UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

MEMORANDUM

DATE: MAR 30 1988

SUBJECT: Use of RTDM for Ashland Petroleum Company, Catlettsburg, Kentucky

FROM: Bruce P. Miller, Chief
Air Programs Branch Wayne J Aronson / acting for

TO: Joseph Tikvart, Chief
Source Receptor Analysis Branch (MD-15)

SUMMARY

In 1980, Region IV established SO_2 emission limits for the Ashland Petroleum Company (APC) Refinery based on monitoring. Use of the Valley model had been attempted to determine the emission limits. Due to the high concentrations calculated, APC asked for and was granted additional time to establish a monitoring and meteorological data set for use in establishing an emission reduction strategy. The monitoring consisted of 18 SO_2 monitors and 4 meteorological towers. During the one year data collection, the monitoring network yielded a number of exceedances of the SO_2 standard.

One conclusion from the monitoring study was that the meteorological conditions which lead to all of the higher concentrations were not those associated with the meterological conditions used in the Valley model. The monitoring data showed the high concentrations were all associated with neutral, moderate-to-high wind speeds. One exceedance was also indicated during unstable (three hours) conditions. Stable meteorological conditions produced no high concentrations at any monitor. For this reason, APC presented to Region IV a study that indicated that the Valley model was inappropriate for this location. We accepted the study results and based the emission limit on the monitoring data.

PROBLEM

The present SIP limit for APC is based upon ambient monitoring which by its nature gives dispersion credit for actual stack heights, some of which are greater than GEP. As a result of the good engineering practice stack height requirement that all stacks be analyzed at their GEP heights if they were given credit for height in excess of GEP, we are required to reexamine the APC SIP emission limit.

PROPOSAL

Since the Valley model was determined to be inappropriate for establishing an emission rate at this source and since the GEP rules require that the

SIP be based on modeling, we propose that the RTDM model be used to establish the emission rate for APC. We may ask the consultant to also look at a model comparison study that was done in Region III for the Coors Brewery PSD application. In that model comparison study the APC monitoring data was used to compare model calculations for a number of different models. These models were LAPPES, Short Z, EPA-Cramer, EPA-SSCTM and ESCTM. The analysis showed that the LAPPES model was conservative and was recommended as the refined model for use in the Coors PSD application. That recommendation was in part based on the APC monitoring and modeling demonstration.

The APC study included four meteorological towers. Three towers had a height of ten meters. The fourth tower (M3) on the enclosed map was located adjacent to the refinery at an elevation of 700 feet MSL. This height is about 170 feet above plant elevation, with the instrumentation located so as to approximate as closely as possible the meteorological condition at plume elevation.

Unless there are other factors we need to consider on the locations of a meteorological tower, we would prefer to use the data from the M3 tower. Page 2-9 of the RTDM User's Manual indicates that alternative wind speed values (located at height closer to equilibrium rise height such as on a hill) can be used for the dilution calculation. By allowing the use of the M3 tower data, the analysis could begin immediately rather then wait for an additional 18 months to collect additional meteorological data in the vicinity of the 76 meter stacks. A secondary concern we have is that actual stack heights, exclusive of the 76 meter stacks, range in height from 12 to 56 meters. In the previous study these other stacks accounted for almost all the calculated impact. Therefore we are concerned whether the modeling analysis needs to be split into more than one part with certain sources using a different set of meteorological wind directions and speeds as determined by different aerometer heights.

