5.2 Rail Safety

Railroads provide transportation for passengers and a wide range of commercial goods, and support regional economic activity. Similar to other forms of transportation, rail traffic is subject to various regulatory requirements, including requirements for tracks, rail cars and locomotives, crew operations, inspection and maintenance, and methods and types of goods and services that can be transported. Rail safety for this analysis refers to train derailments and collisions that could lead to a loss of cargo.

This section assesses impacts on rail safety that could result from construction and operation of the Proposed Action and No-Action Alternative. This section describes the regulatory setting, presents historical and current rail safety conditions in the study area, and assesses potential rail safety impacts for the Proposed Action and No-Action Alternative. Section 5.3, *Vehicle Transportation*, addresses grade crossing safety related to vehicle transportation. This section also presents measures to mitigate impacts resulting from the Proposed Action and any remaining unavoidable and significant adverse impacts.

5.2.1 Regulatory Setting

Laws and regulations relevant to rail safety are summarized in Table 5.2-1. Regulations pertaining to grade crossings are presented in Section 5.3*, Vehicle Transportation.*

Table 5.2-1. Regulations, Statutes, and Guidelines for Rail Safety

Regulation, Statute, Guideline	Description
Federal	
Federal Railroad Safety Act of 1970	Gives FRA rulemaking authority over all areas of rail line safety. FRA has designated that state and local law enforcement agencies have jurisdiction over most aspects of highway/rail grade crossings, including warning devices and traffic law enforcement.
Highway Safety Act and the Federal Railroad Safety Act	Gives FHWA and FRA regulatory jurisdiction over safety at federal highway/rail grade crossings.
Federal Railroad Administration General Regulations (49 CFR 200–299)	Establishes railroad regulations, including safety requirements related to track, operations, and cars.
State	
Title 81, Transportation—Railroads, Employee Requirements and Regulations (RCW 81.40)	Establishes general requirements for railroad employee environment and working conditions, the minimum crew size for passenger trains, and requirements for flaggers.
Title 81, Transportation—Railroads, Crossings (RCW 81.53)	Establishes requirements and process for railroad construction and extensions that would cross any existing railroad or highway at grade and vice versa. Includes approval from the commission.

Regulation, Statute, Guideline	Description
Rail Companies—Clearances (WAC 480-60)	Establishes clearances for railroad companies operating in Washington State. Includes rules of practice and procedure, walkway clearances, side clearances, track clearances, side clearances, track clearances, and rules for operation of excess dimension loads.
Rail Companies—Operation (WAC 480-62)	Establishes operating procedures for railroad companies operating in Washington State.
Local	
No local regulation, statutes, or guidelines apply to rail safety.	

Notes:
FRA = Federal Railroad Administration; FHWA = Federal Highway Administration; CFR = Code of Federal Regulations; USC = United States Code; RCW = Revised Code of Washington; WAC = Washington Administrative Code

5.2.2 Study Area

The study area for direct impacts on rail safety is the project area. The study area for indirect impacts on rail safety is the expected rail routes of Proposed Action-related trains within Washington State, as illustrated in Figure 5.1-1 in Section 5.1, *Rail Transportation*.

5.2.3 Methods

This section describes the sources of information and methods used to evaluate the potential impacts on rail safety associated with the construction and operation of the Proposed Action and No-Action Alternative.

5.2.3.1 Information Sources

The following sources of information were used to identify the potential impacts of the Proposed Action and No-Action Alternative on rail safety in the study area.

Rail accident data from the Federal Railroad Administration (FRA)[1] were used as the basis for the analysis. While the Washington Utilities and Transportation Commission (WUTC) gathers information on accidents that occur in Washington State, WUTC does not have the corresponding data on train miles within the state for determining accidents per million train miles traveled.

