INTERSTATE COMMERCE COMMISSION

WASHINGTON

INVESTIGATION NO. 2526

THE SOUTHERN PACIFIC COMPANY

REPORT IN RE ACCIDENT

AT WELLSONA, CALIF., ON

SEPTEMBER 19, 1941

SUMMARY

Railroad:	Southern Pacific	
Date:	September 19, 1941	
Location:	Wellsona, Calif.	
Kind of accident:	Rear-end collision	
Trains involved:	Passenger	: Freight
Train numbers:	76	: 374
Engine numbers:	4441	: 4446
Consist:	16 cars	: 35 cars, caboose
Speed:	Standing	: About 22 m.p.h.
Operation:	Timetable, train orders and automatic block-signal system	
Track:	Single; tangent; 0.6 percent ascending grade eastward	
Weather:	Clear	
Time:	About 1:50 a.m.	
Casualties:	48 injured	
Cause:	Accident caused by failure to provide adequate flag protection for the first train and by failure to stop the second train in accordance with signal indications as a result of insufficient stopping distance for maximum authorized speed between automatic signals involved.	
Recommendation:	That the Southern Pacific Company immediately take necessary measures to bring its automatic block-signal system into conformity with Section 204 of the Commission's order of April 13, 1939, and to accelerate its program of equipping its freight cars with standard air brakes.	

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 2526

IN THE MATTER OF MAKING ACCIDENT INVESTIGATION REPORTS UNDER THE ACCIDENT REPORTS ACT OF MAY 6, 1910.

THE SOUTHERN PACIFIC COMPANY

November 26, 1941.

Accident at Wellsona, Calif., on September 19, 1941, caused by failure to provide adequate flag protection for the first train and by failure to stop the second train in accordance with signal indications as a result of insufficient stopping distance for maximum authorized speed between automatic signals involved.

REPORT OF THE COMMISSION[1]

PATTERSON, Commissioner:

On September 19, 1941, there was a rear-end collision between a passenger train and a freight train on the line of the Southern Pacific Company at Wellsona, Calif., which resulted in the injury of 43 passengers, 2 Pullman employees and 3 train-service employees. This accident was investigated in conjunction with representatives of the Railroad Commission of California.

