Alaska Department of Environmental Conservation

AIR QUALITY MODELING PROTOCOL OUTLINE
PSD Permit Applications

The Alaska Department of Environmental Conservation (ADEC) developed this outline to help you, the Prevention of Significant Deterioration (PSD) permit applicant, prepare an air quality modeling protocol for our review. The outline provides quick reminders of the typical areas to be addressed in a modeling protocol. However, it does not address all scenarios that could arise, or conversely, it may list non-applicable items. This outline should, therefore, be used as a guide, not a comprehensive mandate. The goal is to help you develop a modeling protocol that adequately describes your project and proposed modeling approach so that any recommendations or concerns can be addressed during the protocol review phase, rather than the application review phase.

Whether you are preparing a new modeling protocol, or updating an existing protocol that is based on a previous modeling analysis, all components of the proposed modeling analysis should be addressed. If you are updating an existing analysis, clearly indicate which aspects are new or changed from the previous modeling analysis. Use your judgment on how best to comply with this request, but make it obvious which parts are new or changed, and which parts are unchanged.

1. Project Description

Provide a general description of the proposed project. Answer the basic "who, what, when, where, and how" type of questions so that someone who is unfamiliar with the project can obtain a basic understanding of what this project is about. Describe the physical location, i.e. an address or geographic coordinates, and provide a map that shows where in Alaska the stationary source is or will be located. Summarize the desired timeline for obtaining a PSD permit and when construction would start.

Identify the Air Quality Control Region in which the stationary source is located. Include information such as the distance to Class I areas and whether or not the stationary source is in a non-attainment area. Note any other general issues that ADEC should be aware of during its review.

1.1 Project Classification

In addition to the information identified above, list each air permit classification that this project triggers along with why the classification is triggered. Be explicit. For example, say something like: "*This project triggers PSD for oxides of nitrogen (NOx) due to an increase in NOx emissions that exceeds the 40 ton per year PSD significant emission rate.*" The first column in the tables listed under Section 1.2 can be used to determine the applicable regulations.

1.2 Pollutants and Averaging Times

Describe or list which of the applicable permit classifications require an ambient assessment, and for which pollutants and averaging periods an assessment will be performed. Describe or list any ambient assessments requested by ADEC, or a Federal Land Manager (FLM), under a discretionary provision for this project. Confirm that you intend to assess each of the triggered or requested pollutants and averaging periods. State which pollutants and averaging periods will be assessed through modeling and which will be assessed through other means, e.g., qualitative discussion, if there is a distinction to be made. The tables in this section can be used to identify the triggered pollutants and their respective averaging periods. You may copy and paste the tables into your protocol or use them to guide you in describing the applicable pollutants and averaging periods.

Project Classification	Pollutants to be Assessed Due to Project Classification							Comments
	NO_2	SO_2	PM-10	PM-2.5	CO	O_3	Pb	
PSD (18 AAC 50.306)	☐	☐	☐	☐	☐	☐	☐	
18 AAC 50.502(c)(2)(A)	☐	☐	☐	☐	--	--	--	
18 AAC 50.502(c)(2)(B)	--	☐	--	--	--	--	--	
18 AAC 50.502(c)(3)	☐	☐	☐	☐	☐	--	--	
18 AAC 50.508(3)	☐	☐	☐	☐	☐	☐	☐	
18 AAC 50.508(6)	☐	☐	☐	☐	☐	☐	☐	

Regulatory Provision	Pollutants to be Assessed Due to Department Request							Comments
	NO_2	SO_2	PM-10	PM-2.5	CO	O_3	Pb	
18 AAC 50.540(c)(2)(D)	☐	☐	☐	☐	☐	☐	☐	
18 AAC 50.201(a)	☐	☐	☐	☐	☐	☐	☐	
18 AAC 50.540(l)	☐ (1-hour NO_2)							
Other:	☐	☐	☐	☐	☐	☐	☐	

