IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE CHESAPEAKE & OHIO RAILROAD AT XN CABIN, NEAR PRINCE, W.VA., APRIL 26, 1919.

June 12, 1919.

On April 26, 1919, there was a derailment of a deadhead equipment train on the Chesapeake & Ohio Railroad at XN Cabin, near Prince, W. Va., which resulted in the death of two employees. After investigation of this accident the Chief of the Bureau of Safety submits the following report.

The accident occurred on the Hinton Division, which is a double-track line with the exception of two short single-track sections through tunnels, one of these sections being between XN Cabin and Prince, a distance of .9 mile. Trains are handled by time table and train orders supplemented by an automatic block signal system, the normal indication of which is stop. The color indications are red, green and white. Operation over the section of single track through the tunnel is governed by the electric train staff system. The proper sequence of movements in operating the staff mechanism is as follows: When the indicator announces the approach of an east-bound train, the operator at XN Cabin asks the operator at Prince for the block. If the block is clear, the operator at Prince pushes a button which releases the staff in the machine at XN Cabin. This staff is then removed by the operator and placed in the staff and lever lock box in front of the lever operating machine, thus unlocking the operating levers. The operator then reverses the levers, setting the switches and derail for an eastbound movement, the normal position being westbound. The staff is then taken out of the lever locking machine, placed in a holder and the holder placed in the staff crane on the opposite side of the track. The operator then returns to the cabin and pulls the lever for the home and distant signals. As the train passes the staff crane, the engineman catches the staff and carries it to the other end of the block at Prince and throws it off to the operator who places it in the staff machine at that point, thus completing the movement of the train.

The derailment occurred at a derail at the end of double track at XN Cabin. Approaching this point from the west there are several curves to the right and left followed by 405 feet of tangent, a curve to the right of 2 degrees and 22 minutes about 700 feet in length, another curve to the right of 37 minutes nearly 1400 feet in length, and a curve to the right of 3 degrees 7 minutes about 625 feet in length, near the middle of which the accident occurred. The grade is about one-half of one percent ascending. Approaching the end of the double track from the west, the distant signal is encountered

at a distance of 2889 feet from the end of double track, then come the home signal and the dwarf signal, 424 feet from the end of double track, with the derail 63 feet beyond the home signal. XN Cabin is on the left side of the right of way 62 feet beyond the end of the double track. Directly opposite the cabin on the right side of the track is the staff crane from which the enginemen of eastbound trains obtain the train staffs, while on the left side is a staff holder pit into which the staff holders are thrown from trains going in the opposite direction. This pit is illuminated at night by a large white light with a reflector, which, at the time of the accident, faced eastbound trains. The weather was cloudy.

Extra 156 consisted of 12 tourist sleeping cars hauled by engine 156, and was in charge of Conductor Smith and Engineman Reynolds, and was en route from Huntington, W. Va., to Newport News, Va. It left Huntington at 1.40 a.m., passed CS Cabin, the last open telegraph office, at 5.31 a.m., and at about 5.43 a.m. ran off the derail at the end of the double track at XN Cabin, 8.7 miles from CS Cabin, while travelling at a speed estimated to have been about 20 miles an hour.

The engine and tender went down the 45-foot embankment on the right side of the track and were badly damaged. The first car also went down the embankment and was considerably damaged. The forward trucks of the second car were derailed, but the car was only very slightly damaged.

Operator Sampson, on duty at XN Cabin at the time of the accident, stated that after extra 156 was reported to him from CS Cabin, he tried to ask the dispatcher about letting the train through the tunnel ahead of a westbound extra, but the dispatcher was busy, and when he noticed extra 156 approaching, he made an effort to let it go without stopping it, unlocking the switches and then taking the staff across the track to the crane without setting the switches. He saw that by this time the train was close to the home signal and hurried up the stairs of the cabin in order to line up the switches and set the signals to govern the movement, but by this time the train was on the detector bar and he was unable to throw the switches. He said he had never been instructed in the operation of the signals, but had handled them in this manner about one-fourth of the time, afterwards saying that he only did this when he wanted to save time. Operator Sampson did not know anything about the signal lamps, but the dispatcher at Hinton said the engineman of train No. 4 told him the lights were out on the home and dwarf signals, and he in turn told Conductor Smith and the section foreman. They then went out and later on the conductor came in and said the home signal was burning, but that the light on the dwarf signal was out. He also stated that the last he heard of engine 156 it was working steam. He did not hear the engineman sound

the whistle.

