Millennium Bulk Terminals—Longview SEPA Environmental Impact Statement

SEPA Rail Safety Technical Report

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Contents

Tables

Figures

Acronyms and Abbreviations

Applicant	Millennium Bulk Terminals—Longview, LLC
BNSF	BNSF Railway Company
CFR	Code of Federal Regulations
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
LVSW	Longview Switching Company
mph	miles per hour
Port	Port of Longview
RCW	Revised Code of Washington
SEPA	Washington State Environmental Policy Act
UP	Union Pacific Railroad
USDOT	U.S. Department of Transportation
WAC	Washington Administrative Code
WUTC	Washington Utilities and Transportation Commission

Chapter 1
Introduction

This technical report assesses the potential rail safety impacts of the proposed Millennium Bulk Terminals—Longview project (Proposed Action) and No-Action Alternative. This technical report describes the regulatory setting, establishes the methods for assessing potential rail safety impacts, presents the historical and current rail safety conditions in the study area, and assesses potential impacts. The SEPA Vehicle Transportation Technical Report (ICF and DKS Associates 2017) addresses grade crossing safety.

1.1 Project Description

Millennium Bulk Terminals—Longview, LLC (Applicant) is proposing to construct and operate a coal export terminal (Proposed Action) in Cowlitz County, Washington along the Columbia River (Figure 1). The coal export terminal would receive coal from the Powder River Basin in Montana and Wyoming, and the Uinta Basin in Utah and Colorado via rail shipment. The coal export terminal would receive, stockpile, and load coal onto vessels and transport the coal via the Columbia River and Pacific Ocean to overseas markets in Asia.

1.1.1 Proposed Action

Under the Proposed Action, the Applicant would develop the coal export terminal on 190 acres (project area) primarily within an existing 540-acre site that is currently leased by the Applicant (Applicant's leased area). The project area is adjacent to the Columbia River in unincorporated Cowlitz County, Washington near Longview, Washington (Figure 2). The Applicant currently operates and would continue to operate a bulk product terminal within the Applicant's leased area.

BNSF Railway Company (BNSF) or Union Pacific Railroad (UP) trains would transport coal on BNSF main line routes in Washington State, and the BNSF Spur and Reynolds Lead in Cowlitz County to the project area. Coal would be unloaded from rail cars, stockpiled, and loaded by conveyor onto ocean-going vessels for export at two new docks (Docks 2 and 3) located in the Columbia River.

Once construction is complete, the Proposed Action could have a maximum annual throughput capacity of up to 44 million metric tons of coal per year. The coal export terminal would consist of one operating rail track, eight rail tracks for storing up to eight unit trains, rail car unloading facilities, a stockpile area for coal storage, conveyor and reclaiming facilities, two new docks in the Columbia River (Docks 2 and 3), and shiploading facilities on the two docks. Dredging of the Columbia River would be required to provide access to and from the Columbia River navigation channel and for berthing at the two new docks.

Vehicles would access the project area from Industrial Way (State Route 432), and vessels would access the project area via the Columbia River. The Reynolds Lead and BNSF Spur track—both jointly owned by BNSF and UP and operated by Longview Switching Company (LVSW)—provide rail access to the project area from a point on the BNSF main line (Longview Junction) located to the east in Kelso, Washington. Coal export terminal operations would occur 24 hours per day, 7 days per week. The coal export terminal would be designed for a minimum 30-year period of operation.

At full terminal operations, approximately 8 loaded unit trains each day would carry coal to the export terminal, 8 empty unit trains each day would leave the export terminal, and an average of 70 vessels per month or 840 vessels per year would be loaded, which would equate to 1,680 vessel transits in the Columbia River annually.