Averaging Period	Averaging Periods to be Modeled								Comments
	NO_2	SO_2	PM-10	PM-2.5	CO	O_3	Pb	Other	
1-hour	☐	☐	--	--	☐	--	--	☐	
3-hour	--	☐	--	--	--	--	--	☐	
8-hour	--	--	--	--	☐	☐	--	☐	
24-hour	--	☐	☐	☐	--	--	--	☐	
3-month	--	--	--	--	--	--	☐	☐	
Annual	☐	☐	☐	☐	--	--	--	☐	

2. Stationary Source Description

Provide a more detailed description of the stationary source in this section. Identify any air quality control permits, Owner Requested Limit (ORL), or Preapproved Emission Limit (PAEL) under which the source is currently operating, if applicable. Discuss the proposed or existing emissions units (EUs) that will be affected by the project. Include any other information regarding the stationary source that ADEC should be aware of during its review of your modeling protocol.

Include a scaled plot plan of the proposed and existing structures, the proposed and existing EUs, the fence-lines, and the proposed ambient boundary. Include a north pointing arrow on the map. Identify any easements or other publicly accessible areas within the greater stationary source boundary (e.g., roadways, rivers, or rail lines running through the property), or housing areas for off-duty workers.

3. Pre-construction Monitoring

Address how you intend to meet the pre-construction monitoring requirement in 40 CFR 52.21(m)(1) for each applicable pollutant. Do you intend to use site-specific monitoring data, surrogate monitoring data, or a Significant Monitoring Concentration (SMC) analysis? Be pollutant-specific. If you maintain that pre-construction monitoring is <u>not</u> required for a given pollutant, provide sufficient information to justify your position.

When referencing an ambient pollutant data set, identify the station name or location, the monitoring period, who collected the data (if it was someone other than you), and the date of ADEC's quality assurance review and approval.

4. Approach

Discuss the basic methodology you intend to use for conducting the required or requested ambient pollutant demonstrations listed in Section 1.2. Additionally discuss the following:

- Will you be conducting quantitative modeling analyses, qualitative assessments, or a combination of these approaches?
- Will you be conducting a screening-level assessment or a refined assessment?
- Will you be using a previous assessment as your starting point, and if so, which assessment?
- Will you be relying on special modeling features (e.g., deposition) or non-Guideline approaches, and if so, note those aspects here, even if the details regarding those aspects are provided elsewhere.

In developing your approach, remember that all air quality modeling must comply with 18 AAC 50.215(b) – (e).

4.1 Model Selection

List each dispersion model and version number you intend to use for your ambient demonstrations. Provide the rationale for selecting any model that is not generally used for this purpose.

If you propose to change the program code of the proposed model, provide sufficient reason for modifying the model code. These types of changes require both ADEC and U.S. Environmental Protection Agency (EPA) approval. Explain how the changes are appropriate and consistent with the *Guideline on Air Quality Models* (Appendix W of 40 CFR 51, hereafter referred to as the *Guideline*). If an alternative model is proposed, explain how the alternative model is more appropriate than the preferred air quality model, consistent with Section 3.2 of the *Guideline*. Refer to 18 AAC 50.215(c) for the regulatory basis for this requirement. Additionally, the use of an alternative model is subject to public notice per Alaska's State Implementation Plan (SIP).

Modifications to the dispersion model, or the use of alternative models, also applies to any preprocessor (e.g., meteorological) or post-processors provided by EPA or ADEC. In either case (proposing modifications to an existing preferred model or the use of an alternative model), approval must be obtained from the EPA regional administrator and ADEC commissioner, or their designee.

4.2 Model Options

Dispersion models have a varying number of options and controls that differ from model to model. Discuss the modeling options you intend to use with each model. This discussion should include the regulatory default options, as applicable, and the proposed use of any non-regulatory options, e.g. beta options in AERMOD. If you previously obtained ADEC and EPA approval for the use of a non-regulatory option, provide the date that these approvals were granted.

4.3 Operating Scenarios

If you intend to request various operating scenarios in your permit application, then include a section in the protocol that describes each scenario and the proposed approach for addressing them in the ambient demonstration. Note: the approach used for a "probabilistic" short-term standard may need to be different from the approach used for a "deterministic" short-term standard or increment.

