# 8. CLIMATE AND AIR QUALITY

This chapter describes climate and air quality in the project area of the proposed Port MacKenzie Rail Extension and potential impacts to climate and air quality from project alternatives. Section 8.1 describes applicable regulations. Section 8.2 discusses the methodology the Office of Environmental Analysis (OEA) used to assess potential impacts. Section 8.3 describes the climate and air quality study area. Section 8.4 describes the existing climate and air quality in the vicinity of the proposed rail line. Section 8.5 describes the potential impacts of emissions from rail line construction and operation. Section 8.6 describes unavoidable environmental consequences of the proposed action to climate and air quality.

## 8.1 Regulatory Setting

This section describes Federal and state regulatory requirements related to air quality and identifies the regulating agencies responsible for air quality management and the regulations relevant to the air quality analysis. There are no regulatory requirements for greenhouse gas emissions that would apply to construction and operation of the proposed rail line. Council on Environmental Quality guidance on climate change and greenhouse gas emissions is discussed in Chapter 16, Cumulative Impacts.

### 8.1.1 Federal Regulations

Surface Transportation Board (STB or the Board) regulations (49 Code of Federal Regulations [C.F.R.] § 1105.7[e][5]) set thresholds for analyzing anticipated impacts to air quality. When a case before the Board would result in an increase in rail traffic of at least 8 trains per day on any segment of rail line affected by a project, then STB regulations require quantification of the anticipated effect on air emissions.[1] Under the proposed action, the Alaska Railroad Corporation (ARRC or the Applicant) would construct and operate a proposed rail line from 31 to 46 miles long, depending on alternative. ARRC anticipates operating only 2 trains per day over the proposed rail line. Nevertheless, OEA elected to analyze potential impacts to air quality from proposed rail line construction and operation, and used conformity thresholds to determine whether estimated increases in emissions would be *de minimis*.[2]

U.S. Environmental Protection Agency (USEPA) regulations specify the maximum acceptable ambient concentration level for 6 primary or "criteria" air pollutants – ozone ($O_3$), nitrogen dioxide ($NO_2$), carbon monoxide (CO), sulfur dioxide ($SO_2$), respirable particulate matter (PM), and lead (Pb). As defined by the Clean Air Act Amendments of 1990 (42 United States Code [U.S.C.] § 7409), there are 2 types of National Ambient Air Quality Standards (NAAQS) for

[1] For projects in nonattainment areas, the threshold is at least 3 trains per day.

[2] Although the USEPA General Conformity Rule is not directly applicable to Board actions, it nevertheless provides useful thresholds for measuring potential impacts to air quality from a proposed project before the Board. The General Conformity Rule defines a "conforming" project as one that conforms to the approved State Implementation Plan's overall objective of eliminating or reducing the severity and number of air quality violations in a state, and achieving expeditious attainment of the NAAQS; does not cause or contribute to new NAAQS violations in the area; and does not increase the frequency or severity of existing NAAQS or impede required progress toward attainment. The General Conformity Rule establishes emissions thresholds, or *de minimis* levels, for use in evaluating the conformity of a project. If the net emission increases due to a project would be less than these thresholds, the project is presumed to conform and no further conformity evaluation is warranted. The General Conformity Rule is codified at 40 C.F.R. part 51, subpart W.

these 6 air pollutants. Primary NAAQS set limits to protect public health and secondary standards set limits to protect public welfare. The Alaska Department of Environmental Conservation (ADEC) has adopted the same standards for Alaska (Alaska Administrative Code [Alaska Admin. Code] 18 § 50.010, Ambient Air Quality Standards). Table 8-1 lists and describes the primary and secondary standards.