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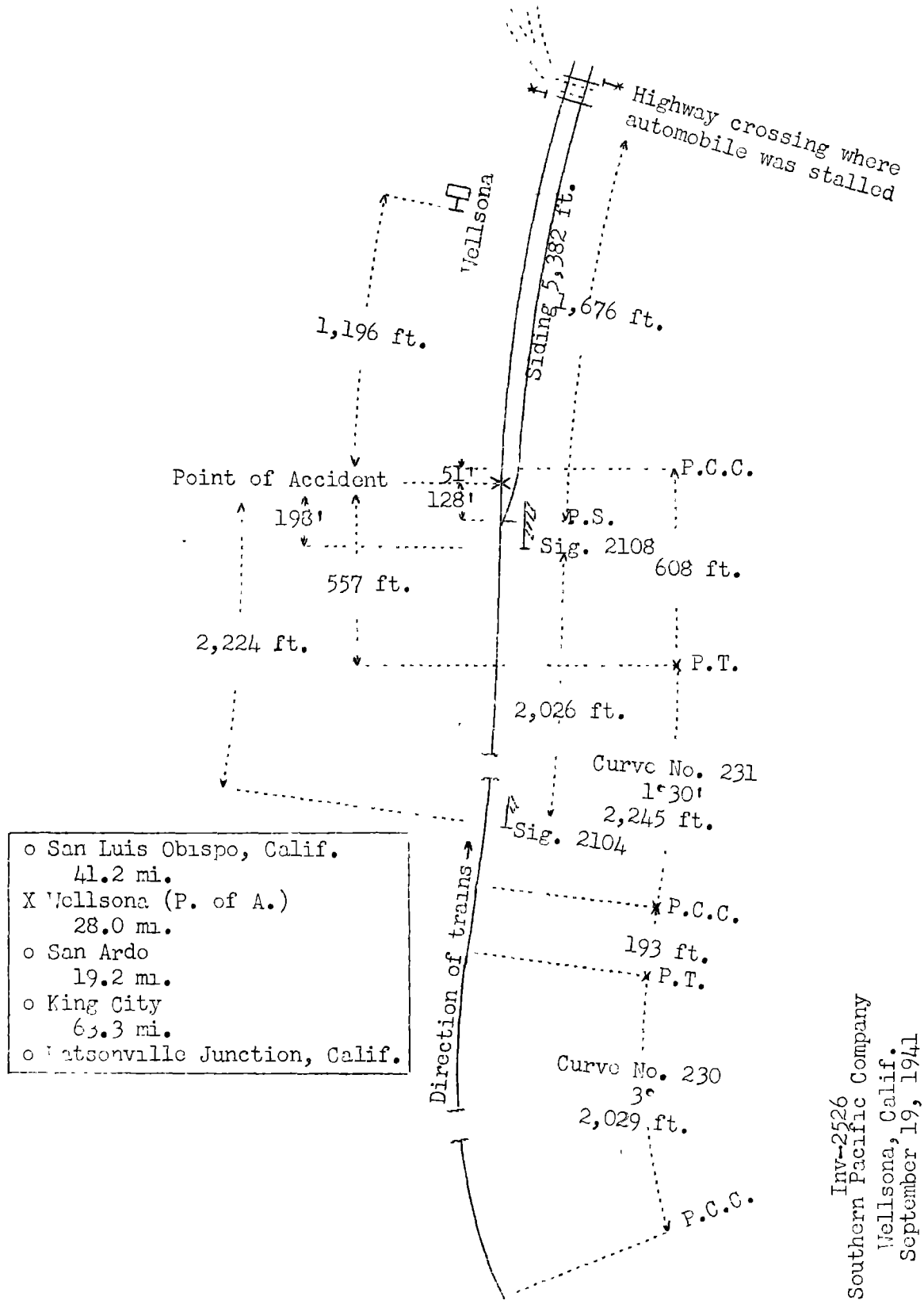
[1] Under authority of section 17(2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Commissioner Patterson for consideration and disposition.



Inv-2526
Southern Pacific Company
Wellsona, Calif.
September 19, 1941

Location of Accident and Method of Operation

This accident occurred on that part of the Coast Division designated as the Salinas Subdivision, which extends between Watsonville Junction and San Luis Obispo, Calif., a distance of 151.7 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 Wellsona a siding 5,382 feet in length parallels the main track on the south. The west switch of this siding is 1,196 feet west of the station. The accident occurred at a point 128 feet east of the west siding-switch. As the point of accident is approached from the west there are, in succession, a compound curve to the right 2,029 feet in length, which has a maximum curvature of 3°, a tangent 193 feet, a compound curve to the left 2,245 feet in length, which has a maximum curvature of 1°30', and a tangent 557 feet to the point of accident and 51 feet beyond. The grade for east-bound trains varies between 0.35 and 0.6 percent ascending a distance of 1.2 miles, and is 0.6 percent at the point of accident. An unimproved highway crosses the main track and the siding at grade at a point 1,676 feet east of the west siding-switch. As the point of accident is approached from the west the track is laid on a hillside cut throughout a considerable distance. The south bank of this cut rises to a height of about 25 feet. To the north of the track there are numerous trees.

The automatic block-signal system is of the overlap type and consists of intermediate signals between stations and double-location signals at sidings. At Wellsona a distant signal operates in conjunction with the eastward home signal. Distant signal 2104 and home signal 2108, governing east-bound movements, are mounted on masts to the right of the track at points, respectively, 2,224 and 127.5 feet west of the point of accident. Distant signal 2104 is of the one-arm, lower quadrant, semaphore type, and is approach lighted. Home signal 2108 is of the two-arm, lower quadrant, semaphore type, and is approach lighted. The involved night aspects and indications are as follows:

	Night Aspect	Indication
Signal 2104	Yellow	Proceed with caution
Signal 2108	Red-over-yellow	Stop

Signal 2108 is lighted when an east-bound train reaches a point 9,074 feet west of the signal and signal 2104 is lighted from a point 2,394 feet west of it.