A train accident for this analysis is defined as involving one or more railroads that have sustained combined track, equipment, and/or structural damage in excess of the reporting threshold. The FRA reporting threshold was $10,500 in 2015. Therefore, an accident includes a wide variety of incident types and severity and is not limited to collisions or derailments.

[1] The Federal Railroad Administration (FRA) was created by the U.S. Department of Transportation Act of 1966. It is one of ten agencies within the U.S. Department of Transportation concerned with intermodal transportation. FRA's mission is to enable the safe, reliable, and efficient movement of people and goods. FRA has established federal regulations pertaining to the safety of interstate commerce. These regulations set standards that must be observed by all railroads dealing with the interchange of railroad cars and equipment.

Existing and Projected Rail Traffic

- **Reynolds Lead and BNSF Spur.** Existing (2015) and projected (2028) rail traffic on the Reynolds Lead and BNSF Spur was based on estimates from the Longview Switching Company (LVSW) and field observations.
- **BNSF main line routes**. Existing (2015) and projected (2028) rail traffic for BNSF Railway Company (BNSF) main line routes within Washington State was based on estimates from the *Washington State Rail Plan* (Washington State Department of Transportation 2014a).

Proposed Action-Related Train Operations

- **Volumes.** Proposed Action-related rail traffic to the project area was provided by the Applicant, notably 8 loaded and 8 empty trains per day if the coal export terminal is constructed and operated at full terminal throughput in 2028.
- **Routes.** Routes to and from the project area within Washington State were based on existing BNSF operations and Washington State Department of Transportation documents including the *Washington State Rail Plan* and *Washington State Freight Mobility Plan* (Washington State Department of Transportation 2014b).[2] Figure 5.1-1 in Section 5.1*, Rail Transportation*, illustrates the expected routes for Proposed Action-related trains in Washington State.
- **Train parameters.** Train parameters including the number of rail cars were based on information provided by the Applicant and existing BNSF train operations.

Accident Rates

- **FRA data (2012–2014).** Accident rates were compiled from FRA data for 2012 to 2014.[3] Published literature was also used to identify derailment rates by track class.[4] Historically, accident rates (accidents per train mile) do not change dramatically from one year to the next, but generally trend downward over time because of improved control systems, communications, and inspection practices. The analysis used 3-year data to account for year-to-year variations. Typically, year-to-year accident rates are more consistent than year-to-year traffic volumes on any specific route, which may vary substantially as demands change.

5.2.3.2 Impact Analysis

The following methods were used to evaluate the potential impacts of the Proposed Action and No-Action Alternative on rail safety.

Accident Frequency

Accident rates for BNSF, Union Pacific Railroad (UP), and all railroads were calculated using FRA data for the 3 most recent years of available data (Table 5.2-2). Specific train accident rates for BNSF

[2] In 2012, BNSF introduced a directional routing strategy to enhance existing capacity, which routes all westbound-loaded unit trains (including coal) from Pasco to Vancouver via the Columbia River Gorge. Empty unit bulk trains (including coal) generated north of Vancouver, including Cowlitz County, travel to Pasco and to points east via Stampede Pass.

[3] 2014 data were the most recent available data when the analysis was completed.

[4] As part of its jurisdiction, FRA categorizes all tracks into track classes, segregated by maximum speed limits for freight and passenger trains. FRA maintenance and inspection requirements vary by track class.

in Washington State were not available in FRA data. LVSW did not have any reported train accident data in the FRA database because there were no train accidents on the Reynolds Lead or BNSF Spur from 2012 to 2014.

Table 5.2-2. Nationwide Train Accident Rates

	Accident Rate per Million Train Miles		
Year	All Railroads (Passenger and Freight Trains)	BNSF (Freight Trains)	UP (Freight Trains)
2012	2.41	2.20	3.04
2013	2.43	2.11	3.02
2014	2.27	1.89	2.82

Notes:
Source: Federal Railroad Administration (2015).
BNSF = BNSF Railway Company; UP = Union Pacific Railroad

Because Proposed Action-related rail traffic in Washington State would be on BNSF routes, a rate of two accidents per million train miles was used for the analysis.

