for PacRim Coal, LP

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Application for a Minor Air Permit For the Chuitna Coal Project

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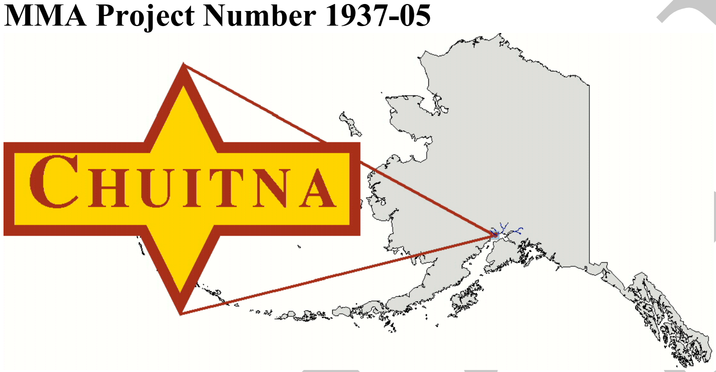
MMA Project Number 1937-05



Submitted to

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1.0 INTRODUCTION

PacRim Coal, LP (PacRim) plans to develop and operate a surface coal mine, coal handling system (preparation plant) and coal export facility in the Beluga Coal Field region of south central Alaska approximately 45 miles west of Anchorage (Map 1). The project will be known as the Chuitna Coal Project. McVehil-Monnett Associates, Inc. (MMA) has been contracted by PacRim to prepare an 18 AAC 50.502 minor source air quality permit application and technical support documentation in support of those plans. Requisite information is provided herein.

In this report/application, MMA provides a description of the planned project, estimates of project-related emissions and mitigation measures, an air quality impact (modeling) assessment and application forms and supporting documentation as required by 18 AAC 50.502 and relevant guidance issued by the Alaska Department of Environmental Conservation (ADEC), Division of Air Quality and the U.S. Environmental Protection Agency ("EPA"). See Appendix 1 for permit application forms. MMA also describes the baseline meteorological monitoring program undertaken by MMA on behalf of PacRim to characterize the site-specific dispersion climatology in the area of the proposed project. In addition, MMA describes herein the regulatory background and need for a minor source permit and why the proposed project will not trigger either a federal Title V operating permit or major new source review under the federal Prevention of Significant Deterioration (PSD) permit program.

Through these analyses, PacRim/MMA demonstrate that the proposed mining, coal handling (processing) and coal export facilities will comply with all applicable state and federal air quality regulations, and, as a result, should be granted a minor source permit to construct.

2.0 PROJECT DESCRIPTION

The Chuitna Coal Project will consist of a surface coal mining operation, coal crushing/handling (preparation) facilities and 12-mile overland conveyor to a coal export and storage facility on the west coast of Cook Inlet. The surface coal mine will utilize both truck/shovel and dragline mining methods for excavation. The life-of-mine (LOM) is projected to be approximately 25 years of active coal production, plus time for initial mine and infrastructure development and final mine closure and reclamation. Maximum annual coal production is projected to be 12 million metric tons. The annual coal progression sequence and locations of associated facilities are shown on Map 2. LOM mine parameters are provided in Table 2-1.

Run-of-mine (ROM) coal will be loaded by shovel onto trucks and hauled to the truck dump and hopper, where it will enter the crusher. Overland conveyors will then transport the crushed coal approximately 12 miles to the Ladd Coal Export Terminal facilities (Map 3). At Ladd Landing, the coal will either be stored in stockpiles for later reclaiming/loadout, or continue on additional conveyors to a two mile long trestle to the ship loader. Personnel housing and an airstrip near the mine are also planned for this project. A small coal-fired boiler will provide steam heat to the housing area. Additional power will be provided by a high voltage power line from the existing Beluga Power Station.

Project-related emissions to the atmosphere will consist principally of fugitive dust (PM_{10}) from mining, coal handling (preparation), and coal loadout activities. Large mine vehicles will also be responsible for significant amounts of mobile source emissions. Lesser amounts of particulate and gaseous emissions will be generated by the on-site boiler and from ship hotelling operations at the port facility.

