# Response to Comments for Minor Permit AQ1227MSS04

**June 10, 2014**

## Introduction:

This document is the Alaska Department of Environmental Conservation's (Department) analysis and response to the public comments received during the March 4, 2014 through April 14, 2014 public comment period, for Minor Permit AQ1227MSS04. The Department received 691 public comments, on its preliminary decision to issue Minor Permit AQ1227MSS04 to Usibelli Coal Mine, Inc. for the Wishbone Hill Coal Mining and Processing Operation. This document does not consider comments received after the comment period closed.

The majority of the comments were submitted via either e-mail or hand delivered paper forms originating from web sites and are essentially identical. The Department has therefore organized this response-to-comment document by topic, rather than commenter.

This document presents each topic with a summary statement and uses quotation marks to indicate any direct quotes from the comments received. The table of contents presents the topics under general categories to make them easier to find. This organizational structure for the comments does not necessarily mean sub-categories are related. Air quality is a complex topic and the various sub-categories do affect one another.

The **categories** are designated by **14-point bold font**. The **topics** are designated by **12-point bold font**. The comments are in regular 12-point font. The Department's *responses are in 12-point italics.*

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# Categories:

## 1. Regulatory Basis for approving a minor permit

*The regulatory standard for approval or denial of a minor permit is based on whether the permit meets the regulatory provisions in Title 18 of the Alaska Administrative Code – Chapter 50 (18 AAC 50). The Department has confined this response to comment document to those comments that are related to whether the applicant and the Department has or has not complied with the air quality permitting requirements contained in 18 AAC 50.*

## 2. Comments on the Air Quality Modeling Analysis

The Department received comments on the following aspects of UCM's modeling analysis.

### Meteorological Data

The Department received numerous comments regarding the meteorological data that UCM used to support their air quality modeling analysis. While not always worded as such, the comments essentially questioned whether the data were representative of the meteorological conditions at the proposed mine site. The specific concerns are described in the following subsections.

#### General Data Concerns

**2.a.** One commenter questioned the validity of the meteorological data due to a belief that it had the wind blowing "only once a year".

*Department Response:*

*The commenters' characterization of the data is inaccurate. The 1990 dataset has 5,749 hours where the wind speed equals or exceeds 0.5 meters per second (m/s) (see related response to Comment 2.h).*

**2.b.** One commenter stated, "The UCM permit fails to recognize the unique meteorological environment of the Wishbone Hill area". The commenter further stated that using "substitute data from Palmer, Anchorage, or other locations in the state is an unacceptable substitute as these areas, due to the geography, are not subject to even similar weather patterns". The commenter also stated: "The permit does not reflect the fact that during those few days in the winter when the wind is not blowing, an inversion layer often develops over the mine area. This inversion will trap engine emissions and dust at ground level over the adjacent neighborhood. There is no discussion or plan to mitigate this collection of unhealthy air."

*Department Response:*

*The commenter's claims are unsubstantiated. The modeling analysis does recognize the unique meteorological environment of the Wishbone Hill area because it used surface-level wind and temperature data from the Wishbone Hill site. The use of Anchorage upper air data is reasonable since the change in temperature, pressure and wind speed with altitude is fairly constant over relatively large areas. EPA even discussed this fact during a January 2014 webinar that described pending modeling revisions, including an option in AERMET to combine upper air sounding data from multiple NWS stations in order to minimize daytime convective hour data loss.[1] The Department accepted the use of Palmer cloud cover data only after UCM demonstrated that the modeling results are insensitive to changes in cloud cover. The Department's response to calm wind conditions is provided under Comment 2.h.*

**2.c.** A commenter stated the permit is not based on a detailed analysis of the winds, especially those passing the Wishbone Hill site en route to the Palmer area. The commenter provided wind data from his home in Cedar Hills (Palmer, Alaska), along with his assessment of that data, to help satisfy "that void". Another commenter echoed this concern by saying, "The unique conditions of winds in a deep river valley bottom have not been considered… There is ample evidence from local observers that winds in 2013 – March 2014 frequently exceed 33 mph for extended periods in the winter."

*Department Response:*

*The obligations of a minor permit applicant are described in 18 AAC 50.540. Modeling demonstrations must comply with the U.S. Environmental Protection Agency's (EPA's) Guideline on Air Quality Models (Guideline). The EPA approved dispersion model for new source review assessments is a line-of-sight model (AERMOD). There is no requirement to assess the wind patterns at off-site locations or to even estimate the impact at more distant locations.*

**2.d.** A commenter questioned why UCM was allowed to replace missing data with "assumed" data. The commenter further stated, "Data should be accurately collected and not assumed, for assumptions allow for the potential for bias. Assumptions such as this are not allowed in medical literature for a reason- the wrong assumption could prove harmful or dangerous."

*Department Response:*

*As stated in response to Comment 2.b, the Department accepted the use of assumed cloud cover values only after UCM demonstrated that the modeling results are insensitive to changes in cloud cover. Since the results are insensitive to this parameter, there is no bias in the modeling results.*

[1] U.S. EPA/OAQPS, Air Quality Modeling Group, AERMOD Modeling System Update Webinar, January 14, 2014.

**2.e.** One commenter asked what the standard was for accepting the meteorological data.

*Department Response:*

*The Department used the quality assurance criteria described in EPA's On-site Meteorological Program Guidance for Regulatory Modeling Applications (EPA-450/4-87-013) to ensure the data was collected properly. The Department uses the criteria in Section 8.3 of the Guideline to determine whether a meteorological data set is representative of the applicable transport conditions.*

**2.f.** Numerous commenters asked why UCM was allowed to continue using their 1990 site-specific meteorological data when the Department had rejected this data in its Response to Comment (RTC) document for minor permit AQ1227MSS02. One commenter stated, "If this data was not adequate with the prior permit applications and no new data collected, how can it suddenly be acceptable?" Another commenter alleged that over 40% of the original 1990 data was missing – "far above the EPA threshold of 10%." Another commenter said the data was incomplete due to missing "nighttime" and cloud cover data. The commenter further stated, "Usibelli should be required to collect new data that includes cloud cover and nighttime data."

*Department Response:*

*The Department rejected the meteorological data for minor permit AQ1227MSS02 because of the substantive data gaps in the 1990 Palmer cloud cover data. The RTC for that permit noted that, since UCM demonstrated that their modeling results are insensitive to variations in cloud cover data, UCM could still use their 1990 site-specific data if they first fill-in the missing cloud cover data with surrogate values. This is exactly what UCM did for the current minor permit (AQ1227MSS04). Therefore, the Department finds the meteorological data acceptable for this permit.*

**2.g.** Several commenters claimed that the Department used inconsistent parameters for the permit. One commenter stated, "First, the permit says Palmer data is not adequate for this study but then DEC allows Usibelli to use Palmer data as a substitute for this missing data from the onsite data set."

*Department Response:*

*The commenters are confusing the Department's decision regarding Palmer wind data with the Department's decision regarding Palmer cloud cover data. The wind data collected by the National Weather Service (NWS) in Palmer does not represent the plume transport conditions at Wishbone and therefore, it may not be used to model the Wishbone emission activities. Unlike the wind data, the cloud cover data has little effect on the model results for Wishbone. Therefore, the Department can accept the use of Palmer cloud cover data without causing errors in the model results.*

**2.h.** Several commenters said the impacts are underestimated due to the large number of calm hours in the onsite meteorological data. One commenter elaborated on this concern by saying the maximum impacts likely occur during calm conditions and that the modeling therefore underestimated the maximum impact since AERMOD ignores calm hours. This commenter further stated, "Attempts should be made to fill in the calm and missing hours with linearly interpolated data or reset wind speed to a minimum of 1 [meter per second (m/s)]."

*Department Response:*

*The proposal is inconsistent with EPA guidance. The Department notes that calm conditions are not the same as missing data, even though both situations result in a non-prediction by AERMOD. A "calm" refers to a horizontal wind speed that is less than 0.5 meters per second (m/s) when using site-specific meteorological data. A properly measured "calm wind" is considered valid data since calm conditions do occur. "Missing data" refers to a data gap associated with instrument malfunction or down time.*

*The EPA recommended treatment of calm and near-calm conditions is described in Section 8.3.4 of the Guideline. EPA states, "AERMOD can produce model estimates for conditions when the wind speed may be less than 1 m/s, but still greater than the instrument threshold." EPA further states:*

> *For input to AERMOD, no adjustment should be made to the site specific wind data. In all cases involving steady-state Gaussian plume models, calm hours should be treated as missing, and concentrations should be calculated as in paragraph (a) of this subsection [which describes the method embedded within AERMOD].*

*The anemometer Idemistu used at Wishbone Hills could measure wind speeds as low as 0.5 m/s – as required by EPA for site-specific monitoring programs. UCM therefore used 0.5 m/s as the minimum wind speed in their AERMOD analysis. This approach is fully consistent with EPA guidance. Increasing the minimum wind threshold to 1 m/s would be inconsistent with the Guideline and would result in a potentially less conservative evaluation since AERMOD would exclude additional hours from the modeling analysis.*

*The EPA recommended approach for dealing with missing data is described in Section 8.3.3.2.c of the Guideline. EPA dropped their previous recommendation to fill-in missing wind data with interpolated data more than 10 years ago. EPA currently states, "If no representative alternative data are available for substitution, the absent data should be coded as missing using missing data codes…" UCM used EPA's recommended approach for processing missing data.*

**2.i.** A commenter stated, "Modeling is the only way to get an idea of what air quality will look like during operations, but it should be based on hard, relevant data."

*Department Response:*

*The Department agrees that modeling should be based on relevant data, which is what UCM used in their modeling analysis.*

**2.j.** Several commenters said the meteorological data should not be used because it was measured with "25-year-old technology". One of these commenters stated "the methodology and equipment for collecting meteorological data has changed significantly in the last 25 years" and therefore, data that is almost 25-years old is "unacceptable".

*Department Response:*

*The Department disagrees that 1990-era meteorological data is invalid since there are now more options in monitoring, recording and telemetry equipment than what existed in 1990. EPA requirements pertaining to instrument specifications and accuracy have not changed, and therefore, data measured with "traditional" instruments is just as valid as data measured with a newer option (provided both sets of instruments comply with EPA specifications). For example, wind speed measured to the nearest 0.2 meters per second (m/s) with a cup anemometer is still just as accurate as wind speed measured to the nearest 0.2 m/s with a sonic anemometer. The Department further notes that the "Met One 014a" wind speed sensor and the "Met One 024a" wind direction sensor used by Idemitsu are still available for purchase, and continue to comply with EPA requirements regarding data collection.*

**2.k.** A commenter stated, "Certain parameters required to allow the calculation of surface heat fluxes were not measured in 1990. To fill this gap, cloud cover data from the Palmer airport were substituted." Other commenters referred to the Palmer cloud cover data as "off-site" data, as part of their allegation that the use of Palmer data is inappropriate.

*Department Response:*

*The Department acknowledges that EPA's meteorological processors and associated dispersion model input requirements between circa-1990 and 2014 (today) differ. The Department also agrees that sensible heat flux is a required AERMOD input parameter that is computed by AERMET. As discussed in the TAR (Section entitled, 'Usibelli's Site-Specific Surface Data'), AERMET estimates the unstable daytime heat flux using measurements of net radiation or solar radiation, temperature data and cloud cover data; and the stable nighttime heat flux utilizing cloud cover, wind speed, and temperature data. Site-specific surface characteristic values of Bowen ratio and albedo are also required.*

*EPA was aware that the parameters measured in meteorological monitoring efforts have and will vary. EPA therefore developed AERMET with a hierarchal process for estimating sensible heat flux. This process provides for the alternate use of solar radiation data and/or cloud cover data, in conjunction with other directly measured parameters and the surface characteristic values. UCM's use of site-specific wind and temperature data with NWS cloud cover data is one of the allowed approaches.*

*The Department further notes that cloud cover is rarely, if ever, measured in site-specific monitoring efforts. The standard approach is to obtain this parameter from the NWS.*

### High Wind Speeds

**2.l.** One commenter stated, "The wind monitor Idemitsu installed couldn't give them an accurate reading because it kept blowing over".

*Department Response:*

*Meteorological towers can be designed and operated to collect accurate data in high wind areas. While Idemitsu had numerous problems during the first year of data collection, they were able to correct these problems and collect accurate data during the subsequent calendar year.*

**2.m.** A commenter questioned UCM's meteorological data by stating, "It's not the average wind speed that's the problem – it's wind gusts."

*Department Response:*

*The AERMOD dispersion model uses hourly average wind data to simulate hourly concentrations, which can then be processed for comparison to the 1-hour, 3-hour, 8-hour, 24-hour, and annual averaging periods of the various ambient air quality standards, as applicable. Hourly average wind data does includes episodic (i.e., short-term) high wind events, if such occur.*

*The highest hourly average wind speed that Idemitsu measured in 1990 is 42 miles per hour. While the maximum instantaneous wind speed during 1990 is not known, wind gusts would have been detected and included as part of the hourly average wind speed.*

*There is no instantaneous dust standard, so EPA did not develop AERMOD to simulate episodic impacts. Episodic events are instead managed through fugitive dust plans.*

### Concerns Regarding 1990 Data

**2.n.** Several commenters said the 1990 data does not meet State requirements since it is more than 17 years old. Another commenter stated the data is "stale" and that "DEC should require a year's worth of recent (less than 10 years old) and complete onsite meteorological data to make an informed decision on the impacts of this permit on ambient air."

*Department Response:*

*The assertion regarding a 17-year sunset date, or the implied 10-year sunset date, is inaccurate. There is no State or Federal age limit for meteorological data. The Department's past reference to "17 years" regarded the length of record used in a study, not an age limit for meteorological data. The data used by UCM represents actual meteorological conditions that were measured at the Wishbone Hill location.*

**2.o.** Several commenters said 1990 had unusual anomalies, such as high snow fall and low temperatures. One commenter said, "DEC includes no analysis of whether the 1990 data is 'temporally representative.' This is problematic because data collected between 1949 and 1999 indicates that the weather in 1990 was highly unusual." The commenter then compared the 1990 snow fall amount for Matanuska Valley to a fifty year period (1949 – 1999). They then stated, "Relying on such anomalous weather conditions for the modeling of ambient air quality impacts does not ensure that the results reflect worst-case conditions or even typical conditions at the site…"

*Department Response:*

*The Guideline does not require the "temporal analysis" requested by the commenters. The Guideline instead describes the length of data needed to meet temporal concerns – i.e., five years of representative NWS data or at least one year of site-specific data.*

*The particular combination that will lead to the highest modeled impact (or second highest impact in the case of PM-10) will depend on multiple meteorological factors, source characterization, terrain elevations within the modeling domain, and even geometrical factors (i.e., source-receptor distances, source-to-source layout, etc.). These factors can be difficult to assess at a cursory level. One likewise cannot say whether that combination is or is not present in any other given year, or whether another year would produce higher or lower short-term impacts, just by comparing annual trends. It is not the "typical" short-term concentrations that are compared to the standard, it is "maximum" concentrations – as determined by the form of the given standard (e.g., the high second-high impact for PM-10 and the high eighth-high impact for 1-hour $NO_2$). It is because of these complex issues that use of a multi-year meteorological data set, when available, provides the most robust modeling analysis. However, while more than one year of site-specific representative meteorology is preferred for improved temporal representation, EPA does not require that a properly collected meteorological data set be post-reviewed to determine whether additional data collection is warranted. EPA only requires that a compliance modeling demonstration use a minimum of one year of quality-assured, representative data. The 1990 meteorological data set and UCM's modeling analysis meet this requirement.*

## Documentation Concerns

**2.p.** Inconsistencies – A commenter asked how can UCM claim that most days do not have high enough wind speeds to cause erosion, yet the monitoring effort was plagued with large periods of data loss due to high wind events? The application has conflicting information regarding high winds.

