Inv-2444

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

LINE OF THE

READING COMPANY

WESTON-MANVILLE, N. J.

AUGUST 31, 1940

INVESTIGATION NO. 2444

SUMMARY

Inv-2444

Railroad:	Reading
Date:	August 31, 1940
Location:	Weston-Manville, N. J.
Kind of accident:	Derailment
Train involved:	Passenger
Train number:	Passenger Extra 5300 East
Engine number:	5300
Consist:	9 cars
Speed:	48 m. p. h.
Operation:	Interlocking
Track:	Four; tangent; 0.4 percent descending grade eastward
Weather:	Foggy
Time:	7:05 a. m.
Casualties:	31 injured
Cause:	Failure to control speed of train in accordance with interlocking signal indications.

Inv-2444

October 17, 1940.

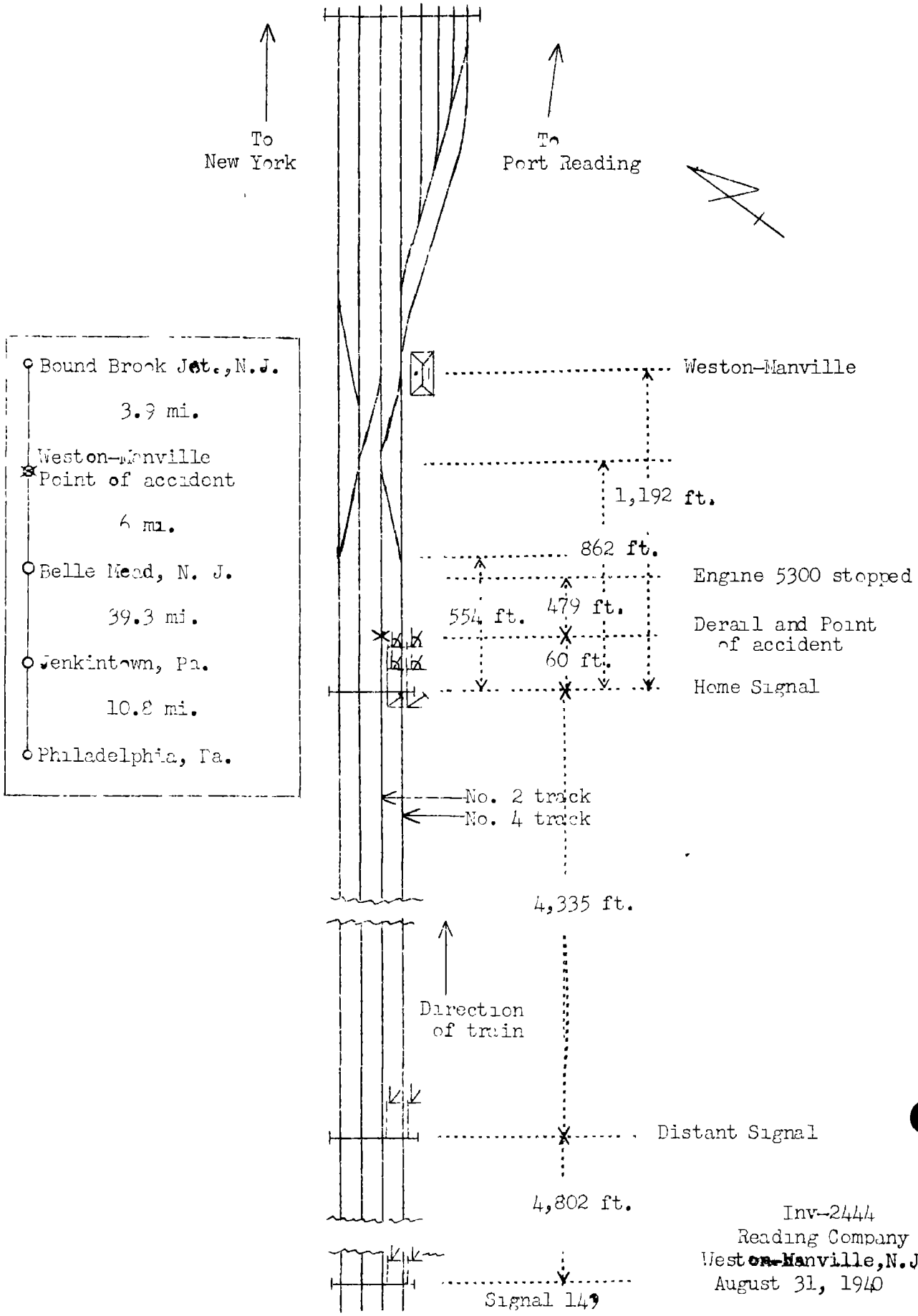
To the Commission:

On August 31, 1940, there was a derailment of a Baltimore & Ohio Railroad passenger train on the tracks of the Reading Company at Weston-Manville, N. J., which resulted in the injury of 30 passengers and 1 dining-car employee. This accident was investigated in conjunction with the New Jersey Board of Public Utility Commissioners.

