3.2 Rail Operations Safety

This section describes OEA's analysis of potential rail safety impacts from operation of the proposed rail line. The subsections that follow describe the study areas, data sources, methods OEA used to analyze the impacts, the affected environment, and the impacts of the Action Alternatives and No-Action Alternative on rail safety. OEA focused the discussion of existing rail operations safety conditions on downline segments outside of the immediate project area because there are currently no active rail lines in the Uinta Basin (the Basin).

3.2.1 Analysis Methods

This subsection identifies the study areas, data sources, and analysis methods OEA used to analyze rail operations safety. The rail operations safety analysis focuses on the operation of the proposed rail line and the operation of existing rail lines, not rail construction.

3.2.1.1 Study Areas

The study area for rail operations safety includes both a defined study area for the proposed rail line (project study area) and a study area for downline impacts (downline study area) that OEA anticipates could experience a project-related increase in rail traffic.

- **Project study area**. The project study area for rail operations safety includes the track for each of the Action Alternatives. Under any of the Action Alternatives, the proposed rail line would extend from two terminus points in the Basin near Myton, Utah, and Leland Bench, Utah, to a connection with an existing rail line near Kyune, Utah.
- **Downline study area**. The downline study area includes segments of existing rail lines outside of the Basin that could experience an increase in rail traffic above OEA's thresholds at 49 C.F.R. § 1105.7(e)(5) if the proposed rail line were constructed. As described in Section 3.1, *Vehicle Safety and Delay*, the downline study area extends from the proposed connection near Kyune to the northern, eastern, and southern edges of the Denver Metro/North Front Range air quality nonattainment area (Appendix C, *Downline Analysis Study Area and Train Characteristics*, Figure C-1).

3.2.1.2 Data Sources

OEA reviewed the following data sources to determine the potential impacts on rail operations safety that could result from operation of the proposed rail line.

- Information from the Coalition related to train composition, train traffic volumes, track class, track length, train speed, and rail car design for each Action Alternative.
- Available information from the Coalition on commodities other than crude oil that might move on the proposed rail line and how those commodities would affect the length and composition of trains.

- Specific information from the Coalition on any additional speed restrictions beyond those for the track class, such as those required for train operations on steep inclines, on bridges, or in tunnels.
- Data on rail accidents obtained from publicly available national databases and media, for descriptions of possible accidents.
- Federal Railroad Administration (FRA) accident statistics nationwide and by carrier, track class, and state, as available. The Coalition has indicated that Rio Grande Pacific Corporation would operate the proposed rail line if it were authorized and constructed. Because Rio Grande Pacific Corporation does not currently operate in the Basin or elsewhere in Utah, OEA based the analysis on broader data sets that included rail operations in other states and by other operators.
- Available data on spill likelihood and ignition probabilities from prior studies.
- Existing train traffic (average number of trains per day) from the FRA (2020).

3.2.1.3 Analysis Methods

OEA used the following methods to analyze potential impacts related to rail operations safety. This subsection describes the methods OEA used to determine the potential likelihood of rail accidents, including collisions, derailments, and spills and fires resulting from accidents during rail operations. As discussed in Chapter 2, *Proposed Action and Alternatives,* operations at the terminus points in the Basin are not part of the proposed action and are covered in the cumulative impacts analysis (Section 3.15, *Cumulative Impacts*).

OEA identified potential accidents that could occur during rail operations and estimated both the likelihood of occurrence (the frequency) and the potential impacts of potential accidents, including spills of crude oil or other bulk liquids. OEA conducted a separate analysis for each of the Action Alternatives to develop representative frequencies and potential impacts associated with a set of representative release scenarios in the study area and the selected downline areas. The resulting estimates are most meaningful when compared to each other, as opposed to considering them as predicting absolute frequencies or potential impacts.

Estimating the chance of a release from a rail accident is a two-part process. The first part is to estimate the chance that a train will be involved in an accident, particularly a derailment or collision. The second part is to estimate the chance of a release given the occurrence of the accident, including both the probability that one or more tank cars will be damaged or derailed and that those cars will release some or all of their cargo. The number of cars derailing and releasing product determines the ultimate spill size. The purpose of the analysis was to estimate the relative likelihood of different types of potential accidents, not to make predictions of the potential for various impacts occurring in specific locations.