ACTION

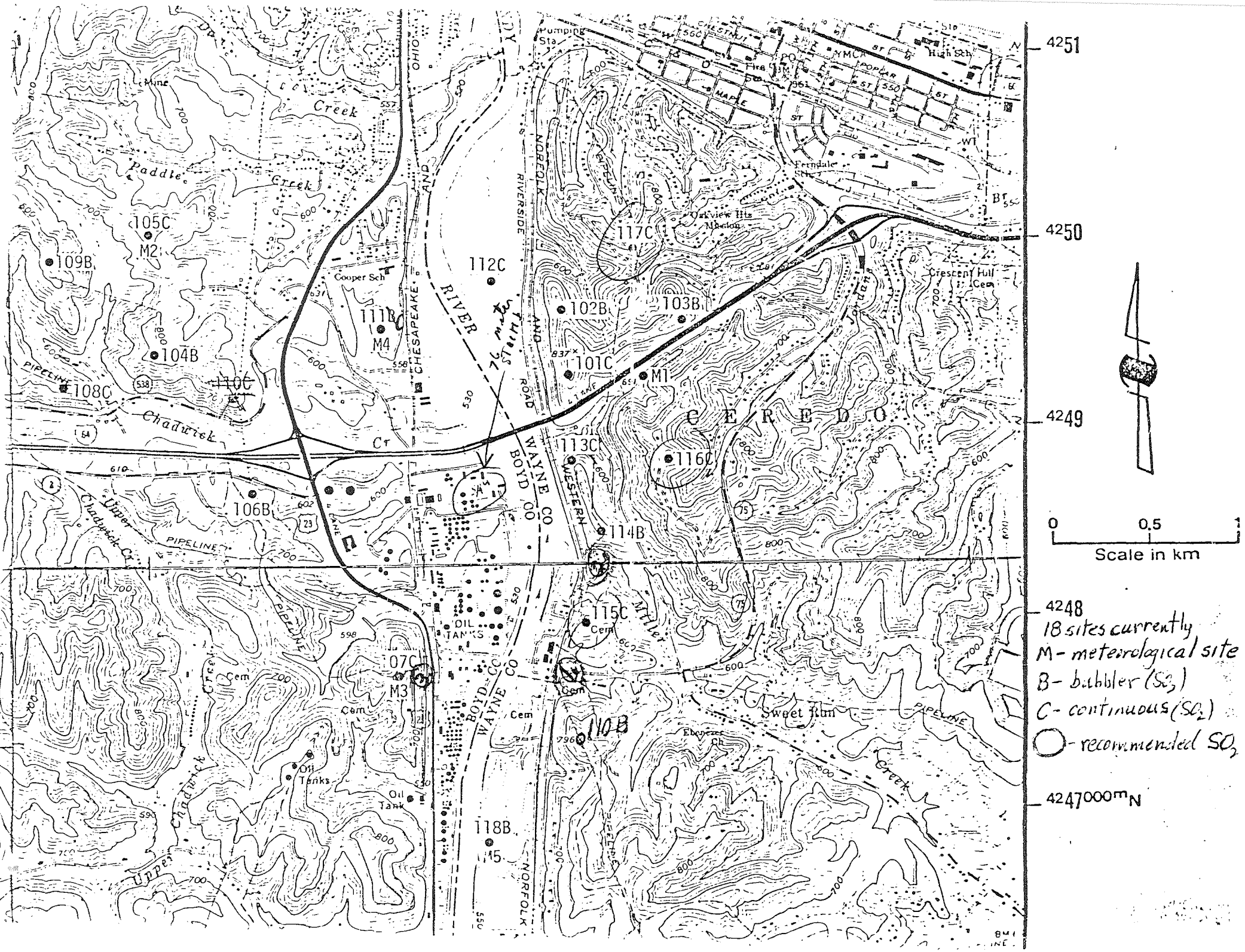
Please advise us by April 18, 1988, on (1) the use of RTDM to establish an emission limit for APC, and (2) whether the M3 meteorological tower is appropriate to model all sources at APC or whether an additional one or two meteorological towers are needed to model the many different stack heights. We would also like any comments you may have on comparing RTDM results with the LAPPES model, in particular whether you believe this is an option which we should pursue. One real concern that we believe needs to be addressed is that RTDM is a single source model. The APC analysis will involve over 20 separate sources. Can RTDM realistically be used for this analysis?

If you have any questions, please contact me or either Kevin McGee or Lewis Nagler of my staff at (FTS) 257-2864.

BACKGROUND

GEP stack height regulations and the Part D SO_2 SIP for Ashland Petroleum Company.

Enclosure



4251
4250
4249
4248
4247000mN
0
0.5
1
Scale in km
18 sites currently
M - meteorological site
B - bubbler (SO_2)
C - continuous (SO_2)
- recommended SO_2
105C
M2
109B
104B
108C
110C
111B
M4
112C
117C
102B
103B
101C
M1
113C
116C
106B
114B
115C
107C
M3
110B
118B
M5
CEREDO
RIVER
WAYNE CO
BOYD CO
CHESAPEAKE AND OHIO
NORFOLK AND WESTERN
RIVERSIDE ROAD
Paddle Creek
Chadwick Cr
Upper Chadwick Cr
Cooper Sch
Oakview Hts Mission
Crescent Hill Cem
Sweet Run
Miller
Oil Tanks
Oil Tank
Cem
PIPELINE
76 meter stack