Location and Method of Operation

This accident occurred on that part of the Philadelphia Division designated as the New York Branch which extends between Jenkintown, Pa., and Bound Brook Junction, N. J., a distance of 47.6 miles. In the vicinity of the point of accident this is a four-track line over which trains are operated by an automatic block system, the indications of which supersede time-table superiority. The main tracks from north to south are Nos. 3 and 1, westward tracks, and Nos. 2 and 4, eastward tracks. Weston-Manville interlocking is controlled from WX interlocking tower. The accident occurred within interlocking limits on track No. 2 at a point 1,152 feet west of the interlocking tower. As the point of accident is approached from the east the track is tangent more than 10 miles. The grade varies between level and 0.67 percent descending eastward a distance of 9,125 feet to the point of accident and some distance beyond and is 0.4 percent at the point of accident.

The interlocking machine is a Model 14, power type, and consists of 33 working levers; it is equipped with approach-locking on all routes and electric-locking for all switches and derails. Time releases on approach circuits are set for 2-minute operation. All movements through the interlocking are controlled by signal indication. Distant signals and home signals governing eastward movements on tracks Nos. 2 and 4 are located on signal bridges 5,527 feet and 1,192 feet, respectively, west of the interlocking tower. The distant signals are of the automatic, single-arm semaphore type. The home signals are of the semi-automatic, 3-arm, upper quadrant, semaphore type. The involved aspects, indications, and names of the distant and home signals on track No. 2 are as follows:



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Reading Company
Weston-Manville, N.J.
August 31, 1940

Signal	Aspect	Indication	Name
Distant Signal	Yellow	Prepare to stop at next signal. Train exceeding medium speed, must at once reduce to that speed.	Approach Signal
Home Signal	Red	Stop	Stop Signal

Main-track derails of the Wharton type are located on tracks Nos. 2 and 4 at points 60 feet east of the eastward home-signal bridge. The west switch of the cross-over from track No. 4 to track No. 2 is located 554 feet east of the home-signal bridge.

General Instruction No. 10 of the current timetable provides as follows:

> 10. In conforming to the speed requirements when operating under Rules 501-B, 601-B and 504-B (Approach Signals) and Rules 503-J, 503-J and 603-J (Caution Signals), the train should not exceed medium speed (one-half normal speed, not to exceed thirty (30) miles per hour), when passing the signal. When the signal cannot be seen a sufficient distance to reduce to medium speed before passing the signal, the speed should be so reduced as soon as proper handling of the train will permit.

The maximum authorized speed on track No. 2 in the vicinity of the point of accident for the train involved is 80 miles per hour.

The weather was foggy at the time of the accident, which occurred at 7:05 a. m.

Description

Passenger Extra 5300, an east-bound Baltimore & Ohio Railroad passenger train, with Conductor Leisure and Engineman Volk in charge, consisted of engine 5300, of the 4-6-2 type, one baggage car, two coaches, one dining car, four coaches, and one dining car, in the order named; all cars were of steel construction. This train departed from Philadelphia, 56.7 miles west of Weston-Manville, at 6:07 a. m., according to the train sheet,

passed Belle Mead, 6 miles west of Weston-Manville, at 7 a. m., passed the eastward distant signal of Weston-Manville interlocking, which was displaying an approach indication, passed the eastward home signal displaying a stop indication and, while moving at a speed of about 48 miles per hour, according to the speed-recorder tape on the engine, was derailed at the derail on track No. 2.

Engine 5300 was derailed to the right and stopped in an upright position on track No.2 at a point 479 feet east of the derail. The tender was derailed but remained coupled to the engine and stopped, leaning to the right at an angle of 30 degrees, with the east end fouling track No. 4. The first four cars remained coupled and were derailed to the right, leaning to the right at an angle of 30 degrees and blocking track No. 4. The fifth car was derailed and stopped in an upright position with the east end fouling track No. 4 and the west end on the derail on track No. 2. The sub-structures of the first five cars were badly damaged.

