INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT OF THE DIRECTOR

BUREAU OF SAFETY

ACCIDENT ON THE

ST. LOUIS-SAN FRANCISCO RAILWAY

QUINCY, MISS.

FEBRUARY 16, 1939

INVESTIGATION NO. 2332

SUMMARY

Inv-2332

Railroad:	St. Louis-San Francisco		
Date:	February 16, 1939		
Location:	Quincy, Miss.		
Kind of accident:	Head-end collision		
Trains involved:	Freight	:	passenger
Train numbers:	238	:	107
Engine numbers:	4208	:	1520
Consist:	48 cars and caboose	:	9 cars
Speed:	Standing	:	45-50 m.p.h.
Track:	3° curve; 1.23 percent descending grade for northward trains		
Weather:	Clear		
Time:	4:20 a.m.		
Casualties:	3 killed, 38 injured		
Cause:	Failure of No. 238 to clear the time of an opposing superior train and to obey the stop indication of an automatic block signal; probably also by failure of No. 107 properly to observe and obey an approach signal indication.		

April 15, 1939.

To the Commission:

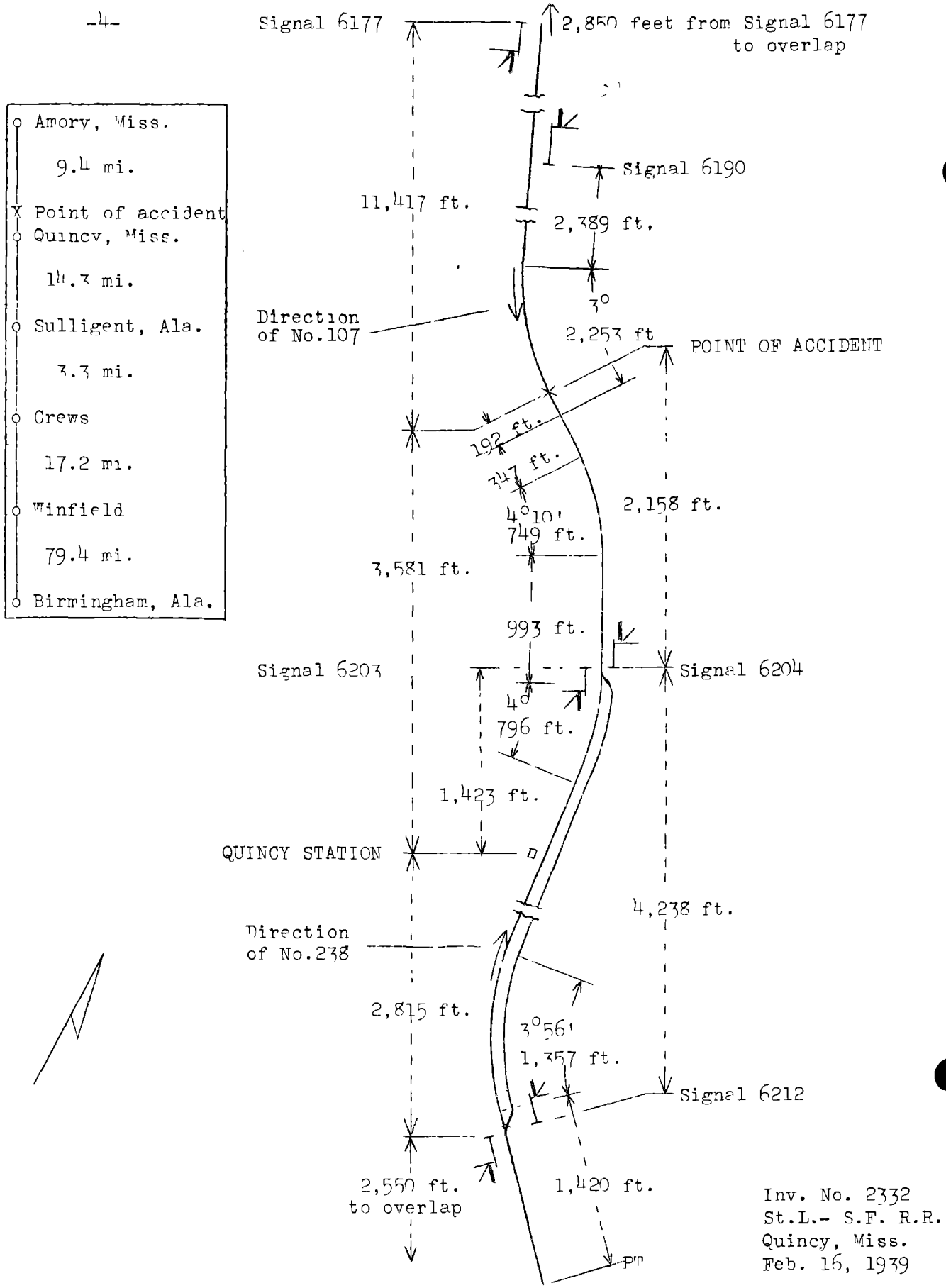
On February 16, 1939, there was a head-end collision between a passenger train and a freight train on the St. Louis-San Francisco Railway near Quincy, Miss., which resulted in the death of 1 trespasser and 2 employees and the injury of 30 passengers, 3 railway postal clerks, 1 trespasser and 4 employees.