*Department Response:*

*The commenter appears to believe that the large data gaps reported in the RTC for AQ1227MSS02 was due to wind events. In reality, the Palmer NWS station only observed and recorded cloud cover data during daylight hours. Therefore, most of the data gaps in the 1990 data set had nothing to do with wind speed.*

**2.q.** A commenter stated that there is no explanation as to why the data from 1990 were selected for use in UCM's current application.

*Department Response:*

*The basis for selecting the 1990 data was described in Appendix A of the TAR, in a section entitled, 'Usibelli's Site-Specific Surface Data'. Briefly, a monitoring plan for the site-specific surface meteorological monitoring program was submitted for Department review in July 1988. The Department approved the monitoring plan on March 1, 1989. Meteorological monitoring occurred from October 23, 1988 through October 31, 1991; but only monitoring year 1990 was determined to comply with EPA's 90-percent data capture requirement for dispersion modeling applications. UCM used the January - December 1990 data since it meets the requirements in Section 8.3 of the Guideline.*

**2.r.** Commenters asked why the 1991 meteorological data was not included in the modeling. One commenter stated, "In the previous TAR, DEC asserted that it had never received the 1991 data, but that is inaccurate. DEC had access to and obtained the 1991 data when evaluating the earlier permit application." This commenter then referenced a July 28, 2011 e-mail from UCM's consultant that transmitted three quarterly data reports from 1991. The commenter went on to say, "DEC should evaluate the 1991 data for quality control and potential inclusion in the modeling. And, if the data is not properly included, explain to the public why the data does not meet the quality assurance requirements of the Guideline."

*Department Response:*

*Page 3 of the Department's Modeling Review Report briefly addressed this question by noting that the 1991 data and pre-1990 data "does not meet the Section 8.3 requirements [of the Guideline] for quality assurance reasons". The Department did not elaborate on the 1991 data situation, but the previous TAR was accurate – we do not even have the actual 1991 data. The quarterly data reports that the Department received contain statistically summaries of the data, but the actual hourly data was not tabulated – nor did the Department receive an electronic copy of the actual hourly data. The Department also does not have all of the supporting information that would*

*be needed for conducting a quality assurance review – such as the 1991 audit reports – even if it had the actual data. Therefore, the data is not available for modeling purposes and cannot be reviewed.*

### Recommendations

**2.s.** Commenters made the following recommendations:

- UCM should collect new on-site data using an Automated Surface Observing Station (ASOS)
- UCM should remodel using five years of ASOS data from the Palmer Municipal Airport
- "At least one year's worth of meteorological data must be collected on site – and preferably 18 months to capture two winter seasons."

*Department Response:*

*UCM collected site-specific meteorological data in accordance with EPA codified requirements in terms of instrument accuracy and performance, and data representativeness, completeness, quality and accuracy. This data conforms to Section 8.3.1 of the Guideline in terms of length of record and representativeness. There is no regulatory requirement for additional on-site data collection. Palmer NWS data cannot be used for modeling the Wishbone stationary source since the wind data is not representative of the wind conditions at Wishbone.*

## The AERMOD Modeling System

**2.t.** A commenter said the model does not appear to be able to distinguish between clear and cloudy days.

*Department Response:*

*AERMOD is able to distinguish between clear and cloudy days. In some cases, the predicted impact for a cloudy day can be substantially different from the predicted impact for a clear day. However, the amount of cloud cover is not a major factor in UCM's case. Other factors, such as wind speed and direction, and relatively low release heights of mostly non-buoyant emissions, are the predominate influences in UCM's modeling.*

**2.u.** A commenter said ceiling height information does not appear to have been used in the model. The commenter further stated, "The Palmer cloud cover observations include both cloud cover and ceiling height (height at which cloud cover is BKN or greater), which is very important in determining boundary-layer stability – yet this useful information seems to have been discarded." "Any model that is not as sensitive to these factors as the real atmosphere is would clearly be deficient."

*Department Response:*

*UCM used the EPA recommended dispersion model (the AERMOD Modeling System) for their analysis. The model algorithms and data requirements within AERMOD were subject to public comment prior to EPA's promulgation of this modeling technique in 2005. The model algorithms and data requirements are not generally subject to public comment within an individual permit decision.*

*UCM used the required meteorological parameters in their analysis. The minimum measured meteorological parameter requirements needed for AERMOD include wind speed; wind direction; cloud cover (opaque first then total if opaque unavailable); ambient temperature; and the morning upper air sounding.* ***Optional*** *additional measured input parameters include solar radiation; net radiation; and values of vertical turbulence and lateral turbulence. The model does distinguish for fractional cloud cover.*

*Using these parameters and surface characteristics of the area (albedo, Bowen ratio, surface roughness), unstable and stable boundary layers (i.e., mixing heights, convectively and/or mechanically generated) are determined in AERMET (with resultant parameters passed to AERMOD) through derived estimates of friction velocity, Monin-Obukhov length, sensible heat flux, and convective velocity scale (needed for unstable boundary layer only).*

## Emission Rates

### Wind Erosion

**2.v.** A commenter questioned how the threshold friction velocities could be accurate. The commenter stated:

> A consultant that DEC worked with in Seward said it would take 12 mph winds to lift coal off the stockpile, and at Chuitna, DEC allowed that 5 mph winds would lift coal. There may be reasons for some differences due to topography, etc., but the permit does not make obvious the reasons why the thresholds at Wishbone Hill would be so much higher than at other locations. Furthermore, we know first-hand that the area often is subjected to very high wind gusts, some as high as 80 mph.

*Department Response:*

*The threshold friction velocity varies by material classification. The mining and coal handling at Wishbone will mostly involve large chunks of coal. The run-of-mine (ROM) coal stockpile will consist of bituminous coal that will also have shale parting material interlaced throughout the pieces of coal, which will be large (approximately 8-inch) size pieces. The ROM coal will initially be sized to 4-inch minus "raw" coal by a combination of crushing and screening before entering the washing process. The 4-inch minus material will be washed and crushed to a final size of 2-inch minus "clean" coal. The "scoria" classification in Table 13.2.4-2 of EPA's Compilation of Air Pollutant Emission Factors (AP-42) best represents the 8-inch and 4-inch minus*

*sized material. UCM therefore used the scoria classification and associated threshold friction velocity for the mine area, the raw coal pile, the reject pile and the ROM pile. The "uncrusted coal pile" classification best represents the 2-inch minus "material". UCM therefore used this classification and associated threshold friction velocity for the clean coal pile.*

*The 12 mph wind speed threshold cited in the comment pertains to material that could be present at a materials handling facility in general. The value originated from a 1963 paper in the Soil Sciences of America Proceedings. It has no relevance to coal piles. Coal tends to have higher erosion wind speed thresholds, as empirically determined by EPA in wind tunnel testing (see Table 13.2.5-2 of AP-42).*

*The 5 mph wind speed referenced by the commenter is a rounded version of the annual average wind speed measured at the Chuitna mine site. It cannot be directly compared to the two-minute wind speeds referenced in UCM's permit application and the Department's technical analysis report.*

*See **APPENDIX A** for additional information regarding wind-blown dust emissions.*

**2.w.** A commenter stated, "UCM indicates that the overburden stockpiles will crust and therefore not be subject to wind erosion. That seems highly doubtful as equipment will need to be continuously placing material into stockpiles and periodically removing material from stockpiles as part of reclamation, disturbing the material and destroying the 'crust' each time."

*Department Response:*

*Based on the UCM mine development plan, UCM estimates overburden loading and dumping (to stockpile) operations to occur for up to 30 days during a calendar year. UCM expects overburden stockpiles to experience minimal disturbance due to the relatively long-term storage of overburden, until it is returned to excavated mine areas as fill. Such general lack of activity will allow for pile crusting. As specified above, the permit will nonetheless require UCM to comply with the elements of their dust control plan, and the associated monitoring, record keeping and reporting, including responding to, and recording, credible complaints of fugitive emissions that transcend the ambient air quality boundary and that are directly attributable to UCM's operations or activities.*

## Tailpipe

**2.x.** Several commenters said UCM underestimated the $NO_2$ impacts since they did not specifically model the NOx emissions from mobile equipment (EUs 29 – 36). One commenter estimated the mobile source NOx emissions at 6 tons per year (tpy). Many of these commenters alleged that mobile emissions were included in the PM-10 analysis, and should have similarly been included in the $NO_2$ analysis. One commenter said "the operation of vehicles" was not included in the PM-10 analysis.

*Department Response:*

*The Department disagrees that the mobile source (aka "tailpipe") emissions should have been specifically modeled. Tailpipe emissions are relatively small and occur throughout the project area, which further dilutes their impact. The standard approach for accounting for this type of low-level emission activity is to say that the impact is accounted through the background data. The Department only requires the modeling of tailpipe emissions when there is substantive traffic – which is not the case at Wishbone.*

*The allegation that UCM modeled their PM-10 tailpipe emissions is incorrect. UCM modeled the fugitive dust associated with vehicle traffic on dirt roads, but they did not model the PM-10 tailpipe emissions. As with the $NO_2$ assessment, UCM used the background data to account for the PM-10 tailpipe impact.*

*The Department nevertheless asked its consultant, Enviroplan Consulting (Enviroplan), to provide a rough estimate of the tailpipe emissions. Enviroplan did so by using the current version of EPA's Motor Vehicle Emission Simulator (MOVES) model and UCM's vehicle mile travel (VMT) data. Enviroplan selected the rural, unrestricted access (local road scenario) options, and then conducted three runs using a variety of vehicle classifications to provide a robust estimate. The NOx estimate ranged from 0.9 to 1.6 tpy. The PM-10 estimate ranged from 0.05 to 0.08 tpy.*

*The Department then reran the $NO_2$ analysis, using the commenter's 6 tpy estimate, rather than Enviroplan's 1.6 tpy estimate, under an "even if" scenario. The high-eighth high (h8h) 1-hour $NO_2$ impact increased by a mere 0.1 micrograms per cubic meter ($\mu g/m^3$). The annual average $NO_2$ impact increased by the same inconsequential amount. The revised total concentrations (modeled plus background) still comply with 100 $\mu g/m^3$ annual average $NO_2$ Alaska Ambient Air Quality Standard (AAAQS) and the 188 $\mu g/m^3$ 1-hour $NO_2$ AAAQS. The Department did not rerun the PM-10 analysis since the smaller emission rate would have only lead to a smaller change in impacts.*

## $NO_2$ Modeling Technique and Issues

**2.y.** A commenter said UCM underestimated their modeled $NO_2$ impacts due to low $NO_2$-to-NOx in-stack ratios (ISRs). The commenter referenced EPA's March 2011 memorandum, Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour $NO_2$ National Ambient Air Quality Standard, and stated:

> [The ISRs used by UCM] are not based on source testing performed with sources that are identical to those proposed by the UCM project. In the absence of source-specific ratios, US EPA recommended a default ratio of 0.5. Use of this default ratio should result in higher calculated $NO_2$ impacts.

*Department Response:*

*The ISR does not need to be based on source test data from identical emission units. Data from similar source categories is adequate.*

*EPA Region 10 (R10) used this same interpretation of the March 2011 $NO_2$ modeling guidance in their October 21, 2011 response to comment for permits issued to Shell for the Kulluk conical drilling unit (Permit No. R10OCS030000). R10 stated:*

> *Emission units have similarity at a much higher level than the very specific make/model level. Emission units are routinely classified and grouped by scholars, industry, and EPA according to what the units are or how they operate… Shell used commonly used groupings in developing their $NO_2$-to-NOx ratio approach…. Shell's level of classification would not be adequately refined for all aspects of a permit application. However, it is suitable for purposes of developing an $NO_2$-to-NOx ratio for purposes of submitting a modeling analysis for the probabilistic 1-hour $NO_2$ standard.*

*UCM's use of ISR's derived from similar source categories is consistent with EPA's interpretation of their own guidance.*

**2.z.** Several commenters said UCM underestimated the $NO_2$ impacts by using the Ozone Limiting Method (OLM). One commenter stated:

> To ensure the maximum 1-hour $NO_2$ impacts are identified, UCM should have used PVMRM instead of – or in addition to – OLM. ADEC previously sponsored a sensitivity study of both OLM and PVMRM techniques using emission sources and meteorological inputs that are appropriate for Alaska. The study concluded that, '[o]verall the PVMRM option appears to provide a more realistic treatment of the conversion of $NO_X$ to $NO_2$ as a function of distance downwind from the source than OLM.' Of particular significance for the Proposed Operation, the study revealed that, for sources with multiple emission units, OLM predicted much lower maximum 1-hour $NO_2$ impacts. Because the Proposed Operation consists of three dozen different emission units, the $NO_2$ impacts predicted by OLM may be underestimated.

*Department Response:*

*The commenters did not support their position that OLM underestimates air quality impacts. The sensitivity analysis referenced by the commenters only compared the results between various modeling techniques. The study did not compare those results to ambient monitoring data. Therefore, the study cannot be used to support a position that any of the techniques, including OLM, underestimate the ambient impacts.*

**2.aa.** Several commenters claimed that UCM only used one-twelfth of the maximum hourly blast emissions in the 1-hour $NO_2$ demonstration instead of the maximum hourly emission rate.

*Department Response:*

*The Department does not agree with this comment. UCM did not reduce their maximum hourly emission rate. UCM applied the maximum hourly blast-related NOx emission rate within the dispersion model to each hour of the allowed 12-hour period of potential daily blasting (7 a.m. to 7 p.m. local time)[2]. The remaining non-blast hours for each day are modeled with a zero emission rate. The use of a variable emissions configuration in the dispersion modeling for blasting is consistent with the daily operating hour restriction in the permit. EPA has coded the AERMOD dispersion model to correctly determine the final 1-hour $NO_2$ predicted concentration in the statistical form of the air quality standard.*

**2.bb.** A commenter reviewed the modeling files and said the maximum 1-hour $NO_2$ impact (210.9 µg/m$^3$) exceeds the 188 µg/m$^3$ AAAQS.

*Department Response:*

*Applicants are not required to compare the high first-high modeled impact to the 1-hour $NO_2$ AAAQS since that approach is inconsistent with the form of this probabilistic standard. EPA even noted in their March 1, 2011 $NO_2$ modeling guidance:[3]*

> *... the probabilistic form of the standard is explicitly intended to provide a more stable metric for characterizing ambient air quality levels by mitigating the impact that outliers in the distribution might have on the design value. The February 9, 2010, preamble to the rule promulgating the new 1-hour $NO_2$ standard stated that "it is desirable from a public health perspective to have a form that is reasonably stable and insulated from the impacts of extreme meteorological events." 75 FR 6492.*

*EPA further states that "the 8$^{th}$-highest of the daily maximum 1-hour values across a year is an unbiased surrogate for the 98$^{th}$-percentile." When using EPA's recommended approach, the modeled impact plus background is less than the AAAQS.*

**2.cc.** A commenter stated, "Since Usibelli only modeled one year of $NO_2$ air quality impacts, the application fails to demonstrate compliance with the 1-hour $NO_2$ AAAQS, which addresses a three-year average."

*Department Response:*

*Multiple years of meteorological data are not required for demonstrating compliance with the 1-hour $NO_2$ AAAQS. EPA's June 28, 2010 memorandum, Applicability of Appendix W Modeling Guidance for the 1-hour $NO_2$ National Ambient Air Quality Standard, "While the 1-hour NAAQS for $NO_2$ is defined in terms of the 3-year average*

[2] As indicated in the TAR, Usibelli inadvertently (and conservatively) modeled the maximum hourly blast-related NOx emission rate for a 14-hour period for each day of modeling instead of only a 12-hour period.