FRA track safety standards establish nine specific classes of track (Class 1 to Class 9). Class of track is based on standards for track structure, geometry, and inspection frequency. Each class of track has a maximum allowable operating speed for both freight and passenger trains. The higher the class of track, the greater the allowable track speed and the more stringent the track safety standards that apply. Accident rates have been shown to vary considerably by track class, with higher accident rates (i.e., yielding more accidents for a given number of train miles) occurring on lower track classes. However, lower track classes have lower maximum operating speeds, which can reduce the consequences of the accidents that occur.

Data on accident rates by track class were used to generate a base accident rate for each route segment. The Reynolds Lead and BNSF Spur are currently maintained in accordance with the Track Class 1 standard. LVSW has indicated plans to make improvements to the Reynolds Lead and BNSF Spur to upgrade to a Track Class 2 designation, as described in Section 5.1, *Rail Transportation*. The Reynolds Lead and BNSF Spur would be maintained as Track Class 1 if planned improvements are not made. This analysis conservatively assumed Track Class 3 for all BNSF main line routes in Washington State.

The predicted number of accidents per year was calculated by multiplying segment length by the number of trains per year, by the applicable accident rate; the number was then adjusted for track classification based on published accident data research by track class.

The predicted accident per year for a segment can be summarized as follows.

(Segment length) x (Number of trains) x (Accident rate for segment x) = Predicted accidents per year for segment x

More information on these methods is provided in the *SEPA Rail Safety Technical Report* (ICF International 2016).

5.2.4 Existing Conditions

This section describes existing conditions in the study area related to rail safety that could be affected by the construction and operation of the Proposed Action and No-Action Alternative. Section 5.1*, Rail Transportation*, describes existing conditions for Proposed Action-related train routes in more detail.

Available data (Liu et al. 2012) indicate the average number of rail cars derailed on main line track (all classes and speeds) for 2001 through 2010 was 8.4 rail cars. The number of rail cars derailed on yard, siding, and industry track ranged from 4.3 to 5.7 rail cars.

5.2.4.1 Accidents in Cowlitz County

Based on FRA data, there were two accidents in Cowlitz County in 2014, and neither involved an injury or fatality. One incident was in a rail yard with no derailment and the other involved a derailment of 11 cars on main line track.

5.2.4.2 Accidents in Washington State

In Washington State, there were 36 accidents in 2014, two of which involved an injury. Thirteen accidents were on main line track, and the remainder were in rail yards or on industry track. Derailments (main line and industry track) involved between 0 and 11 rail cars.

5.2.5 Impacts

This section describes the potential direct and indirect impacts related to rail safety (train accidents) that would result from construction and operation of the Proposed Action and the No-Action Alternative.

5.2.5.1 Proposed Action

This section describes the potential impacts on rail safety that could occur in the study area as a result of construction and operation of the Proposed Action. Chapter 2, *Project Objectives, Proposed Action, and Alternatives*, describes construction-related activities and scenarios for transporting materials to the project area. Under the rail scenario, an average of 1.3 construction trains would travel to and from the project area per day. Construction impacts are based on the peak construction period, assumed to be in 2018. Operations impacts are based on the maximum coal export terminal throughput capacity (up to 44 million metric tons per year), which would result in 8 loaded and 8 empty trains per day in 2028.

Construction—Direct Impacts

Any accidents in the project area would be related to construction in the project area and would not affect rail safety on the Reynolds Lead.

Construction—Indirect Impacts

Construction-related activities associated with the Proposed Action could result in indirect impacts on rail safety as described below. As explained in Chapter 2, *Project Objectives, Proposed Action*, *and Alternatives,* construction-related activities include demolishing existing structures and preparing

the site, constructing the rail loop and dock, and constructing supporting infrastructure (i.e., conveyors and transfer towers).