Location and Method of Operation

This accident occurred on that part of the Southern Division designated as the Birmingham Sub-division which extends between Amory, Miss., and Birmingham, Ala., a distance of 123.6 miles. In the vicinity of the point of accident this is a single-track line over which trains are operated by timetable, train orders, and an automatic block-signal system. At Quincy a siding, 4,238 feet long, parallels the main track on the east; the accident occurred at a point 2,158 feet north of the north siding switch. Approaching this point from the south there is a series of short tangents and curves, followed by a tangent 993 feet long, a 4°10' curve to the left 749 feet long, a tangent of 347 feet, and a 3° curve to the right 2,253 feet long; the accident occurred on this last-mentioned curve at a point 192 feet from its southern end. Approaching from the north there is a tangent 3,749 feet long, followed by the curve on which the accident occurred. The grade for north-bound trains is 1 percent ascending a distance of approximately 1 mile, then 0.65 percent descending 2,000 feet, and 1.23 percent descending 3,900 feet; the accident occurred on the last-mentioned grade. The grade for south-bound trains is from 0.3 to 0.5 percent ascending more than 1 mile, and this is followed by the 1.23 percent ascending grade on which the accident occurred.

The automatic block-signal system is the overlap type, consisting of double-location signals at sidings, and intermediate signals between stations; these are 3-position, upper-quadrant, semaphore signals, oil-lighted. Night aspects and indications are as follows:

Red.....Stop
Yellow.....Proceed at a speed reduced to not exceeding one-half the maximum authorized at point involved, prepared to stop at next signal.
Green.....Proceed



Inv. No. 2332
St.L.- S.F. R.R.
Quincy, Miss.
Feb. 16, 1939

Signals 6212 and 6204, governing north-bound movements, are located 6,396 and 2,158 feet, respectively, south of the point of accident, and signal 6177, an intermediate signal governing south-bound movements, is located 11,417 feet north of the point of accident. The overlap for signal 6204 extends to a point 2,850 feet north of signal 6177; when a south-bound train passes that point, signal 6204 displays a stop indication and signal 6212 displays an approach indication. When a north-bound train reaches a point 2,550 feet south of signal 6212, signal 6203, located at the north siding switch at Quincy, displays a stop indication, and signal 6177 displays an approach indication.

Approaching the point of accident from the north, the view had by the fireman is restricted to a distance of 813 feet. Approaching signal 6204 from the south, the view of that signal had by the fireman of a north-bound train is restricted to a distance of 716 feet.

The maximum authorized speed for passenger trains is 65 miles per hour on straight track and 55 miles per hour on the curve involved; the maximum authorized speed for the freight train involved is 35 miles per hour.

Rule 87 of the Rules of the Transportation Department reads in part:

> On single track, an inferior train must keep out of the way of opposing superior trains and failing to clear the main track by the time required by rule must be protected as prescribed by Rule 99.

