Railroad accident

U.S. INTERSTATE COMMERCE COMMISSION

WASHINGTON

INVESTIGATION NO. 2651

THE NORTHERN PACIFIC RAILWAY COMPANY

REPORT IN RE ACCIDENT

NEAR BAKER, WASH., ON

NOVEMBER 20, 1942

SUMMARY

Railroad:	Northern Pacific
Date:	November 20, 1942
Location:	Baker, Wash.
Kind of accident:	Derailment
Train involved:	Passenger
Train number:	Second 2
Engine number:	2249
Consist:	9 cars
Estimated speed:	30-35 m. p. h.
Operation:	Timetable, train orders and automatic block-signal system
Track:	Single; 10°13' curve; 0.21 percent descending grade eastward
Weather:	Hazy
Time:	About 12:30 a. m.
Casualties:	1 killed; 7 injured
Cause:	Accident caused by excessive speed on snarp curve

INTERSTATE COMMERCE COMMISSION

INVESTIGATION NO. 2651

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

THE NORTHERN PACIFIC RAILWAY COMPANY

January 1, 1943.

Accident near Baker, Wash., on November 20, 1942, caused by excessive speed on sharp curve.

REPORT OF THE COMMISSION[1]

PATTERSON, Commissioner:

On November 20, 1942, there was a derailment of a passenger train on the Northern Pacific Railway near Baker, Wash., which resulted in the death of one train-service employee and the injury of two passengers, three dining-car employees and two train-service employees. This accident was investigated in conjunction with a representative of the Department of Labor and Industries of the State of Washington.

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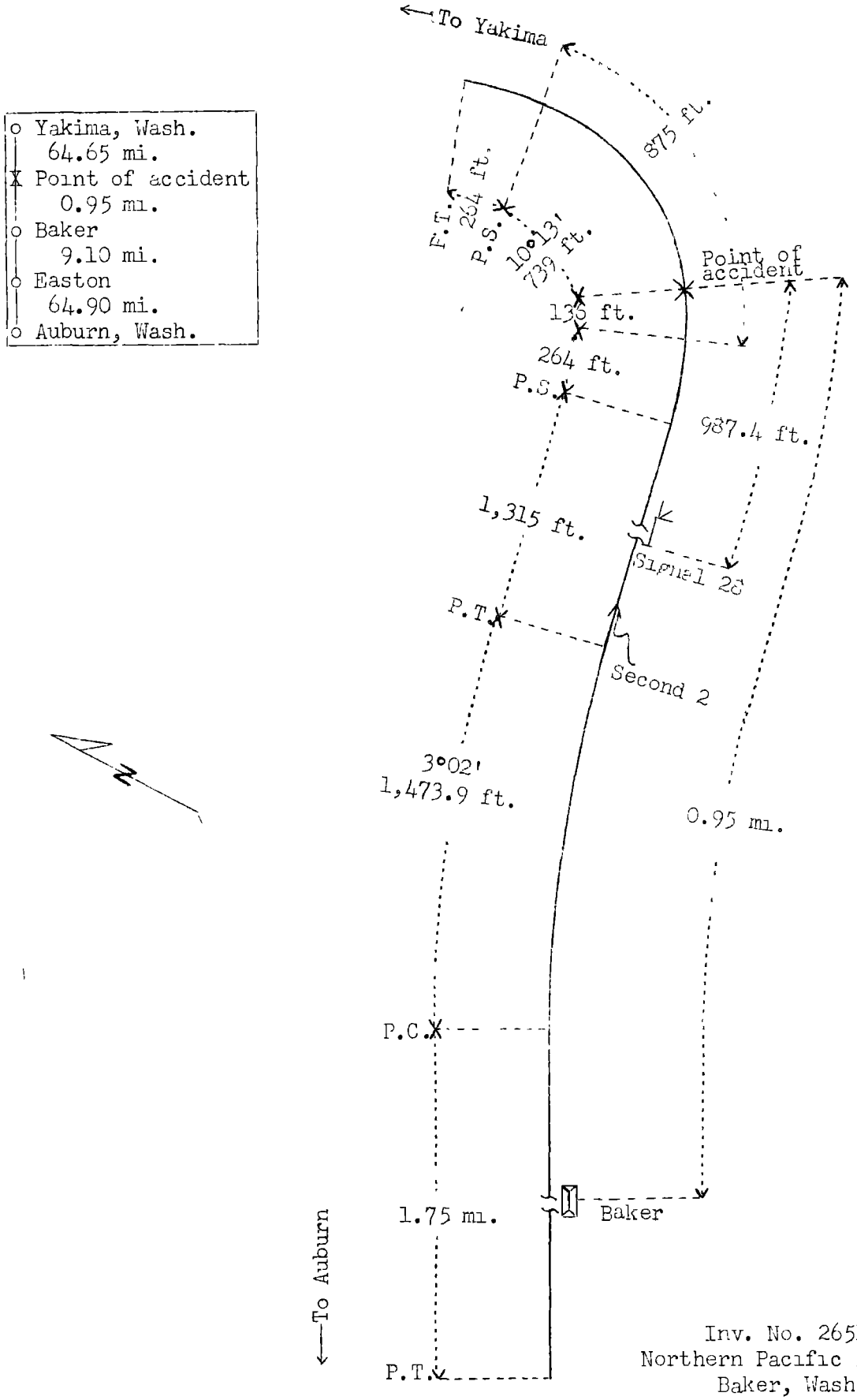
[1]Under authority of section 17 (2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Commissioner Patterson for consideration and disposition.