Operating rules read in part as follows:

Definitions

With Caution--To run at reduced speed, according to conditions, prepared to stop short of a train, engine, car, misplaced switch, derail, or other obstruction, or before reaching a stop signal. * * *

15. The explosion of one torpedo is a signal to stop. When an unattended torpedo is exploded, train, after stopping, must proceed with caution for a distance of not less than one-half mile.

34. All members of train and engine crew must, when practicable, communicate to each other by its name the indication of all signals affecting the movement of their train.

99. When a train stops under circumstances in which it may be overtaken by another train, the flagman must go back immediately with flagman's signals a sufficient distance to insure protection; one-fourth mile from rear of train, if such distance has been reached before being recalled, he must place one torpedo on the rail; one-half mile from rear of train, or at the point from which recalled if less than one-half and more than one-fourth mile, he must place two torpedoes on the rail two rail-lengths apart; if less than one-fourth mile, he must, if safety to train requires leave a lighted fusee. * * *

When a train is seen approaching closely before flagman has reached the required flagging distance, he must immediately place one torpedo on the rail, and continue in the direction of the approaching train, displaying stop signals. By night, or by day when conditions warrant, a lighted fusee must be displayed.

* * *

When a train is moving under circumstances in which it may be overtaken by another train, the flagman must take such action as may be necessary to insure protection. By night, or by day when the view is obscured, lighted fusees must be thrown off at proper intervals.

* * *

509. When a block signal indicates "stop", * * * train, after stopping, will proceed as follows:

* * *

(e) * * * ,
Send a flagman ahead immediately, wait at least five minutes, and then follow, * * * .

In the vicinity of the point of accident the maximum authorized speed for the trains involved is 55 miles per hour.

Description of Accident

No. 76, an east-bound first-class passenger train, consisted at the time of the accident of engine 4441, one baggage car, one mail car, five Pullman sleeping cars, one kitchen-dormitory car, one dining car, one lounge car, five Pullman sleeping cars and one Pullman observation car, in the order named. The first two cars were of all-steel construction. The eighth, ninth and tenth cars were articulated and operated as a triple-unit. This triple-unit was of the light-weight type and had truss side-frames of high tensile steel and sheathing of stainless steel. The Pullman cars were of the light-weight type and were equipped with girder side-frames and high-tensile-steel side-sheets. This train departed from San Francisco, 210.9 miles west of Wellsona, at 9 p.m., September 18, according to the dispatcher's record of movement of trains, on time, departed from Watsonville Junction, 110.5 miles west of Wellsona, at 11:36 p.m., 16 minutes late, and passed San Ardo, 28 miles west of Wellsona and the last open office, at 1:05 a.m., September 19, 6 minutes late. At a highway grade crossing located 1,750 feet east of signal 2108 an automobile veered off the crossing and stopped with its frame upon the rails of the main track. This condition shunted the signal circuits and caused signal 2104 to display yellow and signal 2108 to display red-over-yellow. No. 76 passed signal 2104 and stopped at signal 2108 at 1:37 a.m. A flagman preceded the train into the block, and about 1:44 a.m. the train proceeded, then stopped about 1:47 a.m. with the rear end of the train standing 198 feet east of signal 2108. About 3 minutes later the rear end was struck by No. 374.

No. 374, an east-bound first-class freight train, consisted of engine 4446, 35 loaded cars and a caboose. At San Francisco a terminal air-brake test was conducted and the brakes were reported as functioning properly. Brake-pipe pressure was 90 pounds. This train departed from San Francisco at 7:55 p.m., September 18, according to the dis-

patcher's record of movement of trains, 15 minutes late. At Watsonville Junction crews were changed and this train departed at 11:50 p.m., 58 minutes late, passed San Ardo at 1:21 a.m., September 19, 51 minutes late, passed signal 2104, which was displaying a yellow aspect, passed signal 2108, which was displaying a red-over-yellow aspect, and, while moving at a speed of about 22 miles per hour as indicated by the tape of the speed recorder with which engine 4446 was equipped, it collided with the rear end of No. 76.

