40 CFR 52.21(o) requires applicants to evaluate the impact that the new source or modification will have on local visibility conditions. This analysis is based upon impacts within the significant impact area of the new source or modification and is separate from the Class I visibility analysis.

Initially, it must be determined what, if any, scenic vistas, airports, or other sensitive areas are located within the significant impact area of the new source or modification. Staff from the Department's Air Pollution Control Program Construction Permit Modeling Unit will provide a list of each sensitive area that must be considered along with its location in relation to the proposed new source or modification.

VISCREEN, the plume visual impact screening model, should be used to determine the impact on visibility within each sensitive area. As recommended in the VISCREEN User's Guide, a Level 1 screening analysis should initially be performed using the worst case meteorological conditions and a plume/observer relationship that places the plume adjacent to the observer. The Level-1 screening analysis does not require the user to specify raw meteorological data inputs because the model assumes that the worst case stability, wind speed and wind direction are occurring.

In order for VISCREEN to calculate the difference in contrast and the color difference parameter (delta-E) the user must provide the maximum short-term emissions information for both particulate matter and oxides of nitrogen. It is important to note that sulfur dioxide emissions are not a required input into VISCREEN because sulfate formation is not instantaneous and is unlikely to occur over the short distances that are considered for the Class II visibility assessment.

In addition to the input of the emission rates, the user is also required to input the distance between the source and the boundary of the sensitive area being evaluated and the background visual range. Figure 9 contained within the document entitled "Workbook for Plume Visual Impact Screening and Analysis (Revised)" contains background visual range values for the entirety of the United States and should be used to define this value for the Level 1 analysis.

Upon execution, the VISCREEN model compares the contrast and color difference parameters to pre-defined adverse impact thresholds for Class I areas. If the thresholds are exceeded, the user should move forward with a Level 2 screening analysis.

Unlike the Level 1 analysis, the Level 2 screening analysis requires an evaluation of both the frequency and distribution of wind speed and direction in order to determine if the plume will remain cohesive as it travels towards the observer located within the area of interest. If the plume is dispersed due to convective activity, it is unlikely that any discoloration of the atmosphere will be visible.

Prior to performing the Level 2 analysis, the applicant should construct a meteorological database that includes the joint frequency of occurrence of wind speed, wind direction, and stability class. Once the meteorological data is tabulated, maps of the source/observer relationship should be reviewed so that the wind sector that transports emissions closest to the observer can be determined. For each critical wind direction, the worst case dispersion characteristics should be ranked in order of severity along with the frequency of occurrence. A table should be created that includes a summary of the worst case meteorological conditions, transport time associated with each condition and the frequency of occurrence for each sensitive area for each meteorological period included in the air quality analysis.

The stability class and wind speeds should be based upon the one percentile meteorology identified in the frequency distribution tables. The one percentile meteorology occurs when the most severe meteorological conditions are coupled with other factors that contribute to maximum plume visual impacts.

If visible impacts continue to be likely at the sensitive areas identified in the air quality analysis, the applicant should investigate the ambient conditions that resulted in the adverse impacts, i.e. time of day, wind speed, stability class, etc. For example, if the worst case meteorological conditions occurred during the late evening and early morning hours when wind speeds decrease and atmospheric stability increases the plume may not be visible. Additionally, the use of typical nighttime conditions will yield conservative results because low wind speeds and stable conditions are likely to occur immediately after sunrise and the likelihood that they would persist for multiple hours after sunrise is small.

The criteria used to determine plume visual impacts within the VISCREEN modeling system were developed to protect Class I areas from harm and were not designed to determine if visibility degradation within Class II areas is likely. As such, the prediction of Class I impacts may or may not indicate an adverse impact within a Class II region. A more refined analysis, which incorporates particle size distributions, plume overlap, and different geometries, could lead to improved Class II visibility results. The consideration of a more sophisticated model could also lead to improved visibility predictions if the facility fails to meet the Level 2 adverse impact thresholds.