[3] *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour $NO_2$ National Ambient Air Quality Standard, page 8.*

*for monitored design values to determine attainment of the NAAQS, this definition does not preempt or alter the Appendix W requirement for use of 5 years of NWS meteorological data or at least 1 year of site specific data."*

## PM-10 Modeling Technique and Issues

**2.dd.** A commenter said the emissions from the coal transfer belts should be included in the modeling analysis.

*Department Response:*

*The Department acknowledges that particulate emissions from wind erosion from the project conveyor belts were not included in the dispersion analysis. This notwithstanding, the Department evaluated the potential contribution to project PM-10 attributable to the belts as follows. The mine site belt conveyors will be located at the processing plant. The processing plant will contain five belt systems: 1) one 400 foot belt between the run-of-mine / crusher to the raw coal stockpile; 2) one 800 foot conveyor from the raw coal stockpile to the wet jig plant; 3) one 80 foot conveyor from the wet jig plant to the reject stockpile; 4) one 400 foot conveyor from the wet jig plant to the clean coal stockpile; and 5) one 800 foot conveyor to truck loadout. All belts would be three feet wide.*

*Conveyor belts downstream of the wet jig plant will handle wetted coal that is assumed not to produce airborne dust. The two conveyor belts upstream of the wet jig plant will have a total area of 3,600 square feet (Figure A-3 of UCM's permit application). By comparison, the reject stockpile has an area of 0.1 acres (4,356 square feet) and a wind erosion particulate emissions estimate of 0.02 tons per year (0.01 grams per second). The maximum 24-hour PM-10 concentration predicted by AERMOD for the reject storage pile is 0.16 micrograms per cubic meter ($\mu g/m^3$).[4] Since the conveyor belts are located in close proximity to the reject pile, a gross approximation of wind erosion PM-10 impacts from the conveyors can be determined from the reject storage pile prediction since AERMOD predictions and source emission rates are proportional. As such, incremental impacts can be estimated based on the added areal belt coverage, i.e., 0.16 $\mu g/m^3$ x (7,956/4,356) = 0.29 $\mu g/m^3$, maximum 24-hour prediction for the reject pile and conveyor belts combined. This incremental increase of 0.13 $\mu g/m^3$ (i.e., 0.29 $\mu g/m^3$ - 0.16 $\mu g/m^3$ = 0.13 $\mu g/m^3$), is negligible. The Department has nonetheless included it in a modeling summary table within the TAR.*

**2.ee.** A commenter stated, "If no winds below 7.5 m/s were provided for in the model, it is possible that dust effects could be missed."

[4] Includes Usibelli prediction grid, plus new fence-line receptors included by the Department to address commenter concern regarding sufficient receptor density near the location of maximum $NO_2$ impacts; and additional receptors created for the PM-10 rerun.

*Department Response:*

*The commenter may be misinterpreting the discussion presented in the Wind Erosion section preceding Table 3 of the TAR. The 1990 meteorological data set contains "as-recorded" hourly average wind speed data, including wind speeds below 7.5 meters per second (m/s). As indicated therein, UCM utilized the AERMOD variable emission rate option, WSPEED, to characterize PM-10 impacts for EU ID 24 (wind erosion for mine areas 1 and 2). As explained in the TAR, that option applies a non-zero emission rate when the wind speed is above a threshold value and a zero emission rate when the wind speed is below the threshold value. UCM used 7.5 m/s as the threshold value in their modeling analysis. The non-zero emission rate for EU 24 is presented in TAR Table 3. The 7.5 m/s threshold value, as explained in the TAR, is a "trigger" that prompts the model to use the non-zero emission rate and make a non-zero PM-10 prediction for an episode when a potential wind erosion event may occur. As explained elsewhere herein, the Palmer "fastest mile" wind data were used in the computation of wind erosion emission rates. Since AERMOD requires hourly-average wind speed data from the on-site station, it was determined that an hourly average on-site wind speed of 7.5 m/s would trigger at least as many episodes of wind erosion (i.e., 40) as determined using Section 13.2.5 of AP-42.*

**2.ff.** A commenter stated the "project $PM_{10}$ impacts have been underestimated by using the second highest concentration." The commenter further stated, "In a March 2010 memo from the Director of the Office of Air Quality Planning and Standards regarding *Modeling Procedures for Demonstrating Compliance with $PM_{2.5}$ NAAQS*, US EPA has recommended the use of the maximum highest 24-hour concentration predicted in modeling with one year of onsite meteorological data… According to US EPA, the use of the maximum concentration is designed to avoid the underestimation of the impact." The commenter stated Table 5 of Appendix B of the TAR should be revised to reflect the first high PM-10 impact.

*Department Response:*

*The commenter is incorrectly applying the March 2010 PM-2.5 modeling guidance to PM-10 modeling procedures. The procedure for demonstrating compliance with 24-hour PM-2.5 AAAQS is very different than the procedure used to demonstrate compliance with the 24-hour PM-10 AAAQS. Section 2.1.6 of EPA's December 2013 addendum to the AERMOD User's Guide provides the procedure for both pollutants. The approach used by UCM is consistent with the PM-10 procedure in Section 2.1.6.2.*

**2.gg.** Several commenters claimed the PM-10 impacts are underestimated by using particle deposition. One commenter stated, "Since the project emissions are already calculated as $PM_{10}$, it is customary to model $PM_{10}$ emissions without particle deposition."

*Department Response*:

*The commenters did not support their claim that the AERMOD deposition algorithm underestimates PM-10 impacts, or show how the use of deposition is inconsistent with*

*EPA guidance. While not required, the use of particle deposition is allowed under Section 7.2.7 of EPA's Guideline on Air Quality Models. Per Section 2.2 of EPA's December 2013 addendum to the AERMOD User's Guide, "… the particle deposition algorithms with a user-specified particle size distribution (referred to below as 'Method 1') can be applied under the regulatory default option" – i.e., the use of Method 1 deposition is allowed in a regulatory modeling analysis.*

*The use of a deposition algorithm does not automatically mean that all particles are simulated to immediately fall out of the plume. The rate of deposition in a "Method 1" analysis is dependent on user-provided input regarding the particle size distribution and particle densities from each emissions unit. The algorithm uses this information to estimate the amount of deposition that occurs as the plume travels downwind. In simple terms, the algorithm simulates large, heavy particles falling out more quickly than small, light particles; or conversely, small, light particles traveling further than large, heavy particles.*

**2.hh.** A commenter said the PM-10 assessment is inadequate since UCM excluded haul road emissions from the potential to emit calculation.

*Department Response:*

*UCM did account for the fugitive dust associated with vehicle traffic on dirt roads in their PM-10 air quality modeling.*

**2.ii.** A commenter said the PM-10 AAAQS is violated when modeling with Palmer NWS meteorological data. The commenter reported the modeling results to "support" their comment.

*Department Response:*

*Palmer NWS wind data does not represent the wind conditions at Wishbone and therefore cannot be used to model the ambient impacts.*

## Off-site Sources

**2.jj.** Several commenters challenged the statement in the Department's modeling review that "there are no off-site stationary sources near Wishbone Hill." Many of the commenters then discussed the Jonesville Mine or a gravel pit (rock crusher) in the Buffalo-Soapstone area.

*Department Response:*

*The phrasing in the modeling report is misleading. The Department should have said, "There are no off-site stationary sources near Wishbone Hill that would cause a significant concentration gradient within the vicinity of the project site."*

*The Jonesville Mine and the Buffalo-Soapstone gravel pit are relatively small off-site stationary sources. They would not have the emissions potential or plume characteristics that would lead to significant concentration gradients near Wishbone.*

*Section 8.2.3f of the Guideline states that in these situations, off-site stationary sources may be represented through background data.*

**2.kk.** A commenter stated the modeling analysis and permit did not take into account the coal seam fires in the Wishbone Hill area. They said UCM should update its permit application and that the Department should require UCM to extinguish the fires as a precondition to any mining activity.

*Department Response:*

*Permit applicants are not required to assess natural, or unexpected fires, as part of their permit application. The sporadic and variable affects from coal seam fires are not considered in the permitting process.*

## Ambient Boundary

### Conceptual Concerns

**2.ll.** Several commenters do not understand the ambient boundary concept and cannot fathom how air can go from being acceptable to unacceptable once it crosses an imaginary line. One commenter said, "It is impossible to have health hazards on one side of a fence and say the residents that live on the other side of the fence will be safe from toxic coal dust and other chemicals that will be air born."

*Department Response:*

*The ambient boundary establishes where the Department has regulatory authority. The Department has authority to manage air that is accessible to the general public (aka "ambient air"). Air within a delineated "industrial zone" is managed by the Department of Labor or the Occupational Safety and Health Administration. The permit ensures that air quality where the Department has authority will meet the health-based ambient air quality standards.*

### Documentation

**2.mm.** A commenter stated that the Department did not demonstrate that a Public Access Control Plan is necessary. The commenter referenced an ambient air discussion in the ADEC Modeling Review Procedures Manual and then stated:

> There is no finding in the DRAFT TAR or related materials, however, that a fence is impractical or creates safety concerns at the Proposed Operation. Thus, ADEC may not rely on the Public Access Control Plan to preclude public access in the absence of effective physical barriers.

*Department Response:*

*There is no EPA or State rule that says applicants must show that "a fence is impractical or creates safety concerns" in order to use some other type of physical barrier. EPA guidance routinely uses the phrase "fence* ***or*** *other physical barriers" (emphasis added) to describe the ambient air boundary. This wording implies equal weighting of these options. UCM's public access control plan (PACP) describes the*

*physical barriers that will be relied on to preclude access across the ambient air quality boundary (AAQB).*

## Proposed Barriers

**2.nn.** A commenter stated that the elevation changes at Wishbone Hill are unlikely to preclude members of the public from accessing the property. The commenter stated, "EPA has stated that 'occasional rolling hills' are not analogous to rugged mountainous terrain…" They also stated:

> Not including the access road, the first phase of the mine ranges in elevation from just under 260 to 300 meters, a difference of 40 meters (approximately 130 feet). The second phase of the mine includes elevations of 340 meters to 420 meters in the far northeast corner, representing a difference in elevation of 80 to 160 meters from the lowest point in the mine area (approximately 260-525 feet). In comparison, the elevation at the Kennecott smelter in Magna, Utah, which depended on the rugged, mountainous terrain in the vicinity to aid in preventing public access, ranges from 4200 to 4600 feet in immediate vicinity, and to over 6400 feet in surrounding property owned by Kennecott. This represents a range of 400 to over 2000 feet. The elevation changes at Kennecott surrounded the smelter, such that someone attempting to access the property would either have to go over a mountain or arrive from a public road, which cannot be exempted from ambient air. In contrast, Wishbone Hill slopes upward towards the north in a manner fairly uniform with the surrounding area, meaning that someone approaching from the east or in the southwest corner would experience little or no change in elevation. The topography at Wishbone hill is inadequate to assure that public access is precluded from the area proposed to be exempt from ambient air.

*Department Response:*

*The means for precluding public access is made on a case-specific basis. The factors used in one case do not become absolute metrics for the next case.*

*The rate of elevation change is a factor when considering terrain features. Slopes that are too steep to walk can be very effective barriers, especially if it is mixed with dense vegetation. For example, a 10-foot tall vertical bluff creates a more difficult barrier to cross than a 5-foot tall fence. Basically, any feature that requires climbing in order to proceed is worth consideration as a physical barrier.*

*All existing trails that enter the AAQB or allow easy access to the AAQB will be blocked by a fence (see following discussion), so the only place where terrain features would be relied on are those areas where someone would be attempting to access the area through the wild. The western boundary at Wishbone has very steep terrain features. These features, create barriers that exceed that of a fence. The terrain features to the north and north-east of the ambient boundary are not generally as steep as the southwest area, but the terrain features are still adequate to preclude access, especially when considering that travelers would also need to negotiate vegetation as well as terrain. While the Department believes these natural features are*

*adequate barriers, UCM has developed an additional layer of preclusion through signage and surveillance.*

**2.oo.** Several commenters said vegetation is an inadequate barrier to preclude public access. One commenter stated, "Vegetation such as thick devils club is not sufficient." Another commenter stated, "A search of several sources – including a database of EPA guidance, Westlaw compilations of EPA Administrative Law Judge decisions, Environmental Appeals Board decisions, General Counsel memoranda, EPA Regional decisions, and *Federal Register* notices – reveals not a single instance of vegetation being used as an ambient air boundary." The commenter further stated:

> Additionally, as a practical matter the Draft Permit does not indicate where, exactly, this vegetation provides a sufficient barrier, other than to assert that it is present "in many parts of the Wishbone Hill area," nor does it state how wide the vegetative barrier is to demonstrate how difficult it may be to penetrate. Trees and shrubs, even if dense, are permeable barriers under the right conditions, such as during colder seasons when vegetation dies back or is covered in snow, or for people with adequate clothing to protect against the "spiny vegetation." Because devil's club is a deciduous plant, the lack of leaves in winter will leave the proposed ambient air boundary exposed and even easier to cross. For these reasons, vegetation does not satisfy the requirement that public access to the area be precluded.

Several commenters also provided pictures of where they believed vegetation would be inadequate to preclude public access.

*Department Response:*

*The Department disagrees with various aspects of the comments, but concedes that fencing should be used in lieu of vegetation along select portions of the AAQB.*

*Vegetation has been used as a fence for millennia. Probably the best known example is "hedgerows". While these are purposely planted to preclude access, vegetation in the wild can be just as effective at precluding access. Trees with overlapping branches or thick undergrowth can be very difficult to penetrate. Where this type of growth occurs, it would be far easier to scale a fence (which isn't all that hard to do) than to pass through the vegetation.*

*The real issue isn't whether vegetation can be used as a barrier – it's whether the local vegetation is adequate. As indicated by some commenters, the answer can vary by location. The pictures provided by the commenters showed areas where vegetative growth would be inadequate. The comments regarding winter dieback of seasonal plants can also be valid – if there's not residual stems and tree branches to preclude access during that time. However, based on a staff site visit in 2011, the Department believes that there are areas where vegetation does provide an adequate barrier.*

*The commenters correctly noted that UCM did not identify "where, exactly" vegetation provides a sufficient barrier. The plan instead describes the various*

*physical barriers that would be relied on, with several specific examples of where a fence would be used in lieu of natural features. The plan also states that "fencing will be placed at locations at which terrain and vegetation is not sufficiently restrictive to prevent public access." This implies that natural features would be relied on for all other locations.*

*The concern regarding where else fencing would be used – i.e., natural features would not be used – is valid. The Department therefore re-examined the PACP to determine whether the permit should identify additional places for fencing. The Department also considered the other ambient boundary comments in making this evaluation.*

*The Department focused on those areas where the public could easily approach the AAQB by means of a trail. UCM had stated in the PACP, "Any existing trails within the Phase 1 AAQB will be blocked." While UCM's intent to block access at these points is appropriate, the means for doing so is unclear. The Department resolved this deficiency as described below. The Department further noted that ROW 52715 runs parallel to the southern portion of the AAQB. There are also areas along this stretch with no substantive terrain features to help preclude access. Rather than relying on vegetation in these areas, the Department decided that it would be better to use a fence to ensure that there is a year-round barrier. Based on these findings, the Department added the following fencing requirements to the final permit:*

- *At the gate just north of where Right of Way (ROW) 52715 crosses the access road, UCM shall:*
  - *Install a fence from the east side of the gate to at least 100-feet beyond the point where the previous ROW 52715 crosses the AAQB.*
  - *Install a fence from the west side of the gate along the entire southern portion of the AAQB to where ROW 52715 crosses Moose Creek.*
- *UCM shall also install a fence at any other location where an existing trail crosses the Phase 1 ambient boundary. The fence will need to run for at least 100-feet in both directions along the AAQB. The Department is also adding a similar condition saying that UCM will need to use the same technique prior to beginning operation in the Phase 2 area.*

*UCM will not need to extend the fence north of where ROW 52715 crosses Moose Creek due to the significant terrain features in that area. Terrain and vegetation are likewise adequate barriers along the remaining portions of the AAQB, except as noted above with respect to trail crossings.*

*In reassessing the public access control plan and UCM's modeling analysis, the Department realized that UCM does not need to preclude public access along the haul road. UCM placed receptors along and across the haul road where ROW 52715 crosses. Their modeling demonstrated compliance with the AAAQS at these locations. To further ensure the AAAQS are protected at this location, the Department increased the receptor density in this area and reran the PM-10 and $NO_2$ assessments. Compliance is still demonstrated. Since the AAAQS are protected at a point where the*

*haul road is nearest the mine, they would be protected at more distant locations as well. The Department is therefore adding a permit condition saying that UCM does not need to control access along the haul road for air quality purposes. UCM will however, still need to install and maintain a gate between the ROW 52715 crossing and the mine. They will also still need to comply with the fugitive dust control plan along the entire haul road.*

**2.pp.** A commenter stated that the PACP and the Department's ambient assessment did not explain "how a berm will be adequate to physically exclude the public from the trail that follows ROW 52715 or how a culvert will physically exclude the public from the trail."