5. Meteorology

Provide the information described in the following subsections, as applicable. You do not need to provide a place-holder for non-applicable aspects.

5.1 Screening Meteorology

Describe the proposed approach for developing the screening meteorological data set. For example, AERSCREEN requires the specification of bounding values for some parameters, such as wind speed, for the model to generate the screening meteorology. Provide a justification for the selected bounding values, i.e., why you believe they are representative of the conditions at the stationary source.

5.2 Refined Meteorology

Describe the meteorological data to be used, including an identification of the stations, whether it be National Weather Service or site-specific collected by a stationary source. Describe how the data will be processed, or where the data were obtained if it is an existing, model-ready dataset. Indicate the data periods that will be used in the dispersion modeling. If using less than the EPA recommended time period (e.g., less than 5 years when conducting a near-field assessment with AERMOD or OCD), state whether additional data was collected, and if so, why it would not be used (e.g., failed the applicable quality assurance requirements). If using site-specific meteorological data, state whether ADEC has conducted a quality assurance review and if so, whether the data meets the PSD quality assurance requirements.

5.2.1 Representativeness

Explain why you believe the meteorological dataset represents the plume transport conditions for the proposed EUs. According to EPA's *Meteorological Monitoring Guidance for Regulatory Modeling Applications* (EPA-454/R-99-005) *"… data representativeness should be viewed in terms of the appropriateness of the data for constructing realistic boundary layer profiles and three dimensional meteorological fields.*" Section 8.3 of the *Guideline* provides additional discussion on this topic.

Non-exhaustive, but important, factors to consider are distance (the distance from the meteorological tower to the sources being modeled), terrain (whether there is terrain between the measurement site and modeling location and how terrain can influence local wind flow at the measurement site), and proximity (e.g. to a coastline).

If the proposed meteorological data were previously processed for a different application, whether for the current stationary source or from another stationary source, summarize how the data were processed and whether it was processed with the current version of the meteorological pre-processor.

5.2.2 Data Processing

Describe all the raw data input required if a pre-processor will be used. If pre-processed data are being proposed that has NOT been approved by ADEC, provide a description of its processing and the procedures that were applied to address the quality of the data such as an approved Quality Assurance Project Plan (QAPP) for site-specific data. If pre-processed data are being proposed that has been approved by ADEC, indicate how it was obtained. If any changes to approved pre-processed data are to be made, provide an adequate explanation for ADEC to assess whether or not the changes are appropriate.

Describe any data substitutions that would be performed prior to input to a meteorological pre-processor as well as any options within the pre-processor controls that allow for data substitution. Describe why you think the substituted data is representative.

If AERMET is being used, describe the proposed surface characteristic sectors and domains, the land use classifications within these domains, and your approach for processing the albedo, Bowen ratio, and surface roughness length (the surface characteristics).

Note: ADEC provides guidance on how these values can be calculated without the use of AERSRUFACE. A link to the guidance document is available on ADEC's modeling web page at http://dec.alaska.gov/air/ap/modeling.htm under *Geometric means for AERMET surface parameters (Rev. 2, Revised 6/17/09)*. Describe any deviations, if any, from the ADEC Guidance on calculating surface characteristics.

Provide an aerial photo of the area, if available. Also provide a figure that shows the characterization of the land-use classifications within a 10 kilometer (km) by 10 km domain (for albedo and Bowen ratio), and another figure that shows the characterization of the land-use classifications within a 1 km radius (for surface roughness). The 1 km radius figure should also show the proposed sectors. If you use a spreadsheet to calculate the weighted parameter averages, provide an electronic copy to ADEC.

5.2.3 Other Software

If a program that is not approved by EPA or ADEC is used for any part of the data processing, indicate what function it provides and be prepared to provide the program to ADEC for review and concurrence. These provisions include programs you may have developed to reformat data in order to input it to an approved pre-processor.

