Department of Energy
Washington, DC 20585

July 29, 2004

Program Manager for Particulate Matter
National Center for Environmental Assessment
B243-01
U.S. Environmental Protection Agency
Research Triangle Park, NC 27711

Dear Sir/Madame

In its June 23, 2004, Federal Register Notice, Environmental Protection Agency (EPA) announced the availability of Chapters 7, 8, and 9 of the Air Quality Criteria Document of Particulate Matter for public review and comment. These chapters present health information concerning ambient particulate matter concentrations and the integrative synthesis for the document. We have reviewed these chapters and offer the following general and specific comments on the content of Chapter 7; these changes should also be reflected in the integrative chapter of the document, Chapter 9.

Chapter 7 presents information on the toxicology of particulate matter. The chapter provides considerable information on this subject, including recent studies and data that is useful, informative and well-organized. Specifically, evidence is presented about the mutagenicity of the combustion products of different energy types. We note here that given the high dosages used in assessing possible mutagenicity in bacteria, that many chemicals might be seen as mutagenic in such tests, but not be harmful at the much lower levels found in many "real world" situations; however, if a substance does not have mutagenic properties in such tests, it is very unlikely to be mutagenic or carcinogenic at the smaller concentrations to which people might be exposed. There are two areas where the chapter should be modified:

1. *The degree of mutagenicity of air emissions from coal combustion in the United States is not accurately reflected in the Interpretive Summary of Chapter 7.* Although data on the mutagenicity of air emissions from coal combustion at U.S. power plants is provided in Chapter 7, these data are not reflected properly in the Interpretive Summary of the chapter. These data include information on the primary air emissions from coal combustion and on the comparison with other fossil fuels.

Chapter 7 presents data from studies conducted with soot from incomplete combustion of coal in residential units in China without the use of emission control equipment. These studies show mutagenic effects on laboratory bacteria. The data shows that PM levels of emissions from residential coal burning in such

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homes is up to tens of milligrams per cubic meter, about 1,000 times typical annual ambient levels in the U.S.

Similar laboratory studies analyzing virtually completely combusted, highly controlled air emissions from the burning of coal at U. S. power plants equipped with conventional emission control equipment, also cited in Chapter 7, do not show these mutagenic tendencies. Because conventional coal units represent about 98 to 99 percent of U.S. coal-fired electricity capacity, these data indicate that almost all primary air emissions from U.S. facilities are not mutagenic.

In the Interpretive Summary for Chapter 7, the results of the Chinese study, rather than the U.S. study findings appear to direct the conclusions concerning the mutagenicity of primary air emissions from coal combustion. Because the Chinese model of residential coal use does not apply to exposure scenarios in the U.S., the Interpretive Summary in Chapter 7 and the subsequent discussion in Chapter 9 should rely on the findings based on the usage of coal in the United States rather than in China in assessing mutagenicity of coal PM emissions to air. Thus, we strongly recommend that any discussion of health effects of coal as used in the U.S., be based upon studies of the fuel as typically used in the U.S. Because coal is used primarily for electricity production in the U.S., and because there is virtually no residential use of coal in the U.S. any longer, a discussion of mutagenicity of coal based upon its residential use in China, with poor combustion and no controls, should be dropped from the Criteria Document as irrelevant to coal use in the U.S.

Chapter 7 also presents information concerning the mutagenicity of primary air emissions for other fossil fuels as used in the U.S., including diesel fuel, wood, and gasoline, in comparison to the mutagenicity for coal's primary air emissions. The information indicates a greater degree of mutagenicity for diesel fuel, wood and gasoline primary air emissions than for similar emissions from coal combustion in the U.S. Because the evidence presented in Chapter 7 shows extensive mutagenicity of PM emissions from wood and gasoline, but not of PM emissions from coal as used in the U.S., the conclusion that particulate matter emissions from coal are more mutagenic than similar emissions from the combustion of wood or gasoline are not supported by the information provided. The relative rankings of mutagenicity for the U.S. should be restated to show that coal is the least carcinogenic of the four fuel types, based on the information presented in the body of Chapter 7, and these conclusions should also be included in Chapter 9.

2. *The information on the general toxicology of secondary sulfates and acid aerosols provided in the body of Chapter 7 should be included in the Interpretive Summary in Chapter 7 and in Chapter 9.* Based on a 37-page long review article of over a hundred studies concerning the health effects of secondary sulfate and nitrate compounds and acid aerosols by Schlesinger and Cassee, Chapter 7 states that "exposure to environmentally relevant levels of these particles has little

biological potency". Because these findings, and this study, are far more comprehensive that the two studies cited in the acid aerosol section of the Interpretative Summary of Chapter 7, these findings should be incorporated there and in Chapter 9.

Thank you for this opportunity to provide comments on the draft Criteria Document. If you have any questions concerning our comments, please contact Mitchell Baer at (202) 586-5167.

Regards,

Vincent DeVito
Acting Assistant Secretary
Office of Policy and International Affairs