In order to minimize particulate emissions, mining activities and the coal handling system will be designed and operated with elements such as:

1) Stilling shed at the truck dump to control emissions related to dumping/crushing;
2) Enclosed crusher facility;
3) Enclosed conveyor transfer points;
4) Use of water sprays at transfers, discharges, and reclaim locations;
5) Covered coal conveyors;
6) Minimizing transfer in and out of stockpiles;
7) Minimizing stockpile heights; and
8) Use of water and chemical surfactants on roads.

Engineering drawings and a flow diagram are provided in Appendix 2.

Detailed estimates of emissions from all project facilities are provided in Section 4.0.

Table 2-1
Chuitna Coal Mine
Life of Mine Parameters

(Separate File)

3.0 REGULATORY BACKGROUND

3.1 Title V/PSD Applicability

Pursuant to the federal Prevention of Significant Deterioration (PSD) provisions of 40 C.F.R. § 52.21,[1] a "major stationary source" is a source that either falls within one of the categories of sources listed at 40 C.F.R. 52.21(b)(1)(i)(a) and has the potential-to-emit (PTE) a regulated pollutant in an amount of 100 tons per year (TPY) or more, or, if a source does not fall within the listed categories, has the potential-to-emit a regulated pollutant in an amount of 250 TPY or more.

For purposes of Title V permitting, a "major source" is a source that has the potential to emit 100 TPY or more of a regulated pollutant. 40 C.F.R. § 71.2.[2] Both a surface coal mine (SCM) and coal preparation plant (without coal cleaning or thermal dryers) are planned components of the Chuitna Coal Project. Neither of these components is a PSD "listed" source under 40 C.F.R. 52.21(b)(1)(i)(a). Therefore, the Chuitna Coal Project would constitute a "major stationary source" for PSD purposes only if its potential to emit any regulated pollutant is 250 TPY or greater. For purposes of Title V permitting, the Chuitna Coal Project would constitute a "major source" if its PTE for any regulated pollutant is 100 TPY or greater.

The PSD and Title V regulations explain under what circumstances fugitive emissions "count" for purposes of calculating PTE values for a proposed project. 40 C.F.R. § 52.21 (b) (1)(c)(iii) and 40 C.F.R. § 71.2 list sources whose fugitive emissions must be considered when making PSD and Title V applicability determinations. The list provided in both regulations includes "[a]ny . . . stationary source category which, as of August 7, 1980, is being regulated under Section 111 . . . of the [Clean Air] Act. . . ." Coal preparation plants fall within this category of sources. A "new source performance standard" (NSPS) for coal preparation plants became effective in May, 1976, well before August 7, 1980. 40 C.F.R. § Part 60, subpart Y;[3] 41 Fed. Reg. 18501 (May 4, 1976).[4] However, surface coal mines are not a type of source listed by 40 C.F.R. § 52.21 (b) (1)(c)(iii). Therefore, fugitive emissions for the coal preparation plant component of the Chuitna Coal Project, but not the coal mining area itself, must be considered in the PSD and Title V applicability determinations. EPA has issued guidance confirming this approach. See March 6, 2003 Memorandum from EPA Air and Radiation Division to Janet McCabe, Indiana Office of Air Quality ("McCabe Memorandum").[5] This guidance states that if the primary activity of a stationary source falls within an "unlisted category," generally the fugitive emissions from emissions units at that source are not included in determining whether the source is a major stationary source. McCabe Memorandum at 3. However, if the source also contains emissions units that do fall within a listed category, you must count fugitive emissions from the listed emissions units. Id. An example of such a situation provided by the guidance is a surface coal mine

[1] For your convenience, Appendix 11 contains the federal legal authority and guidance referenced in this application. 40 C.F.R. § 52.21 is at Tab A of Appendix 11.
[2] Tab B of Appendix 11.
[3] Tab C of Appendix 11.
[4] Tab D of Appendix 11.
[5] Tab E of Appendix 11.

(unlisted source) collocated with a coal cleaning plant (listed source). Because the primary activity of the source is surface coal mining, fugitive emissions from the mine need not be counted, but fugitive emissions from an associated coal cleaning plant must be. Id.