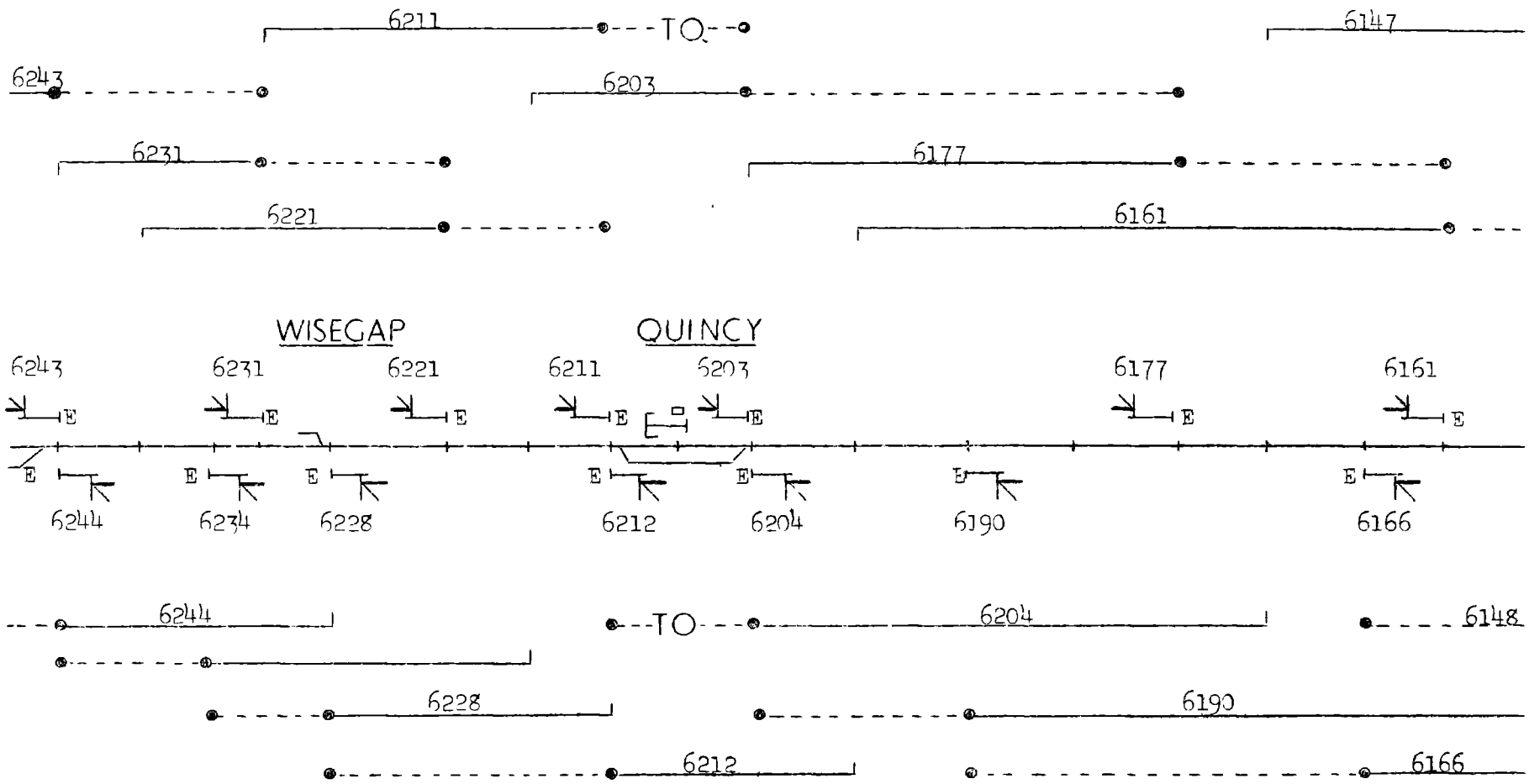
Rule 89 reads:

> On single track, at meeting points between trains of different classes, the inferior train must take the siding and clear the superior train at least five minutes, and must pull into the siding when practicable. If necessary to back in, the train must first be protected as prescribed by Rule 99 unless otherwise provided.

Rule 90 reads in part:

> The engineman of each train will give signal 14(n) at least one mile before reaching a meeting or waiting point. When the train is to take siding at the meeting point, engineman will repeat signal 14(n) at least one-half mile before reaching the switch at which it must take siding. Should the engineman fail to give signal 14(n) as herein prescribed, the conductor must take immediate action to stop the train.

SIGNAL CONTROLS



Inv. No. 2332
St.L.-S.F. R.R.
Quincy, Miss.
Feb. 16, 1939

Scale, 1" 5,000 feet.

Signal 14(n) is two long and one short blasts of the engine whistle.

Instructions under example 3 relating to time orders, Form "E", the type involved, read as follows:

> The train first named must not pass the designated point before the time given, unless the other train has arrived. The train last named is required to run with respect to the time specified at the designated point, or any intermediate station where schedule time is earlier than the time specified in the order, as before required to run with respect to the scheduled time of the train first named.

The weather was clear at the time of the accident, which occurred about 4:20 a.m.

Description

No. 238, a north-bound second-class freight train, consisted of 33 loaded and 15 empty cars and a caboose, hauled by engine 4208, and was in charge of Conductor Connell and Engineman Wilson. This train departed from Dora, 86.8 miles south of Quincy, at 12:37 a.m., according to the train sheet, 1 hour 47 minutes late, passed Winfield, 34.8 miles south of Quincy, at 3:15 a.m., 2 hours 5 minutes late, where the crew received a clearance card and a copy of train order No. 9, Form 19, reading:

> No. 107 Eng 1520 wait at Sulligent until 4:05 a.m. for No. 238 eng 4208.

The crew also received a telegram addressed C&E 238, as follows:

> No. 107 - 35 mins. overdue Amory and not showing Call Opr. Sulligent soon as you get there.