*Department Response:*

*UCM is not planning to use a berm to preclude public access. The "Diversion Berm" shown on the PACP maps are for water control.*

*The culvert would be used as part of the trail, not to preclude access to the trail. The trail would run through the culvert, with the access road running above it. UCM is planning to use this approach once the mine matures to keep the public and trucks from crossing paths. It's predominately a safety measure, although the culvert walls constitute the "physical barrier" at that part of the ambient boundary.*

**2.qq.** A commenter stated that EPA requires the boundary to be "fenced and marked" if "there is [even] a very remote possibility that the public would attempt to use this property".

*Department Response:*

*The commenter excluded the context and a key part of the quoted sentence. The memorandum referenced by the commenter describes EPA's interpretation of their ambient air policy in several specific situations. In the case quoted by the commenter, EPA was addressing two specific sources located along the Ohio River. Within this context EPA said, "Any areas where there is any question – i.e.,* ***grassy areas, etc****.— should be fenced and marked…" (emphasis added).*

*Grass obviously does not constitute a physical barrier. However, EPA's statement that a fence should be used in this situation does not mean that fencing is the only option in all situations. As previously stated, the phrase that EPA generally uses to describe the means for precluding public access is "fence or other physical barriers." The use of "or" in this phrasing implies equal weighting of both terms.*

**2.rr.** A commenter stated that the PACP fails to provide dedicated security. The commenter elaborated by saying:

> [UCM's] approach does not meet the standard set by previous applications of EPA's ambient air interpretation, where security personnel actively and regularly patrol ambient air boundaries that lack an effective physical barrier. In contrast to the security personnel at the Kennecott smelter, who make "diligent efforts to evict any trespassers," Usibelli plans to instruct its mine employees to ask trespassers twice to leave, and if an individual refuses to do so, the mine

employee will inform the individual that "Usibelli will not be liable or responsible for any harm" he or she may encounter. This approach flies in the face of the purpose of the ambient air exclusion, which is not to protect the source from liability but to protect "knowing or innocent trespassers" from pollution not subject to the protections of the Clean Air Act. The mine employee will also make a record of the trespasser's name, "[d]uration of unauthorized presence within the AAQB," and other information. It is irrelevant how long someone is within the exempted area, because "ambient air is defined in terms of public access, not frequency of access, length of stay or other factors." If unauthorized individuals are within the ambient air quality boundary, public access has not been precluded and the exemption must be withdrawn.

*Department Response:*

*The means for establishing an ambient boundary are case-specific. EPA Region 10 did not require the use of dedicated security when it approved an unfenced ambient boundary for the U.S. Borax & Chemical Corporation's Quartz Hill project. In that situation, Region 10 determined:*

> *The extreme nature of the terrain constitutes an adequate physical barrier for purposes of the definition of ambient air. This pertains generally to the project area. I understand that access to all roadways, will be limited solely to traffic associated with mine operations. This provision, if access is controlled by gate or security guard, will satisfy our concerns about roadways, which are clearly the easiest access routes into the project area. Other traditional or likely accesses to the area, trails for example, must be posted at the ambient air boundaries to warn members of the general public that the areas in question may constitute a health threat.*[5]

*The commenter has not shown that the facts of the Kennecott case are similar to the Wishbone case, or why other considerations and options could not be considered.*

## Tribal Access Concerns

**2.ss.** The Chickaloon Village Traditional Council stated that they must be permitted to use the "permit area for critical cultural and spiritual activities." They further stated, "DEC must withdraw the Draft Permit until and unless Tribal spiritual and cultural practices are taken into account and protected from air pollution that exceeds the NAAQS or AAAQS. To effectuate this access and protection, the ambient boundary necessarily must be drawn much more narrowly…" They further stated that installation of restrictive barriers is not an acceptable or realistic solution due to ongoing use by the Chickaloon Village Traditional Council and other community members.

*Department Response:*

[5] Michael Johnston, Chief of EPA Region 10 Air Operations Section to John Paulsen, U.S. Borax & Chemical Corporation; June 27, 1985.

*UCM provided evidence that indicates they have legal authority to preclude public access within their AAQB. The commenter did not provide evidence to the contrary. Since the Department has no authority on land management issues, it can only make decisions based on the information at hand. Legal disputes on land ownership or access rights need to be taken up with the applicable land owner.*

### Existing Trails

**2.tt.** A commenter stated: "It is inappropriate to exclude Usibelli's access road connecting the mine area to the Glenn Highway from ambient air. Several trails intersect with the access road but a restricted crossing is provided for only one, Right of Way (ROW) 52715."

*Department Response:*

*For the reasons described in Comment 2.oo, there is no air quality reason to preclude the public from the access road.*

**2.uu.** A commenter stated there is no discussion as to how effective the relocation of ROW 52715 is expected to be. "If the trail currently is used to access features not provided by the relocated segment, such as cultural, spiritual, recreational, aesthetic, hunting, or fishing uses, or if the old trail is not well-blocked, it is unlikely to deter members of the public from continuing to use the old trail."

*Department Response:*

*As discussed under Comment 2.oo, the Department is requiring UCM to install a fence where the previous ROW 52715 crosses the AAQB.*

## Receptor Grid

**2.vv.** Several commenters said the receptor grid is too coarse to capture the maximum impacts. A commenter said, "ADEC's prior sensitivity analysis with respect to $PM_{10}$ is no basis for excusing Usibelli's failure to use a 25-meter spaced grid to assess maximum 1-hour $NO_2$ concentrations… 24-hour concentrations of PM10 are unlikely to exhibit the same variability as 1-hour $NO_2$ concentrations." "The failure to model maximum 1-hour $NO_2$ impacts at a finer scale is particularly troublesome because the maximum predicted $98^{th}$ percentile impact (181 $\mu g/m^3$) very nearly exceeds the AAAQS limit (188 $\mu g/m^3$) and that maximum projected impact will 'occur along the western perimeter of the mine… that is 'an area with relatively short [emissions unit] to ambient boundary distances.'"

*Department Response:*

*The Department agrees that 1-hour concentrations exhibit different concentration gradients than 24-hour concentrations. While the Department still believes that the grid spacing is generally adequate, the Department nevertheless added receptors and reran the $NO_2$ and PM-10 assessments to ensure the maximum impacts were found. The Department placed additional fence-line receptors around the 1-hour $NO_2$, the annual $NO_2$, and 24-hour PM-10 maximum impact locations. The Department also*

*added receptors where ROW 52715 crosses the access road. The maximum (high second-high) 24-hour PM-10 impact remained the same. The maximum annual average $NO_2$ impact increased by 0.6 µg/m$^3$. The revised total is 62 µg/m$^3$, which is still well below the 100 µg/m$^3$ AAAQS. The maximum (high eighth-high) 1-hour $NO_2$ impact increased by 4.2 µg/m$^3$. The new total 1-hour $NO_2$ impact is now 185 µg/m$^3$, which is still less than the 188 µg/m$^3$ AAAQS.*

*As stated in the preliminary TAR, UCM used an extremely conservative approach for modeling the NOx emissions from blasting activities. They chose the worst-case location for the blast, and then assumed that the blast would occur at that same location each day of the year for three-years. They also assumed that the blast would occur during the worst-case meteorological condition that occurs during the 7 a.m. to 7 p.m. blast period. Their approach allowed them to demonstrate compliance in the simplest manner possible from a permitting perspective, but the results are unrealistically large. These types of conservative approaches are both acceptable and common in permit applications, especially when dealing with a portable activity – which is the case here. In reality, blasting will not occur at the exact same worst-case location each day for three years. The location of the blasts will actually move as the mine grows. Therefore, the actual impacts should be well under this worst-case upper bound.*

## Background Data

A number of commenters challenged the ambient pollutant data that UCM used to represent the background concentration at Wishbone. The various concerns are summarized below.

**2.ww.** A commenter stated, "DEC should not allow Usibelli to use Eagle River 2009 as baseline data for calculating PM-10 and NOx projections." They further stated: "What has changed since 2009? What new sources would add to the background data?" and "Pollutant sources are different at Eagle River and Wishbone Hill".

*Department Response:*

*Eagle River pollutant data was only used for the PM-10 analysis, not the $NO_2$ analysis. The Department recommended and accepted the use of Eagle River PM-10 data for the following reasons:*

- *The Eagle River site is roughly within the same ecosystem as Wishbone; and*
- *The Eagle River site experiences similar source patterns for PM-10 and also has similar sources contributing to the highest concentration – i.e., windblown dust.*

*The Department reviewed the 2009 Eagle River data and compared it to the Eagle River data from 2010 – 2013. The data are very consistent, both in magnitude and trends. This finding was expected since the source mix has not substantially changed during this time.*

**2.xx.** A commenter said, "DEC should require Usibelli to use 2013 Palmer or Butte data as the background as it would provide an accurate projection of the impacts of this mine and

operation [in Palmer]". Another commenter similarly stated that Eagle River data does not allow UCM to estimate the potential impact in Palmer. They further stated, "By using background data from Eagle River, which does NOT have the same wind patterns or background PM10, DEC has no way of understanding the implications of the coal mine operation on PM10 in the surrounding area or whether this operation will in fact increase the number of 24-average exceedance events in the Palmer area."

*Department Response:*

*UCM did not estimate the impacts in Palmer for the reason described in response to comment 2.c.*

**2.yy.** A commenter stated, "The 1990 on-site data does not accurately represent ambient air." "…there is more dust today than in 1990."

*Department Response:*

*The commenter appears to be confusing the meteorological data set with the background data sets. The meteorological data was from 1990. The background PM-10 data was from 2009.*

**2.zz.** Numerous commenters said UCM should have collected ambient pollutant data for use as the background concentration or for "baseline" information. Some of the specific comments were:

- Background PM10 data varies substantially around the state… Given the contributions of glacial silt to Sutton ambient air, site-specific data would show where Sutton lays in the state range of ambient PM10 concentrations.
- Multi-year, daily sampling is needed for a foundation to understand current air chemistry and wind patterns.
- Why wasn't UCM required to collect air quality information on site when Donlin was? Both mines have similar lifespans.
- It could be useful to know the levels of baseline PM2.5 prior to bringing the engine and other diesel heaters and vehicles into operation.

  Another commenter provided the following argument for collecting site-specific background data:

- There are fewer air advisories in Eagle River than in Palmer [with subsequent counts from various periods]
- Wind events in Eagle River are fewer than at stations on either side of Wishbone Hill [with subsequent wind gust counts from Eagle River, Cedar Hills and Kings River/Sutton]
- Eagle River does not experience extended wind events [with a subsequent discussion regarding low-level circulation regimes].

The commenter concluded, "[the presented data] strongly suggests that the pattern, strength, and length of windstorms in the Wishbone Hill area is different from Eagle River, and that in order to bound the extremes of air quality, data should be collected on site."

*Department Response:*

*18 AAC 50.540 sets forth the requirements for minor permits. There is no requirement to collect site-specific pollutant data. Minor permit applicants rely on surrogate datasets to represent the background concentration. The Donlin mine will require a Prevention of Significant Deterioration (PSD) major permit due to the large power plant that they intend to install in order to meet their electrical needs.[6] Pre-construction pollutant monitoring is a required element of the PSD program.*

**2.aaa.** A commenter said, "Use of the Eagle River data raises significant concerns. Today's air quality around Wishbone Hill is affected by winds with glacial silt, but there is little traffic, industry, or sources other than the gravel pit. At Eagle River, air quality daily is affect by traffic... especially during the morning and evening rush hours, by road dust, and in general by the larger and denser community. To equate the source and type of emissions of Eagle River with Wishbone Hill is entirely unrealistic."

Another commenter provided the following similar concerns: "Pollutant sources are different at Eagle River and Wishbone Hill. Rush hour traffic drives the air quality in Eagle River. The particulate matter (PM) is derived primarily from traffic-deposited dust and road sand; dust that arrives from the Matanuska Valley via north to northeasterly winds will consist of farmland dust as well as glacial silt – at Sutton, the material will be nearly all glacial silt with no Palmer farm dust."

A third commenter provided their summary of wind data from "locations both directly upwind (Sutton) and downwind (Farm Loop) of the proposed Wishbone Hill mining area." They then stated: "As you can see, the area is plagued with very high winds all winter. Eagle River was allowed as a substitute data site but experienced almost none of those winds or dust related air quality warnings."

*Department Response:*

*The Eagle River monitoring site is impacted by windblown dust. There are seasonal patterns, with higher PM-10 concentrations in the spring and fall. The pattern is similar to what the Department observes in Palmer. The presence of greater vehicle traffic in Eagle River than what is experienced near Wishbone, leads to a higher estimate of the background concentration than what really occurs near Wishbone. A higher estimate of background concentration means the total combined impact is estimated to be higher than the actual impact. Since the estimated impact complies with the standard, we conclude that the lower actual impact will also comply with the standard.*

[6] Donlin estimated their total electric load at 227 megawatts (227,000 kilowatts) in their November 2013 modeling protocol. The associated air emissions trigger the PSD permitting requirements. The proposed electrical generating capacity at Wishbone is only 600 kilowatts (1/378$^{th}$ of Donlin's electrical generating capacity). The substantially smaller Wishbone emissions are below the PSD permitting thresholds.

*The PM-10 AAAQS is a mass based standard. It does not take particulate composition into consideration, so a differentiation between glacial silt and farmland dust does not factor into the particulate matter measurements. The question is whether the measured concentrations in the surrogate dataset adequately represent the expected background concentrations, for purposes of complying with Section 8.2 of the Guideline. The Department believes the Eagle River data is adequate, for the reasons described in response to comment 2.ww.*

**2.bbb.** A commenter asked, "Is the statewide NOx range similar to that of PM10 [as shown in a table that the commenter provided]? If so, where does Donlin and, if measured on site, where would Sutton fall in the statewide range?"

*Department Response:*

*Most of the NOx data available to the Department is from the North Slope. That data provides a poor surrogate of the expected concentration at Wishbone. Donlin data provided the best surrogate of the 1-hour $NO_2$ background concentration.*

## 3. Requests for Additional Modeling Under 18 AAC 50.540(c)(2)(D)

**3.a.** Several commenters said UCM should conduct additional modeling assessments. Some commenters said the Department should request these assessments under the Department's discretionary provision in 18 AAC 50.540(c)(2)(D). The requests varied, but included: ozone, PM-2.5, visibility and off-site deposition. At least one commenter said secondary PM-2.5 formation should also be assessed due to the project's NOx and VOC emissions. Some commenters asked the Department to require the additional modeling assessments recommended by the Alaska Department of Health and Social Services in its Draft Health Impact Assessment for the Proposed Coal Mine at Wishbone Hill ('Draft HIA'). The commenters listed the additional assessments that they desired. The list included a revised modeling analysis with an extended receptor grid "for a distance sufficient for evaluating exposures to residential areas," an estimate of the tail-pipe PM-2.5 emissions, and a PM-2.5 modeling analysis.