The McCabe Memorandum also clarifies that if a particular source is regulated under a New Source Performance Standard, as is the Chuitna Coal Project coal preparation plant, you must include fugitive emissions from all emissions units at the source, even those that are not regulated as "affected facilities" under the NSPS. McCabe Memorandum at 4. For this reason, fugitive emissions from the coal stockpiles, which are not regulated under the coal preparation plant NSPS, were included in calculating whether the Chuitna Coal Project is a major stationary source.

Therefore, for determining whether the Chuitna Coal Project is a "major stationary source" for PSD (and Title V) purposes, the PTE of the Project is computed by summing the following: (1) fugitive and non-fugitive emissions from the coal preparation plant (listed source) and (2) non-fugitive emissions from the surface coal mine (unlisted source). Specifically, MMA included the following fugitive emissions at the coal preparation plant in the Project's PTE and PSD/Title V applicability analyses:

1. Emissions from stockpiles;
2. Emissions from coal dumping at the hopper;
3. Emissions from the crusher at the truck dump;
4. Emissions from all transfer points from the truck dump through ship loading;
5. Emissions from wind erosion of coal on the conveyor; and
6. Emissions from the coal-fired boiler.

As explained in more detail in Section 4.1.4, the Chuitna Coal Project's PTE for PM_{10} is 74.46 TPY and its PTE for NO_x is 30.88 TPY, both well below the 250 TPY threshold triggering the PSD requirements/100 TPY threshold triggering the requirement for a Title V permit. Thus, only a minor source permit is required for the Project.

3.2 Minor Source Permitting

The minor source permitting rules found at 18 AAC 50.502 require a minor permit for air quality protection for several types of and/or sizes of emissions sources. Principal to the permitting aspects of the Chuitna Coal Project is the requirement of 18 AAC 50.502 (b) (5) that owners or operators of a coal preparation plant must obtain a minor permit prior to construction, operations or relocation of a stationary source.

As described in Section 2.0, the Project will include coal crushing, conveying and storage/ship loadout operations. Therefore, consistent with the following definition of coal preparation plant found at 40 C.F.R. § 60.250 (a), a minor source permit is required for the Project:

Coal Preparation Plant means any facility (excluding underground mining operations) which prepares coal by one or more of the following processes: breaking, crushing, screening, wet or dry cleaning, and thermal drying. 40 C.F.R. § 60.250 (a)

4.0 IMPACT ASSESSMENT

MMA has conducted a comprehensive air quality impact assessment of the Project's proposed emissions. The assessment involved air quality modeling of all significant sources in accordance with project-specific guidance provided by ADEC via multiple meetings, phone calls and e-mails. The details of that assessment are provided in the following sections.

4.1 Emission Inventory

4.1.1 Fugitive PM_{10} Emissions

Annual PM_{10} emission inventories were developed from the life-of-mine operating parameters provided for the Chuitna Coal Mine. As previously approved by ADEC, the emission factors for surface coal mining permit applications endorsed by the State of Wyoming, Department of Environmental Quality ("Wyoming emission factors") were used by MMA in analyzing the operating parameters.[6] In cases where a particular source was not addressed by the Wyoming emission factors, an appropriate factor was selected from EPA's AP-42 compilation. Fugitive PM_{10} emissions at the Chuitna Coal Project are presented in Appendix 3 for each year of the life-of-mine.

Several emission factors require the use of inputs such as silt and moisture percentages and vehicle speed. Where the Wyoming emission factors were used, site specific inputs for these parameters were obtained from the Chuitna Coal Project and can be considered representative of actual conditions found at the Chuitna Coal Mine.