6. Coordinate System

Discuss the coordinate system (e.g., Universal Transverse Mercator (UTM) coordinates and zone, Lambert Conformal Conic or (LCC), state plane, etc.) that will be used to identify the locations of all EUs, receptors and buildings that you intend to model.

Background Information: UTM or local coordinates are commonly used in modeling with AERMOD; LCC is often used with CALPUFF. If you propose a coordinate projection that is not commonly used, describe how it will properly represent the various locations required in the dispersion modeling and its effect on the model impacts.

If you need to convert coordinates from one system to another, e.g. from latitude-longitude to UTM, identify the methodology or software that you intend to use for this conversion.

7. Terrain and Land Use Analysis

When modeling onshore stationary sources, provide a description of the land use around the stationary source and, if required by the model, the specification as to whether the surrounding area is rural or urban and the analysis method used to make that determination (e.g. Auer method or population density).

Discuss how terrain will be handled in the modeling analysis. Describe the type of terrain data that will be used (e.g., National Elevation Data (NED) or Digital Elevation Model (DEM)), the resolution (e.g., 1/3 arc-second for NED, 7.5-minute for DEM), and the datum. Describe how the terrain data will be processed (e.g., a model's pre-processor), and the proposed switch settings, as applicable. If you intend to use a previously processed terrain dataset for the input elevations, state where you obtained the dataset, whether it was approved by ADEC, and whether it was processed with the current version of the EPA terrain pre-processor.

If a program is used for any part of the processing that is not approved by EPA or ADEC, indicate what function it provides and be prepared to provide the program to ADEC for its review and concurrence.

8. EU Inventory

Provide a table that lists each EU that you intend to model. For each modeled EU, provide a short description (e.g., "Turbine Gen-Set 1"), the "source ID" that will be used in the model, the EU ID number

used in the existing permit, the EU rating, and the type of fuel fired, as applicable. The use of multiple tables to group EUs can be helpful, especially for large, complex projects.

Describe or list any EUs at the stationary source that would not be modeled, and the basis for excluding those EUs (e.g., "*rated capacity is less than the 400 bhp threshold in Policy and Procedure 04.02.105 for intermittently used oilfield support equipment*").

Describe the planned operating scenarios and which EUs would be operated under each scenario (or conversely, which EUs would not be operated under a given scenario). Clearly identify all increment consuming or increment expanding EUs, or other items of modeling-related importance, as warranted.

Discuss whether there are any secondary emissions that will be included in the modeling analysis per 40 CFR 52.21(k). If so, provide a list of the secondary emissions to be included.

9. EU Release Parameters

Provide the proposed source type (e.g., point, area, volume) and release parameters (e.g., emission rate, stack height, temperature, etc.) for each EU or fugitive emissions activity that you intend to model. Provide the emission rate for each pollutant and averaging period that will be modeled. If you are still developing the release parameters, provide at least a general discussion as to how these parameters will be obtained. Discuss your approach for characterizing combined stacks and stacks with waste heat recovery.

Note: ADEC does not generally review proposed emission rates prior to receiving the permit application (unless the emissions will be derived through a "non-standard" approach). Either way, you should describe how the proposed emission rates will be obtained or calculated – e.g., vendor data, source tests, EPA's *Compilation of Air Pollutant Emission Factors* (commonly known as AP-42), or some other reference material. Provide the preliminary emission estimates in a format that is consistent with the given source type (e.g., for an area source, as grams/second/square meter in AERMOD or specified according to the user input option (IARU) in CALPUFF). When using a non-standard approach for estimating emissions, contact ADEC to identify additional information that may be needed for the review.

The following items should also be clearly discussed, as applicable.

9.1 Load Analysis

Describe whether you plan to conduct a load analysis and, if so, for which EUs.

Background Information: The maximum ambient concentration does not always occur during the full-load conditions that typically produce the maximum emissions. The relatively poor dispersion that occurs with cooler exhaust temperatures and slower partial-load exit velocities may produce the maximum ambient impacts. Turbine emissions also tend to greatly vary by fuel type, load, and inlet air temperature. EPA, therefore, recommends that a load analysis be conducted on the primary EUs to determine the worst-case conditions.

