INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY IN RE INVESTIGATION OF AN ACCIDENT WHICH OCCURRED ON THE NORTHERN PACIFIC RAILWAY NEAR TACOMA, WASH., ON JULY 5, 1923.

August 2, 1923.

To the Commission:

On July 5, 1923, an Oregon-Washington Railroad & Navigation Company passenger train struck a land slide and was derailed while running over the tracks of the Northern Pacific Railway near Tacoma, Wash., resulting in the death of 1 employee, and the injury of 15 passengers and 2 employees. This accident was investigated in conjunction with representatives of the Department of Public Works and the Department of Labor and Industry, of the State of Washington.

Location and method of operation.

This accident occurred on the First subdivision of the Tacoma Division, extending between Tacoma and Vancouver, Wash., a distance of 136.4 miles. This is a double-track line over which trains are operated by timetable, train orders, and a manual block-signal system. The tracks between Tacoma and Vancouver, Wash., are owned by the Northern Pacific Railway, and a traffic agreement with the Oregon-Washington Railroad & Navigation Company provides for the operation of their trains over this section of track.

The accident occurred at a point 7 65 miles west of Tacoma, approaching this point from the west there is a 2-degree curve to the right 738 feet in length, the track is then tangent for 3,421 feet, following which is a 2-degree curve to the left 775 feet in length, the accident occurring on this curve 475 feet from its western end. The grade for 2,200 feet is 0.30 per cent ascending and is then 0.22 per cent ascending to the point of derailment, a distance of approximately 600 feet.

The tracks, at the point of derailment and for several miles in either direction are about 20 feet above the shore line of Puget Sound, on the opposite side of the tracks are bluffs 175 feet high at some points The track is laid with 90-pound rails, 33 feet in length, double-spiked, tie-plated, with an average of 19 ties to the rail-length, and ballasted with gravel. The alinemen

gauge and surface were in good condition. A time-table rule restricts the speed of passenger trains to 60 miles an hour. The curve and bluffs restrict the range of vision of an engineman on an eastbound train to about 400 feet, while the fireman may see the track ahead for a distance of about 2,500 feet.

It was daylight and the weather was clear at the time of the accident, which occurred at about 4.47 a.m.

Description.

Eastbound Oregon-Washington Railroad & Navigation Company passenger train No. 564 consisted of two baggage cars, three coaches and six Pullman sleeping cars, all of all-steel construction with the exception of the first baggage car, which was of wooden construction, hauled by engine 3219, and was in charge of Conductor Pyncheon and Engineman Roddy. This train passed Sixth Avenue station, the last open office and approximately 3 miles west of the point of derailment, at 4.42 a.m., 25 minutes late, and was derailed about five minutes later while traveling at a speed estimated to have been between 35 and 40 miles an hour.

Engine 3219 and its tender were derailed to the right, and came to rest with the front end of the engine approximately 315 feet from the initial point of derailment, the engine lying on its right side. The wooden baggage car was demolished, and later entirely destroyed by fire, while the next four cars were derailed and slightly damaged, the fourth car being badly damaged by the fire The employee killed was the engineman.

Summary of evidence.

Fireman Watson said that approaching the point of derailment the speed of the train was about 35 miles an hour, and that both he and Engineman Roddy were observing the track ahead. He stated that the slide came down directly in front of the engine, not more than 20 feet in advance, and there was not time enough to stop or call a warning to each other. Statements from the other employees on the train were to the effect that there was no air-brake application prior to the time of the derailment. The speed of the train was estimated by the train crew to have been between 35 and 40 miles an hour.

Mr. Temple, a civilian and an eye-witness of the accident, stated that he was in a boat fishing about a mile from the shore opposite where the slide occurred. His attention was first attracted by a rumbling noise and he then noticed the headlight of the engine, a few seconds later he heard a loud crash, the headlight disappeared and the train came to a stop, a fire breaking out very shortly afterwards. Mr. Stopnak, also a civilian, was with Mr. Temple and corroborated his statements.

Examination of the engine after the derailment disclosed the fact that the brake valve was in running position and the throttle closed.

The formation of the sides of the bluff and cuts consists of a top of loose gravel, a stratum of sand and a sub-base of clay and hard pan soil, and Roadmaster Ager, who has had charge of the tracks in this section for the past five years, stated that the bluff near the point of accident contains springs in all of its formation. He said that rains often cause the sand to be washed from under the gravel, resulting in a sloughing off of the face of the cuts. He advanced the opinion that the slide was caused by underground springs forming a water pocket sufficiently large to force the clay stratum loose and cause the top layer of gravel and sand to slide down upon the tracks.

Assistant Engineer Gaylord, of the Northern Pacific Railway, estimated the slide to have been about 310 yards in volume, covering the westbound track to a depth of about 1 foot and the eastbound track about 3 feet, and was of the opinion that there was still about 75 cubic yards of debris ready to come down at any time.

A drainage ditch 15 feet wide on the inside of the track next to the bluff is maintained by the railroad company and a ditching crew is employed throughout the year to maintain the ditch through this section. A patrolman is also employed during the rainy season, but as the weather had been dry during the past two months his services had been discontinued Slow orders over this section of track are also issued during the rainy season.

Between mile posts 7 and 8, within which distance the accident occurred, there are five concrete culverts, three timber culverts, and one box culvert. Of this total of nine culverts, three are located in front of the point where this slide occurred. These culverts are used to drain the water from the cuts and bluffs

under the track into the sound. In the vicinity of the point of derailment and between mile posts 7 and 8, there are 15 small streams draining off of the side cuts into the ditch paralleling the tracks. These streams are fed by underground springs. It is to be noted that during the period of 30 days preceding the time of this accident less than one-half inch of rain fell. The fact that during the time when there was very little rainfall there was enough water drained from the side cuts to feed 15 small streams and even cause a slide, as in this instance, gives weight to the theory advanced that a water pocket formed and undermined the top strata of gravel and sand and with the clay slid down the face of the cut onto the tracks.

Mr. I. A. Williams, geologist of the Oregon Bureau of Mines, who has made an extensive study of this particular locality in connection with a proposed power transmission line, was of the opinion that the drainage ditch is not sufficient protection from a recurrence of similar slides. The ditch serves only to drain the water from the sides of the bluffs into the sound, preventing it from undermining the grade which supports the tracks. Mr. Williams was also of the opinion that the character and formation of the terrain in this vicinity is such as to warrant a through investigation of the source of suppl of the water now draining from the bluffs, and, through conduits, control its flow so that slides of this nature may be prevented, saying that unless this drainage is controlled, surface slides may be expected at any time.

The last train to pass this point prior to the time of the accident was eastbound Northern Pacific train No. 680, which passed at about 2.25 a.m.

Conclusions.

This accident was caused by a landslide.

The evidence indicated that the slide came down directly in front of the train, and that there was no opportunity of bringing the train to a stop, or even of reducing its speed, before encountering the slide. It also appears that it is necessary to take extra precautions in this vicinity during the rainy season, but that this season had passed and that at the time of this accident there had been very little rain for several weeks. The hill side above the tracks, however, appears to have considerable water seeping through it at all times, and in the opinion of the geologist of the Oregon Bureau of Mines, slides are apt to occur unless the flow of this

water is controlled. Under these circumstances, it is believed that extra precautions should be taken to insure safe operation of trains until arrangements can be made to provide for an effective method of controlling the water.

At the time of the accident the engine crew of train No. 564 had been on duty less than 6 hours, after 15 hours off duty.

Respectfully submitted,

W. P. BORLAND

Director.