At Sulligent, 14.3 miles south of Quincy, the crew received a clearance card and a copy of train order No. 16, Form 19, reading:

> No. 107 eng 1520 wait at Quincy until 4:35 a.m. for No. 238 eng 4208

No. 238 passed Sulligent at 3:55 a.m., according to the train sheet, 2 hours 15 minutes late, passed signal 6212 displaying a green aspect, according to the statements of the crew, passed Quincy at 4:18 a.m., according to the train sheet, passed signal 6204 displaying a red aspect, and had just stopped when it was struck by No. 107.

No. 107, a south-bound passenger train, consisted of 3 baggage cars, 1 mail car, 2 coaches and 3 Pullman sleeping cars, in the order named, hauled by engine 1520, and was in charge of Conductor Jones and Engineer Bower. All cars were of all-steel construction except the first car which was of steel under-frame construction. At Amory, 9.4 miles north of Quincy, the crew received a clearance card and a copy of train order No. 16, Form 19, previously quoted. No. 107 left Amory at 4:08 a.m., according to the train sheet, 1 hour 43 minutes late. This train passed signal 6177 displaying a green aspect, according to the statement of the fireman, and collided with No. 238 while traveling at a speed estimated to have been between 45 and 50 miles per hour.

Engine 4208, of No. 238, was shoved back a distance of 120 feet; it was derailed and badly damaged; its tender stopped west of and at right angles to the track. The first car stopped parallel to the tender with one end on the track, and the second car was derailed to the east of the track with its front end beside the engine; none of the remaining equipment in this train was derailed or damaged. Engine 1520, of No. 107, was derailed but stopped in upright position in general line with the track and was considerably damaged; the tender telescoped the engine cab; the first car was derailed and, telescoping the tender, was practically demolished; the third and fourth cars were slightly damaged.

The employees killed were the engineman and the porter of No. 107; the employees injured were the conductor, the fireman and the baggageman of No. 107 and the engineman of No. 238.

Summary of Evidence

Engineman Wilson, of No. 238, stated that an air-brake test was made before leaving Birmingham, their initial terminal. Cars were picked up at two points en route and after each pickup the air brakes were tested and they functioned properly. Train order No. 9 and a message directing them to call the operator on arrival at Sulligent were received at Winfield. When they arrived at Sulligent an operator was on duty and train order No. 16 was received; the train was practically stopped to allow the conductor, who had been on the engine, to get off and board the caboose. The fireman received the train order and handed it to the engineman. Engineman Wilson said he read it aloud and he read it "Wait at Amory," instead of "Wait at Quincy." The head brakeman was standing behind him at the time and he also read the order. The engineman then handed it to the fireman who read it and remarked that they had until 4:35 a.m. to go to Amory and that they could make it on the time they had. The order was returned to the engineman and he placed it on the clip board provided for that purpose. When approximately 4 or 5 miles south of

Quincy he again read train order No. 16 and again read it as "Amory" instead of "Quincy." He looked at his watch and figured on passing the south switch at Quincy at 4:15 a.m. He passed the south switch, however, at 4:16 a.m. and the station at 4:17 a.m. and made the remark that they had 20 minutes in which to reach Amory. Signal 6212, located at the south switch, displayed a green aspect when they passed it and he called its indication, which was answered by both the fireman and the brakeman as, "Clear block." The train was moving at a speed of about 30 miles per hour on the ascending grade approaching Quincy and after tipping over the hill just south of the station a speed of about 35 miles per hour was attained. When the engine reached a point about 10 car lengths from signal 6204, which is the maximum distance it can be seen, the fireman called out, "Red block," and the engineman immediately applied the air brakes in emergency. He saw the red aspect when about 3 or 4 car lengths from it and the train stopped with its front end about 50 car lengths beyond the signal. There was nothing wrong with the brake-pipe line, and he considered the emergency application to be a very effective one. As soon as his train stopped he placed the brake valve in running position and applied the straight air brake. He instructed the brakeman to run ahead and flag, and just as the brakeman reached the front end of the engine, No. 107 was seen rounding the curve about 10 car lengths distant. The headlights of both locomotives were burning brightly and the weather was clear at the time of the accident. Engineman Wilson stated that he had sounded the station whistle signal approaching Quincy, and when approaching a meeting or waiting point he sounded one long or two long and a short blast at the mile board and a short distance beyond he repeats the signal; he has heard members of the crew say that whistle signals cannot be heard in the caboose. He was not familiar with the provision of the rule that requires a conductor to take action to stop the train in the absence of the signal being sounded when approaching a meeting or waiting point. He stated that he would start applying the air brakes to head in at the south siding-switch at Quincy when approximately 1½ miles south of the switch. He acknowledged but was unable to explain his mistake in misreading the train order. His eyesight is good and he was given new lenses for his glasses the last time the doctor's car was over the line. Looking at an original copy of the order at the time of the investigation he said that there was no similarity between "Quincy" and "Amory."