*Department Response:*

*18 AAC 50.540(c)(2)(D) requires an application to include an analysis if requested by the Department to demonstrate compliance with an ambient air quality standard. The provision does not apply to other types of assessments, including a visibility or deposition analysis. Requested demonstrations must be consistent with 18 AAC 50.215(b) – (e). There is no provision in the minor permit program to request other types of modeling assessments, including the type of modeling assessment suggested by the Department of Health and Social Services.*

*Enviroplan estimated the tailpipe PM-2.5 and PM-10 emissions when they estimated the mobile source NOx emissions (see response to comment 2.x). The emission*

*estimates varied by the assumed mix of vehicle classifications but ranged from 0.05 to 0.08 tpy for both pollutants.*

*The Department has a minor permit threshold for PM-2.5, which when triggered, requires a PM-2.5 assessment. However, the PM-2.5 emissions from Wishbone are too small to trigger this automatic modeling requirement. PM-2.5 emissions are typically associated with combustion activities, which are relatively limited in this application. The Department sees no reason why it should request a PM-2.5 analysis from this stationary source whose emissions are below the regulatory modeling threshold. The Department further notes that AERMOD is an acceptable model for performing near-field analysis of direct PM-2.5 emissions, but EPA has not developed a near-field model that includes the necessary chemistry algorithms for estimating secondary impacts.*

*Ozone is inherently a regional pollutant that is the result of NOx and volatile organic compound (VOC) emissions from numerous sources. EPA does not have a recommended modeling approach for estimating ozone impacts from an individual stationary source. There are regional scale ozone models, but they are generally only used when dealing with precursor emissions that are several orders of magnitude greater than the Wishbone emissions. It's questionable whether Wishbone-scale emissions would even have a noticeable impact in a regional modeling analysis. The Department finds no basis or merit in requesting an ozone modeling analysis.*

## 4. Permit Language

**4.a.** UCM asked the Department to revise the language in Condition 6.1b., Footnote 2. UCM stated

> Please amend this condition as follows to make the 1st Calendar Quarter inclusive of all of the calendar days in that quarter.
>
> [2]Calendar Quarter is defined as follows: 1st Calendar Quarter is January 1 through March <u>31</u> ~~30~~; 2nd Calendar Quarter is April 1 through June 30; 3rd Calendar Quarter is July 1 through September 30; 4th Calendar Quarter is October 1 through December 31.

*Department Response:*

*The Department has made the change as requested to include all of the calendar days in the 1st Calendar Quarter.*

**4.b.** UCM asked the Department to revise the language in Condition 6.1d. UCM stated

> Condition 6.1d – Please amend this condition as follows to increase the length of the shutdown time before a visible emission observation is required. The crusher (Emission Unit 12) may be operated intermittently, particularly during the early years of mine development. No reason exists to believe that the physical condition

of the crusher will deteriorate in a five day period such that excess visible emissions would be expected to occur. A more appropriate down-time duration would be 30 days, consistent with the requirement in Condition 6.1a to conduct the initial visible emissions observation with 30 days after initial startup.

> Within 24 hours following startup of ~~the~~ EU 12 after a shutdown period of more than 30 days.

*Department Response:*

*The Department made the requested change for the reasons described in UCM's comment to allow for operational flexibility.*

**4.c.** UCM asked the Department to revise the language in Condition 18. UCM stated

> Condition 18. – Please amend this condition as follows to make the spelling of "annual average" and "particulate matter" consistent with other permit conditions and to make the description of $PM_{10}$ consistent with the definition at 18 AAC 50.990.76.
>
> > To protect the annual average Annual Average and 1-hour nitrogen dioxide ($NO_2$) and the 24-hour particulate matter Particulate Matter with an aerodynamic diameter of less than or equal to a nominal 10 microns (PM-10) ambient air quality standards the Permittee shall:

*Department Response:*

*The Department has made the changes as requested to reflect the definition of PM-10 under 18 AAC 50.990(76).*

**4.d.** UCM asked the Department to revise the language in Condition 18.1. UCM stated:

> Please amend this condition as follows to delay initial implementation of the Public Access Control Plan (the Plan) until onsite construction and mining activity actually begins. An active plan to preclude public access is not needed until such onsite activity begins because the need to protect public health from potential air pollutant emissions will also not begin until that time. Premature implementation of the Plan requirements before needed may give the public a false impression as to when mining activity will actually begin. Premature implementation of the Plan also imposes an unnecessary burden on UCM because the site will not be manned until actual construction and mining activity begins.
>
> > Upon beginning onsite construction or mining activity, maintain a physical ambient air boundary between the public and the industrial site as described in the February 14, 2014 Public Access Control Plan (as provided in Section 13), or a subsequent written version approved by the Department that only contains editorial revisions.
>
> This requested change is also consistent with the Alaska Department of Natural Resources (DNR) coal and surface lease agreements. Public access can be

currently legally restricted within the ambient air quality boundary within Surface Lease ADL 225305, and Surface Lease ADL 224865 per Stipulation 10. However, public access cannot be restricted within the two coal leases, ADL 309947 and ADL 32144, under lease Stipulation 3 until actual mining activities and mining structures are present in the coal lease areas.

Additional detail about the ADL leases is provided in the comment addressing the Ambient Air Boundary within the Technical Analysis Report.

*Department Response:*

*The Department made the requested change for the reasons described in UCM's comment.*

**4.e.** UCM asked the Department to add Condition 18.1a (new). UCM stated

Please add Condition 18.1a to require reporting the date that onsite construction and mining activity actually begins. This reporting is necessary to keep ADEC fully informed and to ensure compliance.

Report the date that actual onsite construction or mining activity began in the stationary source operating report under Condition 25 for the period in which the activity began.

*Department Response:*

*The Department has made the change as requested to include a reporting requirement (Condition 18.3) to notify the Department of when onsite construction or mining activity begins.*

**4.f.** UCM asked the Department to revise the language in Condition 19.2b. UCM stated

Please amend this condition as follows to require this observation be made once per 8-hour shift, as opposed to three times per day. Mining activity may not always occur 24 hours per day, and, in some instances, may not occur for more than one shift. As a result, requiring this observation once per shift provides the flexibility needed to integrate the observation schedule into the daily mining schedule while providing assurance that fugitive particulate matter emissions are adequately controlled to ensure compliance with the applicable ambient air quality standards.

At least once per active shift ~~3 times each calendar day~~, when the road surface is not frozen or the road surface does not exhibit visible surface moisture, determine and record the duration of particulate matter emissions resulting from road traffic, as follows:

*Department Response:*

*The Department revised the condition to read, "At least once per active **8-hour** shift" (emphasis added) for the reasons described in UCM's comment.*

**4.g.** UCM asked the Department to revise the language in Condition 19.4. UCM stated

> Consistent with the comment addressing Condition 19.2b, please amend the first sentence of this condition as follows to provide the flexibility needed to integrate the observation schedule into the daily mining schedule while providing assurance that fugitive particulate matter emissions are adequately controlled to ensure compliance with the applicable ambient air quality standards.
>
> > Perform an ~~a daily~~ inspection at least once per active shift ~~3 times per calendar day~~ of the mine area, topsoil/overburden stockpile area, coal preparation plant, conveyor system, jig plant, and truck and support vehicle traffic (EU IDs 3 through 32).

*Department Response:*

*The Department revised previous Condition 19.4 now Condition 19.3 to read, "Perform an inspection at least once per active **8-hour** shift" (emphasis added) to allow for flexibility in the observation schedule to account for times when mining activities are not occurring.*

**4.h.** UCM asked the Department to revise the language in Condition 19.5e. UCM stated

> Condition 19.5e. – Please amend this condition to remove the underlining from "any" or explain the meaning of the underlining.

*Department Response:*

*The Department has revised Condition 19.5e (now Condition 19.4e) as requested to remove the underline from "any".*

**4.i.** UCM asked the Department to revise the language in Condition 19.6. UCM stated

> Please amend this condition as follows to add clarity to the requirement.
>
> > Submit any completed Section 16 complaint form to the Department per Condition 22 within 30 days after ~~of~~ receiving the complaint.

*Department Response:*

*The Department has revised Condition 19.6 (now Condition 19.5) as requested to add clarity to the requirement.*

**4.j.** UCM asked the Department to delete Condition 41. UCM stated

> Please delete this condition in its entirety. The permit does not require any piece of monitoring equipment, making this condition unnecessary.

*Department Response:*

*The Department has deleted Condition 41 as requested, because no monitoring equipment is required by the permit.*

## 5. Miscellaneous Comments

**5.a.** A commenter said more wind erosion and fugitive dust emissions will occur once all trees and vegetation are removed.

*Department Response:*

*The comment is unsubstantiated. Cutting nearby trees and vegetation should not affect the emission factors used to estimate the PM-10 emissions. UCM estimated the fugitive dust emissions using Section 13.2.5 (Industrial Wind Erosion) of EPA's compilation of emission factors (AP-42). EPA assumes the dust-generating surfaces are exposed, not covered. There is no variable for adjusting upwind fetch or surface roughness. The emission estimates are based on these emission factors and seven full years of 2-minute wind gust data from the Palmer airport. The commenter provided no argument as to why the 2-minute wind speeds at Wishbone would become greater, or more frequent, than the 2-minute wind speeds at Palmer. UCM's modeling analysis is based on site-specific wind data. EPA has minimum set-back requirements for each measured meteorological parameter, including wind speed. Per EPA guidance, the vegetation and trees surrounding the meteorological tower must be cut back at least 10-times the height of the vegetative canopy, in order to obtain unobstructed wind data. The commenter provided no data as to why this 10-fold distance is inadequate or why a greater distance would lead to greater predicted impacts. The Department further notes that the permit requires UCM to mitigate fugitive dust emissions under all conditions. Therefore, even if there is an increase in high wind events – for any reason, UCM must still take action to minimize their fugitive dust emissions.*

**5.b.** A commenter asked the Department to impose a permit condition that would require UCM to "stop operations on days when the wind measures 12 miles per hour" for the reasons described in Comment 2.v. The commenter further stated: "If UCM's calculations are correct, such a requirement should not be any great inconvenience to the company and it would help reassure the residents of the area that their health was being protected."

*Department Response:*

*The Department denied this request. UCM included wind erosion emissions in their PM-10 modeling analysis and demonstrated compliance with the 24-hour PM-10 AAAQS. As discussed in the Department's response to Comment 2.v, the wind erosion emissions are based on the material that is specific to UCM's operation and 2-minute wind speeds. These factors do not correlate with the 12 miles per hour wind gust threshold proposed by the commenter. The Department is also requiring UCM to minimize fugitive dust emissions through their fugitive dust control plan.*

**5.c.** Several commenters felt UCM made unsubstantiated statements in-regards to the benefits from possible snow cover. In discussing the modeled impacts, UCM stated, "Furthermore, the time that these few higher wind speeds occurred (all in November and most on a single day) coincides with likely snow cover in the area which tends to mitigate dust erosion."

*Department Response:*

*UCM made a general comment regarding expected conditions. They did not incorporate this expectation into their modeling analysis.*

**5.d.** UCM did not provide adequate justification for determining Year 4 as the "worst-case" scenario to be used in the Modeling Analysis. Commenters suggest that year four of the mine, may not represent the maximum "worst-case" scenario for estimating ambient impacts.

*Department Response:*

*The permit application indicates that "For the computation of emission estimates, year 4 of mining was used. This year was determined to be the worst case year in terms of total emissions because the largest volume of overburden material requiring the longest haul distance will be moved during this year. In addition, the mining operation as well as the coal processing facilities will be at full production." UCM has certified that the statements and information in the permit application are true, accurate, and complete. The commenters do not provide sufficient justification to contradict this assertion.*

## 6. Requests for Post-construction Monitoring

**6.a.** Several commenters requested post-construction PM-10 or PM-2.5 monitoring. The specific comments included:

- UCM should install a meteorological station and a PM-10 monitoring station.
  - The met tower should be at least 10 meters high
  - The public should be allowed to comment on the PM-10 station location
  - DEC should require multiple PM-10 monitoring stations
- UCM should monitor PM-2.5
- There should be a requirement for independent air quality monitoring of both PM-10 and PM-2.5
- Monitoring should occur throughout the mine life, to determine if additional glacial silt burdens due to global warming are being added to mine emissions
- There are many 'research grade' air monitors with high accuracy available for less than $10,000. For around $15,000 UCM could purchase two instruments with data loggers, calibrate them to DEC's existing TEOMs, and provide weather shelters for them

- Stations should be installed between the mine emission sources and residences in locations that would capture emission transport with prevailing winter winds (often north/northeasterly) and prevailing summer winds (often southerly)

*Department Response:*

*The Department disagrees that PM-10 or PM-2.5 monitoring is warranted. UCM's modeling analysis demonstrated compliance with the 24-hour PM-10 AAAQS with a notable margin of compliance. The Department has prepared a quantitative assessment of PM-2.5 in response to Comment 8.i that demonstrates that the PM-2.5 emissions are below the 10 ton per year minor permit threshold under 18 AAC 50.502(c)(1). Requiring post-construction PM-2.5 monitoring would therefore be without merit.*

*The potential impacts from global warming are better addressed through the State/Local Air Monitoring System – this type of monitoring is not the responsibility of an individual Permittee.*

**6.b.** Several commenters asked for post-construction $NO_2$ monitoring. A commenter supported this request by saying: "There is a reasonable concern that NOx may exceed ambient air quality standards, particularly during blasting, therefore it is reasonable to request NOx monitoring."

*Department Response:*

*The Department does not agree that post-construction $NO_2$ monitoring is warranted. The 1-hour $NO_2$ AAAQS is based on a complex statistically derived formulae that makes the modeling of portable activities, such as blasting emissions, extremely challenging. UCM met this challenge by using very conservative, simplifying assumptions that overestimate the expected 1-hour $NO_2$ impacts.*

*More than 99 percent of the maximum modeled impact is due to blasting. Blast emissions are instantaneous, yet the related modeled emission rate is presumed to be held constant for a full hour (which is the required minimum AERMOD prediction averaging time). Further, UCM assumed that blasting would always occur at the exact same worst-case location. In reality, blasting will occur at various locations throughout the mine. UCM also assumed that blasting would occur continuously during the 7 a.m. to 7 p.m. blasting period, rather than just one hour per day, in order to ensure that the hour with the highest impact was always used in calculating the design concentration. UCM's approach fulfilled the regulatory obligation of demonstrating compliance, and it overstates what would likely occur (see response to Comment 2.vv).*

*Post-construction monitoring is therefore unwarranted due to the conservative approach UCM used for demonstrating compliance with the 1-hour $NO_2$ AAAQS.*

## 7. Health Issues

**7.a.** Asthma, Black Lung, and West Virginia Health Study

Commenters' provided examples of studies in West Virginia recently accomplished about the possible health effects of coal mining.