Summary of Evidence

Engineman Volk, of Passenger Extra 5300, stated that at Philadelphia a terminal test of the air brakes was made and the brakes applied and released on all cars. A running test of the air brakes was made and they functioned properly en route. He said that it was foggy in spots and it was difficult to observe the signals but he did not reduce speed because of the fog. Signal 149, which is located 4,802 feet west of the distant signal at Weston-Manville, displayed a clear indication. While the train was moving at a speed of about 70 miles per hour he observed a yellow aspect displayed by the distant signal at Weston-Manville at a point 200 feet distant, whereupon he called the indication to the fireman, made a service application of the air brakes, and opened the sand valve. No. 652 was on track No. 4 and as his train passed it between the distant signal and the home signal he realized that he would not be able to stop short of the home signal; he applied the air brakes in emergency and reversed the engine. When his engine was about a train length distant from the home signal he observed that the signal was in stop position, but he had already applied the brakes in emergency. He said that his train passed the home signal at a speed of 25 or 30 miles per hour and the speed was 18 or 20 miles per hour at the time of derailment. He had been under the impression that there was sufficient distance between the distant signal and the home signal in which to stop from normal speed. He said that if the weather had been clear he would have been able to see the indication of the distant signal at least a mile

distant and then he would have reduced speed sufficiently to pass the distant signal at a speed not in excess of 30 miles per hour. He understood that when weather conditions restrict his vision he should reduce the speed of his train sufficiently to comply with any indication the next signal might display. He had closed the throttle at a point west of the distant signal and thought that if this signal should be in approach position he would be able to stop short of the home signal. He said he had been qualified over the Reading Company tracks for 5 years, had worked regularly in that territory for 1-1/2 years, and that the officials of that railroad had never criticized him for reducing speed in bad weather. When the engine was standing at Philadelphia he called the fireman's attention to the fact that the speedometer was then registering 85 miles per hour; after the accident it registered 85 miles per hour and he called this matter to the attention of Road Foreman of Engines Kimber.

Fireman Pryor, of Passenger Extra 5300, stated that at Philadelphia a terminal test of the air brakes was made and the brakes functioned properly en route. He was breaking lumps of coal in the gangway when the engineman called a yellow aspect and made a service application of the air brakes at the distant signal involved. As the weather was very foggy he sat on the left seat-box to watch for the home signal; he thought the speed of the train at this time was between 60 and 70 miles per hour. At a point 3 or 4 car lengths west of the home signal he and the engineman simultaneously called the red aspect, and immediately the engineman applied the brakes in emergency.

Conductor Leisure, of Passenger Extra 5300, stated that as his train approached the point where the accident occurred he was in the seventh car. He said the speed of the train was about 60 miles per hour when the brakes were applied and it had been reduced to about 30 miles per hour at the time of the derailment. It was very foggy at the point of accident and his vision was restricted to about 6 car lengths.

Flagman Barrett, of Passenger Extra 5300, corroborated the statement of his conductor.

Engineman Schmeig, of No. 652, stated that his train was on track No. 4 approaching Weston-Kenville on the morning of the accident; the weather was very foggy. When his train was about 1,050 feet west of the distant signal he saw the approach indication displayed by it and from a point about 700 feet distant he saw the home signal; it was displaying a clear-medium indication, which indicated that the route was lined for his train to move from track No. 4 to track No. 2 and that track No. 2 was clear two blocks in advance of the interlocking. Extra 5300

passed on track No. 2 when his train was about 5 car lengths west of the home signal. He could see that the home signal on track No. 2 was in stop position and, realizing that Passenger Extra 5300 was not going to stop short of that signal, he applied the brakes and stopped his train just west of the home signal. He had no difficulty in observing signals until he reached the distant signal for Weston-Manville; east of that point the fog was thick. He said the accident occurred at 7:05 a. m.

