**APPENDIX B**

# Modeling Protocol

The application process required the preparation of a modeling protocol, which outlined the types of impact analyses conducted, the methods used, and the support data used for both the PSD modeling analyses.

It is also expected that, based on the use of the Lancaster monitoring station data for use as background, it is expected that the monitoring data would conservatively represent all background sources within 10 kilometers of the project site.

For assessing the 1-hour $NO_2$ NAAQS, as in the previous PHPP analysis, the same receptors will be used (i.e., the facility downwash, intermediate, and coarse receptor grids that extend 10-km from PEP in all directions but which exclude receptors on the Lockheed-Martin and Northrop-Grumman properties at Air Force Palmdale Plant 42). All five years of Palmdale ASOS meteorological data will be analyzed. In addition, the 1-hour $NO_2$ analysis will use the USEPA Ozone Limiting Method (OLM) with concurrent ozone data from the Lancaster air quality monitoring site and hourly seasonal background $NO_2$ data averaged over the past 3 years as described in USEPA $NO_2$ guidance documents. The Plant 42 sources will be modeled with an $NO_2/NO_x$ ISR ratio of 0.2 with a project based ISR of 0.5.

For assessing increment, all major increment consuming sources will be identified and used in the analysis for which baseline has been triggered. This includes both PM10 and PM2.5, although this proposed project will be the only increment consuming source for PM2.5.

**Secondary PM2.5 Formation:** Formation of secondary PM2.5 from the emissions of precursor pollutants such as $NO_2$ and $SO_2$ can occur at downwind distances over time periods of hours or days. The creation of secondary PM2.5 can increase the total concentration of the total PM2.5 impacts by adding to the direct PM2.5 emissions from the project. EPA has published draft guidance on how to account for secondary PM2.5 from the precursors of $NO_2$ and $SO_2$ (*EPA Guidance for PM2.5 Permit Modeling, March 2014*). Within this guidance, EPA has developed two assessment cases from which secondary impacts should be addressed. For the CPEC project, where direct emissions of PM2.5 and $NO_x$ will exceed the significant emission rates, the EPA allows a qualitative or a hybrid/qualitative/quantitative approach for assessing the secondary air quality impacts.

The project impacts are expected to be below the SILs for annual $NO_2$ and $SO_2$, which would likely limit the pollutants from impacting secondary formation significantly enough to result in a violation of the PM2.5 standards. But it is possible that some transformation will occur, although given the time for the transformation to occur, secondary PM2.5 impacts are expected to occur at distances much farther downwind than the SIA of 1.8 km. However, to assess secondary formation, a hybrid/qualitative assessment will be made using Appendix D of the EPA *Guidance for PM2.5 Permit Modeling* (May 2014). Here, the formation of secondary PM2.5 is accounted for by dividing the projected emissions by a region average offset ratio. The national ratio for $SO_2$ is 40 and for $NO_x$ is 100.Total PM2.5 emission are calculated by multiplying the primary PM2.5 modeled concentration by the ratio obtained from the secondary equivalent calculation.

For the PEP project, this results in the following:

- Total Equivalent PM2.5 = Primary 2.5 + ($SO_2$/40) + ($NO_x$/100) =
  81.01 + (11.39/40) + (139/100) = 82.68 tpy
- Total Equivalent PM2.5/Primary 2.5 = 1.02

Thus, all molded impacts of PM2.5 will be increased by a factor of 1.02 to account for the secondary formation for sources emitting significant amounts of secondary precursor emissions (note, $SO_2$ emissions from PEP are not expected to be significant, but are included for conservatism).