9.2 Operating Limits

Discuss the operational limits that you will be proposing in the permit application and how these limits will be reflected in the modeling analysis. Be pollutant and averaging period specific. For example, if an EU will be restricted to 4,000 hours per year, then the resulting *annual average* SO_2 emission rate could be used to model the annual SO_2 impact, but the *unrestricted* emission rate should be used to model the 24-hour SO_2 impact.

9.3 Horizontal or Capped Stacks

Identify all horizontal and capped stacks and indicate how these stacks will be characterized in the modeling analysis.

9.4 Haul Roads, Stock Piles, and Other Fugitive Emissions

The desired approach for characterizing fugitive emissions should be clearly described. Unit-specific parameters should also be provided for ADEC review, along with any associated assumptions used to develop those parameters (e.g., the truck height and road width used to develop the volume source or area source characteristics for a haul road). Deviation from current EPA guidance, or current EPA/State Workgroup recommendations, such as the Haul Road Workgroup[1] recommendations, should be clearly justified.

9.5 Increment Modeling Considerations

Discuss the general assumptions you intend to make in your increment analysis. Past examples, include: *"…will assume all emissions are increment consuming;" "…will model the increase in emissions but ignore increment expansion;" "…obtained the baseline emission rate and stack parameters from…"*

Notes:

- Actual emissions should be used to represent baseline and increment expanding emissions.
- Sources to be included are dependent upon their emission rates (i.e., major or minor sources) and whether the minor source baseline date has been triggered. Refer to Table 2 in 18 AAC 50.020 for the list of baseline dates, listed by area and pollutant.
- If an increment analysis is needed, identify the baseline date(s) and ensure sources are grouped correctly: e.g., increment-consuming (or expanding) and baseline (retired and non-retired). Provide the baseline/credit emission release parameters and emission rates.
- A conservative option is to model all EUs as increment consuming. If you know *a priori* that using this approach would not result in a violation of an air quality standard, include a discussion on how you arrived at this conclusion.

9.6 Offsite EUs

Nearby EUs that do not operate concurrently with your proposed project EUs do not need to be modeled in a cumulative analysis. An example of a non-concurrent EU is a backup diesel engine that supports a primary power combustion turbine. This modeling exclusion only applies to EUs located at other stationary sources. You must demonstrate to ADEC's satisfaction that the excluded EUs are not operated concurrently.

9.7 Intermittent Emissions

Discuss how intermittently operated EUs will be characterized in each ambient demonstration.

Note: The allowances provided in EPA's 1-hour NO_2 modeling guidance (*Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard*; March 1, 2011) is only applicable for the probabilistic 1-hour air quality standards. Other approaches may be required for purposes of demonstrating compliance with the "deterministic" standards and increments, and the 24-hour "probabilistic" PM-2.5 standard.

[1] http://www.epa.gov/ttn/scram/reports/Haul_Road_Workgroup-Final_Report_Package-20120302.pdf

9.8 Source Groups

Some dispersion models, such as AERMOD, allow the grouping of EUs to provide information on how a group of one or more EUs contributes to the modeled concentrations at a stationary source. Source-grouping is especially helpful in providing insight into which EUs may be contributing to a modeled violation of a standard or increment. Describe any user-specified source-grouping that you intend to use as a part of your ambient demonstration.

10. Pollutant Specific Modeling Considerations

Provide the additional information requested below, as applicable. (Note: You do not need to include a placeholder in your protocol for non-applicable topics. Keep the protocol focused.)

10.1 NO_2

Describe your proposed approach for estimating atmospheric conversion of NO-to-NO_2 in both the annual average NO_2 demonstrations and the 1-hour NO_2 demonstrations. For example, will you be assuming full conversion, EPA's default ambient ratio method (ARM) values, or an ozone-related approach such as the Ozone Limiting Method (OLM) or the Plume Volume Molar Ratio Method (PVMRM)? Provide the proposed input values associated with the given approach.