*Department Response:*

*The Department has adopted the national ambient air quality standard (NAAQS) for PM-10, which is a health based standard. Review of studies that relate to the health impacts of coal mining in West Virginia is outside the scope of air quality permitting in Alaska.*

*The proposed minor permit allows for the stationary source to be in compliance with the 24-hour PM-10 NAAQS adopted in Alaska's regulations under 18 AAC 50, therefore the permit is adequate for ensuring that the PM-10 concentrations are at an acceptable level. The NAAQS are set at levels to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. The NAAQS are also intended to protect public welfare and include protection against lower visibility and damage to animals, crops, vegetation, and buildings.*

*The Department has also conducted a quantitative analysis of hazardous air pollutants (HAPs) associated with coal dust at the source and has found that Wishbone Hill is not classified as a major source of HAPs (see response to Comment 8.p).*

## 8. Permit Issuance Criteria under 18 AAC 50

### Claims of an Incomplete Application

**8.a.** Several commenters made claims that the application is incomplete and that a permit should not be issued because of this.

*Department Response:*

*The Department disagrees with the commenters. The commenters have not provided a regulatory basis for why the application should be deemed incomplete.*

### Claims of the Department "Rubber Stamping" the Permit

**8.b.** Commenters claim that the Department is just rubber stamping this permit.

*Department Response:*

*The Department disagrees with the commenters. The Department has conducted a careful review in accordance with applicable regulations as shown by the technical analysis report and has proposed conditions not requested by the applicant.*

### Claims of Fraudulent Information

**8.c.** Some commenters claimed that the application was fraudulent, inaccurate, and purposefully misleading.

*Department Response:*

*The commenters have not provided any facts or data to establish that the information was false, inaccurate, or fraudulent. The data provided for this application meets the normal data requirements for this type of permit. Therefore a new application is not warranted.*

### PM-10 Emissions are under-estimated and the Source should be Major

**8.d.** Commenters questioned why DEC allowed UCM to reduce their estimate of potential fugitive particulate matter emissions in this permit action from previous permit actions from 494 to 225 tons per year (tpy).

*Department Response:*

*The Department has evaluated the change in potential PM-10 emissions from the previous to current permit action and found the difference is a result of modifications to expected operations. The engineering design for EU 31 (overburden hauling – stockpile), for example, is refined to operate 67,104 vehicle miles traveled per year (VMT/yr)* ***less*** *than previously anticipated. This along with changes in expected emissions control efficiencies (see response to Comment 9.r), result in a reduction of 169.5 tons per year of PM-10.*

*This reduction in expected operation can be partially attributed to a 2010 feasibility study performed by UCM to optimize their mining fleet size with their anticipated product demand. They determined that under maximum production, a 150 ton capacity truck (rather than a 200 ton capacity truck) would adequately meet production requirements and allow for better maneuverability and acceleration for their short transport distances.*

*The Department notes that the changes made to the potential emissions calculations from the previous permit action is a result of operational design changes. The Department has reviewed UCM's permit application for which, a responsible official has certified that "Based on information and belief formed after reasonable inquiry, I certify that the statements and information in an attached to this document are true, accurate, and complete". The Department has included a table in Appendix A of the TAR detailing the emissions calculations for the source.*

**8.e.** Commenters requested a clarification on "Overburden hauling, stockpile", as it is relevant to mitigation and whether all dust sources have been captured. The commenter also provided a tabulated comparison between fugitive dust emissions from hauling overburden and fugitive dust emissions from other sources, based on vehicle miles traveled.

*Department Response:*

*Fugitive dust emissions potentials for EUs 30 through 35 are the product of the emission factors (as calculated in **APPENDIX A** in terms of lb per vehicle miles traveled) multiplied by the number of vehicle miles traveled per year. The number of vehicle miles traveled per EU are derived from their respective expected operations as indicated in Table C-10 of the permit application.*

**8.f.** Commenters noted that fugitive emissions from haul roads within the coal preparation and processing plant are erroneously excluded from the PM-10 potential to emit calculations, resulting in an incorrect permit classification.

*Department Response:*

*The Department agrees with the commenter that haul road emissions within the coal preparation and processing plant should be included in the PTE calculation for PM-10. The Department disagrees, however that inclusion of these emissions would change the classification of the source from a minor source to a major stationary source that would require a Title V operating permit.*

*The Department has included the emissions from EU 35 (coal hauling – loop road) in the PTE calculations for permit applicability. Based on the expected operation of 4,410 vehicle miles traveled per year, as provided by UCM, the resulting increase in PM-10 emissions is 1.1 tpy as noted in Table C-10 of the permit application. This change increases the potential PM-10 emissions from the coal preparation and processing plant to 35.36 tpy, still well below Title V applicability thresholds.*

### The Permit Does Not Clearly Limit $SO_2$ Emissions below the Major Source Threshold.

**8.g.** Commenters state that $SO_2$ emissions are underestimated in the TAR and based on use of ULSD fuel with a sulfur content of 15 ppmv.

*Department Response:*

*The Department agrees with the commenters that the permit does not clearly limit potential $SO_2$ emissions from the source to a level that would result from firing diesel fuel with a sulfur content of 15 ppmv. Therefore the Department has re-calculated $SO_2$ emissions based on firing diesel fuel with a maximum sulfur content of 0.75 percent sulfur by weight, and has included reporting requirements to ensure no permitting thresholds are exceeded.*

### Total NOx Emissions Exceed the Operating Permit Threshold of 100 tpy.

**8.h.** Commenters stated that the total project NOx emissions will exceed the operating permit threshold of 100 tpy.

*Department Response:*

*The Department disagrees with the commenters that Wishbone Hill has the potential to emit over 100 tons per year of NOx emissions. Commenters have not shown any calculations to demonstrate that potential NOx emissions will exceed the Title V operating permit threshold of 100 tons per year. The application conservatively*

*evaluated NOx emissions from the diesel fired generator at full-time, year-round operation, even though the primary power to the coal processing plant will be purchased from the local utility.*

## Claims that Permit failed to Quantify PM-2.5 Impacts

**8.i.** Commenters claim that PM-2.5 emissions have not been completely quantified and that PM-2.5 emissions from sources other than the diesel engine, heaters, and coal preparation and processing plant need to be accounted for.

*Department Response:*

*The Department provides the following table to quantify PM-2.5 emissions for clarification:*

| ID | Description | Basis for Emission Factor | Potential PM-10 Emissions (tpy) | PM-2.5/ PM-10 Ratio | Potential PM-2.5 Emissions (tpy) |
|---|---|---|---|---|---|
| 1 | Diesel-fired Engine | Vendor Data | 0.8 | ND[1] | 0.80 |
| 2 | Diesel-fired Heaters | AP-42 Tables 1.3-1, 1.3-6 | 0.6 | 0.240 | 0.14 |
| 9 | Coal Dumping - Crusher Feeder | AP-42 Table 11.9-1 | 16.1 | 0.144 | 2.32 |
| 10 | Coal Dumping - Run-of-Mine Pile | AP-42 Table 11.9-1 | 5.4 | 0.144 | 0.78 |
| 11 | Coal Reclaim from Run-of-Mine Pile | AP-42 Table 11.9-1 | 5.4 | 0.144 | 0.78 |
| 12 | Coal Crusher | AP-42 Table 11.19.2-2 | 2.2 | ND[2] | 2.20 |
| 13 | Transfer - Crusher to Conveyor 1 | AP-42 Section 13.2.4, Eq. 1 | 0.2 | 0.151 | 0.03 |
| 14 | Transfer - Conveyor 1 to Raw Stockpile | AP-42 Section 13.2.4, Eq. 1 | 0.2 | 0.151 | 0.03 |
| 15 | Transfer - Raw Stockpile to Conveyor 2 | AP-42 Section 13.2.4, Eq. 1 | 0.2 | 0.151 | 0.03 |
| 16 | Transfer - Conveyor 2 to Jig Plant | AP-42 Section 13.2.4, Eq. 1 | 0.2 | 0.151 | 0.03 |
| 17 | Transfer - Jig Plant to Conveyor 3 | AP-42 Section 13.2.4, Eq. 1 | 0.1 | 0.151 | 0.02 |
| 18 | Transfer - Conveyor 3 to Reject Stockpile | AP-42 Section 13.2.4, Eq. 1 | 0.1 | 0.151 | 0.02 |
| 19 | Transfer - Jig Plant to Conveyor 4 | AP-42 Section 13.2.4, Eq. 1 | 0.1 | 0.151 | 0.02 |
| 20 | Transfer - Conveyor 4 to Clean Stockpile | AP-42 Section 13.2.4, Eq. 1 | 0.1 | 0.151 | 0.02 |
| 21 | Transfer - Clean Stockpile to Conveyor 5 | AP-42 Section 13.2.4, Eq. 1 | 0.1 | 0.151 | 0.02 |
| 22 | Transfer - Conveyor 5 to Loadout Bin | AP-42 Section 13.2.4, Eq. 1 | 0.1 | 0.151 | 0.02 |
| 23 | Transfer – Loadout Bin to Truck | AP-42 Section 13.2.4, Eq. 1 | 0.1 | 0.151 | 0.02 |
| 25 | Run-of-Mine Coal Stockpile | AP-42 Section 13.2.5, Eq. 2 & 3 | 0.9 | 0.150 | 0.14 |
| 26 | Raw Coal Stockpile | AP-42 Section 13.2.5, Eq. 2 & 3 | 0.4 | 0.150 | 0.06 |
| 27 | Clean Coal Stockpile | AP-42 Section 13.2.5, Eq. 2 & 3 | 0.7 | 0.150 | 0.11 |
| 28 | Reject Stockpile | AP-42 Section 13.2.5, Eq. 2 & 3 | 0.02 | 0.150 | 0.00 |
| Total PTE from All Point Emission Units | | | 1.4 | | 0.94 |
| Total PTE from Coal Preparation and Processing Plant Fugitive Emission Units | | | 32.6 | | 6.61 |
| Total PTE from All Emission Units for Permit Applicability Determinations | | | 34.0 | | **7.55** |
| PSD Permit Applicability Threshold for Coal Preparation and Processing Plant | | | 100 | | 100 |
| PSD Applicable | | | No | | No |
| Minor Air Quality Permit Applicability Threshold (18 AAC 50.501(c)(1)(A)) | | | 15 | | 10 |

| ID | Description | Basis for Emission Factor | Potential PM-10 Emissions (tpy) | PM-2.5/ PM-10 Ratio | Potential PM-2.5 Emissions (tpy) |
|---|---|---|---|---|---|
| Minor Permit Applicable under 18 AAC 50.502(c)(1)(A) | | | Yes | | **No** |

Notes: [1] No vendor data on PM-2.5 available; assume PM-2.5 = PM-10 as worst-case
[2] No uncontrolled crusher PM-2.5 data available; assume PM-2.5 = PM-10 as worst-case

*Additionally, the Background Document for Revisions to Fine Fraction Ratios used for AP-42 Fugitive Dust Emission Factors (AP-42, Chapter 13.2.2) states "PM-2.5 / PM-10 ratios for fugitive dust should be in the range of 0.1 to 0.15. Currently, the fine fraction ratios in AP-42 range from 0.15 to 0.4 for most fugitive dust sources." Based on the PM-2.5 / PM-10 ratios provided above, the Background Document suggests that the PM-2.5 PTE calculations are within an acceptable range.*

## Permit Underestimates Startup, Shutdown, and Malfunction Emissions

**8.j.** Commenters were concerned about the generator emissions. One concern was that the potential emissions of the proposed project have been underestimated and must be amended. The commenter believed that if this were corrected it will likely result in the source having a potential to emit ("PTE") above the major source threshold, subjecting the proposal to the PSD, Title V, and National Emission Standards for Hazardous Air Pollutants ("NESHAP") programs of the CAA. There was a question of federally or practically enforceability, the use of Startup, Shutdown, and Malfunction (SSM) emissions, and operation in cold temperatures.

*Department Response:*

*The potential emissions from the diesel-fired engine (EU ID 1) as stated in the Technical Analysis Report (TAR) are representative of normal operations as well as startup, shutdown, and malfunction conditions. A discussion of each of these cases is provided below.*

- *Normal Operations: Potential emissions were calculated using vendor-provided not-to-exceed emission factors (lb/hr) for the worst-case (highest) emission rate regardless of load. As a result, all possible normal operating scenarios have been addressed.*

- *Start up: In the preamble to promulgating changes to 40 CFR 63 Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines, EPA stated the following with respect to periods of startup. (See FR Vol. 75, No. 41, Wednesday, March 3, 2010, page 9656).*

  > *"EPA has determined it is not feasible to finalize numerical emission standards that would apply during startup because the application of measurement methodology to this operation is not practicable due to technology and economic limitations."*

*Consistent with this determination, quantifying emissions from EU ID 1 during startup is not technically feasible. However, the calculated potential NOx emissions conservatively include startup emissions for the following reasons:*

- *The highest vendor-provided NOx emission rate occurs at 100 percent load, the emission rate used to calculate potential emissions.*

- *Very few startups will occur because reliable, purchased line power from an existing regulated utility will be used to provide electricity to the operation. EU ID 1 will be used only if line power is not available due to some unforeseen event.*

- *The engine will be operated and maintained consistent with the manufacturer's written instructions, which will minimize the actual time each startup requires.*

- *Shutdown: Shutdown of the engine occurs almost instantaneously with virtually no emissions being created after the engine is turned off. As a result, assuming that the engine operates constantly throughout the year results in a conservatively high potential emission calculation with respect to shutdown emissions.*

- *Malfunction: The engine will be operated and maintained consistent with the manufacturer's written instructions. Given this practice, malfunctions (and the associated emissions) will occur rarely, if at all. Consistent with good operating practice, the engine will be shut down immediately upon a malfunction being detected. Assuming that the engine operates constantly throughout the year results in a conservatively high potential emission calculation with respect to malfunction emissions.*

- *Operation in cold temperatures: operating EU ID 1 in low ambient temperatures will result in minor changes to the unit's emissions profile. Assuming that the engine operates year-round results in a conservatively high potential emission calculation with respect to cold temperature operation.*

- *Variations in emissions due to local conditions: potential emissions are calculated on an annual basis that reflect variations in temperature and humidity throughout the year.*

*The Department has looked at the increases in emissions that would be required to trigger PSD review, and they are summarized below. The emissions would need to increase by the following to reach PSD for the following criteria pollutants.*

- *For CO for this source to approach and exceed the PSD threshold it would require a lb/hr rate of 56.73 lb/hr, which is an increase in the vendor not to exceed max rate, by 3,105%, for it to be operated that way for a full year (8760 hours).*

- *For NOx to exceed the PSD threshold for NOx, would require a 308% increase in emissions factors for a full year (8760 hours) of operation.*

- *For VOC's it would require an increase in emissions of 41,567% increase in emission factor for a full year at 8760 hours, to trigger the 250 tpy PSD threshold.*

- *For PM-10 to trigger the 250 tpy PSD threshold, it would require an increase in emissions of 31,150% increase for a full year (8760 hours).*

- *All of these increases are beyond reasonable assumptions for increases in emission factors on a lb/hour basis.*

*Based on its expertise and experience with the operation of equipment and associated emission factors, the Department does not believe this source is capable of exceeding the PSD threshold for NOx. Exceeding the PSD thresholds for other pollutants is even more unlikely.*

### Discussion about the Emissions from the Generator

**8.k.** Several commenters were concerned about the Caterpillar C-18 engine not being representative of the actual emission unit that could be purchased now, because the commenter did not see it listed on the CAT website. One commenter questioned whether the Caterpillar C-18 comes in the 900 bhp range.

*Department Response:*

*The Department has no evidence that the unit intended for this location is anything other than the unit identified by the applicant. UCM certified the application true, accurate, and complete. The permit authorizes to install and operate the specific unit identified or one with similar emission characteristics.*

*The Department included a new permit condition (Condition 1.2) to address the commenter's concerns to require UCM to notify the Department of any changes to the Diesel engine within 30 days of installation, specifying the type of unit and including with the notification, the manufacturer's specification sheet for that unit.*

### Emissions Calculations need to account for the Engines Deterioration Curve

**8.l.** A commenter believes that the permit application and emissions calculations fail to account of the engine's deterioration curve and associated increases in emissions especially after 8,000 hours of operation, the solution recommended is to require a continuous emission monitoring system ("CEMS") to monitor emissions.