**Table 8-1**
**National and Alaska Ambient Air Quality Standards[a]**

| | Primary Standard (Public Health) | | | Secondary Standard (Public Welfare) | | |
|---|---|---|---|---|---|---|
| **Pollutant[b]** | **Level[c]** | **Averaging Time** | **Form** | **Level** | **Averaging Time** | **Form** |
| $O_3$ | 80 ppb | 8 hours | 3-year average of annual fourth-highest daily maximums | Same as primary standard | | |
| $PM_{10}$ | 150 $\mu g/m^3$ | 24 hours | Not to be exceeded more than once per year on average over 3 years | Same as primary standard | | |
| $PM_{2.5}$ | 35 $\mu g/m^3$ | 24 hours | 3-year average of the 98th percentile 24-hour concentrations | Same as primary standard | | |
| | 15 $\mu g/m^3$ | Annual | 3-year average of annual averages | | | |
| CO | 35 ppm | 1 hour | No more than once per year | No secondary standard | | |
| | 9 ppm | 8 hours | No more than once per year | | | |
| $SO_2$ | 140 ppb | 24 hours | No more than once per year | 0.5 ppm | 3-hour | No more than once per year |
| | 30 ppb | Annual | Not to be exceeded | | | |
| $NO_2$ | 53 ppb | Annual | Not to be exceeded | Same as primary standard | | |
| Pb | 0.15 $\mu g/m^3$ | 3-month rolling average | Not to be exceeded over a 3-year period | Same as primary standard | | |

[a] Source: 40 C.F.R. part 50.

[b] $O_3$ = ozone, $NO_2$ = nitrogen dioxide, CO = carbon monoxide, $SO_2$ = sulfur dioxide, $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than 2.5 microns, $PM_{10}$ = particulate matter with an aerodynamic diameter less than 10 microns, Pb = lead.

[c] ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter; ppb = parts per billion.

The USEPA has designated certain lands as mandatory Class I areas because air quality is considered a special feature of those areas. Class I areas have special protection under the Clean Air Act Prevention of Significant Deterioration Program. In general, if a new stationary source would be within 62 miles of a Class I area, potential impacts of the source on that Class I area must be determined. The nearest Class I areas to the proposed rail line project area are the Tuxedni Wilderness Area at a distance of 120 miles and the Denali National Park Wilderness Area at a distance of 125 miles. Because the proposed rail line would not be a stationary source

and would be beyond the 62-mile distance threshold, OEA did not analyze potential impacts on Class I areas.

USEPA also designates attainment and nonattainment areas. Attainment areas are those areas designated by EPA as meeting the national ambient air quality standards. Nonattainment areas are designated by EPA as not meeting the national ambient air quality standards. An area can be in attainment for one pollutant but out of attainment for another pollutant. The proposed rail line would be in an attainment area for all criteria air pollutants.

### 8.1.2 State Regulations

Since the proposed rail line would be in an attainment area for all criteria air pollutants, no additional state air quality regulations would apply.

## 8.2 Analysis Methodology

OEA evaluated the potential impacts of increased emissions of NAAQS air pollutants plus greenhouse gas emissions in 3 steps. First, OEA identified and characterized the emission sources that would result from proposed rail line construction and operation. Second, OEA aggregated these emission sources to obtain estimated total emissions per year for construction and estimated total emissions per year for operation for each NAAQS air pollutant plus greenhouse gases. OEA estimated air emissions for the longest alternative and for the maximum average train length of 80 cars anticipated by the Applicant. Third, OEA compared the increase in estimated emissions with the *de minimis* conformity thresholds.

## 8.3 Study Area

The build alternatives for the proposed rail line all fall within the Matanuska-Susitna Borough (MSB or the Borough) and would run between the Port MacKenzie District and the ARRC main line, connecting at a point along ARRC's existing main line between Mile Post 188.9, north of Willow, and Mile Post 170.3, near Wasilla. Given the relatively small projected annual emissions from the project, the relevant study area for analyzing impacts to air quality is confined to the immediate vicinity of the project.

## 8.4 Affected Environment

OEA relied on current climate characterizations along the proposed rail line for information on existing conditions. Climate information is available for the project area from 3 principal sources. Near the northern end of the project area, data are available for summer for Houston and for winter from the Matanuska Agricultural Experimental Station near Palmer. For the southern portion of the project area, climate information is available for Anchorage, which is approximately 5 miles south of Port MacKenzie, across Knik Arm.