Inv. No. 2651
Northern Pacific Railway
Baker, Wash.
November 20, 1942

Location of Accident and Method of Operation

This accident occurred on that part of the Tacoma Division designated as the First Sub-division and extending between Auburn and Yakima, Wash., a distance of 139.6 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. The accident occurred on the main track at a point 0.95 mile east of Baker. Approaching from the west there are, in succession, a tangent 1.75 miles in length, a 3°02' curve to the right 1,474 feet in length, a tangent 1,515 feet, a spiral to the left 264 feet, and a 10°13' curve to the left 375 feet. The accident occurred on the last-mentioned curve at a point about 133 feet east of its western end. The grade for east-bound trains varies between 0.77 and 0.21 percent descending a distance of 1,700 feet to the point of accident and is 0.21 percent at that point.

On the curve involved the track structure consists of 131-pound rail on the high side and 130-pound rail on the low side, 39 feet in length, laid on 24 treated hardwood ties to the rail length; it is fully tieplated, double-spiked, provided with 20 rail anchors per rail length, and is ballasted with gravel to a depth of 8 inches. During 1941 rail ends were built up by welding. On the curve involved the superelevation varies between 4-1/8 and 4-5/8 inches and the gage varies between 4 feet 8-7/8 inches and 4 feet 9-1/2 inches.

In the vicinity of the point of accident the track parallels the north bank of the Yakima River and is laid on a hillside cut. At a point 36 feet horizontally distant from the center of the track, the top of the embankment is 18 feet below the tops of the rails.

Automatic signal 28, which governs east-bound movements, is located 1,038 feet west of the point of accident.

The maximum authorized speed on the curve involved is 30 miles per hour. A speed-limit sign bearing the numerals "30" is located 884 feet west of the west end of the curve and 13 feet south of the center-line of the track. On tangent track the maximum authorized speed is 65 miles per hour.

Description of Accident

Second 2, an east-bound first-class passenger train, consisted of engine 2249, of the 4-6-2 type, one dormitory-baggage car, five Pullman tourist cars, one dining car and two Pullman sleeping cars, in the order named. All cars were of steel construction. After a terminal air-brake test was made this train departed from Auburn, 74 miles west of Baker, at 9:53 p. m., November 19, according to the dispatcher's record of movement of trains, 23 minutes late, departed from Easton, 9.1 miles west of Baker and the last open office, at 12:18 a. m., November 20, 32 minutes late, passed signal 28, which displayed proceed, and

while moving at a speed estimated by the crew as 30 to 35 miles per hour the engine and first five cars were derailed on a 10°13' curve to the left at a point 0.95 mile east of Baker.

Engine 2249 was derailed to the south and stopped on its right side in reverse direction, down the embankment at a point 315 feet east of the point of derailment and about 100 feet south of the track. The engine truck was detached and the cab was demolished. The tender was torn loose from the engine and stopped, badly damaged, 25 feet west of the engine. The cistern was torn from its frame and both trucks were detached. The first car stopped down the embankment on its right side between the engine and the tender. The second, third and fourth cars were derailed and stopped in a tangential line to the curve. The front truck of the fifth car was derailed. These cars were considerably damaged.

It was hazy at the time of the accident, which occurred about 12:30 a. m.

The train-service employee killed was the engineer. The train-service employees injured were the fireman and the flagman.

Mechanical Data

After the accident an inspection of engine 2249 disclosed that all flanges were of good contour and the height and thickness were within the prescribed limits. The maximum tread wear was 3/32 inch. The lateral motion of all wheels and the back-to-back measurements of the driving-wheel tires and the engine-truck wheels conformed to prescribed requirements. The spring rigging was in suitable condition for service. Throughout a portion of its circumference the right trailer-wheel tire had moved outward from its seat on the wheel-center a distance of 2-5/8 inches; however, on the opposite portion of the circumference the tire was tight on the wheel-center. A deep indentation about 4-1/2 inches in length was on the outer face of the wheel-center at the tire seat. There was no indication that the tire was loose prior to the derailment.

