INTERSTATE COMMERCE COMMISSION

REPORT OF THE DIRECTOR OF THE BUREAU OF SAFETY CONCERNING AN ACCIDENT ON THE NORTHERN PACIFIC RAILWAY NEAR ARROW, IDAHO, ON JANUARY 23, 1934.

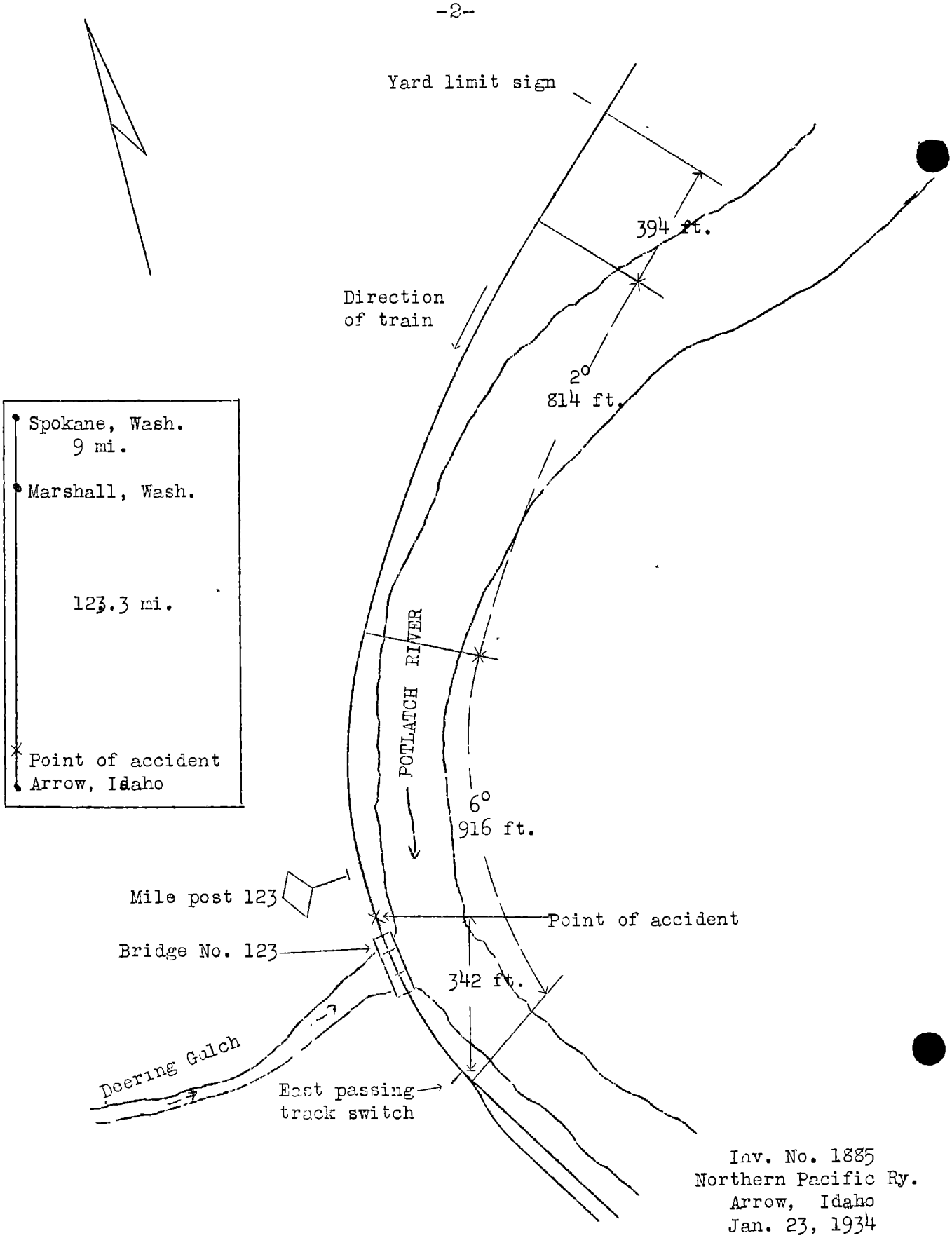
April 9, 1934.

To the Commission:

On January 23, 1934, there was a derailment of a passenger train on the Northern Pacific Railway near Arrow, Ida., which resulted in the death of 1 employee and the injury of 1 trespasser.