Note: Some NO_2 modeling methods require case-specific approval by ADEC and EPA Region 10.

10.2 PM-2.5

Describe how secondary PM-2.5 formation will be assessed if using a model that does not contain the chemistry algorithms for estimating this formation (such as AERMOD and OCD).

10.3 PM Deposition

Describe the proposed approach for estimating particle deposition (e.g., the "Method 1" algorithm in AERMOD). Provide the parameters needed to support that approach for each EU for which deposition will be used (e.g., the particle size distribution, mass fraction, and particle density). Describe where you obtained the requisite information.

11. Building Downwash

Discuss how the building and structure information will be obtained (e.g., via plot plans and building elevations, estimates from aerial photography, etc.) and how the data will be processed for input to the dispersion model. If a separate processor is used (e.g. EPA's BPIPPRM program), identify the program by name and the version number.

If you are planning to install exhaust stacks that may exceed 65-meters, describe the Good Engineering Practice (GEP) analysis you intend to conduct in order to take credit for the stack height.

12. Ambient Air Boundary

Describe the proposed ambient air boundary and the means of restricting public access. Indicate the ambient air boundary on a map or the plot plan provided under Section 2 above.

Note: If the stationary source is located on leased, unfenced land, provide a copy of the land-owner's permission for you to control access (including their own access) within the proposed ambient boundary.

13. Worker Housing Areas

If you will be providing on-site housing for your workers, discuss how this area will be treated in your modeling analysis. Identify on a plot plan all areas within the stationary source boundaries where off-duty employees have access.

> *Background Information*: Off-duty workers are typically treated as members of the public. Therefore, if you provide on-site housing for your workers, then this area may need to be treated as ambient air. The limited situations where on-site housing accommodations are not treated as ambient air are described in Policy and Procedure 04.02.108 (see http://dec.alaska.gov/air/ap/docs/whg.pdf). If your stationary source provides on-site housing accommodations, treat the area as ambient air or provide justification as to why it should not be treated as such.

14. Receptors

Describe the network of receptors proposed for your ambient analysis. Divide the discussion into the following sub-sections, if warranted. Otherwise, just address the applicable aspects.

14.1 Receptor Placement

Describe the proposed receptor grid(s) with regard to their node spacing, coordinate system (e.g. Cartesian, polar, or custom), and distance from the stationary source. Include the following types of receptor placement, as appropriate:

- along the ambient boundary,
- within grids beyond the ambient boundary,
- discrete receptors at sensitive population areas such as hospitals, schools, and senior centers,
- within worker housing areas (see Section 13 above), and
- at other locations not included above.

If receptor grids of a different resolution are placed inside a larger receptor grid (nesting), describe the arrangement of each nested network, its node spacing, and the range (i.e. distance 'from' and 'to').

14.2 Flagpole Receptors

Include a discussion regarding flagpole receptors *if* you intend to use them. If used, describe why, where, and the proposed flagpole heights.

> *Background Information*: Flagpole receptors are rarely used. They should not be used to model impacts at open windows and building air intakes. Impacts at flagpole receptors are subject to the ambient air quality standards but not the increments.

14.3 Multiple Model Runs and Maximum Impact Area Analysis

Discuss whether multiple model runs will be performed to identify potential areas of maximum anticipated concentrations. An example of this is seen in an initial run that uses a coarse "screening" receptor network and is followed by one or more runs with finer resolution receptor networks around the previously identified receptors with high modeled concentrations. Discuss the criteria used to determine which receptors define the high impacts, e.g., all receptors for which the modeled concentration is 75% or greater of the maximum observed concentration on the coarse network.

15. Off-site EUs and Background Air Quality Data

State whether you will need to incorporate off-site EUs and background air quality data in your ambient analysis, and, if so, your proposed approach for addressing this issue. Be specific. Address the issue for

each ambient standard and increment that you will be modeling. Use the following sub-sections, if needed.