There was no condition of the engine of this train that distracted the attention of the crew or obscured their vision. Because of the cut, trees and track curvature, the view of signal 2104 from the right side of an east-bound engine was restricted to 1,260 feet and from the left side, to 304 feet. The view of signal 2108 from the right side of an east-bound engine was restricted to about 500 feet, and from the left side, to 2,198 feet.

The sixteenth car of No. 76 was derailed to the right, stopped on the siding and leaned to the right at an angle of 30 degrees; this car was practically demolished. The fifteenth car was derailed to the right and stopped, practically upright, across the main track and the siding. The rear vestibule was telescoped, the underframe was buckled, and the body was damaged. The fourteenth car was derailed but stopped upright and in line with the track; the roof sheet was buckled and the car was otherwise damaged. Both ends of the thirteenth, twelfth, eleventh, seventh, sixth and fifth cars were derailed. The rear end of the tenth car, the front end of the eighth car and the rear end of the fourth car were derailed. All cars except the fifteenth and sixteenth were but slightly damaged and remained upright and in line with the track. Both rails were overturned beneath the fourth, fifth, sixth and seventh cars. The left rail was overturned beneath the eleventh, twelfth, thirteenth, fourteenth, fifteenth and sixteenth cars of No. 76, and under the engine and first three cars of No. 374. Some of the rails were kinked to the left.

The front end of engine 4446, of No. 374, stopped 105 feet east of the point of collision. The engine truck, the No. 1 pair of driving wheels and the front tender-truck were derailed. The pilot, the pilot beam and the front end were broken. The front truck of the first car was derailed.

The weather was clear at the time of the accident, which occurred about 1:50 a.m.

The employees injured were the fireman, the front brakeman and the flagman of No. 374.

Data

The total length of No. 76 was 1,380 feet 9 inches. Engine 4446 was provided with No. 8-ET brake equipment, the caboose with an LN-2 valve, 16 cars with AB valves, 1 car with a UC-12 control valve, and the remainder with K-2 triple valves. The first, fifth, sixth, eighth, tenth, eleventh, twelfth, fifteenth, twenty-second, twenty-third, twenty-fourth, twenty-sixth, twenty-seventh, twenty-ninth, thirty-third and the thirty-fifth cars were provided with AB valves.

After the accident, inspection disclosed that the brake-cylinder piston travel varied between 6-1/2 and 11 inches. Piston travel on 16 cars was excessive.

After the accident, four braking tests were conducted. The cars that were in the train of No. 374, and engine 4448, of the same type and class as engine 4446, were used. Brake-pipe pressure of 90 pounds was used in all tests. The results were as follows:

During the first test the train was stopped in a distance of 3,909 feet, from a speed of 55 miles per hour, by a service application of the brakes. The first 700 feet was on a 0.98 percent ascending grade and the remainder was level.

During the second test the train was stopped on level track in a distance of 4,027 feet, from a speed of 60 miles per hour, by a service application of the brakes. The service application consisted of a 15-pound brake-pipe reduction followed immediately by a 12-pound reduction.

During the third test the driving-wheel brake-cylinder pressure was cut out. The brakes were applied with a service brake-pipe reduction and this was followed immediately by an emergency application. The grade was 0.87 percent ascending. The train was stopped from a speed of 55 miles per hour in a distance of 2,530 feet.

During the fourth test a 27-pound brake-pipe reduction was made and the train was stopped from a speed of 50 miles per hour on level track in a distance of 2,360 feet.

Signal Data

Tests made after the accident of signals 2104 and 2108 disclosed no abnormal condition of the control circuits, relays or signal mechanisms. Both signals functioned as intended.