The dominant climate for all of Southcentral Alaska, including the project area, can be classified as a maritime climate, meaning that summers and winters are milder than normally seen in continental (interior) climates of similar latitude. Average temperatures range from 60.4 degrees Fahrenheit (°F) in July to 13.9°F in January in the northern portion of the study area, while the

southern portion is more moderate, with average temperatures from 58.5°F in July to 15.2°F in January. Precipitation is relatively uniform from November through June, and increases during the summer and early fall.

The area around Houston and the Matanuska Agricultural Experimental Station has a maritime climate typical of coastal Alaska, which is characterized by short moderate summers, long cool winters, moderate precipitation, and high humidity. Average monthly temperatures (WRCC, 2008) in the area range from 13ºF in January to 60ºF in July, with an average annual temperature of 36ºF. The all-time low temperature recorded was -45ºF; the highest temperature recorded was 92ºF. Thunderstorms are infrequent and occur only during the summer. Average annual precipitation is approximately 15 inches on the eastern side of Matanuska Valley and upward of 24 inches on the western side. Most precipitation falls during summer and early fall. Average monthly precipitation ranges from a low of less than 0.5 inch in April to peaks in September ranging from 2 to 4 inches. Average annual snowfall is approximately 48 inches, but more than twice this amount falls in some years.

Average monthly temperatures in Anchorage (WRCC, 2008) over the 30-year period of 1971 through 2000 ranged from 15.1ºF in January to 58.5ºF in July, yielding a yearly average temperature of 36.1ºF. The all-time low temperature recorded was -34ºF; the highest temperature recorded was 82ºF. Average monthly precipitation ranges from 0.52 inch in April to 2.93 inches in August. Annual average precipitation is 16.1 inches. Most precipitation occurs as rain during summer, with some additional rainfall during fall. Average snowfall over 56 winters (1951 through 2006) was 71.9 inches, with a maximum of 132.6 inches occurring during the winter of 1954 to 1955. Heavy fog occurs during November through February, with 4 to 6 days each month having 0.25 mile or less visibility.

Prevailing wind direction from April through September is from the south. During the other months, the prevailing wind is from the north, with an average speed of about 6.5 miles per hour. The highest average wind speeds occur during spring, May being the windiest with an average speed of 8.7 miles per hour. Thunderstorms are infrequent but do occasionally occur in June and July with an average of less than 1 thunderstorm.

Alaska's air monitoring program focuses on 3 of the 6 criteria pollutants regulated through the NAAQS – CO and both coarse ($PM_{10}$) and fine ($PM_{2.5}$) particulate matter. Available air quality data from the vicinity of the proposed rail line are available for the Municipality of Anchorage and for the MSB. Anchorage air quality monitoring includes monitoring for CO, $PM_{10}$, and $PM_{2.5;}$ $PM_{10}$ and $PM_{2.5}$ are also monitored for the Matanuska-Susitna area in Butte. OEA anticipates that existing air pollutant levels in the immediate area of the proposed rail line are lower than at either the Anchorage or Butte sites because human activities and associated emissions are considerably lower.

The Matanuska-Susitna area is in the process of transitioning from a rural/agricultural area to one that includes developed areas that extend suburban Anchorage. The Matanuska-Susitna area has historically experienced occasional periods in which 24-hour average $PM_{2.5}$ concentrations have exceeded 35 micrograms per cubic meter. While increased road paving has helped reduce the levels of road dust across the valley, high winds off the Matanuska River Drainage (in winter and early spring) and the Knik River Drainage (in late spring and summer), along with increased

population and the associated motor vehicle activity, does occasionally increase the 24-hour average $PM_{2.5}$ concentration levels above 35 micrograms per cubic meter. To further understand and address air quality in the Borough, ADEC established 2 new monitoring sites, located in downtown Palmer and at the Wasilla fire station. These began collecting and archiving $PM_{10}$ and $PM_{2.5}$ measurements in October 2008.

