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

2 JUL 1991

MEMORANDUM

SUBJECT: Review of East Helena Pb Source Apportionment Study

FROM: C. Thomas Coulter, Environmental Scientist
Techniques Evaluation Section, SRAB (MD-14)

TO: Larry Svoboda, Chief
Assessment, Modeling & Emissions Section
EPA Region VIII (8AT-TO)

In response to your May 20, 1991 request, the Model Clearinghouse has reviewed the ASARCO Chemical Mass Balance (CMB) study for the third and fourth quarters of 1990. On June 18 there was a conference call with John Cooper of KEYSTONE/NEA (ASARCO's contractor for the study) to ask questions and get clarification on some issues in the Final Report. Mindy Mohr and Dale Wells of Region VIII were party to that call. There was a followup telephone conversation with NEA's Bryan Patterson (one of the Report authors) on June 24 and with Jeff Sprenger (Quality Control (QC) Coordinator) on June 26, and our comments reflect topics discussed in those conversations. In general, we agree with your staff's assessment that the study met or exceeded the requirements of the April 19, 1990 Apportionment Protocol, and rates well with respect to EPA's "Protocol for Applying and Validating the CMB Model" (May 1987). However, there are several comments/suggestions which would serve to improve the Final Report as a decisionmaking document.

The Introduction and Experimental sections are well written. The sampling and analytical procedures are explained well and the Quality Assurance (QA) protocols appear adequate based on the reported results. In the Results and Discussion section, it would be helpful to reference the arbitrary source numbers from Table 2.4.1 when referring to specific sources (rather than just their names). The full paragraph on p. 62 seems a tedious way to explain that, when the CMB analysis implicates contributions from a source group because of unsuccessful resolution of the individual source profiles therein, the aggregate contribution may be due to any or all of the group members. While the CMB performance statistics depicted in Table 3.3.3 are impressive, footnotes a and b should explain that the days were excluded because they caused the worst statistical performance for the CMB analysis at the respective sites. In spite of the discussion of Table 3.3.6 on p. 68, it is unclear how the values in the "TSP SCE (%)" column

are derived (we were unable to replicate any of the calculations and unfortunately Bryan Patterson was of little help). Derivation of the values in the Pb columns is also poorly explained. For clarification, the header for Table 3.3.6 (and Table 2) should appear as (new features in bold):

CMB Code	Ungrouped Source	TSP SCE ($\mu g/m^3$) [X]	TSP SCE (%)	SCE % Unc[a] [Y/X]	Pb Frac	**Apportioned[b]** Pb ($\mu g/m^3$) [Y]	% Pb [y/4.9892][c]

and the footnote should include:

[b] From Table 3.3.4; note that average apportioned Pb values obtained for each source in this Table differ from those obtained from Table 3.3.4 due to propagation of rounding errors.

[c] 4.9892 is the mean measured Pb value ($\mu g/m^3$) for the 25 highest days at Firehall, 3rd and 4th Quarters (see Table 3.1.2).

Similarly, the header for Table 3.3.8 (and Table 3) should appear as (new features in bold):

CMB Code	Ungrouped Source	TSP SCE ($\mu g/m^3$) [X]	TSP SCE (%)	SCE % Unc[a] [Y/X]	Pb Frac	**Apportioned[b]** Pb ($\mu g/m^3$) [Y]	% Pb [y/2.3004][c]

and the footnote should include:

[b] From Table 3.3.5; note that average apportioned Pb values obtained for each source in this Table differ from those obtained from Table 3.3.5 due to propagation of rounding errors.

[c] 2.3004 is the mean measured Pb value ($\mu g/m^3$) for the 25 highest days at Old Railroad, 3rd and 4th Quarters (see Table 3.1.2).

