



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

April 15, 1988

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Air Quality Planning Branch
Region V

MEMORANDUM

SUBJECT: PM₁₀ Modeling Methodologies for Colorado
FROM: *Dean A. Wilson*
Dean A. Wilson, Meteorologist
Source Receptor Analysis Branch (MD-14)
TO: John Notar, Meteorologist
Region VIII

In response to your request the Model Clearinghouse has reviewed the proposed modeling methodologies for five PM₁₀ areas in Colorado. We apologize for the delay in responding but as you understand these issues are complicated and involve a significant amount of coordination with other groups. We have tried to keep you apprised of our progress and preliminary findings during the course of this review.

Attached are five information sheets which summarize the issues, problems and our recommendations for possible corrective actions for each PM₁₀ area. With regard to these corrective actions you will note that they are a mixture of technical analyses and possible policy considerations. In most cases no single corrective action will solve the problem as most of the technical analyses entail delays of the SIP and would thus require a policy decision. With regard to the policy considerations, which we have starred (*) on the information sheets, the Particulate Matter Programs Section has asked that the Region's policy staff e.g., Dale Wells, work with Ken Woodard on implementing any of these. The Model Clearinghouse can continue to work with you in the usual fashion on any followup to the technical analyses.

In response to your questions on the high TSP value for March 9, 1986 in Lamar, we agree that the conditions on that day appear to satisfy EPA's criteria for an exceptional event. The only question that we have is whether there was any significant precipitation on that particular day. (The exceptional events guideline indicates that the day should have no or only a trace of precipitation to qualify.) As far as the use/nonuse of this data as a design value, the final decision can only be made after a public

review process has taken place (See page 8 of the exceptional events guideline).

If you have any questions, please call me.

Attachment

cc: W. Keith
W. Laxton
T. Pace
S. Reinders
D. Skie
S. Sleva
D. Stonefield
D. Wells
T. Williams

TELLURIDE

PROPOSAL

- o Use the Ventilated Valley Diffusion Model (VVDM) to estimate the 24-hour design concentration & for the control strategy demonstration.
- o Use receptor modeling for annual mean design concentration/control strategy.

ISSUES

- o Technical defensibility of VVDM
- o No details provided on receptor modeling for annual mean.

PROBLEMS

- o An evaluation of VVDM by ORD recommends against its use.
- o Further discussions with ORD also confirms that VVDM is much too simple for use in Telluride.
- o Performance evaluation of VVDM extremely limited and perhaps not completely independent of monitoring data.
 - Only four days simulated; doesn't follow guidance for determining design concentrations (Section 6 of the PM₁₀ SIP Development Guideline)
 - Mixing height input highly subjective
 - Model adjustment factor at least partially derived from observed concentration profiles
- o Only 12 days appear to have been analyzed using CMB; five samples per quarter recommended for annual analyses, consistent with Protocol for Reconciling Differences Among Receptor and Dispersion Models
- o Two independent analyses required for use of receptor modeling alone, consistent with PM₁₀ SIP Development Guideline

POSSIBLE CORRECTIVE ACTIONS

- o Apply a 2- or 3-layer dispersion model such as WYNDvalley in place of VVDM; supplement WYNDvalley by applying Guideline dispersion model, consistent with Region X procedures
- o Use receptor modeling alone for all averaging times, consistent with PM₁₀ SIP Development Guideline (two independent analyses)*
- o Provide for a partial SIP approval whereby EPA would approve control measures but not the attainment demonstration.*

*Implementation of these actions would require concurrence by AQMD

ASPEN

PROPOSAL

- o Use VVDM (State proposal)
- o Approve control measures but not control strategy demonstration (Region VIII proposal)

ISSUES

- o Technical defensibility of VVDM
- o No proposal for addressing annual mean

PROBLEMS

- o An evaluation of VVDM by ORD recommends against its use
- o Further discussions with ORD also confirms that VVDM is much too simple for use in mountain valleys
- o No performance evaluation of VVDM
- o No PM₁₀ data

POSSIBLE CORRECTIVE ACTIONS

- o Collect on-site meteorological data; use Guideline dispersion model and WYNDvalley
- o Monitor for PM₁₀ (State is now initiating) and use receptor modeling alone (two independent analyses)*
- o Provide for a partial SIP approval whereby EPA would approve control measures but not the attainment demonstration.*

*Implementation of these actions would require concurrence by AQMD

LAMAR

PROPOSAL

- o Model with ISCST
- o Meteorological data inputs to ISCST consist of a mix of local radio station data and Garden City KS NWS data

ISSUES

- o Appropriateness of meteorological data inputs to model

PROBLEMS

- o No PM₁₀ data
- o Highest TSP day probably associated with wind blown dust
- o Mixing meteorological data bases may not be technically sound and is in conflict with precedents.
- o Doubtful that radio station data quality assured
- o Few identifiable sources--mostly rural fugitive dust

POSSIBLE CORRECTIVE ACTIONS

- o Collect on-site meteorological data and model with ISCST
- o Model with ISCST using 5 years of Garden City NWS data
- o Monitor for PM₁₀ and use receptor/dispersion modeling
- o Apply EPA's current rural fugitive dust policy to the area with the understanding that the policy is being reviewed and, if revised the State must comply with the revised policy*
- o Provide a partial SIP approval whereby EPA would approve control measures but not the attainment demonstration.*

* Implementation of these actions would require concurrence by AQMD

CANON CITY

PROPOSAL

- o Model the 4 highest monitored TSP days in the last three years with ISCST
- o Meteorological data inputs to ISCST consist of a mix of local radio station data and Pueblo NWS data (nighttime hours)

ISSUES

- o Modeling limited to 4 days
- o Appropriateness of meteorological inputs to model
- o Lack of annual modeling

PROBLEMS

- o Modeling only days with high monitored data inconsistent with guidance and not technically defensible and doesn't comply with guidance for determining design concentrations (Section 6 of PM₁₀ SIP Development Guideline)
- o Mixing meteorological data bases not recommended
- o Doubtful that radio station data quality assured
- o No PM₁₀ data

POSSIBLE CORRECTIVE ACTIONS

- o Model with ISCST using 5 years of Pueblo NWS data
- o Collect on-site meteorological data and model with ISCST
- o Monitor for PM₁₀ (Colorado is now initiating) and use receptor/dispersion modeling
- o Provide for a partial SIP approval whereby EPA would approve control measures but not the attainment demonstration.*

*Implementation of this action would require concurrence by AQMD

PAGOSA SPRINGS

PROPOSAL

- o Use proportional (receptor) modeling (State proposal)
- o Approve control measures but not control strategy demonstration (Region VIII proposal)

ISSUES

- o Need for both receptor and dispersion modeling
- o Approvability of control measures only
- o No proposal for addressing annual mean

PROBLEMS

- o Only a single receptor modeling technique proposed (PM₁₀ SIP Development Guideline recommends two techniques if dispersion modeling not used)
- o No representative meteorological data
- o Not sure whether enough samples analyzed for annual receptor modeling (5 samples per quarter recommended in EPA's Protocol for Reconciling Differences Among Receptor and Dispersion Models)

POSSIBLE CORRECTIVE ACTIONS

- o Collect on-site meteorological data and use Guideline dispersion and perhaps WYNDvalley
- o Obtain a second independent receptor modeling result and use receptor modeling alone
- o Analyze enough samples to perform annual receptor modeling
- o Provide for a partial SIP approval whereby EPA would approve control measures but not the attainment demonstration.*

*Implementation of this action would require concurrence by AQMD