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

6 APR 1992

MEMORANDUM

SUBJECT: Proposal for Resolving the SO_2 State Implementation Plan (SIP) Revision for Rhinelander, Wisconsin

FROM: Joseph A. Tikvart, Chief
Source Receptor Analysis Branch (MD-14)

TO: Gary Gulezian, Chief
Air Toxics and Radiation Branch
Air and Radiation Division, Region V (AT-18J)

In response to your request, the Model Clearinghouse has reviewed your latest proposal to resolve this long standing nonattainment issue. We understand that modeling with the Industrial Source Complex Short Term model (ISCST) using worst case meteorological conditions commonly employed in the SCREEN model as input indicates an underprediction on the design day. Thus, we agree that there is no other logical choice but to base the emission limits on rollback from ambient data. We agree with your proposal for resolving this SIP.

Refined dispersion models recommended in the Guideline on Air Quality Models are designed to provide a "best estimate" of the design concentration. This means that in a performance evaluation of such a model there will be both underestimates and overestimates but that on average the model is expected to be unbiased. Thus it is not totally surprising to find ISCST underpredicting for some events, e.g. some of the high days in Rhinelander. At the same time we should not use the model estimates for the design value in the face of monitored data which indicates an ambient problem that will not be corrected by a SIP based solely on modeling. The need to consider ambient data as well as modeled data in setting SIP emission limits is recognized in a January 13, 1982 letter from Walter Barber to Charles Taylor at the State of Ohio. The letter states: "...In addition, existing air quality data in the vicinity of the plant should be considered along with modeling results in establishment of revised emission limitations...."

You indicated there is an interest in lifting the construction ban in the Rhinelander area. We have some thoughts for you to consider in this regard. Your staff has done a good job in resolving the current situation in a manner that leads to confidence that the National Ambient Air Quality Standards will

be attained. However, given that the analysis is based on rollback, we are still without a tool that can be confidently applied that will account for the effects of stack height and stack separation. This will be of concern if there is to be an expansion at the plant or if another new source wants to construct in the area. Thus we urge the State to continue monitoring in the area and for the source to keep careful logs of hourly SO_2 emissions from each stack that will allow the reconstruction of events for any given day. Also, there would be a need for better meteorological data, i.e., "on-site", if a new source needs to be analyzed.

If you have any questions please contact me at 629-5562. Effective April 20, my new 10-digit telephone number will be 919-541-5562.

cc: Gary Blais, MD-15
Patrick Dolwick, Region V

bcc: Regional Modeling Contact, Regions I-X (with copy of incoming memorandum and list of FY-92 Clearinghouse memoranda)

ATTACHMENT

(1)

RHINELANDER PROPOSAL 2

A) CYCLONE + 2 STOKER BOILERS EMISSION LIMIT (EL) ? EMISSION TOTAL

(BASED ON ROLLBACK CALCULATIONS FROM 3/12/92 MEMO)

ET: 26,948 lbs SO_2 / DAY TOTAL

STOKER CASE	EMISSION RATE (lbs SO_2/DAY) [BASED ON STOKER EL OF 1.25 lbs SO_2/mmBT
1 STOKER	1,021
2 STOKERS (BASE CASE)	2,042
3 STOKERS (ALTERNATE 1)	3,063
4 STOKERS (ALTERNATE 2)	4,084

B) ROLLBACK CALCULATION FOR CYCLONE BOILER IS:

1) BASE CASE (BASED ON 365 mg/m^3 SO_2 MAX. 24 HR. NOT TO BE EXCEEDED MORE THAN ONCE/YE

26,948 lbs/DAY (TOTAL CYCLONE + 2 STOKER BOILERS)

− 2,042 lbs/DAY (2 STOKERS @ 1.25 lbs SO_2/mmBTU)

24,906 lbs/DAY (CYCLONE RATED @ 3.63 lbs SO_2/mmBTU)

EL BASE CASE: 3.63 $\frac{\text{lbs } SO_2}{\text{mmBTU}}$

ATTACHMENT (2)

RHINELANDER PROPOSAL 2

B) 2) ALTERNATE CASE 1 (SAME BASIS AS BASE CASE)

CYCLONE EL: 3.4 lbs SO_2/mmBTU FOR CASE 1 } 3 STOKERS, 1 CYCLONE

CYCLONE RATING:

$$\frac{3.4 \text{ lbs } SO_2/\text{mmBTU (CASE 1)}}{3.63 \text{ lbs } SO_2/\text{mmBTU (BASE)}} = \frac{X_1 \text{ (CASE 1)}}{24{,}906 \text{ lbs } SO_2/\text{DAY (BASE)}}$$

WHERE X_1 = 23,328 lbs SO_2/DAY FOR CASE 1

TOTAL: 23,328 lbs SO_2/DAY (CYCLONE RATED @ 3.4 lbs SO_2/mm
+ 3,063 lbs SO_2/DAY (3 STOKERS @ 1.25 lbs SO_2/mm
26,391 lbs SO_2/DAY (3 STOKERS PLUS CYCLONE)

CASE 1 ET FOR 3 STOKERS & CYCLONE < 26,906 lbs SO_2/DAY BA

3) ALTERNATE CASE 2 (SAME BASIS AS BASE CASE)

CYCLONE EL: 3.3 lbs SO_2/mm BTU FOR CASE 2

CYCLONE RATING:

$$\frac{3.3 \text{ lbs } SO_2/\text{mm BTU (CASE 2)}}{3.63 \text{ lbs } SO_2/\text{mm BTU (BASE)}} = \frac{X_2 \text{ (CASE 2)}}{24{,}906 \text{ lbs } SO_2/\text{DAY (BAS}}$$

WHERE X_2 = 22,642 lbs SO_2/DAY FOR CASE 2

TOTAL: 22,642 lbs SO_2/DAY (CYCLONE RATED @ 5.3 $\frac{\text{lbs } SO_2}{\text{mmBTU}}$
+ 4,084 lbs SO_2/DAY (4 STOKERS @ 1.25 $\frac{\text{lbs } SO_2}{\text{mmBTU}}$)
26,726 lbs SO_2/DAY (4 STOKERS PLUS CYCLONE)

CASE 2 ET FOR 4 STOKERS & CYCLONE < 26,906 lbs SO_2/DAY BASE

FY-92 MODEL CLEARINGHOUSE MEMORANDA

Date	Region	Subject
10/16/91	IV	Dade County, Florida, Stack Height Increase
11/7/91	VI	Phelps Dodge--Hidalgo Modeling Protocol
11/15/91	VIII	ASARCO E. Helena Lead State Implementation Plan (SIP)
12/04/91	I	Proposal to Use a Non-Guideline Model to Satisfy Intermediate Terrain Policy in New Source Permitting (Pine State Power; Jay, Maine)
12/23/91	VIII	East Helena Lead SIP - Protocols for Design Value Determination, and Model "Verification"
12/26/91	VI	Information Copy of El Paso-Juarez PM-10 Modeling
01/13/92	I	NHARD Modeling Guideline
01/27/92	VIII	East Helena Lead SIP - Protocols for Design Value Determination and Model "Verification"; Clarification of Model Clearinghouse Memorandum of December 23, 1991
03/06/92	I	Modeling Credits for Stack Height Increases and Merging Flue Gases at Taunton Municipal Light Plant
04/06/92	V	Proposal for Resolving the SO_2 State Implementation Plan Revision for Rhinelander, Wisconsin