APPENDIX B

PSD MODELING PROTOCOL AND REPORT CHECKLISTS FOR CLASS I AND CLASS II AREAS

PSD Modeling Protocol and Report Checklist for Class I Areas

MODELING PROTOCOL		
General Information		
1.	**Project Identification**: provide the applicant's name and registration number (if available) and identify the facility.	
2.	**Project Description and Purpose of Modeling**: provide a description of the proposed project and the purpose of the modeling.	
3.	**Class I Area Identification**: identify each Class I area within 300 kilometers of the facility that will be included in the analysis.	
4.	**Emission Sources**: identify all fugitive and non-fugitive existing and proposed emission sources, including emergency emission sources. Indicate the emission sources to be modeled.	
5.	**Source/Pollutant Identification**: identify the pollutants to be modeled for each emission source and the type of release (i.e., point, area, or volume).	
6.	**Point Source Emission Parameters**: stack parameters (e.g., emission rate, stack height, stack diameter, stack gas exit velocity, stack gas exit temperature) for each point source. Indicate if the stack is obstructed (e.g., raincap) or non-vertical (e.g., horizontal or downward discharge). Identify maximum potential short-term and long-term emission rates for all pollutants to be modeled for each point source.	
7.	**Non-Point Source Emission Parameters**: parameters for each area and volume source such as source dimensions and release heights. Include all assumptions and calculations to determine parameters. Identify maximum potential short-term and long-term emission rates for all pollutants to be modeled for each area and volume source.	
8.	**Source Location**: provide the coordinates (e.g., Universal Transverse Mercator (UTM), Lambert Conformal Conic (LCC)), datum, and base elevation of each emission source.	
9.	**Pollutant Emission Rate Calculations**: indicate how the pollutant emission rates were derived (e.g., AP-42, vendor specifications, etc.) for each source and provide the calculations.	
10.	**Facility Map**: submit a United States Geological Survey (USGS) topographic map, Google Earth map or other scaled map showing the location of the facility. Any USGS map or quadrangle should be clearly marked with the map name, datum and coordinate system.	
11.	**Site/Facility Diagram**: provide a facility plot plan showing the location of all existing and proposed emission sources, buildings or structures, and the facility property/fence line boundaries. Include a scale and a compass or true north indicator. Provide a GIS shapefile, if available.	
12.	**Buildings/Structures**: provide the dimensions of each building (i.e., tier heights, width, and length) and the base elevation of each building.	
13.	**Receptors**: a description of the receptors to be used and how terrain elevations will be assigned. Include the coordinate system and datum used to identify the receptors.	
14.	**Operating Scenarios/Loads Analysis**: provide a detailed discussion of the operating scenarios proposed to be modeled and the justification that the full range of load conditions selected for modeling is sufficiently conservative and representative of potential air quality impacts, including startup and shutdown conditions.	
15.	**Preliminary (also referred to as Significant Impact) Analysis**: provide a discussion of the preliminary analysis to be conducted. Include how the SIA will be determined and the SIL(s) and Class I PSD increment(s) considered for the analysis.	
16.	**Full Impact Analysis**: provide a discussion of the full impact analysis that includes a description of the analysis for demonstrating compliance with the Class I PSD increment(s)	
17.	**Input File Examples**: provide an example of the input files (e.g., CALPUFF, CALMET, CALPOST and POSTUTIL) proposed to be used.	
Far-Field Modeling: Class I Areas 50-300 km		
18.	**Modeling System**: a description of the modeling system, including all programs of the modeling system (e.g., CALPUFF, CALMET, POSTUTIL, CALPOST) to be used and the justification or basis for the selected modeling system. Include the version number for each model.	
19.	**Modeling Domain**: a description of the modeling domain to be used, including the extent of the domain, the horizontal resolution, and the vertical structure.	
20.	**Model Options**: model options, including background ammonia and ozone concentrations, monthly average f(RH), to be used to evaluate the impacts conform to FLM requirements and applicable FLAG guidance (e.g., FLAG 2010).	