Figure 1. Project Vicinity

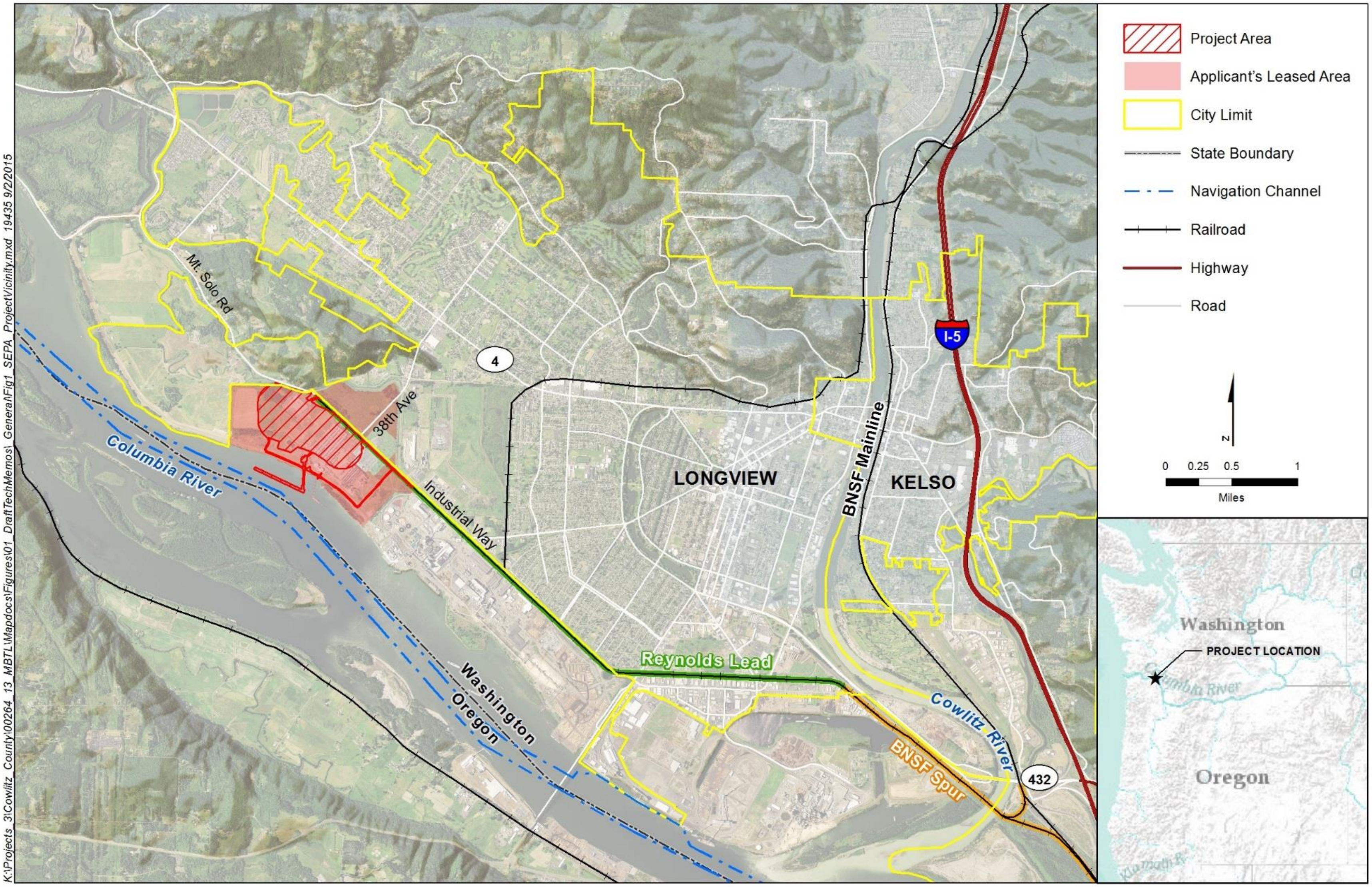
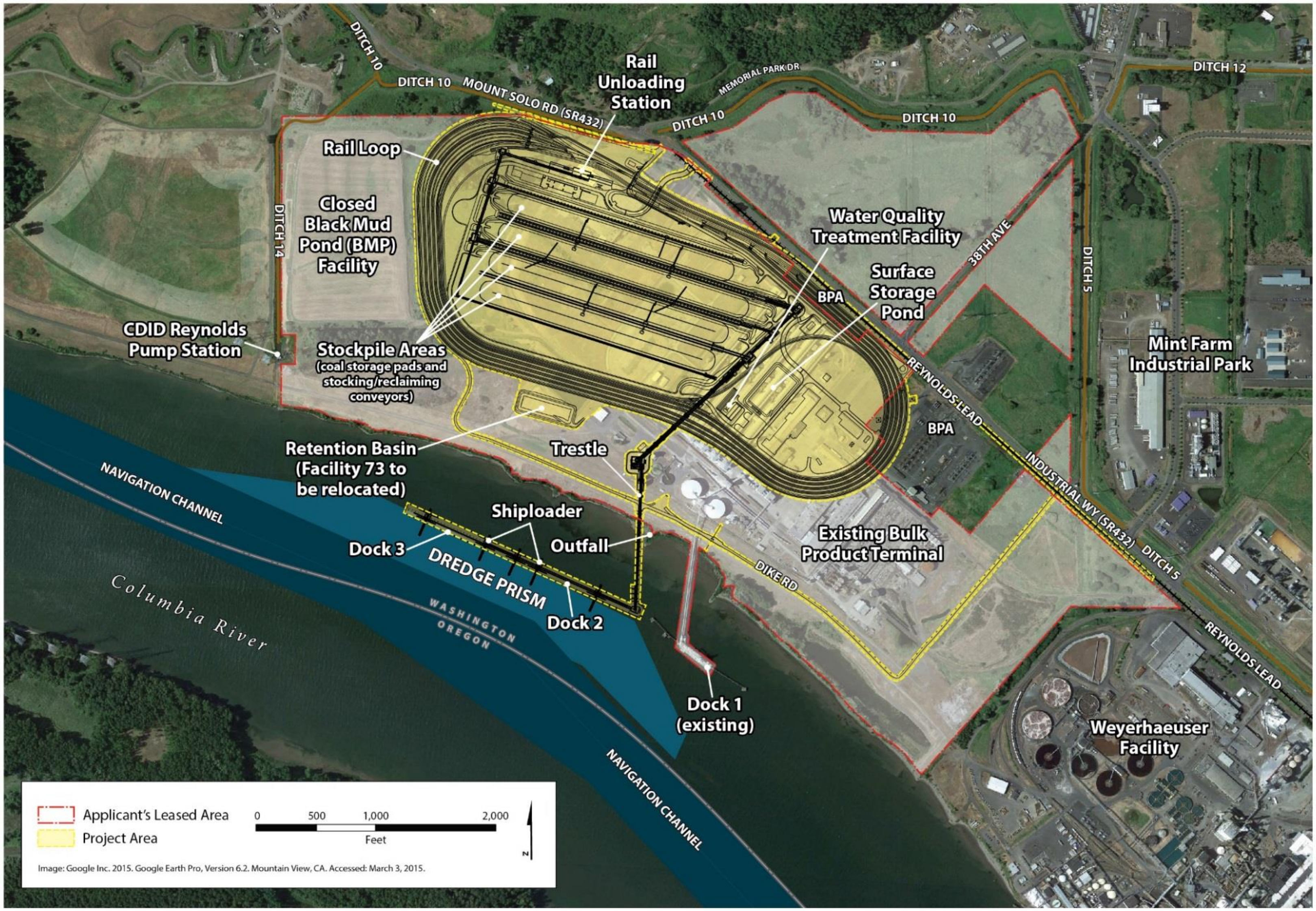


Figure 2. Proposed Action



1.1.2 No-Action Alternative

The Applicant plans to continue operating its existing bulk product terminal located adjacent to the project area. Ongoing operations would include storing and transporting alumina and small quantities of coal, and continued use of Dock 1. Maintenance of the existing bulk product terminal would continue, including maintenance dredging at the existing dock every 2 to 3 years. The Applicant plans to expand operations at the existing bulk product terminal, which could include increased storage and upland transfer of bulk products utilizing new and existing buildings. The Applicant would likely need to undertake demolition, construction, and other related activities to develop expanded bulk product terminal facilities.

If the coal export terminal is not constructed, the Applicant would likely propose expansion of the bulk product terminal onto areas that would have been subject to construction and operation of the proposed coal export terminal. Additional bulk product transfer activities could involve products such as a calcined pet coke, coal tar pitch, cement, fly ash, and sand or gravel. Any new operations would be evaluated under applicable regulations. Upland areas of the project area are zoned Heavy Industrial and it is assumed future proposed industrial uses in these upland areas could be permitted. Any new construction would be limited to uses allowed under existing Cowlitz County development regulations.

1.2 Regulatory Setting

The jurisdictional authorities and corresponding regulations, statutes, and guidance for determining potential impacts on rail safety are summarized in Table 1. Those regulations pertaining to at-grade rail crossings are used in the SEPA Vehicle Transportation Technical Report (ICF and DKS Associates 2017).

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

Regulation, Statute, Guideline	Description
Federal	
National Environmental Policy Act (42 USC 4321 *et seq*.)	Requires the consideration of potential environmental effects. NEPA implementation procedures are set forth in the President's Council on Environmental Quality's Regulations for Implementing NEPA (49 CFR 1105).
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 at-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 at-grade crossings. USDOT has promulgated rules addressing grade-crossing safety and provides funding for installation and improvement of warning devices. FRA has issued rules that impose minimum maintenance, inspection, and testing standards for at-grade crossing warning devices for highway/rail at-grade crossings on federal highways and state and local roads.