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[6] AP-42 factors for all mining activities were not used because of their systematic overprediction of actual emission rates of fugitive dust emissions at mines. In Section 234 of the 1990 Clean Air Act Amendments (PL101-59, November 5, 2990, 104 Stat 2399, Section 234) (Attached as Tab F of Appendix 11), Congress recognized the limitations on the use of the Industrial Source Complex (ISC) model when used in conjunction with emission factors from AP-42. Congress prohibited EPA from imposing the use of those modeling tools on states until such time as EPA developed revisions to those tools to eliminate significant over-prediction. EPA subsequently undertook a comprehensive effort to improve the ISC/AP-42 modeling approach to eliminate its systematic over-prediction through improved emission factors and algorithmic approaches within the model. However, in its final report in 1996, attached as Tab G of Appendix 11, EPA clearly acknowledged that the system still over-predicted impacts and could not meet the accuracy requirements of their own evaluation protocol. EPA further recognized the limitations of its own factors in a footnote to Section 11.9 (emission factors for western coal mines) in the 2005 version of AP-42, attached as Tab H of Appendix 11:

> Note: Section 234 of the Clean Air Act of 1990 required EPA to review and revise the emission factors in this Section (and models used to evaluate ambient air quality impact), to ensure that they did not overestimate emissions from western surface coal mines. Due to resource and technical limitations, the haul road emission factors were isolated to receive the most attention during these studies, as the largest contributor to emissions. Resultant model evaluation with revised emission factors have improved model prediction for total suspended particulate (TSP); however, there is still a tendency for overprediction of particulate matter impact for PM-10, for as yet undetermined causes, prompting the Agency to make a policy decision not to use them for regulatory applications to these sources. However, the technical consideration exists that no better alternative data are currently available and the information should be made known. Users should accordingly use these factors with caution and awareness of their likely limitations.

Specific inputs for each emission factor are presented in Appendix 3 as footnotes on the emission inventory tables.

For those sources located within a pit, an appropriate pit retention factor was applied to the PM_{10} emission rate to better quantify emissions that actually escape the pit. This pit retention factor was previously approved by ADEC for use in air modeling at the Ft. Knox Gold Mine, and was described by Cole and Fabrick, 1984[7] (Reference included in Appendix 4). Of the two pit retention equations described by Cole and Fabrick, Equation 1 predicts a greater escape fraction (i.e., higher emission rate) than does Equation 2, and therefore Equation 1 was used to conservatively calculate emissions from the pit. After applying this factor to the in-pit sources and pit-specific geometries, it was predicted that 82.2% of the PM_{10} generated would escape the pit.

Based on the Wyoming emission factors, the control factor for water application on roads was assumed to be 50%. This control factor was applied to vehicle travel emissions throughout the Chuitna Coal Project. It was conservatively assumed that unpaved road surfaces would be exposed throughout the year, even though roads will be covered by snow during the winter. Therefore, the modeled vehicle travel emissions can be considered conservatively high.

No control measures were included in the inventories for the crusher and coal handling transfer points, which will contribute to conservatively high modeling results. As described above, these sources will have appropriate emission control systems and will, for the most part, be enclosed.

Emissions from wind erosion on the coal conveyor were reduced by 90% based on the fact that to account for the partially covered conveyor will effectively limit the amount of wind erosion from the belt surface. The control efficiency for partially covered conveyors is specified in an EPA Region VIII summary of Best Available Control Technologies for surface coal operations.[8]

4.1.2 Tailpipe Emissions

While neither required for nor included in the modeling analysis, mobile source tailpipe PM_{10}, NO_x and SO_x emission inventories were compiled. Appropriate emission factors were selected from AP-42 for each vehicle type. Appendix 5 presents the mobile source emission inventories.

4.1.3 Stationary Source Emissions

Emissions from stationary sources were calculated based on operating parameters provided by the Chuitna Coal Project and emission factors from AP-42. At the mine site, sources included light plants, pumps, compressors, welders, and a 25 MMBTU/hr coal-fired boiler. At the Ladd Coal Export Terminal, sources included auxiliary power units on-board vessels at berth (hotelling emissions). PM_{10}, NO_x, and SO_x emission inventories for these sources are shown in Appendix 6. NO_2 impacts from these sources were modeled as described below.

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[7] "Surface Mine Pit Retention", Cole and Fabrick, Journal of the Air Pollution Control Association, June 1984.

[8] Tab I of Appendix 11.