The total weight of engine 2249 in working order is 316,600 pounds. The diameters of the engine-truck wheels, driving wheels and trailer-truck wheels are, respectively, 36-1/2 inches, 70-15/16 inches and 45-3/4 inches. The tender is rectangular in shape and is equipped with two four-wheel trucks. The weight of the tender loaded is 198,500 pounds. The rigid wheelbase of the engine is 13 feet 2 inches long, and the total length of the engine and tender is 84 feet 6-7/8 inches. The center of gravity is 76 inches above the top of the rails.

Track Data

After the accident, measurements of the track taken between points 406 and 55 feet west of the point of accident were as follows:

Distance west of point of accident	Superelevation	Gage
406 feet	0	4 feet 8-5/8 inches
367 feet	3/4 inch	4 feet 8-5/8 inches
328 feet	1-5/8 inches	4 feet 8-3/8 inches
289 feet	2 inches	4 feet 8-1/2 inches
250 feet	2-3/4 inches	4 feet 8-3/4 inches
211 feet	3-1/4 inches	4 feet 9-1/8 inches
172 feet	3-3/4 inches	4 feet 9-1/4 inches
133 feet	4 inches	4 feet 9-1/2 inches
94 feet	3-7/8 inches	4 feet 9-1/4 inches
55 feet	4-1/4 inches	4 feet 9 inches

According to data furnished by the carrier the equilibrium, comfortable, safe and overturning speeds on a 10°13' curve having a 4-1/2-inch superelevation are, respectively, 26-1/2, 34, 39, and 59-1/2 miles per hour.

Discussion

Second 2 was moving on a 10°13' curve to the left having a superelevation of approximately 4-1/2 inches when the engine and the first four cars were derailed and overturned to the right. The maximum authorized speed on the curve was 30 miles per hour. The last automatic signal displayed proceed for this train. There was no defective condition of the engine prior to the accident, and there was no indication of dragging equipment, defective track, or of any obstruction having been on the track.

According to the statement of the fireman, as the train was approaching the point where the accident occurred the headlight was lighted, the speed was about 60 miles per hour, and the engineer and he were maintaining a lookout ahead. It was somewhat hazy in the vicinity of the point of accident. When the train reached a point which the fireman thought was about 3,100 feet west of the curve involved, the engineer made a brake-pipe reduction to reduce speed on a 3°02' curve at that point, then released the brakes. The fireman said that the speed was materially reduced and was not increased after the brakes were released. Soon afterward the engineer made a brake-pipe reduction for the 10°13' curve and when the engine entered the curve it overturned to the right. The engine had been riding smoothly and there was no thrusting or swinging before it overturned. He thought his train was moving at normal speed when the derailment occurred; however, he was seriously injured in the accident and was somewhat confused as to what occurred. The conductor, the front brakeman and the flagman estimated the speed to be 30 or 35 miles per hour at the time of the accident; however, these members of the crew were inside the cars, which were being moved under black-out regulations. The engineer of First 2 said that when his train passed around the curve involved, about 20 minutes before the accident occurred, fog restricted visibility to about 200 feet. At that time the engine rode smoothly on the curve. He said that when the speed is 65 miles per hour it is customary for passenger engineers to make a 6-pound brake-pipe reduction

about 1 mile west of the curve, make further reductions if necessary to reduce the speed to 30 miles per hour and, just before the engine reaches the curve, release the brakes so that the train will ride smoothly on the curve. Since the engineer of Second 2 was killed in the accident it could not be definitely determined what action was taken. The brakes of Second 2 had been tested and had functioned properly en route.

After the accident, examination of the track disclosed that the engine and the first four cars had overturned without marking the rails or roadbed. The only abnormal marks on the track structure were flange marks on six ties which were made by the front truck of the fifth car. Two angle bars were freshly broken as a result of the track shifting outward during the derailment. According to A. R. E. A. tables and data furnished by the carrier, the overturning speed on the curve involved was 59-1/2 miles per hour, and the maximum safe speed, 39 miles per hour. The investigation disclosed that between any two adjacent stations 39 feet apart the greatest variation in surface was 1/2 inch and in gage, 5/8 inch. No doubt these variations resulted in the engine rolling and pivoting to some extent, but since the engine and cars overturned to the outside of the curve without marking the rails and continued in practically a tangential direction after overturning, evidently the train was moving at overturning speed, and the estimates given by the members of the crew were considerably lower than the actual speed.

Apparently the engineer was lost as to location, as he released the brakes after controlling the speed on the 3°02'- curve 3,100 feet west of the curve on which the accident occurred. The sign limiting the maximum authorized speed to 30 miles per hour on the curve involved is located only 884 feet west of the curve, and action to reduce speed to 30 miles per hour before an engine enters the curve would be required at some point west of this sign. If the engineer was lost as to location, it is probable that if this sign had been located a sufficient distance west of the curve involved he would have been warned in time to take action, and this accident could have been averted.

Cause

It is found that this accident was caused by excessive speed on a sharp curve.

Dated at Washington, D. C., this first day of January, 1943.

By the Commission, Commissioner Patterson.

W. P. BARTEL,

(SEAL)

Secretary.