Conductor Smith stated that Engineman Reynolds seemed to be in good physical condition before leaving Huntington, and handled the train well except at Gauley, which is at the end of double track prior to running over a single-track section through the tunnel between Gauley and Cotton Hill, 30 miles from XN Cabin. At that point the engineman applied the emergency brakes, but called in the flagman before he could ascertain the reason for the stop, and he was unable to say what the trouble had been unless the emergency application was necessary in order to avoid passing the signals, as a westbound passenger train was passing from single to double track at the time. As the train approached the distant signal at XN Cabin the whistle was sounded and he felt the brakes being applied, the speed being reduced from 30 miles an hour to about 18 or 20 miles an hour, which was its speed at the time of derailment. He did not hear the whistle sounded a second time. He did not observe the signals until about an hour after the accident, when the operator asked him if the home signal lamp was burning. He then went to the signal pole in company with the section foreman, but from the ground could not tell whether or not the lamp was burning. At about 8.30 a.m. the lamp was taken from the pole by the track walker and he then saw that it was burning. The lamp at the derail was out. Conductor Smith thought the accident was due to the absence of the derail signal and the bright light at the sand box, coupled with the engine being close enough to enable the engineman to see the operator place the staff in the crane, leading him to believe that the operator would clear the signal as soon as he returned to the tower, but on account of the operator having failed to handle the staff mechanism properly, the switches were still against the approaching train, resulting in the engine going through the derail without the operator having an opportunity of throwing the switches.

Head Brakeman Brightwell, who was riding in about the middle of the train, estimated the speed to have been about 40 miles an hour. He did not know whether or not the speed was reduced approaching the home signal at XN Cabin, but thought the train was drifting. Previously he had heard the whistle sounded west of the distant signal. He did not observe any of the signal indications or lights until about 40 minutes after the occurrence of the accident, and did not know whether or not they were burning.

Flagman Clark, who was riding in the same car with Brakeman Brightwell, estimated the speed to have been about 35 or 40 miles an hour, and said that he thought it was reduced to 15 or 20 miles an hour at the time of derailment.

He did not notice the condition of the signals.

R. B. Gwinn, a clerk employed by the railroad at Quinnimont, the next station beyond Prince, was on his way to work when extra 156 passed him, traveling at a speed of 40 or 45 miles an hour. He followed the train on his track velocipede and heard the engineman sound one long blast on the whistle when apparently about 30 car lengths from the distant signal, followed shortly after by two short blasts. On account of the fact that he has to obtain a staff at XN Cabin in order to go through the tunnel, he was observing the signals closely and stated that the distant signal was in the normal or caution position with no light on it, while the home signal was red but burning very dimly. He did not notice the light on the derail.

Master Mechanic Robertson stated that on examining engine 156 he found the throttle to be open and the reverse lever near the center of the quadrant. The brake valve was broken, so that nothing could be told as to its position previous to the derailment. There was no indication of any condition of the engine which could have taken the attention of the engineman away from his observance of the signals.

On August 31, 1916, the tower at Prince was destroyed by fire, and since that time the switches and signals at that point have been operated by hand. From September 5, 1916, to January 10, 1917, train movements through this tunnel were handled by train orders, operation by the staff system being resumed at the later date. On account of the switches at Prince still being operated by hand, the distant signal governing eastbound movements at XN Cabin was maintained in an inoperative condition, displaying the normal or caution indication, the idea being that in this manner all trains would be sure to approach XN Cabin under full control. The lamp in this signal was not burning at the time of the accident and there is a question as to the condition of the lamps at the home and dwarf signals at XN Cabin. There was a light in the tower, on the second floor, which could be seen by eastbound trains, and a question also arises as to whether or not the combination of the white lights in the tower and on the ground at the staff holder pit was not mistaken by Engineman Reynolds for clear signal indications at the home and dwarf signals, his error being due to the fact that these signal lamps either were extinguished or burning dimly.

Engineman Edwards, of eastbound extra 459, which passed XN Cabin at 3.30 a.m., stated that he attached a message to the staff holder, reporting the home and distant signal lamps at XN Cabin as being extinguished, leaving this message at

Prince. The operator at that point, however, did not receive it. Engineman Hamilton, of eastbound passenger train No. 4, due to pass XN Cabin at 5.10 a.m., also stated that the lamps on the home and distant signals were extinguished, while Fireman Withrow of the same train stated that the dwarf signal was burning, but that he did not see the home signal. In all, statements in regard to the matter were obtained from seven enginemen and five firemen. Nine said the home signal was out, while the engine crew of one train said it was burning very dimly. With regard to the dwarf signal, some said it was burning brightly, others merely said it was burning while two said it was out. Some also said the distant signal was burning.

Colored Trackwalker Jackson stated that he put the signal lamp on the home signal at about 4 p.m. on the afternoon preceding the accident, and that it was burning when he took it down at 8.20 a.m., shortly after the accident. Section Foreman Furry, as well as Conductor Smith, confirmed the trackwalker's statement about the lamp burning when it was taken from the pole after the accident. The section foreman also said that the dwarf signal at the derail had been struck and bent by some part of the derailed train and was not burning at the time he examined it. Both the section foreman and the trackwalker said that there had been no lamp on the distant signal since last fall, the section foreman having ordered the trackwalker to take it down, inasmuch as the signal was not in use. They also stated that no lamp had been furnished by Signal Maintainer Crowder within two preceding weeks and that there had not been any lamp in the distant signal within that time.