Background Information: Per Section 8.2.3b of the *Guideline*, "*All sources expected to cause a significant concentration gradient in the vicinity of the [applicant's] source or sources under consideration for emission limit(s) should be explicitly modeled.*" The impact from other sources can be accounted for through ambient monitoring data (background air quality).

ADEC generally interprets the term "source" to mean "stationary source" in this section of the *Guideline*, although the term can also refer to individual EUs as well. The interplay between explicit modeling of off-site sources and the reliance on ambient monitoring data is also evaluated on a case-specific basis. Factors to consider include: the relative location of the off-site sources, the expected plume behavior of the off-site source (e.g., is the source down-wash dominated), the size of the off-site source, and what ambient data is available.

15.1 Off-site Sources

List the proposed off-site sources that would be modeled on a pollutant-by-pollutant basis. Include a scaled map that shows where these sources are located. Reference the EU-specific release parameters requested in Section 9, or provide them in this section.

15.2 Background Air Quality Data

Provide the proposed background concentration for each pollutant and averaging period that would be modeled in a cumulative ambient standard demonstration. The use of time-varying (e.g., seasonal) ambient data may be considered for some pollutants and averaging periods. Describe the source of the background data (e.g., provided by ADEC or generated from raw monitoring data), monitor location, data period, ranking within the data set (as applicable), deficiencies in the data, and the rationale as to why the monitored data is representative for each pollutant and averaging time. Note whether the selected values (including the ranking) are consistent with EPA and ADEC guidance for the given pollutant and averaging period. When modeling PM-2.5, state what role the background data takes in addressing secondary formation.

If unprocessed monitoring data will be used to compute the background concentrations, include a description of how the monitored data would be processed. When proposing data from an industry monitoring effort, identify the QAPP that was followed in conducting the monitoring program and whether the data meet all quality assurance requirements. *Note: ADEC will not accept data that have not been reviewed or do not meet the applicable quality assurance requirements*.

16. Design Concentrations

Describe which model output value will be compared to each Significant Impact Level (SIL), SMC, Alaska Ambient Air Quality Standard (AAAQS), and increment that you will be using in your ambient demonstration. For example, are you planning to compare the highest annual average NO_2 concentration from a multi-year run to the annual average NO_2 SIL, AAAQS and increment; but the highest multi-year average of the annual average PM-2.5 impacts to the annual average PM-2.5 AAAQS? Be aware that the allowed approach can vary by pollutant, averaging period, and regulatory threshold. Provide supporting justification for your proposed approach, if warranted.

17. Post-processing

Standard dispersion model output may require additional processing to compare the modeled impacts to a regulatory threshold, e.g., the three-month lead AAAQS. Discuss any post-processing you intend to conduct. State whether the post-processing would be conducted with EPA or ADEC approved post-

processors, or user-developed programs. If a user-developed program is used, have it available for review if ADEC requests it.

18. Modeling Results

List each regulatory threshold to which you will be comparing your modeled impacts. If you will be conducting several types of assessments (e.g., a project impact analysis, a cumulative AAAQS analysis, and a cumulative increment analysis), clearly identify which assessment will be compared to which threshold. Be pollutant-specific. The use of tables is encouraged. If needed, provide a sub-section for each type of assessment that you will be conducting. Examples of the most common types of assessments are provided below.

18.1 Significant Impact Level (SIL)

You may choose to compare your project impacts to the SIL for a given pollutant and averaging period to determine whether the impacts are significant. The AAAQS and Class II SILs are provided in Table 5 of 18 AAC 50.215(d).[2] As of this writing, there are no formally established SILs for Class I areas. If the project impacts are significant, you must perform a cumulative impact analysis to demonstrate compliance with the applicable ambient air quality standard or increment. (Note: You may bypass the project impact analysis and instead just proceed with a cumulative impact analysis. This can save you and ADEC time, especially if it's clear that the project impacts will likely exceed the SILs.)