The respective headers and footnotes for Tables 3.3.7 and 3.3.9 should be modified similarly, though it is not clear why these Tables are included: they are not discussed. A more thorough discussion of these Tables (3.3.6 and 3.3.8) on p. 68 would help. In fact, the explanation of the "Pb Frac" column on p. 68 (second full paragraph) appears misleading. Values in that column are not the "fraction of lead in the source profile" (this sounds like a source strength). Rather, values in this column represent the apportioned Pb at that site from that source averaged over the two quarters. The values in the last column should be explained as the ratio of apportioned Pb (by source) to mean measured Pb at that site over the two quarters, expressed as a percent.

Figures 3.3.1 - 3.3.4 are illustrative and their discussion on p. 73 was good. The apportionments depicted in Figure 3.3.5 may weigh the most in control strategy development as CMB analyses for the Firehall site showed less uncertainty (better fits) than did those for the Old Railroad site. It should be remembered that the "blast furnace fugitives" category to which 20.5% of the ambient Pb is apportioned consists of four potential sources (Group 14 in Table 3.2.1). Future reconciliation with dispersion modeling may help better resolve this, as well as much of the fitting difficulty with the sinter storage baghouse stack (#10) at the Old Railroad site discussed on p. 73.

The appendices to the Report are quite thorough. The QA results reported in Appendix A are consistent with NEA's Standard Operating Procedure (SOP) for elemental analysis of air filters by X-ray fluorescence (SOP #010, January 1991). In Appendix B, the ambient analytical reports are good but ought to have appropriate headings on each page bracketing results from X-ray Fluorescence, Ion Chromatography, Thermal/Optical Reflectance, and Inductively Coupled Argon Plasma Spectroscopy methods. In Appendix C, a Table of Contents such as the following would be helpful:

Source Category	Individual Sources*	Page
Material Handling	30-43, 61-64, 66, 68, 69	C.9
Wind-blown Dust	22-25, 67	C.34
In-plant Road Dust	15-21, 26-29, 57, 65	C.41
East Helena Area Road Dust	44-50	C.57
Building Sources	51-56, 58-60	C.65
PSDS Point Sources - Teflon®	1-8	C.76
PSDS Point Sources - Quartz	1-8	C.105
Other Point Sources	9-14, 80	C.134

* See Table 2.4.1 of Final Report

It is unclear when the source samples for which the analyses are reported in this appendix were taken. The CMB results reported in Appendix E are generally very good.

Since we have seen no dispersion modeling results we can offer no comments from that perspective. We understand the reconciliation process by NEA, Inc. is in progress.

In summary, the receptor modeling seems to have been handled well. I hope these comments are helpful. If you have any questions, please feel free to call me at FTS 629-0832.

cc: J. Dicke
J. Tikvart
D. Wilson

FY 91 MODEL CLEARINGHOUSE MEMORANDA

Date	Region	Subject
1/7/91	V	Pit Retention from Stone Quarries
1/8/91	IV	Meteorological Data for the Ashland Petroleum Company GEP Modeling Analysis
1/31/91	IV	Georgia Power Plant Yates GEP Modeling
2/8/91	VIII	Revised ASARCO, East Helena Modeling Protocol
3/4/91	V	Particulate Matter from Surface Coal Mining
3/5/91	II	New Jersey DEP Comments on Valley Model
3/15/91	II	Use of CTDMPLUS in the Virgin Islands Water and Power Authority PSD Application
4/15/91	VIII	Revised ASARCO, East Helena Modeling Protocol
4/26/91	V	Use of Nonguideline Versions of Urban Airshed Model
5/8/91	I-X	PM-10 State Implementation Plan Attainment Demonstration Policy for Initial Moderate Nonattainment Areas
5/24/91	VIII	Review of Chemical Mass Balance (CMB) Analysis for the Communities of Polson and Ronan, Montana
6/24/91	IV	On-Site Meteorological Data Collected at Ashland Oil Refinery in Catlettsburg, Kentucky
7/2/91	VIII	Review of East Helena Pb Source Apportionment Study