UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

January 26, 1995

Reply to
Attn of: ES-097

Mr. Bruce Bradshaw
Idaho Department of Health and Welfare
Division of Environmental Quality
1410 North Hilton
Boise, ID 83706-1290

Dear Bruce:

I am writing in response to your request for some general guidance/recommendations on the development of the WYNDvalley component of the modeling analyses to be conducted as part of the Sandpoint PM_{10} SIP and the work being conducted in Kootenai County. We recommend that you develop and submit a modeling protocol before you commence with the modeling analyses in either the Sandpoint nonattainment area (NAA) or Kootenai County. The protocols should outline the methodologies and data sources to be used in the WYNDvalley analyses as well as any other modeling approaches (evaluation of point sources) to be used in defining necessary controls and demonstrating attainment of the NAAQS.

As you know, the WYNDvalley model has no official regulatory status with respect to current Agency regulations (see 40 CFR, Part 52, Appendix W). Consequently, because WYNDvalley is a "nonguideline" modeling technique, you will ultimately need to demonstrate that the model is an appropriate tool for use in these (or any other) analyses through an evaluation of model performance relative to measured ambient PM_{10} concentrations. The recommendations that follow are provided as general guidelines on what we have determined to be reasonable approaches to constructing a WYNDvalley analysis and are based on the use of the model in various SIP analyses throughout Region 10. You, of course, will need to apply some additional judgements of your own in the development of the analyses for Sandpoint and Kootenai County.

1. The most current version of the model should be used. The suitability/usability of a specific version will ultimately be divulged in the model evaluation portion of your analyses. Should the most current version exhibit unacceptable performance characteristics, an alternative version may be considered appropriate. The most current version we have encountered to date is Version 3.11, which has provided reasonably good performance in the Spokane PM_{10} SIP analyses.

2. In general, our recommendation is to resolve the modeling grid to the smallest workable scale. This provides a greater degree of spatial resolution of the emissions inventory and impacts and minimizes the portion of the modeling domain that may be subjected to significant boundary condition influences. Various WYNDvalley analyses conducted in the Region have used horizontal cell dimensions which have typically ranged between 0.25 km to 1.0 km on a side.

3. Grid cell heights of 25 m should be used unless site-specific information suggests another value may be more appropriate. A minimum of three (3) vertical layers should be used.

4. A meander velocity of 0.5 m/s should be specified.

5. Input a background concentration of 0 into the model. We recommend that an appropriate background concentration be added to the completed modeling results.

6. Absorptive and/or leaky boundary conditions should be used except in areas marked by elevated terrain, where hybrid boundaries are probably most appropriate. In the event that boundary conditions characterizing elevated terrain exert extreme influences on predicted concentrations, we would recommend that you add up to two (2) buffer (computational) cells to the outside of the selected modeling domain. This approach was used successfully in the WYNDvalley analysis for the Boise PM_{10} SIP.

7. It is critical that the modeling domain is selected to include all emitting sources impacting the monitoring network. An incorrectly defined modeling domain will inappropriately influence the model evaluation component of your analyses. While we understand that the intent of the SIP analyses is to define impacts (and needed controls) for sources within the NAA boundaries, we have encountered situations where sources outside of the NAA boundaries (and therefore excluded from modeling) were determined to contribute significantly to measured values. Exclusion of these sources from the modeling domain contributed (in our opinion, significantly) to model performance that was judged to be unacceptable.

Should you have any questions with regards to these recommendations, or any other modeling considerations for Sandpoint and Kootenai County, please feel free to call either me or Rob Wilson.

Sincerely,

Bill

William M. Ryan
Environmental Engineer

cc: D. Cole, IOO
S. Body, ATD
D. Redline, IDEQ-NIRO