OEA's specific analysis process included the following. Appendix E, *Rail Accident Rates*, provides additional information regarding the analysis process.

- **OEA considered the railroad operations safety context**. The context includes applicable FRA track safety standards (49 C.F.R. Part 213) and the types of railroad cars that could be used on the proposed rail line, particularly for crude oil. OEA also considered specific design features, such as sidings, which would allow loaded and empty trains to effectively pass each other and could create conditions for collisions if safety systems were to fail.

- **OEA estimated the potential for project-related rail accidents**. OEA used available FRA data on accidents by track type, as well as other estimates of accident rates by track class, to assess the potential for collisions and derailments on the proposed rail line. For the proposed rail line, OEA used a predicted accident rate of 2 per million train miles; for the downline study area, OEA used a predicted accident rate ranging from 0.5 to 2 per million train miles depending on track class (Appendix E, *Rail Accident Rates*). The number of accidents on the proposed rail line would depend on the number of trains that would move on the line. The Coalition estimates that rail traffic on the proposed rail line could range from as few as 3.68 trains per day, on average (the low rail traffic scenario), to as many as 10.52 trains per day, on average (the high rail traffic scenario), depending on future market conditions, including future demand for crude oil produced in the Basin. OEA estimated accident frequencies separately for the high rail traffic scenario and the low rail traffic scenario. OEA also estimated accident frequencies separately for trains carrying loaded and unloaded rail cars under each of the Action Alternatives.
- **OEA estimated the likelihood and volume of possible crude oil spills.** Because the proposed rail line is anticipated to primarily transport crude oil, OEA focused on this commodity in its analysis of potential spills. OEA estimated the probability of crude oil releases (spills) and the amount of crude oil that could be released based on the anticipated rail car types and numbers of cars per train, as well as previous studies and models of spill probabilities for other rail projects in a number of industries. OEA did not assess the possibility of releases of other commodities in detail because OEA anticipates that the volumes of commodities other than crude oil would be low. As described in Chapter 2, *Proposed Action and Alternatives*, other commodities would be transported in manifest rail cars added to the oil trains and would not require dedicated trains.

3.2.2 Affected Environment

This subsection identifies the existing environmental conditions related to rail operations safety in the study areas. In 2019, there were 1,869 train accidents across all track types and across all railroads; 607 of these were on main lines or sidings (FRA 2020). There are no rail operations at present within the project study area, so there is no baseline for rail operations safety in that study area. For the downline study area, there are existing main line operations that provide a baseline for rail safety impacts.

Table 3.2-1 provides the rail traffic and predicted accidents per year for the downline segments that OEA included in its analysis. OEA analyzed the baseline traffic using the same accident rates as for the traffic that would originate or terminate on the proposed rail line.

Table 3.2-1. Downline Segment Rail Traffic and Predicted Accidents per Year

Downline Segment[a]	Miles[a]	Distance from Kyune	Trains per Day[a]	Predicted Accidents per Year[b]
Kyune to Denver				
Kyune to Grand Junction	189.4	0–189.4	8	1.1
Grand Junction to Denver	268	189.4–457.4	11	0.54
Denver Eastbound	**59**	**460.6–519.6**	**3**	**0.032**
Denver Southbound				
Southbound-a	12.4	268–280.4	38	0.086
Southbound-b	4.2	280.4–284.6	20	0.015
Denver Northbound				
Northbound-a	27.2	460.6–487.8	14	0.069
Northbound-b	42	487.8–529.8	10	0.077
Denver East/North	**3.2**	**457.4–460.6**	**25**	**0.015**

Notes:
[a] Miles and train counts derived from the downline analysis.
[b] Accidents were calculated as part of this analysis.

3.2.3 Environmental Consequences

Operation of the proposed rail line would introduce the possibility of a rail-related accident in the project study area and increase the likelihood of a rail-related accident in the downline study area. This subsection first presents the potential impacts that would be the same for all three Action Alternatives and then compares the potential impacts that would be different across the Action Alternatives. This subsection also discusses rail operations safety under the No-Action Alternative.

3.2.3.1 Impacts Common to All Action Alternatives

This subsection discusses potential impacts on rail operations safety that would be the same across the three Action Alternatives.

