# Appendix A:  Undetermined location modeling

(Background concentrations and meteorological data for modeling setback distances for relocation to unknown locations.)

Modeling for unknown locations is difficult because conservative meteorology and background concentrations can combine to produce unrealistically high concentrations.  The goal of the modeling is to predict the worst case concentration without going beyond that case with overly conservative assumptions. The combination of meteorology and background concentrations that produces the highest distance to predicted violations of standards is the combination that should be used for setback distance determination. Some combinations of meteorology and background concentration may be excluded because they are not realistic.  For example, a peak particulate matter background concentration produced by strong wind events should not be used with a calm set of meteorological data.  As a practical application of this observation, it is recommended to use meteorology and background concentrations that come from the same general vicinity. For example, both data sets should come from Doña Ana County or both should come from Eastern New Mexico.

Are sets of meteorological data site-specific for unknown locations?
The surprising answer to this question can be "yes".  Both the meteorological data and the background concentration are site-specific for the worst case region modeling is being performed for.  It is not necessary to require maximum concentrations instead of second high concentrations  (if applicable) in this case, because the worst case combination is already being used to model the area.

For many pollutants, parts of Doña Ana County have significantly higher peak background concentrations than occur in the rest of New Mexico.  Applicants may wish to calculate separate setback distances for Doña Ana County and for the rest of the State.  Others may desire a simplified set of setback distances that apply everywhere.  The following sections identify data that can be used to model setback distances for specified regions of the State.  In some cases, an applicant may wish to further refine areas of the State for calculation of setback distances.

## A.1 Setback distances valid for anywhere in New Mexico

The following values and data sets are the maximum concentrations for each pollutant in New Mexico. Because the background concentrations are high in Doña Ana County, the setback distances calculated using this data may be used anywhere in the State.

Sunland Park City Yard 1998 meteorology has higher rates of calm and low wind speed hours than the other data sets in Doña Ana County.  This year of meteorological data may be used with background concentration from Doña Ana County to model setback distances anywhere in the state.

**Table A1:  Setback distance modeling valid Statewide**

| Parameter | Data Source |
|---|---|
| meteorological data | Sunland Park City Yard 1998 |
| CO 1-hour background | 4.96 ppm |
| CO 8-hour background | 3.01 ppm |
| CO refined background | CAMS12, El Paso UTEP |
| $NO_2$ 1-hour background | 0.075 ppm |
| $NO_2$ annual background | 0.018 ppm |
| $NO_2$ refined background | 6ZM Desert View (Sunland Park) |
| $O_3$ 1-hour background | 0.097 ppm |
| $O_3$ refined background | 6O La Union |
| $PM_{2.5}$ 24-hour Background 100th%ile | 35.9 μg/m$^3$ |
| $PM_{2.5}$ 24-hour Background 98th%ile | 28.8 μg/m$^3$ |
| $PM_{2.5}$ Annual Background | 10.7 μg/m$^3$ |
| $PM_{2.5}$ refined background | 6ZG Sunland Park City Yard |
| $PM_{10}$ 24-hour Background Maximum | 92.3 μg/m$^3$ |
| $PM_{10}$ 24-hour Background Second High | 89.1 μg/m$^3$ |
| $PM_{10}$ Annual Background | 34.0 μg/m$^3$ |
| $PM_{10}$ refined background | 6ZG Sunland Park City Yard |
| $SO_2$ 1-hour background | 61.7 ppb |
| $SO_2$ refined background | 1H Shiprock Substation |
| TSP 24-hour Background | 122.8 μg/m$^3$ |
| TSP Annual Background | 45.2 μg/m$^3$ |
| TSP refined background | 1.33 x (6ZG Sunland Park City Yard) |

## A.2 Setback distances valid for outside Doña Ana County

The following values and data sets are the maximum concentrations outside of Doña Ana County for each pollutant in New Mexico. The setback distances calculated using this data may be used anywhere in New Mexico except for Doña Ana County.

Bloomfield 1997 meteorology has higher rates of calm and low wind speed hours than the other data sets in New Mexico. This year of meteorological data may be used with background concentration from outside Doña Ana County to model setback distances anywhere outside this County.

**Table A2:  Setback distance modeling valid outside Doña Ana County**

| Parameter | Data Source |
|---|---|
| meteorological data | Bloomfield |
| CO 1-hour background | 2.1 ppm |
| CO 8-hour background | 1.5 ppm |
| CO refined background | 2ZR Rio Rancho Senior Center |
| $NO_2$ 1-hour background | 0.055 ppm |
| $NO_2$ annual background | 0.018 ppm |
| $NO_2$ refined background | 2ZR Rio Rancho |
| $O_3$ 1-hour background | 0.085 ppm |
| $O_3$ refined background | 2ZR Rio Rancho |
| $PM_{2.5}$ 24-hour Background 100th%ile | 18.2 $\mu g/m^3$ |
| $PM_{2.5}$ 24-hour Background 98th%ile | 13.6 $\mu g/m^3$ |
| $PM_{2.5}$ Annual Background | 6.2 $\mu g/m^3$ |
| $PM_{2.5}$ refined background | 1Z Farmington |
| $PM_{10}$ 24-hour Background Maximum | 73.2 $\mu g/m^3$ |
| $PM_{10}$ 24-hour Background Second High | 52.5 $\mu g/m^3$ |
| $PM_{10}$ Annual Background | 21.1 $\mu g/m^3$ |
| $PM_{10}$ refined background | 5ZG Roswell |
| $SO_2$ 1-hour background | 61.7 ppb |
| $SO_2$ refined background | 1H Shiprock Substation |
| TSP 24-hour Background | 97.4 $\mu g/m^3$ |
| TSP Annual Background | 28.1 $\mu g/m^3$ |
| TSP refined background | 1.33 x (5ZG Roswell) |