At present, the Municipality of Anchorage operates 5 air monitoring stations in the municipality. None of these monitoring sites exceeded the ambient CO, $PM_{10}$, or $PM_{2.5}$ standards from 2005 through 2007 (USEPA, 2008). Over the same period, the Butte monitoring site did not show an exceedance for $PM_{10}$ or $PM_{2.5}$, but the 24-hour $PM_{2.5}$ 3-year (2005 through 2007) average of 28.4 micrograms per cubic meter is within 20 percent of the standard. Table 8-2 lists the maximum pollutant levels measured from 2005 through 2007 for the Anchorage and Butte monitoring sites.

**Table 8-2**
**Measured Ambient Air Concentrations for Anchorage and Butte, Alaska (2005 through 2007)[a]**

| Monitoring Station | Measured Concentrations[b] | | | | | |
|---|---|---|---|---|---|---|
| | 1-Hour CO 2nd Highest Maximum | | | 8-Hour CO 2nd Highest Maximum | | |
| | 2005 (ppm) | 2006 (ppm) | 2007 (ppm) | 2005 (ppm) | 2006 (ppm) | 2007 (ppm) |
| Anchorage | 8.1 | 8.4 | 12.5 | 4.8 | 6.1 | 5.3 |
| | 24-Hour $PM_{2.5}$ 98th percentile | | | Annual Average $PM_{2.5}$ | | |
| | 2005 ($\mu g/m^3$) | 2006 ($\mu g/m^3$) | 2007 ($\mu g/m^3$) | 2005 ($\mu g/m^3$) | 2006 ($\mu g/m^3$) | 2007 ($\mu g/m^3$) |
| Anchorage | 17.9 | 26.9 | 14.5 | 6.9 | 6.3 | 4.9 |
| Butte | 25.2 | 40.0 | 20.1 | 6.5 | 7.5 | 5.6 |
| | 24-Hour $PM_{10}$ 2nd highest | | | Annual Average $PM_{10}$ | | |
| | 2005 (µg/m3) | 2006 ($\mu g/m^3$) | 2007 ($\mu g/m^3$) | 2005 ($\mu g/m^3$) | 2006 ($\mu g/m^3$) | 2007 ($\mu g/m^3$) |
| Anchorage | 145.0 | 105.0 | 98.0 | 41.0 | 25.0 | 25.0 |
| Butte | 111.0 | 79.0 | 48.0 | 23.0 | 14.0 | 12.0 |

[a] Source: USEPA, 2008.

[b] CO = carbon monoxide; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than 2.5 microns; $PM_{10}$ = particulate matter with an aerodynamic diameter less than 10 microns; ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.

# 8.5 Environmental Consequences

## 8.5.1 Proposed Action

### 8.5.1.1 Common Impacts

#### Construction Impacts

OEA developed an emissions estimate for proposed rail line construction. To be conservative, OEA estimated construction emissions for the alternative that would require the most rail construction (the Mac West-Connector 1-Willow Alternative, the longest potential route at approximately 46 miles). Because only limited preliminary engineering information is available for the types of construction equipment and activity levels needed to implement the proposed

project, OEA estimated construction-related emissions based on construction emission estimates developed in the detailed analysis for the *Eielson Branch Realignment Air Quality Assessment Study* (Sierra Research, 2006).

Table 8-3 lists the results of the estimated construction emissions compared to the most recently available (2001) MSB total emission inventory (USEPA, 2008). As shown in the table, construction-related emissions would be expected to be a small fraction of the Borough's total annual emissions during the assumed construction period of 2 years. Estimated nitrogen oxides ($NO_x$), $PM_{10}$, and $PM_{2.5}$ construction-related emissions would range from 0.1 to 1.9 percent of Borough total annual emissions for each pollutant. These emissions would be distributed over the approximately 46 miles of proposed rail line. The estimated emissions would be well below the *de minimis* conformity thresholds (100 tons per year for each pollutant), indicating their relatively small potential impact. Further, estimated construction emissions would be temporary (limited to the construction period). Estimated rates of fugitive dust emissions include the use of watering during construction in summer to limit fugitive dust emissions.