Engineman Ott, of No. 600 which was being operated immediately ahead of Passenger Extra 5300 on track No. 2, stated that it was very foggy in the vicinity of Weston-Manville and his vision was restricted to a distance of about 200 feet. His train passed Weston-Manville at 7:02 a. m. He said that he was always cautious when approaching the distant signal for Weston-Manville. About 1 year ago, when it was foggy, he received a yellow aspect at the distant signal and his engine would have run off the derail if the operator had not heard his whistle signals and cleared the home signal. He stated the instructions are that if weather conditions restrict the view of a signal, from which it would be impossible to stop short of the next signal from maximum authorized speed, the engineman must reduce speed before that signal is reached.

Signalman Fetherston, on duty at Weston-Manville at the time of the accident, stated that when No. 600 passed the tower No. 652 was on the distant-signal circuit and he lined the route and cleared the home signal for that train to move from track No. 4 to track No. 2. Passenger Extra 5300 entered the circuit after the signal was cleared for No. 652; he did not change the signal lever subsequent to the accident until the maintainer and the supervisor of signals had made observations.

Signal Maintainer Riley, who was on No. 352 en route to Weston-Manville, observed that the distant signals for both track No. 4 and track No. 2 were displaying approach indications. Passenger Extra 5300 passed No. 652 about halfway between the distant signal and the home signal. He said it was very foggy in the vicinity of the point of accident. When No. 652 was within 300 or 400 feet of the home signal he observed that the signal for track No. 2 was in stop position. After the accident occurred he went to the tower and observed that the route was lined for movement from track No. 4 to track No. 2 and that the signal lever was cleared for that movement.

Road Foreman of Engines Kimber stated his interpretation of Rule No. 10 of the general instructions of the current timetable is that when difficulty is experienced in observing the signals until a point within 200 or 300 feet of the signal is reached, the engineman must reduce the speed of his train sufficiently to comply with any restrictive indication.

General Superintendent Lewis stated that the fundamental requirement of Rule No. 10 of the general instructions of the current timetable is that the speed of a train must be reduced to one-half normal speed, but not to exceed 30 miles per hour, when passing signals indicating approach; when weather conditions restrict the engineman's view of a signal the speed must be reduced sufficiently before the engine reaches the signal to comply with any restrictive indication the signal might display.

Air Brake Instructor Brown furnished the following data: Locomotive 5300 is provided with No. 6-E air-brake equipment. Brake-pipe pressure of 108 pounds and main-reservoir pressure of 130 pounds are maintained. The total weight of the engine and tender is 544,000 pounds; the total weight of the engine is 326,000 pounds; the weight on drivers is 201,000 pounds. The braking ratio on drivers is 60 percent based on 50 pounds brake-cylinder pressure and the braking ratio of the tender when empty is 125 percent based on 50 pounds brake-cylinder pressure. Brake information concerning the cars of the train is as follows:

Car	Weight Pounds	Number of wheels braked	Style of Brake	Brake Cylinders	Braking Ratio at Brake Cylinder Pressure of 60 Pounds
Baggage	128,770	12	LN	1-18"	80 percent
Coach	146,675	12	U-12-B	1-18"	90 percent
Coach	148,500	12	U-12-B	1-18"	90 percent
Diner	178,100	12	U-12-B	2-16"	90 percent
Coach	152,300	12	U-12-B	1-18"	90 percent
Coach	165,400	12	U-12-B	1-18"	90 percent
Coach	146,675	12	U-12-B	1-16"	90 percent
Coach	148,500	12	U-12-B	1-18"	90 percent
Diner	179,000	12	U-12-B	2-16"	90 percent

Total weight of engine, tender and cars was 1,937,920 pounds.

According to the speed-recorder tape of engine 5300, the speed of Passenger Extra 5300 was 77.5 miles per hour at a point 500 feet east of the distant signal involved, and from that point the speed was decreased to 48 miles per hour when the train passed the home signal.

Superintendent of Motive Power and Rolling Equipment Galloway stated that the speed recorder of engine 5300 was tested at Elizabethport Shop on the day after the accident. At a speed of 67 miles per hour the cab gauge registered 3-1/2 miles slow and the tape registered 2 miles slow.