Location and method of operation

This accident occurred on the Palouse and Lewsiton Branch of the Idaho Division, which extends between Marshall, Wash., and Arrow, Ida., a distance of 123.3 miles. In the vicinity of the point of accident this is a single-track line over which trains are operated by time table and train orders, no block-signal system being in use. The accident occurred within yard limits, immediately east of the east end of bridge 123, which is located about 300 feet east of the east passing-track switch at Arrow and practically opposite mile post 123. Approaching the point of accident from the east, the track is tangent for a distance of 1,629 feet, followed by a compound curve to the left approximately 1,730 feet in length, the first half consisting of 2° curvature while the western half consisted of 6° curvature, the accident occurring on this latter portion at a point about 361 feet from its western end. At the point of accident the grade for westbound trains is 0.476 percent descending. The track follows the north bank of the Potlatch River for more than 1,000 feet in the vicinity of the point of accident and is on a fill about 20 feet in width, 15 feet in height and 1,350 feet in length. The track is laid with 90-pound rails, 33 feet in length, with 18 ties to the rail length, fully tieplated and single-spiked. The roadbed is composed of 6 inches of Mesa gravel ballast upon 6 feet of cemented gravel embankment, with a sub-grade of large gravel and boulders, and protected against high water by derrick-size riprap on the slope of the embankment. The track is fairly well maintained. On the north side of the track there was a ravine at right angles to the track, known as Deering Gulch, and the bridge involved in this accident spanned Deering Gulch at its junction with Potlatch River. Portions of riprap on both the east and west approaches to bridge 123 were lost in the high water of December 22, 1933, and for a distance of about 60 feet on each side of the bridge the riprap had not been fully replaced prior



Inv. No. 1885
Northern Pacific Ry.
Arrow, Idaho
Jan. 23, 1934

to the occurrence of the accident. Bridge 123 was a 3-span pile bridge, 45 feet in length, with bulkheads at each end, and was renewed complete in September, 1931.

During the night of January 22, there had been a heavy rain causing a heavy flow of water in Deering Gulch, and there also had been heavy rains and a rise in the Potlatch River at points east of the scene of accident which necessitated the use of 65 or more men to protect the track between mile posts 114 and 123. It was not raining at the time of the accident, which occurred at 3:30 a.m.

Description

West-bound passenger Train No. 313 consisted of 1 combination mail, express and baggage car, 1 combination baggage car and coach, and 1 coach, hauled by engine 2139, and was in charge of Conductor Vermeers and Engineman Maloney. The first car was of steel construction and the other two were of wooden construction. Train order 598, received at Pullman, 47.7 miles east of Arrow, restricted the speed at various points west of mile post 113, including a restriction of 15 miles per hour from the east yard-limit board at Arrow to the east switch at Arrow. This train passed Troy, Ida., 23.9 miles east of Arrow, at 1:35 a.m., 5 minutes late, was stopped several times in the restricted area, and on approaching Arrow was derailed near bridge 123 while traveling at a speed estimated to have been between 6 and 10 miles per hour.

Engine 2139 stopped on its left side on the south side of the track in the Potlatch River, opposite the eastern end of the bridge and partly submerged in about 4 feet of water. The tender, coupled to the engine, was practically on its left side with its left front corner held suspended by the engine. The employee killed was the fireman.

Summary of evidence

Engineman Maloney stated that it was necessary to reduce speed at several points en route in accordance with the slow orders received, and he was flagged at three points, the last time being at mile post 122. After leaving that particular restricted area, which extended about 1,000 feet west of mile post 122, he increased the speed of his train and on reaching the east yard-limit board at Arrow, 1,777 feet from bridge 123, he applied the air brakes for the purpose of reducing the speed to 15 miles per hour; when approaching the bridge he made another light application, reducing the speed still further, and the next thing he knew the engine turned over in the river while traveling at a speed of about 10 miles per hour. It seemed to Engineman Maloney that the rear end of the engine started over first; the engine had not reached the bridge, but struck the east bulkhead of the bridge in its downward plunge. Engineman Maloney had been leaning out of his side window and while he could not state positively he thought the fireman also

was looking out of his side window and it was his idea that if the fill had been washed out the fireman would have seen it.

Conductor Vermeers said the approaches on both sides of the bridge had been washed out and the east bulkhead shoved westward; the fill on the east side had been washed out to the center of the track for a distance of 30 feet and on the west side for a distance of 50 or 60 feet. Conductor Vermeers estimated the speed of the train at the time of the accident to have been 6 or 7 miles per hour, and said that while stopped at mile post 122 there were severe gusts of rain and wind and it was evident that there had been a heavy rain there, but on approaching the point of accident there was no rain.

Flagman Robertson did not make a detailed examination of the track and bridge but saw that the bridge had been shoved forward and he thought the derailment occurred about two rail-lengths east of the bridge; the fill was missing under the south rail just east of the bridge, where the engine had overturned into the river, but the north rail was properly supported by the fill up to the bulkhead.