Project Study Area

Predicted Accidents

Based on accident rates on existing rail lines that are similar to the proposed rail line, OEA predicts that rail accidents would be uncommon under any of the Action Alternatives. Depending on the rail traffic volume and which Action Alternative was constructed, OEA predicts that an accident involving a loaded oil train would occur approximately once every 3 to 10 years. These accidents would not all be serious—some might involve derailments of a few rail cars and no release of crude oil, while others could involve more derailed cars and could release crude oil into the environment. Accidents involving trains carrying unloaded oil tanker cars would involve limited, if any, crude oil releases regardless of the number of cars that derailed. To minimize the likelihood and consequences of accidents during rail operations, the Coalition is volunteering mitigation (VM-1, VM-15) to ensure that train operators using the rail line would comply with the requirements of the

Hazardous Materials Transportation Act, as implemented by the U.S. Department of Transportation, and with FRA safety requirements, including any applicable speed limits and train-lighting requirements. In addition, OEA is recommending a mitigation measure (ROS-MM-2) that would require the Coalition to inspect, as part of their routine rail inspections or at least twice annually, both track geometry and local terrain conditions. Implementation of this measure would minimize the potential for problems with the track or track bed that could potentially lead to accidents.

Accident Consequences

If an accident were to occur along the proposed rail line, there could be a variety of possible outcomes. A minor accident might involve the derailment of a single rail car and no release of crude oil, while a major accident might involve multiple cars or trains and could cause injuries or fatalities to workers or passengers on the train or the trains involved. On existing rail lines, major accidents that result in spills, injuries, or fatalities are much less likely than minor accidents, and OEA expects that the same would be true for the proposed rail line. Because OEA predicts that accidents would be equally likely to occur for loaded trains leaving the Basin and empty trains entering the Basin, only half of the predicted accidents would involve loaded trains with the potential to release any quantity of crude oil. For those derailment accidents involving loaded trains, most would result in the derailment of only a few cars, and only one in four of those accidents would be expected to have a release of crude oil (Appendix E, *Rail Accident Rates*, provides additional information on the typical sizes of derailments).

Accidents involving a loaded oil train could result in several different outcomes and associated consequences, depending on the force of the collision or derailment, the location of the accident, and the number of train cars involved. If an accident were to release crude oil near a waterway, crude oil could enter the waterway, which would affect water quality. If the force of the accident were sufficient to ignite the crude oil, a fire could result that could remain confined to a single car or could surround other cars and cause them to rupture if the thermal protection[1] on the other cars were breached or damaged. A fire that surrounds other cars could, in turn, cause a larger fire. In general, the greater the potential damage of an accident, the lower the likelihood that such an accident would occur because more concurrent factors (such as the spill being larger, ignition occurring, and the accident occurring in a sensitive area) would have to be involved.

For a smaller release (e.g., minor collision or derailment with spills equivalent to one to three rail cars), there is a chance of ignition; however, OEA expects that most spills of this size would not cause a fire because the force of the accident would not be strong enough to cause ignition (Appendix E, *Rail Accident Rates*). Of those smaller releases that could result in a fire, the fire could engulf or affect other rail cars. As the material in adjacent rail cars heats up, the pressure would build and could eventually cause other rail cars to fail. The likelihood of this occurring would depend on the exact configuration of the release and the fire compared to the location of the other rail cars after the derailment, any fire suppression capabilities, and the timing and nature of response actions. Thus, there is a chance of a small spill escalating into a larger spill due to a fire. For larger spills (e.g., spills involving five or more loaded rail cars), the likelihood of an accident having sufficient energy to yield an ignition would be greater, i.e., closer to 50 percent or more (Appendix E, *Rail Accident Rates*). The additional number of cars that would be derailed in the accident and the

[1] Thermal protection increases the chance of rail cars staying intact in the event of exposure to a fire, whether a nearby pool fire if a spill on the ground is ignited or a jet fire from a smaller hole in an adjacent car. Jacketed thermal protection adds both strength to the car and protection of the insulating material.

additional amount of material that would be released would increase the likelihood that ignited cars would affect other rail cars and cause a larger fire.