4.1.4 Potential-To-Emit

As described in detail in Section 3.1, emissions from stationary point sources and certain fugitive sources count toward the Chuitna Coal Project potential-to-emit (PTE). PM_{10} emissions that count toward the Project's PTE include fugitive emissions from the truck dump, crusher, coal conveyor and transfer points, storage piles (in and out plus wind erosion), ship loading, and the coal-fired boiler. The highest PM_{10} emissions for these sources will occur during the year with the highest coal production, 2030, and are calculated to be 74 TPY (Table 4-1). This value is conservative, because no control reduction factor has been applied to the crusher or coal transfer points, despite the fact that these areas will be enclosed. The only NO_x source that contributes to the Chuitna Coal Project PTE is the coal-fired boiler. NO_x emissions from the boiler are calculated to be 31 TPY.

Table 4-1
Computation of Project Potential to Emit

Mining Operation	PM_{10} Potential to Emit (tons)	NO_x Potential to Emit (tons)
Coal truck dumping[a]	4.03	--
Primary crusher at truck dump[a]	16.86	--
Transfer points from truck dump to ship loading[a]	14.88	--
Wind erosion of stockpiles[a]	10.86	--
Wind erosion of coal on conveyor[a]	7.68	--
Coal-fired boiler[b]	20.15	30.88
Total Potential to Emit	74.46	30.88

[a] calculations included in Appendix 3
[b] calculation included in Appendix 6

4.2 Selection of Modeled Years in the Life-of-Mine

Because it was not practical to analyze/model impacts for each year in the 25 year life of the Chuitna Coal Mine, three "worst-case" years were selected for modeling. The selection of these years was based on the emission rates determined in the annual inventories in conjunction with source proximity to the lease boundary. The boundary defines the location of ambient air, and, therefore, the placement of model receptors. Proximity to the lease boundary is an important factor, as air quality impacts can be more significant in years when sources are located near the boundary than years with higher emission rates located further from the boundary.

Year 2023 is one year selected for modeling. Estimated PM_{10} emissions are the second highest of any year of mining, the TS2 pit will be close to the lease boundary, and the amount of coal removed will be higher than average. Year 2030 was also selected. The PM_{10} emissions in 2030 are projected to be the highest of any year of mining, the dragline pit will be close to the lease boundary, and long coal haul distances will be present. Year 2035 is the final year selected. In this year, all production will occur in only one pit at the south side of the Chuitna Coal Mine area. When sources are concentrated in one area, as in Year 2035, modeled PM_{10} concentrations are generally higher. The worst-case years selected for NO_2 modeling are the same as for PM_{10}.

4.3 Model Selection

Annual and 24-hour PM_{10} and annual NO_2 impacts were modeled using AERMOD, version 07026. AERMOD is the dispersion model currently approved by the EPA's Guideline on Air Quality Models, as revised November 9, 2005. 40 C.F.R. Part 51, Appendix A to Appendix W.[9] ADEC approved the use of this model in December 2006. AERMOD was run in regulatory default mode using terrain elevations for all sources and receptors. Sources were modeled as a series of area sources, except the coal-fired boiler at the mine and auxiliary power units on vessels, which were modeled as point sources.

Since the Chuitna Coal Project covers a large area of varied meteorological conditions, model runs were performed using two sets of meteorological data. The meteorological data were obtained from a monitoring tower located at the Chuitna Coal Mine site and a tower located at the Ladd Landing coal export terminal development. Emission sources were divided spatially: those nearest the Mine tower were modeled using the Mine site meteorological data, and those sources nearest the Ladd tower were modeled using the Ladd data. All receptors were included in each model run. Respective concentrations from each model output (Mine and Ladd) were combined to obtain a total impact at each receptor, which will over-predict the highest 2^{nd} high receptor concentrations for the 24-hour modeling runs. For stationary sources, emissions were modeled as NO_x, and the resulting receptor concentrations were multiplied by 0.75 to account for chemical conversion to NO_2.

Annual PM_{10} model results (plus background concentration) were compared to the annual PM_{10} Alaska Ambient Air Quality Standard (AAAQS) of 50 $\mu g/m^3$. The highest 2^{nd} high 24-hour PM_{10} model results (plus background concentration) were compared to the 24-hour AAAQS of 150 $\mu g/m^3$, consistent with direction provided in the ADEC Modeling Review Procedures Manual. Finally, annual NO_2 results were compared to the AAAQS of 100 $\mu g/m^3$.