18.2 Significant Monitoring Concentration (SMC)

You do not need to discuss or list the SMCs if you intend to provide ambient monitoring data to meet the pre-construction monitoring required under 40 CFR 52.21(m)(1). However, please list each SMC that you do intend to use and describe which assessment you would be using for the comparison. The SMCs are listed in 40 CFR 52.21(i)(5), which ADEC has adopted by reference in 18 AAC 50.040(h)(7).[3] Additional information regarding the use of SMCs may be found in EPA's *Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD)*, which ADEC has adopted by reference in 18 AAC 50.035(a)(5).

18.3 Cumulative Impact Analyses

Clearly identify each AAAQS and increment to which you will be comparing your cumulative impacts. The AAAQS are listed in 18 AAC 50.010 and the increments are listed in 18 AAC 50.020. If warranted, identify which cumulative impact analysis will be compared to which threshold. This clarification could be especially helpful if the EU inventory varies by threshold and pollutant, or if the form of the AAAQS is different than the form of the increment for a given pollutant and averaging period.

18.4 Culpability Analyses

If you know or suspect that there will be modeled violations of an AAAQS or increment, describe the approach that you intend to use for demonstrating that you will not be causing or contributing to those violations.

[2] In January 2013, the District of Columbia Circuit Court of Appeals remanded the federal PM-2.5 SILs back to EPA. Regulatory changes may be forthcoming from EPA and/or ADEC. Check the EPA and ADEC websites for possible updates regarding this issue.

[3] In January 2013, the District of Columbia Circuit Court of Appeals vacated the PM-2.5 SMC.

19. Ozone Impacts

Describe your proposed approach for estimating the ozone impacts if it is a PSD-triggered pollutant.

Notes:

- You will need to provide an ozone demonstration if there is a net emissions increase of 100 tons-per-year or more of volatile organic compounds (VOCs) or NOx (per footnote 1 of 40 CFR 52.21(i)(5)(i)).
- EPA does not have a recommended modeling approach for assessing the impact of an individual EU on ambient ozone concentrations. In most cases a qualitative assessment is, therefore, acceptable.

20. Qualitative Assessments

If you are planning to provide a qualitative AAAQS or increment demonstration for any pollutant not described above, describe your proposed approach here. Use a more descriptive title, exclude any previous sections that are irrelevant, and revise the section numbering, if warranted. Exclude this section and revise the following section numbers if qualitative assessments are not applicable for your project.

21. Additional Impact Analyses

Describe the approach you intend to use for meeting the additional impact analyses required under 40 CFR 52.21(o).

21.1 Visibility, Soil and Vegetation Analysis

Describe your intended approach for the visibility, soil, and vegetation assessments required under 40 CFR 52.21(o)(1). Please note that these assessments are required whether or not a Class I assessment has been requested under 40 CFR 52.21(p). See the *ADEC Modeling Review Procedures Manual* for an additional discussion regarding this topic. The manual is posted on ADEC's modeling web-page at: http://dec.alaska.gov/air/ap/modeling.htm.

21.2 Associated Growth Analysis

40 CFR 52.21(o)(2) requires PSD applicants to assess the impacts from general commercial, residential, industrial, and other growth associated with the source or modification. Discuss whether there would be associated growth due to this project and, if so, your proposed approach for assessing the air quality impacts.

21.3 Visibility Monitoring

Visibility monitoring can be required under 40 CFR 52.21(o)(3). If ADEC has previously stated that visibility monitoring will be required, you should note this requirement in your protocol, even if the monitoring approach has been or will be addressed in a separate Quality Assurance Project Plan (QAPP). Do not include this sub-section if visibility monitoring has not been requested, which is the typical case.

22. Class I Analyses

If the FLM requested a Class I assessment under 40 CFR 52.21(p), describe your approach for providing the assessment in this section. If you do not yet know whether a Class I assessment will be requested, provide the distance to the nearest Class I areas in km. If the distance is between 50 and 300 km, provide the "Q/d" information requested in Section 3.2 of the *Federal Land Managers' Air Quality Related Values Work Group (FLAG): Phase I Report – Revised (2010)*.

23. References

If peer-reviewed literature, user's manuals, or guidance documents are referenced in the protocol, provide appropriate citations.