To ensure that the consequences of a potential accident would be minimized, the Coalition is committing to developing an internal Emergency Response Plan for operations on the proposed rail line. The plan would include a roster of agencies and people to be contacted for specific types of emergencies during rail operations and maintenance activities, procedures to be followed by particular rail employees in the event of a collision or derailment, emergency routes for vehicles, and the location of emergency equipment (VM-8). In addition, the Coalition's voluntary mitigation measure (VM-14) and OEA's recommended mitigation measure (ROS-MM-1) would require the Coalition to ~~would~~ immediately notify state and local authorities in the event of a release of crude oil and to immediately commence cleanup actions in compliance with federal, state, and local requirements ~~(VM-8, VM-9)~~. If these recommended mitigation measures are implemented, OEA concludes that impacts related to rail operations safety would not be significant.[2]

Downline Study Area

Impacts on the downline segments would depend on the length of the downline segment and the number of trains that would use the segment. Increased rail traffic would have the greatest impacts on the segment of the existing UP rail line between Kyune and Denver because this segment is the longest existing rail line segment in the downline study area and would receive the most new rail traffic if the proposed rail line were constructed. Under the high rail traffic scenario, the Kyune to Denver segment would experience more than two times the risk of an accident than under baseline (existing) conditions, and the low rail traffic scenario would increase the predicted accident risk by about 40 percent from the baseline risk. This is because the Kyune to Denver segment currently has a low volume of rail traffic relative to the predicted traffic on the proposed rail line.

Table 3.2-2 presents the predicted frequencies of accidents on the downline segments. Any potential increase in rail traffic on existing rail lines in the downline study area would depend on the volume of rail traffic originating or terminating on the proposed rail line. The volume of rail traffic on the proposed rail line would depend, in turn, on future market conditions, such as future demand for crude oil produced in the Basin. Because the volume of rail traffic on the proposed rail line would not depend on which Action Alternative is constructed, the predicted impacts on downline segments are the same for all of the Action Alternatives. The table shows predicted accidents for loaded and unloaded trains separately, along with those for baseline (existing) traffic.

Table 3.2-2. Predicted Annual Train Accidents by Downline Segment

		Predicted Accidents per Year				
Downline Segment	**Length (miles)**	**Baseline**	**High Rail Traffic-loaded**	**High Rail Traffic-unloaded**	**Low Rail Traffic-loaded**	**Low Rail Traffic-unloaded**
Kyune to Denver	457.4	1.6	0.89	0.89	0.31	0.31
Denver Eastbound	59	0.032	0.0059	0.0059	0.0022	0.0022
Denver Southbound	16.6	0.10	0.0017	0.0017	0.00061	0.00061

[2] These requirements are similar to those for unit trains of more flammable crude oil (http://dothazmat.vividlms.com/docs/Emergency-Response/TRIPR%20HHFT%20ER%20Supplement%20(Rev%209.3).pdf).

Downline Segment	Length (miles)	Predicted Accidents per Year: Baseline	High Rail Traffic-loaded	High Rail Traffic-unloaded	Low Rail Traffic-loaded	Low Rail Traffic-unloaded
Denver Northbound	69.2	0.15	0.046	0.046	0.016	0.016
Denver East/North	3.2	0.015	0.0025	0.0025	0.00085	0.00085

Table 3.2-2 shows that the predicted accident risk involving trains coming from or heading to the proposed rail line would be lower than the baseline accident risk on all downline segments except for the Kyune to Denver segment. Aside from that segment, the chance of an accident involving a loaded crude oil train would be low on an annual basis. On the Kyune to Denver segment, OEA predicts that accidents involving a loaded crude oil train would occur slightly less than once per year under the high rail traffic scenario. Because downline impacts would occur on existing rail lines that are not owned or operated by the Coalition, and railroads have the right to determine how to operate and route their traffic, any potential increase in the risk of accidents in the downline study area would be beyond the Board's control in this proceeding; therefore, OEA is not recommending mitigation to address this potential impact.

3.2.3.2 Impact Comparison between Action Alternatives

This subsection compares the potential environmental impacts related to rail operations safety across the three Action Alternatives.

If the proposed rail line were authorized and constructed, OEA estimates that rail operations would result in 0.2 to 0.72 predicted train accidents per year (primarily collisions and derailments) in the project study area, depending on the Action Alternative and the volume of rail traffic. OEA predicts that approximately half of the accidents would involve loaded trains and approximately a quarter of accidents involving loaded oil trains would result in a release of crude oil (Appendix E, *Rail Accident Rates*). The chance of a major spill with or without a fire would be lower, as described in Appendix E. Table 3.2-3 shows the predicted annual number of accidents by Action Alternative and rail traffic scenario.