Supervisor of Bridges and Buildings Stang, who arrived at the scene of the accident about noon, thought the derailment occurred about 5 feet east of the east bulkhead, the engine dropping low enough for the pilot beam to strike the bulkhead and thus causing the damage which the bridge had sustained. The fill was gone from under the south rail, the missing portion extending diagonally across the fill from about the north rail, at the east end of the bridge, to the outside edge of the fill on the river side, for a distance of 50 feet. The fill at the west end of the bridge was washed out under the south rail for a distance of 100 feet, 30 feet of which had been washed out as far as the center of the track. The riprap and embankment slope were intact from a point 50 feet east of the bridge back to and beyond where the coaches stood after the derailment. Supervisor Stang stated that the volume of water flowing down Deering Gulch was more than he had ever seen before, but there was no indication of an eddy at the junction with the river other than a small one caused by the engine lying at the mouth of the gulch, and it was his opinion that the washout was due to high water in the Potlatch River.

Section Foreman Walsh, in charge of the section on which the accident occurred, stated that during the past month he had been repairing damage tothe track due to washouts that occurred during the latter part of December, and the last work that had been done near bridge 123 was on January 30. A new fill had been put in which necessitated that the track across the bridge be raised about 4 inches and after this work had been completed he

considered the track at that point to be safe for a speed of at least 25 miles per hour. Before the occurrence of the accident he was last over bridge 123 about noon on January 21; during the day and night of January 22 he had a large force of men assisting in protecting the track in the vicinity of mile posts 114, 116, 118 and 122, due to the heavy rains and high water in the river. He went from one point to another, supervising the work and obtaining necessary material to protect the track, and had intended to proceed to Arrow ahead of Train No. 313; he did not expect any trouble near Arrow, but had his work pretty well lined up and under control and thought he would take time to go to the end of his section. While at mile post 120, however, he received a telephone call from one of his men at mile post 116, to the effect that the track had washed out at that point and there would be no passenger train through that morning. He therefore changed his mind and proceeded eastward toward mile post 116 and as he reached bridge 118 he saw the headlight of Train No. 313. He flagged the train and held it there until he proceeded down to mile post 122 and after seeing that the track was safe, Train No. 313 was allowed to pass, the section foreman stating that in his hurry and excitement he gave up the idea of going down to Arrow, and from the depth of the water at that time he was satisfied in his own mind that everything would be all right at bridge 123.

Track Supervisor Blevins stated that he made an inspection of bridge 123 about 11 a.m., January 22, inspecting the banks on both sides of the bridge, and there was no indication of any cutting or washing. At that time the water in the river was not high enough to reach the new material which had been placed in the fill after the washout of December 22, and there was very little water in Deering Gulch Creek. In talking with Section Foreman Walsh that evening the section foreman said he would protect the track during the night and would call the supervisor if he were needed. The section foreman called him about 12:30 a.m. January 23 and said that everything was all right, and from his conversation with the section foreman it was his impression that the section foreman would go ahead of Train No. 313 to Arrow. Track Supervisor Blevins stated that he did not anticipate any trouble near bridge 123, that he considered the track to be safe for a speed of 30 miles per hour, and that it was fully protected by the slow order of 15 miles per hour. On previous occasions, however, it had been advisable to have trains stop and examine bridges during high-water periods when no patrol had preceded the trains. The statements of Rodman Henry corroborated those of Supervisor Blevins as to the condition of the fill at bridge 123 on the morning of January 22; he stated that the fill did not have the appearance of raveling or slipping in any way.

The testimony of Assistant District Engineer Young was to the effect that the 3-span bridge built in 1931 replaced a 1-span bridge which had been washed out in March, 1931. The fill on both sides of the bridge was replaced with slide rock which remained in place until December 22, 1933, at which time the water in the Potlatch River overflowed the tracks at that point, rising to a height of 6 inches above the ties, and the embankment at the east bulkhead of the bridge was washed out to a depth of 6 feet; prior to this washout the riprap extended 15 feet below the top of the ties, but only the lower 9 feet of the riprap remained after the washout. In replacing this fill the material used consisted of gravel, from egg size to small boulders, and was of a cementing nature that he considered excellent for that purpose, although until it became compact, water action would have a tendency to cause erosion and softening. There was high water again on December 29 and 30, 1933, and on January 3 and 4, 1934. Assistant District Engineer Young arrived at the scene of the accident about 6 a.m. on the date of the accident and at that time the water in Deering Gulch was 1 foot 8 inches below the tops of the ties and the water in the Potlatch River was 4 feet below the tops of the ties and 2 feet above the top of the riprap at the east end of the bridge. It was his opinion that the accident was caused by the water from the gulch seeping through the fill at the east end of the bridge, together with a possible eddy created by water from the gulch emptying into the river, the fill being saturated from a point 2 feet below the tops of the ties down to the bottom of the new embankment, and he thought the saturation weakened the fill to the extent that it sloughed out under the weight of the engine. Engineer Young further stated that after heavy rains there would be a heavy flow of water in the gulch for short periods of time, after which the stream would be comparatively dry.