**Table 8-3**
**Estimated Construction Emissions along the Proposed Port MacKenzie Rail Extension[a] and the Matanuska-Susitna Borough 2001 Emissions Inventory**

| | Emission Quantities (metric tons per year)[b] | | | | | |
|---|---|---|---|---|---|---|
| **Emission Sources** | **VOCs** | **CO** | **$NO_x$** | **$PM_{10}$** | **$PM_{2.5}$** | **$SO_2$** |
| **Port MacKenzie Rail Extension** | | | | | | |
| Construction Exhaust | 4.1 | 28.3 | 44.2 | 4.9 | 4.9 | 0.03 |
| Construction Fugitive Dust | 0.0 | 0.0 | 0.0 | 18.7 | 7.0 | 0.00 |
| **Total Construction[c]** | **4.1** | **28.3** | **44.2** | **23.6** | **11.9** | **0.03** |
| **Matanuska-Susitna Borough[d]** | | | | | | |
| Off Highway (2001) | 1,054 | 18,435 | 1,954 | 52 | 40 | 62 |
| Highway Vehicles (2001) | 977 | 4,197 | 224 | 37 | 34 | 32 |
| Other Sources (Point and Area) | 705 | 4,347 | 179 | 15,268 | 2,787 | 70 |
| **Total Matanuska-Susitna Borough[c]** | **2,736** | **26,979** | **2,357** | **15,357** | **2,861** | **164** |

[a] Based on Sierra Research, 2006; most similar construction as segment "B".
[b] VOCs = volatile organic compounds; CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter with an aerodynamic diameter less than 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than 2.5 microns; $SO_2$ = sulfur dioxide.
[c] Measurements are in metric tons per year. Totals assume construction takes place over a 2-year period and that the length of proposed rail line construction would be 46 miles.
[d] Based on USEPA estimated inventory for the MSB from the National Emissions Inventory (USEPA, 2008).

## Operation Impacts

OEA also developed a conservative emission estimate for proposed rail line operation based on the longest rail line alternative. OEA estimated emissions assuming an average of one round-trip (2 one-way trips) freight train per day with 3 locomotives, 80 rail cars, with a loaded weight of 125 tons per car and unloaded weight of 30 tons per car (ARRC, 2008a- Appendix J, 2008b). OEA also assumed that freight trains would begin operating along the proposed rail line in 2012 (ARRC, 2008-Section 3.4) or later using ultra-low sulfur diesel fuel (effective December 1, 2010, all diesel fuel sold in Alaska is required to be ultra-low sulfur diesel). OEA obtained all base emission factors (grams per brake-horsepower-hour) from the USEPA Regulatory Support

Document, Appendix O (USEPA, 1998) for line-haul Class I locomotives, except the base emission factor for $SO_2$, which was not available from this source. OEA used an $SO_2$ factor from *Development of Railroad Emission Inventory Methodologies* (Sierra Research, 2004). OEA also used this study to identify appropriate bulk freight use fuel efficiency – 1061.2 ton-miles per gallon – for a rail line operating over similar grades (that is, 1 percent or less) and carrying predominately bulk materials, such as wood, coal, and gravel.

Table 8-4 lists the estimated annual average rail line operation emissions. These estimated emissions are small fractions of the MSB annual off-highway vehicle emissions (see Table 8-3). In addition, the estimated emissions would be distributed over approximately 46 miles of rail line. Emissions of $NO_x$ would represent the largest fraction in comparison with the off-highway vehicle emissions, at approximately 2 percent of existing off-highway emissions in the Borough. In addition, as an indicator of the relatively small emission amounts, the emission totals for each of the pollutants would be well below the *de minimis* conformity thresholds of 100 tons per year for each pollutant. Finally, to the extent that commodities from Interior Alaska that would be transported to Port MacKenzie over the proposed rail line would otherwise be transported to the ports of Anchorage or Seward, emissions associated with rail line transport of those commodities would be reduced because of the shorter rail haul distance.