Fireman Patrick, of No. 238, stated that after the engineman and head brakeman read train order No. 16 he heard one of them say "We have 40 minutes to go to Amory." He then read the order himself by the reflection of the light through the holes in the firebox door and he also read it as "Amory." Passing through Gateman, 8.3 miles south of Quincy, he read the order a second time; he accounted for reading the order as "Amory" instead of "Quincy" as due to the fact that it was impressed upon his mind

when he heard the others say "Amory" and to the similarity in the spelling of the words "Quincy" and "Amory." Approaching Quincy he looked at his watch, called the clear indication of signal 6212, and he said they passed the south siding-switch at a speed of 25 or 30 miles per hour. He observed the train-order board and called it as clear, and they passed the station at 4:17 or 4:18 a.m. When his engine reached a point where he could see signal 6204 he called "Red block," and the engineman immediately applied the air brakes in emergency; as soon as the train stopped the engineman called a warning and he jumped off. Fireman Patrick was positive that signal 6212 displayed a green aspect when the locomotive passed it.

Head Brakeman Petty, of No. 238, stated that while the engineman held train order No. 16 up to the light to read it, he was standing behind the engineman and read it with him; he could see the order clearly and it was legible. The engineman said, "Amory 4:35 a.m." and Brakeman Petty looked at his watch and remarked, "We have 40 minutes; can we make it?" The engineman replied that they could if they proceeded quickly. The fireman after reading the order said, "Amory 4:35 a.m." Brakeman Petty was in the cupola house on the tender until his train reached Wise Gap Hill, just south of Quincy, and thinking that possibly the engineman might change his mind and head in at Quincy, he came back over the tender, stood in the gangway and heard the engineman say that they had plenty of time to go to the Junction. He said signal 6212 displayed a proceed indication and he thought the train was about 20 or 23 car lengths from it when he called its indication. He did not pay any particular attention to the signal after that, but the engineman had his head out the window. The speed was about 30 miles per hour when passing the station at Quincy and he was standing near the engineman and heard the fireman call, "Red block." He rushed over to the fireman's side, saw that the signal was red and grabbed his lantern, and as soon as the train stopped he started out to flag, but had only reached the front end of the engine when he saw the headlight of No. 107. He could not estimate the speed of No. 107, but it appeared to be moving at a high rate. He thought his own train had made a good stop, and it had been standing about 30 or 40 seconds when the collision occurred. Sometime after the accident when inspecting the train he found an angle cock closed on the front end of the sixth car from the caboose. In the past, they had frequently had trouble with angle cocks being turned on trains out of Thomas Yard, located about 111 miles south of Quincy.

Conductor Connell, of No. 238, stated that the last stop prior to the accident was made at Crews where water was taken, and he noted from the gauge in the caboose that the air was cut through the train. He inspected the train at Crews and was on the engine from that point to Sulligent so as to be in position

to call the operator on arrival at Sulligent. Approaching Sulligent, however, the train-order board was displayed and the operator was standing on the platform with train orders. He left the engine, received his copy of train order No. 16, inspected the train as it pulled by him, and then boarded the caboose. After reading the order he said to the flagman that they had 40 minutes, until 4:35 a.m., in which to go to Quincy, and the flagman replied that they could go to Amory in that time. As he climbed up in the cupola he noted that the air gauge registered 65 pounds pressure, which is the usual amount with a train of that length. Approaching the south siding-switch at Quincy the speed was about 35 miles per hour and he thought that the engineman should be reducing speed to head in at the south switch. The engine then started to climb a slight hill, there was a run of slack at the rear, and he thought the engineman had shut off steam to stop. He looked at the gauge but no brake-pipe reduction had been made. He called to the flagman that the engineman was not heading in, jumped down from the cupola, ran to the rear platform of the caboose and looked ahead to ascertain their location. The flagman had just called the indication of signal 6212 as being clear, but when the conductor looked ahead he saw the indication change from caution to stop, at which time the engine apparently had passed the signal. He immediately opened the valve on the rear of the caboose but did not obtain an emergency application of the brakes, the exhaust being of short duration. The train continued until the caboose was about three car lengths beyond the north switch when it stopped, and the collision occurred about 30 seconds later. About 1 or 1½ hours after the accident he instructed the head brakeman to assist in inspecting the train to ascertain why an emergency application of the air brakes was not obtained when he opened the valve on the rear end. Brakeman Petty found a closed angle cock on the sixth car from the caboose, and all the brakes on the cars were applied except those on the caboose. Conductor Connell stated that at the rear of a long train it is impossible to hear whistle signals with the type of whistle with which the engine involved was equipped, and in the absence of such a signal it is not his practice to take any action himself when approaching meeting and waiting points until he is sure that the engineman is not taking the proper action.