Regulation, Statute, Guideline	Description
Federal Railroad Administration General Regulations (49 CFR 200–299)	Regulates safety, including operations, engineers, and crew (e.g., control of alcohol and drug use), track, signaling, and rolling stock (e.g., locomotives and passenger and freight cars) for common carrier rail lines that are part of the general rail line system of transportation.
State	
Washington State Environmental Policy Act (WAC 197-11, RCW 43.21C)	Requires state and local agencies in Washington to identify potential environmental impacts that could result from governmental decisions.
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.
Rail Companies—Clearances (WAC 480-60)	Establishes operating procedures 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 railroad operating procedures in Washington State. Includes general and procedural rules, safety rules, reporting requirement rules, and the establishment and distribution of a grade-crossing protective fund.
Local	
Cowlitz County SEPA Regulations (CCC 19.11)	Provides for the implementation of SEPA in Cowlitz County.

USC = United States Code; NEPA = National Environmental Policy Act; CFR = Code of Federal Regulations; FRA = Federal Railroad Administration; FHWA = Federal Highway Administration; USDOT = U.S. Department of Transportation; RCW = Revised Code of Washington; WAC = Washington Administrative Code; CCC = Cowlitz County Code; SEPA = State Environmental Policy Act

1.3 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.

Chapter 2
Existing Conditions

This chapter describes the methods for assessing the existing conditions and determining impacts in the study area as they pertain to rail safety and existing conditions.

2.1 Methods

This section describes the sources of information and methods used to characterize the existing conditions and assess the potential impacts of the Proposed Action and No-Action Alternative on rail safety.

The analysis used the definition of a rail accident from the Federal Railroad Administration (FRA):[1]

> Collisions, derailments, fires, explosions, acts of God, or other events involving the operation of railroad on-track equipment (standing or moving) and causing reportable damages greater than the reporting threshold for the year in which the accident/incident occurred.

The FRA reporting threshold was $10,500 in 2016. Therefore, accidents include a wide variety of incidents and are not limited to collisions or derailments.

The analysis used existing rail accident data from FRA as the basis for the rail safety and accident 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. Such accident rates provided by FRA, broken down by track class, are the basis of the rail safety analysis. Appendix A, *Rail Safety Data,* describes the observed data on accident rates nationwide and accident counts specific to Washington State and Cowlitz County.[2]

Historically, accident rates (accidents per train mile) do not change dramatically from one year to the next, but generally trend downward over time due to improved control systems, communications, and inspection practices. As a result, using current data for future projections is conservative. Typically, year-to-year accident rates are more consistent than year-to-year traffic volumes on any specific route, which may vary substantially as new projects are added or demands change.

2.1.1 Data Sources

The following sources of information were used to evaluate the rail safety characteristics of the study area.

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[1] The Federal Railroad Administration (FRA) was created by the U.S. Department of Transportation Act of 1966. It is one of 10 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 for all railroads dealing with the interchange of railroad cars and equipment.

[2] Appendix A, *Rail Safety Data,* is based on the most recent data available when the analysis was completed.

- **Train parameters** including the number of rail cars (125 rail cars per unit trains) were based on information provided by the Applicant and existing BNSF train operations.
- **Baseline train volumes** for the Reynolds Lead and BNSF Spur were collected from LVSW and field observations. BNSF main line volumes were collected from the *Washington State Rail Plan* (Washington State Department of Transportation 2014a). Year 2015 and 2028 projected volumes were estimated using a linear extrapolation based on 2010 volumes and 2035 projected volumes.
- **Future project-related train traffic** from the SEPA Rail Transportation Technical Report (ICF and Hellerworx 2017), notably 8 loaded and 8 empty trains per day if the coal export terminal is constructed and operated at full terminal throughput in 2028.
- **Future train routes** compiled from the SEPA Rail Transportation Technical Report (ICF and Hellerworx 2017), which used information from the *Washington State Rail Plan* (Washington State Department of Transportation 2014a) and *Washington State Freight Mobility Plan* (Washington State Department of Transportation 2014b).[3]
- **Accident rates** compiled by FRA for year 2012 through year 2014,[4] along with analyses by Liu et al. (2011), and Anderson and Barkan (2004) giving derailment rates by track class and discussing the impacts of track class, train length, and signal systems.

2.1.2 Impact Analysis

The following methods were used to evaluate the potential rail safety impacts of the Proposed Action and No-Action Alternative. For the purposes of this analysis, construction impacts are based on peak construction period, assumed to be in 2018, which would average 1.3 trains per day. Operations impacts are based on the maximum coal export terminal throughput capacity (up to 44 million metric tons of coal per year), which would result in 8 loaded and 8 empty trains per day by 2028.

2.1.2.1 Accident Frequency

The analysis considered one construction scenario and two operations scenarios.

- **2018 Construction:** Average of 1.3 train trips per day
- **2028 Baseline Conditions:** 2028 conditions without the Proposed Action
- **2028 Proposed Action:** Full train operations in 2028 (8 loaded and 8 empty trains per day on the Reynolds Lead, BNSF Spur, and BNSF main line)

Train accident rates are generally distinguished only by freight versus passenger service, not by specific cargoes. Both loaded and unloaded Proposed Action-related trains were evaluated, as well as other existing rail traffic where appropriate. Given that the project would operate *unit trains* of

[3] In 2012, BNSF introduced a train operations protocol change to enhance the use of existing capacity by a directional running agreement using Stampede Pass for eastbound empty bulk trains. The strategy of directional running is to route 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 are destined to return to Pasco and to points east via Stampede Pass.

[4] 2014 data were the most recent available data when the analysis was completed.

approximately 125 rail cars that would travel from the mines to the project area without being split up, trains would generally pass around or straight through yards without switching.

This analysis used both qualitative and quantitative methods to estimate accident rates for the scenarios. The number of accidents (primarily collisions and derailments) resulting from train operations based on accident rates from FRA were estimated. Rates, in combination with the specifics of the operations (e.g., number of trains, route length, track class), were analyzed to estimate the number of accidents per year. The analysis compared predicted rates (in accidents per million train miles) for all railroads with rates specific to BNSF and UP (as co-owners of LVSW) as the first step in determining the appropriate accident rates with Proposed Action-related trains (Table 2).

Table 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

BNSF's accident rates are similar to but less frequent than the average for all railroads. UP has a slightly higher accident rate. LVSW did not have any reported train accident data in the FRA database for 2012 to 2014; that is, there were no train accidents experienced in this period on the Reynolds Lead or BNSF Spur. Given the rail transportation associated with the Proposed Action within Washington State would be on BNSF lines, a rate of 2 accidents per million train miles (the national average for BNSF over the last 2 years) was used as the starting point of the accident analysis. Specific train accident rates for BNSF in Washington State were not available because FRA data do not include train accident rates by state, only nationally. In addition, WUTC does not collect data for a Washington State accident rate to be calculated. For these reasons, the national average for BNSF over the last 2 years was used. FRA data include accident count by state (Appendix A) but does not include accident rate data by 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. Thus, the derivation of accident rates is an important part of the overall analysis. 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. Lower track classes have lower maximum operating speeds, which can reduce the consequences of those accidents which occur (Table 3).[5]

[5] Train accidents are more likely to occur on lower track classes (which have lower maximum allowable speeds) because lower track classes are not designed and maintained to the same standards as higher track classes. Track Class 1 is restricted to 10 miles per hour (mph) for freight trains. Rail yards, branch lines, many short lines, and industrial track are typical places to see Track Class 1 track. Track Class 2 may have travel up to 25 mph for freight trains. Secondary main lines, branch lines, and many regional railroads may have track in this category.