**Table 8-4**
**Estimated Annual Average Operation Emissions (metric tons per year) along the Proposed Port MacKenzie Rail Extension[a]**

| Emission Sources | VOCs | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | $SO_2$ |
|---|---|---|---|---|---|---|
| Freight Train Operation | 1.9 | 6.3 | 33.7 | 1.2 | 1.2 | 0.12 |

[a] VOCs = volatile organic compounds; CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter with an aerodynamic diameter less than 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than 2.5 microns; $SO_2$ = sulfur dioxide.

As discussed in Chapter 2, the proposed rail line extension would include a terminal reserve (rail yard) at the end of the line in the Port MacKenzie District. The rail yard would provide for receiving, sorting, temporary storage, and distribution of commodities shipped on the rail line. Possible activities at the facility would include receiving inbound trains, switching rail cars, loading and unloading cars, storing commodities, and building and departing outbound trains. Other activities could include arriving/departing track maintenance equipment and operation of a switch locomotive and cargo handling equipment.

Based on the assumption that the rail yard would provide services to support an 80-car train per day, the number of rail cars handled would be about 29, 200 per year. There is a rail yard with similar capacity in Commerce, California – Commerce Eastern Rail Yard. This facility had an average of 72 rail cars per train in 2004, but with nearly 4 trains arriving per day, a detailed emission inventory had been assembled (Environ, 2006). Scaling for the smaller number of rail cars the proposed rail line rail yard is anticipated to handle, it is estimated that PM emissions would total about 0.48 metric tons per year, which would be a fraction of the emissions from operation along the proposed rail line. Other air pollutants would show similar fractions of operation emissions. Again, these emissions would be well below the *de minimis* conformity threshold of 100 tons per year. In addition, the terminal reserve would not be close to any residences or schools.

To provide a further comparison of the relative change in rail line operation emissions, OEA estimated existing roadway traffic emissions along an 0.5-mile segment of the George Parks Highway at 3 locations where the proposed rail line would connect with the existing rail line via the Willow, Houston North, or Big Lake segments and compared those emissions with the estimated emissions from proposed rail line operation over an equivalent distance. OEA obtained the average number of vehicle miles traveled over this section of roadway for each area from the Alaska Department of Transportation for 2006 (ADOT&PF, 2008) and then projected forward to 2012 using an arterial growth rate of 0.6 percent per year (FHWA, 2007). OEA estimated highway traffic emissions along this segment of roadway using this vehicle-traffic-volume information and emission factors (grams per mile) from the USEPA MOBILE6.2 model (which estimates emission rates for the on-road fleet of vehicles, considering such factors as fleet age, miles driven, type of fuel, vehicle engine size, engine technology, and ambient temperature) (USEPA, 2003) for 2012. The emission factors OEA used were based on Matanuska-Susitna-specific mobile emission inputs using an average of the winter and summer seasons' vehicle registration information based on the MOBILE6.2 inputs developed for the Knik Arm Crossing Air Quality Technical Report (ADOT, 2006).

Table 8-5 lists the estimated annual emissions from rail line operation over a 0.5-mile segment of the proposed rail line compared to estimated vehicle emissions along a comparable length of George Parks Highway at the 3 connection locations for the Willow, Houston North, and Big Lake segments. These results show that estimated rail emissions would be a small fraction of the highway emissions for all 3 segments, with the exception of $NO_x$ and PM – this is due to the comparatively high $NO_x$ and PM emission rate for diesel-fueled locomotives.