Flagman McMurran, of No. 238, stated that he read train order No. 16 and understood its contents. Approaching signal 6212 the conductor remarked that it did not appear that the engineman was preparing to take siding. The flagman was seated in the cupola, looking ahead and called signal 6212 which was displaying a green aspect. He said that it changed to yellow and then to red just as it does when an engine enters the block; he could see smoke near the signal and he was positive that the change of aspects was actuated by the locomotive of his train. At that time

the conductor opened the brake valve on the rear of the caboose but the brakes did not respond. He heard one blast sounded on the engine whistle, but was unable to say what the signal was as it is impossible to hear short blasts when on the rear of a long train. He was positive that the air was cut through when leaving Crews, as he heard the rear brakes release prior to departure and also after a brake-pipe reduction had been made at Sulligent he heard the brakes release on the rear cars and caboose. The brakes were not applied by the engineman between Sulligent and the point where the accident occurred. Angle cocks have been closed by trespassers in this vicinity several times prior to the date of this accident.

Fireman Davis, of No. 107, stated that approaching the point of accident he was on his seatbox. The engineman called the aspect displayed by signal 6177 as "green" and he repeated it when he saw it; it was still displaying a green aspect when the locomotive passed it. As soon as he saw the headlight of No. 238 he warned the engineman, who immediately applied the air brakes in emergency. Fireman Davis shut off the oil fuel supply and jumped off, at which time the engine was about 4 or 5 car lengths from No. 238, and his own train was traveling at a speed of about 50 miles per hour.

The statement of Conductor Jones, of No. 107, added nothing of importance.

Flagman Temple, of No. 107, stated that the maximum speed attained en route was about 60 miles per hour. About 1-3/4 miles north of the point of accident he felt an application of the air brakes to steady the train entering a dip in the track, and approaching Quincy the speed was about 50 miles per hour. He did not feel an application of the air brakes prior to the accident, nor did he hear a whistle signal sounded, and he estimated the speed to have been 45 or 50 miles per hour at the time of collision. He was thrown to the floor, and after getting up he looked at his watch and it was 4:20 a.m.

Operator Jones, at Sulligent, stated that when he delivered train order No. 16 to Conductor Connell he told him that an operator was on duty at Quincy and to look out for an order there; the conductor replied that they would have to head in at Quincy in any event.

Agent-Operator Crump, at Quincy, stated that he was called at 3:35 a.m. to go on duty to handle train orders for No. 108, and after clearing that train he was instructed by the train dispatcher to remain on duty in the event he could move No. 238. He heard train order No. 16 being transmitted and understood it to read "107 wait at Quincy until 4:35 a.m. for No. 238." He

left the office a short time and when he came back he heard a whistle sounded by No. 238 and he informed the dispatcher that No. 238 was approaching. He then saw the train coming down the main track and so advised the dispatcher. He was on the platform when a portion of the train passed at a speed of about 25 miles per hour and he was inside his office looking out the window when the caboose passed. He saw two members of the crew at the rear of the caboose. He thought possibly the train was going to back in at the north switch, or that an additional order had been issued while he was absent from the office. He observed that the caboose of No. 238 passed at 4:18 a.m.; the collision occurred about 4:20 a.m.

General Foreman Car Department Clark arrived at the scene of accident about 11:30 a.m. He inspected No. 238 and observed that the brakes on practically all of the cars were applied. He found that the brakes on the thirty-fourth car from the caboose were cut out and that the angle cock on the north end of the sixth car from the caboose was closed. The brakes were applied on the sixth, fifth and third cars from the caboose, while the brakes were released on the fourth, second and first cars from the rear, and the caboose. After the rear six cars and the caboose had been taken to Amory a leakage test was made thereon. The brake-pipe was charged to 75 pounds and the angle cock was then closed on the front end of the sixth car ahead of the caboose; it took 60 minutes for the air pressure to drop to 12 pounds, the leakage being slightly more than one pound per minute; the brakes did not become applied. The brake-pipe was then charged to 73 pounds and an emergency application was made from the conductor's valve in the caboose and it was found that it took from 1 hour 34 minutes to 3 hours 15 minutes for the brakes to release on the three rear cars and caboose, while on the fourth, fifth and sixth cars from the caboose the air brakes were still applied 6 hours later. No difficulty was experienced in turning the angle cock; while it was somewhat stiff, it was easy to turn.

Roundhouse Foreman Garner stated that he inspected engine 1520 at the scene of accident and found the brake valve in emergency position and the throttle closed.