Liu et al. (2011) derived derailment rates by track class,[6] using the baseline rates provided by Anderson and Barkan (2004). They found the derailment rates for Track Class 3 were twice the average across all track classes. Derailment rates for Track Class 2 were six times the average for all track classes (accident rates increase with lower track classes generally due to lower track quality). Conversely, derailment rates for Track Class 5 were roughly a third of the overall average rates (accident rates decrease with higher track classes due to higher track quality and other factors).

Table 3. Railroad Track Classes

	Maximum Allowable Speed (mph)	
Class	**Freight Rail**	**Passenger Rail**
Excepted (X)	10	NA
1	10	15
2	25	30
3	40	60
4	60	80
5	80	90
6	NA	110
7	NA	125
8	NA	150
9	NA	200

Notes:
Source: 49 CFR Part 213.9 Classes of track: operating speed limits
mph = miles per hour; NA = not applicable

Anderson and Barkan (2004) found that the overall accident rate (collisions, derailments, and other types) on Track Class 3 was roughly twice the total rate for all track classes (the same pattern seen for just derailments), and the overall rate on Track Classes 4 and higher was roughly half the total rate for all track classes.

Data on accident rates by track class was used to generate a base accident rate for each segment. The Reynolds Lead and BNSF Spur are currently maintained in accordance with the Track Class 1 standard. LVSW plans to upgrade the Reynolds Lead and BNSF Spur to Track Class 2 designation for full capacity operation of the Proposed Action or other future action (ICF and Hellerworx 2017). The Reynolds Lead and BNSF Spur would be maintained as Track Class 1 if planned improvements are not made.

Using the base rate of two accidents per million train miles, a multiplier of six was then applied as an adjustment to better represent Track Class 2, as indicated by Anderson and Barkan (2004) and Liu et al. (2011), resulting in a rate of 12.0 accidents per million train miles for the Reynolds Lead and the BNSF Spur if improvements are made to Track Class 2. For the other segments in Washington

[6] FRA's track safety standards establish nine specific classes of track (Class 1 to Class 9). Class of Track is based on standards for track structure and 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 applicable track safety standards.

State, it was assumed the track was Track Class 3, giving an accident rate of 4.0 accidents per million train miles when the multiplier of two is applied to the base rate.[7]

Accident rates for Track Class 1, which includes the Reynolds Lead and BNSF Spur (without planned improvements), are more uncertain, given the small percentage of train miles that occur on such track. Moreover, many sources group Excepted Track (Class X) and Track Class 1 in their data collection making it harder to obtain accident rates specific to just Track Class 1. (Track Class X is exempted from many of the stated geometry and structural requirements and is thus limited to extremely low speeds.) As such, it is hard to predict accident rates for Track Class 1, but they could be 10 to 20 or more times higher than the base (total) accident rate. Thus, if the Reynolds Lead and the BNSF Spur are not improved, the estimates for the Reynolds Lead and the BNSF Spur presented in this report would increase by roughly a factor of 1.5 to 3 times higher than Track Class 2.

2.1.2.2 Accident Severity

Main line train accidents in Cowlitz County and Washington State with and without injuries and fatalities as an indicator of potential accident severity were reviewed. Based on FRA data (2015) as shown in Appendix A, there were two accidents in Cowlitz County in 2014, and neither one resulted in an injury or fatality. One incident was in a yard with no derailment and the other involved a derailment of 11 rail cars on main line track. In Washington State, there were 36 accidents in 2014, two of which involved an injury. Thirteen accidents were on main line track, and the remainders were in rail yards or on industry track. Derailments (main line and industry track) involved from 0 to 11 rail cars.

2.2 Existing Conditions

As described in Section 1.1.1, *Proposed Action*, the project area is primarily located on 190 acres (project area) of a 540-acre existing industrial site (Applicant's leased area) near Longview, Washington. As shown in Figure 1, the project area is connected to the BNSF main line and Longview Junction (approximately 7.1 miles away) via the Reynolds Lead and the BNSF Spur. The Reynolds Lead currently serves several industries including Weyerhaeuser and North Pacific Paper Corporation, and existing operations in the Applicant's leased area.

The follow describes the BNSF Spur and Reynolds Lead.

- **BNSF Spur.** This section of track runs from the BNSF Seattle Subdivision main line switch at Longview Junction, across the Cowlitz River Bridge to the LVSW yard (Figure 1). Baseline traffic on the BNSF Spur is about 7 trains per day. The Port Industrial Rail Corridor connects with the BNSF Spur just east of the LVSW yard. Trains to or from various port facilities leave or enter the BNSF Spur at the Industrial Rail Corridor switch. The rest of the trains originate or terminate in the yard.
- **Reynolds Lead.** This section runs from the west end of the yard to the existing bulk product terminal (Figure 1). Baseline traffic is just over 2 trains per day, on average. Trains operating on the Reynolds Lead include an LVSW local crew switching industries along the Reynolds Lead 3

[7] Certain rail segments are Track Class 4, which has a much lower accident rate than Track Class 3, thus, making the assumption of Track Class 3 a conservative analysis.

days per week and a local crew that delivers and picks up rail cars that are interchanged at two sidings west of California Way.

Table 4 provides key parameters of the BNSF Spur and Reynolds Lead, based on the SEPA Rail Transportation Technical Report (ICF and Hellerworx 2017).

Table 4. Key Segment Parameters for Existing Traffic on BNSF lines in Washington State

Segment	Miles	Track Class	Estimated Baseline Trains per Day (2015)
Idaho/Washington State Line–Spokane	18.6	3[a]	70
Spokane–Pasco	145.5	3[a]	39
Pasco–Vancouver	221.4	3[a]	34
Vancouver–Longview Junction	34.8	3[a]	50
Longview Junction–LVSW Yard (BNSF Spur)	2.1	1	7
LVSW Yard–Project Area (Reynolds Lead)	5.0	1	2
Longview Junction–Auburn	118.6	3[a]	50
Auburn–Yakima	139.6	3[a]	7
Yakima–Pasco	89.4	3[a]	7

Notes:

[a] Track class for other segments in Washington State conservatively assumed to be Track Class 3 for the analysis.

Chapter 3
Impacts

This chapter describes the potential direct and indirect impacts on rail safety (train accidents) that would result from construction and operation of the Proposed Action and ongoing operations under the No-Action Alternative.

