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RESPONSE TO EPA/CDPHE COMMENTS RECEIVED DECEMBER 13, 1995 ON EXPOSURE PARAMETERS IN THE EXPOSURE FACTOR TABLES TRANSMITTED JUNE 15, 1995

Dear Mr. Rehder, Mr. Schieffelin, Ms. Chaki:

The purpose of this letter is to address the comments received December 13, 1995 on DOE's Exposure Factors Tables (EFTs) transmitted June 15, 1995. As discussed during the meetings held with your staff during the development of the EFTs, these parameters are intended as a template for OU risk assessment calculations. As considerable meeting time, discussion and comment incorporation time was expended to develop the June 15, 1995 version of the EFTs, DOE did not anticipate additional comments at this time. Several OU's have already developed draft RI Reports that have risk assessments based on the exposure parameters contained in the EFTs. Considering the timing of the comments, the conservatism inherent in the current parameters and the scientific defensibility of the existing parameters, DOE proposes very few changes to the current EFTs. The following text addresses the individual comments contained in your letter.

Page 1, paragraph 2 - As a result of a meeting attended by representatives of EPA, CDPHE, DOE and EG&G on December 12, 1994, site specific information on the PM10 fraction of total suspended particulate (TSP) collected at air monitoring stations at RFETS was provided to the agencies. The provided information included calculation of the 5-year mean PM10 concentration (PM10 = 0.46). All parties agreed that these values be used as the CT and RME parameters for respirable fraction. The RME value was inadvertently given as 0.36 in the exposure factors tables transmitted to the agencies on June 15, 1995. The EFTs have been corrected to reflect the PM10 fraction of total suspended solids = 0.46.

Page 1, paragraph 3 - DOE agrees that the use of the depositional factor is inappropriate if the respirable fraction is used or if suspended particulate are expressed as PM10. This parameter was added to the tables in response to a request by EPA representatives at the December 12, 1994 meeting. The depositional factor will be removed from the exposure factor tables and will not be used in any risk calculations.

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Page 1, paragraph 4 - DOE supports the use of the CT values for soil ingestion by industrial and office workers as given in the EFTs. These values are based on information from peer reviewed publications (Finley and Paustenbach, 1994 and Gephart et. al. 1994). In meetings held on December 12, 1994 and February 22, 1995, the CT values were not disputed by representatives of EPA and CDPHE. Comments received by the agencies on the exposure TMs for OUs 5 and 6 and on the OU 2 RFI/RI report did not comment on these parameters. These factors will not be changed in the EFT because they are reasonable, peer developed estimates of CT values.

Page 2, paragraph 2 - EPA guidance on calculation of intakes for incidental ingestion of soil includes the use of the parameter "fraction ingested from contaminated source". In RAGS (EPA, 1989), guidance is given to "consider contaminant location and population activity patterns". In the EPA draft document of CT and RME values (EPA, 1993) it is "advocated that this factor be given consideration" (EPA's italics). Based upon EPA's guidance on the subject DOE does not accept the EPA Region VIII and CDPHE recommendation to remove this parameter from the EFTs.

Page 2, paragraph 3 - DOE disagrees that use of a soil matrix effect to estimate absorption of a compound through the gut wall is inappropriate. EPA approved toxicity criteria (reference doses and cancer slope factors) are derived from studies in which the compound is administered in a readily absorbed form (e.g., food, water, corn oil). For virtually all compounds considered in RFETS risk assessments, absorption of these compounds when ingested in a soil matrix would be expected to be considerably less than that from a diet-based matrix. Nevertheless, assumptions concerning soil matrix effects in RFETS risk assessments have generally defaulted to 1 (100% absorption) when the data support the assumption or information is insufficient to support an assumption of lower absorption. For compounds where literature-based information indicated decreased absorption, a conservative assumption of 0.5 (50% absorption) was assumed, even when literature-based values supported estimates of much lower absorption. For example, in the OU6 RFI/RI Human Health Risk Assessment, a matrix effect for metals of 0.5 was conservatively assumed. In a publication on metals bioavailability, EPA found the matrix effect for metals in the diet was between 0.01 and 0.03 (EPA, 1990). It should also be noted that use of the 0.5 matrix effects, in the EFTs, is only applied to a single compound (Aroclor 1254) that contributed significantly to overall risk. There is acceptable precedence for this assumption since the EPA assumed an "ingestion absorption fraction" from soil of 0.3 in developing its PCB spill policy (Labieniec et al. 1994).

EPA and CDPHE insistence that conducting RFETS-specific bioavailability studies in live animals or geochemical speciation studies are required in order to apply a factor for matrix effects is unreasonable. Bioavailability studies require large amounts of time and resources and would be required for each contaminant of concern or chemical class. Geochemical speciation studies would be useful for metals, but speciation can generally be inferred with confidence from literature derived data when applied to RFETS-specific data on soils. EPA Region VIII has successfully, over several years, performed bioavailability studies on specific metals (e.g. arsenic). However, to undertake such studies on multiple compounds, given the generally low calculated risk from these compounds at RFETS, would not be a responsible use of limited funds.

Due to the considerations summarized herein, DOE considers the use of the matrix effect as both scientifically defensible and conservative. Therefore, the matrix effect values, as stated in the OU specific baseline risk assessments, will not be changed.

Steven W. Slaten
Interagency Agreement Coordinator

Enclosure

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REFERENCES

EPA. 1989. Risk Assessment Guidance for Superfund, Vol. I, Human Health Evaluation Manual (Part A). EPA/540/1-89/002

EPA 1990. Metals Bioavailability and Disposition Kinetics Research Needs Workshop. Office of Research and Development, Research Triangle Park.

EPA. 1993. Superfund Standard Default Exposure Factors for the Central Tendency and the Reasonable Maximum Exposure (Draft). EPA, Washington, D.C.

Finley, B. and D. Paustenbach. 1994. The Benefits of Probabilistic Exposure Assessment: Three Case Studies Involving Contaminated Air, Water, and Soil. Risk Analysis, Vol. 14:1, pp. 53-72.

Gephart, A., J.G. Tell, and L.R. Triemer. 1994 Exposures Factors Manual. Journal of Soil Contamination. 3:1, pp. 47-117

Labieniec, P. A., Dzombak, D. A., and Siegrist, R. L. 1994. Risk Variability from Uniform Soil Remediation Goals for PCBs. Journal of Environmental Engineering. Vol. 120, No. 3, May/June, 1994.

As suggested in your letter, if EPA and CDPHE would still like to meet and discuss these comments, please call me at 966-4839.