Division Engineer King said he knew the distant signal was inoperative but did not know the signal light was not burning, and there was nothing in the report of the signal supervisor of March 5, 1919, to show that the light was not burning at the time he made his inspection. Signal Supervisor Peterson said the distant signal was inoperative and that he had discussed the matter with former Division Engineer Walters and was advised by him to keep it in that condition as long as the switches at Prince were hand-thrown. He said that Signal Maintainer Crowder had spoken to him about the section foreman wanting to remove the lamp on account of the signal being inoperative, and he told the maintainer that the lamp was not to be removed under any condition. His report of March 5 covering the inspection of the signals did not indicate the absence of a lamp at the distant signal, and he said he felt the section foreman must have been incorrect in his statement about having removed it, saying that he was positive he had seen the lamp at Prince since that time.

Signal Maintainer Crowder said that the home signal lamp was burning when he reached the scene of the accident at about 8.30 a.m. He did not notice the lamp at the dwarf signal and said that there was no lamp on the distant signal. He claimed to have furnished a lamp for the distant signal and to have hung it on the signal pole a few days prior to the date of the accident. He also said that he had seen it burning as recently as April 22 as well as on two other occasions when he had had work to do at XN Cabin.

The evidence indicates that an undesirable condition existed at XN Cabin with regard to the arrangement of the various lights whereby an engineman not absolutely familiar with the territory might mistake the combination of the light in the tower and the light at the staff holder pit for clear signal indications at the home and dwarf signals, respectively, particularly in view of the fact that the lamps on these two signals were burning very dimly. The home signal was also so located that it could not be seen at night by an approaching engineman until within a few hundred feet of it, while the two white lights in the tower and at the staff holder pit could be seen from a point west of the distant signal. This condition was a plain violation of general rule No. 320 relating to block signaling, which rule reads as follows:

> "Lights in block stations shall be so placed that they can not be seen from approaching trains."

An engineman not running regularly over this part of the road might readily overlook the fact that the home signal could not be seen until close to it, thus facilitating his error in mistaking the two white lights for signal indications. Engineman Reynolds had been over this part of the road on only two occasions since February 25. On that date he was the engineman on train No. 42, due to pass XN Cabin at 9.12 p.m., while on the other occasion, March 14, he was on the second of two engines running light. It was also noted that between September 1, 1918, and February 25, 1919, he had been over this division but ten times. While it is not believed that the absence of a signal lamp on the distant signal had any direct bearing on the cause of the accident, it is not good practice to permit the existence of a condition of this kind, and it indicates lack of a proper sense of responsibility on the part of those charged with the maintenance and supervision of these signals. With regard to the inoperative condition of the distant signal, the officials stated that it was left in this condition in order to make sure that trains approached the end of double track under control. With proper instruction and supervision on the part of those officials whose duty it is to attend to such matters,

this arrangement would be entirely unnecessary.

It is believed that this accident was due to Engineman Reynolds being misled by the arrangement of the lights at XN Cabin being such as to make him think that he had clear signal indications when as a matter of fact the signals were in the stop position and the derail open. This condition undoubtedly was brought about by the fact that the lamps on the home and dwarf signals were burning dimly, by their being so turned that their correct indication could not be seen until the engineman was within a short distance of them, and by the two white lights burning brightly. That the officials of the company realized this dangerous condition is evident by the changes made by them within a few hours after the occurrence of the accident. These consisted of putting in a new home signal lamp and turning the home signal pole so that the signal could be seen from the distant signal; covering the window in the cabin so that the white light could not be seen from eastbound trains; moving farther away from the track the white light at the staff holder pit and placing a shield on this light so that it could not be seen from eastbound trains, and placing the distant signal in operation.

Operator Sampson contributed to the accident by the manner in which he handled the staff mechanism. Had he operated this mechanism properly, he would have thrown the switches before placing the staff in the crane. This would not have prevented extra 156 from passing the signals, but it would have passed onto the single track without being derailed and would have reduced the net result to a case of running signals.

Engineman Reynolds was employed as a fireman in 1903 and promoted to engineman in 1906. He was dismissed in September, 1910, for running too fast after receiving a caution card and not keeping a proper lookout, being reinstated in March, 1911. He had been on duty about 4 hours after a period off duty of over 3 days. Operator Sampson had been employed as a towerman since 1913 and had a good record. He had been on duty between 6 and 7 hours after a period off duty of 16 hours.

It is noted that the color of lights used by this railroad for clear and caution night signal indications does not conform to standard practice. Had the colors for caution and clear been yellow and green, respectively, Engineman Reynolds could not have been misled by the white lights in the tower and at the staff holder pit, and it is possible that this accident would not have occurred.

G.V.L.