Increase the Potential for Train Accidents

According to the Applicant, construction materials could be delivered by rail. This would require an estimated 350 loaded trains of 100 cars each, and 350 empty trains of 100 cars each. It is anticipated two-thirds of the construction material would be transported during the first year of construction in 2018 (approximately 467 trains, an average of 1.3 trains per day). Construction trains would use the Reynolds Lead and BNSF Spur. Because the specific main line routes for Proposed Action-related construction trains are not known, the expected routes for Proposed Action-related trains in Washington State during operations was used to illustrate the possible range of accident frequencies.

The predicted accident frequencies during the peak year of construction are shown in Table 5.2-3. Proposed Action-related construction rail traffic would have a relatively small increase on predicted train accidents.

Table 5.2-3. 2018 Predicted Train Accidents during Peak Year of Construction

Route Segment	Length (miles)	Predicted Train Accidents[a]
Inbound Route (Loaded Trains)		
Idaho/Washington State Line-Spokane	18.6	0.03
Spokane-Pasco	145.5	0.27
Pasco-Vancouver	221.4	0.41
Vancouver-Longview Junction	34.8	0.07
Longview Junction-LVSW Yard (BNSF Spur)	2.1	0.01
LVSW Yard-Project Area (Reynolds Lead)	5.0	0.03
Outbound Route (Empty Trains)		
Project Area-LVSW Yard (Reynolds Lead)	5.0	0.03
LVSW Yard-Longview Junction (BNSF Spur)	2.1	0.01
Longview Junction-Auburn	118.6	0.22
Auburn-Yakima	139.6	0.26
Yakima-Pasco	89.4	0.17
Pasco-Spokane	145.5	0.27
Spokane-Idaho/Washington State Line	18.6	0.03

Notes:
[a] Accidents related to Proposed Action-related trains; these would be additive to baseline conditions.

Operations—Direct Impacts

During operations at full terminal capacity, 8 loaded trains would travel to the project area, and 8 empty trains would travel from the project area daily. These trains would maneuver along the rail loop in the project area. The predicted accident frequency within the project area was not analyzed because the rail loop is in an industrial facility.

Operations—Indirect Impacts

Based on current operations, BNSF loaded and empty Proposed Action-related trains would be expected to travel via the same route between the coal mines in the Powder River Basin in Montana and Wyoming, and Pasco, Washington.

- West of Pasco, loaded BNSF trains would be expected travel to the project area via the Columbia Gorge through Vancouver to Longview Junction, and travel along the BNSF Spur and Reynolds Lead to the project area.
- Empty BNSF trains would be expected to travel from the project area along the Reynolds Lead and BNSF Spur and return from Longview Junction via Stampede Pass route through Auburn and Yakima to Pasco.

Loaded and empty Proposed Action-related UP trains would be expected to move between Vancouver and Longview Junction in Washington State. Because UP operates over the same track that carries BNSF trains, no additional analysis was required for Proposed Action-related rail traffic in Washington State for UP trains.

Operation of the Proposed Action would result in the following indirect impacts. Operations-related activities are described in Chapter 2, *Project Objectives, Proposed Action*, *and Alternatives*.

Increase the Potential for Train Accidents

The Proposed Action would increase the potential for train accidents by adding loaded and empty rail traffic on rail routes in Washington State. The predicted accident frequencies in 2028 are shown in Table 5.2-4.

The following summarizes the predicted accident frequencies.