*Department Response:*

*The Department disagrees with the commenter. This engine is a standby backup unit and is intended for unforeseen outages in line power. It is classified as a stationary engine, which under 18 AAC 50, requires a permit with conditions that require the engine to be maintained under a maintenance plan that contains recordkeeping requirements.*

*UCM performed the emission calculations for the engine operating at 8,760 hours per year to demonstrate that unlimited operation would not violate the ambient $NO_2$*

*AAAQS, and that there is no reason for any restrictions on the unit. To exceed the PSD threshold would require a 308% increase in the NOx emission factor. The CO emission factor provided by the vendor is 1.77 lbs per hour at maximum load. For this source to approach and exceed the PSD threshold it would require an increase in the emission factor by 3,105%. These kinds of increases are not reasonable assumptions. The Department sees no rationale for requiring a CEMS, when there is no reasonable chance of a permit threshold or limit being violated as a result of this unit.*

### Use of Vendor Data to account for the Emissions

**8.m.** Commenters were concerned that the permit application relies on "vendor" data for the emission factor. The commenter was concerned about the use of an engine designed by the manufacturer as a standby and checked in the application as base load.

*Department Response:*

*The Department finds that the application used the correct emission factor for evaluating the engine emissions. The base load vs. standby designation of the unit has no effect on the emission factor for the NOx emissions at 100% load. The application did not use the non-road weighted average as the emission factor, but based the 100% load emissions on the measured emissions at the tested loads. This emission factor is independent of the base load and standby "nomenclature" used in the non-road tier-2 certification weighted average numbers.*

### Request to Require a CEMS on the Generator Set

**8.n.** Commenters stated that to prevent the proposed project from becoming a major source after a minor source permit has issued, the minor source permit must impose enforceable emission limitations on each source, including CEMS monitoring and reporting.

*Department Response:*

*The Department disagrees with the commenter. The commenter has not presented any data or calculations that show that the emissions will be any more than what was calculated and included in the TAR. Additionally, this unit does not approach the Title V thresholds even if operated at 8,760 hours per year.*

*This stationary source does not have emissions that would trigger major status for hazardous air pollutants (see response to Comment 8.p).*

### Request to Conduct Experiments on Dust Generation from Trucks

**8.o.** Commenters requested that UCM perform experiments on the trucks, to time how long it takes dust to dissipate after a vehicle passes, stating that it will be greatly affected by additional variables such as wind speed, other weather conditions, the speed of the vehicle, the weight of the vehicle, etc.

*Department Response:*

*Under AS 14.14.180 the Department may not require an owner or operator to monitor emissions or ambient air quality solely for the purposes of scientific investigation and*

*research. Monitoring activities must be consistent with the applicable requirements of the permit.*

## Permit unlawfully fails to address Hazardous Air Pollutants

**8.p.** Commenters stated that ADEC has a clear legal obligation to quantify HAPs emissions and institute appropriate control measures and monitoring requirements.

*Department Response:*

*The Department agrees with the commenters that HAPs emissions should be quantified to ensure that the source is not classified under Section 112 of the Clean Air Act, HAP program, as a "major source". A major source is a stationary source that has the potential to emit, considering controls, 10 tons per year or more of any listed HAP or 25 tons per year or more of any combination of listed HAPs. An area source is any stationary source of HAPs that is not a "major source". UCM must also comply with any applicable federal HAPs requirements but they will report directly to the EPA.*

*The Department includes the following tables to verify that the Wishbone Hill Coal Mine does not meet the definition of a "major source" of HAPs. The values provided in the table are from a Trace Elements Analysis Report, provided by UCM and are based on the total coal mine fugitive emissions of 225.1 tons per year. The samples were taken at Wishbone Hill.*

| | **Upper Sample** | | **Middle Sample** | | **Lower Sample** | | **Average Sample** | | **Largest Trace Element Concentration Converted to lb HAPs/ton of Fugitive PM** | **HAPs Emissions from Coal Mine Fugitives (tpy)** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Trace Element** | Raw Coal (mg/kg) | 1.70F 2" x 100M (mg/kg) | Raw Coal (mg/kg) | 1.70F 2" x 100M (mg/kg) | Raw Coal (mg/kg) | 1.70F 2" x 100M (mg/kg) | Raw Coal (mg/kg) | 1.70F 2" x 100M (mg/kg) | **Total Coal Mine Fugitives (225.1 tpy)** | |
| *Silver | < 0.2 | < 0.4 | < 0.2 | < 0.4 | < 0.4 | < 0.4 | < 0.3 | < 0.4 | 0.001 | 0.0001 |
| Arsenic | 4 | 8 | 2 | 2 | 4 | 4 | 3 | 5 | 0.016 | 0.002 |
| *Barium | 461 | 393 | 637 | 489 | 535 | 420 | 544 | 434 | 1.274 | 0.143 |
| Beryllium | 1.1 | 0.6 | 1.3 | 0.9 | 1.4 | 1.0 | 1 | 1 | 0.003 | 0.000 |
| *Boron | 31 | 97 | 18 | 57 | 26 | 54 | 25 | 69 | 0.194 | 0.022 |
| Cadmium | < 0.8 | < 0.3 | < 0.9 | < 0.4 | < 0.8 | < 0.4 | < 0.8 | < 0.4 | 0.002 | 0.000 |
| Cobalt | 12 | 13 | 14 | 16 | 9 | 10 | 12 | 13 | 0.032 | 0.004 |
| Chromium | 50 | 24 | 59 | 26 | 59 | 34 | 56 | 28 | 0.118 | 0.013 |
| *Copper | 40 | 26 | 42 | 25 | 35 | 27 | 39 | 26 | 0.084 | 0.009 |
| Fluoride | 120 | 51 | 130 | 72 | 180 | 54 | 143 | 59 | 0.360 | 0.041 |
| Mercury | 0.10 | 0.06 | 0.09 | 0.07 | 0.17 | 0.17 | 0 | 0 | 0.0003 | 0.00004 |
| *Lithium | 32 | 14 | 37 | 18 | 25 | 14 | 31 | 15 | 0.074 | 0.008 |
| Manganese | 34 | 16 | 56 | 11 | 46 | 12 | 45 | 13 | 0.112 | 0.013 |
| *Molybdenum | < 8 | < 3 | < 9 | 4 | < 8 | < 4 | < 8.3 | < 3.7 | 0.018 | 0.002 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Nickel | 25 | 16 | 29 | 18 | 29 | 21 | 28 | 18 | 0.058 | 0.007 |
| Lead | 14 | 7 | 16 | 10 | 16 | 10 | 15 | 9 | 0.032 | 0.004 |
| Antimony | < 1 | < 2 | < 1 | < 2 | < 2 | < 2 | < 1.3 | < 2.0 | 0.004 | 0.0005 |
| Selenium | < 1 | < 1 | < 1 | < 1 | < 1 | < 1 | < 1.0 | < 1.0 | 0.002 | 0.0002 |
| *Tin | < 5 | < 2 | < 4 | < 2 | < 3 | < 2 | < 4.0 | < 2.0 | 0.010 | 0.001 |
| *Strontium | 205 | 240 | 317 | 340 | 242 | 250 | 255 | 277 | 0.680 | 0.077 |
| *Thallium | < 3 | < 2 | < 3 | < 2 | < 3 | < 2 | < 3.0 | < 2.0 | 0.006 | 0.001 |
| *Vanadium | 106 | 71 | 118 | 75 | 97 | 79 | 107 | 75 | 0.236 | 0.027 |
| *Zinc | 66 | 39 | 57 | 32 | 53 | 24 | 59 | 32 | 0.132 | 0.015 |
| *Zirconium | 116 | 93 | 128 | 120 | 130 | 110 | 125 | 108 | 0.260 | 0.029 |
| Chlorine | 100 | 200 | 100 | 200 | 100 | 200 | 100 | 200 | 0.400 | 0.045 |
| *Iodine | < 20 | < 20 | < 20 | < 20 | < 20 | < 20 | < 20 | < 20 | 0.040 | 0.005 |
| Phosphorous | 678 | 776 | 759 | 738 | 604 | 559 | 680 | 691 | 1.552 | 0.175 |
| **Total HAPs Emissions from Coal Mine Fugitives (tons per year)** | | | | | | | | | | **0.64** |

* Trace elements that are not listed on EPA's Air Toxics Web Site (Not HAPs) www.epa.gov/ttn/atw/orig189.html

*The total HAPs emissions from coal mine fugitives is 0.64 tons per year, and conservatively includes trace elements that are not listed HAPs.*

***Total HAPs from generator:***

| HAP under Section 112 of CAA | Emission Factor (fuel input) (lb/MMBtu) | HAPs PTE (tons per year) |
|---|---|---|
| Benzene | 9.33E-04 | 2.42E-02 |
| Toluene | 4.09E-04 | 1.06E-02 |
| Xylenes | 2.85E-04 | 7.41E-03 |
| Butadiene | 3.91E-05 | 1.02E-03 |
| Formaldehyde | 1.18E-03 | 3.07E-02 |
| Acetaldehyde | 7.67E-04 | 1.99E-02 |
| Acrolein | 9.25E-05 | 2.40E-03 |
| Naphthalene | 8.48E-05 | 2.20E-03 |
| **Total potential to emit HAPs from generator:** | | **0.099** |

[1] ULSD heat content: 138,000 Btu/gal

[2] Max Generator Throughput of 43 gal/hr for 8,760 hr/yr: 376,680 gal/yr

[3] Max heat content per year (376,680 gal/yr * 138,000 Btu/gal): 51,982 MMBtu/yr

[4] HAP Emission factors from AP-42 Table 3.3-2

***Total HAPs from all heaters:***

| HAP under Section 112 of CAA | Emission Factor (fuel input) (lb/MMBtu) | HAPs PTE (tons per year) |
|---|---|---|
| Benzene | 9.33E-04 | 4.09E-02 |
| Toluene | 4.09E-04 | 1.79E-02 |
| Xylenes | 2.85E-04 | 1.25E-02 |

| | | |
|---|---|---|
| Butadiene | 3.91E-05 | 1.71E-03 |
| Formaldehyde | 1.18E-03 | 5.17E-02 |
| Acetaldehyde | 7.67E-04 | 3.36E-02 |
| Acrolein | 9.25E-05 | 4.05E-03 |
| Naphthalene | 8.48E-05 | 3.71E-03 |
| **Total potential to emit HAPs from heaters** | | **0.17** |

[1] Max Rated Capacity of All Heaters = 10 MMBtu/hr

[2] HAP Emission factors from AP-42 Table 3.3-2

*Total HAPs emissions from the source = HAPs from coal mine fugitives + HAPs from generator + HAPs from heaters*

***Total HAPs emissions = (0.64 + 0.099+ 0.17) tons per year = 0.91 tons per year***

*The "major source" threshold for HAPs is 25 tons per year, combined. The Wishbone Hill coal mine potential HAPs emissions are well below the HAP major threshold.*

## 9. Fugitive Dust

### House Dust Producing Activities in Buildings

**9.a.** Commenters said UCM should house some or all coal dust generating activities in a structure.

*Department Response:*

*The impacts from these types of sources are near field and not far field impacts. The Permittee has assessed the ambient impacts using the assumptions that the activities were not housed in a structure. Unless a structure to control the dust would be necessary to comply with an ambient standard, there is not a compelling reason to require additional controls beyond what the Permittee has provided in the fugitive dust control plan. The commenter has not provided any compelling reason for the Department to require UCM to enclose dust producing activities inside a structure.*

### The Fugitive Dust Control Plan should require Public Input for any Future Changes

**9.b.** Commenters stated that any changes to the Fugitive Dust Control Plan should be subject to public notice and comment given the interest of, and impact to, the public in this project.

*Department Response:*

*The Department removed Condition 19.3 of the preliminary permit, thereby allowing for public input for future revisions. The Fugitive Dust Control Plan is broad in range and allows for slight modifications. More comprehensive changes to the plan warrant a permit revision that includes a public comment period.*

### Fugitive Dust Plan allows UCM to decide what constitutes a Credible Complaint

**9.c.** Commenters are concerned that complaints related to fugitive dust won't be treated as "credible" by UCM, and will therefore not have the desired effect to initiate corrective actions to address the cause for the complaint.

*Department Response:*

*The Department has removed the term "credible" from the applicable permit condition to satisfy the commenter.*

*Note that under the Air Pollution Prohibited Condition, the permit requires UCM to record the date, time, and nature of all emissions complaints received; and to notify the Department of a complaint that is attributable to emissions from the stationary source within 24 hours of receiving the complaint, unless the Permittee has initiated corrective action within 24 hours of receiving the complaint.*

### Fugitive Dust Control Plan seemingly only focuses on the Roads

**9.d.** Commenters were concerned that the primary area of focus of the dust control plan was on the roads.

*Department Response:*

*The Department has determined that the roads are the primary source of PM-10 emissions from the operations at the Wishbone Hill Coal Mine and therefore are the appropriate primary area of dust control focus.*

*The Department has also included fugitive particulate matter control requirements in the permit that require UCM to perform dust inspections of the: mine area, topsoil/overburden stockpile areas, coal stockpile area, coal preparation plant, conveyor system, jig plant, and truck and support vehicle traffic; at least once per active 8-hour shift while the mine is operating.*

### Fugitive Dust Control Plan doesn't control dust from Roads when the Temperature is below Freezing

**9.e.** Commenters were concerned that there is no method for controlling dust from roads when the temperature is below freezing.

*Department Response:*

*The Department has modified the fugitive particulate matter control requirement to ensure that particulate matter emissions are monitored once per active 8-hour shift, regardless of whether the ambient temperature is below freezing. The exemption for when the road surface is frozen has been removed.*

### The effect of Fugitive Dust on the Quality of Life

**9.f.** Commenters were concerned about the effects of windblown coal dust on their quality of life.

*Department Response:*

*The commenter provides no evidence that the proposed source would unreasonably interfere with the enjoyment of life. The Department is limited to preventing the permitted source from unreasonably interfering with the enjoyment of life. The commenter provides only a vague statement of concern about quality of life.*

### The effect of the Mine and Fugitive Dust concerns on local Property Values

**9.g.** Commenters were concerned about the decline of property values in their neighborhood, and that banks have refused to give residents loans on their properties because of the proposed mine.

*Department Response:*

*Protecting property value is outside the scope of this permit action. The Department is limited to preventing the permitted source from unreasonably interfering with the enjoyment of life or property. The commenter provided no evidence that the proposed source would unreasonably interfere with the enjoyment of life or property.*

### Coal Transfer between Trucks and Railcars

**9.h.** Commenters were concerned about people living downwind of the mine site where the transfer of coal from trucks to rail cars will be another site for coal dust to escape and be distributed around the Matanuska Valley.

*Department Response:*

*The offsite coal transfer from trucks to railcars is not part of this stationary source (e.g. same industrial grouping, on contiguous or adjacent property, and under common control) and is therefore not included in this minor permit action.*

### Blasting Dust

**9.i.** Commenters are concerned about the fugitive dust generated from blasting.

*Department Response:*

*UCM included blasting in their ambient air quality modeling assessment. The ambient assessment showed this activity will not cause or contribute to a violation of ambient air quality standards.*

### Noise from Blasting

**9.j.** Commenters were concerned about the noise from the blasting.

*Department Response:*

*Noise and other concerns not related to air quality are not part of the air quality permit.*

### Questions concerning Overburden Loading and Dumping Operations

**9.k.** Commenters stated that they have been provided inadequate information with regards to the estimated 30 days per year of loading and dumping operations, when compared to

the expected 240 days per year for overburden blasting; stating that overburden would need to be moved away from the blast site more often than once per eight blast days.