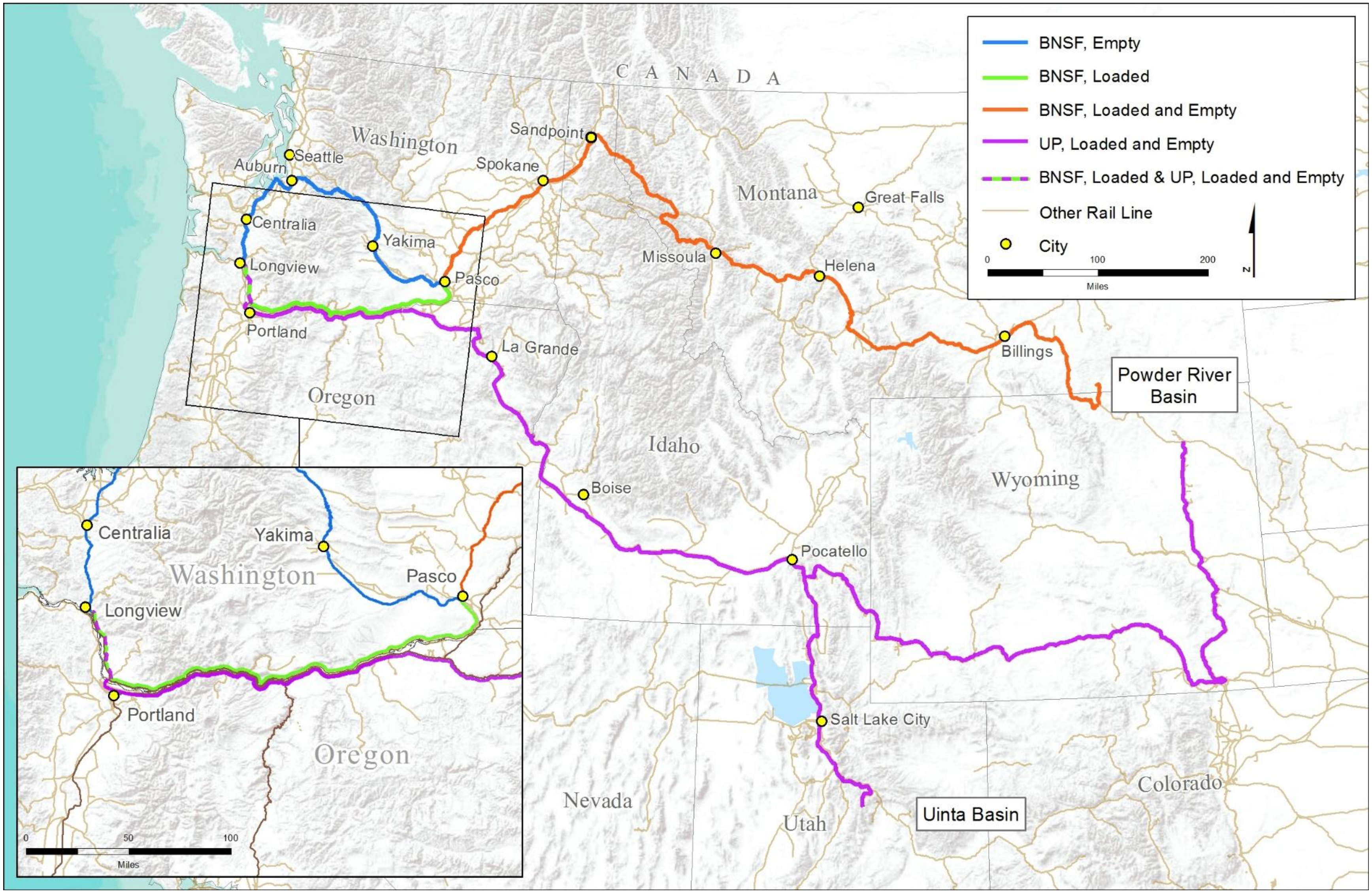
Under the Proposed Action, trains would travel along the Reynolds Lead and BNSF Spur as described in Chapter 2, *Existing Conditions*. Beyond Longview Junction, the main rail lines to and from the potential sources for the coal already exist and are currently in operation as illustrated in Figure 3.

Based on current operating practices, BNSF loaded and empty Proposed Action-related trains would travel via the same route between the coal mines in the Powder River Basin and Pasco, Washington. West of Pasco, loaded trains would move to the project area via BNSF's Columbia River Gorge route through Vancouver, Washington to Longview Junction. Empty trains would return from Longview Junction via BNSF's Stampede Pass route through Auburn, Washington, and Yakima, Washington, to Pasco. These routes are analyzed in this section. Estimates on a per-mile basis have also been developed so that they can be applied to other routes, if applicable.

Both loaded and empty Proposed Action-related trains on the UP would move via the same route between the Uinta Basin and Powder River Basin and the project area. Between Vancouver and Longview Junction, UP operates over the same track that carries BNSF trains, so no additional analysis was required for Proposed Action-related UP trains within Washington State.

As described previously, 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 2016. Therefore, an accident includes a wide a variety of incident types and severity and is not limited to collisions or derailments.

Figure 3. BNSF and Union Pacific Routes to and from the Project Area



3.1 Proposed Action

Potential impacts on rail safety from the Proposed Action are described below.

3.1.1 Construction: Direct Impacts

As described previously under the rail construction scenario, trains transporting construction materials would travel to and from the project area. Under this 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. Any accidents would be related to construction activities in the project area and would not result in a rail safety direct impact on the Reynolds Lead, BNSF Spur, or BNSF main line routes. Construction: Indirect Impacts

Construction of would result in the following indirect impacts.

Increase the Potential for Train Accidents

The Applicant has indicated materials needed for construction could be delivered by rail. This would require an estimated 350 loaded trains of 100 rail cars each to deliver construction materials. There would also be the same number of empty trains returning. All rail traffic would use the Reynolds Lead and BNSF Spur. Because the specific routes that would be used by Proposed Action-related trains are not known, a conservative estimate was used. The expected routes in Washington State for Proposed Action-related trains during operations were used to illustrate the possible range of accident frequencies for rail transportation of construction materials.

It is anticipated two-thirds of the construction materials would be transported during the first year of construction (2018), which would amount to approximately 467 one-way train trips (half loaded, half empty; an average of 1.3 trains per day). The numbers of accidents were predicted using the rates described in Section 2.1.2.1, *Accident Frequency,* and are presented in Table 5 for the major route segments.

Table 5. 2018 Predicted Train Accidents during Peak Year of Construction

Segment	Length (miles)	Predicted Proposed Action-Related Construction Train Accidents[a]
Loaded Trains (Inbound Route)		
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
Empty Trains (Outbound Route)		
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 the construction of the Proposed Action; these would be additive to the baseline results.

Proposed Action-related construction rail traffic would contribute to relatively small increase in predicted train accidents.

3.1.2 Operations: Direct Impacts

At full terminal operations, 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 accident rates described previously are not applicable to the project area. Any rail accidents in the project area would be related to overall operations of the coal export terminal and would not affect rail safety on the Reynolds Lead, BNSF Spur, or BNSF main line.