Vice President Brown stated that the signals in this territory were installed during 1918-1919. At that time maximum authorized speed on the New York Branch was not prescribed. Subsequently, however, maximum authorized speed was prescribed as follows: In 1923, 70 miles per hour; in 1927, 75 miles per hour; and in 1928, 80 miles per hour. The distance between the distant signal and the home signal on track No. 2 at the location involved is 4,335 feet, which the management considers adequate for operation of trains at maximum authorized speed, as there is an unrestricted view a considerable distance when approaching these signals. The signals can be seen plainly one block section in advance except during adverse weather conditions, when Rule No. 10 of the time-table instructions is applicable. Although the management is of the opinion that compliance with Rule No. 10 insures adequate safety, it has conducted a survey of signal spacing on the entire system and plans are being prepared for the relocation of signals where necessary to conform with the provisions of section 204 of rules, standards, and instructions for signal systems, which were prescribed by the Commission's order of April 15, 1939. These signal locations will be based upon a braking chart which represents signal spacing for stopping from maximum speed plus a liberal margin. He said that the intention was to complete the relocation of signals where necessary prior to September, 1941.

According to data furnished by the carrier, the stopping distance from a speed of 80 miles per hour is 5,335 feet.

Observations of the Commission's Inspectors

The Commission's inspectors observed the operation of the switches, derails and signals at Weston-Manville on the day after the accident and they were found to be functioning as intended.

Discussion

According to the evidence, Passenger Extra 5300 on track No. 2 approached the distant signal, which was displaying an approach indication, at a speed of about 80 miles per hour, the maximum authorized speed, passed the home signal, which was displaying a stop indication, and while moving at a speed of about 48 miles per hour became derailed at the derail, 60 feet beyond the home signal. The route had been lined for No. 652, which was approaching Weston-Manville on track No. 4, to move from track No. 4 to track No. 2; however, a short distance west of the home signal the passenger extra passed No. 652. The engineman of No. 652, realizing that the passenger extra would not be able to stop short of the derail, stopped his own train just west of the home signal.

The weather was foggy and the engineman of the passenger extra said that he did not see the distant signal until he was within 200 or 300 feet of it. When he observed that the signal was displaying an approach indication he made a service brake-pipe reduction and thought this would be sufficient to stop the train short of the home signal but as a result of his experience in this instance he found there was not sufficient braking distance between the distant signal and the home signal to stop his train from a speed of 80 miles per hour. As his train passed No. 652 he realized that he would not be able to stop short of the home signal, so he applied the brakes in emergency and reversed the engine. When his train was about 800 feet west of the home signal he observed that the home signal was displaying a stop indication, but since he had already applied the brakes in emergency and reversed the engine there was nothing further he could do to avert the derailment. There was some discrepancy between the estimates of the speed made by members of the crew and the speed indicated on the speed-recorder tape. The engineman thought the speed was about 25 or 30 miles per hour when his engine passed the home signal and the conductor thought it was about 30 miles per hour at the time of the derailment; however, the speed-recorder tape indicated the speed to be 48 miles per hour at the home signal.

The investigation disclosed that the route was lined for No. 652 to move from track No. 4 to track No. 2 as intended; this resulted in the home signal for track No. 2 displaying a stop indication and the derail being open. There was no defect in the interlocking apparatus which would contribute to the cause of the derailment. Under the rules, a train is not authorized to pass a signal displaying approach at a speed in excess of 30 miles per hour. The engineman understood that during foggy weather, such as existed in the vicinity of the point of accident, he should have controlled the speed of his train when approaching the distant signal so that he could pass it at a speed not in excess of 30 miles per hour in case the signal displayed an approach indication; however, according to the evidence, the train passed the distant signal at a speed considerably in excess of 30 miles per hour and approached the home signal at a speed too high to stop short of it.

According to data furnished by the carrier, the stopping distance from a speed of 80 miles per hour is 5,333 feet. The signals involved are spaced a distance of 4,335 feet only, but the carrier relied upon a special time-table rule, which is applicable during adverse weather conditions, to provide adequate safety. In order to obtain uniform practice in automatic-block territory, it is necessary to so locate signals that adequate stopping distance is provided regardless of variable visual conditions so that enginemen can operate their trains from signal to signal and obey their indications in consecutive order.

Section 204 of the rules, standards and instructions for signal systems and appliances which were prescribed by the Commission's order of April 13, 1939, under the provisions of the Interstate Commerce Act as amended, provides that signals shall be spaced at least stopping distance apart, or where not so spaced an equivalent stopping distance shall be provided by two or more signals arranged to display restrictive indications approaching signal where such indications are required. The carrier has made plans to conform with this requirement and intends to complete respacing of signals where necessary prior to September, 1941.

Conclusion

This accident was caused by failure to control the speed of the train in accordance with interlocking signal indications.

Respectfully submitted,

S. N. MILLS,

Director.