- With track improvements to the Reynolds Lead and BNSF Spur (Track Class 2): The predicted number of accidents is 0.25 per year for loaded Proposed Action-related trains, and 0.25 accident per year for empty Proposed Action-related trains. Therefore, 1.0 accident for each type of train (loaded and empty) every 4 years is predicted. Proposed Action–related traffic would increase the predicted accident frequency on the Reynolds Lead and BNSF Spur from 0.11 accident per year to 0.61 accident per year for all rail traffic.
- Without track improvements to the Reynolds Lead and BNSF Spur (Track Class 1): Accident rates for Track Class 1 are more uncertain given the small percentage of train miles that occur on Track Class 1. Data sources group Excepted Track (Class X) and Track Class 1. Therefore, it is difficult to predict accident rates for Track Class 1, but data indicate the 2028 Proposed Action-related predicted train accidents per year in Table 5.2-4 would increase by a factor of approximately 1.5 to 3 without planned improvements to the Reynolds Lead and BNSF Spur.
- BNSF Main Line Routes (Track Class 3): The predicted number of accidents for loaded Proposed Action-related trains on BNSF main line varies between 0.22 accident per year to 2.59 accidents per year.

Table 5.2-4. 2028 Predicted Train Accidents per Year by Scenario[a]

Route Segment	Length (miles)	2028 Proposed Action-Related Trains[b]	2028 Baseline Conditions
Inbound Route (Loaded Trains)			
Idaho/Washington State Line–Spokane	18.6	0.22	2.88
Spokane–Pasco	145.5	1.70	11.90
Pasco–Vancouver	221.4	2.59	15.52
Vancouver–Longview Junction	34.8	0.41	3.71
Longview Junction–LVSW Yard (BNSF Spur)	2.1	0.07	0.06
LVSW Yard–Project Area (Reynolds Lead)	5.0	0.18	0.04
Outbound Route (Empty Trains)			
Project Area–LVSW Yard (Reynolds Lead)	5.0	0.18	0.04
LVSW Yard–Longview Junction (BNSF Spur)	2.1	0.07	0.06
Longview Junction-Auburn	118.6	1.39	12.64
Auburn–Yakima	139.6	1.63	2.24
Yakima–Pasco	89.4	1.04	1.44
Pasco–Spokane	145.5	1.70	11.90
Spokane–Idaho/Washington State Line	18.6	0.22	2.88

Notes:

[a] Assumes the Reynolds Lead and BNSF Spur would be improved to Class 2 standards, as indicated by LVSW. If the Reynolds Lead and BNSF Spur are not improved to Class 2 standards, the predicted train accidents per year would increase by a factor of approximately 1.5 to 3.

[b] Additive to the 2028 baseline conditions results.

Not every accident of a loaded Proposed Action-related train would result in a coal spill. As a result, a range of coal spill sizes could occur from accidents involving loaded Proposed Action-related trains. Coal spills on the Reynolds Lead or BNSF Spur would be expected to be smaller than on main line routes due to lower operating speeds. Impacts from coal spills on the natural environment are addressed in Chapter 4, Sections 4.5, *Water Quality,* 4.6, *Vegetation*, 4.7, *Fish,* and 4.8, *Wildlife*.

Cowlitz County Impacts

The predicted number of loaded Proposed Action-related train accidents in Cowlitz County (BNSF main line, BNSF Spur, and Reynolds Lead) is 0.46 per year, or approximately 1.0 accident every 2 years. The predicted number of empty Proposed Action-related train accidents is slightly higher (0.50 per year), due to the greater number of miles within Cowlitz County on the empty train route.

The baseline predicted number of accidents is approximately 4.30 per year. The number of predicted accidents per year would be 5.25 with Proposed Action-related trains (an increase of approximately 22%), which illustrates the relative contribution of Proposed Action-related trains to overall rail safety within Cowlitz County. Additional information is provided in the *SEPA Rail Safety Technical Report.*

Statewide Impacts

The predicted number of loaded train accidents related to the Proposed Action in Washington State (including Cowlitz County) is 5.16 per year. The predicted number of Proposed Action-related empty train accidents is 6.23 per year, due to the greater length of the empty train rail route.