Discussion

About 1 a.m. an automobile veered off the highway crossing at Wellsona, became stalled on the track and metal of the automobile fouled the rails at a point about 1,750 feet east of signal 2108. As a result, signal 2104 displayed proceed-with-caution and signal 2108 displayed stop. No. 76, a first-class passenger train, stopped at signal 2108 at 1:37 a.m. and engine whistle signals were sounded for flagmen to protect the train in each direction. The flagman proceeded to the rear and the front brakeman proceeded ahead of the train. Soon afterward an occupant of the stalled automobile informed the engineer concerning the location of the stalled automobile and the difficulty it was in. About 3-1/2 minutes after the train stopped, the engineer sounded the whistle signal for the flagman to return from the rear. The flagman had reached a point about 2,800 feet west of signal 2108, or about 700 feet west of signal 2104, when he was recalled. He placed a lighted 10-minute fusee outside the right rail, returned to the rear of the train and gave a proceed signal. No. 76 proceeded into the block at an estimated speed of about 6 miles per hour. About 1:47 a.m. No. 76 stopped short of the stalled automobile, with the rear end of the train standing 198 feet east of signal 2108. The engine whistle was again sounded to signal the flagman to protect the rear of the train and he started immediately toward the rear. He had reached a point about 470 feet to the rear of the train when he heard No. 374, a first-class freight train, approaching. The flagman lighted a fusee and gave stop signals, but No. 374 passed him at a speed of about 30 miles per hour and collided with No. 76. The speed-recorder tape indicated that the speed of No. 374 was about 22 miles per hour at the time of the collision.

According to the statement of the engineer of No. 374, as his train was approaching the point where the accident occurred the throttle was open, the speed was about 55 miles per hour and the fireman and he were maintaining a lookout ahead. All signals between Watsonville Junction and signal 2104 displayed proceed for his train. As the engine rounded the curve west of signal 2104 the engineer observed from a distance of about 600 feet that signal 2104 displayed proceed-with-caution. He closed the throttle and started a service brake-pipe reduction; however, since he thought the distance between signal 2104 and 2108 was insufficient for stopping a freight train from a speed of 55 miles per hour, he placed the brake valve in emergency position as the engine passed signal 2104. No. 374 passed signal 2108 and struck the rear end of No. 76 at a point 198 feet beyond the signal. Because of the service brake-pipe reduction, he was of the opinion that an emergency application was not obtained on

the cars that were equipped with K-2 triple valves. Of the 35 cars and caboose in the train, 18 cars were equipped with K-2 triple valves.

The present A. A. R. standards for freight-car brake equipment, to which the "AB" type of equipment conforms, were adopted in 1933, and in 1935 the member lines of the Association of American Railroads entered upon a program to equip, within a period of 10 years, all freight cars in interchange with brakes conforming to these standards. According to report of the A. A. R. on June 30, 1941, during the first 6½ years or 65 percent of the 10-year period, the Southern Pacific Company had installed the improved type of brake equipment on only 23.1 percent of its freight cars, which represents approximately one-third of the number of cars of this company that were required to be equipped during this period under the A. A. R. program. All the cars in No. 374 except one Pacific Fruit Express car were Southern Pacific cars. No. 374 was being operated as a fast merchandise train. The scheduled time of this train between San Francisco and Los Angeles, a distance of 480 miles, is 12 hours and 20 minutes. This is only 31 minutes more than the schedule of the passenger train which was involved in this accident. Throughout distances of approximately 100 miles the scheduled times of the two trains involved were practically the same. Safe operation of a freight train moving at a speed equivalent to passenger-train speed requires brakes as efficient as passenger-train brakes. Only 16 of the 35 cars in No. 374 were equipped with the improved brakes. If No. 374 had had a sufficient number of cars equipped with brakes conforming to the present standards to secure an effective emergency application when the engineer moved the brake valve from service to emergency position, it is probable this accident would have been prevented.