Table 3.2-3. Predicted Annual Train Accidents by Action Alternative

Action Alternative	Low Rail Traffic Scenario			High Rail Traffic Scenario		
	Loaded	Unloaded	Combined	Loaded	Unloaded	Combined
Indian Canyon	0.10	0.10	0.20	0.28	0.28	0.56
Wells Draw	0.12	0.12	0.24	0.36	0.36	0.72
Whitmore Park	0.11	0.11	0.22	0.30	0.30	0.60

Because the Wells Draw Alternative is the longest of the Action Alternatives, OEA predicts that it would have the highest chance of accidents (0.24 to 0.72 accident per year), followed by the Whitmore Park Alternative (0.22 to 0.60 accident per year) and the Indian Canyon Alternative (0.20 to 0.56 accident per year). Given that approximately one in four accidents involving loaded trains would result in a release of crude oil of any size, OEA predicts that rail operations under the Wells Draw Alternative would result in a spill approximately once every 11 years (under the high rail traffic scenario) to approximately once every 33 years (under the low rail traffic scenario). Under the Indian Canyon Alternative, a spill would be expected approximately once every 14 to 40 years, while OEA predicts that the Whitmore Park Alternative would experience a spill approximately once every 13 to 36 years, depending on the volume of rail traffic.

The chance of a large spill or a spill into sensitive areas such as waterways would be smaller. For example, both the Indian Canyon Alternative and the Whitmore Park Alternative would parallel Indian Canyon Creek for approximately 22 miles. Using the same per-mile accident rate, a spill of any size along Indian Canyon Creek would be expected to occur approximately once every 55 to 154 years, depending on the volume of rail traffic, under either the Indian Canyon Alternative or the Whitmore Park Alternative.

3.2.3.3 No-Action Alternative

Under the No-Action Alternative, the Coalition would not construct and operate the proposed rail line. Therefore, there would be no risk of a rail-related accident in the project study area, and the probability of a rail-related accident on existing rail lines in the downline study area would not change from current conditions.

If the proposed rail line were not constructed, crude oil produced in the Basin would continue to be transported by truck. On a per-mile basis, rail transportation is significantly safer than truck transportation. Therefore, diversion of truck transportation of freight such as crude oil to rail transportation would be a potential safety benefit of the proposed rail line. As discussed in Section 3.1, *Vehicle Safety and Delay*, OEA does not expect that the proposed rail line would divert truck transportation of crude oil to rail transportation for the purpose of serving existing oil refineries in Salt Lake City in the short term because those refineries currently do not have rail access. However, OEA anticipates that the proposed rail line would eliminate the existing tanker truck traffic transporting crude oil from production areas in the Basin to the Price River Terminal in Wellington, Utah. Under the No-Action Alternative, crude oil that currently moves to the Price River Terminal from the Basin by truck would continue to move by truck and the benefits of the proposed rail line in terms of prevented vehicular accidents would not be realized.

If oil production in the Basin were to increase in the future in response to market conditions, truck traffic on local roadways could increase under the No-Action Alternative because there would be no alternative transportation option available. This potential future increase in truck traffic would result in a greater number of vehicular accidents and decreased transportation safety under the No-Action Alternative relative to any of the Action Alternatives.

3.2.4 Mitigation and Unavoidable Environmental Effects

Operation of any of the Action Alternatives would involve a risk of potential rail-related accidents. The likelihood of an accident along the proposed rail line would depend on the volume of rail traffic, which would depend on future market conditions, including future demand for crude oil produced in the Basin. Across the three Action Alternatives, the Wells Draw Alternative would have the highest probability of experiencing accidents because of its longer length relative to the other Action Alternatives. Because the operation of rail lines inherently involves the potential for accidents, some impacts related to rail operations safety in the project study area would be unavoidable. OEA concludes, however, that these impacts would be minimized and would not be significant if the Coalition's voluntary mitigation measures, OEA's recommended mitigation measures, and all applicable federal requirements are implemented (Chapter 4, *Mitigation*)

Accidents involving trains originating on or heading to the proposed rail line could also occur in the downline study area. Because downline impacts would occur on existing rail lines that are not owned or operated by the Coalition, and railroads have the right to determine how to operate and route their traffic, any potential increase in the risk of accidents in the downline study area would be beyond the Board's control in this proceeding; therefore, OEA is not recommending mitigation to address this potential impact.