Signal Maintainer Guthridge stated that arriving at Quincy about 3 hours after the accident he found signals 6212 and 6204 displaying stop indications and signal 6228, the next signal south of signal 6212, displaying an approach indication. As a safety precaution he disconnected the track circuits until after the damaged track had been repaired and the rails bonded. He then connected the circuits and the signals functioned as intended.

Signal Supervisor Ross stated that after the track was repaired and the rails bonded, he observed the signals function as two trains passed; they functioned properly, and there was nothing to indicate that there was anything wrong with the signals prior to the time of accident.

Signal Maintainer Young stated that a general inspection is made of the signals every two weeks. This inspection includes cleaning motors, oiling signals, inspecting the relays, etc., and such an inspection was last given the signals involved on February 2. He had never experienced any trouble with these signals.

Signal Engineer Uhr stated that it would not be possible for both Nos. 238 and 107 to receive clear indications on signals 6177 and 6212 at the same time, on account of the overlaps.

Assistant Superintendent Callaham stated that it was his opinion that the accident was caused by the misreading of the train order and failure to observe a caution indication of the block signal at the south siding-switch at Quincy, which indication signal 6212 must have displayed, regardless of statements to the contrary. He based his opinion on the fact that No. 238 passed Sulligent at 3:55 a.m., and the station at Quincy at 4:19 a.m., having traveled a distance of approximately 14 miles in 24 minutes, or at an average speed of 35.75 miles per hour, which would have placed that train at a point about 2,550 feet south of signal 6212 at 4:17:20, and the caboose as passing the station at 4:19. No. 107 left Amory at 4:08 a.m. and the accident occurred at 4:20 a.m.; this train therefore traveled the distance of 9 miles from Amory to the point of accident in 12 minutes or at an average speed of 45 miles per hour, and this would have placed that train at a point approximately 6 miles south of Amory, at which point it would have actuated signal 6212 so as to display an approach indication, at about 4:16 a.m., or at least 1 minute prior to the time this signal was visible to the members of the crew on the engine of No. 238.

Observations of Commission's Inspectors

Vision tests made by the Commission's inspectors disclosed that signal 6212 could be seen on the engineman's side of a north-bound train a distance of 2,312 feet, and that signal 6204 could be seen from the fireman's side a distance of 716.5 feet. Signal 6177 could be seen from the engine of a south-bound train a distance of approximately 4,552 feet; the view to the point of accident from the fireman's side was restricted to 813 feet because of the curvature and a side-hill cut.

Discussion

According to the timetable, No. 107 was due to leave Quincy at 2:45 a.m. Both trains involved held copies of train order specifying that No. 107 would wait at Quincy until 4:35 a.m. for No. 238; this latter train held no order effective north of Quincy against No. 107. Under the rules, since No. 107 was a first-class train and No. 238 a second-class train, it was obligatory for No. 238 to enter the south switch of the siding at Quincy and be into clear not later than 4:30 a.m.; however, No. 238 passed the south switch about 4:17 a.m., passed signal 6204 which was displaying a stop indication but which was located on a descending grade and was visible for a distance of only 716 feet, and stopped on the main track with its engine 2,158 feet north of the north switch, and 30 or 40 seconds later, before adequate flag protection could be provided, it was struck by No. 107.

According to the evidence the engineman, fireman and head brakeman of No. 238 read the order but read it as "Amory" instead of "Quincy," and after checking the time they figured they had 40 minutes from Sulligent, at which point they received the order, to reach Amory, 23.7 miles beyond. The engineman read the order aloud and while he held the order up to the light the head brakeman stood behind him and read it at the same time. The fireman read the order by the reflection of the light through the firebox door holes.

The engineman acknowledged but could not account for his error in reading the order. When shown an original copy of the order at the time of the investigation he stated that it was clear. The fireman stated the fact that he had heard "Amory" mentioned may have impressed it upon his mind and thus he also read it as "Amory." According to the evidence the order was written clearly and legibly. Because of this misunderstanding of the order by members of the crew who were on the engine, No. 238 did not stop and take siding at the south siding switch but proceeded on the main track toward Amory.

The rules provide that the engineman must give a meeting or waiting point whistle signal at least 1 mile before reaching the meeting or waiting point, and in case of his failure to do so the conductor must take immediate action to stop the train. The engineman of No. 238, however, failed to sound the required whistle signal approaching Quincy. The conductor stated that it is impossible to hear whistle signals at the rear of a long train with the type of whistle with which the engine involved was equipped, and in the absence of the required whistle signal he does not take any action until he is sure that the engineman is not taking the proper action.