According to the statement of the flagman of No. 76, about 1:41 a.m. he left a lighted fusee at a point 2,800 feet west of signal 2108. According to the statement of the engineer of No. 374, no fusee was burning near that location; however, the flagman and the middle brakeman of No. 374 said a fusee was burning at that location when their caboose passed that point. After the accident occurred, several minutes elapsed before these employees were able to leave the caboose and at that time the fusee was not burning. The rules require that if a flagman reaches a point 1/4 mile to the rear of his train one torpedo shall be placed on the rail. The flagman of No. 76 said that when his train stood west of signal 2108 he did not reach a point 1/4 mile to the rear of his train and for that reason he did not place a torpedo; however, the investigation disclosed that he reached a point slightly more than 1/4 mile to the rear of his train before

he was recalled. Since several members of the crew of No. 76 knew that it was necessary to stop short of the stalled automobile, it should have been apparent to them that their train would be proceeding beyond signal 2108 in a manner in which it might be overtaken by another train. If the flagman had not been recalled, undoubtedly he would have been able to station himself far enough to the rear to provide ample flag protection against No. 374.

After the accident, a series of braking tests were made. These tests disclosed that in territory similar to the territory involved in this accident a distance of 2,026 feet is insufficient for stopping a freight train from a speed in excess of 50 miles per hour by a full-service application of the brakes. The investigation disclosed that 16 of the 35 cars in No. 374's train had excessive brake-cylinder piston travel. The rules of this carrier provide that piston travel shall not be less than 7 inches nor more than 9 inches. If the piston travel of all the cars of this train had been properly adjusted the resultant damage would have been lessened. An air-brake test was made at Watsonville Junction, 110.5 miles west of Wellsona; however, the cars in the middle of the train were not inspected. If all the cars had been properly inspected, undoubtedly the excessive piston travel would have been discovered and corrected.

No. 374 was moving under a proceed indication until it reached signal 2104, which was displaying proceed-with-caution. Under the most favorable conditions, the view of signal 2104 from the right side of an east-bound engine was restricted to 1,260 feet and from the left side, to 304 feet; however, the engineer of No. 374 did not see this signal until the engine was about 600 feet west of it. The automatic signals involved were installed 35 years ago when the maximum authorized speed for trains having freight equipment was much lower than it was at the time the accident occurred. The investigation disclosed that the carrier has been depending upon the engineers to begin the reduction of speed in obedience of a proceed-with-caution indication before the engine reached the signal displaying that indication. In order to procure a uniform practice on the part of engineers operating trains in automatic block-signal territory, it is necessary that signals be so located or so arranged to provide adequate stopping distances at all times regardless of variations, permanent or temporary, in visual conditions, and so that engineers can operate their trains from signal to signal in accordance with the indications displayed. Section 204 of the rules, standards and instructions for the installation, inspection, maintenance and repair of automatic-block signals, prescribed by the Commission's order of April 13, 1939, provides as follows:

> 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 investigation disclosed that the distance between the signals involved was insufficient for a freight train moving at maximum authorized speed at signal 2104 to be stopped short of signal 2108. Under the order of April 13, 1939, the effective date of section 204 as applied to the signals involved in this accident was September 1, 1941; however, on petition of the Southern Pacific Company this effective date had been extended to January 1, 1942. The investigation disclosed that this carrier had not made provision for safeguarding operation pending the respacing of signals to provide adequate stopping distance between the automatic signals involved in this accident. If the speed of the following train had been restricted to conform to existing signal spacing, this accident would not have occurred.

Cause

It is found that this accident was caused by failure to provide adequate flag protection for the first train and by failure to stop the second train in accordance with signal indications as a result of insufficient stopping distance for maximum authorized speed between the automatic signals involved.

Recommendation

It is recommended that the Southern Pacific Company immediately take necessary measures to bring its automatic block-signal system into conformity with Section 204 of the Commission's order of April 13, 1939, and to accelerate its program of equipping its freight cars with standard air brakes.

Dated at Washington, D.C., this twenty-sixth day of November, 1941.

By the Commission, Commissioner Patterson.

(SEAL)

W. P. BARTEL,

Secretary.