*Department Response:*

*The 30 days per year of loading and dumping overburden listed in Table C-6 of the application is UCM's estimate of the expected operation, however, this number of days was not used in the modeling analysis. Therefore it does not need to be included as an ambient air condition. UCM instead assumed that overburden truck loading and dumping occurs every day of the year in their PM-10 modeling analysis.*

*UCM conservatively overstated the emissions for EUs 6 and 7 in Table C-6, see APPENDIX A for details.*

### Plan doesn't Control all Dust

**9.l.** Commenters were concerned that the Fugitive Dust Control Plan and Air Quality Control Minor Source Permit are inadequate when addressing the management of fugitive dust from a coal mine operation. Since coal dust is a toxin (OSHA), it should require extra scrutiny because it is located next to a neighborhood.

*Department Response:*

*A fugitive dust control plan describes the procedures that a Permittee will use to prevent particulate matter from being emitted into ambient air. The procedures must represent "reasonable precautions" per 18 AAC 50.045(d). The commenter does not identify any additional reasonable precautions that the dust control plan fails to include.*

*The OSHA determination is for workers in mine shafts, a confined space with very high concentrations, and it is not applicable in this permitting decision.*

### The Fugitive Dust Requirements should include Active Controls for Wind Erosion from open mine areas, transfer points, and stockpiles

**9.m.** Commenters stated that the fugitive dust control plan should be expanded to require active dust suppression controls for wind erosion from open mine areas, stockpiles, transfer points, and conveyors.

*Department Response:*

*The impacts from these types of sources are near field and not far field impacts. UCM has assessed the ambient impacts using the assumptions that no controls would be required. Unless they are required to comply with an ambient standard, there is not a compelling reason to require additional controls beyond what has been developed in the fugitive dust control plan. The commenter has not provided any compelling reason for the Department to include additional controls.*

### UCM's Discretion over Department Inspections

**9.n.** Commenters were concerned that the Permittee has discretion over inspectors being allowed on site "upon presentation of credentials and at a reasonable time with the consent of the owner or operator to enter the site and inspect various operations".

*Department Response:*

*The Alaska State Implementation Plan allows the Department to obtain a warrant to conduct inspections if access is refused (Alaska Statues: Titles 3, 17, 18, 44, and 46).*

### Fugitive Dust Control Plan should specify a Minimum Observation Period

**9.o.** Commenters stated that the fugitive dust plan should be refined to specify a minimum observation period of six-minutes, as specified in the test method to be applied (Reference Method 22).

*Department Response:*

*The Department has revised the Fugitive Dust Control Plan, as requested, to require a minimum observation period of six-minutes.*

### Include and define equations used to Calculate PM-10 Emission Factors

**9.p.** Commenters requested that the Department include the defined equations that are used to calculate PM-10 emission factors that are used for potential to emit calculations and input into the modeling analysis.

*Department Response:*

*The Department has defined the key equations used in the emissions calculations and has included them in* ***APPENDIX A***.

### Explain use of both Chapter 11 and Chapter 13 from AP-42 Handbook

**9.q.** Commenters asked why Chapter 11 of the AP-42 Handbook (Western Surface Coal Mining) is used for some equations (e.g. dumping and loading coal) and Chapter 13 (Miscellaneous Sources) are used for others.

*Department Response:*

*AP-42 Chapter 11: Table 11.9-1 "Emission Factor Equations for Uncontrolled Open Dust Sources at Western Surface Coal Mines", Footnotes g and h, reference using AP-42 Section 13 (Miscellaneous Sources) to estimate emissions from unpaved surfaces by vehicles such as haul trucks, light-to-medium duty vehicles, or scrapers in travel mode; and to estimate emissions from coal storage piles on a shorter time scale (e.g. worst-case day). That is why both Chapter 11 and Chapter 13 of the handbook were used.*

### DEC incorrectly accepts UCM's contention that the Fugitive Dust Control Plan will reduce fugitive particulate matter emissions by 80%

**9.r.** Commenters stated that the Department erroneously accepted a dust suppression control efficiency of 80% for fugitive emissions associated with topsoil operations and mobile equipment.

*Department Response:*

*An 80% control efficiency for fugitive emissions associated with mobile equipment is consistent with EPA's guidance located in AP-42 for fugitive emissions from unpaved roads. Chapter 13.2.2 of AP-42 provides guidance as to the control effectiveness of chemical dust suppressants and states that "Past field testing of emissions from controlled unpaved roads has shown that chemical dust suppressants provide a PM-10 control efficiency of about 80 percent when applied at regular intervals of 2 weeks to 1 month."*

*As stated in the TAR, the Department has imposed fugitive particulate matter control conditions that require UCM to "apply calcium chloride, or similar dust control agents in sufficient quantities to control fugitive dust" and that have inspection criteria based on EPA's Reference Method 22, to ensure that more dust surfactant is added if the duration of particulate matter emissions is greater than two minutes.*

*With respect to the control efficiencies for fugitive particulate matter emissions associated with topsoil removal to storage and grader operations (EU IDs 3 and 29), the Department agrees that a more conservative approach is warranted. The Department therefore reran the 24-hour PM-10 analysis using a 50-percent control efficiency for these two EUs. The new maximum impact (with background) is 107.8 µ.g/m$^3$, which is still below the ambient air quality standard of 150 µ.g/m$^3$.*

### Watering and Dust Control is absurd for Alaska

**9.s.** Commenters were concerned that controlling the dust by simply "watering" is absurd in Alaska, as watering is not possible in winter.

*Department Response:*

*The dust control plan contains provisions for using a chemical dust palliative to mitigate fugitive dust during the winter months when watering is not technically feasible.*

### Covered Vehicles (trucks transporting the coal)

**9.t.** Commenters asked that the trucks require covers.

*Department Response:*

*The Matanuska-Susitna Borough has required that the coal trucks are covered, as part of the agreement to allow UCM to use the access road. As this is already required, the permit does not duplicate that requirement.*

### Long Distance Concerns

**9.u.** Several commenters are worried about aggravation of their asthma condition in Wasilla and at Mat-Su Regional Hospital.

*Department Response:*

*The 24-hour PM-10 AAAQS is a health based standard that protects the most sensitive members of society. UCM demonstrated compliance with the 24-hour PM-10 AAAQS at the point of maximum impact. Since concentrations decrease with distance, it is unlikely that appreciable concentrations would reach the Mat-Su Regional Hospital or points within Wasilla.*

## 10.Perceived Problems with the Application

### Determination of the Community Closest to Wishbone Hill, it is Moose Creek – Soapstone, not Palmer

**10.a.** Commenters were concerned that the application states that Palmer is the closest community and not Moose Creek – Soapstone Community.

*Department Response:*

*The Department states in the Stationary Source Description in the TAR, that Wishbone Hill will be located approximately one mile from the community of Moose Creek – Soapstone.*

## 11.Extra Permit Requirements

### Bonding of Operations

**11.a.** Commenters asked that UCM should be bonded to cover damages and cleanup

*Department Response:*

*The Borough is requiring bonding for cleanup. Bonding is beyond the scope of an air quality permit.*

## 12.Compliance and Enforcement

### Require that Independent Monitors Oversee Operations

**12.a.** Commenters asked that the Department require independent monitors for oversight.

*Department Response:*

*The Department oversees compliance with the permit conditions and is independent of the Permittee.*

### Call for Specific Fines

**12.b.** Commenters presented compliance and enforcement strategies for the Department including fines they believe are appropriate.

*Department Response:*

*The Department compliance and enforcement strategies in place. Fines are based on consideration of federal penalty policy are adequate to enforce compliant operations.*

## 13. Violation of 18 AAC 50.110

**13.a.** Commenters alleged that the $NO_2$ impacts violate 18 AAC 50.110. One commenter stated, "Usibelli's modeling addressing compliance with the AAAQS for $NO_2$ is insufficient to demonstrate compliance with 18 AAC 50.110."

*Department Response:*

*The Department presumes that compliance with all applicable emission limits, ambient standards, and other operational requirements will ensure compliance with 18 AAC 50.110, unless there is source-specific evidence to the contrary.*

## 14. Zoning Issues

### Relocation of the Mine

**14.a.** Commenters asked that the Department not allow these types of industries to be located where they have an impact on an established community, in an area accessible to a large population for recreation, as well as habitat for wildlife and humans.

*Department Response:*

*The regulatory criteria for approving an air quality minor permit is in 18 AAC 50.540. The Department does not decide whether to allow a source at a particular location, but only whether the proposed source at that location will comply with the regulatory requirements. The commenters have proposed a land use and zoning issue, not an air permit issue, and therefore the Department is unable to deal with this as part of this permitting action.*

### Valley Tourism Negatively Impacted

**14.b.** Commenters were concerned about the negative impacts on valley tourism due to the coal mine.

*Department Response:*

*This is a local land use issue, not an air permit issue. Typically, local jurisdictions use zoning and land use planning to address such concerns.*

# Appendix A: Particulate Matter Emission Factors
# Usibelli Coal Mine, Inc. – Wishbone Hill

# Fugitive PM-10 Emissions Factor Equations

| | | | | | | |
|---|---|---|---|---|---|---|
| EU 3 | **AP-42 Table 11.9-1** | silt content | s = 65 % | Emission Factor | 32.0 | lb/hr |
| | $0.75 * \left(\frac{1.0 * S^{1.5}}{m^{1.4}}\right)$ | moisture content | m = 6 % | | | |
| | | scaling factor | 0.75 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| EUs 4&5 | **AP-42 Table 11.9-1** | Area | A = 13,423 ft$^2$/blast | Emission Factor[1] | 11.32 | lb/blast |
| | $0.52 * (0.000014 * A^{1.5})$ | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| EUs 6&7 | **AP-42 Section 13.2.4 Eq. 1** | particle size multiplier | k = 0.35 | Emission Factor[2] | 0.000135 | lb/ton |
| | $k * 0.0032 * \frac{(\frac{U}{5})^{1.3}}{(\frac{M}{2})^{1.4}}$ | mean wind speed | u = 4.36 mph | | | |
| | | OB moisture content | m = 8 % | | | |

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| EUs 8-11 | **AP-42 Table 11.9-1** | scaling factor | k = 0.75 | Emission Factor[3] | 0.0178 | lb/ton |
| | $0.75 * \frac{0.119}{M^{0.9}}$ | ROM moisture content | m = 6 % | | | |

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| EU 12 | **AP-42, Table 11.19.2-2** | Source | Tertiary Crushing | Emission Factor[4] | 0.0024 | lb/ton |

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| EUs 13-16 | **AP-42 Section 13.2.4 Eq. 1** | particle size multiplier | k = 0.35 | Emission Factor[4] | 0.000201 | lb/ton |
| | $k * 0.0032 * \frac{(\frac{U}{5})^{1.3}}{(\frac{M}{2})^{1.4}}$ | mean wind speed | u = 4.36 mph | | | |
| | | ROM moisture content | m = 6 % | | | |

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| | **AP-42 Section 13.2.4, Eq. 1** | particle size multiplier | k = 0.35 | Emission Factor[4] | 0.000135 | lb/ton |

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| EUs 17-23 | $k * 0.0032 * \frac{(\frac{U}{5})^{1.3}}{(\frac{M}{2})^{1.4}}$ | mean wind speed | u = 4.36 mph | | | |
| | | ROM moisture content | m = 8 % | | | |

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| EUs 24-26 and 28 | **AP-42 Section 13.2.5 Eq. 3.** | friction velocity (m/s) | $u^*$ | Emission Factor[5] | 52.4 | g/m$^2$/yr |
| | $P = 58 * (u^* - u_t^*)^2 + 25 * (u^* - u_t^*)$ | | | | | |
| | $P = 0 \; for \; u^* \leq u_t^*$ | threshold friction v | $u_t$ | | | |

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| EU 27 | **AP-42 Section 13.2.5 Eq. 3.** | friction velocity (m/s) | $u^*$ | Emission Factor[5] | 124.8 | g/m$^2$/yr |
| | $P = 58 * (u^* - u_t^*)^2 + 25 * (u^* - u_t^*)$ | | | | | |
| | $P = 0 \; for \; u^* \leq u_t^*$ | threshold friction v | $u_t$ | | | |

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| EU 29 | **AP-42 Table 11.9-1** | Road Silt Content | S = 5 % | Emission Factor[6] | 0.77 | lb/VMT |
| | $0.6 * 0.051 * S^2$ | Scaling Factor | 0.6 | | | |

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| EUs 30 & 31 | **AP-42 Section 13.2.2 Eq 1a** | road silt content | s = 5 % | Emission Factor[6] | 4.46 | lb/VMT |
| | $E = k(\frac{s}{12})^a(\frac{W}{3})^b$ | mean vehicle weight | W = 195 tons | | | |
| | | constant (industrial) | a = 0.9 | | | |
| | | constant (industrial) | b = 0.45 | | | |
| | | constant (industrial) | k = 1.5 | | | |

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| | **AP-42 Section 13.2.2 Eq 1a** | road silt content | s = 5 % | Emission Factor[6] | 0.874 | lb/VMT |

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| EUs 32-34 | $E = k(\frac{s}{12})^a(\frac{W}{3})^b$ | mean vehicle weight | W = 195 tons | | | |
| | | constant (industrial) | a = 0.9 | | | |
| | | constant (industrial) | b = 0.45 | | | |
| | | constant (industrial) | k = 1.5 | | | |

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| EUs 35 - 36 | **AP-42 Section 13.2.2 Eq 1a** | road silt content | s = 5 % | Emission Factor | 2.42 | lb/VMT |
| | $E = k(\frac{s}{12})^a(\frac{W}{3})^b$ | mean vehicle weight | W = 195 tons | | | |
| | | constant (industrial) | a = 0.9 | | | |
| | | constant (industrial) | b = 0.45 | | | |
| | | constant (industrial) | k = 1.5 | | | |

[1] Daily emission rate is from either EU 4 or EU 5, but not both, as only 1 blast per day is permissible.

[2] UCM inadvertently applied a value of 2.2 instead of 5 in the denominator of the wind speed factor component to AP-42 Section 13.2.4 Equation 1 (i.e., UCM conservatively overestimated PM emissions for EUs 6 and 7 by a factor of 2.9). Modeling of EUs 6 and 7 reflected this overstated (conservative) PM-10 emission rate. Modeling also considered EUs 6, 7, 30, and 31 as a group whose individual modeled emission rates are the group average rate applied equally among the four EUs.

[3] EUs 8 – 11 were modeled as a single open pit source whose emission rate is the summation of the emissions for EUs 8 – 11.

[4] EU IDs 12 – 23 were modeled as a group whose emissions were totaled and collectively assumed to be emitted at the location of EU 12.

[5] Determination of friction velocity u* and threshold friction velocity $u_t$ is based on the daily fastest-mile wind speed. UCM used the maximum daily 2-minute wind speed, determined from 7-years of Palmer National Weather Service data, as a suitable proxy for daily fastest-mile; resulting in 2,555 values of u*.

For EUs 24 through 28, the maximum annual PM-10 emission rate reflects the worst case year of the 7 monitored in Palmer, that produces the greatest potential emissions (43.2 tons per year for all five EUs), determined as the daily summary of erosion events and using the predictive emission factor equation from AP-42 Section 13.2.5, Equation 3.

For modeling, the emission rate (grams per second) used is the average emission, determined as the total emission rate over all days when the daily PM-10 emission rate was greater than zero (meaning there was a recorded wind speed great enough to cause an erosion event) divided by the number of daily erosion events.

[6] EU 29 - 35 were modeled as a group whose emissions were totaled and collectively assumed to be emitted at the location of EU 29.