21.	**CALPOST Methods:** verify the visibility calculation methods (e.g., CALPOST Methods 2 and 8) conform to applicable FLAG guidance (e.g., FLAG 2010).	
22.	**Particulate Matter Speciation Profile**: verify the particle speciation profile is provided and has been reviewed and approved by the FLM and DEQ regional office. Available speciation profiles can be found at http://www.nature.nps.gov/air/Permits/ect/index.cfm.	
23.	**Meteorological Data**: identify gridded wind field data and surface and upper air meteorological data to be used, including the source of the data and period of record.	
24.	**Terrain Data**: a description of the gridded terrain data to be used, including the source of the data (e.g., USGS).	
25.	**Land Use Data**: a description of the land use data to be used, including the source of the data (e.g., USGS) and how it will be processed.	
26.	**AQRV Analysis**: identify the AQRV(s) proposed to be evaluated (e.g., visibility, acid deposition).	
Near Field Modeling: Class I Areas Less Than 50 km (PLUVUE II, VISCREEN for PLUME BLIGHT)		
27.	**Model**: a description of the model(s) to be used and the justification or basis for the selected model(s). Include the model version number.	
28.	**Model Options**: model options to be used and why they are considered appropriate.	
29.	**Meteorology**: a description of the meteorological data to be used, including identification of surface station, upper-air station, and period of record, why it is representative, and how it will be processed. For AERMOD, include a discussion of the development of land use parameters (e.g., albedo, Bowen ratio, and surface roughness).	
30.	**GEP Analysis**: provide a discussion for performing a building downwash analysis and include the latest version of the appropriate model (e.g., BPIP-PRIME).	
31.	**Land Use Classification**: a description of the analysis (e.g., Auer Method or population density) for determining the land use of the area surrounding the source (i.e., urban or rural) and the justification.	
32.	**Terrain**: provide a discussion on the terrain in the vicinity of the facility. Include the source (e.g., USGS), resolution, and datum of the terrain elevation data and the type (e.g., DEM, NED).	
33.	**Plume Blight**: model(s) (e.g., VISCREEN, PLUVUE II) to be used to evaluate visibility impacts due to plume impairment conform to FLM requirements and applicable FLAG guidance (e.g., FLAG 2010).	
MODELING REPORT (if any of the above information applicable to the air quality analysis was not available or contained in the modeling protocol, it is required to be included in the modeling report)		
34.	**Emissions Inventory**: a description and the list of the sources for the Class I PSD increment emissions inventory. Provide a discussion and the justification for any changes or corrections that were made to the sources and for any sources eliminated from the inventory.	
35.	**Modeling Results**: the modeling results should be provided as follows:	
	a) summarized and presented in tabular format that includes pollutants, averaging periods, highest (and second, sixth, etc. highest, if appropriate) modeled concentration, background concentration, total concentration, and applicable ambient standards.	
	b) include graphics (e.g., contour maps) that show the extent of the air quality impacts and utilize a base map that is readily understandable by the general public. Each map should also clearly identify the plant location relative to these air quality impacts.	
36.	**Modeling Files**: submittal of all modeling input/output files (e.g., CALPUFF, CALMET, CALPOST, POSTUTIL, BPIP-PRIME, AERMOD, VISCREEN, PLUVUE II), including any 3rd party software project files (e.g., BEEST, Lakes, Trinity) that are necessary for DEQ to import the projects into these vendor software packages, on CD/DVD or other appropriate electronic storage media. This includes input/output files from preprocessors and postprocessors, if applicable.	