3.1.3 Operations: Indirect Impacts

Operation of the Proposed Action would result in the following indirect impacts.

Increase the Potential for Train Accidents

The Proposed Action would yield predicted accidents per year. The predicted numbers are based on nationwide accident rates as described in Section 2.1, *Methods*; however, only inbound accidents would involve loaded trains. In addition, some accidents might involve standing derailments of a few rail cars.

The predicted accident frequencies on the Reynolds Lead and BNSF Spur in 2028 are shown in Table 6. The analysis is based on 8 loaded inbound trains per day and 8 empty outbound trains per day. As described previously, if the Reynolds Lead and BNSF Spur are not improved to Class

2 standards, the estimates for the Reynolds Lead and BNSF Spur would increase by roughly a factor of 1.5 to 3.

Table 6. Predicted Train Accidents per Year[a]

Segment	Length (miles)	Proposed Action-Related Trains 2028	Baseline 2028
Loaded Trains (Inbound Route)			
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 (BNSF Spur)	2.1	0.07	0.06
LVSW Yard–Project Area (Reynolds Lead)	5.0	0.18	0.04
Empty Trains (Outbound Route)			
Project area–LVSW Yard (Reynolds Lead)	5.0	0.18	0.04[b]
LVSW Yard–Longview Junction (BNSF Spur)	2.1	0.07	0.06[b]
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[c]
Spokane–Idaho/Washington State Line	18.6	0.22	2.88[c]

Notes:

[a] Assumes the Reynolds Lead and BNSF Spur would be improved to Class 2 standards by LVSW. If the Reynolds Lead and BNSF Spur are not improved to Class 2 standards, the predicted train accidents per year would increase to approximately 1.5 to 3 times more than the Class 2 accident rate.

[b] Due to overlap of inbound and outbound routes on these segments, avoid double counting Baseline 2028 results in totals.

The predicted number of accidents on the Reynolds Lead and BNSF Spur is 0.25 accident per year for the loaded Proposed Action-related trains and 0.25 accident per year for empty Proposed Action-related trains. This is roughly one accident for each type of train (inbound and outbound) every 4 years. When added to the estimated 2028 baseline results, this suggests the Proposed Action–related traffic would increase the chance of an accident from 0.11 accident per year to 0.61 accident per year for all traffic, inbound and outbound.

If a different route than those analyzed in this report were to be used, the number of estimated accidents per year could be calculated based on the trains per year on a particular segment multiplied by the length of the segment multiplied by the Track Class 3 accident rate of four per million train miles. If all inbound and outbound Proposed Action-related trains traveled through the Columbia River Gorge, the outbound accident frequencies would be the same as the inbound accident frequencies shown in Table 6 for the Proposed Action. If all inbound and outbound Proposed Action-related trains traveled across Stampede Pass, the inbound accidents frequencies would be the same as the outbound accident frequencies shown in Table 6 for the Proposed Action.

Not every accident of a loaded Proposed Action-related train would result in a coal spill, and spills that would occur would vary in size. A collision or derailment could involve only a few rail cars or lead to a greater number of rail cars being derailed in certain circumstances. Not all rail cars that derail would end up in a position where some or all of their contents could be spilled, depending on the nature of the accident (such as size, speed, and terrain). In addition, spills on the Reynolds Lead or BNSF Spur would be expected to be small given the lower operating speeds, which yield less energetic collisions and derailments, and therefore fewer rail cars derailing and even fewer releasing cargo.

Available data (Liu et al. 2012) indicate that while the average number of rail cars derailed on main line track (all classes and speeds) for 2001 through 2010 was 8.4 cars, the number of rail cars on yard, siding, and industry track ranged from 4.3 to 5.7 rail cars. These types of track provide an indication of the consequences of derailments at very low speeds.

3.1.3.1 Cowlitz County Operations Impacts

Table 6 can also be used to determine the predicted frequency of accidents within Cowlitz County. In addition to the Reynolds Lead and BNSF Spur track, 51.6% of the route from Vancouver to Longview Junction, and 18% of the route from Longview Junction to Auburn are within Cowlitz County. The predicted numbers of annual accidents described below include all the track within Cowlitz County, including the Reynolds Lead and BNSF Spur track.

The predicted number of loaded Proposed Action-related train accidents is 0.46 per year, or roughly one every 2 years, recognizing that accidents do not necessarily involve spills. The predicted number of empty Proposed Action-related train accidents is slightly higher, at 0.50 per year, due to the greater number of miles within Cowlitz County on the return route.

The 2028 baseline traffic for the inbound and outbound routes in Cowlitz County has roughly 4.30 predicted accidents per year. The number of predicted accidents per year increases to 5.25 with Proposed Action-related trains, showing the smaller relative contribution of the project trains to overall rail safety when the other rail shipments on the routes are included.

3.1.3.2 Statewide Operations Impacts

Table 6 can also be used to determine the predicted frequency of accidents on the rail lines within Washington State, including Cowlitz County and the Reynolds Lead and BNSF Spur. When looking at outbound trains, the first two inbound segments within the state are also traveled, albeit in the opposite direction; the associated accident frequencies should not be double counted.

The predicted number of operations-related loaded Proposed Action-related train accidents within Washington State is 5.16 per year, again recognizing that not all accidents involve spills. The number of empty Proposed Action-related train accidents is higher, at 6.23 per year, due to the greater length of the return route.

When inbound and outbound accidents related to the Proposed Action are added to the total baseline traffic (for 2028), predicted accidents increase from 50.43 accidents per year to 61.81 accidents per year, showing the smaller relative contribution of Proposed Action-related trains to overall rail safety when the other shipments on the routes are included.

3.2 No-Action Alternative

Under the No-Action Alternative, the Applicant would not construct the 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 Applicant anticipates that planned growth under the No-Action Alternative would require 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 6). 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 or BNSF Spur would presumably be lower than for a unit train because mixed-load trains would not have as many rail cars as a unit train.

Chapter 4
Permits

No permits related to rail safety would be required for the construction or operation of the Proposed Action.

Chapter 5
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Appendix A

Rail Safety Data

This appendix summarizes the rail accident data used in the rail safety analysis.

Observed Accident Rates

Rail accident data available from the Federal Railroad Administration (FRA) were used as the initial basis for the rail safety and accident analysis. The specific data analyzed were for 2012 through 2014, with the data compiled in 2015 (Federal Railroad Administration 2015), the most recent available data when the analysis was completed.

The following image shows the raw data as it appears in the FRA database for all railroads. FRA data includes accident counts at the state and county levels, but accident rates are calculated on a nationwide basis. The data of interest to the analysis are the total year rates for 2012, 2013, and 2014. The rates are per million train miles.

