman of this section of track was allowed seven men which he thought was sufficient for the 11 miles of track in this section.

Division Engineer Botts stated that he arrived at the scene of the accident on the afternoon of the day of the derailment and that he found the rail on the outside of the curve, approximately 95 feet east of the west portal of the tunnel, had broken. He found that the rail had entirely broken in two 9 feet 9 inches from the receiving end, and on the gauge side of the rail there was 5 feet 9 inches of the ball broken off and on the outside of the rail 3 feet 7 inches. These breaks were all new except that there seemed to be a piped head to the rail which extended from the top of the web part of the way up through the head of the rail. The first wheel marks on the ties were about 5 feet beyond the point where the rail broke in two, and these marks continued on the -

ties for a distance of about 300 feet. The roof of the tunnel caved in at a point about 45 feet from the broken rail.

Trainmaster McLaughlin stated that he examined the track and it was his opinion that the rail broke as the rear wheels of the locomotive were passing over it, that the front trucks of the express car passed over it before the broken piece became displaced, and that the rear trucks of the express car were the first to be derailed.

This accident was caused by a broken rail, its failure being due to an internal defect known as piping, which weakened the rail to such an extent that in all probability it broke when locomotive 71 passed over it. The presence of such piping in the finished rail can be attributed to the condition of the metal in the ingot. It is an internal defective condition of such a nature that it cannot be discovered by ordinary inspection.

The train was derailed while moving at very moderate speed, and the large number of fatalities was caused by the falling rocks and timbers of the tunnel crushing in the end of the car in which the passengers were riding. The crushed car was an open platform car of wooden construction, built in 1883, and was turned out of the repair shop at Huntington, W. Va., on August 7, 1915. It was sound and of good construction for the branch line class of service in which it was used.