4.4 Terrain Data

Elevations for the modeling analysis were generated using electronic terrain maps (*.DEM). Since 7.5 minute DEM data are not available for the project vicinity, 1 degree DEM data were used. The DEM data and all source and receptor locations for each worst-case year were used as inputs into EPA's terrain processor, AERMAP. AERMAP uses the input data to extract elevations in meters for the sources and receptors.

4.5 Receptors

Receptors were located along the ambient air boundary, which in this case is defined by the coal lease boundary. <u>See</u> the Public Access Control Management Plan

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[9] Tab J of Appendix 11.

presented in Appendix 7 for a description of how access to the Project will be controlled. Receptors were spaced at intervals of 200 meters along the lease boundary. A receptor grid outside the lease boundary was also generated at 200-meter spacing to a distance of at least 1 km beyond the boundary, including along the Chuitna Project Infrastructure and Ladd Coal Export Terminal.

As more specifically described in the Public Access Control Management Plan, access to the Chuitna Coal Project area will be controlled by signage stating that entry into the permit and project area is not allowed by those who are not authorized by PacRim Coal LP. Signs would be located at all roads and trails that may be utilized where these features enter the project area. During times of the year when a potential exists for exceedances to air quality criteria within the project, signs would so warn those unauthorized personnel. Additional public access control details are provided in Appendix 7.

4.6 Climate and Meteorological Data

4.6.1 Background and Overview

The Chuitna Coal Project used onsite data to generate the meteorological files for input into AERMOD. Onsite data were collected from two monitoring stations, one located at North Ladd Landing and the other at the Mine site. Data were collected from January 2006 to present. Data collected on-site have been detailed in a comprehensive report entitled "Site Climatology for the Chuitna Coal Project". This report is summarized below and included as Appendix 8.

The Project area is classified by the Koppen climate classification as a Maritime Subarctic Climate. In general, this climate can be best described as having coolest monthly temperature averages below 64°F (18°C) and above 20°F (-3°C) with the warmest months above 50°F (10°C). In addition, it is considered to only have one to three months with a temperature above 50°F (10°C). To be classified as a Maritime Subarctic Climate, the climate must have moderate moisture in all seasons. In this zone winds are moderate, skies are usually cloudy, and the relative humidity is moderate to high. In addition, heavy fog is very frequent in this type of climate as a result of maritime influences. Both continental and maritime climate systems affect the local climate.

Anchorage is approximately 39 miles from the North Ladd Landing site and approximately 45 miles from the Mine site. The Anchorage climate normals covering the 30-year period 1971-2000 show that the annual average temperature is 34.7 °F with the minimum monthly average temperature of 14.3 °F occurring in January and the maximum monthly average of 56.7 °F occurring in July. Precipitation data for Anchorage over the same period show an average annual amount of 24.81 inches. While precipitation is fairly constant, most occurs in the second half of the year.

Meteorological data has been collected at both the Mine site and the North Ladd Landing site since 2006. Data at these sites during this much shorter period show an average annual temperature of 34.2 °F at the Mine site and 35.6 °F at the North Ladd Landing site. These values, while of a shorter timeframe, compare favorably with the Anchorage climate data.

Annual precipitation during 2006 at the Mine site was 40.96 inches while the Ladd Landing site received 29.39 inches. The Ladd Landing site is comparable to the Anchorage data, but the Mine site has nearly double the precipitation. This can be accounted for by the difference in elevation between the Mine site (677 feet ASL) and the Anchorage site (114 feet ASL). Similar to Anchorage, both the Mine site and the North Ladd Landing site have fairly constant precipitation, with the majority occurring in the second half of the year.

The dates selected for use in modeling were May 1, 2006 through April 30, 2007 because of the very high data recovery rates for that period. The sections below describe specific details concerning each type of data and the processing required to obtain model-ready input from the data collected on-site and regionally as required.

4.6.2 National Weather Service Upper Air Data

National Weather Service upper air soundings for the period of May 2006 through April 2007 were obtained in FSL format from the National Climatic Data Center Radiosonde Data Archive. Anchorage Merrill Field (WBAN 26409) was chosen based on its proximity to the Chuitna Coal Project, being approximately 58 kilometers away from the Ladd Landing site and 76 kilometers away from the Mine site and is the nearest upper air station. These data were verified for completeness and processed through AERMET without any modification.