Roadmaster Thomson stated that on January 2 the water in the Potlatch River was about 1 foot above the riprap; it had no apparent effect on the new fill and did not cause the track to settle. With reference to the occurrence of the accident, it was his opinion that the presence of the riprap and other fill material under engine 2139 after the accident indicated that the fill slid out with the engine.

Bridge and Building Foreman Hollenstein stated that the last work on bridge 123 was when he raised the track on the bridge 4 inches on January 17, and after his examination of the bridge after the accident he was of the opinion that the bridge had not been distrubed by high water.

The engine crew of freight Train No. 662, which left Arrow east-bound about 7:10 p.m., January 22, the last train to pass over bridge 123 before the occurrence of the accident, stated that as their train proceeded through that territory at a speed of 5

miles per hour they observed that the water was high in both the river and the creek. The water in the creek was flowing at a rapid rate and was about 3½ feet from the ties, but was not doing any damage and the engineman did not consider it serious enough to be reported, neither did he consider the water in the river to be dangerously high; it was not raining at that time. The engineman further stated that the weight of his engine was more than that of engine 2139, and in passing over this point he noticed nothing unusual or unstable about the fill.

Trainmaster Nichols stated that he went over bridge 123 on Train No. 314 at 3:30 p.m., January 22, and the water was high in both the creek and the river. The water was flowing clearly under the bridge and he thought the water was about 4 feet from the top of the bank at the east end of the bridge.

Conclusions

This accident was caused by a washout.

The evidence indicates that on December 22, 1933, a great deal of damage was done by high water between Kendrick and Arrow, a distance of about 13 miles, at which time the fills to the approaches of bridge 127 were washed out in very much the same manner as on the night of this accident; the fills were replaced, but not the riprap. No official information could be obtained as to the rainfall on the night of the accident, but the evidence indicates there was a heavy downpour resulting in a considerable volume of water flowing into the river from Deering Gulch. While the water in the river did not rise tothe height it reached on December 22, it reached the new fill on which the riprap had not been replaced, and it is believed that this fill was undermined by the action of the water from the Potlatch River, which had been at a high-water stage for some time; the erosion or undermining possibly was intensified to some extent by the large flow of water from Deering Gulch. There is a question whether the fill slid out under the weight of the engine or had been washed out prior to that time; the fill at the west approach, however, was found to have been washed out in the same manner and to the same or even a greater extent, and it is possible that the fill at the east approach also was missing, under the south rail, at the time of the arrival of Train No. 313.

Due to the very unusual water conditions prevailing in that district during the month preceding the date of the accident, all available forces had been employed at points considered dangerous, and on the night of the accident a large number of men were working between mile posts 114 and 122, but it was not thought that there would be trouble at bridge 123 as long as the water in the Potlatch River did not rise any higher, and in this

connection it is noted that on December 22 the water in the river was 6 inches above the ties at bridge 123 while on the night of the accident the highest water was 4 feet below the tops of the ties.

Inspection was made by Track Supervisor Blevins about 11 a.m. January 22, and Trainmaster Nichols observed conditions when he passed over bridge 123 at 3 p.m., while the engineman of the train passing about 7:10 p.m. did not think conditions were serious enough to be reported at that time. Considering the record of washouts at this point, combined with the knowledge that this was a new fill which would not have the stability of an old fill and was unprotected by riprap, those in charge should have realized that there was a very definite possibility of water trouble and should have ascertained conditions at that point before allowing Train No. 313 to proceed, or should have arranged for the crew of the train to stop and examine conditions at that point. Trainmaster Nichols, who was in charge of work trains, and Roadmaster Thomson, who had charge of the track crews, both were absent from the immediate vicinity and the entire track and water supervision responsibility was placed on Track Supervisor Blevins, who on the night of the accident made an arrangement with Section Foreman Walsh to assume charge of the local situation in order to allow Track Supervisor Blevins to get some sleep. Seation Foreman Walsh had started to go to Arrow from mile post 122, but when notified that the track had washed out at mile post 116 and that there would not be any passenger train coming through, he started east toward mile post 116 and then encountered Train No. 313 at mile post 118. The track then was patrolled as far west as mile post 122 and the train allowed to proceed. It is realized that the track supervisor and section foreman had been working long hours under unusual weather conditions for some time, but in view of those unusual weather conditions and the trouble experienced in the past at this point, as well as on the night of the accident at other points, the entire section should have been patrolled immediately ahead of Train No. 313.

The difficulties experienced in this territory clearly indicate the necessity for taking unusual precautions if train service is not to be suspended entirely during periods of high water; such action should not be necessary, however, if adequate protection, such as riprap, is provided and maintained at fills exposed to water action, and if, in addition , all bridges and other points of potential danger are examined immediately prior to the passage of trains.

Respectfully submitted,

W. J. PATTERSON

Director.