Adding the train accidents from the inbound and outbound trains related to the Proposed Action to the total accident baseline would increase accidents from 50.43 accidents per year to 61.81 accidents per year. This means that within Washington State, the predicted increase in rail traffic accidents related to the Proposed Action is approximately 11.38 accidents per year (an increase of approximately 22% over the baseline).

5.2.5.2 No-Action Alternative

Under the No-Action Alternative, the Applicant would not construct the proposed coal export terminal. The Applicant would continue with current and proposed future increased operations in the project area. The project area could be developed for other industrial uses including an expanded bulk product terminal. The Applicant has indicated that, over the long term, it would expand the existing bulk product terminal and develop new facilities to handle more products such as calcine petroleum coke, coal tar pitch, and cement.

The No-Action Alternative would increase rail traffic by approximately 2 trains per day; therefore, the predicted number of accidents would be lower than the Proposed Action and higher than the baseline conditions (Table 5.2-4). Various types of rail cars would be needed for the range of expected cargoes. No-Action Alternative-related rail traffic would have various cargoes (mixed-load train). The potential for a mixed-load train derailment or accident on the Reynolds Lead and BNSF Spur would be lower than a unit train because mixed-load trains would not have as many rail cars as a unit train.

5.2.6 Required Permits

No permits related to rail safety would be required for the Proposed Action.

5.2.7 Potential Mitigation Measures

This section describes the mitigation measures that would reduce impacts related to rail safety from construction and operation of the Proposed Action. These mitigation measures would be implemented in addition to project design measures, best management practices, and compliance with environmental permits, plans, and authorizations that are assumed as part of the Proposed Action.

5.2.7.1 Applicant Mitigation

The mitigation measures identified in Section 5.1, *Rail Transportation*, to mitigate impacts on rail transportation would also mitigate impacts on rail safety.

MM RT-1. Coordinate with LVSW about Operations on the Reynolds Lead and BNSF Spur.

To address potential impacts to rail capacity on the Reynolds Lead and BNSF Spur, the Applicant will coordinate with LVSW before each identified operational stage (Stage 1a, Stage 1b, and Stage 2) that will change average daily rail traffic on the Reynolds Lead and BNSF Spur. The Applicant will prepare a report to document the coordination with LVSW and changes to average daily rail traffic. The report will be submitted to LVSW and Cowlitz County at least 6 months before the change in average daily rail traffic.

MM RT-2. Coordinate with BNSF and UP about Operations on Main Line Routes.

To address potential impacts to rail capacity on main line routes in Washington State, the Applicant will coordinate with BNSF and UP before each identified operational stage (Stage 1a, Stage 1b, and Stage 2) that will change average daily rail traffic on main line routes in Washington State. The Applicant will prepare a report to document the coordination with BNSF and UP and changes to average daily rail traffic. The report will be submitted to BNSF, UP, and Cowlitz County at least 6 months before the change in average daily rail traffic.

Impacts on vehicle safety at grade crossings and measures by the Applicant to mitigate such impacts are discussed later in Section 5.3, *Vehicle Transportation*.

5.2.7.2 Other Measures to Be Considered

The following measure should be considered.

- LVSW should consider improvements to track infrastructure or changes in operations to increase track capacity and service along the Reynolds Lead and BNSF Spur. This could include installing traffic control systems, installing a new switch from the BNSF Spur to Reynolds Lead, upgrading rail, adding new main track, or adding siding. The improvements would benefit rail safety by upgrading the Reynolds Lead and BNSF Spur per Track Class 2 requirements, which would lower the expected accident rate.

5.2.8 Unavoidable and Significant Adverse Environmental Impacts

Proposed Action-related trains could increase the number of potential train accidents along in the rail routes in Cowlitz County and Washington State. BNSF and UP could address safety issues as they emerge using capital improvements or operational changes, but it is unknown when those actions would be taken or permitted. Therefore, the Proposed Action could result in a significant adverse impact on rail safety in Cowlitz County and Washington State.