**Table 8-5**
**Estimated Annual Highway Emissions Compared to Proposed Port MacKenzie Rail Extension Operation Emissions (metric tons per year)[a]**

| Emission Sources | VOCs | CO | $NO_x$ | $PM_{10}$ | $PM_{2.5}$ | $SO_2$ |
|---|---|---|---|---|---|---|
| Willow Segment Connection[b] | 0.43 | 8.5 | 0.41 | 0.028 | 0.018 | 0.004 |
| Houston North Segment Connection[c] | 0.61 | 12.0 | 0.58 | 0.039 | 0.026 | 0.006 |
| Big Lake Segment Connection[d] | 0.79 | 15.0 | 0.74 | 0.050 | 0.033 | 0.008 |
| Freight Train Operation | 0.02 | 0.07 | 0.37 | 0.014 | 0.013 | 0.001 |

[a] VOCs = volatile organic compounds; CO = carbon monoxide; $NO_x$ = nitrogen oxides; $PM_{10}$ = particulate matter with an aerodynamic diameter less than 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than 2.5 microns; $SO_2$ = sulfur dioxide.
[b] Annual average traffic along 0.5-mile stretch of George Parks Highway near Willow (1,459 vehicle miles traveled in 2012).
[c] Annual average traffic along 0.5-mile stretch of George Parks Highway near Houston North (2,075 vehicle miles traveled in 2012).
[d] Annual average traffic along 0.5-mile stretch of George Parks Highway near Big Lake (2,659 vehicle miles traveled in 2012).

OEA expects that air pollutant emissions from truck traffic would decrease on roads leading to Port MacKenzie and on Parks Highway, to the extent that transportation activity by truck would be shifted to rail.

Greenhouse gas emissions associated with the proposed action would be overwhelmingly carbon dioxide ($CO_2$) emissions. Table 8-6 lists estimated $CO_2$ emissions associated with proposed rail

**Table 8-6**
**Annual Average Emissions of Greenhouse Gases Associated with Proposed Port MacKenzie Rail Extension Construction and Operation**

| Emission Sources | $CO_2$[a] (metric tons per year) |
|---|---|
| Rail Line Construction (2-year construction period) | 3,141 |
| Freight Train Operation | 2,606 |

[a] $CO_2$ = carbon dioxide.

line construction and operation. Construction emissions would be limited to the 2-year construction period; there would be operation emissions in subsequent years. By way of comparison, the 2005 annual $CO_2$ emissions from rail line operations for all of Alaska are estimated to be 120,000 metric tons per year (ADEC, 2008). Proposed rail line operation would represent a 2 percent increase in Alaska rail $CO_2$ emissions. For the state as a whole, this would represent an increase in $CO_2$ emissions of less than 0.01 percent (ADEC, 2008). Rail line operation would represent about an 0.0001 percent increase in the U.S. annual (2006) average emission rate of approximately 6 billion metric tons of $CO_2$ (USEPA, 2008). The U.S. emission rate represents about 24 percent of the total global $CO_2$ emission rate. Also, OEA would expect $CO_2$ emissions from existing highway activity to decrease as a result of the proposed rail line to the extent that transportation activity by truck would be shifted to rail.

Based on the findings described above, OEA concluded that estimated emission increases from proposed rail line construction or operation would be minimal in the context of existing conditions and that any potential impacts to climate and air quality would be low under any of the alternatives evaluated.

#### 8.5.1.2 Summary of Potential Impacts by Rail Line Alternative

Impacts to climate and air quality under the proposed action would be minimal for the longest alternative and would be even less for the shorter alternatives.

### 8.5.2 No-Action Alternative

Under the No-Action Alternative, ARRC would not construct and operate the proposed Port MacKenzie Rail Extension. Truck-to-rail diversion of freight and any associated reduction in emissions of NAAQS air pollutants and greenhouses gases would not occur.

## 8.6 Unavoidable Environmental Consequences of the Proposed Action

To avoid or minimize the potential environmental impacts to climate and air quality from the proposed rail line as described above in Section 8.5.1, OEA is recommending that the Board impose 2 mitigation measures (volunteered by the Applicant) requiring minimization of fugitive dust and construction-related emissions.

Notwithstanding the recommended mitigation measures, there still would be some potential unavoidable impacts to climate and air quality from the proposed rail line due to unavoidable

construction and operation emissions. OEA has concluded that such mitigated increases in emissions from construction and operation of the proposed rail line would be minimal in the context of existing conditions.