4/8/2015 Print

ACCIDENTS IN DESCENDING FREQUENCY BY CAUSE (By CALENDAR YEAR)
IMPORTANT: Rates calculated are National Level - they do not display for Region or State Geography

Selections: Railroad - All Railroads
State - All States County - All Counties
All Regions
All Causes / All Types of Accidents
All Track Types / All Track Classes
CALENDAR YEAR - 2015
Reporting Level - ALL
End Month of Report - December

	Total		**Total Year Counts**			**Total Year Rates**			**YTD Counts Jan - Dec**		**% Change Over Time**			**YTD Rates To Dec**	
	Accs	**Pct of Total**	**2012**	**2013**	**2014**	**2012**	**2013**	**2014**	**2014**	**2015**	**2012 to 2014**	**2013 to 2014**	**To Dec 2014 2015**	**2014**	**2015**
-----**GRAND TOTAL.......**	5,480	100.0	1,760	1,822	1,736	2.41	2.43	2.27	1,736	162	-1.4	-4.7	-90.7	2.27	2.58

The following two figures show the extracted data for BNSF Railway Company (BNSF) and Union Pacific Railroad (UP) for all track classes.

4/3/2015 Print

ACCIDENTS IN DESCENDING FREQUENCY BY CAUSE (By CALENDAR YEAR)
IMPORTANT: Rates calculated are National Level - they do not display for Region or State Geography

Selections: Railroad - BNSF Rwy Co. [BNSF]
State - All States County - All Counties
All Regions
All Causes / All Types of Accidents
All Track Types / All Track Classes
CALENDAR YEAR - 2015
Reporting Level - INDIVIDUAL
End Month of Report - December

	Total		Total Year Counts			Total Year Rates			YTD Counts Jan - Dec		% Change Over Time			YTD Rates To Dec	
	Accs	Pct of Total	2012	2013	2014	2012	2013	2014	2014	2015	2012 to 2014	2013 to 2014	To Dec 2014 2015	2014	2015
-----GRAND TOTAL.......	1,178	100.0	397	390	359	2.20	2.11	1.89	359	32	-9.6	-7.9	-91.1	1.89	2.42

4/3/2015 Print

2.09 - Train Accidents and Rates

Back to Query Page Print Version

ACCIDENTS IN DESCENDING FREQUENCY BY CAUSE (By CALENDAR YEAR)
******IMPORTANT: Rates calculated are National Level - they do not display for Region or State Geography******

Selections: Railroad - Union Pacific RR Co. [UP]
State - All States County - All Counties
All Regions
All Causes / All Types of Accidents
All Track Types / All Track Classes
CALENDAR YEAR - 2015
Reporting Level - INDIVIDUAL
End Month of Report - December

	Total		Total Year Counts			Total Year Rates			YTD Counts Jan - Dec		% Change Over Time			YTD Rates To Dec	
	Accs	Pct of Total	2012	2013	2014	2012	2013	2014	2014	2015	2012 to 2014	2013 to 2014	To Dec 2014 2015	2014	2015
-----GRAND TOTAL.......	1,538	100.0	506	501	489	3.04	3.02	2.82	489	42	-3.4	-2.4	-91.4	2.82	3.01

The analysis compared the historic rates (in accidents per million train miles) for all railroads with rates specific to BNSF and UP as the first step in determining the appropriate accident rates for the Proposed Action (Table 1). The data Table 1 summarize the outputs from the FRA database.

Table 1. Train Accident Rates

	Accident Rate per Million Train Miles (FRA 2015)		
Year	**All Railroads**	**BNSF**	**UP**
2012	2.41	2.20	3.04
2013	2.43	2.11	3.02
2014	2.27	1.89	2.82

As shown in Table 1, BNSF's accident rates are similar to but lower (less frequent) than the average for all railroads. UP had slightly higher accident rates than BNSF. The Longview Switching Company (operator of the Reynolds Lead and BNSF Spur) did not have any data in the FRA database for 2012 through 2014; that is there were no train accidents experienced in this period on the Reynolds Lead or BNSF Spur. Because Proposed Action-related rail traffic in Washington State would be on BNSF lines, a rate of 2 accidents per million train miles (the national average for BNSF over the last 2 years) was used as the starting point of the accident analysis. Specific accident rates for BNSF in Washington State were not available. These data were then supplemented with data from analyses by Liu et al. (2011) and Anderson and Barkan (2004), as these give derailment rates by track class.

Observed Accident Counts

In addition to extracting the nationwide accident rates from the FRA database, the analysis also included data on mainline accidents in Cowlitz County and Washington State with and without injuries and fatalities as an indicator of potential accident severity. The data extracted from the database are presented in Figure 1.

Figure 1. Washington State Accident Counts—All Railroads (2014)