4.6.3 Onsite Data

Collection of onsite meteorological data began in January 2006 and continues to be collected at this time. Data are being collected as described in the Chuitna Coal Project Quality Assurance/Quality Control Plan[10]. Data collected from May 1, 2006 through April 30, 2007 were selected for modeling for the Chuitna Coal Project. Onsite data used in the modeling met all requirements specified in the Quality Assurance/Quality Control Plan. The North Ladd Landing station lies along the coast of Beluga Bay at sea level. The Mine station sits atop a ridge, 700 feet above sea level, approximately 12 miles to the west and 2 miles to the north of the North Ladd Landing site. The two locations were sited to collect data representative of the currently proposed Ladd Coal Export Terminal and the Chuitna Coal Mine sites, respectively. Both stations consist of 10-meter towers with separate precipitation gauges. Solar radiation is collected at the 2-meter level while temperature is collected at both the 2-meter and 10-meter levels. Wind speed and direction are collected at the 10-meter level.

Data were processed by AERMET after reformatting and used as input for AERMOD. In general, stability classes for both datasets were determined using solar radiation-delta temperature values; however an exception was made for 72 hours at the Mine site in August 2006 where stability class was calculated with the sigma theta method due to invalidated 2-meter temperature data. The Mine dataset had 212 hours of 2-meter temperature, 6 hours of 10-meter temperature and 8 hours of 10-meter wind speed and direction replaced. Over the entire North Ladd Landing dataset, 6 hours of

[10] Chuitna Coal Project Quality Assurance/Quality Control Plan, MMA, October 24, 2006.

2-meter temperature, 6 hours of 10-meter temperature and 4 hours of 10-meter wind speed and direction were invalidated. Data recovery percentages are shown in Table 4-2.

Table 4-2
Meteorological Station Data Recovery Percentages
May 2006 – April 2007

Parameter	Mine Site Recovery Percentage	North Ladd Landing Site Recovery Percentage
Wind Speed	99.9	99.9
Wind Direction	99.9	99.9
Stability Class	99.9	99.9
Temperature – 10 meter	99.9	99.9
Temperature – 2 meter	97.6	99.9
Delta T	97.6	99.9
Precipitation	99.9	99.9
Solar Radiation	99.9	100

4.6.4 Land Use

EPA's Guideline on Air Quality Models specifies that land use within a radius of three kilometers of the source should be evaluated using the Auer land use typing scheme to determine the appropriate dispersion coefficients for modeling. Examination of the USGS topographic maps for the Chuitna area shows that use of surrounding land within a three-kilometer radius of both the Ladd site and the Mine site is shown as overwhelmingly rural. Thus, both sites were classified as rural in the AERMOD input control options.

4.6.5 Surface Characteristics

In addition to land use, EPA's Guideline on Air Quality Models also specifies that a radius within three kilometers of the source should be evaluated for surface characteristics such as albedo, Bowen Ratio and surface roughness. These parameters were evaluated for each month and for each varying wind direction sector.

The Ladd site was split into two sectors, spanning from 35 degrees to 225 degrees to account for the shore location. The land side used a coniferous forest designation to determine the surface characteristics while the water side used a water (fresh and sea) designation. The Mine site used a single sector with a coniferous forest designation to determine surface characteristics. See Table 4-3 for the surface characteristics used in this analysis.

Table 4-3
AERMET Surface Characteristics

Site	Parameter	January - March	April - May	June - August	September - October	November - December
Ladd Site - Land	Albedo	0.35	0.12	0.12	0.12	0.35
	Bowen Ratio	0.30	0.30	0.20	0.30	0.30
	Surface Roughness	1.30	1.30	1.30	1.30	1.30
Ladd Site - Sea	Albedo	0.20	0.12	0.10	0.14	0.20
	Bowen Ratio	0.30	0.10	0.10	0.10	0.30
	Surface Roughness	0.0001	0.0001	0.0001	0.0001	0.0001
Mine Site	Albedo	0.35	0.12	0.12	0.12	0.35
	Bowen Ratio	0.30	0.30	0.20	0.30	0.30
	Surface Roughness	1.30	1.30	1.30	1.30	1.30