The conductor and the flagman correctly understood the order. Approaching Quincy the flagman announced that signal 6212 displayed a green aspect; about the same time, realizing that the engineman was not reducing speed to enter the siding, the conductor went to the rear platform of the caboose to ascertain their exact location. He saw signal 6212 changing from a yellow to a red aspect, which indicated that their locomotive had passed the south siding switch; he immediately opened the emergency valve on the rear of the caboose. The exhaust was strong but of short duration and an emergency application was not obtained. About 1-1/2 hours after the accident occurred, a closed angle cock was found on the front end of the sixth car ahead of the caboose. The flagman was positive that he heard the air released on the rear cars and the caboose when departing from Sulligent, 14.3 miles south of the point of accident, therefore it is apparent that the angle cock was closed sometime after the train left Sulligent. The flagman also stated that on several occasions prior to the time of the accident angle cocks had been closed by trespassers in that vicinity.

The automatic block signal system in this territory is of the overlap type. According to the statements of employees involved, signal 6212 displayed a green aspect when No. 238 passed it, and signal 6177 displayed a green aspect when No. 107 passed it. The investigation disclosed that assuming the signal system was working as intended, it was impossible for green aspects to be displayed by both signals 6212 and 6177 for the two trains involved in this accident.

According to the opinion of the assistant superintendent, assuming that the caboose of No. 238 passed the station at Quincy at 4:19 a.m. and that No. 107 left Amory at 4:08 a.m., No. 107 would have entered upon the overlap control circuit of signal 6204 in time to have caused signal 6212 to display a yellow aspect approximately one minute prior to the time this signal became visible from the engine of No. 238. In that event, No. 107 would have received a green aspect at signal 6177 and No. 238 would have received a yellow aspect at signal 6212 and a red aspect at signal 6204. However, the assumption that the caboose of No. 238 passed the station at Quincy at 4:19 a.m. is not supported by the evidence.

On the other hand, assuming that No. 107 was traveling at a speed of 50 miles per hour, it would take 3 minutes 15 seconds for it to travel from the overlap point north of signal 6177 to the point of accident, a distance of 2.7 miles, and if the accident occurred at 4:20 a.m., it would place No. 107 at the overlap point, and thus place signal 6212 at approach, at 4:16:45 a.m. The operator at Quincy stated that the caboose of No. 238 passed the station at 4:18 a.m., and assuming the train was traveling at a speed of 35 miles per hour, it would take 39 seconds for it

to pass the station, which would place the engine at the station at 4:17:21 a.m. The distance from the station to signal 6212 is 2,815 feet and No. 238 would traverse that distance at 35 miles per hour in 55 seconds; from these figures, No. 238 would have passed signal 6212 at 4:16:26 a.m., or 19 seconds prior to the time No. 107 reached the overlap point north of signal 6177, and at the beginning of the overlap, 2,550 feet south of signal 6212 at 4:15:36, which would have set signal 6177 at approach 1 minute 9 seconds before No. 107 entered the overlap north of signal 6177. In that event, No. 107 would have received a yellow aspect at signal 6177, and No. 238 would have received a green aspect at signal 6212 and a red aspect at signal 6204.

The statements of the members of both crews indicate that the accident occurred at 4:20 a.m., and the statement of the operator at Quincy that the caboose of No. 238 passed the station at 4:18 a.m. is substantiated by the statements of the engineman and the fireman of No. 238. With the engine of that train passing the station at 4:17:21 a.m., the remaining 2 minutes 39 seconds could have been consumed in traveling the distance of 3,581 feet from the station to the point of accident, the speed being approximately 35 miles per hour until the brakes were applied to stop the train, and the train then standing from 30 to 40 seconds before it was struck.

Under a third possibility, if No. 107 entered the overlap north of signal 6177 prior to the time No. 238 passed signal 6212, and No. 238 entered the overlap south of signal 6212 prior to the time No. 107 passed signal 6177, then No. 107 would have received a yellow aspect at signal 6177 and No. 238 would have received a yellow aspect at signal 6212 and a red aspect at signal 6204.

The preponderance of evidence is to the effect that signal 6212 was displaying a green aspect when the engine of No. 238 passed that signal and it follows that No. 107 must have received a yellow aspect at signal 6177, which would have required No. 107 to reduce speed to not in excess of 27.5 miles per hour on the curve on which the accident occurred.

The investigation failed to disclose any condition which could have caused improper operation of the signal system. The records indicate that it had been operating properly prior to the accident, and investigation and tests subsequent to the accident disclosed that it was functioning properly. However, the investigation developed the fact that under the arrangement of signaling at the point involved it was possible for a train approaching a meeting point to receive a red signal aspect without first having received a yellow signal aspect.

Conclusion

This accident was caused by the failure of No. 238 to clear the time of an opposing superior train and to obey the stop indication of an automatic block signal, and probably also by failure of No. 107 properly to observe and obey an approach signal indication.

Respectfully submitted,

W. J. PATTERSON,

Director.