Acc Nbr	Rpt RR	Report Number	Kld/Inj	Mo	Day	ST	County	Type Track	Trk Maint	Type Acc	Pri Cause	Cont Cause	Equip Damage	Track Damage	Kld	Inj	RR Equip	Spd Mph	Locos Der	Cars Der
1	ATK	131208	55A	01	06	WA	KING	Main	ATK	Der	T311		28,765	3,000	0	0	PASSENGER TRAIN	012	1	0
2	BNSF	NW0114106	55A	01	13	WA	KING	Main	BNSF	Der	E62C		10,296	125,161	0	0	FREIGHT TRAIN	058	0	2
3	TMBL	02042014A	55A	02	04	WA	PIERCE	Yard	PTOZ	Oth	M402	H307	15,000	0	0	0	YARD/SWITCHING	010	0	0
4	BNSF	NW0214105	55A	02	10	WA	KING	Industry	BNSF	Der	H307	H702	13,432	2,500	0	0	YARD/SWITCHING	005	0	1
5	BNSF	NW0214110	55A	02	16	WA	SPOKANE	Yard	BNSF	Der	H312		9,606	3,672	0	0	YARD/SWITCHING	004	0	1
6	TMBL	03012014A	55A	03	01	WA	PIERCE	Yard	TMBL	Oth	H021	H318	15,000	0	0	0	YARD/SWITCHING	002	0	0
7	BNSF	NW0314104	55A	03	10	WA	DOUGLAS	Main	BNSF	Der	E69C		4,278	280,000	0	0	FREIGHT TRAIN	054	0	1
8	BNSF	NW0414101	55A	04	03	WA	COWLITZ	Main	BNSF	Oth	S011		0	17,200	0	0	FREIGHT TRAIN	005	0	0
9	PSAP	PSA558914D	55A	04	29	WA	GRAYS HARBOR	Main	PSAP	Der	T110		126,000	26,000	0	0	FREIGHT TRAIN	005	0	6
10	PSAP	PSA563914D	55A	05	09	WA	GRAYS HARBOR	Main	PSAP	Der	T111		44,700	60,000	0	0	FREIGHT TRAIN	005	0	7
11	BNSF	NW0514106	55A	05	11	WA	COWLITZ	Yard	BNSF	Der	H704		2,200	14,812	0	0	FREIGHT TRAIN	010	0	11
12	PSAP	PSA567314D	55A	05	15	WA	GRAYS HARBOR	Main	PSAP	Der	T109		350,000	189,450	0	0	FREIGHT TRAIN	010	0	11
13	PSAP	PSA570414D	55A	05	21	WA	LEWIS	Yard	PSAP	Der	M599		5,000	69,000	0	0	YARD/SWITCHING	004	0	11
14	BNSF	NW0614102	55A	06	06	WA	PIERCE	Yard	BNSF	Coll	H307		20,559	0	0	0	YARD/SWITCHING	005	0	0
14	BNSF	NW0614102	55A	06	06	WA	PIERCE	Yard	BNSF	Coll	H307		500	0	0	0	YARD/SWITCHING	000	0	0
15	ATK	133106	55A	06	09	WA	LEWIS	Main	BNSF	Oth	M308		1,632	0	0	1	PASSENGER TRAIN	053	0	0
15	BNSF	NW0614200	55A	06	09	WA	LEWIS	Main	BNSF	Oth	M308		0	10,000	0	0	NOT RPD OR N/A	000	0	0
16	BNSF	NW0614109	55A	06	13	WA	KING	Yard	BNSF	Coll	H607		80,000	0	0	0	YARD/SWITCHING	007	1	0
16	BNSF	NW0614109	55A	06	13	WA	KING	Yard	BNSF	Coll	H607		45,514	20,500	0	0	YARD/SWITCHING	008	0	1
17	BNSF	NW0614123	55A	06	27	WA	CLARK	Yard	BNSF	Coll	H318		31,646	0	0	0	YARD/SWITCHING	010	0	0
17	BNSF	NW0614123	55A	06	27	WA	CLARK	Yard	BNSF	Coll	H318		25,143	0	0	0	YARD/SWITCHING	005	0	1
18	BNSF	NW0714105	55A	07	06	WA	SPOKANE	Yard	BNSF	Der	H524	H523	8,412	1,000	0	0	YARD/SWITCHING	010	0	8
18	BNSF	NW0714105	55A	07	06	WA	SPOKANE	Yard	BNSF	Der	H524	H523	2,576	0	0	0	CUT OF CARS	000	0	2
19	BNSF	NW0714109	55A	07	09	WA	BENTON	Main	BNSF	Der	T109		101,465	56,000	0	0	FREIGHT TRAIN	037	0	3
20	BNSF	NW0714102	55A	07	17	WA	SNOHOMISH	Yard	BNSF	Der	H607	H702	6,500	7,100	0	0	YARD/SWITCHING	005	0	4
21	BNSF	NW0714116	55A	07	24	WA	KING	Main	BNSF	Der	E65L		62,316	143,500	0	0	FREIGHT TRAIN	005	1	4
22	BNSF	NW0814106	55A	08	01	WA	SPOKANE	Yard	BNSF	Coll	H021		5,360	0	0	0	FREIGHT TRAIN	003	0	4
22	BNSF	NW0814106	55A	08	01	WA	SPOKANE	Yard	BNSF	Coll	H021		5,156	0	0	0	CUT OF CARS	005	0	1
23	TMBL	08152014A	55A	08	15	WA	THURSTON	Main	TMBL	Oth	M503		14,599	25,000	0	0	FREIGHT TRAIN	008	0	0
24	BNSF	NW0814122	55A	08	29	WA	PIERCE	Yard	BNSF	Oth	H318		9,305	0	0	0	CUT OF CARS	002	0	0
24	BNSF	NW0814122	55A	08	29	WA	PIERCE	Yard	BNSF	Oth	H318		2,200	0	0	0	YARD/SWITCHING	005	0	0
25	BNSF	NW0914101	55A	09	13	WA	CLARK	Yard	BNSF	Coll	H307		10,366	0	0	0	YARD/SWITCHING	008	0	0
25	BNSF	NW0914101	55A	09	13	WA	CLARK	Yard	BNSF	Coll	H307		10,200	0	0	0	LIGHT LOCO(S)	004	0	0
26	BNSF	NW0914107	55A	09	21	WA	FRANKLIN	Yard	BNSF	Coll	H306		77,159	11,156	0	0	FREIGHT TRAIN	010	0	0
26	BNSF	NW0914107	55A	09	21	WA	FRANKLIN	Yard	BNSF	Coll	H306		40,000	0	0	0	YARD/SWITCHING	002	0	0
27	BNSF	NW1114103	55A	11	04	WA	CHELAN	Yard	BNSF	Der	T207		11,726	5,000	0	0	FREIGHT TRAIN	008	0	5
28	BNSF	NW1114111	55A	11	11	WA	KING	Yard	BNSF	Der	M411		7,818	3,000	0	0	YARD/SWITCHING	010	0	3
29	BNSF	NW1114114	55A	11	13	WA	SPOKANE	Yard	BNSF	Der	H525		20,979	7,000	0	0	FREIGHT TRAIN	004	0	4
30	BNSF	NW1114200	55A	11	20	WA	LEWIS	Main	BNSF	Oth	M304		15,000	1,100	0	0	FREIGHT TRAIN	038	0	0
31	BNSF	NW1114201	55A	11	24	WA	SPOKANE	Main	BNSF	Oth	M303		15,000	0	0	1	MAINTENANCE CAR	005	0	0
32	BNSF	NW1214100	55A	12	03	WA	KING	Industry	XGNW	Der	M101		15,043	1,000	0	0	YARD/SWITCHING	004	0	6
33	BNSF	NW1214104	55A	12	07	WA	SPOKANE	Yard	BNSF	Coll	H306		8,295	0	0	0	YARD/SWITCHING	003	0	0
33	BNSF	NW1214104	55A	12	07	WA	SPOKANE	Yard	BNSF	Coll	H306		3,202	0	0	0	YARD/SWITCHING	003	0	0
34	BNSF	NW1214105	55A	12	09	WA	CLARK	Yard	BNSF	Oth	H702		0	40,945	0	0	LIGHT LOCO(S)	002	0	0
35	BNSF	NW1214107	55A	12	12	WA	KING	Yard	BNSF	Der	H318		17,124	1,000	0	0	YARD/SWITCHING	010	0	3
36	BNSF	NW1214109	55A	12	12	WA	SPOKANE	Yard	BNSF	Der	H312		19,199	0	0	0	YARD/SWITCHING	004	0	2

Based on the FRA data (2015), there were two accidents in Cowlitz County in 2014 (accidents 8 and 11 in Figure 1) and neither involved an injury or fatality. One incident was in a yard and the other involved a derailment of 11 rail cars on main line track. For Washington State, there were 36 accidents in 2014, two of which had an injury involved. Thirteen accidents were on main line track, the rest were in yards or on industry track. Derailments had 0 to 11 rail cars involved. Table 2 illustrates UTC data for crashes that occurred at highway rail grade crossings and along railroad rights-of-way in Washington State.

Table 2. Washington State Rail Crash Statistics

Year	Crossing Collisions	Crossing Injuries	Crossing Fatalities	Trespass Fatalities
2012	33	18	2	10
2013	20	10	4	17
2014	35	10	5	9

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