4.7 Emission Apportioning

Fugitive PM_{10} emissions and stationary source NO_x emissions for each worst-case year were apportioned into area sources based on activity type. The number and location of the area sources, as well as their dimensions and orientation, were based on the pit configurations, road orientations and facility locations detailed on maps provided by the Chuitna Coal Project. Emission rates (gram/sec) were divided by the area (m^2) of each area source in which the emissions occur to determine the modeled emission rate (gram/sec/m^2). Detailed PM_{10} emission apportioning tables for the modeled years are presented in Appendix 9. NO_x emission apportioning tables are presented in Appendix 10.

4.8 Background

Per ADEC guidance during a December 12, 2006 meeting, a background value of 6.5 $\mu g/m^3$ was added to the annual PM_{10} modeled results for each receptor. A background value of 33 $\mu g/m^3$ was added to the highest 2^{nd} high 24-hour results. No background value was added to the annual NO_x modeled results.

5.0 MODELING RESULTS

5.1 PM_{10} Results

The area source and haul road PM_{10} data were input to AERMOD for each worst-case year. The meteorological data and receptors described above were also input to the model. All model results show annual and highest 2nd high 24-hour predicted concentrations, after adding background, below the respective PM_{10} air quality standards. The maximum predicted concentrations for each worst-case year are shown in Table 5-1. Files showing the annual and highest 2nd high 24-hour receptor-specific PM_{10} concentrations are contained on the enclosed CD. Also included on the CD are the modeling, meteorological, and receptor files for each model run. In addition, contour plots of each model run are displayed in Maps 4 through 9.

From Table 5-1, the maximum annual concentrations predicted in 2023, 2030, and 2035 are 23.33, 23.35, and 16.46 μg/m^3, respectively. Table 5-1 also shows the highest 2nd high 24-hour concentrations for these years are 148.51, 127.36, and 104.41 μg/m^3, respectively.

Table 5-1
PM_{10} Modeling Results

Year	Receptor UTM Location X (m)	Receptor UTM Location Y (m)	Maximum Annual PM_{10} Concentration (μg/m^3)	Alaska Annual PM_{10} Standard (μg/m^3)	Highest 2nd High 24-Hour PM_{10} Concentration (μg/m^3)	Alaska 24-Hour PM_{10} Standard (μg/m^3)
2023	589689.19	6785835.00	23.33	50	---	---
	589813.06	6785990.00	---	---	148.51	150
2030	589730.56	6784436.00	23.35	50	---	---
	589813.06	6784790.00	---	---	127.36	150
2035	589754.19	6783636.00	16.46	50	---	---
	589730.56	6784436.00	---	---	104.41	150

5.2 NO_2 Results

The stationary source NO_x data were also modeled for each worst-case year. Emissions were modeled as NO_x and the resulting receptor concentrations were multiplied by 0.75 to account for chemical conversion to NO_2. As shown in Table 5-2, all annual model results are well below the NO_2 standard. Files showing the annual receptor-specific NO_2 concentrations are contained on the enclosed CD, as are the modeling input files.

Table 5-2
NO_2 Modeling Results

Year	Receptor UTM Location X (m)	Receptor UTM Location Y (m)	Maximum Annual NO_2 Concentration ($\mu g/m^3$)	Alaska Annual NO_2 Standard ($\mu g/m^3$)
2023	590213.06	6781990.00	1.51	100
2030	590213.06	6781990.00	1.50	100
2035	590213.06	6781990.00	1.51	100

6.0 SUMMARY AND CONCLUSIONS

The analyses presented herein demonstrate that the air emissions sources at the Chuitna Coal Project will not have the potential to emit any regulated air pollutant in an amount that would trigger the requirement for either a Title V or PSD permit under the Clean Air Act. Further, the modeling results show that the Chuitna Coal Project will comply with Alaska's annual and 24-hour ambient air standards for PM_{10} and NO_2 concentrations. As a result, PacRim Coal, LP requests an expeditious review and formal approval of this application for a minor air permit pursuant to 18 AAC 50.502.