PSD Modeling Protocol and Report Checklist for Class II Areas

MODELING PROTOCOL		
1.	**Project Identification**: provide the applicant's name and registration number (if available) and identify the facility.	
2.	**Project Description and Purpose of Modeling**: provide a description of the proposed project and the purpose of the modeling.	
3.	**Emission Sources**: identify all fugitive and non-fugitive existing and proposed emission sources, including emergency emission sources. Indicate the emission sources to be modeled.	
4.	**Source/Pollutant Identification**: identify the pollutants to be modeled for each emission source and the type of release (i.e., point, area, or volume).	
5.	**Point Source Emission Parameters**: stack parameters (e.g., emission rate, stack height, stack diameter, stack gas exit velocity, stack gas exit temperature) for each point source. Indicate if the stack is obstructed (e.g., raincap) or non-vertical (e.g., horizontal or downward discharge). Identify maximum potential short-term and long-term emission rates for all pollutants to be modeled for each point source.	
6.	**Non-Point Source Emission Parameters**: parameters for each area and volume source such as source dimensions and release heights. Include all assumptions and calculations to determine parameters. Identify maximum potential short-term and long-term emission rates for all pollutants to be modeled for each area and volume source.	
7.	**Source Location**: provide the coordinates (e.g., Universal Transverse Mercator (UTM), Lambert Conformal Conic (LCC)), datum, and base elevation of each emission source.	
8.	**Pollutant Emission Rate Calculations**: indicate how the pollutant emission rates were derived (e.g., AP-42, vendor specifications, etc.) for each source and provide the calculations.	
9.	**Facility Map**: submit a United States Geological Survey (USGS) topographic map, Google Earth map or other scaled map showing the location of the facility. Any USGS map or quadrangle should be clearly marked with the map name, datum and coordinate system.	
10.	**Site/Facility Diagram**: provide a facility plot plan showing the location of all existing and proposed emission sources, buildings or structures, and the facility property/fence line boundaries. Include a scale and a compass or true north indicator. Provide a GIS shapefile, if available.	
11.	**Model**: a description of the model(s) to be used and the justification or basis for the selected model(s). Include the model version number.	
12.	**Model Options**: model options to be used and why they are considered appropriate.	
13.	**Buildings/Structures**: provide the dimensions of each building (i.e., tier heights, width, and length) and the base elevation of each building.	
14.	**GEP Analysis**: provide a discussion for performing a building downwash analysis and include the latest version of the appropriate model (e.g., BPIP-PRIME).	
15.	**Terrain**: provide a discussion on the terrain in the vicinity of the facility and how terrain elevations for receptors will be assigned. Include the source (e.g., USGS), resolution, and datum of the terrain elevation data and the type (e.g., DEM, NED).	
16.	**Receptors**: a description of the receptor grid to be used. The receptor grid should be of sufficient size and resolution to identify the maximum pollutant impact. Include the datum and coordinate system used to identify the receptors.	
17.	**Meteorology**: a description of the meteorological data to be used, including identification of surface station, upper-air station, and period of record, why it is representative, and how it will be processed. For AERMOD, include a discussion of the development of land use parameters (e.g., albedo, Bowen ratio, and surface roughness).	
18.	**Land Use Classification**: a description of the analysis (e.g., Auer Method or population density) for determining the land use of the area surrounding the source (i.e., urban or rural) and the justification.	
19.	**Operating Scenarios/Loads Analysis**: provide a detailed discussion of the operating scenarios proposed to be modeled and the justification that the full range of load conditions selected for modeling is sufficiently conservative and representative of potential air quality impacts, including startup and shutdown conditions.	
20.	**Preliminary (also referred to as Significant Impact) Analysis**: provide a discussion of the preliminary analysis to be conducted. Include how the SIA will be determined and the SIL(s), NAAQS, Class II PSD increment(s), and SMCs considered for the analysis.	

21.	**Full Impact Analysis**: provide a discussion of the full impact analysis that includes:	
	a) NAAQS Analysis: a description of the analysis for demonstrating compliance with the NAAQS.	
	b) PSD Increment Analysis: a description of the analysis for demonstrating compliance with the Class II PSD increment(s).	
22.	**Ambient Background Air Quality Data**: provide a detailed discussion addressing pre-construction monitoring requirements, including justification when existing monitoring data is proposed in lieu of pre-construction monitoring. Identify the proposed ambient background concentration(s), including the monitor identification, monitor location, calendar year and source of the data for each ambient background concentration. Consult with Central Office modeling staff for these values.	
23.	**Additional Impact Analysis**: provide a discussion of the methods to be used to evaluate the impacts of the proposed project on the Class II area for the following:	
	a) visibility	
	b) growth	
	c) soils and vegetation	
24.	**Other Considerations (if applicable):**	
	a) ozone	
	b) mercury deposition	
	c) nitrogen deposition	
	d) sulfur deposition	
	e) Virginia toxic air pollutants	
25.	**Input File Examples**: provide an example of the input files (e.g., AERMOD, AERMAP, BPIP-PRIME) proposed to be used.	
MODELING REPORT (if any of the above information applicable to the air quality analysis was not available or contained in the modeling protocol, it is required to be included in the modeling report)		
26.	**Emissions Inventories**: a description and list of the sources for the NAAQS and Class II PSD increment emissions inventories. Provide a discussion and the justification for any changes or corrections that were made to the sources and for any sources eliminated from an inventory.	
27.	**Modeling Results**: the modeling results should be provided as follows:	
	a) summarized and presented in tabular format that includes pollutants, averaging periods, highest (and second, sixth, etc. highest, if appropriate) modeled concentration, background concentration, total concentration, and applicable ambient standards.	
	b) include graphics (e.g., contour maps) that show the extent of the air quality impacts and utilize a base map that is readily understandable by the general public. Each map should also clearly identify the plant location relative to these air quality impacts. It is also recommended to identify any sensitive receptors on the map (e.g., schools, hospitals, residences).	
28.	**Modeling Files**: submittal of all modeling input/output files (e.g., AERSCREEN, AERMOD, AERMET, AERMAP, AERSURFACE, BPIP-PRIME), including any 3rd party software project files (e.g., BEEST, Lakes, Trinity) that are necessary for DEQ to import the projects into these vendor software packages, on CD/DVD or other appropriate electronic storage media. This includes input/output files from preprocessors and postprocessors, if applicable.	